Reviewing the Evidence on Land: An Overview of Land Impact Evaluation Literature and Lessons Learned*

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Abstract

This paper...

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1 Introduction

Tenure security has long seemed the perfect marriage between economic theory and an actionable economic policy. Secure tenure over land is expected to motivate economic effects by facilitating investments, efficient land transfers and allocation, and credit access through the collateralization of land (Besley 1995; Brasselle, Gaspart, and Platteau 2002). Individuals and firms are less willing to invest in their property and land, goes the theory, when they fear it may be taken or unable to benefit from investments made. By mapping and documenting their tenure through legal title or official recognition of customary rights, providing them the ability to transfer land and related investments, and effectively administering and allocating land, a government can reassure landholders that the fruits of their labor will be theirs to enjoy. Once aware of and secure in their land use (ownership and transfer) rights, citizens and investors will make sustainable investments – building irrigation, improving buildings and structures, connecting to utilities, guarding forests, applying fertilizer, planting trees and perennials, renting or transferring underutilized land and so on – that will lift them out of poverty.

The importance of land tenure security to economic development has risen in prominence over the last decade. In 2012, United Nation (UN) member states at a special session of the Committee on World Food Security (CFS), endorsed the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGTs), highlighting the key role land plays in food security, environmental sustainability and the eradication of poverty. That same year, the Millennium Challenge Corporation (MCC), UN-Habitat and the World Bank founded the Global Land Indicator Initiative (GLII) to establish globally comparable land indicators[1]. In 2013, the Global Donor Working Group on Land (GDWGL) was formed to improve donor coordination and knowledge exchange on land governance interventions and jointly advocate on land issues in international policy processes. Then in 2015, UN Member states adopted the Sustainable Development Goals (SDGs), including the first stand-alone indicator on land – 1.4.2 on secure land tenure under Goal 1 to eradicate poverty[2].

International development organizations are spending vast sums on land tenure and governance reforms. The World Bank has $1.5 billion in commitments on land tenure, land systems and geospatial infrastructure[3]. Similarly, the United States government's Millennium Challenge Corporation (MCC) in the last 15 years has funded approximately $500

1. Two of the GLII indicators eventually were adopted as SDG 1.4.2 on secure tenure.

2. The importance of land was also highlighted in the SDGs on gender equality, sustainable cities, food security and the environment.

3. https://www.worldbank.org/en/topic/land2

million in land tenure and governance [4], and the United States Agency for International Development (USAID) is currently working across 23 countries to strengthen property rights and land governance systems[5] including over $530 million[6] in funding over the last 8 years.

Considering the rising importance of land and related investments, it is important to understand their effectiveness and impacts. Specifically, what outcomes have we seen from land interventions and how and in what contexts can land contribute to international development goals? Data from monitoring and evaluation allow us to track and understand the performance, outcome, and impact of these land interventions. Monitoring efforts, qualitative studies and analysis of correlations can provide snapshots through time of trends in key land variables, while impact evaluations can provide evidence of causation or understandings of drivers of changes. For this reason, impact evaluations are crucial to measuring the effectiveness of land interventions in achieving expected outcome streams and related impacts on international development goals.

Recently, the findings from new land sector impact evaluations have been released, adding additional evidence, as well as expanding the substance and methodologies of land sector evaluations. These latest land evaluations have improved designs, expanded exposure periods, moved beyond household surveys, added wives/spousal modules, and triangulated data sources. A handful of land interventions have even supported the rollout of randomized controlled trials (RCTs), showing that RCTs can be successfully conducted in the land sector.

Building on previous systematic reviews, we explore the findings of the latest impact evaluation evidence on land while adding a new perspective on the evidence to date. Our analysis differs from previous systematic reviews across several dimensions. First, we restrict our literature review to counterfactual-based impact evaluations, including those from recently published evaluation reports. Second, we include evaluations assessing urban and peri-urban interventions in addition to those in rural areas. Third, we use the Global Land Logic Model[7] by which to understand the evidence around the theory of change for land. Fourth, in addition to methodological issues, we interrogate the contextual and programmatic factors that led to the conclusions found within the land impact evaluation studies. We explore which land tenure and governance interventions/activities in what types of envi-

4. https://www.mcc.gov/sectors/sector/property-rights-and-land-policy

5. https://www.usaid.gov/land-tenure

6. This excludes funding for protection of forests and related land tenure support

7. The Global Land Logic Model was developed in 2018 as part of a joint initiative between the International Fund for Agricultural Development (IFAD) and UN Habitat, and in consultation with the GDWGL, to improve the tools needed to evaluate land tenure and governance interventions. The model was founded on evidence to date and includes inputs from consultations with evaluators and land community donors, researchers, and civil society.

ronments contribute to key development outcomes. We examine not only the outcomes found but the success of implementation and sustainability of outputs and shorter-term outcomes and the context in which the outcomes were found. Finally, we look at potential evaluation issues that may have hampered the ability to capture results. Hence, we look at not only the outcomes but all findings and the drivers behind them.

The paper commences with a brief overview of the Global Land Logic Model, which illustrates the theory of change for land from types of land interventions to expected outcomes and impacts. We then discuss the methods used to select and classify evaluations and findings. Next, we detail the methodological issues faced by evaluations. From there the paper discusses findings using the expected outcomes of the Global Land Logic Model; this is followed by an analysis of why the findings on a cursory view do not meet expectations. Finally, we conclude with a discussion of policy implications, including guidance and recommendations for improving future land sector evaluations.

2 Theory of Change: The Global Land Logic Model

The Global Land Logic Model, below, lays out the theory of change from land activities (legal reform, property rights, capacity building, awareness, and land use planning) to expected shorter, medium, and longer-term outcomes. Arrows link the group of activities and shorter-term outcomes that are associated with key medium and longer-term outcomes[8].

The logic makes a few key assumptions, which are important to take into consideration in evaluations as well:

1. Land is the main constraint to the expected outcome.

2. Activities are successfully implemented with outputs and shorter-term outcomes sustained.

3. The intervention addresses all first-stage inputs/activities. If these are not addressed by the program, the assumption is that these are already functioning effectively and are not a constraint to achieving land outcomes.

4. The linked boxes are interdependent - progression to higher level outcomes is dependent on linked shorter-term outcomes being part of the intervention or already efficient.

8. Often these activities are not standalone but conducted in tandem with other land activities or as part of a larger agriculture or infrastructure intervention. Further details on the Global Land Logic Model can be found in the "Guidelines for Impact Evaluation of Land Tenure and Governance Interventions". https://gltn.net/download/guidelines-for-impact-evaluation-of-land-tenure-and-governance-interventions-2/.

5. There is a need to differentiate beneficiary impacts and pathways for the specific intervention and country context, including the land governance system, history of statutory versus customary land rights, rural/urban/peri-urban context, baseline perceptions of tenure security, etc.

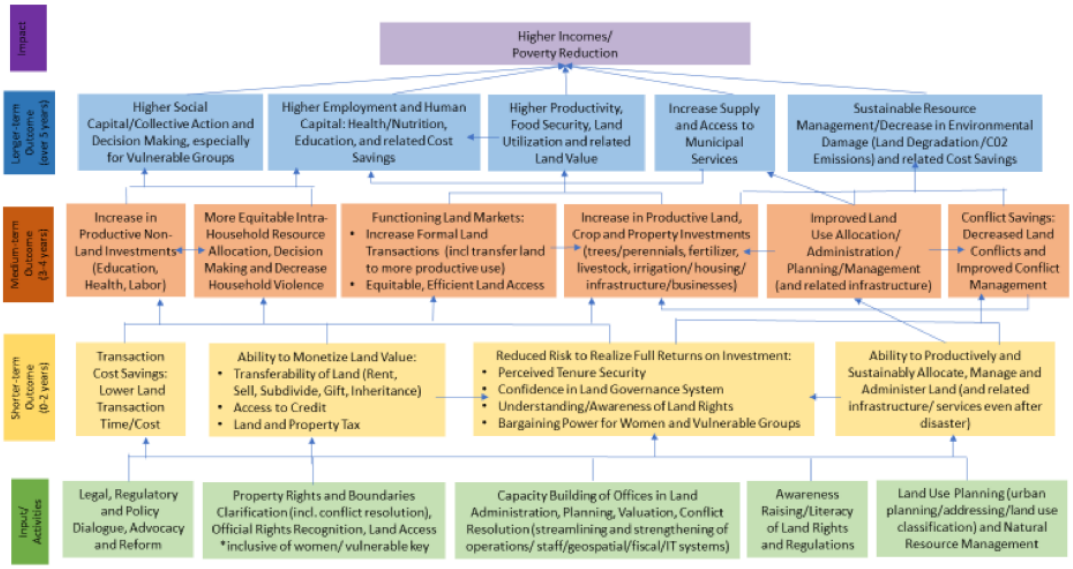

Figure 1: Global Land Logic Model (Lisher 2018)

3 Literature

A few systematic reviews of the literature have summarized key research findings of land research and evaluations in an effort to understand how land tenure security and land governance reforms link to key outcomes like credit, investment, agricultural productivity, women's empowerment and income. These reviews generated important learnings for the land sector and influenced donor decisions on how to invest in and evaluate the sector. These reviews also highlighted significant evidence gaps, mixed empirical results, and emphasized that the magnitude and significance of effects are context dependent.

For rural land interventions, Lawry et al. 2017's systematic review of the evidence on rural land interventions found evidence linking land titles[9] to investment, agricultural productivity and incomes in Asia and Latin America but found weaker evidence in Africa. The authors theorized that the differences in results could be due to the relatively strong customary tenure arrangements in Africa or smaller farms compared to Asia and Latin America. This

9. The impact evaluations all focused on freehold title.

highlighted that context is key, and land titling may not affect all environments the same. Hence, if traditional land tenure arrangements provide sufficient levels of tenure security, bringing land into the statutory system may not catalyze significant behavior changes in investment and land use.

Higgins et al. 2018 expanded upon Lawry's systematic review with the latest land literature and a focus on the theory of change. The authors did not find similar regional differences and pointed to positive effects on productive and environmentally beneficial agricultural investments (soil conservation) and female empowerment, although there was a lack of sufficient evidence to support links with productivity, access to credit and income. The study theorized this might have been due to lack of longer-term exposure periods[10] or lack of understanding contextual factors while noting the dearth of evidence on perceptions of tenure security.

Other studies have noted some of the gaps and lessons learned in land evaluations, pointing to issues around short exposure periods, over-dependence on household surveys which are often not sufficiently powered or ineffective in capturing key effects on transaction costs, land markets and mortgages. These studies also highlight the narrow focus on formalization of land rights with little empirical evidence on effects from other key land governance activities like legal and policy reform, institutional capacity building, and public outreach (Lisher, Higgins, and Bowen 2017; Lisher 2018).

4 Methods

4.1 Focus on Impact Evaluations

The analysis in this chapter is based on 25[11] experimental and quasi-experimental land tenure and governance impact evaluations. These include both interim and endline studies. The list of evaluations included can be found in Figure 2 (below). We selected studies based on the following criteria: i) evaluated the impact of a land-related intervention or reform with the ultimate objective of enhanced welfare and economic development; ii) employed an experimental or quasi-experimental design; and iii) identified a credible counterfactual group to account for selection bias and other potential confounders of program impact. We categorize these evaluations by research design, length of exposure period, intervention type, location, land governance environment, implementation fidelity and sustainability. We

10. The period of time from the treatment to measurement of outcomes. The time of treatment is not when the treatment/intervention begins but rather when the key output inciting behavior change occurs.

11. The Mongolia PURLS evaluation is divided into two studies (Phase 1 and Phase 2) for the purposes of this paper due to the distinct evaluation methodologies.

take a closer look at recently released impact evaluations of donor funded interventions that have employed RCTs, triangulated data across data sources, or incorporated longer exposure periods and the measurement of both interim and longer-term effects. We do not include studies that rely on cross-sectional endline data, except in the case of RCTs or spatial discontinuity designs.

4.2 Categorization of Intervention and Contextual Factors

We classify evaluations by the evaluation method, intervention, and contextual factors. Specifically, evaluations are categorized by:

- *Intervention Type* We categorize whether the intervention involves systematic registration of land rights, policy and institutional strengthening to catalyze sporadic land registration, mapping and natural resource management or other interventions to strengthen land tenure. We also pay attention to whether the intervention focused on individual land parcels or at the level of the community, such as village level mapping. Finally, we consider whether the intervention is a standalone land sector intervention or supports a larger agricultural or irrigation intervention.

- *Location* We note whether the interventions evaluated were implemented in rural, urban, and peri-urban areas.

- *Land Governance Environment* We note the type of land (customary, state) and whether the provision of formal land rights is a common, new, or rare occurrence in the area prior to the intervention taking place. If this is the first-time land rights in the area are being brought into the statutory system and introduced to a population, the curve for demanding, understanding, processing, and transferring those rights is steep.

4.3

We chart the results of the evaluations across the Global Land Logic Model, including positive, null and negative effects. When possible and noteworthy, we specify any differences in outcomes due to intervention type, context, or evaluation factors.

5 Sample Overview

5.1 Interventions Under Evaluation

In our sample, the majority (17) of land sector impact evaluations can be categorized as an assessment of systematic land registration and cadaster work in the context of legal reform and formalization initiatives. Four studies focus on the impact of sporadic registration. In the growing body of evidence, we do find a scattering of studies (4) focused on other land sector interventions, including strengthening community level tenure or customary land rights via land demarcation, land use planning, and legal or institutional reforms and strengthening combined with public awareness efforts to support sporadic demand for titling. Six studies include an evaluation of land titling and related mapping of land rights, as well as components of larger agricultural and irrigation interventions.

Shifting away from individual or household level titling initiatives, the review finds some important benefits from interventions focused on interventions at the community level. We find that community level demarcation and land use planning in Benin resulted in improved perceptions of tenure security and increased investments. Similarly, titling for indigenous communities in the Amazon resulted in improved forest conditions, and the provision of customary documentation led to significant improvements in tenure security in Zambia, and a governance program in Liberia led to associated improvements in governance outcomes.

Study	Description	Reference
Argentina Law 10.239(U)	Law N° 10.239 in 1984; Systematic registration, Legal reform	Galiani and Schargrodsky 2010, 2004
Argentina Forest Law(R)	2007 Forest Law 26.331; Subnational land use planning	Nolte et al. 2017
Benin ATL (R)	MCC Benin Access to Land Project; Sporadic registration; Institutional capacity building; Land use planning	IPA 2019; Goldstein 2015; Wren-lewis 2020
Brazil CAR (R)	Rural Environmental Registry; Environmental registration for private landholders	AlixâGarcia et al. 2018
Brazil PPTAL (R)	Brazil Indigenous Lands Project; Systematic registration	BenYishay et al. 2017
Burkina ADP (R)	MCC Burkina Faso Agriculture Development Project; Systematic registration; extension training, irrigable land, agricultural inputs	Ksoll et al. 2021
Burkina RLG (R)	MCC Burkina Faso Rural Land Governance Project; Institutional capacity building; Legal reform	Zhang, Borelli, and Techapaisarn-jaroenkij 2015
Ecuador PSUR (R)	USAID Ecuador Programa de Sostenibilidad y Union Regional Sur; Systematic registration (community lands)	Buntaine, Hamilton, and Millones 2015
Ecuador AMAZNOR (R)	IADB Sustainable Development of the Northern Boundary Amazonian Region of Ecuador; Conservation requirements	Holland et al. 2017
Ethiopia ELTAP/ELAP(R)	USAID Ethiopia Land Tenure Administration Project/Ethiopia Land Administration Project (Midline Evaluation);Systematic registration (second level certification)	Persha et al. 2016
Ethiopia FLLC (R)	Ethiopia - First Level Land Certification; Systematic registration (use rights); Institutional capacity building	Deininger, Ali, and Alemu 2011
Ghana LTFA (P)	MCC Ghana - Land Tenure Facilitation Activity (Interim and Endline Evalution); Systematic registration	Agyei-Holmes et al. 2020
Lesotho LARP (U)	MCC Lesotho - Land Administration Reform Project (Endline Evaluation); Systematic registration; Legal reform; Institutional capacity building	DESCI 2020
Liberia CLPP (R)	Liberia - Community Land Protection Program (Midline Evaluation); Strengthening community governance; by-laws	Marple-Cantrell et al. 2017; Hartman et al. 2021
Malawi CBRLD (R)	WB Malawi's Community Based Rural Land Development Project; Systematic registration; Increase the size of land cultivated, farm inputs, extension services	Mendola and Simtowe 2015
Mongolia PURL I (P)	Mongolia (MCA-M) Peri-Urban Rangeland Project; Systematic registration (formal leases, collective groups); extension services, infrastructure	IPA and USDA 2018
Mongolia PURL II (P)	Mongolia (MCA-M) Peri-Urban Rangeland Project; Systematic registration (formal leases, collective groups); extension services, infrastructure	IPA and USDA 2018
Nicaragua (R, P, U)	Titling; Systematic registration	Liscow 2013
Peru COFOPRI (U)	Peru Committee for the Formalization of Private Property (COFOPRI); Systematic registration	Field 2005, 2007; Field and Torero 2006
Peru Title (R)	Peru - Indigenous Titling; Systematic registration	Blackman et al. 2017
Rwanda LTR (R)	Rwanda - Land Tenure Regularization; Systematic registration	Ali, Deininger, and Goldstein 2011
Senegal Delta LTSA (R)	Senegal Delta Activity/Land Tenure Security Activity (Interim Evaluation); Sporadic registration; Irrigation infrastructure; Institutional capacity building	Coen et al. 2019
Tanzania LTA (R)	Tanzania - Land Tenure Assistance Activity(LTA); Systematic regisration; Institutional capacity building	Persha and Patterson-Stein 2018
Vietnam 1993 Law (R)	Vietnam 1993 Land Law; Sporadic registration, Legal reform	Do and Iyer 2008
Zambia TGCC (R)	USAID Zambia - Tenure and Global Climate Change (Midline Evaluation); Customary certification, extension, agricultural inputs	Huntington and Shenoy 2021; Huntington et al. 2018

5.2 Location

Most of the studies covered in our review focus on rural land (mostly customary systems) in Africa (18). Although still small, there is a growing literature on impacts in urban and peri-urban environments. Six (6) studies cover urban or peri-urban areas, including land interventions in Ghana, Lesotho, and Mongolia, and studies focused on squatters (Argentina) and urban slums (Peru), and one study covers national titling in Nicaragua. With the exception of an study in Benin, studies of the environmental outcomes of land tenure reform are focused in Latin America.

5.3 Land Governance Environment

We find a large amount of variation in the land governance environment across studies. Often in rural areas there is the introduction of a new law or introduction of statutory rights in an area largely governed by customary authorities, while in the urban and peri-urban areas, there are often existing statutory rights. For example, in the Burkina Rural Land Governance (RLG) and Benin ATL projects, local land administration offices were established and strengthened to allow the demand and issuance of individual land use certificates recognizing customary land use rights within a traditional land governance environment where local chiefs administered customary land rights. On the other hand, the Mongolia PURLS Phase I and Phase II projects were located in peri-urban areas where leases over herders' winter shelters were administered on state land.

Figure 2: Summary information

5.4 Research Design

Land impact evaluations often face a number of methodological and data challenges. Indeed, most land sector impact evaluations rely on uneven rollout of reforms and interventions across geographic areas with notable differences in observed characteristics. Selection issues surround the initial beneficiaries of these reforms.

In the last couple of years, we find a number of improvements in the rigor of impact evaluation designs, including the first[12] and a growing number of land RCTs[13]. Most studies

12. The Benin PFR evaluation of the MCC Benin Compact's Access to Land Project by the World Bank's Gender Innovation Lab was the first large scale land sector RCT.

13. MCC also began land RCTs in Mongolia (urban), Mali and Lesotho but these were cancelled. Mongolia (urban) was cancelled due to the evaluation becoming underpowered due to contextual factors and low site-

(20) use a quasi-experimental method such as DID, geographic discontinuity, natural experiments, or DID combined with matching; five (5)[14] are RCTs. Several projects are defined by intervention packages that combine land sector strengthening activities, such as titling, documentation and land administration capacity building, with activities designed to promote investment and productivity. With the exception of the cross-cutting TGCC Zambia RCT, these evaluations cannot disentangle whether positive downstream effects on investment, productivity and welfare outcomes are due to the impact of agricultural or infrastructure programming versus efforts to strengthen property rights.

Although land sector activities were initially seen as unable to randomize, randomization has been successfully implemented, and, in some cases, has helped to depoliticize land rights allocation. In Benin and Mongolia, projects were able to gain buy-in to randomize the beneficiary selection process of land interventions via local lotteries. These were seen as creating a "fair" structure to who would receive the village level land mapping and planning in Benin and private land lease rights, wells and rangeland/herd management support in Mongolia.

Sampling

Sampling continues to pose a challenge for land sector evaluations. For evaluations that rely on large-N surveys, there are a growing number of evaluations that rely on parcel managers to answer field or parcel specific questions. However, most evaluations sample the household head without regard to parcel managers, spouses, or businesses/rentals. Lack of sampling of these key groups has made it difficult to understand effects for those beneficiaries and has reduced the accuracy of data on production and investment variables, in cases where parcels are not managed by the household head. A focus on male household heads has limited our understanding of program impacts for women, given the dearth of dedicated wives/spousal surveys.

Additionally, there are a number of cases where the area (or households) sampled by enumerators has not corresponded to the intervention areas (or to households receiving a particular treatment). This has been the case for several titling and sporadic registration initiatives. These discrepancies reduce the power of the study to detect effects on key outcomes. These problems of misaligned samples are caused by a number of factors, including a change of location by the intervention, loss of controls due to program targets needing to

specific titling by the project. Mali was restructured into a performance evaluation via a desk study following a political coup. Finally, the Lesotho RCT - following problems with the quality of the baseline data and the need to meet performance targets - was restructured into a quasi-experimental design.

14. RCTs conducted for Benin ALP and Mongolia PURLS each have two studies covering interim and endline results.

be reached, problems with implementation fidelity, or unclear geospatial boundaries of the intervention zones.

Exposure Period

Eight evaluations in our sample measure short exposure periods of 0-2 years. Nine studies (9) in our sample provide analysis of treatment impacts in the 3 to 5 year range. Eight studies (8) studies in our sample provide analysis of treatment effects for 5+ years of exposure.

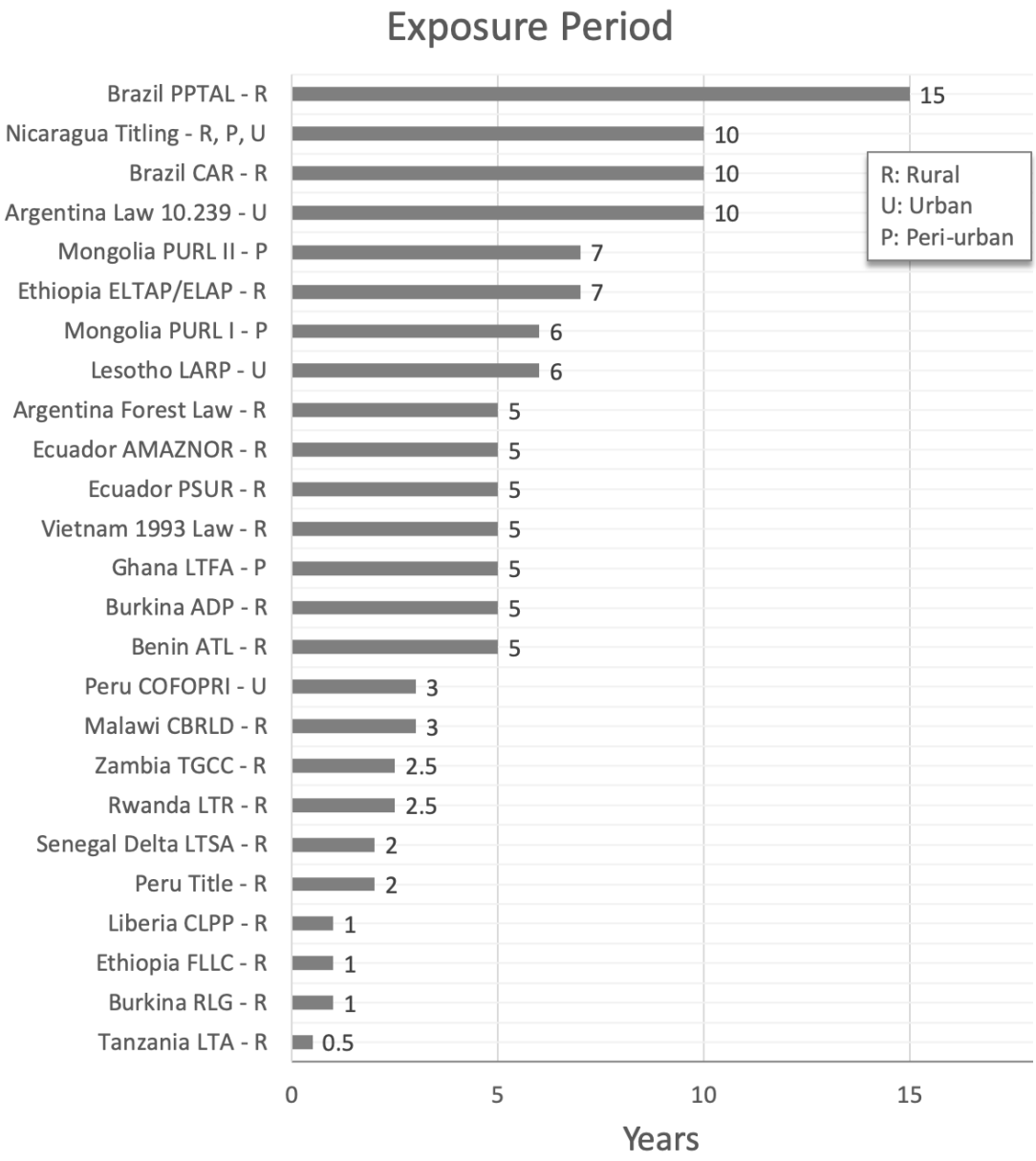

Figure 3: Exposure Period

Data Sources

Quality data sources and instruments are essential for capturing effects. However, a number of land sector evaluations are subject to problems with data quality. For example, several evaluations lack true baseline data, including two discontinuity designs and two RCTs. Several DID studies rely on cross-sectional waves of household data versus panel data. Questions remain on how best to capture perceptions of tenure, conflict, land characteristics (e.g., land size), tenure status and agricultural productivity. Importantly, as not all evaluations capture or report a measure of perceived tenure security, there are critical knowledge gaps to linking changes in land rights to the outcomes of interest.

The number and types of data sources used for land sector impact evaluations has gradually expanded to include a mix of qualitative and quantitative sources. In comparison to earlier studies, most recent evaluations move beyond household survey data and integrate additional contextual and qualitative sources to add depth and breadth to the analysis. Depending on the study, these additional sources can include key informant interviews, focus group discussions, and leader surveys.

There are an increasing number of evaluations that sample women and include a wives' survey to gauge gender effects. There has also been a move to integrate high resolution satellite imagery, land administrative records and administrative data, such as from financial institutions on loans and mortgages and municipal office data on building permits. A number of newer evaluations have incorporated high resolution satellite imagery and/or administrative data to improve impact estimates.

Measuring Tenure Security

Overall, several new trends in measuring tenure security and status are noticeable in recently published impact evaluations. Many studies have expanded and improved indicators to better capture tenure - including perception measures, documentation[15], ownership, and use and access rights. Perception measure for expropriation risk or land loss have been incorporated into many recent studies in light of both tracking perception of tenure measures listed within the SDGs, as well as understanding the interim factors that were missing from historic studies. We find questions about the likelihood of expropriation/encroachment, fear of land loss, expectations of changes in landholdings, concerns about losing fallowed land,

15. Studies are mixed in terms of whether they present clear boundaries, boundary demarcation and the presence of documentation as outcome versus output indicators. We generally recommend conceptualizing these measures as outputs and checks on implementation fidelity. The exception to this is the case of sporadic registration when there is the establishment of a land administration office or legal change but no titling support.

access to resources, and risk of eviction. To understand whether projects are addressing the specific source of tenure insecurity, this includes context specific questions across a range of sources of tenure insecurity and the reasons behind tenure insecurity.

Second, there is an attempt to better capture individual versus household tenure security. For example, studies in Benin, Ghana, and Lesotho have incorporated wives' modules. Other studies, such as Burkina RLG and Senegal LTS, capture information on individuals within the households who manage the parcels rather than solely from the household heads.

Third, recent research has found that there are substantial differences between perceived tenure status and the official tenure status in government records[16]. This could be due to several factors, including a lack of understanding of what tenure status is associated with the documents someone holds, outdated land administrative systems, or persistence of informal systems. As a result, studies are beginning to verify tenure status by taking pictures of documentation and checking the names and dates on documents along with parcel size and other available information.

Measuring Gender and Differential Effects

Subgroup analysis can uncover heterogeneous treatment effects and generate important lessons learned. About half of the studies reviewed (13) analyzed some aspect of a gender effect, although this tends to be limited to female-headed households in treatment versus control areas[17].

In recent evaluations, we find the addition of wives' surveys or modules for women to capture changes for not only women-headed households but also women in male-headed households. This is an important advancement as women and men, even within the same household, have distinct responses to improvements in land tenure security. Benin ATL and Ghana LTFA, presented some of the first causal estimates for program impacts on wives or women in the household via data collected in wives' surveys.

Besides gender, about half of the studies (13) present heterogeneous treatment effects for other geographic and socio-economic subgroups. For example, the ELTAP/ELAP study of second level certification in rural Ethiopia analyzes treatment site distance to the regional capital. The TGCC/Zambia RCT examines outcomes for large landholders, small landholders, as well as a variety of household subgroups, including youth, elderly, poor, wealthy, and

16. Mongolia SHPS, a cancelled RCT, found that about 70% of records matched respondent data for tenure status. Similarly, the Lesotho LARP evaluation found a similar 30% difference between bank records and responses on whether the respondent had a mortgage.

17. Three evaluations that focus on uptake of joint titling are not included in this review because they do not look at socio-economic/well-being outcomes. This includes ongoing studies in Uganda, CDI and Tanzania that seek to understand how to best increase the inclusion of women's names on land titles.

those experiencing a conflict at baseline.

5.5 Implementation Fidelity and Sustainability

Several of the evaluation reports for newer donor funded interventions have provided an in-depth analysis of implementation fidelity although this is missing from most of the earlier literature. Projects are rarely implemented according to the original work plan and target outputs for titling and documentation are rarely achieved. For example in Benin ATL, following a four year treatment exposure period, the actual delivery of land certificates fell well below the target; only 19% of expected certificates had been delivered, 7% of parcels had land certificated and only 55% of the 175 villages sampled had any respondents reporting having land certificates on the demarcated parcels.[18] Thus, any treatment effects are not just due to documentation but also to the village land use plans and demarcation of land parcel boundaries that took place prior to demand and processing of individual land certificates likely contributed to positive impacts in the interim.

Similarly, the MCC Ghana LTF project planned to issue 2,500 land certificates out of the approximately 3,800 existing property rights in the program district; however, by the compact end, around 1,500 titles were issued out of 5,700 land parcels inventoried. During the compact, MCC paid for the certificates but afterwards, residents were responsible for the $165 to obtain the land certificate. Thus, the results capture the effect of parcel demarcation and mapping, as well the expectation of receiving a land title for many beneficiaries, but not the actual receipt of documentation for most beneficiaries because implementation was hampered. Finally, in Senegal LTSA, only around a third of the treatment titled and the weakening of land tenure when land offices were not able to process the growing back-log of land applications demanded.

Problems with implementation fidelity are due to a myriad of factors including ineffectual contractors, a lack of government buy-in or approval, or political or environmental disasters that prevent the project from moving forward. Systematic regularization interventions face issues with failure to issue and/or deliver land rights certificates. In the context of sporadic registration, low demand for titling might be driven by high costs for titling. Both experience implementation difficulties such as government approval delays.

Beyond obtaining outputs, it is also necessary to understand the sustainability of those outputs prior to measuring outcome streams. Information on sustainability of outputs is not readily available for most longer- term exposure studies. For some of the recently published

18. Out of the 65,175 land use certificates expected following UCF/MCA-Beninâs 2014 mission, only 14,558 had been delivered. Another 6,144 certificates had been requested but not yet processed, and 33,956 certificates had been issued but not delivered.

studies, we find evidence of a high degree of (de)regularization and reverting back to informal land tenure systems. There is a notable lack of sustainability of key outputs such as land office operations and land information systems.

These shift back into informality due to issues around willingness to pay, the governmentâs ability to process these land rights, as well as hurdles transferring land - such as high land transfer fees (e.g. Lesotho). This is especially the case when land offices and information systems are established at the end of programs and there is limited time to ensure financially sustainable and effective operations. Or, where demand is present but exceeds the governmentâs ability to process the requests. In other cases, we find functional government land institutions but low demand for obtaining land rights, either due to a lack of willingness to pay for the right or lack of awareness.

6 Findings: Charting Results

In this section, we describe key findings for each of the elements around the Global Land Logic Model based on the available evidence.

6.1 Shorter Term Outcomes[19](0-2 years)

Reduced Risk to Realize Full Returns on Investment

Perceived Tenure Security

Perception of tenure security is an important but complex aspect of tenure to capture. Perception of tenure security varies by individual versus household; can change frequently based on the environment; and can differ by the source of insecurity–whether concerns over loss of land use and/or related productivity from national government, outside investors, local officials, migrants or pastoralists, neighbors or intra-household.

19. There are no impact evaluation findings available for "Ability to Productively and Sustainably Allocate, Manage and Administer Land".

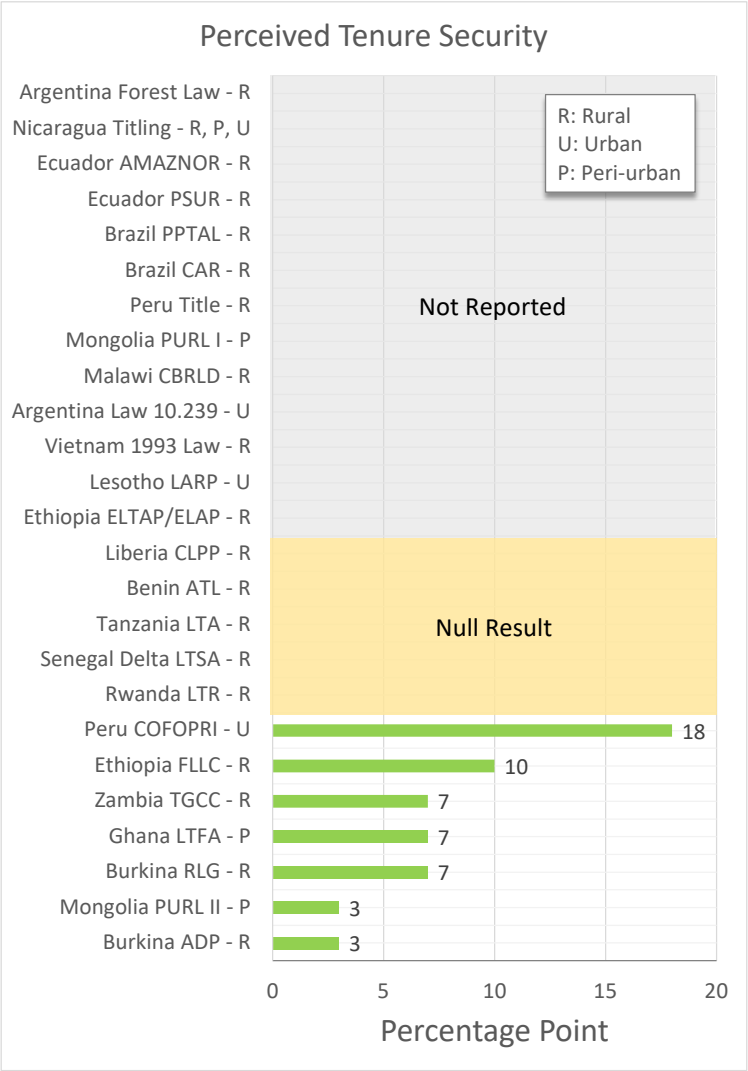

Figure 4: Perceived Tenure Security Findings

Twelve (12) studies present impact estimates for perceived tenure security (Figure XXX); these are more likely to be reported in donor funded land sector evaluations. Seven (7) studies evidence of positive results and five (5) evaluations find only null results[20]. Four of the studies that found a positive impact sought to strengthen land rights through systematic registration and moving land rights into the statutory system.

Four studies find positive effects in rural contexts. In Burkina RLG, the interim evaluation of pilot areas finds that concerns about newcomer influx reduces by 7.4pp, and there is a 6.7pp reduction in concerns over previous villagers' claims on land[21]. Similarly, in Burkina

20. Lesotho also tracked perceived tenure security and found positive results; however, the impact estimates were measured using perceived concern over conflict. For purposes of this paper, we have included these estimates with similar data under conflict findings.

21. There is no impact on overall concern with land conflicts, inheritance disputes or farmer restrictions

ADP, at the interim data collection, treatment households are 11pp (25%) more likely to not be concerned about a loss of land access. However, the magnitude of effects diminishes by endline where we find that treatment households are only 3pp less likely than control households to report that they will lose land. In Ethiopia FLLC, titled households were 10pp less likely to expect a change in landholdings due to administrative actions. The Zambia TGCC (RCT) evaluation of customary land documentation finds 7-10pp improvements in perceived tenure security across a number of sources of insecurity, including the reallocation of land by headpersons and chiefs, as well as encroachment or unauthorized appropriation by neighbors, family members or elites. The study also finds significant positive subgroup effects for female-headed households, elders, large land holders and those experiencing a previous land dispute.

Three (3) studies find positive results in urban/peri-urban contexts - one (1) is in the context of an urban slum, and two (2) from peri-urban sites. In Peru, titled households in the urban slums had a 17.7pp lower perceived risk of eviction compared to the comparison group. The peri-urban Ghana LTFA measures perception by concern about leaving land fallow. For men there are pooled effects of 7pp (22%) higher tenure security than controls, but this reflects positive short-term impacts (11pp) and medium-term impacts (8pp) with no long-term effects. Conversely, in the long term, women are a 7.4pp less likely to be concerned about loss of land if leaving land fallow, compared to control women.[22] Mongolia PURLs Phase II finds overall null effects but positive regional effect of 3pp for tenure security from overgrazing by outside herding groups in a rural context.[23].

Finally, one additional trend might emerge as the empirical evidence grows. Documentation might lead to gains in perceived tenure security when the de facto tenure regime is the guarantor of the tenure security on the titles or certificates. For example, we find positive perceived tenure security results for: Ethiopia (state land), Peru (state land), Zambia (customary land) and Mongolia (state land). In these cases, the state land was certified through a statutory guarantee and the customary certificates in Zambia were signed/certified through their chiefs not the statutory regime. Null results in Benin, Senegal, and Tanzania, might be due to the issuance of statutory guarantees in a customary setting without assurance from

on land. Women are 4pp less likely to report concern of an inheritance dispute.

22. Although parcels in the LTFA intervention area were mapped and inventoried, only 13% of parcels controlled by men obtained a title (as measured by survey response) and under 20% of parcels controlled by women received a title. Survey and land administrative data could not be well matched and where matched showed differing results. In the end the decision was made to use perceived tenure status (survey response).

23. The Phase II rural areas experienced relatively little overcrowding of herders compared to the areas around the three major cities from Phase I where the changes in perception of tenure were much larger and distinct. Phase I showed much larger improvements in land tenure security both in terms of perceived ability to prevent overgrazing and protecting from land expropriation; however, they are not being reported here since the evaluation only provided endline estimates in a DID evaluation design.

the de facto customary managers[24]. However, this pattern does not hold for Rwanda or the Burkina ADP study.

Land Governance

Impact estimates for land governance indicators are limited. Our review identifies three studies that report findings for governance indicators. Two studies find positive effects, and one reports null findings. Two studies focused on customary strengthening initiatives (Liberia CLPP, Zambia TGCC) report changes in local governance indicators, such as accountability, transparency of decision-making, and fairness/effectiveness of rules and local institutions. Both studies find positive treatment effects on governance indicators. Burkina RLG, which analyzed short term effects from policy and institutional reforms, found no significant effects in the short-term on farmer confidence in land chiefs, village development councils or high courts[25].

Understanding Awareness of Land Rights

The Global Land Logic Model assumes a critical role for information campaigns. The level of understanding of land rights is also based on the level and success of public outreach and training initiatives. Knowledge and awareness can drive behavioral changes around understanding of land use and transfer rights, better land management practices, and access to credit, among other things.

As Figure XXX depicts, seven (7) evaluations present measures for knowledge and awareness of laws and/or land rights; five (5) studies report positive impacts and two (2) evaluations find null effects. The measures employed vary widely and include knowledge/awareness of gendered access to land, marital law, government right to expropriate land for public use, whom to contact for disputes, and the process a household must follow to receive a land title[26].

In the Senegal LTSA study, treatment households are 37pp more likely to know the process to obtain a land title. At endline, Burkina ADP finds a 13pp increase in affirmations that beneficiaries can let land[27]. The ELTAP/ELAP evaluation of second level certification

24. There were null effects on tenure security in Liberia CLPP, however, this indicates that governance did not promote tenure security, since that program had not yet initiated the mapping/documentation phase at the time of endline data collection.

25. This could be due to the fact that the decentralized institutions had only recently been established and were in the process of completing training on the new land laws and procedures. A longer-term study is ongoing to look at sustainability and confidence in the institutions, as well as related effects on land markets, tenure security and conflict.

26. There were a number of knowledge/awareness indicators in the survey instruments for these studies, therefore, it is unclear if the other indicators were not measured or not reported because they are null results.

27. However, interim results are mixed. At interim, control households were 17% more likely to say that they had the right to bequeath land. Also, at interim, treatment households were 13% more likely to say

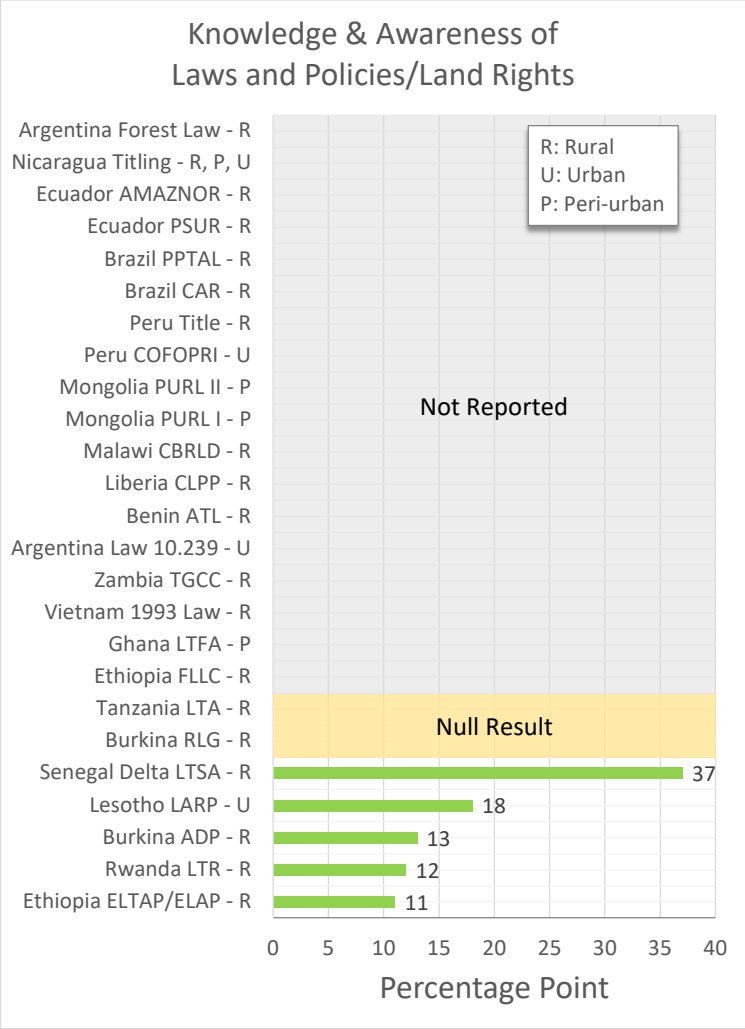

Figure 5: Knowledge and Awareness Findings

in Ethiopia finds that treatment households are 11pp more likely to believe they have a right to bequeath land. In Lesotho, treatment households are 8.9pp more likely to have heard of the Land Administration Authority. LARP significantly increased awareness about the right to hold land title (6pp) and women's right to inherit land from deceased spouse (3pp); treated households were also more likely to report that land could be used as collateral to make improvements (18pp). In Rwanda, the evaluation of LTR indicates that treatment households are 9pp more likely to be aware of their inheritance rights.

that they had the right to sell, although this finding seems to dissipate by endline.

6.2 Medium Term Outcomes[28](3-4 years)

Transaction Cost Savings: Lower Land Transaction Time and Cost

In the short to medium term, reforming land administration systems is expected to facilitate citizens' access to land services via lower land transaction costs, as well as increase confidence in and use of formal land systems and the banking sector. Over the long term, there is an expectation of improvements in land markets and land utilization.

However, to-date, no studies have published impact estimates for changes in transaction time and cost. Findings around changes in land transaction savings remain the focus of mixed methods performance evaluations of land administration systems[29] that have tracked changes in time and cost using land administrative records, customer survey data, and land administrative officer qualitative data.

There are several key challenges to conducting impact evaluations for this class of interventions along with rigorously measuring transaction cost and savings. First, there are difficulties in establishing a counterfactual of land administration reform that generally takes place at the national level. Second, for longer term exposure periods, there is a high risk that local land offices and information systems will be established in control areas by other donors or the government. Third, the number of formal land transactions taking place in these areas is often limited and a random sample of households from baseline data does not always overlap with those households who conduct formal land transactions. Therefore, household survey-based evaluation is not powered to capture minimal land transactions and related time/cost changes. Finally, as this is a new area for analysis, data quality remains relatively poor for indicators of land transaction time and cost. This can be due to restricted access to land records or records that do not consistently track transaction time, as well as a lack of clarity in the actual measures for these indicators in the evaluation design.

Despite these challenges, impact evaluations of land administration reforms are possible and studies are expanding the data sources used to measure land administration outcomes

28. The studies reviewed did not present findings for 'Education and Health investments', however, education and health outcomes are presented below under long term outcomes. Similarly, Improved Land Use Allocation/Administration/Planning/Management is not included as the only estimates of effects on these variables are from performance evaluations.

29. There are some recent studies rigorously analyzing the results of land administration reforms and transaction savings. These evaluations have faced issues obtaining land administrative data due to permission constraints or simply quality issues with the available data. Usually it has required digitization of paper records to understand historic land transaction times. These studies also face difficulties showing standalone results as they are often mixed with direct land registration programs. Although studies have shown significant decreases in consumer time to conduct a land transaction and customer satisfaction, to-date, no studies present impact analysis for outcomes related to land administration efficiency (such as cost and transaction savings), mortgage lending volumes and municipal service access.

beyond household surveys (e.g. Benin ATL, Burkina RLG, Mozambique LTS)[30]. These evaluations illustrate that impact analysis is possible when you have a national level reform combined with institutional strengthening activities that are only implemented in certain geographic areas. This variation allows the evaluations to track many of the benefits from establishing land administration offices and related issuance of titles.

Ability to Monetize Land Value

Access to Credit

Add TOC description. Land tenure may be a necessary factor for credit access, but it is not the sole catalyst. Namely, someone may need land rights documentation to access credit, but obtaining a title is not a driver of credit alone unless the person already had necessary income stream and a bank nearby.

Impact evaluations have measured three indicators related to credit. One indicator is the perception that a household will be able to obtain a loan if needed. The second indicator is a self-reported household measure of actual loan taking, and the third is the self-reported amount of credit obtained. The changes in credit being measured are from changes in land tenure rights, whether from systematic or sporadic registration or efforts to strengthen customary land governance[31].

Similar to the findings from other systematic reviews, we find overall mixed effects for credit with context being a prime factor (Figure X below). Twelve evaluations reported a finding related to taking a loan or the use of land as collateral[32]. Nine (9) of the 12 studies were of individual titling where one might expect to see an increase in formal credit taking because the provision of a title or land use certificate in the statutory system would allow the use of that document in a mortgage loan.

Out of the 12 evaluations that reported a finding, four (4) studies find a positive impact on credit-taking and eight (8) studies find a null effect. Each of the four with a positive effect had a medium to long term exposure period and involved systematic registration of individual rights. The studies were mixed between rural, urban, and peri-urban. Although there is a theory that credit may be more linked to urban areas with better accessibility, only two studies (Argentina, Nicaragua) show this link. Rather, in rural contexts, it is having a larger increase in agricultural income (via Burkina ADP and Senegal Delta LTSA that were tied with provision of irrigated land) and hence bankability that seem to be driving credit.

30. Results for Mozambique LTS and the Burkina RLG endline are expected in 2022.

31. There are performance evaluations measuring changes in credit from land policy reform and institutional strengthening separate and apart from titling.

32. In Benin, credit data was collected but not reported.

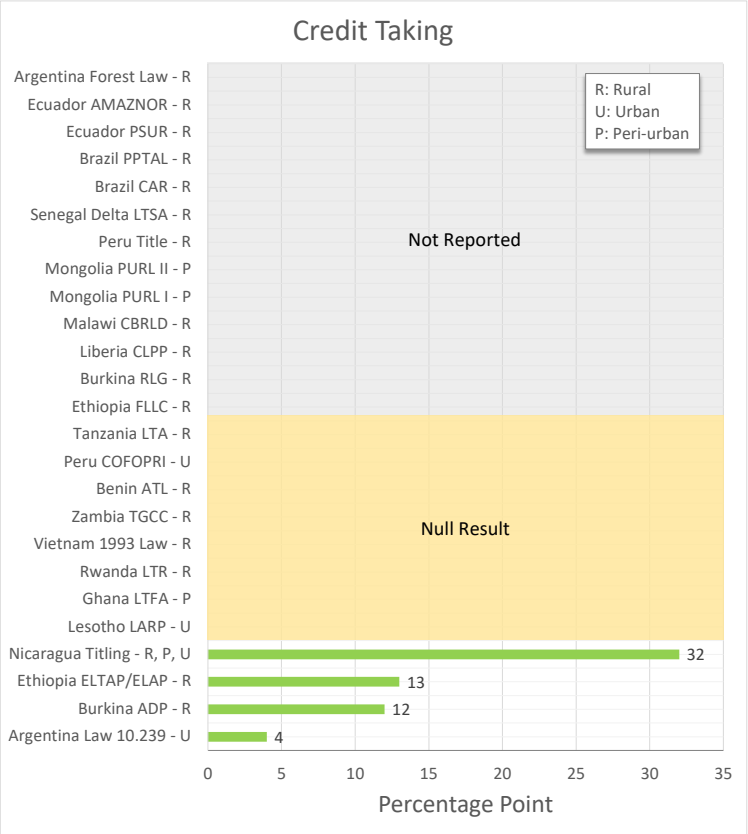

Figure 6: Credit Findings

In particular, the Burkina ADP study finds that at endline treatment households are 12pp (14% vs 2%) more likely to have used land as collateral[33]. In Argentina ISL, with a 10+ year exposure period, treatment households had a 4pp difference with control households who had no loans[34]. There is a 32pp increase in credit-taking in Nicaragua. In the case of second level certification in Ethiopia, we find a positive effect on *informal* credit taking[35]; the ELTAP/ELAP evaluation finds those with full or partial second-level land rights certification are 13pp more likely to have taken credit for farming purposes in the past year, and when compared with first level certification, those with second level certification still are 10pp more likely to have taken credit. There is also a small increase in the average amount of credit obtained.

Five (5) systematic titling studies did not find effects – and some authors point to con-

33. Endline treatment households are 9pp (22% versus 13%) more likely to have applied for a loan and seven times more likely

34. Late treatment groups were removed for the analysis as they were not yet in a legal situation to mortgage the land due to a 10-year moratorium on land transfers which had not yet expired.

35. As land cannot be used as collateral in Ethiopia in the formal system, empirical evidence of credit effects implies an informal channel.

textual and implementation factors to explain the null results. In Rwanda, the authors suggested this could be due to the lack of complementary investments in the Registry and high fees around transfers. In Ghana, only 13% of the sample received titles[36]. Even with the provision of statutory land rights and longer exposure periods, there is not necessarily a link to credit. In Vietnam, the authors note that even though the law was changed to allow land to be used in mortgages, there was still a constraint on implementation[37]. In Lesotho's case, the banks during project design noted low demand for formal loans due to distrust of banks and preference for building up over a long time period without credit[38].

The type of land documentation issued may also be a determinant of credit effects when looking at access to formal bank loans. The land use certificates issued through the Benin ATL and Zambia TGCC projects represent new forms of land rights to recognize existing customary land rights and are not accepted or recognized by the banks[39]. In the Tanzania LTA rural land study, with a six-month exposure period, treatment households are 10% more likely to report that they would be able to obtain a loan if needed, although there is no effect on the actual taking of credit.

Transferability of Land (Rent, Sell, Subdivide, Gift, Inheritance)

The expectation in the theory of change is that improved tenure security will motivate rental of land without the fear of that land being taken. To-date, impact evaluations have reported two impact estimates for rental indicators. One is a measure of the actual incidence of renting-out a property or parcel. The other asks respondents to assess their future likelihood or willingness to rent out a parcel.

36. Borrowing did increase in the Ghanaian case. Thirty-three percent of loans in the treatment group for business purposes compared with 14 percent in the control group. However, the authors noted this was likely the result of boosted enterprise activity versus a direct effect of the ability to use land as collateral.

37. Specifically, the regulation around foreclosure had not yet been fully clarified and commune officials were not likely to support transfer of land outside of the village.

38. These were also informal settlements with lower land values and without high incomes with the banks noting a constant income source would be necessary to be approved for a bank loan in addition to the lease over the land.

39. In addition, there was a low number of individual land use certificates (CFRs) issued by the new land institutions established following the village level land demarcation and land use plans (PFRs) so only a limited number of households would have been eligible even if the certificate eventually is able to be used in the loan process.

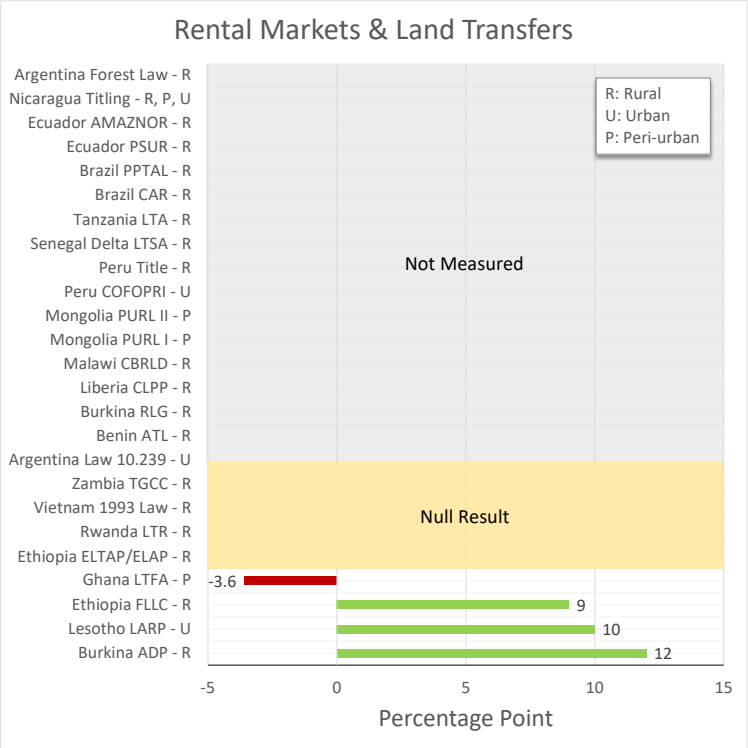

Figure 7: Rental Findings

As Figure XXX shows, eight (8) studies report their findings for rental markets; three studies present positive impacts and one finds a negative treatment effect. Four (4) studies report null findings[40].

In two cases of rural titling - Burkina ADP and Ethiopia FLLC - we find an uptick in renting-out in treatment sites. In line with the theory of change, these two studies also saw improvements in tenure security perceptions. Burkina ADP was newly irrigated land which made the land a valuable commodity for agricultural use. The endline evaluation finds a 6pp increase in land rentals at interim and a 12pp increase at endline for treatment versus control households. Comparing treatment to control households, the Ethiopia FLCC study finds after only a year, a 9pp increase in the propensity to rent out and an increase in the amount rented by about 1/10 ha at the mean.

In two cases of urban/peri-urban titling, we find mixed results. Ghana LTFA found a 3.6pp reduction in renting out, whereas Lesotho LARP finds a 10pp increase in renting out.

Increase in Productive Non-Land Investments (Labor)

Labor Mobility

40. The Zambia TGCC study finds a small increase in renting-in but the estimate is not robust.

Six (6) studies present the results for labor mobility; four (4) studies find treatment impacts and two (2) find null effects[41]. The indicators covered are mostly for engagement in off-farm labor or for changes in off-farm income, including non-farm employment and average monthly profit for non-farm enterprises. Additional measures include women working outside of the home and employment in more educated sectors.

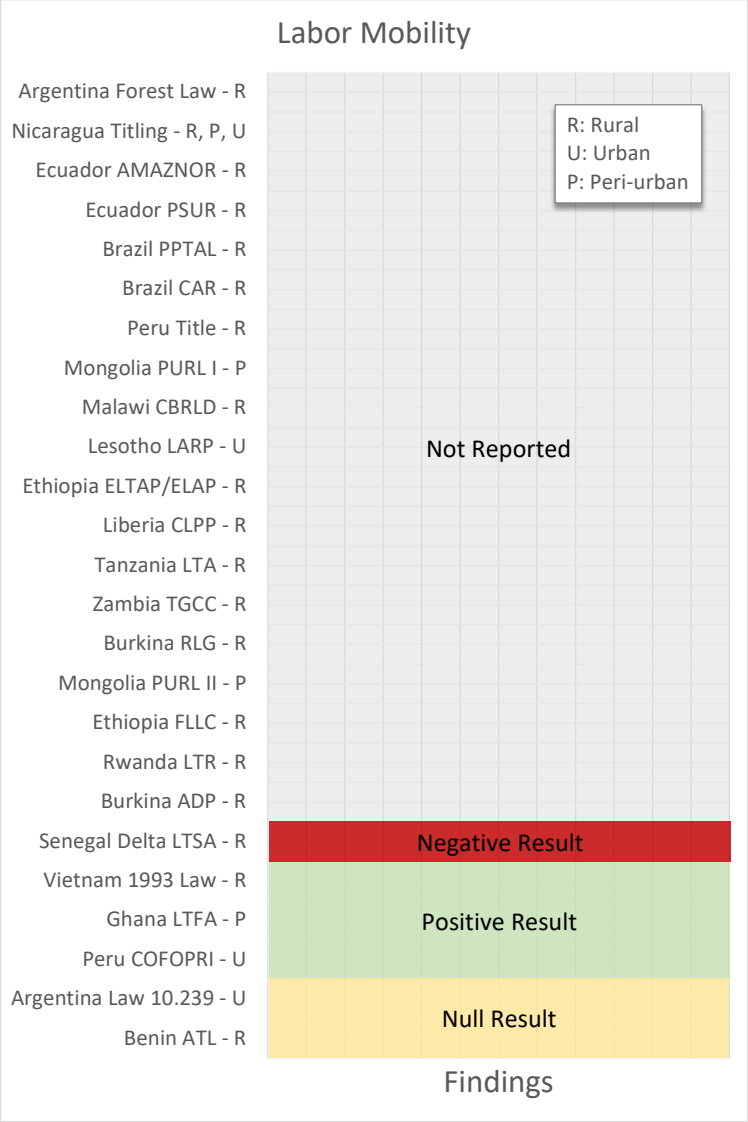

Figure 8: Labor Mobility

Among the studies that find treatment effects, two are for titling initiatives in peri-urban/urban settings(Ghana LTFA, Peru COFOPRI) and one is for systematic titling in a rural context (Vietnam 1993 Law). In Vietnam, systematic titling in rural areas resulted in

41. In the short term, Benin ATL finds an increase in nonagricultural self-employment, however, in the long term, the evaluation finds no impact on off farm labor market participation.

an increase of 2.7 hours per household member in off-farm labor. In Ghana, LTFA expected to increase agricultural productivity by improving tenure and increasing access to commercial agricultural land. Instead, households increased off-farm labor while decreasing agricultural labor. Women in treatment areas were 10.4pp more likely to engage in off-farm work[42]. Yet, this was accompanied by only a small reduction in agricultural production and no changes to agricultural productivity. Similarly, in Peru COFOPRI, property titling in urban slums leads to an increase in total labor force hours and a reallocation of work hours from inside the home to the outside labor market. With no legal claim to land, households spend 13.4 hours per week maintaining informal tenure security and are 40pp more likely to work inside of their homes. Senegal LTSA Delta finds a shift in labor allocation to farming in the hot season yet more off-farm revenue activities in the cold season.

More Equitable Household Resource Allocation, Decision Making and Decreased Household Violence)

A number of studies have highlighted the importance of moving beyond the collection of data focused on household heads, in order to capture gender effects. In recent evaluations, we find the addition of wives' surveys or modules for women to capture changes for not only women-headed households but also women in male-headed households[43].

Three (3) evaluations have collected panel data on wives, including questions related to intra-household resources. Two studies find positive impacts, and one finds null effects.

In a rural context, Ethiopia ELTAP/ELAP finds that second-level certification leads to a 44pp increase in a wife deciding which crops to grow on land in her possession. The peri-urban Ghana LTFA included targeted activities to address barriers to women's participation via the direct engagement of a gender expert in outreach activities and encouragement of women to directly interact with the project[44]. The evaluation finds that women decreased agricultural labor and the number and size of land parcels as they shift to off-farm economic activities. This led to significant increases in women's income.

In rural Benin, the ATL program required the recognition of women's rights as part of the selection process for receiving project support, and women were brought into the village land use planning process, although some of the implementation was delayed. Nevertheless, the evaluation of ATL found null effects on domestic violence, involvement in household land

42. This is a pooled estimate across the interim and endline waves of data collection.

43. As this is a relatively recent improvement, most of the wives data remains cross-section. However, as endlines and longer term data collection efforts continue, we expect to see an increase in the number of panel wives datasets in order to inform the literature with additional impact estimates for women.

44. Lesotho had a similar large gender outreach and awareness raising component but did not measure these variables at baseline.

decisions, receipt of some agricultural revenue, and womenâs private ownership of assets.

Functioning Land Markets (Increase in Formal Land Transactions, Equitable and Efficient Land Access)

In the medium to longer-term, reforming land governance and administration systems, with expected awareness raising, are expected to provide improved access and sustainability of secure tenure rights thereby enabling land to be traded more easily in the form of sale or rent. This, in turn, increases confidence in the formal land system and drives land markets. These changes are expected to increase land transfers and improve land investments and land utilization.

Similar to mortgages, formal land transactions are less frequent events, and it is difficult to capture a large enough sample for impact estimates through a household survey. As a result, some recent studies have used land administrative data to evaluate land market indicators.

Three (3) studies report outcomes for acquisition and size of landholdings, as well as land ownership (inherited or purchased). Impacts on land markets are mixed across land type and interventions. In several cases, contextual analysis is necessary to explain and situate the results[45].

For landholdings, five studies present empirical results, including three on womenâs access. ELTAP/ELAP Ethiopia finds a 0.32 hectare increase in land held jointly by husband and wife or by female-headed households, as a result of second-level certification. In the peri-urban context of Lesotho, there is a 5.5pp increase in the land that women manage. Lesotho had a strong gender awareness component and new legislation around women's ability to own land/not be treated as minors after married. In contrast, Ghana LTFA and Rwanda LTR find a reduction in land holdings. In Ghana, LTFA was implemented in peri-urban areas outside of Accra instead of in a rural agricultural project area. As a result, men and women consolidated their land under purchases as they moved away from land contracts and to off-farm activities, especially women. In treatment areas, landholdings by women decreased by almost 7pp (7%) and 10pp (6%) for men[46], while both women and men decreased their sharecropped land holdings by over 40% (3.6-3.7pp). Men also reduced renting in plots by around 25% as they consolidated their land around land purchases (7.1pp increase). Men

45. The Tanzania LTA study of systematic certification finds an increase in treatment landholdings by.67 ha relative to the control group. However, results are not robust to alternative model specifications and the research team speculates that these findings might just be due to an updated understanding of actual plot size after mapping.

46. On average, the number of parcels held by men decline by 0.103 by the third round of data collection and the aggregate land holdings (at the individual level) drops by 0.192 hectares.

also experience close to double the land inheritance of men in the control group with a 10pp increase by the endline.

The Rwanda LTR evaluation of systematic titling finds a decrease in land market activity and the size of the land area traded, however, there is improved access to land for legally married women as measured by married women being more likely to be registered as joint landowners. The study also finds several potential negative externalities including a small reduction in the likelihood of legally unmarried women having documentation and reduced likelihood of girls in female-headed households being designated to inherit their mother's land.

Increase in Productive Land, Crop and Property Investments (Trees, Perennials, Fertilizer, Livestock, Irrigation, Housing, Infrastructure, and Businesses)

Most studies reviewed for this paper present investment findings. Overall, 19 studies present investment findings with 10 studies finding positive effects, one (1) mixed effects, five (5) null effects, and (2) two negative effects. Out of the 19 studies with published results, eleven (11) studies are from rural contexts, and six (6) are from an urban/peri-urban context.

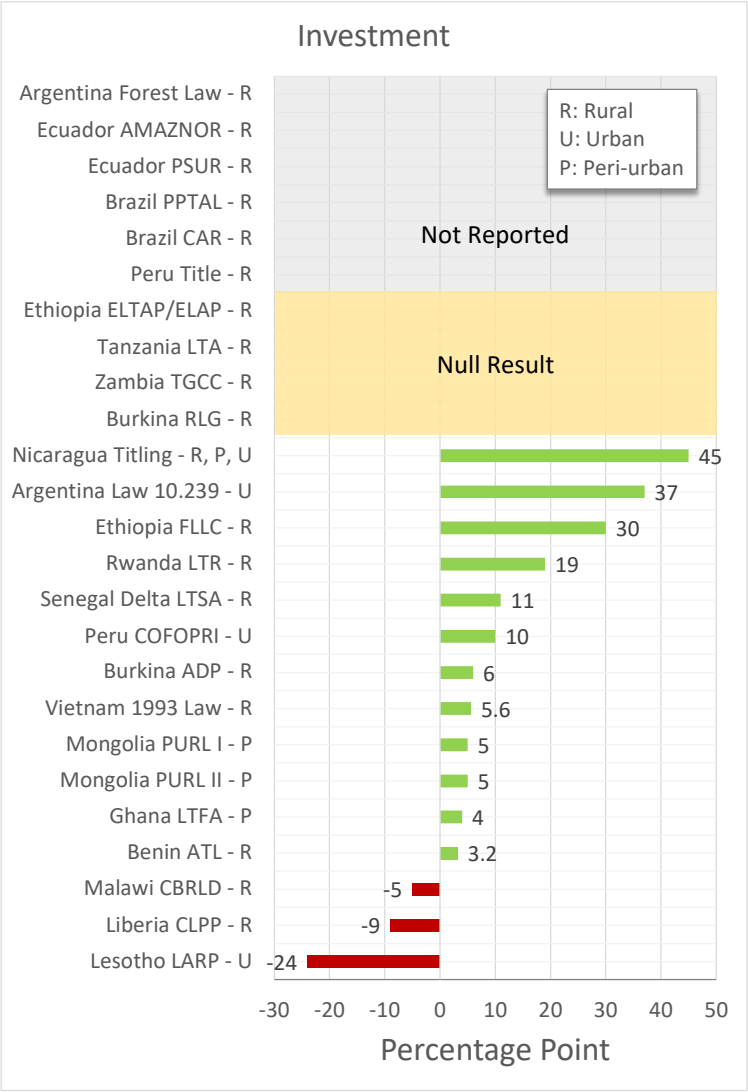

Figure 9: Investment Findings

Rural Investment

In the context of rural sites, the primary outcomes of interest relate to agricultural land investment, including, fallowing, tree planting, land use shifts to cash crops, and soil conservation improvements[47]. Other indicators that are less frequently reported include use of improved seeds, labor hours spent on investment and irrigation improvements.

The results of the eleven (11) studies in rural contexts are mixed. Six (6) studies find positive impacts on investment, four (4) studies report null results, one (1) study finds negative results, and one (1) study finds weak or mixed results. Among the six that find positive

47. Compared to other outcomes, we find the most consistency in measurement of investment indicators across studies.

impacts, four (4) programs involved systematic registration of individual land rights, whereas two were focused on the impact of catalyzing sporadic demand for registration. Importantly, four of the six studies that find positive effects captured shorter exposure periods of 1-2 years, illustrating that investments can occur relatively quickly.

In Ethiopia, systematic titling led to positive effects for soil conservation (20-30pp) and hours on investment (XX). Correspondingly, the Rwanda LTR study found positive impacts (10pp) for soil conservation; at 19pp, the likelihood of soil investment by female headed households was almost double that for men[48].

Burkina ADP and Senegal LTSA combined support for land registration with agricultural investments, which means that the agricultural investment effects cannot be disentangled from tenure effects. Nevertheless, the Burkina ADP interim study finds a 6pp increase in treatment households conducting any form of investment, 6pp increase in tree planting, and 11,360 FCFA increase in the value of investment. At endline, investment effects persist, including a 6pp increase in any investment, 5pp increase in tree planting, increase in hired labor, and 29pp increase in irrigation. In Senegal LTSA, there is an increase of 71 FCFA for rice investment in the hot season; 38 FCFA reduction in rice investment costs in the wet season; and total farm investment increase across all seasons with an 11pp increase in number of households that cultivate rice.

Among studies of sporadic registration, in Vietnam, there are positive but small effects, including a .3 std deviation increase in the proportion of land devoted to long term crops and 5.6pp increase in the area planted by perennial crops. In the short term, the RCT of the Benin ATL found that one year after land demarcation before any documentation for individual land rights were issued) that clarification of land boundaries led to substantively small but significant effects on longer-term land-based investments, including trees (1.7pp) and perennials (2.4pp)[49]. After a five-year exposure period - and despite the issuance of relatively few land use certificates - the proportion of parcels used primarily for perennial crops, increased by 3.2pp but tree-planting was no longer found to be a significant effect.

Urban and Peri-urban investment

The results from the six (6) studies covering urban and peri-urban areas are more positive. Four (4) studies find positive effects, one (1) finds mixed effects, and one (1) finds negative effects. All of the urban/peri-urban studies focus on the impact of formal recognition of land rights (titling and leasing); however, Mongolia PURLs Phase 1 and Phase 2 combines titling

48. The evaluator theorizes that this illustrates the constraints on investment from relatively low levels of tenure security by women prior to the intervention.

49. Although a small change, this amounted to a 60% increase in perennials and 43% in tree planting

with complementary agriculture and irrigation interventions and thus the tenure effects cannot be isolated. To-date, most urban studies have published findings for indicators related to the number of improvements and changes in the quality of buildings/structures, along with water, electricity and sewage improvements. In contrast, the Mongolia PURLS Phase I and Phase II evaluations present indicators specific to the rangeland pastoral context.

In Argentina, titling leads to an increase in housing investment - constructed surfaces increase by 12pp and an overall index of housing quality rises by 37pp. Similarly, titled households in urban slums in Peru are 8pp more likely to desire home improvements and 10pp more likely to have undertaken housing improvements. Mongolia PURLs Phase I and Phase II find positive effects at the interim data collection, but the long term results are mixed depending on the indicator and region. Specifically, Phase 1 households increased investments in immovable property, while in Phase 2, the study identified an improvement in herd composition. In one region (Choibalsan), program households spent more on the purchase and maintenance of wells, whereas, in another region (Kharkhorin), program households spent a significantly smaller amount purchasing and repairing animal shelters.

The Ghana LTFA evaluation finds mixed results for land registration in a peri urban area outside of Accra. Among men, the evaluation reports null or unsustainable investment effects for irrigation, fallowing, tree planting and soil investments, along with negative results on agricultural labor. However, for women, there were positive and sustainable results for fallowing and tree planting (4.4pp) (pooled estimate across interim and endline waves of data collection). Similar to men, women reduce the labor devoted to land prep (23 hours, pooled estimate across interim and endline waves of data collection) and field management (28.9 hours, endline data collection). The authors explain that these results are consistent with a program impact that led to a decrease in agricultural parcels (through land sales) and subsequent move to off farm labor and business. Finally, the evaluation of Lesotho LARP in a peri-urban context finds a 20pp decrease in the likelihood of treatment households having made any investment following the provision of a land lease. The authors explain this is consistent with investment being used to strengthen land rights (thus stronger tenure led to less investment) and note the rapid urbanization occurring in the control area[50].

50. The evaluation notes the lack of comparability in the evaluation sample as rapid urbanization occurred in the control area while the treatment area was already relatively developed. Investment was also used as a qualifying criteria by the Government of Lesotho in order for landholders to obtain a lease from LARP's systematic regularization efforts. Implementers hence noted land-based investments in the treatment area likely occurred prior to the baseline data collection as landowners aimed to qualify to receive a lease.

Decreased Land Conflicts and Improved Conflict Management

Conflict is a key outcome of interest in the global logic model and primary motivator for land sector programming. The literature reviewed presents the findings for two indicators (1) the perception that the likelihood of conflict will increase or decrease in the future, and (2) a self-reported household measure of the occurrence of conflict[51]. There is variation in the definition of conflicts, whether studies measure conflict at the household level versus parcel level, and whether instruments specify the magnitude or saliency of conflict (e.g., led to violence or loss use of property and related loss of productivity)[52].

51. There are also evaluations which track length of time to resolve conflict and some newer evaluations have also begun to review administrative records of land conflict data; however, as many conflicts are not raised to a formal level or even beyond the household or village chief, those records only include severe/major conflicts.

52. Some studies have also interrogated the drivers of conflict (boundary disputes, use rights, inheritance), severity of conflict, and with whom the household or community was in conflict with (intra-household, neighbors, local or national government, migrants, businesses). However, conflict is a rare occurrence and it is not possible to obtain impact estimates on these more nuanced effects.

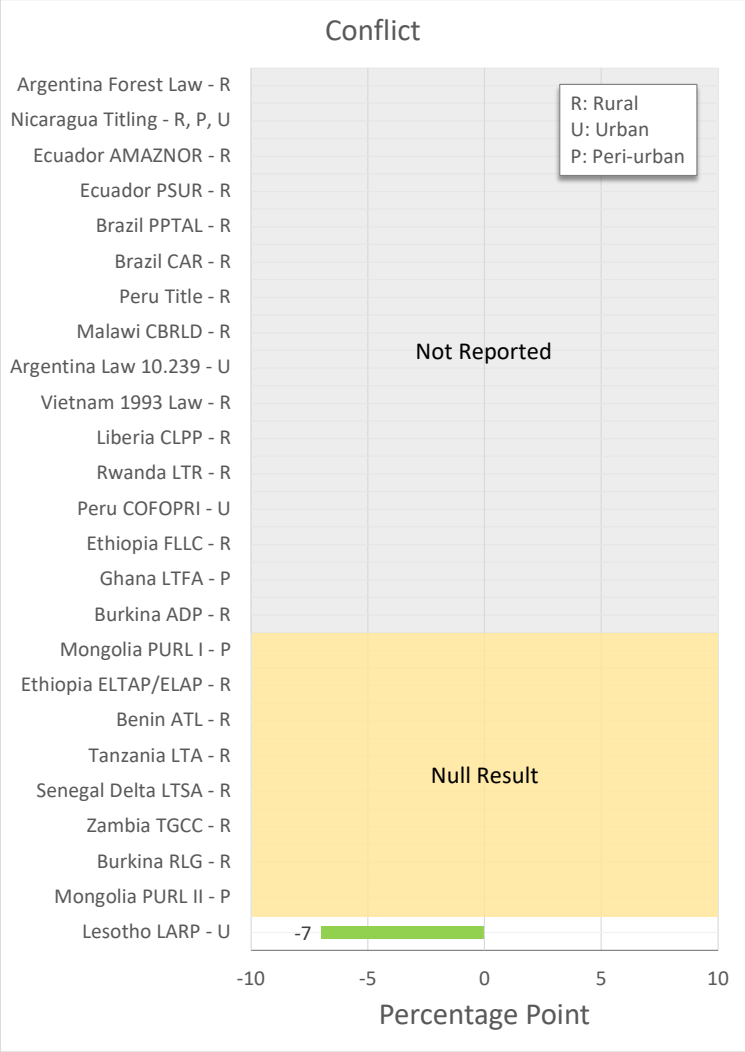

Figure 10: Conflict Findings

Nine (9) studies report on conflict; six (6) cover rural areas and three (3) are urban or peri-urban studies. Overall, eight (8) studies report null results, and one (1) study reports positive results. Lesotho LARP's evaluation of peri-urban systematic regularization finds a reduction in concerns about future conflicts by 5.2pp for female-headed households. This aligns with the expectation that leases strengthened land rights for women following related legal and policy reforms.

6.3 Longer Term Outcomes[53](5+ years)

Human Capital (Health/Nutrition, Education)

One study reported findings for food security or nutrition. After 2 years, Malawi CBLDP finds increased food security for male-headed households; staple food supply increases 3.5 months and the number of meals taken in the lean season increases (.2).

In Argentina, titling resulted in better short run health outcomes for weight for height z score, no difference in height for age, and lower teenage pregnancy rates (12.8pp); longer term results reveal a reduction in household size (which is attributed to lower fertility) and increased schooling.

Higher Productivity, Food Security, Land Utilization and Related Land Values

Land Utilization

Four (4) studies present the findings for land under cultivation. Three of these studies examine interventions that involve the reallocation of land to treatment households - combined with agriculture/infrastructure. Each of these three studies finds that treatment households that received additional land for production, did indeed increase the amount of land that they dedicated to cultivation. Senegal LTSA Delta finds a .56ha increase in area under cultivation; rice cultivation increases by 91% from .64ha to 1.22ha. However, contrary to project expectation, farmers did not increase vegetable farming in the other growing seasons and cropping intensity was half of the project target. Burkina ADP lottery beneficiaries cultivated more land than non-beneficiaries (.48ha); cultivated land more than doubled in the rainy season and increased 20-fold during the dry season, generating higher production. Malawi CBLRDP find an increase in area under cultivation among treatment households. The Ghana LTFA study of titling, which did not have a combined agricultural/infrastructure component, found that women reduced the area under cultivation as labor was reallocated to off-farm endeavors.

Productivity

Ten (10) evaluations present the findings for productivity[54]; four (4) evaluations report positive results, five (5) evaluations find null results, and one (1) evaluation reports a negative result for productivity.

53. There are not yet impact estimates of effects on Higher Social Capital/Higher Employment/Collective Action and Decision Making, so it is not included here.

54. Our review indicates that Senegal Delta and Burkina ADP are the first IEs thus far that have been able to complete a plot panel.

Figure 11: Productivity

All four of the evaluations that found positive results were packaged with additional interventions in agriculture, making it difficult to unpack the impact of strengthening land rights. As a result of irrigation and land investments, Senegal LTSA Delta found positive results around rice yields. There is a 21pp increase for the treatment group (940 kg of rice per hectare of rice) driven by increased cultivated land for rice during the main agricultural season; however, the evaluation found reduced cultivation of other crops. In Malawi, the CBLDP evaluation finds a 763kg increase in maize and tobacco productivity among male-headed households. For Mongolia PURLS Phase II, while there are null results in one region, the evaluation finds positive results for milk yields (92 liters of milk per cow and a 140% increase in milk production) in another region. In Burkina ADP, agricultural income was

441 FCFA higher among treatment respondents; positive effects were seen from the provision of the combined treatment of land rights, new irrigated land parcel and agricultural training.

The Ghana LTFA evaluation reports a negative treatment impact for women and a null overall effect. The study finds that women moved to off-farm labor and consolidated land into smaller purchased land parcels and away from rental and sharecropping contracts, the amount of cultivated land decreased with a related decrease in overall production (75%); however, the productivity per hectare was not significantly different.

Land Values

Only the Ghana LTFA evaluation reports changes in the value of land[55] as an impact estimate and finds higher self-reported land values for both men and women. Specifically, the study finds land values increased by 11,065 cedis which is equivalent to a 26pp increase over the endline control mean. The increase in land values was not from agricultural productivity but rather the ability to transfer land with the provision of land titles, in a per-urban urban context that was experiencing urbanization and rising land values.

Increase Supply and Access to Municipal Services

There is only one study that presents findings for service access. This is the Malawi CBLDP study, which finds negative but substantively small effects on time to school, time to health centers, and minutes to water source.

Sustainable Resource Management and Improved Environmental Outcomes

Nine (9) studies present findings for sustainable resource management and environmental outcomes. Seven studies find a positive impact, and two studies find null effects. Mongolia PURLS Phase I finds an improvement in perceived winter pastureland quality. A study in Peru finds that titling of indigenous communities reduces clearing by more than three-fourths and forest disturbance by 2/3rds. Similarly, a development program in the Northern Boundary Amazonian Region of Ecuador finds a .37pp reduction in deforestation (34%).

55. Several studies collect land value data but do not report changes to land value as an outcome of interest.

Figure 12: Environmental Outcomes

A systematic titling initiative in Nicaragua finds a 14pp increase in deforestation among titled properties. The evaluation of the Rural Environmental Registry (CAR) in Brazil finds a .5pp reduction in deforestation (10%). In Argentina, implementation of the 2007 Forest Law 26.331 finds positive treatment effects for land use planning. Reduced deforestation in all three provinces but not in all zones and not in all periods, effect range from .39pp to 1.54pp. Also some evidence of increased deforestation .61 for one zone in one period - but overall positive effects. Finally, the follow-up study to Benin ATL found a .1 to .3pp reduction in annual tree cover loss in treatment version control villages.

Income and Poverty Reduction

Nine (9) evaluations present the results for income and poverty reduction. The proxy measures focus on income, assets, and expenditures. Three (3) studies present positive effects, three (3) present null effects, and three (3) present mixed or negative impacts.

Figure 13: Income

The Burkina ADP evaluation finds that the incomes of household beneficiaries are 397 FCFA higher than control households, and these results are driven by increased income from agricultural production. The results in Burkina are quite positive; however, even with the increased incomes, the investment itself was not justified from a cost/benefit standpoint due to the high cost to establish large-scale irrigation. Ghana LTFA finds positive impacts on income, non-land wealth, the value of livestock, and durable goods/tools. Conditional on operating a business, the treatment group reports a 98 cedis increase in monthly profits. Long-term results indicate a 30% decrease (27.2 cedis) in the value of livestock holdings for women which is offset by an increase in the value of durable goods (78 cedis). For individually owned durable goods, men showed a 48% increase (227 cedis) in the longer

term. Malawi CBLDP found increased incomes for beneficiary households, a .2 increase in beneficiary householdsâ expenditure composition, as well as positive asset increases for male and female-headed households.

The Senegal LTSA Delta evaluation found no change in consumption. There are gains from agriculture profit but lower off-farm income for a no net change in household welfare[56]. The Mongolia PURLS Phase 1 and Phase 2 evaluations finds mixed results that vary considerably by region. One region finds null income effects. Two regions indicate a small increase in total earned income, as well as net livestock income. Ulaanbaatar program households increased non-livestock income by triple that of comparisons (1.84 million MNT vs. 660,000 MNT). In Choibalsan, program households had a significant increase in livestock revenue (doubling from 4 million MNT to 8.3 million MNT) that was driven by animal sales.

7 Linkages and Breaks in the Theory of Change

There is a need to look across the theory of change versus just presenting a count of outcomes across categories.

With the mixed evidence, we explore expected linkages and 'break points' along the theory of change for tenure security and investment. Importantly, as one examines the TOC within studies we find that there is breakage in the TOC for beneficiary streams; for example, there are many cases where a program increased tenure security but did not motivate the subsequent downstream effect, or there are instances where a program did not impact perceived tenure security â but where we nevertheless find downstream effects on investment. Finally, this TOC analysis is further complicated by the fact that very few evaluations measure empirical outcomes across the theory of change.

7.1 Short Term outcomes

Knowledge of land rights sometimes translate into positive behavior change but not always. In some cases, we see the expected effects of improved knowledge and awareness on downstream outcomes. In the case of the Burkina ADP, land titles/certificates were a new mechanism under the recently passed Land Law, correspondingly, those with an increased awareness of land rights leased land at a higher rate. Benin ATL saw improved awareness of the right to sell land though no effect on land sales.

56. The study found an overall decrease in off-farm income of 344,000 FCFA ($613) per household. For farming households, they found a reduction of 103,000 FCFA ($168) in off farm annual earning but an increase in agricultural revenue of 108,000 FCFA ($192)

Zambia TGCC saw improvements in perceived tenure and Lesotho LARP in perceived conflict but neither saw effects on rentals. We do not have impact estimates on perceived tenure from the other two studies. In two cases of rural titling - Burkina ADP and Ethiopia WB - we find an uptick in renting-out in treatment sites. In line with the theory of change for land, the two studies that found positive rental cases also saw improvements in tenure security perceptions.

7.2 Medium Term outcomes

There are a total of X studies that measure both tenure security and investment. Among those X, in five (5) cases, we find evidence of the expected linkage between improved perceived tenure security and greater investment (Ethiopia WB, Peru, Argentina, Mongolia PURLs and Burkina ADP). And, this connection was most evident in peri-urban areas (four (4) of the five (5) studies), and for studies that assess policy and regulatory changes ahead of the intervention (four (4) of the five (5) studies).

In Peru, there was new recognition of the informal settlements, and in Argentina, squatter settlements obtained rights from private land holders. In Mongolia PURLs, it was the first time allowing private lease rights over common grazing areas, and in Burkina the intervention took place after the new rural land tenure law. Unfortunately, in Mongolia PURLs and Burkina ADP we cannot disentangle the impact of complementary agriculture and irrigation interventions.

For studies that do not measure tenure security or land rights, we do not know if the lack of downstream outcomes is because tenure security was not improved to begin with or because people could not capitalize on the improved land rights.

However, the predicted link between perceived tenure security and investment is not always present â especially for studies in rural contexts. The Zambia TGCC study of customary documentation finds null results for agricultural land investments, despite significant improvements in perceived tenure security. In Rwanda, we see no change in tenure security but some indication of investment changes. Similarly, the Benin ATL RCT illustrates that land demarcation in combination with consultative land use planning can change investment behavior but the evidence around perception of tenure was mixed in the early results and in the longer term, there was no average treatment effect on perceived tenure. This could potentially stem from the lack of land use certificates issued as expected. Households had to demand the CFRs and there were a variety of hurdles dealing with the administrative procedures and related cost as well as issues on the approval process. Although Lesotho LARP identified improved womenâs land rights (XXX) and decreased fear of conflict (5.2

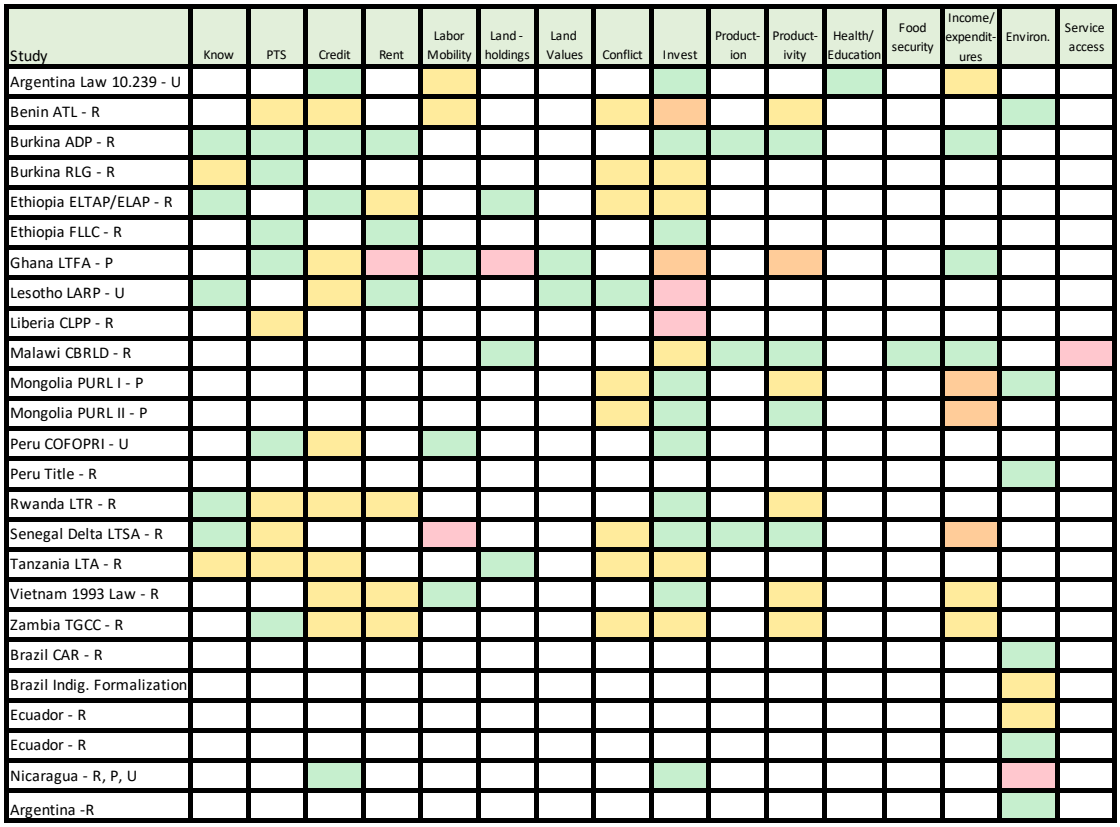

Figure 14: Theory of Change Analysis

pp) for female-headed, investment effects were negative.

7.3 Long Term outcomes

8 Discussion: Why Limited and Mixed Impacts?

In line with previous systematic reviews, we find mixed empirical results. The studies show relatively positive effects for perception of tenure, labor and investment while largely null or mixed effects around credit, conflicts, productivity, and income. Due to limited studies and diverse contextual factors, it is challenging to find a clear pattern to explain which interventions are driving outcomes across the varied settings.

Based on a review of the studies, including available information on project logics, context, implementation performance, evaluation design and findings, we propose that land evaluations have been constrained by three primary factors:

- Contextual factors and constraints: An incomplete understanding during project design of contextual factors and constraints to key elements in the theory of change, including

perception of tenure and land markets. A number of contextual and environmental factors that could significantly alter results lack rigorous exploration or are simply not reported on;

- Implementation fidelity and sustainability. There remain significant problems with the implementation fidelity and sustainability of land sector reforms; this makes it difficult to attribute null or negative results to problems of program implementation versus problems with the theory of change underlying land sector reform. and
- Weaknesses in evaluation. Although increasing, the number of rigorous land sector impact evaluations remains relatively small; there is significant variation in evaluation methodology, rigor and the nature of the data used.

We discuss each of these three factors in more detail, below.

8.1 Context and Constraints

There is large variation in the context and land governance environment within which studies are implemented; land impact evaluations are spread across extremely varied contexts, exposure periods, and implementation activities. The current evidence does not reveal any clear patterns in effects based on location or land governance environment. Studies largely found similar results regardless of location for key indicators.

Program logics often assumes an environment where land is indeed the constraint to investment due to high levels of tenure insecurity and/or pervasive land conflicts. However, land evaluations often find few serious conflicts in a small percentage of parcels and baseline levels of tenure insecurity vary widely and are low in many study sites.

It may also be the case that interventions are not addressing all the necessary constraints. Individuals may not be able to realize the benefits from documents due to binding constraints, including lack of income, knowledge gaps, weak land governance systems, high costs for agricultural inputs and transportation, as well as weak banking and land administrative systems. Implementing land sector reform without relaxing other financial and technical constraints is not likely to result in dramatic changes in the rural economy. Similarly, property rights legal reform alone is insufficient to change behavior; complementary activities are needed to strengthen relevant institutions or ease economic constraints. To maximize the benefits from land sector reform, interventions to strengthen land rights might need to be combined with other programming to alleviate significant input constraints (such as agriculture or infrastructure).

The evaluation of land sector programs that are combined with other direct and complementary interventions to improve investment and productivity show several positive results along the Global Land Logic Model, including tenure perception, investment, productivity, and income/food security. Two recent RCTs- Burkina ADP and Mongolia PURLS - measure outcomes across the Land Logic Model and find the expected positive results across tenure security, awareness of land rights, investment, productivity and livelihoods. These evaluations measure the combined effects of agriculture training and land tenure, as well as water access via wells in Mongolia and irrigation in Burkina, although similar efforts in Senegal Delta LTSA and Malawi CBLRD did not find such positive results.

8.2 Implementation Fidelity and Sustainability

Moderate effects might also be driven by weak implementation with project outputs that are largely unmet. Implementation fidelity has important implications for what 'treatment' is actually being measured by the evaluation and whether the treatment was sufficiently effective to expect tenure security and downstream results. Weak implementation can explain null outcomes such as in perceived tenure security or changes in knowledge and awareness, as well as an evaluation that is underpowered to detect impacts.

If documentation is the key treatment factor by which benefits are supposed to arise, the evaluation is underpowered to detect effects if few people receive titles. Thus, in cases where the delivery of documentation did not reach the expected target, there may have been implications for related investments in perennial crops, trees and related productivity and incomes, as unmet demand for land certificates by the government could have eroded tenure security.

A policy and institutional strengthening intervention needs to have demand for land rights (at a reasonable cost that people will pay) and have a land governance system that can process those rights efficiently. Otherwise, initial changes in perception of tenure or investments can fade away and longer-term goals never realize like reductions in conflict and productivity. Although there might have been initial improvements in perceptions of tenure security and investments, the lack of provision of land rights certificates or the weakening of the government's ability to administer and allocate land rights can erode confidence in the system and weaken perceptions of security.

This is especially the case in areas with first time statutory registration of land rights as opposed to areas where statutory land rights have been around for a while. When it is the first-time formalizing land rights in the country, there is a steep learning curve as related institutions and procedures are established or strengthened. This leads to both

longer implementation timelines, as well as higher sustainability risks.

Program logics sometime assume that sustainability will be achieved by other donors' follow-on projects. The dependence on long-term donor coordination is riskier but allows more time for land administration systems to improve their operations with support. However, reliance on other donors for sustainability increases project risk and requires committed partners along with active engagement before and during implementation.

8.3 Evaluation Methodology and Evidence Limitations

Our review indicates a number of methodological limitations. These include research designs with weak comparison groups, short exposure periods, low quality or problematic data sources, failure to measure key outcomes (such as perceived tenure security), or survey instruments that do not take into account the context. Key indicators remain challenging to measure accurately and reliably, including conflict, land administration, agricultural productivity and income[57]. Only a few studies explore or report the findings for mechanisms and outcomes across the theory of change and many lack data on whether and how interventions affected key binding constraints - such as knowledge/awareness and perceived tenure security[58].

Legal, policy and institutional reforms often require additional programming like public awareness raising to landholders and capacity building to land officials in order to translate these reforms into the realization of rights. However, most studies lack indicators to explore the extent of information dissemination, the populations' knowledge, and awareness and whether statutory legal reforms have been effectively enforced or operationalized in practice.

There is a consensus that intra-household dynamics are key to understanding gender differences, and several recent evaluations have integrated wives' surveys or spousal modules into the research design. However, data from wives' survey/spousal modules with the exception of a few impact evaluations is only available as a cross-section, usually at endline, and as a result, the land sector is still lacking causal evidence on differential program impacts within households.

Many of the land sector evaluations that show the greatest magnitude of effects for economic development outcomes are related to interventions that combine land sector interventions with agriculture/infrastructure projects. However, without an appropriate research

57. There is also very limited empirical evidence on spillover effects, which could explain null or underwhelming estimates for mechanisms such as knowledge and awareness, perceived tenure security or the expected benefits of documentation.

58. It is not clear if studies report all of the null findings for knowledge/awareness, investment and tenure security indicators, as survey modules sometimes contain additional measures for these outcomes that are not reported in the empirical findings.

design - such as cross-cutting randomization - it is impossible to separate out the effects of land sector interventions versus the effects of agricultural extension or infrastructure projects on key downstream outcomes such as investment, productivity, and income/food security. To-date, there is only one such design.

Despite these limitations, there have been a number of notable improvements in land sector evaluations. There is a growing body of lack of evidence around program impacts for longer-term exposure periods. In addition, a number of studies now complement impact analysis with qualitative data sources to contextualize and explain findings and land administrative and financial data to provide data sources with sufficient sample size and frequency to measure effects on land transactions, mortgages and markets.

Differential treatment effects have presented themselves across several land studies and are a key focus of many newer evaluations. There is not just a need to understand gender effects but also to examine heterogeneous treatment effects among other geographic or socioeconomic subgroups, such as large and small landholders, youth, and elite members of the community.

New inroads are being made to better capture difficult to measure outcomes. Geospatial and remotely sensed data allow for the collection of data across areas at multiple periods of time and are increasingly being used as a cost-effective data collection method to capture more credible and precise estimates of changes in land use, crop cover and investment outcomes.

9 Conclusion and Recommendations

The review reaches a number of key conclusions. First, although increasing, the number of rigorous land sector impact evaluations remains small. And results can depend on the evaluation methodology and nature of the data used. Second, there is large variation in the context and land governance environment within which studies are implemented; land impact evaluations are spread across extremely varied contexts, exposure periods, and implementation activities. However, a number of contextual and environmental factors that could significantly alter results lack rigorous exploration or are simply not reported on. Third, there remain significant problems with the implementation fidelity and sustainability of land sector reforms; this makes it difficult to attribute null or negative results to problems of program implementation versus problems with the theory of change underlying interventions to strengthen land rights and administration. Overall, it is difficult to provide coherent and streamlined policy guidance, due to mixed and scattered evidence especially on the how and why behind results. It is not clear if the theory of change for land needs revision.

The discussion and findings point to a few key lessons for future efforts.

9.1 Lessons for Land Policy and Evaluation

Continue to Build the Knowledge Base

We need more evaluations across diverse contexts and interventions. As more impact evaluations of land tenure and governance interventions are published, we learn more about what works and does not work for both land interventions and the evaluations which measure them. We need to continue to push for more rigorous methodologies. RCTs are a viable approach for the land sector - as well as cross-cutting evaluations.

Verify key assumption during due diligence

To the extent possible, key assumptions should be verified during a program's due diligence phase, including the verification that tenure security and/or land governance is a core challenge to development and whether there are other related constraints. Interventions must focus on where land tenure and governance are the main constraints to investment with the understanding that often land is part of a bundle of investments necessary to catalyze growth and that there is no one size fits all approach. In some environments, policy and institutional reform or land demarcation might be enough to catalyze growth while in other environments, systematic land regularization might be required. Understanding, defining and targeting the population of interest for the program and evaluation sample is key. To support due diligence during program design, data collected for the SDG joint land module through urban housing and agricultural studies, as well as Prindex, can contribute to an understanding of which sites have weaker or stronger land tenure.

Improved project logic models

The global land logic model can be used as a foundation for developing a specific project logic models. However, project models and evaluations should document assumptions and constraints specific to the drivers of tenure insecurity, context, and environment, as well as differences in beneficiary streams. It is key to understand the differences in constraints and benefit streams and differences across rural, urban and peri-urban contexts. The same is true about the key drivers behind sources of tenure insecurity. For example, is it national in scope such as government expropriation, a worry about local governance such as issues with a chief or community leader, neighboring villages/parcels or intra-household concerns? The timeline for and types of benefits can vary by beneficiary.

Project Documentation

Project descriptions and documentation, especially around timelines, selection of beneficiaries and changes in implementation is often not documented. During project design and implementation, the project should carefully track details around intervention timelines, selection and treatment of beneficiaries and variances in implementation as part of a comprehensive M&E plan. Documenting the exposure periods, outputs or changes in implementation plans will help improve future programming and research.

Build in Sustainability/Think Longer-term

When the sustainability of certain activities is critical to impacts according to the program logic, the activities should either be built into the project (preferred) or anchored more securely with another donor before project completion.

Understanding implementation fidelity requires systematic and comprehensive ME data. Although largely a qualitative effort, analysis of performance elements and what was not working will produce more useful policy recommendations from the research.

Diversify evaluations

Studies focus disproportionately on measuring the impact of titling programs, to the exclusion of other land tenure and governance interventions. This is in part due to the nature of types of interventions outside of titling which it makes it difficult to establish a counterfactual; however, it is indeed possible to set up such an evaluation. Although evidence is limited, in certain contexts, strengthening community level land governance systems can have similar or greater effects as provision of individual land titles. Expensive individual titling and formalization efforts may not be necessary unless there is a need to have a completed land cadaster and land tax system. More research is needed to understand the contexts where such community interventions may work and if the results last in the long-run.

Legal, Policy and Institutional Reform

It takes substantial time to put new systems and regulations in place even after the passing of legal reforms. Evaluation exposure periods should be planned accordingly. Once established, sustainability is difficult and requires significant capacity building and continued buy in by new institutional stakeholders. Carefully consider what reforms must be in place for a project to succeed and whether the project can still expect outcomes without successfully legal, policy or institutional reform. As part of these initiatives, program design should consider additional attention for public awareness raising and capacity building when there

are new legal and procedural reforms or new institutions and systems, especially when trying to catalyze demand and processing of rights for first time statutory recognition of land rights.

Differential Treatment Effects

When beneficiary groups act distinctly from one another, it is important to separately sample these groups - and to consider the power necessary for subgroup analysis as part of the evaluation design. Moving forward, both the program and research side should consider key gender and subgroup beneficiaries in the implementation design, logic frameworks, and evaluation design. Analyzing subgroup effects can highlight cases of elite capture, negative externalities from programming, and nuanced beneficiary streams, especially in cases of null overall effects, To ensure that research has sufficient power to detect differential effects across beneficiaries, the evaluation design and sampling approach must account for subgroups of interest. Ensuring sampling of women within households during the research design phase and baseline data collection is key to capturing impact estimates on gender differences and intra-household dynamics. As land evaluations increasingly require the inclusion of spousal modules at baseline, we expect future studies to rigorously measure these unique intra-household effects.

Taylor Instruments to the Context

Household surveys cannot provide the full picture of outcomes. Supplementing household surveys with qualitative, banking, administrative, project and geospatial data helps provide the needed accuracy, nuances and details to tell the story of the land intervention and understand the findings. Administrative data and geospatial data can often provide higher levels of accuracy at less cost and higher frequency when planned appropriately. Administrative sources can be used to capture data on land allocation, mortgages, transfers, buildings permits, while geospatial data can measure variables related to land use change, crop cover and investments.

Evaluations should use wives/women's modules for intra-household analysis and direct parcel level modules to the parcel managers, to understand effects beyond the household, including accurate capture of various investments, production, resource allocation decisions and income streams. Having data for more nuanced subgroup analysis will promote a better understanding of program effects, therefore leading to improved logic frameworks and improved land sector programming.

Track additional outcomes

The assumption that households will invest in their farms does not hold in all contexts. Beyond investment and productivity variables, there might also be a need to consider land tenure effects on labor mobility, human capital measures, as well as the potential for households to consolidate land. As shown in Ghana, people may choose to move off farm while decreasing related farm labor, investments and production. Or as shown in Senegal, farm productivity may increase while off farm income decreases. For the purposes of evaluation, this also shows why evaluators will want to track total income and not solely look at agricultural productivity. Also, if land is transferred, as in Ghana or Senegal, evaluators might want to track the land parcel (in addition to the household) to understand whether land utilization and related productivity did indeed improve.

Understand Different Drivers of Tenure Security

For an understanding of what is driving changes in perceived tenure security, more questions on the level and drivers of tenure security should be included in baseline and follow-up data collection instruments, as well as assumptions detailed within project logic frameworks. Measures of perceived tenure security - across sources of insecurity (government/community/family/etc.) - will provide further evidence of the mechanisms driving downstream effects. In addition to tenure security, it is important to understand beneficiaries' knowledge and awareness of land rights. For many reforms, land rights awareness campaigns on land use and transfer rights are a key activity to achieve first stage effects and motivate land use behaviors. Evaluations should dedicate sufficient attention to determining whether households understand their land rights, in addition to the administration of land rights.

Evaluation Timing

There is a need for impact evaluations that examine the complete theory of change and with sufficient exposure periods to understand longer-term results, consistent with the global land logic model, including measures of knowledge/awareness on land ownership and use rights and perception of tenure, along with drivers of insecurity and investment. Studies should ideally aim for three waves of data collection â baseline, 1-2 years after exposure and a follow-up in the longer-term depending on outcomes measuring. More than five years of exposure post treatment introduces a greater threat for confounders, such as other land sector programming - however longer exposure periods provide key insights on sustained outputs and outcomes. Administrative data and remote-sensed data could be used to explore very long-term investment, conservation and productivity effects (5+ years), in cases where there

is not sufficient funding to conduct a household survey.

References

Agyei-Holmes, Andrew, Niklas Buehren, Markus Goldstein, Robert Osei, Isaac Osei-Akoto, and Christopher Udry. 2020. *The Effects of Land Title Registration on Tenure Security, Investment and the Allocation of Productive Resources: Evidence from Ghana.* Technical report.

Ali, Daniel, Klaus Deininger, and Markus Goldstein. 2011. "Environmental and Gender Impacts of Land Tenure Regularization in Africa: Pilot Evidence from Rwanda." *Journal of Development Economics* 110 (August). https://doi.org/10.1016/j.jdeveco.2013.12.009.

AlixâGarcia, Jennifer, Lisa L Rausch, Jessica L'Roe, Holly K Gibbs, and Jacob Munger. 2018. "Avoided Deforestation Linked to Environmental Registration of Properties in the Brazilian Amazon." *Conservation Letters* (Department of Applied Economics, Oregon State University, Corvallis, OR, USA ; Center for Sustainability)(the Global Environment (SAGE), Nelson Institute for Environmental Studies, University of Wisconsinâ-Madison ; Department of Geography, Middlebury College ; Department of Geography, Center for Sustainability)(the Global Environment (SAGE), Nelson Institute for Environmental Studies, University of WisconsinâMadison ; Department of Applied Economics, Oregon State University, Corvallis, OR, USA; Washington) 11, no. 3 (May). https://login.proxy.lib.duke.edu/login?url=https://www.proquest.com/scholarly-journals/avoided-deforestation-linked-environmental/docview/2266442987/se-2.

BenYishay, Ariel, Silke Heuser, Daniel Runfola, and Rachel Trichler. 2017. "Indigenous land rights and deforestation: Evidence from the Brazilian Amazon." Special issue on environmental economics in developing countries, *Journal of Environmental Economics and Management* 86:29–47. ISSN: 0095-0696. https://doi.org/https://doi.org/10.1016/j.jeem.2017.07.008. https://www.sciencedirect.com/science/article/pii/S0095069617304813.

Besley, Timothy. 1995. "Property Rights and Investment Incentives: Theory and Evidence from Ghana." *Journal of Political Economy* 103 (5): 903–937.

Blackman, Allen, Leonardo Corral, Eirivelthon Santos Lima, and Gregory P Asner. 2017. "Titling indigenous communities protects forests in the Peruvian Amazon." *Proceedings of the National Academy of Sciences of the United States of America* 114, no. 16 (April): 4123–4128. https://doi.org/10.1073/pnas.1603290114. https://pubmed.ncbi.nlm.nih.gov/28373565.

Brasselle, Anne-Sophie, Frédéric Gaspart, and Jean-Philippe Platteau. 2002. "Land tenure security and investment incentives: puzzling evidence from Burkina Faso." *Journal of Development Economics* 67 (2): 373–418. ISSN: 0304-3878. https://doi.org/https://doi.org/10.1016/S0304-3878(01)00190-0. https://www.sciencedirect.com/science/article/pii/S0304387801001900.

Buntaine, Mark T., Stuart E. Hamilton, and Marco Millones. 2015. "Titling community land to prevent deforestation: An evaluation of a best-case program in Morona-Santiago, Ecuador." *Global Environmental Change* 33:32–43. ISSN: 0959-3780. https://doi.org/https://doi.org/10.1016/j.gloenvcha.2015.04.001. https://www.sciencedirect.com/science/article/pii/S0959378015000503.

Coen, Thomas, Sarah M. Hughes, Matthew Ribar, William Valletta, and Kristen Velyvis. 2019. *Evaluation of the Irrigation and Water Resource Management Project in Senegal: Interim.* Technical report. Mathematica Policy Research.

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.

DESCI. 2020. *LESOTHO: Land Administration Reform Project (LARP) Impact performance evaluation report.* Technical report. The World Bank.

Do, QuyâToan, and Lakshmi Iyer. 2008. "Land Titling and Rural Transition in Vietnam." *Economic Development and Cultural Change* 56 (3): 531–579. ISSN: 00130079, 15392988. http://www.jstor.org/stable/10.1086/533549.

Field, Erica. 2007. "Entitled to work: Urban property rights and labor supply in Peru." *The Quarterly Journal of Economics* 122 (4): 1561–1602. https://academic.oup.com/qje/article-abstract/122/4/1561/1850508.

———. 2005. "Property Rights and Investment in Urban Slums." *Journal of the European Economic Association* 3, nos. 2-3 (May): 279–290. ISSN: 1542-4766. https://doi.org/10.1162/jeea.2005.3.2-3.279. eprint: https://academic.oup.com/jeea/article-pdf/3/2-3/279/10313137/jeea0279.pdf. https://doi.org/10.1162/jeea.2005.3.2-3.279.

Field, Erica, and Maximo Torero. 2006. "Do Property Titles Increase Credit Access Among the Urban Poor? Evidence from a Nationwide Titling Program."

Galiani, Sebastian, and Ernesto Schargrodsky. 2004. *Effects of land titling on child health.* Research Network Working Paper R-491. Inter-American Development Bank.

———. 2010. "Property rights for the poor: Effects of land titling." *Journal of Public Economics* 94 (9): 700–729. Accessed September 5, 2017. http://www.sciencedirect.com/science/article/pii/S0047272710000654.

Hartman, Alexandra, Heather Huntington, Adi Greif, Kate Marple-Cantrell, and Caleb Stevens. 2021. *The impact of communal property rights reform on governance and gender norms: Quasi experimental evidence from Liberia.* Technical report, Presented at the World Bank Conference on Land and Poverty, Washington, D.C. Washington DC: 2021 World Bank Conference on Land And Poverty.

Higgins, Daniel, Tim Balint, Harold Liversage, and Paul Winters. 2018. "Investigating the impacts of increased rural land tenure security: A systematic review of the evidence." *Journal of Rural Studies* 61:34–62. ISSN: 0743-0167. https://doi.org/https://doi.org/10.1016/j.jrurstud.2018.05.001. https://www.sciencedirect.com/science/article/pii/S0743016717300426.

Holland, Margaret B., Kelly W. Jones, Lisa Naughton-Treves, José-Luis Freire, Manuel Morales, and Luis Suárez. 2017. "Titling land to conserve forests: The case of Cuyabeno Reserve in Ecuador." *Global Environmental Change* 44:27–38. ISSN: 0959-3780. https://doi.org/https://doi.org/10.1016/j.gloenvcha.2017.02.004. https://www.sciencedirect.com/science/article/pii/S0959378016302126.

Huntington, Heather, and Ajay Shenoy. 2021. "Does insecure land tenure deter investment? Evidence from a randomized controlled trial." *Journal of Development Economics* 150:102632. ISSN: 0304-3878. https://doi.org/https://doi.org/10.1016/j.jdeveco.2021.102632. https://www.sciencedirect.com/science/article/pii/S0304387821000110.

Huntington, Heather, Aleta Starosta, Ben Ewing, and Nicole Walter. 2018. *Tenure and Global Climate Change Evaluation Report.* Technical report. United States Agency for International Development.

IPA and USDA. 2018. *Millennium Challenge Account of Mongolia (MCA-M) Peri-Urban Rangeland Project (PURP): Final Report for Phase I and II Areas.* Innovations for Poverty Action (IPA) and USDA-ARS Jornada Experimental Range. Millennium Challenge Corporation.

Ksoll, Christopher, Elena Moroz, Abbie Turiansky, Anthony D'Agostino, Yiriyibin Bambio, Daniel Roberge, and Randall Blair. 2021. *MCC Burkina Faso - Agriculture Development Project Final Report.* Technical report. Mathematica.

Lawry, Steven, Cyrus Samii, Ruth Hall, Aaron Leopold, Donna Hornby, and Farai Mtero. 2017. "The impact of land property rights interventions on investment and agricultural productivity in developing countries: a systematic review." *Journal of Development Effectiveness* 9 (1): 61–81. https://doi.org/10.1080/19439342.2016.1160947. eprint: https://doi.org/10.1080/19439342.2016.1160947. https://doi.org/10.1080/19439342.2016.1160947.

Liscow, Zachary D. 2013. "Do property rights promote investment but cause deforestation? Quasi-experimental evidence from Nicaragua." *Journal of Environmental Economics and Management* 65 (2): 241–261. ISSN: 0095-0696. https://doi.org/https://doi.org/10.1016/j.jeem.2012.07.001. https://www.sciencedirect.com/science/article/pii/S0095069612000642.

Lisher, Jennifer. 2018. "Guidelines for Impact Evaluation of Land Tenure and Governance Interventions." Land and Poverty Conference. Washington, D.C.: World Bank.

Lisher, Jennifer, Daniel Higgins, and Derick Bowen. 2017. "A Land Evidence Review and Framework." World Bank Annual Land and Poverty Conference.

Marple-Cantrell, Kate, Heather Huntington, Ben Ewing, and Alexandra Hartman. 2017. *Community Land Protection Program: Midline Performance Evaluation Report.* Technical report. The Cloudburst Group.

Mendola, Mariapia, and Franklin Simtowe. 2015. "The Welfare Impact of Land Redistribution: Evidence from a Quasi-Experimental Initiative in Malawi." *World Development* 72:53–69. ISSN: 0305-750X. https://doi.org/https://doi.org/10.1016/j.worlddev.2015.02.010. https://www.sciencedirect.com/science/article/pii/S0305750X15000431.

Nolte, Christoph, Beatriz Gobbi, Yann le Polain de Waroux, María Piquer-Rodríguez, Van Butsic, and Eric F. Lambin. 2017. "Decentralized Land Use Zoning Reduces Large-scale Deforestation in a Major Agricultural Frontier." *Ecological Economics* 136:30–40. ISSN: 0921-8009. https://doi.org/https://doi.org/10.1016/j.ecolecon.2017.02.009. https://www.sciencedirect.com/science/article/pii/S0921800916309375.

Persha, Lauren, Adi Greif, Dan Mattingly, Stephanie Fenner, Karol Boudreaux, Aidan Boyd, Cynthia Caron, and Heather Huntington. 2016. *Ethiopia Strengthening Land Tenure and Administration Program Endline Report: An Impact Evaluation of the Effects of Second-Level Land Certification Relative to First-Level Certification.* Technical report. The Cloudburst Group.

Persha, Lauren, and Jacob Patterson-Stein. 2018. *Phase II Baseline and Phase I Midline Report: Impact Evaluation of the Feed the Future Tanzania Land Tenure Assistance Activity.* Technical report. United States Agency for International Development.

Zhang, Ye, Sara Borelli, and Teerachat Techapaisarnjaroenkij. 2015. *Burkina Faso Rural Land Governance Project Impact Evaluation: Findings after Phase I: Interim Evaluation Report.* Technical report. Impaq International LLC.

10 Annex

Study	Title	Exposure Period (years)	Context	Level	Description	Category	Method	Land Type	Gender	Implementation Fidelity	Sustainability
Argentina Forest Law -R	2007 Forest Law 26.331	2 to 5	Rural	Individual	Subnational land use planning	Legal reform; land use zones	DID with matching	Private land	No	No info	No info
Argentina Law 10.239 - U	Law Nº 10.239 in October of 1984, expropriation law transferring land from former private land owners to squatters	10+	Urban	Individual	Systematic registration; Legal reform	Systematic registration; Legal Reform	Natural experiment	Urban squatters on private land	No	No info	Info (L)
Benin ATL - R	Plans Fonciers Ruraux (PFR); MCC Benin - Access to Land Project (Endline Evaluation)	5; 5+(environmental)	Rural	Community; Individual	Sporadic registration (use rights); Institutional capacity building; Land use planning	LP (interim); Sporadic registration (endline)	RCT	Customary	Yes	Info (L)	Info (L)
Brazil CAR - R	Rural Environmental Registry (CAR)	5 to 10	Rural	Community	environmental registration for private landholders	Sporadic registration	DID with matching	Private land	No	No info	No info
Brazil PPTAL - R	Brazil Indigenous Lands Project (PPTAL)	2 to 15	Rural	Community	Systematic registration (indigenous land rights)	Systematic registration	DID with matching	Indigenous lands	No	No info	No info
Burkina ADP - R	MCC Burkina Faso - Agriculture Development Project (Endline Evaluation)	5	Rural	Individual	Systematic registration; extension training, irrigable land, and agricultural inputs	Systematic registration; AG	RCT	Customary	Yes	Info (H)	Info (H)
Burkina RLG - R	MCC Burkina Faso - Rural Land Governance Project (Interim Evaluation)	~1	Rural	Community; Individual	Institutional capacity building; Legal reform	LP; Legal Reform	DID	Customary	Yes	Info (H)	NA
Ecuador AMAZNOR - R	IADB - Sustainable Development of the Northern Boundary Amazonian Region of Ecuador (AMAZNOR)	1 to 5	Rural	Individual	Conservation requirements on ownership bundle of rights	Systematic registration	DID with matching	Private land	No	No info	No info
Ecuador PSUR - R	USAID - Ecuador Programa de Sostenibilidad y Union Regional Sur (PSUR)	5	Rural	Community	Systematic registration (community lands)	Systematic registration	DID with matching	Community lands	No	No info	No info
Ethiopia ELTAP/ELAP - R	USAID Ethiopia Land Tenure Administration Project/Ethiopia Land Administration Project (Midline Evaluation)	3 to 7	Rural	Individual	Systematic registrationn (second level certification)	Systematic registration	DID with matching	State land	Yes	Info (H)	No info
Ethiopia FLLC - R	Ethiopia - First Level Land Certification	1	Rural	Individual	Systematic registration (use rights); Institutional capacity building	Systematic registration; LP	Geographic discontinuity; DID	State land	No	Info (H)	Info
Ghana LTFA - P	MCC Ghana - Land Tenure Facilitation Activity (Interim and Endline Evalution)	3 to 5	Peri-urban	Individual	Systematic registration	Systematic registration	Geographic discontinuity	Mixed	Yes	Info (H)	Info
Lesotho LARP - U	MCC Lesotho - Land Administration Reform Project (Endline Evaluation)	6	Urban/peri-urban	Individual	Systematic registration; Legal reform; Institutional capacity building	Systematic registration; LR	Geographic discontinuity (plus DID with PSM)	Mixed: Customary (chiefs) and private land	Yes	Info (H)	Info
Liberia CLPP - R	Liberia - Community Land Protection Program (Midline Evaluation)	~1	Rural	Community	Strengthening community governance, by-laws, and training	LP (delimitation not demarcation)	DID	Customary	Yes	Info (L)	NA (midline)
Malawi CBRLD - R	WB Malawi's Community Based Rural Land Development Project	3	Rural	Community; Individual	Systematic registration; Increase the size of land cultivated, farm inputs, extension advice	Systematic registration; AG	DID	Customary	Yes	Info (M)	No info
Mongolia PURL I - P	Mongolia (MCA-M) Peri-Urban Rangeland Project	6	Peri-urban	Community	Systematic registration (formal leases, collective groups); extension services, infrastructure	Systematic registration; AG	DID with PSM	State land	No	Info (H)	Info (H)
Mongolia PURL II - P	Mongolia (MCA-M) Peri-Urban Rangeland Project	7	Peri-urban	Community	Systematic registration (formal leases, collective groups); extension services, infrastructure	Systematic registration; AG	RCT	State land	No	Info (H)	Info (H)
Nicaragua Titling - R, P, U	Titling	10+	Rural, Peri-urban, Urban	Individual	Systematic registration	Systematic registration	Regression Discontinuity	Mixed	No	No info	No info
Peru COFOPRI - U	Peru Committee for the Formalization of Private Property (COFOPRI)	2 to 3	Urban	Individual	Systematic registration	Systematic registration	DID and IV	State/Urban slums	No	Info (H)	No info
Peru Title - R	Peru - Indigenous Titling	2	Rural	Community	Systematic registration	Systematic registration	DID	Indigenous lands	No	No info	No info
Rwanda LTR - R	Rwanda - Land Tenure Regularization	1 to 2.5	Rural	Individual	Systematic registration	Systematic registration	Geographic discontinuity	Mixed	Yes	H	L
Senegal Delta LTSA - R	Senegal Delta Activity/Land Tenure Security Activity (Interim Evaluation)	2	Rural	Individual	Sporadic registration; Irrigation infrastructure; Institutional capacity building	Sporadic registration; AG	DID with Matching	Customary	Yes	H	L
Tanzania LTA - R	Tanzania - Land Tenure Assistance Activity	~.5	Rural	Community; Individual	Systematic regisration; Institutional capacity building	Systematic registration; LP	RCT	Customary	Yes	H	NA (midline)
Vietnam 1993 Law - R	Vietnam 1993 Land Law	4 to 5	Rural	Individual	Sporadic registration, Legal reform	Sporadic registration	DID	State land	No	No info	No info
Zambia TGCC - R	USAID Zambia - Tenure and Global Climate Change (Midline Evaluation)	1 to 2.5	Rural	Community; Individual	Customary certification (individual, community), extension, agricultural inputs	LP; AG	RCT	Customary	Yes	Info(M)	NA (midline)