

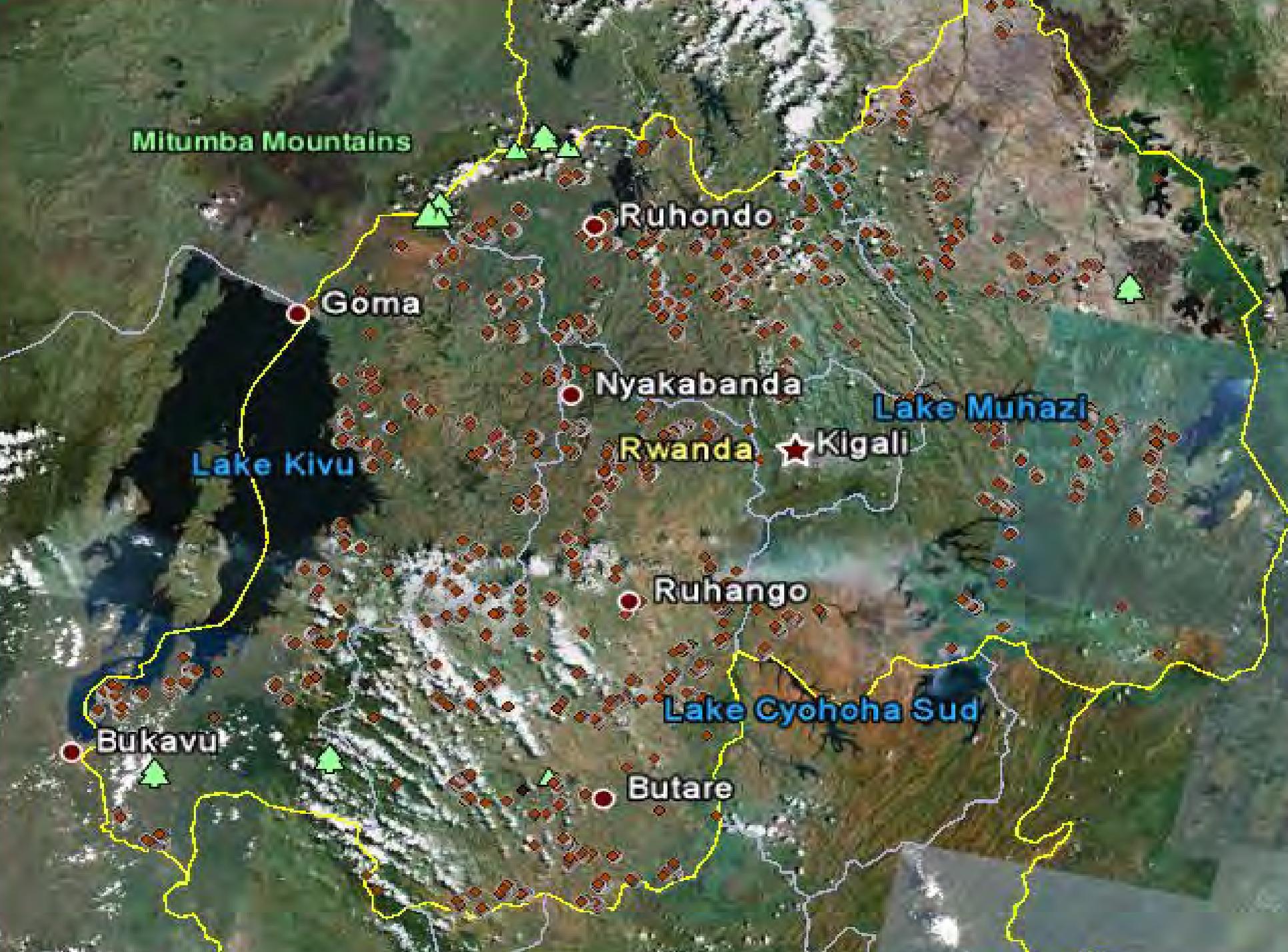


Land and credit in Rwanda

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Key questions to be explored

- ▣ **Can Rwanda's agricultural sector do better?**
- ▣ **Are credit constraints affecting investment & productivity, especially by women?**
- ▣ **Do land markets enhance productivity and promote structural change ?**
- ▣ **Does land fragmentation reduce productivity and should be regulated?**
- ▣ **Did land regularization increase investment and equity?**



Mitumba Mountains

Goma

Ruhondo

Nyakabanda

Lake Muhazi

Lake Kivu

Rwanda

Kigali

Ruhango

Lake Cyohoha Sud

Bukavu

Butare



Large untapped potential

- ▣ **Rural income affected by yield gaps; low input use**
 - Only 8% use fertilizer; 12% improved seed; 10% extension advice
 - Low market integration: 33% subsistence (48% asset quartile 1)
- ▣ **Low investment limits productivity & sustainability**
 - Overall low levels of on-farm assets limits technology options
 - 80% state that land could benefit from soil conservation investment
- ▣ **Few fully realize the benefits from diversification,**
 - Limited use of cash crops & vegetables w 50-100% higher labor py
 - Non-ag enterprise income very low (7.7%)

Better performance would have benefits

▣ **For poverty reduction**

- 85% of the bottom quartile in agriculture; 70% of income from the sector
- Globally, agricultural growth has highest impact on poverty reduction

▣ **For gender equity and female empowerment**

- 46% of spouses are key agricultural decision-makers
- But their rights are limited: Only 4% inherited land; 26% would get certificate
- Stronger rights to inputs and output could improve agric. productivity & intra-household decision-making

▣ **For overall economic growth**

- Extent and welfare effect of movement out of agriculture depends on their ability to derive benefits from their land, mostly through rental
- Even large expansion of non-agriculture will reduce reliance on agric. only slowly
- Efficiency and equity impacts will be affected by well-functioning factor markets



Farmers suffer from limited credit access

- ▣ **Low credit access reduces investment & productivity**
 - 38% had any loan (3% from formal sector); most small for consumption
 - Vast differences in amounts: Formal USD 600 vs. 30 semi-formal.
 - More than half of households (56%) report to be credit constrained
 - Credit constrained farmers
 - ▣ Are less integrated into markets & use lower levels of inputs (fertilizer, manure)
 - ▣ Invest less in perennials, conservation structures, and non-farm enterprises
- ▣ **Credit constraints prevent realization of their potential**
 - Lifting credit constraints with key impact
 - ▣ Almost doubling of output per ha
 - ▣ ... and a 30% higher probability of establishing non-farm enterprise
- ▣ **Implication: Greater access to collateral & information**
 - Loans secured against land; access to documentation can increase this
 - Reliable, low-cost registry information on land ownership

Women have more difficulty accessing credit

- ▣ **Borrowing capacity varies even within households**
 - Women can borrow only 60% the amount men are able to
 - Affecting ability to, for example start independent enterprises
- ▣ **Large part of the gap is due to discrimination**
 - Computations suggest 80% in informal; 50% in formal sector
 - Public education plus increased asset ownership can help reduce these
- ▣ **Other factors that could increase their credit access**
 - Ownership/inheritance of assets
 - Education, active community role (office)

Land rental & sales have different impact

▣ **Most land sales are distress sales**

- 32% participated in sales market (as a buyer or seller) over the past 5 years
- 12% pay debt; 45% to maintain consumption with unexpected shocks

▣ **By contrast, rentals enhance equity and efficiency**

- 48% participated in land rental market (38% as tenant; 10% as landlord)
- Rentals transferred land to land- and asset-poor, reducing inequality
- Benefited youth with less non-agricultural opportunities
- Vast equalization of factor ratios (halving of land/labor ratio)

▣ **Rental more appropriate to drive structural change**

- Allows continued use of land as a safety net & collateral for investment
- Fully in line with global best practice, especially with long-term contracts
- Demand for land access by investors will require specific safeguards

Labor-land ratios before and after rental market participation

	Total	Tenant	Autarky	Landlord
<i>Before participation in land rental market</i>				
Number of adults per hectare of owned land	20.621	32.822***	14.798	7.273***
<i>After participation in land rental market</i>				
Number of adults per hectare of operated land	15.594	15.945	14.798	18.542
Number of households	3493	1370	1873	343

Asterisks indicate the difference in significance between means for tenant and landlord groups as compared to those in autarky with *, **, and *** denoting significance at 10%; 5%; and 1%.

Land fragmentation not only negative

- ▣ **Impacts of fragmentation could go either way**
 - Negative: Transport cost, loss to boundaries, setup time, no machines
 - Positive: Reduce risk (rain, pests), positive externalities (rotations)
 - Evidence mixed; markets can deal with some of these (e.g. China, ECA)
- ▣ **In Rwanda's case benefits & losses are evident**
 - Crop diversity enhances resilience against climatic & disease shocks
 - If both introduced in production function, positive diversity-effects outweigh negative (and significant) fragmentation impact
- ▣ **Policy needs to weigh these & make trade-offs**
 - Cost of regulation & enforcement to be in line with potential benefits
 - Global experience: Strict subdivision restrictions ineffective and possibly counter-productive by encouraging informality
 - This applies to land use planning in a more general sense

Effects of Land Fragmentation on the Incidence of Crop Shocks

	Incidence of crop shocks			
Simpson land fragmentation index	-0.099***			
	(3.349)			
Log of number of parcels		-0.051***		
		(4.072)		
Shannon crop diversity measure			-0.034**	
			(2.421)	
Log of number crops				-0.044***
				(3.130)
Number of observations	3,397	3,404	3,404	3,404
R ²	0.189	0.190	0.188	0.189

Absolute value of t-statistics in parenthesis: *** significant at 1%; ** significant at 5%; * significant at 10%. The dependent variable is the share of land affected by crop shocks while the crop is in the field or at the time of harvest. Household control characteristics are not reported

How does the LTR fit into this?

▣ **Motivation for making it a priority**

- Secure and transferable land rights a precondition for modern economy
 - Female empowerment and land-related investment and
 - Transferability and credit access
- Addressing land issues also a key to post-conflict reconciliation

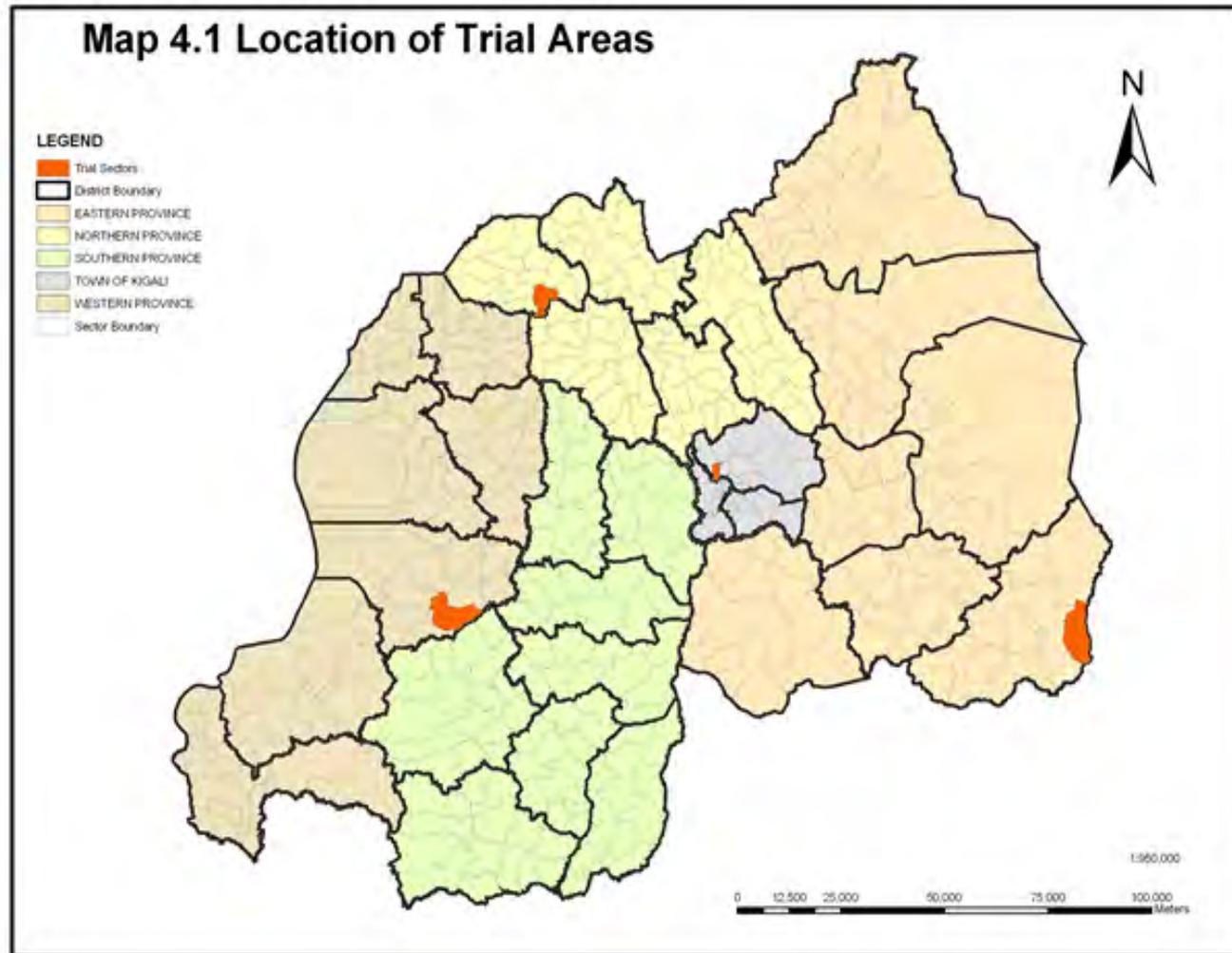
▣ **Sequencing of policy reforms**

- 1999 inheritance law to establish equal rights by females
- Broad framework 2004 Land Policy, followed by 2005 Organic Land Law
 - Recognizes existing (customary) rights, formalizes these
 - Equality for spouses; registration compulsory
 - Establishes institutional infrastructure (NLC, DLBs, LCs at cell, sector, dist. Level)
 - Regulates expropriation & registration

▣ **Experimentation towards a national program**

- Development of methodology based on photomaps
- 4 pilots (2.5 years; 15,000 plots) 2007/8 to solve operational challenges
- Massive scale-up thereafter (millions of plots; demarcation almost complete)

Pilot locations (Gatsata, Kabushenge, Biguhu, Mowga)





Explaining process and map



Field adjudication with neighbors



Locating parcels on the index map

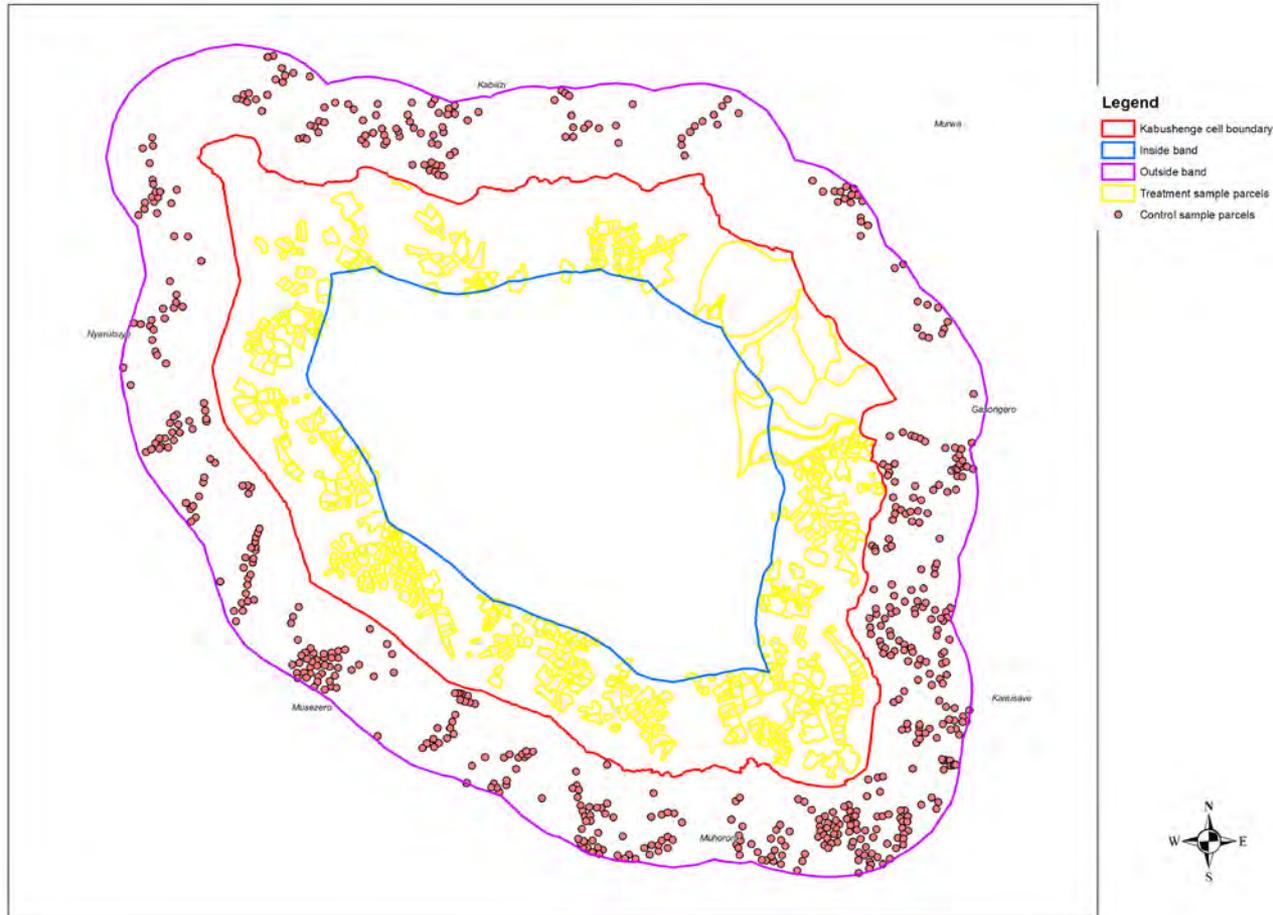






Processing claims receipts

Counterfactual



Initial impacts from LTR

▣ **Methodology and assumptions**

- No other cell-level interventions affecting outcomes
- Spatial fixed effects to control for market and soil conditions

▣ **Initial impacts impressive**

- Reduced perceived risk of land loss due to expropriation
- Induced investment, especially for female-headed households (triple)
- Enhanced female co-ownership, conditional on marriage certificate
- A challenge that has already been acted upon
- Created clarity on equal inheritance of boys **and** girls fully in line with law

▣ **Broader impacts of interest in a number of areas**

- Main impact on credit expected in urban areas
- Market transfers and credit access depend on operating registries
- Long-term effects could be much larger

Impact of LTR on investment

Dependent variable	soil conservation	
	Δ (new const + maint)	imp seed
Treatment indicator	0.099**	0.064
Treatment X Female headship	0.094**	0.003
Number of years possessed	-0.002**	0.001
Parcel was purchased	-0.030	-0.074**
Parcel was inherited	-0.065	-0.083
Acquired through other means	-0.209**	0.087
Parcel size in hectares	-0.002	0.032*
Head's age	-0.001	-0.001
Female headed household	-0.044	-0.052*
Number of observations	6325	6325

includes controls for hh demographics, spatial FE 1000m, spatial SE

Results: Women access to land

	Female spouse/head owns or co-owns plot
Treatment indicator	-0.074**
Treatment X Marriage certificate	0.171***
Treatment X Female head with no spouse	0.143**
Has marriage certificate	0.075***
Female head with no spouse	0.094***
Male head with no spouse	-0.837***
Number of observations	6209

includes controls for plot characteristics, hh demographics, spatial FE 1000m, spatial SE

Effect of LTR on land inheritance

dependent variable	know inherit	son inherit	daughter inherit	children inherit
Treatment indicator	0.094**	0.102**	0.096**	0.133**
Treatment X Female head	-0.044	-0.052	-0.158**	-0.046
Number of years possessed	0.001	0.001	0.001	0.000
Parcel was purchased	-0.008	0.043	0.008	-0.021
Parcel was inherited	0.026	0.072**	0.038	0.004
Acquired through other means	-0.051	0.167*	-0.030	0.025
Parcel size in hectares	-0.023**	0.006	0.004	-0.012
Head's age	0.001	0.002	0.004**	0.003**
Female headed household	0.071*	0.210***	-0.003	0.094***
Number of observations	6325	4053	4053	6325

includes controls for hh demographics, spatial FE 1000m, spatial SE

Implications for policy

- ▣ **Support to gov't emphasis on formal land rights**
 - Substantive: Land rights key to an interlinked economy (rural-urban links)
 - Process: Participatory pilot approach to formulate policy (other countries)
 - Continued learning with quick evaluation to feed into OLL revision
 - But: Investment and tenure security only the first step
- ▣ **Measures to further enhance land market potential**
 - Establishing technically viable local registries (decentralization)
 - Reduce transaction cost through proper fee structures & model leases
 - Publicly provide information on land prices and transfers
 - Clarify extent and enforcement of land use restrictions (incl. subdivision)
- ▣ **Provide basis for broader credit and gender effects**
 - Urban: Fully integrate ownership with mortgage registry
 - Rural: Link up & train informal sector to expand lending to agriculture
 - Maybe worth to think about more specific urban evaluation