



Assessing the impacts of land tenure regularization: Evidence from Rwanda and Ethiopia



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ABSTRACT

This article connects theoretical effects of the Land Tenure Regularization (LTR) and available evidence from Rwanda and Ethiopia. Based on a review of 26 quantitative and qualitative relevant and robust studies, the paper contributes to the understanding on what evidence exist to validate the LTR effects and how to gain long-term economic, environmental and social impacts. Results suggest a propensity of well supported evidence for positive LTR effects on investment in soil conservation and the role of LTR in enforcing certain dimensions of women's empowerment. Agricultural productivity and rental and sale effects are more supported in Ethiopia but with mixed findings for the case of Rwanda. There is lack of any robust evidence for credit mechanism except some very limited support from qualitative studies on Rwanda as well as for youth inclusion in the LTR. Key institutional and economic factors identified for long-term impacts relate to reliable agricultural market incentives and contract arrangement, adapted financial products and services to guaranty credit access and collateralized effects of LTR, and active land markets to support modernised and collective investment in agriculture.

1. Introduction

Despite the efforts in LTR in Africa to reform aspects of land property rights, to instil modern land registration systems, and secure land tenure; a lot remain to ensure consequent economic, environmental, and social benefits especially in Sub-Saharan Africa. The literature has identified several venues through which tenure security can translate into development impacts. Tenure security has the potentials to support effective land markets, increased agricultural productivity, support environmental management, political stability and social justice, long-term land related investment, efficient land reallocation for potential users, and access to formal credits by using land as collateral (Williamson, 1997; Fosudo, 2014; Melesse and Bulte, 2015; Ali et al., 2014; Holden and Otsuka, 2014; Higgins et al., 2018; Holden and Tilahun, 2020). However, it is absolutely essential that the LTR process is designed and implemented appropriately to serve the needs of the respective countries (Williamson, 1997). Similarly, other land-related structural challenges pertaining to land tenure such as overlapping land tenures systems, poverty, and inequality within the broader menu of economic needs have also to be addressed in order to optimize expected benefits of the LTR (Bizoza, 2015; Higgins et al., 2018).

Consistent with Feder and Nishio (1999), there is a clear and consistent case of empirically proven economic benefits of the land registration and certification in Asia, Latin America, and the Caribbean; while the picture emanating from various prominent studies in Africa has been mixed (Place, 2009; Melesse and Bulte, 2015; Higgins et al., 2018). For instance, an extensive review done by Place (2009) on relationship between land tenure and agricultural productivity in Africa suggests the co-existence of both convergence and divergence in the economic and policy literature on the impacts of the land tenure. He continues to argue that much attention should be paid to the local context and the overarching macro and sectoral conditions within which tenure systems operate. Similarly, Higgins et al. (2018) based on the analysis of 59 robust studies found strong evidence for positive effects of land tenure security on productive and environmentally-beneficial agricultural investments as well as on female empowerment. But they found no support for links with productivity, access to credit, and income. They further argued for consideration of other contextual factors that shape the validity of expected causal effects of LTR such as potential for discrimination and elite capture, historical experiences with land ownership, and the characteristics of local lending institutions. This raises an important policy question on the effectiveness and

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efficient allocation of privatized land tenure rights through on-going land tenure regularization programs in Sub-Saharan Africa.

Rwanda and Ethiopia are considered as the most prominent African countries in embarking into the Land Tenure Regularization (LTR) programs in a very cost-effective and participatory manner. In Rwanda, the LTR program was initiated since 2008/9 for the pilot and the scale-up went from 2009 to 2013 where a total of 10.3 million of parcels were registered. In Ethiopia, the LTR was done in two phases starting in 1998/9 where more than 25 million of parcels were registered and certified in the four regions of Tigray, Amhara, Oromia, and SNNPR (Byamugisha, 2016). Subsequently, this low-cost land registration and certification has started to expand in other developing countries after the establishment of documented land rights through land registries which in turn has also contributed to strengthening tenure security, particularly so for female land holders in Rwanda and Ethiopia (Holden and Tilahun, 2020, citing Deininger et al., 2011; Holden et al., 2011, Bezabih et al., 2016, Melesse et al., 2018, and Ali et al., 2014). Increasing land tenure security through LTR is suggested to have a variety of social, economic, and environmental benefits such as increased investment in agriculture, use of land as a collateral, and incentivise the rental and sale of under-used land, thus increasing allocative efficiency and reducing economic and social inequalities (Higgins et al., 2018).

Against this backdrop, the aim of this research is to review the literature on land tenure regularization and its impacts in Rwanda and Ethiopia to take stock of the justified case of empirically proven social, economic, and environmental benefits of land tenure programs, in a bid to contribute to the current discourse by the policy in this particular area. This study builds upon previous similar studies (i.e. Lawry et al., 2017; Holden and Ghebru, 2016; Higgins et al., 2018) to take advantage of new studies and to give a particular focus on Rwanda and Ethiopia, the two Eastern African countries that have been viewed as first movers to embarking on LTR programs, this being an additional distinctive contribution of this study. The paper achieves the above objective by exploring the following two research questions: (i) what empirical evidences exist to sustain the relevance of the LTR? (ii) what enabling institutional and economic considerations to strengthen long-term impacts of LTR? The first question is important to take stock of empirical evidences of LTR impacts and inform possible policy adjustments. By addressing the second question, we provide the institutional and economic perspectives to maximize long-term gains from land tenure regularization specifically in Rwanda and Ethiopia as well as in other African countries undertaking or yet to design and implement the LTR programs Sub-Saharan Africa or elsewhere in Africa.

The remainder part of this article is structured as follows. It starts by describing the theory of change that has guided the analysis followed by the methodology and sources of information used to validate this study's questions. We present further the findings contrasting both the theoretical expectations and evidence for economic, environmental, and social effects of land tenure regularization: increased agricultural productivity, improved land markets, and increased access to credit and land-based investment in the context of Rwanda. Next to this, we reflect on key considerations with regard to institutional and economic factors for long-term impacts of LTR in study countries and elsewhere in Africa.

The last section concludes the paper.

2. Theory of change of LTR impacts

The literature suggests positive effects of land tenure regularization on different livelihood outcomes and impacts due to enhanced land tenure security for instance in China, Thailand, Latin America, Eastern Europe, and in Africa (Deininger et al., 2008; Higgins et al., 2018). Particular to Africa, some countries like Rwanda, Ethiopia, and Botswana have initiated and implemented large-scale land tenure and land administration regularization programs. Their purpose is to address issues pertaining to land tenure insecurity, land concentration in the hands of few people, and land grabbing under the auspices of large-scale land related investments among others (Odusola, 2014; Byamukama, 2016). But the debate in the last few decades focused on whether land tenure reform in terms of land registration and certification through land tenure regularization and formalisation programs is commendable (Pinckney and Kimuyu, 1994). It is hypothesized from the literature that land tenure security resulting from land tenure regularization in the form of registration and certification of land titles can lead to increased agricultural productivity, facilitate efficiency in land transfers through increased land markets and subsequent transactions, improve access to credits since land can then be used as collateral, increase investment in soil and water conservation measures, increased output/income, reduce undesirable social impacts such as conflicts and land based discrimination, and induces increased productive capacities of women through improved rights of land ownership and use (Lawry et al., 2017; Higgins et al., 2018; Holden and Tilahun, 2020).

This paper explores evidence of the links between LTR and expected outcomes following the theory of change adapted from Higgins et al. (2018). The proposed theory of change (see Fig. 2) portrays land tenure security as an ultimate goal of LTR activities and outputs which, in turn, will translate into expected outcomes and impacts. However, this relationship should be seen far from a linear but a simultaneous process because of potential endogeneity effects stemming from possible synergies among the outcomes. For example, as stated by Higgins et al. (2018), one of the expected synergies is that both increased credit access and increased investment outcomes can jointly contribute to the expected impacts of increased productivity, income and food security.

The assessment of LTR effects is often done at outcome and impact levels with little effort to understanding other determinant factors of long-term impacts of the LTR. Guided by this change pathway of LTR, we follow a two-stage process in documenting the evidences of LTR effects (Fig. 1). In the first stage, the focus is on LTR outcomes and impacts resulting from LTR related activities and outputs (see links between A, B, and C). In the second stage, the interest is to discuss some pre-requisite enabling institutional and economic conditions in order to achieve long-term impacts of LTR program on identified outcomes within the LTR's theory of change (see links between A, D, B, and C). The links between LTR activities leading to land tenure security (LTS) and LTS leading to the outcomes/impacts are mainly captured by the proposed assumptions (see Fig. 2 from A up to K) while they also deserve their own assessment even though it is beyond the scope of this

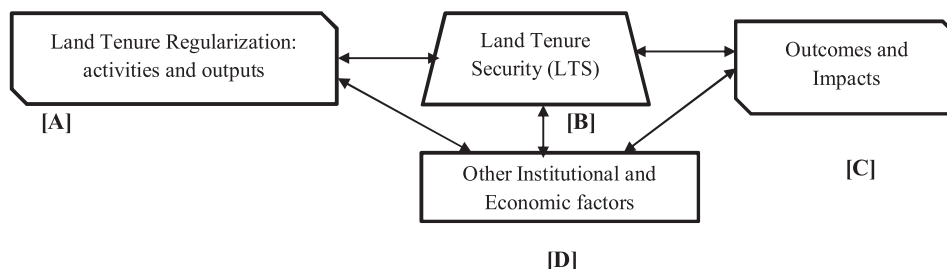


Fig. 1. Path diagram of two-stage process in documenting LTS effects.

LTR activities	Outputs	Outcome	Impacts
Land registration and certification activities: field preparations, mapping, demarcation of parcels, certificate/title issuance. Facilitate subsequent land laws and related policy reforms.	Transparently demarcated parcels and distribution of land titles Increase distribution of certificates and formal proof of ownership	<ul style="list-style-type: none"> Increased investment in agricultural production Increased credit access Increased land rentals and sales 	<ul style="list-style-type: none"> Increased agricultural productivity Increased income from agricultural Improved Financial Inclusion off-farm employment
Rehabilitation and distribution of degraded and /or un(der) used land	Increase in land ownership by women and other social groups	Improved equality in land distribution and ownership and particular for women and other disadvantaged social groups	<ul style="list-style-type: none"> Improved food security and nutrition Increased social order and cohesion. Reduced land-based conflicts Increased access to land by the youth for their inclusion
Institutional strengthening, arrangement, and enforcement of the LTR	Efficient land use and management		
Facilitation of land (re) allocation, leasing, and sharing through reduced transaction costs	Improved land governance and enforcement of land tenure security	Increased investment in soil conservation	<ul style="list-style-type: none"> Improved land management Soil conservation and improved soil fertility
Awareness raising	Improved awareness and claim of land entitlement		
Key assumptions / Outputs		Key assumptions / Outcomes	
<ul style="list-style-type: none"> A. Appropriate design and implementation of activities B. Readiness of the existing institutions to adopt and adapt new changes C. Land owners have enough land to cultivate and lease for rentals D. Government is ready for fair and objective reforms 		<ul style="list-style-type: none"> E. There is sufficient capital and incentives to invest beyond LTR F. Increased security of tenure. G. Women face no other barriers for land access and use as well as resulting economic benefits H. There is capacity for efficient use of established Soil and Water Conservation (SWC) 	
		Key Assumptions	
		<ul style="list-style-type: none"> I. Other markets constraints are controlled. J. Other systems are conducive to the LTR K. Others. 	

Fig. 2. Theory of change of land tenure security activities. Source: Adapted from Higgins et al. (2018)

paper.

3. Methodology and description of case studies

The review of empirical evidences of LTR effects covers two countries in East Africa namely Rwanda and Ethiopia. Both countries are highly agrarian and characterised by high lands, experiencing increased population (with an estimate annual growth 2.3 % and 2.5 %, respectively), diminishing natural resources including per capita land size (less than 0.5 ha), and increased investment in soil and water management (Headey et al., 2014). But these two countries are going through different land tenure systems. For Ethiopia, until 1975 all land was declared to be the state land while user rights of land were distributed in an equitable manner within communities where both land rental and sale were prohibited before the 1991 regime that was a bit market friendly yet with some restrictions (Holden and Otsuka, 2014). Thus, the Ethiopian land certification was initiated in response to widespread concerns over land and tenure insecurity associated with state land ownership (Melesse et al., 2018). Accordingly, the programme was implemented in four populous regions of the country: Tigray, Amhara, Oromia, and the Southern Nations and Nationalities (SNNR). In respect to Rwanda, the government of Rwanda had claimed ownership of the land with only usufruct rights for users till 2005 (Musahara and Huggins, 2005). Later, the Organic Law adopted in 2005 has promoted registration and commoditization of land, enforcing private land rights meant to vehicle land markets and investment (Bizoza, 2011; Kagaba, 2015).

In response to deficiencies in land governance, the two countries have taken significant steps in visible improvement in land administration including successful land tenure regularization programs and land legal reforms aimed to improve land governance through privatized tenure rights and to promote gender equity (Deininger et al., 2011; Ali et al., 2014; Djurfeldt, 2020). Despite the fact that these countries have embarked on privatization and certification of land

tenure rights, but tenure rights are distributed differently in these two countries. For Rwanda, tenure rights are distributed equally among legally married spouses (50 % for the wife and 50 % for the husband) while in Ethiopia they vary from regions and between the spouses. For instance, in some regions of Ethiopia, the names of both the spouses are on the certificate, whereas in Tigray, the land is registered in the name of the household head only (Dokken, 2015).

This article involves a review of the literature which provide robust quantitative and qualitative evidence on the existence of LTR outcomes and impacts from the year 2000 onwards. Case studies considered are those that studied land tenure regularization impacts in Rwanda and Ethiopia guided by a theory of change that reflects the expected effects of land tenure related activities on the following development outcome variables: increased agricultural productivity, long-term investment in soil conservation and water management, land rental and sale, access to credits, and on social order in terms of women’s empowerment and inclusion of the youth in the LTR process. However, this article does not enter into the discourse on differences regarding the impacts of LTR between Rwanda and Ethiopia nor the factors explaining those differences; this is beyond the scope of this study.

Information used to validate the LTR effects and explore how to gain long-term economic, environmental and social impacts in Rwanda and Ethiopia was collected using online search engines such as Google Scholar, the authors have used a number of relevant case-studies conducted in Rwanda and Ethiopia obtained from other scholars and professional networks. Moreover, few quantitative studies exist, a challenge has been to obtain sufficient empirical led studies on the LTR impacts. In order to address the imbalance in the length of studying LTR impacts vis-à-vis each of the above outcomes, we considered where necessary qualitative studies in order to provide a more supported evidence. Furthermore, we also considered case-studies focusing on Eastern and Sub-Saharan Africa or elsewhere including Rwanda and Ethiopia. These have added on the available evidence base but also supported arguments made and lessons for future land tenure

Table 1
The most focus of selected case studies.

Outcome area	Total case studies per outcome		Case studies per outcome and country	
	No of studies	% Share	Rwanda	Ethiopia
Agricultural productivity	5	19	1	4
Land rentals and sales	10	38	6	4
Credit access	4	15	3	1
SW Conservation	7	27	2	5
Women's Empowerment	7	27	4	3
Youth Inclusion	2	8	1	1

regularization programs in Africa.

From Table 1, overall, the most covered LTR outcome by the quantitative studies is the link between land tenure related activities and land rentals and sales (38 %), followed by women's empowerment outcome (27 %), investment in soil and water conservation outcome (27 %), agricultural production and productivity outcome (19 %), and credit access outcome (15 %), and youth inclusion in the discourse of LTR (8%). Comparing Rwanda and Ethiopia on their respective coverages by sampled case studies, Ethiopia is the most studied on the links between LTR and agriculture production or productivity as well as on land tenure and investment in soil and water conservation for agricultural and environmental benefits. Out of the total cases studies, Rwanda is mostly covered on the links between LTR and land rentals, credit access, and women's empowerment. Only two studies distributed equally addressed the inclusion of youth in LTR processes. Looking at the coverage level of the expected outcomes by each sampled study, on average each study covers three outcomes of the land tenure security as results of the land tenure regulation processes in the research area. We have also considered four qualitative studies from Rwanda and two previous reviews studies that have considered one or more outcomes in Rwanda and/ or Ethiopia. Case-studies co-authored by Ali et al., Deininger et al., Holden et al. and Bizoza are dominant in this review, implying their constant research interest on this subject matter in these countries and hence providing a certain momentum and consistency in the findings on the relationship between land tenure and the expected outcomes addressed.

4. Presentation of the findings on LTR impacts

This section presents the findings after contrasting the hypothesized LTR effects against the evidence from 26 quantitative and qualitative case studies judged robust based on the rigorous methodologies used and relevant for this review. There are different approaches to synthesize and present the findings from similar review studies. We have followed Higgins et al. (2018) and applied the narrative synthesis approach to synthesize and discuss the findings. In respect to the purpose of this study, we assessed the findings that provide evidence for causal linkages between land tenure regularization and expected outcomes as described in the theory of change followed in this review. Where possible, we provide the estimated impact for quantitative studies. In addition, in our synthesis of the findings we bring at certain level a comparison between Ethiopia and Rwanda to show what evidence exist in one country or both without focusing on the difference in their magnitude. Other referenced studies are further used to support the discussion of the findings from the specific case studies and relate them with other research from similar contexts.

4.1. Agricultural productivity effects of the LTR

Due to the historical importance of land in agriculture, formalization of land ownership may translate into increased agricultural output and inherent income especially when accompanied by adequate support

services to agricultural production. For the case of Rwanda and Ethiopia, there are yet scarce empirical evidences of the LTR productivity effects. Only five of the identified case studies have directly addressed causal effects on agricultural productivity, one on Rwanda (Ali et al., 2015), and four on Ethiopia (Deininger and Jin, 2006; Deininger et al., 2011; Holden et al. 2009; and Melesse and Bulte, 2015). In Ethiopia, the study by Melesse and Bulte (2015) echoed robust positive agricultural productivity effects of the land registration and certification initiated in 1998. They compared the productivity of certified plots with uncertified plots using the Propensity Score Matching (PSM) approach. Their findings postulate higher productivity of certified plots by 35.4 % than uncertified plots with an annual income gain of US\$ 75.4. The same trend was observed by Holden et al. (2009) where they noted an increase in land productivity of 40–45 % on certified lands, a sign of land intensification. Deininger et al. (2011), though with no direct estimate of the LTR links with agricultural productivity but assert that certification-induced rental markets effects could enhance productivity and income through selection of productive tenants by the landlords.

For the case of Rwanda, we did not find any case study attributing directly changes in agricultural productivity and inherent income to the land tenure regularization. The proxied only study is by Ali et al. (2015) who did not observe any difference in agricultural productivity among buyers, sellers, and households that do not participate in the land sales markets as result of the LTR. But they observe buyers tending to have significantly higher levels of farm abilities. Further, productivity effects of the LTR are also sustained by two review studies that involve Ethiopia and Rwanda (Holden and Gebru, 2016 and Higgins et al., 2018). Thus, consistent with Feder and Nishio (1999), additional incentives such as better markets are needed to increase the output per land unity and income complementary to LTR effects.

4.2. Land rental and sale effects of the LTR

It is highly hypothesized from the literature that privatization of land titles enhances reallocation of land to more efficient users and transfer of land rights through active land markets. This is verified by three studies for the case of Ethiopia (Deininger et al., 2011; Holden et al., 2011; and Holden and Bezu, 2016) while it is validated in Rwanda by five case studies (Ali et al., 2014, 2015; Ali et al., 2016, 2019, and Bizimana, 2011). Deininger et al. (2011) noted a positive and a statistically significant marginal effect of land certification with an increment of 13 % points of the propensity to rent out and the magnitude of 9 points or 1/10 of a hectare for the average farm in the Amhara region of Ethiopia. Likewise, Holden et al. (2011) found a positive effect of land certification on allocative efficiency on land rental markets in Tigray region. Further, Holden and Bezu (2016) tested whether land certification have contributed to reduced resistance against land sales and increasing land values, they ended with very little supportive evidence in favour of LTR effect.

For the case of Rwanda, Ali et al. (2014) assessed if LTR had effects on land markets. They measured this through changes in land market participation (through a categorical variable taking -1,0, and 1) or the actual area transacted in 3 years immediately preceding the reform (i.e. 2004–2007) as compared to 3 years immediately following it (i.e. 2007–2010). Their results rejected the assumption of LTR-induced land sales. Likewise, one of their estimated equation (spatial fixed equation) pointed out a statistically significant reduction in land market activity. Part of explanation provided re rejection of LTR effects is linked to the change of the fees meant to be paid upon registration of a transfer from 6% of the property value to a flat fee of Rwf 20,000 which for smaller plots, could easily exceed 25 % of the land value. The second reason relate to legal prohibition of registering a transfer of parcels of less than 1 ha while majority of land owners have even less than this. Subsequently, a follow up study by Ali et al., 2015 has substantiated positive impact of land tenure regulation on the functioning of land rental and

Table 2

Trends of land transactions in Rwanda (2005/6- 2016/7).

Source: NISR (2018).

Types of Transactions	Year 2005/6			Year 2010/11			Year 2016/17		
	Rwanda	Urban	Rural	Rwanda	Urban	Rural	Rwanda	Urban	Rural
Own agricultural land	70.8	59.9	72.0	84.0	73.0	85.2	79.5	61.4	81.3
Purchased land	11.2	5.2	12.4	14.0	6.5	15.4	7.7	3.3	8.7
Sold land	5.7	2.5	6.3	9.0	5.8	9.6	6.4	2.0	7.5
Rented out	11.4	6.6	12.3	11.7	8.1	12.3	8.3	5.0	9.1
Shared crop	19.9	16.1	20.4	18.2	9.4	19.2	6.4	3.4	7.1
Gave land to others	3.0	1.4	3.6	5.4	2.5	6.0	2.8	1.5	3.2
Inherited or gift	5	3.7	5.2	8.3	5.4	8.8	4.0	2.0	4.5

sale markets; but they also affirm that their findings remain with a number of questions to explore by future research. In 2016, based on administrative data obtained in the Land Information System (LAIS), Ali et al. (2016) found that in 2014/15 annual volumes of registered sales ranged between 5.6 % for residential land in Kigali and 0.1 % for agricultural land in the rest of the country. But they also affirm high persistence of informality of transfers in rural areas. Subsequent study by Ali et al. (2019) shows that five years after completing first-time land registration, 87 % of rural transactions remain informal though active land markets did not increase inequality and urban informality. On the land rental, Bizimana (2011) found renting out to be positively affected by tenure certainty and enforcement ability of the land rights.

We further performed a trend analysis using national administrative data by the National Institute of Statistics (NISR) on land transactions for the case of Rwanda (see Table 2). We considered three periods representing the situation before the LTR (2005/6), situation during which LTR has been initiated (2010/11) and the situation after LTR (2016/17) using the same variable indicators used for the national level cross-sectional surveys in 12 months to measure land transactions (NISR, 17). The following national level status is observed when compared the period 2010/11 as a baseline and 2016/17 representing the current status. Overall, there is a decline in agricultural land (4.5 %), land purchases (6.3 %), land sales (2.6 %), land rented out (3.4 %), shared crops (11.8 %), land given to others (2.6 %), inheritance (4.3 %). A possible explanation of these changes in land transaction reflect how land is increasingly becoming a more valuable and the main asset for the majority of the population as result of a combined effect of increased land scarcity and land tenure security, among others. The existence of land tenure security facilitates the land use consolidation policy and hence more crop sharing and land rentals than selling. However, the causal relationship of land tenure regularization and these changes needs further analysis of other contextual factors that may shape the validity of the expected LTR effects.

4.3. Collateral and access to credit effects of LTR

Access to credits as result of collateralized lands is argued to be a key motivating factor of land tenure formalization program. Out of the five identified studies for both Ethiopia and Rwanda, there is rare evidence supporting increased access to credits as result of land tenure regularization. In Ethiopia, despite land tenure regularization, land remains a state property and it becomes difficult to anticipate LTR credit and collateral effects when land cannot be used as collateral to secure a loan (Melesse and Bulte, 2015). Similarly, the evidence from Rwanda also shows no significant impact on credit access (Ali et al., 2014). A qualitative study by Abbot and Mugisha (2015) confirm occurrence of fewer cases where LTR has encouraged landowners to use their lease certificates as collateral and secure formal loans to invest in farm and/or non-farm enterprises. The impact of LTR on credit access remains at perception level. The study by Bizoza (2014a) sustained significant mean difference (estimate of 11.8 %) in the perceived rights

to sell or use land as collateral. Accordingly, about 34 % of households confirm to have used land as collateral in 2012 (after LTR) compared to almost 10 % in 2005 (before LTR). Ali et al. (2015) have further observed in Rwanda that risk aversion and high transaction costs may make use of land as collateral difficult even if clear title to it exists, they conclude that the impact of LTR on credit access will vary across regions.

These findings should not be a surprise. Because for the LTR program to yield on credit and ensure collateral effects it goes beyond land certification and titling. Other factors are even more important. These include the need of effective rural financial institutions, households 'capacities to present bankable projects for credit and be credit worthy along the willingness to take the associated risks, and the mortgage system that is linked to both the market and the land registry systems (Deininger et al., 2011). Also, Higgins et al. (2018) in their review from other parts of the world come to a conclusion on how access to credit is the most contested linkage within the theory of change of land tenure security where majority of studies fail to observe effects resulting from higher LTR interventions.

4.4. Long-term land-based investment effects of the LTR

Most of the LTR programs predict an increase in land-based investments such soil and land management infrastructure due to land registration and certification. We also find positive effects from the six identified case studies in Rwanda (Ali et al., 2014 and Bizoza, 2014b) and in Ethiopia (Gebremedhin and Swinton, 2003; Deininger and Jin, 2006; Deininger et al., 2011; and Melesse and Bulte, 2015). For instance, in Ethiopia the study by Gebremedhin and Swinton (2003) realized positive but not statistically significant effects of factors associated with land tenure security on intensity of use or investment in stone terraces meant for soil erosion control. One of the associated prerequisites is that the influence would be strong when farmers feel certain to cultivate the same plot more than 5 years and whether they may leave the plots that receive the investment to their children. Further, the study by Deininger and Jin (2006) explored the determinants of different types of land-related investment and its possible impact on productivity. They differentiated tenure security and land transfer rights where they noted past redistribution of land rights having a positive impact on the planting of trees but discouraging investment in terracing. This difference, they argue, is explained by the fact that some investment can be used to establish or visibly manifest land rights. Their further analysis concluded that transfer of land rights is unambiguously investment-enhancing. Likewise, Deininger et al. (2011) found positive and a statistically significant marginal effect of the land certification on the repairs and new investments in soil and water management with an estimated average treatment effect of 30 %. Finally, results from Melesse and Bulte (2015) substantiate that land certified households are more likely to adopt land management strategies than the uncertified ones.

The two identified case studies in Rwanda found positive effect of

LTR. Ali et al. (2014) evaluated short-term impact of LTR found that this has featured a very high impact on investment and maintenance of soil conservation measures such as terraces. For advanced long-term impacts, they suggest a clear completion of the land registration; review of the institutional structures, specific rules for the implementation and the policy framework. Bizoza (2014a) estimated a positive but not statistically significant impact of land tenure security on the adoption of bench and progressive terraces for soil conservation. The same study revealed that 80 % of the survey respondents felt they were tenure secured even before the land certification and titling since the majority have inherited the plots from their fathers. Respondent stated the “land titling come just to formalize or modernize their land titles – previously they had what they used to call “*Ibuku*” literary “a book on which the size of the land and the names of the owner were recorded by the administrative officials.

From these findings we argue in cases like Rwanda and Ethiopia, the positive relationship between land tenure security and land enhancing -investment need further research to establish whether it is not a correlational effect than an absolute causal effect. Subsequently, identified case studies substantiate the likelihood of farmers investing in soil conservation when they feel they have tenure security or in order to create tenure security of their landholdings (Deininger and Jin, 2006; Bizoza, 2014b). Thus, despite this general positive trend of LTR effects on land-based investment for soil conservation and productivity enhancement, these results should be treated with caution, especially in African countries where traditional institutions and tenure insecurity are still vivid even in the midst of land tenure regularization as well as in a context where investment in soil conservation is mainly government led- which is the case for Rwanda.

4.5. Social effects of LTR

Social effects of the LTR are well covered aspects by identified case studies both in Rwanda and Ethiopia. The focus is more put on the role of LTR in enhancing social order and cohesion in terms of reduced land related conflicts, women’s empowerment, and ensuring food and nutrition security. We present in this sub-section evidences from both quantitative and qualitative studies on women’s empowerment and the extent to which the inclusiveness of the youth is taken into account in the LTR process.

4.5.1. Women’s empowerment

As is true for much Africa, LTR greatly matters for women’s empowerment (Feder and Nishio, 1999; Sagashya, 2012; Bhaumik et al., 2016; Bizoza, 2019). Three identified case studies confirm the LTR effects on women’s empowerment in Ethiopia (Holden et al., 2011; Dokken, 2015; and Melesse et al., 2018). However, gender related bias in land ownership and use by women is still observed. For example, the study by Dokken (2015) has estimated gender differences in land ownership in Northern Ethiopia and found that female-headed households have 25 % smaller owned landholdings and 54 % smaller operational landholdings. Also, there remains challenges linked to female households’ abilities to protect their rights in case of land conflict due partly to the fact only the household head is registered as the owner of the land. Registering both spouses on the certificate could give more land tenure security for women in case the family dissolves. This policy proposal is well supported by Melesse et al., 2018 they demonstrate how joint land certification has a positive and statistically significant impact on various (but not all) dimensions of women’s empowerment. They agree, certified women are more likely to participate in household decision, community activities, be more knowledgeable and willing to protect their rights, and have higher levels of perceived tenure security. Likewise, Holden et al. (2011) found that female-headed households have benefited from the improved tenure security and they became capable to rent out their land through sharecropping contracts; this resulted into other benefits such as food security and improved child

nutrition (Holden and Tilahun, 2020).

Rwanda is often put forth as the most progressive advocates of women’s rights in Sub-Saharan Africa both in terms of enhancing land legislation and gender equality (Djurfeldt, 2020). Two quantitative studies identified validate positive LTR effects on women’s empowerment (Ali et al., 2014, 2015). They have confirmed improved land access for legally married women (about 76 % of married couples), better recording of inheritance rights without gender bias, and improved women’s perceived land rights as claimants of household parcels when compared the period before LTR and after. Also, additional five qualitative studies identified support this trend of women’s empowerment as result of the LTR through their description (Polavarapu, 2011; Jones-Casey et al., 2014; Abbot et al., 2018; Bayisenge et al., 2015 Bayisenge, 2018). But some suggest, in the context of LTR, women’s empowerment should be seen beyond the equation of *Women = Men* ; but also integrate their ability to use, control, and claim their rights over land (e.g. Jones-Casey et al., 2014).

Nevertheless, this status for Rwanda can not solely be attributed to LTR. Prior to the start of land tenure regularization in 2010 in Rwanda, the government had already adopted the 1999 inheritance law as an act to eliminate all types of traditional bias against female land rights ownership. Subsequently, two additional pieces of legislation, the national land policy of 2004 and the Organic Land Law (OLL) of 2005, constitute the core legal and policy framework for Rwandan land relations and prohibited all sorts of gender-based discrimination (Kagaba, 2015; Bayisenge, 2018; Djurfeldt, 2020). Thus, the LTR program become an enabler of the structural shift earlier embarked by the government of Rwanda towards gender equality and equity as far as women’s empowerment is concerned. All these legal and institutional reforms have empowered women to have access on land and increase their productive capacities. Djurfeldt (2020) has grouped these effects into what called primary effects (related directly to land use and ownership) and secondary effects linked to gender relations in general. Thus, effects related to land ownership are clear but those linked to land use and to gender relations in general need further research and policy interventions.

4.5.2. Inclusion of the youth in the LTR

Little evidence was taken from the case studies assessed with respect to LTR effects on the inclusion of the youth in the land tenure systems. For the case of Ethiopia, only one review case study considered (Holden and Otsuka, 2014) explore the unmet needs of the youth when assessing the roles of the land tenure reforms and land markets in the context of population growth and land use intensification in Africa. They confirm how lack of access to land for livelihood is likely to be an important driver for youth migration, particularly in rural areas with very high population densities and with few non-farm job opportunities. Likewise, for the case of Rwanda, Bizoza (2014a) argues that uptake of the new entrants to the labour market by the non-farm sector is positively correlated with land scarcity.

Recent land laws both in Ethiopia and Rwanda prohibit subdivision of agricultural lands below 0.25 – 0.5 ha and less than 1 ha respectively (Holden and Otsuka, 2014; Ali et al., 2014). The earlier options of land transfers through inheritance are disappearing because access to land remains constitutional, calling for other innovative models of access to land especially for the youth. This applies even for other experiences in Africa where land remains concentrated in the hands of the spouses (fathers and mothers), traditional chiefs, the clan, the state, and large investors compromising the access by the proportion of the youth willing to invest in agriculture (Njeru and Gichimo, 2014; Bizoza, 2019). Thus, there is need to effectively integrate the notions of land tenure regularization and those of youth employment. Land tenure regularization may not be a sole panacea to the problems facing the youth. But, despite no strong evidence from this review on youth’s inclusion impacts of LTR, they still form part of expectations from the policy perspective. Again, it difficult to dissociate tenure security and

youth employment as well as the overall structure of the economy (Polavarapu, 2014; Foxa et al., 2016). Thus, more secure property rights and removal of restrictions on the land markets have the potential to create both efficiency and equity benefits – including those for the youth (Holden and Otsuka, 2014).

5. Discussions

Guided by the evidence from the reviewed case-studies, the aim in this section is to discuss the findings and key pre-requisite enabling institutional and economic considerations for research and policy towards long-term economic, environmental, and social impacts of LTR.

Findings on the causal links between LTR and agricultural productivity, land rental and sale, and access to credits suggest more pronounced positive LTR effects on productivity and land rentals and sales for the case of Ethiopia with no empirical evidence for the case of Rwanda on productivity effect plus mixed effects for land rentals and sales. From identified case studies in Rwanda and Ethiopia, there is no evidence of LTR effects on credit access. Considering the causal chains these three outcomes, addressing transaction costs restraining access to better agricultural markets, effective contract arrangements, active land and credit markets constitute critical incentives for long-term economic impacts of LTR. One still observes high transaction costs, market inefficiencies, and little development in enabling institutions which once developed can lead to more private investment (with LTR being one of the enablers) and induced agricultural productivity (Byiringiro and Reardon, 1996; Jayne et al., 2002; Alene et al., 2008; Bizoza and Ngabo, 2014).

Another consideration is on active land markets to uphold the expected economic effects from the LTR and land rentals and sales chains. However, other contextual factors remain to be addressed for sustained LTR effects such as certainty on land ownership, effective joint land certification, clarity on transferability of land rights and full title, constraining land laws related to land subdivision, efficient land use planning, and the level of influences of the State on land systems (Bizimana, 2011; Jones-Casey et al., 2014; Bizoza, 2015; Holden and Otsuka, 2014). Furthermore, the case studies identified confirm in unambiguously manner lack of LTR effects on access to credits. Effective rural financial institutions, bankable business projects, and the de-risking of the agriculture sector are indispensable for more and sustainable LTR benefits (Chamberlin et al., 2015; Ali et al., 2014; Pinckney and Kimuyu, 1994; Melesse and Bulte, 2015). To capitalize on the causal effects of the LTR on credit access, some persistent structural challenges facing the rural financial institutions need first to be addressed comprising high interest rates and non-adapted financial products to specific context of potential lenders, small sized land holdings constraining large-based investments, limited financial literacy to process sufficient formal loan application, and inability to develop bankable and profitable businesses (Higgins et al., 2018). Also, in some instances, land is unlikely to be used as collateral for accessing formal credits services and collateralized effects are not expected from the LTR program especially when land remains as state property like in Ethiopia (Melesse and Bulte, 2016). Apart from the land property system, banks and microfinance are much interested in the development there in lands than in titled lands themselves. For the case of Rwanda more than 82 % of collaterals are for mortgages. Thus, the collateral effects of the land depend on the assets within the lands supported by land certification and registration. Additional explanation is found in the little development of credit markets in the research area and elsewhere in Africa (Holden et al., 2016).

The direct positive link between land tenure regulation and land enhancing investment mainly in terms of soil conservation is substantially supported by the results from the identified case studies. However, though positive, not in all cases was found with significant impact. We argue that this can be interpreted more as a correlational effect than a real causal effect. There is yet a need for more clarity on

whether the investment in soil conservation is to create tenure security or to exercise tenure security for more land productivity (Deininger and Jin, 2006; Bizoza, 2014a). Secondly, soil conservation measures like terraces are highly expensive and hardly profitable especially in the early age of their establishment making majority difficult for individual investment (Bizoza and De Graaff, 2012). Consequently, this type of investment is mainly government led in collaboration with development partners, leaving little room for differential LTR effects. Despite the general trend of positive effects of LTR, a call has been constantly made for further investigation to take into account specific institutional and economic contexts, potential bias as well as land tenure systems (Higgins et al., 2018; Melesse et al., 2018).

One of the significant findings in this article is a well-supported evidence of LTR effects on certain dimension of women's empowerment though some persistent gender bias in land certification, especially for the case of Ethiopia but also those related to gender relations at household level (Djurfeldt, 2020). Also, the case-study by Bayisenge (2018) shows persistent social norms and other customary practices to enable materialization of the general idea that women should benefit from the on-going land reforms in Rwanda. Additionally, cognisant of the potential links between LTR and access to land by the youth from the policy perspective, we find however no strong evidence from this review for the case of Rwanda and Ethiopia.

6. Conclusions

In this paper we bring contribution to the understanding of the expected effects of land tenure regularization (LTR) or certification on economic, environmental and social outcomes drawing on evidence from Rwanda and Ethiopia. Our literature review suggests that LTR is an emerging program in Sub-Saharan Africa, both Rwanda and Ethiopia being considered as the first movers in implementing a very cost-effective LTR. Unlike other previous reviews (i.e. Lawry et al., 2017; Higgins et al., 2018, and Holden and Otsuka, 2014), this review has isolated and expanded the evidence needed to validate the LTR impacts specifically for Rwanda and Ethiopia. We have answered the following two questions: what empirical evidences exist to sustain the relevance of the LTR? (ii) what enabling institutional and economic considerations are needed to strengthen long-term impacts of LTR? Few quantitative studies exist to bring more quantitative evidence which has been complemented by qualitative case studies mainly for the social outcomes.

The evidence gathered from 26 case studies shows that land tenure regularization has not lived up to the theoretical expectations, especially on productivity gains (mostly for the case of Rwanda) and access to credits. This echoes conclusions from earlier reviews on Sub-Saharan Africa on unclear pathways of LTR impacts to justify the on-going privatization of land rights through certification and registration programs. Findings in this study postulate a propensity of significant LTR impacts in terms of agricultural productivity, large-land based investments in terms of soil conservation, and consistent qualitative results on the role of the LTR in empowering and enforcing women's land rights. The evidence on whether LTR induces active land rental and sale and access to credits remain with little support from identified case studies and remain site specific; making difficult conclusive inclusion of these among LTR outcome and impacts for the case of Rwanda and Ethiopia. Moreover, of the case studies identified, we observed little consideration of the potential causal effects of the LTR on youth development as part of the social effects, part of reason being limited consideration of this during the planning of land tenure regularization.

Going forward, there is need to clearly distinguish the agricultural farms in terms of their types of investment and the purpose - whether it is commercial or for food subsistence- when analysing the productivity effects of the land tenure regularization. For future employment and reduced migration of the youth, it is critical to start considering issues facing the youth in the on-going land tenure regularization as part of

the overall structure of the economies. Also, good knowledge of the incentives offered by the LTR especially for the youth adds value to this discourse from both the institutional and economic perspectives.

In order to draw lessons for the future design and implementation of the LTR, we propose greater consideration of other institutional and economic factors. These comprise existence of reliable agricultural market incentives and contract arrangement, better functional financial institutions with adapted financial products and services to guaranty credit access and collateralized effects, and active land rentals and sales to support modernised and collective investment in agriculture. To optimise effects of the LTR, constraints facing the development in the above areas need equally or more attention as LTR programs to address other confounding and interconnected effects with other development interventions. Land certification and registration would serve mainly as a catalyst towards the outcomes together with proper consideration of the above both before and during the implementation of the LTR interventions. It is further noted that the lifespan of LTR interventions in Rwanda and Ethiopia is between 10–20 years. Despite limited knowledge of the optimum time or policy combination needed for LTR to yield its effects, but in some regions these interventions are still in their inception phases calling for more policy interventions to yield the expected outcomes and impacts.

In the future, the researchers in this particular area of land tenure regularization should focus on gathering national level data in addition to micro-level data especially in the form of Panel data to adequately assess the LTR impacts over time and within household/ farm development dynamics. Policy makers and development practitioners in land related interventions need to integrate the Land Tenure Regularization with other land-based interventions. This will make LTR program more impactful not only in terms of equity and justice but also in terms of people's improved livelihoods. There is further general limitation on the empirical concluding findings to appreciate the LTR effects on some outcomes such as agricultural productivity, land rental and sale, inclusion of the youth in the LTR process; these need further research in both countries. Finally, further analysis of LTR will need to embed this in the national and local institutional context; lessons learnt from isolated cases from one or many countries can only be used to validate the progress and can be treated as inputs into the long-term and comprehensive assessment of LTR effects.

Author's statement

This is to certify that I have fully contributed to the conception, design, collection of data and review of the literature, analysis of the findings, drafting of the manuscript, the response to the reviewers of the paper and other needed activities to make this paper ready. I also confirm that my co-author James Opio-Omoding has contributed to the design and the proof reading of the different version of the manuscript.

I stand as the corresponding and the first author of this manuscript.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:<https://doi.org/10.1016/j.landusepol.2020.104904>.

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