



## Impact Evaluation of Systematic Regularization of Land in Urban/Peri-Urban Areas of Maseru, Lesotho: Baseline Survey Report

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## Glossary

AFRE	Department of Agricultural, Food and Resource Economics
CSUS	Department of Community Sustainability
DiD	Differences-in-Difference
FAS	Foreign Agricultural Service
GDP	Gross Domestic Product
GIS	Geographic Information System
GPS	Global Positioning System
GoL	Government of Lesotho
HDDS	Household Dietary Diversity Score
HH or hh	Household
Ho	Null hypothesis
IE	Impact Evaluation
LAA	Land Administration Authority
LARP	Land Administration Reform Project
LSPP	Land Survey and Physical Planning
M	Matched
m <sup>2</sup>	Square Meters
MCA	Millennium Challenge Account
MCC	Millennium Challenge Corporation
MDE	Minimum Detectable Effect
MMC	Maseru Municipal Council
MSU	Michigan State University
M&E	Monitoring and Evaluation
N	Number of observations
PIU	Project Implementation Unit
PPP	Purchasing Power Parity
PSD	Private sector Development
PSM	Propensity Score Matching
RCT	Randomized Control Trial
U	Unmatched
USD	United States Dollar
USDA	United States Department of Agriculture

## EXECUTIVE SUMMARY

This Report describes the results of the baseline survey towards the impact evaluation of the institutional strengthening and land regularization activities conducted in the urban/peri-urban areas of Maseru under the auspices of the Lesotho Millennium Challenge Account's 'Land Administration Reform Project (LARP).'<sup>1</sup> The main objective of LARP is to strengthen the rights of the legitimate occupiers of the land by giving them a title deed of their property (referred as "Lease") and to record the ownership in Lesotho's reformed land information system. The plan is to use a non-experimental *matched comparison group difference-in-difference* (DiD) design approach for this evaluation, whereby data will be collected at household level from both the treatment and control areas before and after the intervention.

This Report presents the results of the baseline survey conducted in 2013 of 1904 households in four Maseru Municipal Councils (MMCs). The results of the baseline data analysis presented in this report provide a picture of the status of surveyed households in study areas of three treatment MMCs (MMC1, MMC2 and MMC3) and one control MMC (MMC27) across three broad categories: a) socio-economic characteristics (i.e., demographics, sources of income, asset holdings, consumption, expenditure, and access to credit; b) land characteristics (i.e., land ownership, land markets, and land investments), and c) perceptions on tenure security and knowledge about land law and rights. The Report also illustrates the potential application of the Propensity Score Matching technique to reduce sample bias and to make the households more comparable across treatment and control areas. Tests of correlation between household / parcel characteristics and the treatment / outcome variables are also presented to examine some of the underlying assumptions of the LARP project logic.

### *Socioeconomic and welfare characteristics of surveyed households*

Results of the survey indicate that more than 40% of the households in the study area are headed by women, the average age of the head of the household is 50 years, and 96% have at least some formal education. The typical respondent household has four members, which translates to 3.4 adult equivalent members. In the study area, the main source of income reported is from salaried employment (64%). The average income among households that reported (or responded to this question) was about 14,500 Maloti per year (or US\$ 1,600) and was higher (but not statistically significant) among male-headed (16,000 Maloti) than female-headed (12,600 Maloti) households.

In general, income from self-employment across the study area is less common than from salaried employment. Sixty four percent of households reported receiving income from salaried employment versus 26% from self-employment. A significant number of households (16.6%) across the study site report receiving money, food or other goods from someone outside the household. The total value of assets owned by an average household is 41,000 Maloti. Male-

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<sup>1</sup> Throughout this report, study area refers to Maseru Municipal Council (MMC) 1, 2, 3 and 27. Parts of these MMCs (especially MMC27) have characteristics of a 'peri-urban' area. Thus, the study area is also referred as being 'urban/peri-urban.' The report does not distinguish or compare results between 'urban' and 'peri-urban' areas. When comparative results are presented they are comparisons of treatment vs. control areas.

headed households own 50% more value of assets (e.g., car, entertainment units, electronic items, and farm assets) than female-headed households.

The total weekly food and non-food expenditure (excluding expenses on asset purchase) per household is estimated to be around 706 Maloti (or 180 US\$) (comprised of about 300 maloti on food expenditure and 400 maloti on non-food expenditure). On a per capita basis, the average expenditure per day in the study area is \$5.2 (at PPP exchange rate of 1 Maloti = \$0.177)<sup>2</sup>, which is on the higher end of average per capita expenditures in other developing countries in the region. About 23% of households live on less than \$2 per person per day in the study area.

About 12% of the surveyed households in the study area reported having applied for credit in the last 12 months. The most common source of credit application was the bank, and the most common reasons for applying for credit were property improvement (29%) and education (29%), followed by purchase of assets (15%) and for construction or purchase of home (15%). For those households that did not apply for credit, the main reasons provided are 'no need' (49%), 'don't want to have debt' (24%) and 'lack of access' (17%). On average, the amount of credit received by those who accessed credit in the past 12 months (and for whom data was reported) is about 46,000 Maloti (or USD 5,500). About 6% of 136 households that provided the information indicated that they had to present collateral for accessing credit.<sup>3</sup>

### ***Land holding, land markets and perceived tenure security***

A household in the study area typically has 1.25 land parcels--1.07 currently used, 0.09 not used, and 0.09 rented to others. More than 90% of the parcels currently used in the study area are used for residential purpose and the other for commercial purposes. The average size of the land parcel is about 5000 m<sup>2</sup> in the study area. A majority of the residential parcels have access to tap water (90%), private toilet (88%), private bath and shower facilities (82%), a mobile phone network (83%), and electricity (76%). Twenty four percent of land parcels have no electricity and only 10% have access to a paved road.

About 13% of parcels surveyed in the four MMCs reported having a Lease. Among those that did not have a Lease, close to 60% of the land parcels were acquired through purchase (i.e., through buy-sell agreement) without obtaining a lease. The average amount which was paid to acquire a non-leased parcel including payments to previous owner and administrative costs was about 6,023 Maloti and the total time for parcel acquisition from the start of the process till possession was reported to be about two months (60 days). In the treatment area, the total cost of acquiring the parcel was 6,504 maloti for non-leased parcels and 15,460 maloti for leased parcels.

For those that do not have a Lease, more than 70% have Form C (a document issued by a chief to a land holder as an evidentiary proof of customary tenure), but 10% of parcel holders have no document that gives them property rights to that parcel. Tenure insecurity (as measured by

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<sup>2</sup> Based on a PPP conversion factor (GDP) to market exchange rate ratio in Lesotho of 0.62 as reported by the World Bank data for 2012 at <http://www.tradingeconomics.com/lesotho/ppp-conversion-factor-gdp-to-market-exchange-rate-ratio-wb-data.html>.

<sup>3</sup> Among those that had to present collateral, only a third presented land as collateral.

worries of being in conflict with someone for a land parcel) was not reported as a major concern by respondents in the study area. Only 7% of parcel owners in the treatment area and 3.4% of owners in the control area expressed concerns about any potential conflict. Despite low tenure insecurity, the interest and desire to obtain a Lease is very high, with 80% of respondents indicating such interest across the study area. Among those that expressed an interest, 15% reported as having initiated the process of obtaining the Lease at the time of the survey.

About 30% of households reported making at least one type of investment on land in the 3 years prior to the survey. The most common type of investment related to repairs and improvements of existing buildings and construction of new building/house. On average, the households (that made an investment and reported the value) spent about 34,300 Maloti in the past 3 years on repairs, rehabilitation, and upgrades on their land. The opinion on the use of land as a collateral for credit if it had Lease was rather mix, with more than 50% indicated that they would use the credit for business purpose, 25% would use it for improvements of their existing property or for buying more property, and 10% would use it for education and other purposes.

The hypothetical average sale price of land parcel including buildings/structures in the study area was reported to be about 222,000 Maloti or 361 Maloti/m<sup>2</sup>. Similarly, the hypothetical average monthly rental price for a land parcel including buildings in the study zone was reported to be about 5,000 Maloti or about 11 Maloti/m<sup>2</sup>. The study area is characterized by a thin rental market. Of the total number of parcels surveyed in the study area, only 5% were rented-out and less than 1% was rented-in. Due to the low response rate, it is difficult to estimate the actual rental rate of land parcels from this baseline survey.

In general, the knowledge about the land law was found to be poor in the study area. Less than 20% of respondents reported to be informed about the 2010 Land Act. However, the knowledge about what the Lease is and different types of rights Basotho men and women have under the Land Act was much higher and impressive. More than 50% of respondents knew what the land Lease was and more than 90% correctly identified different types of land rights Basotho men and women have under the Land Act.

### ***Potential for using propensity score matching technique***

The results of the baseline survey analysis indicate that in many ways, the treatment and control areas share similar socioeconomic characteristics with respect to key demographic features, sources of income, access to credit and source of credit. They also share many land market characteristics such as cost of parcel acquisition, hypothetical sale and rental value of land, perception of risks, rental participation (or non-participation), sources of financing land improvement investments, willingness to sell and rent out Leased parcels, and knowledge about land rights. However, in many other ways they are significantly different, including assets, dietary diversity, food consumption, total expenditures, characteristics of parcels, type and value of land investments, knowledge on Lease and the Land Act. In terms of assets, expenditures, food consumption, diversity index, the respondents in the treatment group are relatively better off. Also, parcels located in the treatment area have better access to facilities, amenities and infrastructure than parcels in the control area.

These differences between project treatment and control group can complicate the interpretation of any post-program differences to be observed in the follow-up survey. We thus explore the potential use of Propensity Score Matching (PSM) research design to mimic randomization by creating a sample of households receiving the LARP intervention that is comparable on all observed covariates to a sample of households that do not receive the project intervention. Overall, the matching technique was successful in producing a treatment and control group closer to each other in comparison across a wide range of covariates. After applying the matching technique the size of the mean differences between the two groups is reduced considerably and become statistically insignificant (at  $p < 0.05$ ) in all but three cases. The average standardized bias across the covariates is reduced from 16.4% before matching to 4% after matching.

### ***Correlation tests***

Formally recognized titles are expected to increase investment in land, increase the frequency of sales and rentals, increase the value of land, and reduce land related conflicts. In this Report we also examine the correlation between some of these outcome indicators in the baseline data with household / plot characteristics. Correlation tests that focused on three sets of indicators are presented: 1) lease status of the land parcel; 2) value of land as measured by the hypothetical price and rental value per parcel; and 3) behavioral outcomes (i.e., sales, rental, investment, etc.) that would be realized in a hypothetical scenario that a land parcel has a Lease compared to not having a Lease.

Results of these tests confirm that there is a positive and statistically significant correlation between access to amenities/utilities and the lease status of a parcel and the hypothetical value of the parcel. There is also a strong association between the parcel having a Lease and the cost of parcel acquisition and the self-assessed value of the parcel. A respondent's willingness to pay more, sell more, rent out more and invest more with Lease than without were positively correlated with each other, indicating that people who indicate behaving according to the assumption of the project logic for one outcome are also highly likely to indicate behaving in line with the project assumption for other outcomes. In general, parcel holders characterized as having the knowledge and awareness about the Lease and legal rights to have land title, transfer or inherit land were associated with their willingness to pay more, sell more, rent out more and invest more with a Lease than without.

### ***Conclusions***

In conclusion, the baseline survey provides extensive information about the land economy in the urban/peri-urban areas in Maseru. At this time, the best use of the data is to create a description of the treatment and comparison groups (as done in this Report). Following the second round of the survey, it should be possible to draw substantiated conclusions about the impact of land regularization intervention on the parcel holders.

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# **Impact Evaluation of Systematic Regularization of Land in Urban/Peri-Urban Areas of Maseru, Lesotho: Baseline Survey Report**

## **1. Introduction**

The Kingdom of Lesotho is strategically located within the rapidly growing Southern African Development Community.<sup>4</sup> It can greatly benefit from the expected economic upsurge in the region, if it is able to unlock the potential of its water resources, improve health of its productive workforce, remove legal and regulatory impediments to private sector growth, and increase the participation of women in the economy. Realizing this need and the great potential, in July 2007, the Millennium Challenge Corporation (MCC) signed a five-year, \$362.6 million compact with the Kingdom of Lesotho aimed at improving the provision of water supplies for industrial and domestic use, improving health outcomes, and removing barriers to foreign and local private sector investment. The compact entered into force in September 2008, formally initiating the five-year timeline for project implementation.

The Private Sector Development (PSD) component of the Lesotho Compact is designed to increase private sector economic activity in the country by improving access to credit, reducing transaction costs and increasing the participation of women in the economy. Activities within the PSD Project represent an essential component of the government of Lesotho's (GoL) major policy reform program and are designed to contribute to the broader efforts to attract foreign investment and stimulate growth of Basotho-owned companies. One of the projects under the PSD component includes technical assistance to the GoL in the implementation of a systematic land regularization program for urban/peri-urban areas, and development of a new land administration authority. The main objective of this project, known as the 'Land Administration Reform Project (LARP)' is to strengthen the rights of the legitimate occupiers of the land by a process of formalizing those rights. The goal is to register 55,000 parcels and give their owners a title deed of their property (referred to as "Lease") and to record the ownership in Lesotho's reformed land information system.

This formalization process of the rights to land is considered fundamental to promote private sector development and stimulate economic growth. An updated register of property rights is expected to enable the land to be traded more easily in the form of sale or rent. An improved system should lower land-transaction costs, lower the risk of expropriation or conflict, and increase tenure security. It is also expected to improve the confidence on the part of lenders to secure loans against registered leases (titles), and an increased understanding amongst citizens of the importance and use of land as an economic asset, which in turn can contribute to more efficient land uses due to improved productivity, increased investment, and the development of land markets. More productive land should result in higher asset/land values and higher incomes for property owners. Over time, as land and financial markets develop formal land rights can also be used as collateral for loans.

Empirical studies suggest that the outcomes and impact pathways of land tenure projects vary considerably from country to country, depending on market development, financial institutions, legal frameworks, and beneficiary income sources (Deininger, 2003). Land tenure reform has

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<sup>4</sup> The Kingdom of Lesotho is a small mountainous country of 30,355 sq km and 2 million people landlocked by South Africa.

demonstrated impacts for economic growth that reaches the poor, but can have socially differentiated impacts that need to be measured and monitored. Monitoring and evaluation (M&E) is thus essential for a results-based approach to program management. As part of its results-based M&E, MCC is committed to conducting rigorous impact evaluations of its programs. These impact evaluations aim to measure the changes in individual, household or community well-being that result from a particular project or program. The distinctive feature of an impact evaluation (as compared to performance monitoring or project evaluation) is the use of a counterfactual, which identifies what would have happened to the beneficiaries in the absence of the program. This counterfactual is critical to understanding the improvements in people's lives that are directly caused by the program.

For the impact evaluation component of the M&E, MCC and MCA have partnered with Michigan State University (MSU) to design the impact evaluation of the Land Administration and Reform Project in Lesotho, assist MCA-Lesotho in baseline data collection efforts, carry out data analysis, and write up results. This Report serves as an output towards the impact evaluation of the institutional strengthening and land regularization activities conducted in the urban/peri-urban areas of the capital city Maseru. The report describes the impact evaluation design, including the proposed methodology, and reports the results of the baseline survey conducted in 2013 in four Maseru Municipal Councils (MMCs). The baseline survey results reported in this document will serve as a basis for estimating the impacts of LARP after a follow-up survey is completed in 2016 (or thereafter).

## **2. Impact Evaluation Design for the Lesotho Land Reform and Administration Project**

### ***2.1 Rationale for MCA investments in LARP and the vision of impact pathway***

Lesotho has limited land resource base, as more than 75% of the country is characterized as mountainous. Country's land quality is diminishing due to rampant soil erosion problem and rapid urbanization. At the turn of the century, according to Kassanga (1999) (cited in Johnson 2013a) the country had many land problems—informal settlements were growing, landlessness and homeless were increasing; land speculation and corruption was widespread; the legal framework contradictory; and the institutional setting complex and bureaucratic. Following a lengthy consultative process, a draft National Land Policy emerged in 2001 and a comprehensive Land Bill was prepared in 2003 which led to decentralization of local government with land management functions and supported capacity-building through various technical assistance projects. However, the Land Bill proved contentious and never became law. In 2005, when the Millennium Challenge Corporation (MCC) was conducting pre-Compact scoping studies to guide its investment strategy, land issues and governance were a matter of serious concern (Adams and Palmer, 2007). Land issues were high on the Government's agenda and land reform was already part of the Poverty Reduction Strategy.

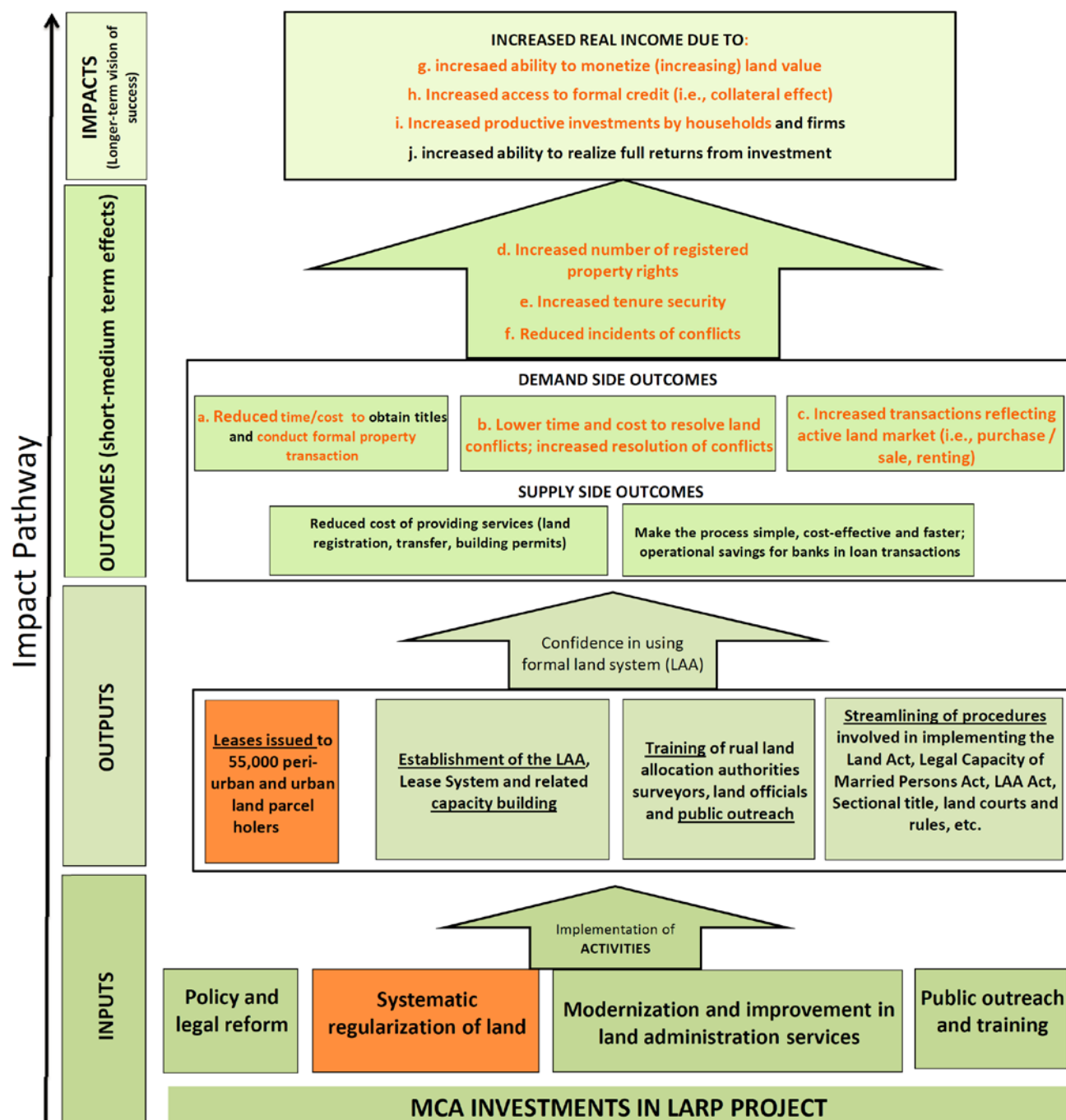
The scoping study conducted by MCC in 2006 found "...that the formal (legal) land tenure system and its administration do not meet the needs of the Lesotho society of today. The stakeholders and the public perceive it as expensive, slow and inefficient, restrictive and not transparent. A result is that registered land rights are not provided to the majority of the citizens.

This hampers investments and creates dysfunctional land markets” (Swedesurvey, 2006, p.5, cited in Johnson 2013a).

Land tenure has long been recognized by economists as ‘a public good’ just like education, health, safety and security. The nature and strength of property rights have a profound impact upon economic decision-making through their effects on expectations of returns on investment of labor and capital. Recognizing this importance, the Millennium Challenge Compact, signed in July 2007 by the Government of Lesotho and MCC, included a Land Administration Reform Project (LARP) with the following four components (Johnson 2013b):

1. *Policy and Legal Reform* to revise land legislation currently in draft form and to develop a land policy, and to promote the use of land as an economic asset.
2. *Systematic Regularization of Land in Urban Areas and Improvement of Rural Land Allocation Processes* to upgrade land tenure of informal settlements in urban and peri-urban areas, beginning in Maseru, and issue leases to the legally recognized title holders, as well as to support ongoing effort to train community councils and traditional authorities on their roles in land allocation and land management.
3. *Modernization and Improvement of Land Administration Services* to simplify land administration procedures and to create a new land administration authority that will be:
  - a. professionally managed and operated;
  - b. operated in a largely autonomous manner in accordance with its objectives;
  - c. capable of providing cost-effective and efficient services to the public and land information users (including the poor);
  - d. able to hire and retain qualified managerial and technical staff; and
  - e. self-sustaining
4. *Public Outreach and Training* in support of all of the land administration reform activities.

The overall objective of activities planned under these four components of LARP is to promote the use of land as an economic asset and contribute to the Compact goal of reducing poverty through growth in real income (Figure 1). The component related to the systematic regularization of land in urban and peri-urban areas (depicted by the orange box in Figure 1) is the focus of this impact evaluation. It is a key activity linked with the outcome of ‘increased number of registered property rights,’ (outcome ‘d’), which in turn is linked to impacts on indicators of economic behavior and income outcomes, some of which are the focus of the impact evaluation described in this report (Figure 1). This Activity is intended to expand the number of registered land parcels and to improve the prospects of using land to stimulate investment activity. The Activity is expected to introduce 55,000 additional parcels within Greater Maseru into the registry within the Compact period than would have been otherwise expected. By the end of the Compact period the number of registered land parcels should approach 64,000 –72,000 as opposed to about 22,000 – 23,000 without the project.



Source: Authors' compilation based on project Logic Framework

Figure 1. The vision of impact pathway for MCA investments in LARP project

The impact evaluation described in this report is designed to test the following key economic hypotheses associated with this one specific component of LARP—i.e., area-wide registration of urban and peri-urban land parcels. Based on the impact pathway depicted in Figure 1, it is hypothesized that land with formally recognized titles will result in:

1. Increased number of land parcels used as collateral for mortgage



2. Increased investment in the property, increased frequency of transfers, subletting, rentals, and other economic activities
3. Increased value of land
4. Reduction in land related conflicts
5. Increase in income/expenditures of beneficiaries

The purpose of the rigorous IE design is to precisely measure and monitor these hypothesized impacts and assess the causality in effects outlined in the impact pathway. The key research questions guiding our design of the evaluation are to evaluate the extent to which there is evidence of change in indicators of outcomes and impacts identified in Figure 1 (in orange font) that can be attributed to ‘systematic regularization of land’ component of the LARP project that resulted in the issuance of Lease to thousands of legitimate parcel holders in Greater Maseru.

## ***2.2 Description and scope of activities being evaluated***

Most land in Lesotho is held under “allotted” or “allocated” land use right granted by either traditional authorities, local councils, or other allocating authorities. The main objective of the systematic land regularization project is to strengthen the rights of the legitimate occupiers of the land by a process of formalizing those rights. This project is implemented in the urban/peri-urban areas of the city of Maseru, which is the capital of Lesotho and has a population of about 227,000 inhabitants (or 12% of country’s population). It is the largest urban area in the country with more than 50% of country’s urban population residing in the city of Maseru (Bureau of Statistics 2009). Under the MCC Compact, activities related to ‘systematic regularization of land’ encompassed administrative units called Maseru Municipal Councils (MMCs). Each MMC is further divided into villages<sup>5</sup> led by area Chiefs.

One of the significant innovations ushered in by the 2010 Land Act is regularization. This is provided for in Part XI of the 2010 Land Act and detailed further in the Systematic Regularization Regulations 2010. Regularization is defined in the Act to mean one or both of the following:

- i) The process of surveying, planning, adjudicating and registering the boundaries and rights associated with a parcel of land informally occupied or;
- ii) Readjustment of boundaries for the purpose of town planning.

The regularization (in effect mass real estate titling) scheme of targeted 55,000 land parcels in Maseru (under the MCA Compact) was characterized as follows:

First, regularization schemes were prepared by the Commissioner of Lands and implemented by the Lesotho Land Administration (LAA) following consultations with MMC having jurisdiction for approval by the Minister of Local Government. Once the scheme was prepared, as per the requirement of the law, it was published in a government gazette.

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<sup>5</sup> The term ‘village’ as used in this Report should not be confused with a rural setting. It refers to a geographic unit controlled by a ‘chief’ in either urban or rural areas; in this case it refers to a geographic unit in an urban/peri-urban setting.

After going through the public outreach and consultation process with area Chiefs and local communities within the MMC, the implementing partner (i.e., COWI) then implemented the regularization scheme in geographic units roughly corresponding to ‘villages’ or ‘sub-villages’. The process (post-public outreach) comprised following major activities in their respective time order: (i) adjudication of land rights; (ii) land survey of boundary and digitizing the information; (iii) registering the boundaries and rights associated with a parcel of land that was previously informally occupied; and (iv) the issuance of official land title (also called land lease or in effect, an officially-certified 99-year use right) to the identified legitimate ‘owner.’

Area chiefs and government councils were fully consulted and engaged in the entire process. In fact, area chiefs and council members were directly involved in the adjudication of rights and land survey of boundary processes. The formal owners eventually received a Lease to their property and the rights were recorded in Lesotho's existing land information system. Under the Compact phase, regularization (titling) was free, except for a minimal stamp duty fee.

The proposed impact evaluation focuses on assessing the impact of the issuance of land titles on outcome indicators at the beneficiary level (i.e., individual title holder's household). As such, this evaluation will assess the impact of the systematic regularization as a whole encompassing all the major components/activities described above, and not on a subset of components of the formalization process.

### ***2.3 Impact evaluation methodology***

The IE is based on the *differences-in-difference* (DiD) analysis approach. The DiD approach essentially measures the difference of outcome indicators between participants (treatment group) and nonparticipants (comparison group) before and after program intervention. In the context of panel data (with a baseline survey and a follow up survey of the same households), DiD is a common method to estimate the impact of an intervention if the assumption that unobserved heterogeneity is time invariant and uncorrelated with the treatment effect is satisfied. While the main advantage of DiD is its ability to allow for selection on unobserved factors, its assumption of constant selection bias over time may be unrealistic in practice.

Let  $Y$  be the outcome of interest (i.e., land investment, land market participation, household income, off-farm employment, etc.). Our goal is to evaluate the impact of a specific intervention  $T$  (i.e., issue land titles to urban residents) on  $Y$  after a time period 1. Specifically, we can achieve this evaluation through DiD as:

$$DD = E[Y_1^T - Y_0^T] - E[Y_1^C - Y_0^C] \quad (1)$$

where the superscripts T and C refer to treatment and control households, respectively; the subscripts 1 and 0 refer to time period 1 (after the intervention) and time period 0 (the baseline period), respective;  $T=1$  refers to Treatment group. The regression counterpart of (1) is the following:

$$Y_i = \alpha + \beta T_i + \gamma t + \delta(T_i * t) + \varepsilon_i \quad (2)$$

Where  $T_i$  is the treatment dummy variable ( $T=1$  for treatment group,  $T=0$  for control group) to control for the pre-intervention difference between the two groups,  $t$  is a time dummy variable ( $t=0$  for before treatment and  $t=1$  for after the treatment) to control for common time trend in spite of treatment status, and  $\delta$  is the key parameter of interest (measuring the average effect of the titling program on  $Y_i$ ). In (2), we can further add other control variables ( $X$ ) to increase the efficiency of the estimation. DiD is widely used in impact evaluation of policy interventions especially when the experimental data are not available (see discussion by Duflo, Glennerster and Kremer 2007; Ravallion 2005). The DiD approach was also used by similar studies on land titling projects in other countries (Deininger et al. 2011, Di Tella 2007; Field 2007, Maredia et al. 2012, Jin et al. 2013).

## ***2.4 Identifying the treatment and comparison communities***

There are two things needed to implement the DiD IE design:

1. Identification of treatment and comparison sites, and
2. Data collection from both treatment and comparison sites before and after intervention.

The initial IE design of this project was based on a randomized control trial (RCT) design. However, after implementing a baseline survey based on the RCT design, in late 2012, the plan to maintain the IE design by assigning some randomly selected villages within Maseru city as control villages was ruled out due to political sensitivity issues and the desired target of registering 55,000 land parcels in Maseru by the end of the Compact (i.e., by September 2013). After some discussions and negotiations by MCC/MCA, project implementers agreed to exclude one of the Maseru Municipal Council from the land regularization plan for the next few years (at least 3 years). This is MMC 27 that is located in the north/northeast part of Maseru city (Figure 2). Thus, for the IE described in this report, MMC 27 is designated as the control/comparison area. The villages in the neighboring MMCs (1, 2, and 3) **that were not yet regularized** at the time of re-designing the IE were designated as treatment areas for this impact evaluation. The list of villages that fall within the treatment and control MMCs that form the basis for drawing the clusters for sample selection is given in Table 1.

## ***2.5 Sample size and sampling strategy***

Sample size, as well as other design choice, affects the power of an evaluation. The power of the design is the probability that, for a given effect size and a given statistical significance level, we will be able to reject the hypothesis of zero effect. To estimate the total sample size for this IE, we used the following equation, to solve for  $j$  (number of clusters) and  $n$  (number of households per cluster).

$$\left(\frac{MDE}{\sigma}\right) = \frac{MJ_{-2}}{\sqrt{P(1-P)}J} \sqrt{\rho + \frac{1-\rho}{n}} \quad (3)$$

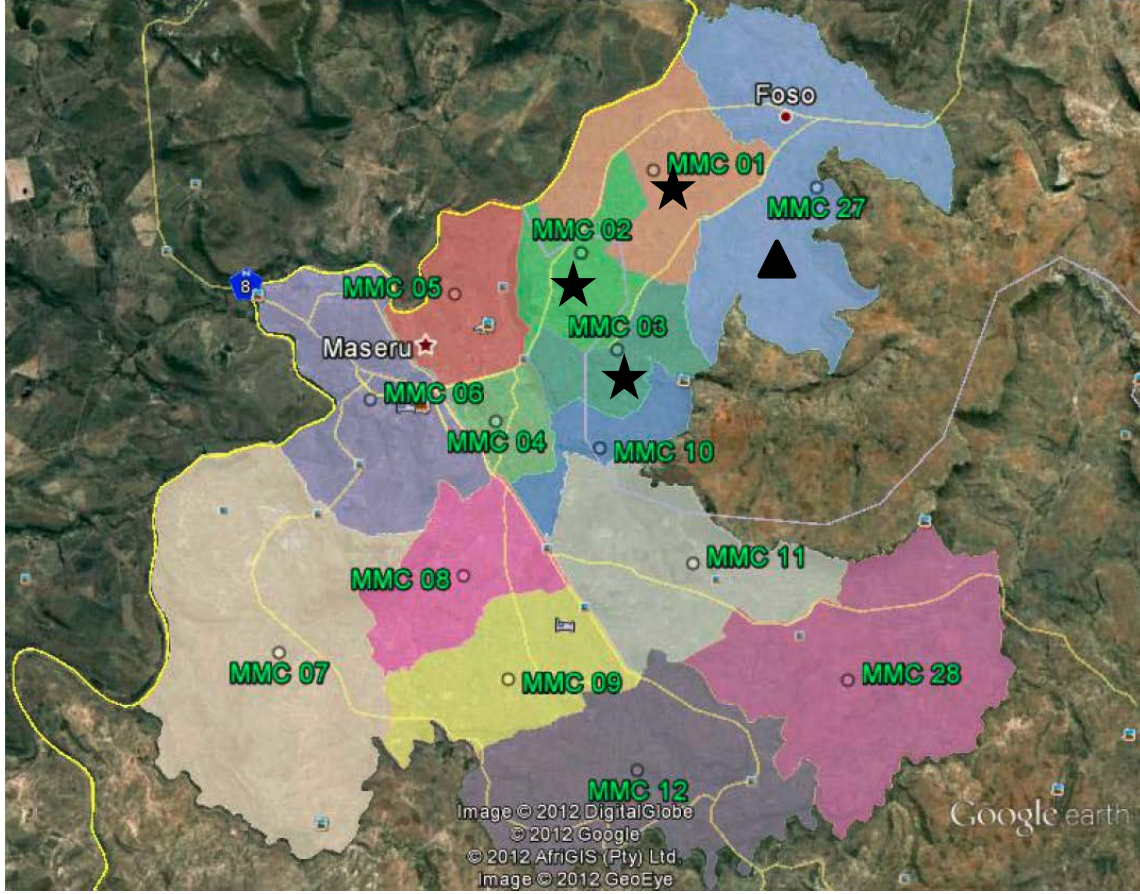


Figure 2. Map of Maseru city and designated treatment (MMC 1, 2, and 3) and control MMCs (MMC 27)

In this equation,  $M_{J-2}$  is the minimum detectable effect (MDE) multiplier which is the sum of the  $t$  values for level of significance ( $t_{\alpha/2}$ ) and power ( $t_{1-\beta}$ ). The  $t$  values correspond to degrees of freedom determined by the number of groups included in the intervention ( $j-2$ ). Parameter  $P$  is the proportion of sample allocated between the treatment and control groups,  $\rho$  is the intra-cluster correlation coefficient,  $j$  is the total number of clusters (or groups) included in the evaluation, and finally  $n$  is the number of households in each cluster. Equation 3 is basically the same as equation 12 in Duflo et al. (2007). The detailed explanation of each of the parameters and the derivation of the formula can be found in Duflo's paper. According to Cohen (1992), MDE of 0.2 is "small", 0.5 is "medium" and 0.8 is "big" in the impact evaluation literature. The smaller the value of MDE, the better it is as it signifies more power to detect even a smaller significant effect.

We used the following parameter values to solve for  $n$  and  $j$  in equation 3: a power ( $k$ ) of 80%, a significance level ( $\alpha$ ) of 0.05, and proportion of households allocated to treatment group ( $P=0.7$ ), and a standardized minimum detectable effect size ( $MDE/\sigma$ ) of 0.35 (which is in between small and medium effect size as per the literature).

Table 1. List of villages located in treatment and control MMC used to draw the sample of clusters for the proposed impact evaluation design

<b>TREATMENT MMC</b>		<b>CONTROL MMC</b>	
MMC01	Boiketlo	MMC27	Ha Foso
MMC01	Kuroane	MMC27	Ikhetheleng
MMC01	Le-coop	MMC27	Khopane
MMC01	Pecha	MMC27	Koalabata
MMC01	Phomolong	MMC27	Marabeng
MMC01	Rasetimela	MMC27	Sekhutlong
MMC01	Selakhapane		
MMC01	Thoteng-Khubetsoana		
MMC02	Bochabela I		
MMC02	Bochabela II		
MMC02	Bochabela III		
MMC02	Lifelekoaneng-Mabote		
MMC02	Mapaleng-Mabote		
MMC02	Maqalika-Mabote		
MMC02	Phahameng-Khubetsoana		
MMC02	Phpoletsa-Mabote		
MMC02	Rural		
MMC02	Sebaboleng		
MMC02	Taung-Mabote		
MMC02	Thoteng-Mabote		
MMC03	Tsosane (part that is not regularized)		
MMC03	Naleli-Tsosane		

The estimated minimum sample size based on this formula and the given parameter values noted above came to 40 clusters and 40 observations per cluster. To account for a possible attrition and non-response rate the number of observations per cluster was increased by 5. Thus the IE consists of 28 treatment clusters (i.e., villages/sub-villages) and 12 control clusters (i.e., villages/sub-villages), with 45 households targeted for data collection from each cluster to reach a target sample size of 1,800 households.

Sample selection was done as a three-step process. In the first step, the 22 treatment villages identified in Table 1 were divided into 28 clusters (or sub-villages) and the 6 control villages were divided into 12 clusters (or sub-villages) such that each cluster had at least 100 households and belonged to only one village. In other words, big villages were sub-divided into smaller clusters (or sub-villages) for sampling purpose. Each of these villages or sub-villages were considered as units of intervention for the IE design (and statistics analysis). Based on the village boundaries identified in the field (with the help from the LARP Project Implementing Unit), and using the GPS coordinates of this boundary and superimposing it on the satellite imagery of the MMC map that shows the density of land parcels with structures (i.e., roof outlines), the 40 sub-villages were mapped and labeled as per Table 2. The maps of these 28 treatment and 12 control sub-villages is given in Appendix A.

Table 2. List of clusters or sub-villages identified for sample design

<b>MMC #</b>	<b>Village name</b>	<b>Group</b>	<b>Name of the cluster (sub-village)</b>	<b>Cluster code</b>
MMC0	Boiketlo	Treatment	Boiketlo	101
MMC0	Kuroane	Treatment	Kuroane	102
MMC0	Le-coop	Treatment	Le-coop	103
MMC0	Pecha	Treatment	Pecha	104
MMC0	Phomolong	Treatment	Phomolong 1	105
MMC0	Phomolong	Treatment	Phomolong 2	106
MMC0	Rasetimela	Treatment	Rasetimela 1	107
MMC0	Rasetimela	Treatment	Rasetimela 2	108
MMC0	Selakhapane	Treatment	Selakhapane	109
MMC0	Thoteng-Khubetsoana	Treatment	Thoteng-Khubetsoana	110
MMC0	Bochabela I	Treatment	Bochabela I	111
MMC0	Bochabela I	Treatment	Bochabela II	112
MMC0	Bochabela II	Treatment	Bochabela III	113
MMC0	Bochabela IV	Treatment	Bochabela IV	201
MMC0	Lifelekoaneng-Mabote	Treatment	Lifelekoaneng-Mabote	202
MMC0	Mapaleng-Mabote	Treatment	Mapaleng-Mabote	203
MMC0	Maqalika-Mabote	Treatment	Maqalika-Mabote	204
MMC0	Phahameng-Khubetsoana	Treatment	Phahameng-Khubetsoana	205
MMC0	Phpoletsa-Mabote	Treatment	Phpoletsa-Mabote	206
MMC0	Rural	Treatment	Rural	207
MMC0	Sebaboleng	Treatment	Sebaboleng	208
MMC0	Taung-Mabote	Treatment	Taung Mabote	209
MMC0	Thoteng-Mabote	Treatment	Thoteng-Mabote 1	210
MMC0	Thoteng-Mabote	Treatment	Thoteng-Mabote 2	211
MMC0	Tsosane (part not	Treatment	Tsosane (not reg) 1	301
MMC0	Tsosane (part not	Treatment	Tsosane (not reg) 2	302
MMC0	Naleli-Tsosane	Treatment	Naleli-Tsosane 1	303
MMC0	Naleli-Tsosane	Treatment	Naleli-Tsosane 2	304
MMC2	Ha Foso	Control	Ha Foso 1	2701
MMC2	Ha Foso	Control	Ha Foso 2	2702
MMC2	Ikhetheleng	Control	Ikhetheleng 1	2703
MMC2	Ikhetheleng	Control	Ikhetheleng 2	2704
MMC2	Ikhetheleng	Control	Ikhetheleng 3	2705
MMC2	Khopane	Control	Khopane	2706
MMC2	Koalabata	Control	Koalabata 1	2707
MMC2	Koalabata	Control	Koalabata 2	2708
MMC2	Koalabata	Control	Koalabata 3	2709
MMC2	Koalabata	Control	Koalabata 4	2710
MMC2	Marabeng	Control	Marabeng	2711
MMC2	Sekhutlong	Control	Sekhutlong	2712

In step two, 45 households from each cluster were randomly selected. To aid in this selection process, a GIS based method of ‘listing’ was undertaken. This involved using orthophotos to pre-vectorize land parcels (which were provided by COWI, the project implementer) and using them to produce GIS maps for sample selection. This method was used to randomly select the required numbers of households (and replacement households) in each cluster across all MMCs.

In step three, to augment the number of parcels in the survey that are used for commercial purposes, a field based listing exercise was undertaken to identify all the parcels in each cluster where some kind of commercial activities would be taking place. An average of about 4-6 additional parcels per cluster that were identified as commercial plots (but were not part of the sample selection based on the GIS method) were randomly selected to increase the number of observations for commercial parcels.

For the purpose of this IE, in both steps 2 and 3 of sample selection, the sampling frame was defined as “households that have land parcels that belong to them in the same village where they are being interviewed, and for which they have not yet obtained any Lease. The land parcel could be either occupied by the HH or rented to others for housing or commercial purpose.”<sup>6</sup> However, as reported in the results section, 329 parcels belonging to 275 households inventoried using the GIS based sampling frame already had Lease, which was discovered during the data analysis stage. To establish the baseline, these 275 households and 329 parcels with Lease are excluded from all the balancing tests included in this report.

## ***2.6 Data collection***

The evaluation is based on household level surveys that included interviewing the head of the household based on a detailed instrument which was translated into Sesotho. The survey has detailed sections for each of the outcomes to be evaluated, both intermediate and final outcomes, and some M&E indicators to be monitored. The questionnaire included more than 25 sections encompassing modules on:

- Household characteristics (demographic information by each member of the HH)
- Employment and sources of any other cash transfers
- Identification and list of all the parcels
- Information on Parcel Acquisition, Documents and Land Value
- Land conflicts
- Rights to the land and perceptions of the risk
- Parcels rented out, rented in
- Characteristics of parcels
- Investments on land
- Perceptions about Lease, renting land, the land law, women’s rights and LAA
- Ownership of Assets
- Expenditures
- Credit in the last 12 months
- Consumption
- Woman module

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<sup>6</sup> Note that households that only rented-in a property are excluded from the sampling frame.

In addition, each of the survey households was geo-referenced for ease of locating the household for a follow-up survey. A separate module targeted towards women was administered separately with the women head of the family. The survey was translated and administered in Sesotho, and was designed to take between 1 ½ to 2 hours to complete. Copies of the survey instruments are available upon request.

The baseline survey was implemented in the selected villages from March to June 2013. Data set received from the survey firm in 2013 had many gaps and data matching issues. The data was thus re-entered by the survey research unit at Michigan State University (MSU) in 2015 based on scanned copies of the completed questionnaires obtained from Lesotho. The results presented in this report are based on the dataset compiled at MSU after this second re-entry. The number of households surveyed in treatment and control MMCs across all the clusters was 1904 (Table 3). However, 251 households in the treatment MMC and 24 households in the control MMC reported to already having Leased parcels (Table 4). For the balancing test reported in this Section, these 275 households are excluded. So the effective sample size for the balancing test is 1629 households – 1077 in the treatment group and 552 in the control group (Table 4). Moreover, the data set received has many missing data and non-responses to several questions. Thus the number of observations (N) on which a specific estimate is based varies across Tables. We report the N for each item in the Table where relevant.

The data presented in this Report represent baseline data for this IE design. Ideally, the follow-up survey should be planned after a few years to allow the observation of outcomes and impact (but before any land regularization activities take place in MMC 27). Currently, the plan is to have the follow-up survey in 2016 or 2017 around the same time as the baseline survey was conducted in 2013.

The baseline data analysis presented in this Report is conducted with three objectives in mind: a) Conduct balancing test between the treatment and control group to see how similar or different these two groups are prior to the intervention, and if different present preliminary assessment of using alternate techniques to minimize the bias such as the propensity score matching; b) Provide descriptive of baseline characteristics of sampled households to gain an understanding of the profile of project beneficiaries and status of outcome variables targeted by the LARP project; and c) Conduct some correlation tests between household, respondent and plot characteristics and potential outcomes hypothesized in the impact pathway of the LARP project.

### 3. Results of the Balancing Test

The logic behind the balancing test is to examine whether the treatment and control groups are statistically significantly different in the mean values of observable pre-treatment characteristics. This test is based on the following model estimation:

$$X_{ji} = \alpha + \beta T_i + \varepsilon_{ji} \quad (3)$$

Where,  $X_{ji}$  is the characteristic of individual  $j$  from treatment group  $I$ ;  $T_i$  is the treatment dummy variable ( $T=1$  for treatment group,  $T=0$  for control group) to control for the pre-intervention difference between the two groups;  $\alpha$  is the mean value of the dependent variable without any



treatment (i.e., control group);  $\alpha + \beta$  is the mean value of the dependent variable for the treatment group. Parameter  $\varepsilon_{ji}$  is an error that is independently and identically distributed between individuals within groups with a pooled mean of zero and variance of  $\sigma^2$ .

Table 3. Number of households interviewed by type of cluster

Treatment Group			Control Group		
Cluster code/name		# of HHs surveyed	Cluster code/name		# of HHs surveyed
101	Boiketlo	42	2701	Ha Foso 1	48
102	Kuroane	32	2702	Ha Foso 2	53
103	Le-coop	52	2703	Ikhetselong 1	48
104	Pecha	52	2704	Ikhetselong 2	48
105	Phomolong 1	47	2705	Ikhetselong 3	47
106	Phomolong 2	48	2706	Khopane	47
107	Rasetimela 1	45	2707	Koalabata 1	51
108	Rasetimela 2	42	2708	Koalabata 2	45
109	Selakhapane	49	2709	Koalabata 3	51
110	Thoteng-Khubetsoana	47	2710	Koalabata 4	51
111	Bochabela I	46	2711	Marabeng	44
112	Bochabela II	49	2712	Sekhutlong	43
113	Bochabela III	44			
201	Bochabela IV	49			
202	Lifelekoaneng-Mabote	43			
203	Mapaleng-Mabote	44			
204	Maqalika	44			
205	Phahameng-Khubetsoana	42			
206	Phpoletsa-Mabote	35			
207	Rural	47			
208	Sebaboleng	53			
209	Taung Mabote	41			
210	Thoteng-Mabote 1	51			
211	Thoteng-Mabote 2	46			
301	Naleli-Tsosane 1	53			
302	Naleli-Tsosane 2	63			
303	Tsosane (not reg) 1	57			
304	Tsosane (not reg) 2	65			
Total		1328	Total		576
Total Number of HHs surveyed			1904		

Table 4. Number of households with leased parcels and non-leased parcels

	Treatment	Control	Total
<b>No Lease</b>	<b>1,077</b>	<b>552</b>	<b>1,629</b>
Lease	251	24	275
Total	1,328	576	1,904

Source: MCC/MSU Urban Land Survey, 2013

We estimate equation 3 using the simple linear regression model for each of the covariates to test the hypothesis that  $\beta = 0$ . Rejection of this hypothesis (when  $p < 0.05$ ) would imply that the mean value of a given covariate is statistically significantly different between the treatment and the control group. Failure to reject this hypothesis would imply the opposite—i.e., that the mean values of the dependent variable across the two groups are not statistically significantly different from one another). In the tables described below, we present the mean and standard deviations of the dependent variables for both the treatment and the comparison groups. Any statistically significant difference between the mean values of two groups is indicated by the conventional notation of one or two asterisks to denote significant difference at 5% and 1% levels, respectively. Data analysis underlying all the results reported in this report was done using the Stata version 13 statistical package.

The results of the balancing tests presented in this section provide a picture of the status of surveyed households in study areas of MMC 1, 2, 3 and 27 across three broad categories: a) socio-economic characteristics (i.e., demographics, sources of income, asset holdings, level of income, consumption, expenditure, and access to credit; b) land characteristics (i.e., land ownership, land markets, land investments); and c) Respondents' knowledge, perception and opinion on tenure security, land law and rights. For each characteristic, results are presented by treatment status (i.e., treatment and control groups) to test how different or similar these two groups are pre-treatment. For some key characteristics, we also present in Appendix B the comparison by the gender of the head of the HH. When reporting these comparisons, the table number is preceded by a letter B to indicate that it is a table in Appendix B.

### **3.1 Socio-economic characteristics**

#### **3.1.1 Household demographics**

Table 4 presents key demographic characteristics of the households of the study area. Results in Table 4 reveal that about 43% of the households in the study area are headed by women, the average age of the head of the household is 50 years, about 96% have at least some formal education, 62% have completed secondary school and about 4% are currently attending school. Among these variables, the age of the household and percentage of household heads that have completed high school are significantly higher in the treatment area compared with the control group.

The household size in the study area is 4 in both the treatment and control villages, which translates to about 3.4 adult equivalent members. Across the study area, a typical household has on average two adults less than 45 years and the other two members distributed in other age groups. In terms of difference between the treatment and control groups, households in control

area have significantly more children and fewer older adults than the treatment group. On other household level variables, they share similar characteristics (Table 5). The difference between male headed and female headed households on several of these head level and household level characteristics is statistically significant. For example, female heads are older than male counterparts live in households with proportionately less number of females and infants, and significantly more number of older adults than male headed households (Appendix Table B1).

Table 5. Demographic characteristics

Item	Treatment			Control			Total			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean	S.D.	
% of households headed by women	1,076	44%	50%	550	38%	49%	1,626	43%	49%	
Age of the household head (years)	1,033	50	13	514	47	14	1,547	50	13	**
<b>Education of the head:</b>										
Know how to read and write	1,055	96%	19%	533	97%	18%	1,588	96%	19%	
Currently enrolled in school	1,055	4%	20%	532	3%	18%	1,587	4%	19%	
Went to school	1,015	97%	18%	514	96%	21%	1,529	96%	18%	
Completed at least secondary education	1,031	63%	48%	529	56%	50%	1,560	62%	49%	*
<b>Household size:</b>										
Total number of members	1,077	4.1	2.2	552	4.1	2.0	1,629	4.1	2.1	
Total adult equivalent	1,075	3.5	1.8	550	3.4	1.6	1,625	3.4	1.7	
Number of members who were away more than 6 months	1,077	0.2	0.7	552	0.1	0.6	1,629	0.2	0.7	
Woman as percentage of all adults (15 years of age or older)	1,074	45%	29%	549	45%	28%	1,623	45%	29%	
<b>Household composition: average number of members per age group</b>										
Infant (<5 years)	1,075	0.27	0.51	550	0.28	0.50	1,625	0.27	0.51	
Child (5-14 years)	1,075	0.65	0.86	550	0.86	0.98	1,625	0.69	0.89	**
Adult (15-45 years)	1,075	2.09	1.45	550	2.12	1.31	1,625	2.10	1.42	
Adult (46-60 years)	1,075	0.67	0.74	550	0.50	0.66	1,625	0.64	0.73	**
Older ( >60 years)	1,075	0.39	0.72	550	0.37	0.70	1,625	0.39	0.72	

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

The difference between total number of hh in the table and 1629 (i.e., total number of hh without Lease) is the number of hh with missing data.

(a) Significance testing  $H_0: b=c$ . \* indicates significant difference at 5%, and \*\* at 1%. If not noted, the p value is more than 0.05.

### 3.1.2 Type of Employment, Income Sources and Value of Assets Owned

In the study area, the main source of income reported is from salaried employment (64%), followed by remittances (32%) and self-employment (26%) (Table 6). The total household income across all the households was reported to be 16,575 Maloti per year. This translates to about 4,600 Maloti per person per year. The self-reported total value of non-land assets owned per household is estimated to be about 41,000 Maloti (or about US\$ 4,500 using the market exchange rate in 2013 of 1 Maloti=0.11 US\$). These include vehicles, household goods such as entertainment units, electronic items, appliances, and farm assets (tools and equipment).

On the total income, per capita income and value of assets, the households in the treatment area have higher values than the households in the control area. But the difference is statistically not significant at the 5% level. In terms of gender differences, male headed households across the study area have higher per capita income and own higher value assets than female headed households (Figure 3).

Table 6. Total annual household income, sources of income and value of non-land assets owned

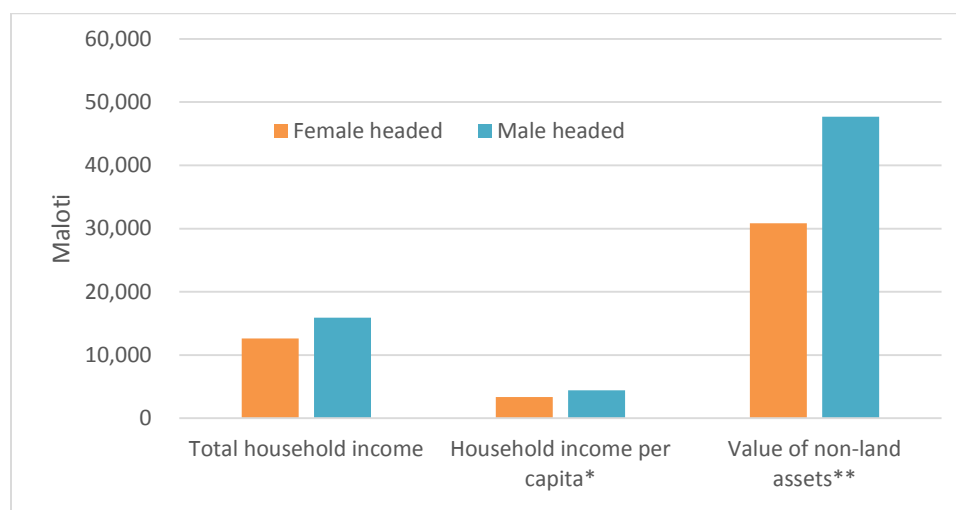
Item	Treatment			Control			Total			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean	S.D.	
Total income (maloti)	1,046	16,575	33,130	543	13,769	31,123	1,589	15,935	32,695	**
Total income per capita (maloti)	1,046	4,577	9,228	543	3,511	7,884	1,589	4,334	8,948	
% of household with any member working in salaried employment	1,077	64.2%	47.9%	552	63.5%	48.2%	1,629	64.0%	48.0%	
% of household with any member working in self-employment	1,077	27.3%	44.5%	552	22.6%	41.8%	1,629	26.3%	44.0%	
% of household receiving any transfer, remittances or pensions	1,077	32.6%	46.9%	552	28.4%	45.1%	1,629	31.6%	46.5%	
Value of non-land assets (maloti)	1,050	42,149	68,345	544	37,180	67,517	1,594	41,010	68,170	

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population.

The difference between total number of hh in the table and 1629 (i.e., total number of surveyed hh with no-leased land) is the number of hh with missing data.

(a) Significance testing  $H_0: b=c$ . \* indicates significant difference at 5%, and \*\* at 1%



Source: MCC/MSU Urban Land Survey, 2013. \* indicates significant difference at 5%, and \*\* at 1%.

Figure 3. Household income and value of non-land assets: Comparison of male vs. female head of the household

### 3.1.3 Food consumption, expenditures and poverty

The ultimate goal of increasing land tenure security through the Land Administration Reform Project is to positively impact the welfare of the population. In economics, welfare is often measured by indicators of food consumption, quality of diets consumed, expenditure and poverty. Although these types of indicators take a long time to realize impact at the household or a community level and may be beyond the scope of this impact evaluation, we did collect quantitative data that provides a baseline assessment of the characteristics of the households in the study area in terms of their status with regards to food consumption, dietary diversity, and total expenditures. The estimates of per capita expenditures are also used to assess how many people in the study area live below \$1.25, \$1.50 and \$2 per day, which is often used as the threshold for the global measure of poverty. The results of this baseline analysis are presented in this section.

Table 7 presents the self-reported value of household food consumption per week in the study area by different categories. The total average value of food consumption per household in the study area is estimated to be around 300 Maloti (or US\$ 33) per week, with a significantly higher value of total food consumption in the treatment areas (Maloti 309) compared to control areas (Maloti 268). On a per capita basis, the total value of food consumption in the treatment villages was 93 Maloti per week (or US\$ 1.46 per day), which is significantly higher than the total value of per capita per day consumption of 79 Maloti in the control villages (or \$1.24 per day.) (Table 7).

Table 7. Value of household food consumption, household dietary diversity score, non-food expenditure, and total expenditure

Item	Treatment			Control			Total			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean	S.D.	
Value of total food consumption per week (Maloti)	1,044	309	293	548	268	215	1,592	299	276	**
Value of total food consumption per capita per week (Maloti)	1,035	93	97	545	79	67	1,580	90	91	**
Household dietary diversity (HDDS) (0-12)	1,050	5.4	2.6	546	4.6	2.4	1,596	5.2	2.6	**
Total expenditures on non-food items per week (Maloti)	1,009	440	465	540	381	462	1,549	426	465	**
Total expenditures (food and non-food) per week (Maloti)	1,009	726	579	540	639	574	1,549	706	579	**
Total expenditures per capita per week (Maloti)	1,009	212	178	540	176	155	1,549	204	173	***
Total expenditures per capita per day (PPP USD)	1,013	5.4	4.5	542	4.6	4.3	1,555	5.2	4.5	***

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

The difference between total number of hh in the table and 1629 (i.e., total number of surveyed hh with no-leased land) is the number of hh with missing data.

(a) Significance testing  $H_0: b=c$  \* indicates significant difference at 5%, and \*\* at 1%. If not noted, the differences don't have statistical significance.

The composition of different categories of food consumed by the households on the previous day of the survey interview is used to compose a dietary diversity score for the study area. The Household Dietary Diversity Score (HDDS) is considered to be highly correlated to the economic status of households and provides a proxy for the quality dimension of food security. The HDDS is comprised of the following twelve food groups: 1 "staple cereals" 2 "tubers" 3 "meat" 4 "eggs" 5 "fish and other sea food" 6 "legumes" 7 "vegetables" 8 "fruit" 9 "milk and milk products" 10 "oil and oil seeds" 11 "sugar" 12 "Miscellaneous" (Swindale and Bilinsky, 2006). The highest possible score a household can get for dietary diversity is 12 (which is considered the most diverse diet) and the lowest 1 (least diverse diet).

The survey results presented in Table 7 show a low to medium level of average dietary diversity among households in the study area. In the treatment MMCs, the households consume, on average, foods from at least 5-6 different food groups. Comparison across study groups indicates that the treatment sites have a higher and statistically significant dietary diversity score than the households in control villages (5.4 vs. 4.6) (Table 6).

The difference in value of consumption between male and female-headed households is higher for male-headed households but not statistically significant (Table B2 in Appendix B). For example, average total value of food consumption reported by male-headed household is 312 Maloti per week versus 283 Maloti per week reported by female-headed households (Table B2). The number of different food groups consumed by male vs. female-headed households was same (5.2 out of 12) (Table B2).

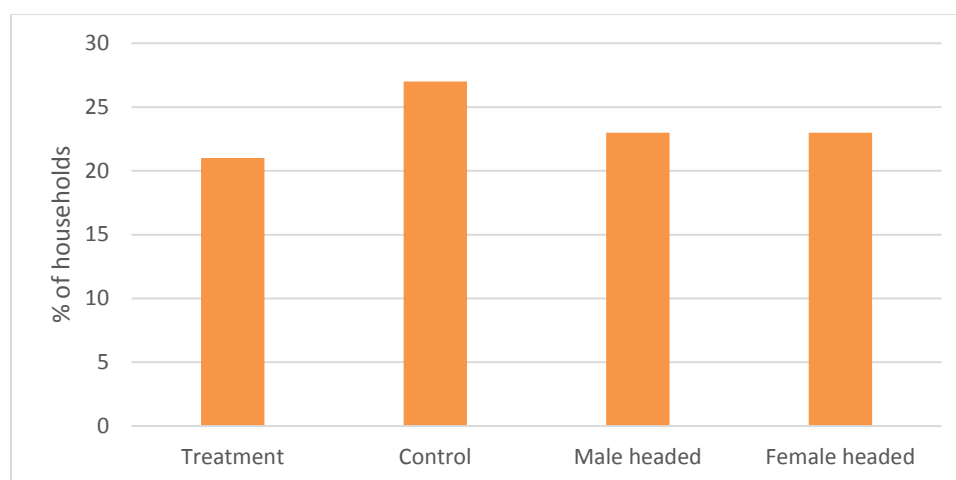
Table 7 also summarizes the average weekly non-food expenditures in the study area. This includes expenditures on clothing, shoes, rent, utilities, education, health, transportation, household goods, small electronics, kitchen items, etc. It does not include expenditures on durable goods (i.e., major appliances and electronic goods) and transportation, farm and business assets. Results indicate that on average, the households in the study area spend about 426 Maloti per week on non-food expenditures, which is about 40% more than average amount spent on food. Overall, the weekly total expenditures of female-headed households is significantly lower than male-headed households (i.e., only 76% of the total non-food expenditures incurred by male-headed households) (Table B2).

Adding the food and non-food expenditures together gives the total expenditure per household per week of 706 Maloti (726 Maloti in treatment areas and 639 Maloti in control areas) (Table 7). Converted at the market exchange rate, this is equivalent to US\$ 78 of total expenditure per household per week in the overall study area (or US\$80 in treatment villages and \$70 in control villages). The total household expenditure per week is higher for male-headed households (761 Maloti) than female-headed households (634 Maloti) across the study site (Table B2).

The total household level expenditure reported were divided by total household size to get an estimate of per capita expenditures per week of 465 Maloti in the treatment area, which is significantly higher than per capita per week total expenditure of 386 Maloti in the control areas. The per capita expenditure estimates for male-headed households is also significantly higher than female-headed households (Table B2).

The per capita total expenditures (excluding expenses on asset purchase) reported in Table 7 were further divided by seven to get the per capita per day value of total expenditure in the study population and converted at the purchasing power parity (PPP) exchange rate of 1 Maloti = 0.177 dollar.<sup>7</sup> The average per capita expenditure in the study area is estimated to be \$5.2 (PPP exchange rate). According to this estimate, the average expenditures in the study area are on the higher end of average per capita expenditures in other developing countries in the region. For example, the average per capita expenditures in the two urban areas in Mozambique where MCC has had similar land project, was \$1.66, substantially lower than the estimated per capita expenditures in this study (Maredia et al. 2012).

However, this average masks the fact that about 27% of households in the control MMC and 21% of households in the treatment MMCs live on less than \$2 per person per day (Figure 4). Statistical analysis indicates that the percentage of households living on less than \$2 is significantly higher in the control area than in the treatment area. The difference in the proportion of male vs. female-headed households in this low expenditure categories is not statistically significant (Figure 4). Although, out of scope of this report, analysis of severity and inequality of poverty in the area of study can help to understand the structure of poverty as a guide for land related development programs in the region.



Source: MCC/MSU Urban Land Survey, 2013

Figure 4. Percentage of households with total expenditure per capita per day less than \$2 (in USD PPP): Comparison of treatment and control areas and male-headed vs. female-headed households

<sup>7</sup> Based on a PPP conversion factor (GDP) to market exchange rate ratio in Lesotho of 0.62 as reported by the World Bank data for 2012 at <http://www.tradingeconomics.com/lesotho/ppp-conversion-factor-gdp-to-market-exchange-rate-ratio-wb-data.html>.

### 3.1.4 Access to credit

The baseline survey data suggests that applying for credit is generally a rare phenomenon in the study MMCs. About 10% of the surveyed households reported having applied for credit in the last 12 months, with significantly more percentage of households applying for credit in the treatment area (11%) compared to control area (7%) (Table 8). Among those that applied for credit, the most common reasons for applying for credit overall was for property improvement and education (29%), followed by purchase of asset and for construction or purchase of home (15%). Households in treatment villages cited education as a reason for credit significantly more than in control villages, and surprisingly significantly more percentage of households in control villages cited construction or home purchase as a reason for applying for credit than households in treatment villages (Table 9). However, note that the sample size of credit applicants in the control area is very small, and these results are not robust. Other than these two reasons, all the uses of credit reported are similar across treatment and control sites.

Table 8. Access to credit in the last 12 months

	Treatment			Control			Total			Testing (a) b≠c
Item	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean	S.D.	
% of households that applied for credit in the last 12 months	1,067	11%	31%	547	7%	25%	1614	10%	30%	*
Among those who applied (N=143): % of respondents by reasons for applying for credit										
Property improvement	100	31%	46%	33	21%	41%	133	29%	46%	**
Construction / purchase of home	100	12%	33%	33	33%	48%	133	15%	36%	
Education	100	33%	47%	33	6%	24%	133	29%	45%	
Purchase asset	100	13%	33%	33	29%	46%	133	15%	36%	
Other	100	12%	32%	33	11%	32%	133	12%	32%	
Among those who didn't apply (N=1471): % of respondents by the reason for not applying for credit										
No need	954	48%	50%	505	52%	50%	1459	49%	50%	**
Lack of access	954	18%	38%	505	14%	35%	1459	17%	37%	
Lack of collateral	954	5%	22%	505	2%	12%	1459	4%	20%	
Do not want to have debts	954	22%	42%	505	28%	45%	1459	24%	43%	
Other	954	7%	25%	505	5%	21%	1459	6%	24%	
% of households that have bank account	1077	63%	48%	552	61%	49%	1629	63%	48%	*
% of households that have credit card	1077	22%	42%	552	16%	37%	1629	21%	41%	

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

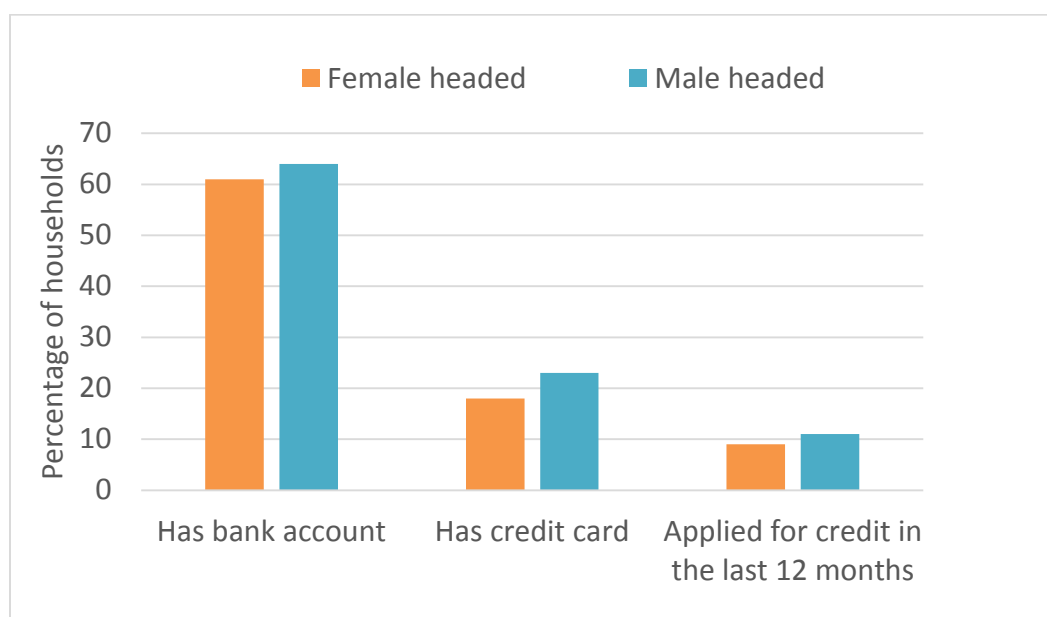
The difference between total number of hh in the table and 1629 (i.e., total number of surveyed hh with no-leased land) is the number of hh with missing data.

(a) Significance testing  $H_0: b \neq c$  \* indicates significant difference at 5%, and \*\* at 1%.



For those households that did not apply for credit, the main reasons provided are ‘no need’ (49%) and ‘don’t want to have debt’ (24%) (Table 8). The concern of lack of collateral was cited as a reason for not applying for credit by relatively more percentage of treatment vs. control households (5% vs. 2%) (Table 8). More than 60% of households (63% in treatment group and 61% in control group) reported having a bank account, which is not surprising given the urban setting of this study. Ownership of a credit card by at least one member of the household was less common, with 22% of households in the treatment area and only 16% in the control area reported having a credit card. The difference in owning a credit card between the treatment and control group is significant at  $p < 0.05$ . This difference may be due to the difference in the socio-economic profile (i.e., income, employment) and the urban/peri-urban nature of the treatment and control areas included in the study.

In terms of gender differences in access to credit, not surprisingly, more male-headed households have bank accounts, credit card, and had applied for credit in the last 12 months than the households headed by a female member (Figure 5). However the difference was not statistically significant at  $p < 0.05$  for any of these access to credit variables.



Source: MCC/MSU Urban Land Survey, 2013

Figure 5. Percentage of households with bank account, credit card and that applied for credit in the last 12 months: Comparison of male-headed vs. female-headed households

Several households that applied for credit didn’t report whether they received the credit and the amount they received. Thus data are incomplete to determine the rate of receiving the credit. Among those who applied for credit and provided the data (a total of 143 households), 97% received the credit (Table 9). On average, the amount of credit requested by those who accessed credit in the past 12 months (and for whom data was reported) is about 38,779 Maloti (or USD

4,300) (Table 8). About 6% of 136 households that provided the information indicated that they had to present a collateral for accessing credit. Among those who received credit and provided the data (a total of 114 households), the amount received was 46,036 Maloti but with a wide variability in the amount received. For none of the variables reported in Table 8, the difference is statistically significant.

Since the number of observations of credit acquisition using land as collateral is negligible, we are not able to make any inference on the link between land ownership rights and access to credit. However, the module on credit included questions on what would be the main purpose of using credit in a hypothetical scenario that the household could use land as a collateral. As indicated in Figure 6, more than 50% of respondents reported that they would use such credit for business investment, with a significantly higher percentage of households reporting this potential use in the control area than in the treatment area (Figure 6). The second major use of such credit was for land improvement or to buy new property. This potential use was reported by significantly more respondents in the treatment area (35%) than in the control area (30%). About 12% of respondents in the treatment area and 10% in control area cited other uses (such as education) as the main purpose if they were to get credit using land as a collateral (Figure 5).

Table 9. Access to credit in the last 12 months

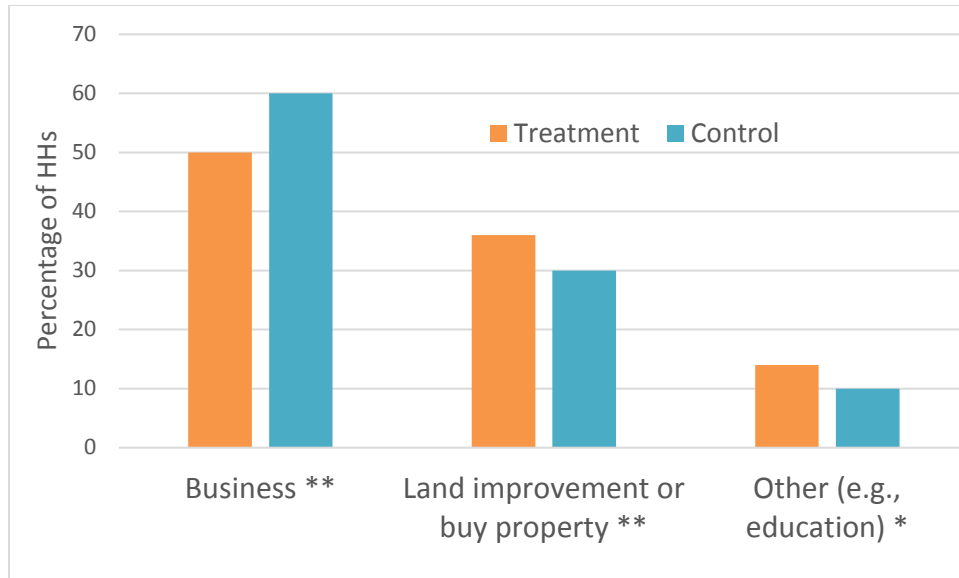
Item	Treatment			Control			Total			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean	S.D.	
<b>Among those who applied (N=143):</b>										
Average total amount requested per household (maloti)	90	38,018	55,066	29	43,643	61,183	119	38,779	55,782	
% of households that had to present collateral	102	6%	23%	34	11%	31%	136	6%	25%	
% of households that received credit	106	97%	18%	37	96%	19%	143	97%	18%	
<b>Among those who received credit (N=137):</b>										
Average amount received per household (maloti)	86	46,123	109,564	28	45,483	61,388	114	46,036	104,113	

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

The difference between total number of hh in the table and 1629 (i.e., total number of surveyed hh with no-leased land) is the number of hh with missing data.

(a) Significance testing  $H_0: b \neq c$ . \* indicates significant difference at 5%, and \*\* at 1%.



Source: MCC/MSU Urban Land Survey, 2013. \* indicates significant difference at 5%, and \*\* at 1%.

Figure 6. If able to use land as collateral to obtain credit, main purposes for which a HH will use the credit: Comparison of treatment and control group

### 3.2 Land Ownership, Land Markets and Perceived Tenure Security

Respondents were asked a detailed set of questions on land assets that include parcel locations, parcel characteristics in terms of size, use type, mode of acquisition, cost of transaction, lease documents, market participation, land value, perception about land tenure security, etc. In this section, we present the balancing test between the treatment and control areas on all these aspects.

#### 3.2.1 Profile of land parcels surveyed in terms of location, size, use, and ownership status

The baseline data set contains an inventory<sup>8</sup> of 2,496 parcels reported as being ‘in possession’ by the 1904 households surveyed in the study areas; 1799 (or 72%) of these are located in treatment MMCs – 1, 2 and 3, and 697 (or 28%) are located in control MMC 27, and 1,480 belong to<sup>9</sup> male headed households and 1,016 belong to female headed households (Table 10). As indicated before, despite the intent, the baseline survey data includes several households that had Leased parcels. Table 10 provides a breakdown of total parcels inventoried (2496) into those that already have Lease (329 parcels) and those that don’t (2167 parcels). The distribution of Leased and non-Leased parcels by location indicates that a majority of these parcels (302) are located in the treatment MMCs. In all the parcel level balancing tests presented in this section, unless explicitly specified, we only include parcels that did not have Lease at the time of the baseline survey. So the potential number of parcels included in the baseline analysis is 2,167 parcels that belong to 1,629 households.

<sup>8</sup> The plot inventory is based on Section F of the questionnaire that asked for the Lease status of each parcel owned by the household.

<sup>9</sup> Although, legally land cannot be owned by an individual in Lesotho, we use the terms ‘own’ or ‘ownership’ in the context of land in lieu of ‘belongs to’ an individual or a household.

Table 11 provides a further breakdown of the non-leased parcels in the treatment and control areas and belonging to male vs. female headed households by type of parcel use (residential, commercial, not used) and by rental status (currently used by the household or rented out). Not surprisingly, a majority of parcels are reported to be currently used by the households (1809 out of 2167), and a majority of these are used for residence (1,703). Very few parcels were reportedly used mainly for commercial (140) purpose and some were reported as not currently used (178) across both treatment and control villages (Table 10).<sup>10</sup>

Table 11 also provides the breakdown of this inventory of non-leased parcels by the gender of the head of the household. As indicated, 1286 parcels without the Lease belong to male headed households and 881 belong to female headed households, which is proportionately same as the share of female headed households in total sample (i.e. about 43%) (Table 11).

Table 10. Number of leased and non-leased parcels by treatment status and gender of the head of the household

	Treatment	Control	Total	Male-headed	Female-headed
No Lease	1,497	670	2,167	1,286	881
Lease	302	27	329	194	135
Total	1,799	697	2,496	1,480	1,016

Source: MCC/MSU Urban Land Survey, 2013

Table 11. Number of non-Leased parcels by type, by treatment and control MMC, and by the gender of the head of the household

Type of parcel	Treatment	Control	Total	Male-headed	Female-headed
<b>Belong to household and currently in their possession</b>					
Residential	1,135	568	1,703	998	705
Commercial	75	31	106	70	36
Total	1,210	599	1,809	1,068	741
<b>Rented-out or lent to others</b>					
Residential	118	26	144	84	60
Commercial	26	8	34	17	17
Total	144	34	178	101	77
<b>Not used or occupied currently</b>	143	37	180	117	63
<b>Total</b>	1,497	670	2,167	1,286	881
Number of hhs to whom these parcels belong	1,077	552	1,629	957	672

Source: MCC/MSU Urban Land Survey, 2013

<sup>10</sup> A majority of these parcels were reported as having no constructed building or structures on them and were 'empty' plots.

Table 12 presents the average number of land parcels owned per household in the study area and the average size of these parcels. The survey results indicate that on average, a household in the study area owns 1.25 parcel--1.07 parcel for household's own use, 0.09 parcel that is rented out to others and 0.09 parcel that is not used (or vacant). The percentage of parcels rented out by households in the treatment villages is significantly higher than in the control villages (Table 12). The number of parcels rented in was very insignificant among the surveyed households—only 9 observations of parcels rented from others for household use were recorded in the entire survey and are thus not reported in the Table.<sup>11</sup>

The average size of the parcel for 817 parcels for which area data are available (either from GIS method or respondents' self-reported parcel area) is 5015 square meters, with parcel size in treatment area significantly larger (6,015 square meter) than the average parcel size in the control area (1583 square meters) (Table 12). The commercial parcels are on average larger than the residential parcels. Compared to control areas, the residential parcels are significantly larger in the treatment area (6,202 sq m) than in the control area (1,560 sq m).

Table 12. Number of land parcels and parcel size (non-leased parcels only)

Item	Treatment			Control			Total			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean	S.D.	
Average number of parcels that belong to the household f:										
Parcels owned and used	1,077	1.08	0.32	552	1.06	0.31	1,629	1.07	0.32	
Parcels owned and rented-out to others	1,077	0.10	0.34	552	0.06	0.28	1,629	0.09	0.33	*
Parcels owned and not used currently	1,077	0.10	0.33	552	0.06	0.25	1,629	0.09	0.32	
Total number of owned parcels	1,077	1.27	0.63	552	1.18	0.48	1,629	1.25	0.58	**
Average parcel size (of any parcel owned and used or rented out) (m²):										
Average area of owned parcel	561	6,015	18,935	256	1,583	5,474	817	5,015	16,959	**
Average parcel area by parcel's main use (m²):										
Average of residential area	478	6,202	19,395	228	1,560	5,740	706	5,127	17,329	**
Average of commercial area	36	7,118	22,686	17	1,574	2,632	53	5,797	19,894	

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

(a) Significance testing Ho:b≠c. \* indicates significant difference at 5%, and \*\* at 1%.

\f The differences between total number of parcels in the table and 1952 is the number of parcels with missing information.

<sup>11</sup> This is not surprising, as parcels that were rented-in and did not belong to the household, were excluded from the sampling frame when selecting the study sample

### 3.2.2 Characteristics of parcels owned

Registration of property rights promoted by the LARP project is expected to increase land value, among other things. However, the value of the land can be a function of characteristics such as access to amenities, facilities and infrastructure. To control for this potential confounders, we collected parcel level information in terms of access to road, water, electricity, latrine, bath and shower facilities, and communication services. The summary descriptive is reported in Table 13. In terms of road access, only 10% of the parcels in the sample are connected through paved roads; this percentage is 2% in the control area, which is significantly lower than in treatment areas (11%) (Table 13).

Tap water through private or public connection is the major water source for the parcel owners in the study area with 90% of parcels (92% in treatment and 86% in the control area). About 76% of parcels reported to have access to electricity, 18% have access to landline, 83% have access to mobile phone network, 88% have toilet and 82% has bathroom facility. Other than access to paved roads, tap water and landline phone, the difference in access to other utilities between parcels located in the treatment and control areas is not statistically significant (Table 13). In terms of gender analysis, the differences in parcel characteristics are not significantly different across parcels that belong to male-headed households vs. female-headed households (Table B3).

Table 13. Percentage of parcels with access to utility and infrastructure (non-Leased parcels only)

Item	Treatment			Control			Total			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean	S.D.	
% of parcels whose mode of access most used is paved road	1,431	11%	32%	657	2%	14%	2,088	10%	29%	**
% of parcels with tap water	1,412	92%	28%	651	86%	34%	2,063	90%	29%	**
% of parcels with electricity	1,427	75%	43%	657	77%	42%	2,084	76%	43%	
% of parcel with landline phone	1,422	20%	39%	655	12%	33%	2,077	18%	38%	**
% of parcel with mobile phone	1422	84%	37%	655	83%	38%	2,077	83%	37%	
% of parcel with toilet	1,417	88%	32%	659	88%	32%	2,076	88%	32%	
% of parcel with bathroom	1,419	81%	39%	656	85%	36%	2,075	82%	38%	
Average time it takes to access/reach the following facility from the Main Parcel owned by the HH by walking (minutes)...										
Drinking water source	1072	1.9	6.6	552	5.2	9.8	1624	2.7	7.6	**
Public transport	1072	8.5	7.6	552	11.7	9.6	1624	9.3	8.2	**
School	1072	14.8	11.5	552	16.9	12.0	1624	15.3	11.6	**
Hospital/clinic	1072	24.9	16.4	552	36.0	13.8	1624	27.4	16.5	**

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

The differences between total number of parcels in the table and 2167 is the number of parcels with missing information.

(a) Significance testing  $H_0: b=c$ . \* indicates significant difference 5%, and \*\* at 1%.

For the main parcel owned by the households, Table 13 also reports the average time it takes to access the main drinking water source, public transport, school and hospital/clinic. Access to these amenities as measured by number of minutes is significantly better in the treatment area than in the control area. On average, it takes 50% more time to access public transport and a hospital/clinic from the main parcel located in the control area than in the treatment area. It takes on average 2 minutes to access drinking water from the main parcel in the treatment area, but more than 5 minutes in the control area. The lower levels of accessibility to different utilities and longer distance to access amenities from parcels located in the control area indicate that in general, the control MMC 27 is underdeveloped than the treatment MMCs 1, 2 and 3.

### 3.2.3 Land acquisition

In economic systems where land is privately owned and property rights are formally registered, there are two major modes of acquiring land—through purchase or inheritance. In the urban setting of this study area, land acquisition through purchase (mostly from a non-lease holder) was reported as the main mode of acquisition of the parcels belonging to the surveyed households—60% in the treatment MMC and 58% in control MMC (Table 14). However, ‘allocated by traditional authorities’ was the second most important mode of parcel acquisition reported both in the treatment and the control areas, and inheritance was ranked the third. Proportionately, a significantly more number of parcels were acquired through inheritance (15%) in the control area than in the treatment area (9%) (Table 14). With the formal land registration to take place in the treatment villages under the LARP project, it is expected that the importance of acquiring land through purchase will increase and that of allocation by traditional authorities will decline. Comparison across gender of the head of the households (not reported in any table) indicates no significant difference in the mode of parcel acquisition between the male- and female-headed households.

Table 14. Parcel distribution by mode of acquisition for parcels in the possession of the households and those rented-out (non-Leased parcels only)

Item	Treatment			Control			Total			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean	S.D.	
Purchase	1,372	60%	49%	641	58%	49%	2,013	60%	49%	**
Allocated by traditional authorities	1,372	22%	42%	641	18%	39%	2,013	21%	41%	
Inheritance	1,372	9%	29%	641	15%	36%	2,013	11%	31%	
Other	1,372	8%	27%	641	9%	28%	2,013	8%	27%	

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

The differences between total number of parcels in the table and 2167 is the number of parcels with missing information.

(a) Significance testing  $H_0: b \neq c$ . \* indicates significant difference at 5%, and \*\* at 1%.

In terms of cost, the average cost to acquire a parcel (whose status was ‘non-Leased’ at the time of survey) in the study area is reported to be about 6023 Maloti (or about USD670) per parcel (Table 15).<sup>12</sup> This includes the price of the parcel paid to the previous owner of 5,786 Maloti and the transaction cost of acquiring the parcel of 237 Maloti in the form of tax, stamp duties and fees, and other informal costs of land transfer from one owner to another owner. The average transaction cost incurred by parcel holders in the treatment area is significantly higher (291 Maloti) than in the control area (50 Maloti). The estimate of 6023 Maloti is the average cost of acquiring the parcel among 1585 parcels that reported a value for either types of costs, including zero cost or no cost reported by 474 parcels for parcel acquisition and 1217 parcels for transaction cost (Table 15). The average cost in terms of payments made to previous owner reported by 918 parcel holders that did make a positive payment is 9,656 Maloti (or USD 1060) across the study area. Similarly, among those (i.e., 69 parcel holders) that reported a value for the transaction costs incurred to acquire the parcel (in the form of tax, stamp duty, and fees), the average cost was 4476 Maloti across the study area (Table 15). For these 69 parcels that reported incurring these costs, this type of cost represented about 16% of total cost of parcel acquisition.

Table 15. Costs for parcel acquisition by mode of acquisition for parcels in the possession of the households and those rented-out (non-Leased parcels)

Item	Treatment			Control			Total			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean (c)	S.D.	
<b>Number of parcels reporting...</b>										
Zero payment for parcel acquisition	256	0		218	0		474	0		
Zero cost for tax, stamp duties and fees to acquire the parcel	802	0		415	0		1,217	0		
<b>Average across respondents reporting positive cost incurred for a given category (non-reporters and zero cost reporters excluded)</b>										
Payments made to previous owner to acquire this parcel (Maloti)	675	10051	45828	243	8074	16124	918	9656	41617	
Costs incurred for tax, stamp duties, and fees to acquire this parcel (Maloti)	50	5144	10364	19	1244	2754	69	4476	9590	
<b>Average across all respondents that reported incurring either type of cost (non-reporters of a given cost considered zero)</b>										
Payments made to previous owner to acquire this parcel (Maloti)	1084	6213	36353	501	4309	12439	1585	5786	32555	
Costs incurred for tax, stamp duties, and fees to acquire this parcel (Maloti)	1084	291	2714	501	50	592	1585	237	2408	**
Total amount of payments to acquire this parcel (Maloti)	1084	6504	36934	501	4360	12465	1585	6023	33062	*
<b>Total time it took to acquire this parcel</b> from the start of the process to getting the possession (Days)	904	63	220	431	51	149	1,335	60	206	

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

The difference between the total number of parcels in the table and the N indicated in the header row is the number of parcels with missing information.

(a) Significance testing  $H_0: b=c$ . \* indicates significant difference at 5%, and \*\* at 1%.

<sup>12</sup> For parcels that have size information, the total cost of parcel acquisition per square meter comes to about 24 Maloti, which is similar across the treatment and control areas.



Another type of transaction costs involved in acquiring a land parcel is the time cost. The survey asked the parcel holders to estimate the total time it took to acquire a given parcel from the start of the process to getting the parcel in possession. The average reported time for parcel acquisition (that did not have a Lease at the time of survey) which includes time to complete the land transfer from one owner to another owner was 63 days in the treatment area, which is not significantly different from the 51 days reported in the control area (Table 15). As a comparison, the time cost involved in acquiring a land parcel that had a Lease at the time of the survey was 130 days (for 194 parcels that responded to this question). One of the aims of the LARP project is to reduce the time (and other transaction costs) involved in the whole process of parcel acquisition.

### 3.2.4 Land documents

Table 16 presents the summary of types of documents currently in possession by non-Leased parcel holders. About 10% of land parcels do not have any land documents, with a significantly more parcel holders not having any document in the control area (14%) compared to treatment area (9%). Among those that own non-Leased parcel of land, more than 70% of the parcel holders reported to possess Form C (71% in the treatment area and 73% in the control area) as a proof that the parcel belongs to them. The ‘informal letter of agreement between buyer and seller’ was reported by 9% of the parcel holders in the study area. Other types of documents (i.e., title deed, deed of transfer, letter of inheritance, order of court, etc.) were reported by 8% of parcel holders surveyed. The letter of agreement between buyer and seller was cited as the land document by significantly more percentage of parcel holders in the treatment area than in the control area (Table 16).

Table 16. Types of Land Documents Currently in Possession by Parcel Holders (for parcels in the possession of the households and those rented-out)

Item	Treatment			Control			Total			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean	S.D.	
Form c (all types)	1,393	71%	45%	652	73%	45%	2,045	71%	45%	
Letter of agreement between buyer and seller (informal)	1,393	10%	30%	652	5%	22%	2,045	9%	29%	**
Other	1,393	8%	27%	652	7%	26%	2,045	8%	27%	
No document	1,393	9%	29%	652	14%	34%	2,045	10%	30%	**

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

The differences between total number of parcels in the table and 2167 is the number of parcels with missing information.

(a) Significance testing  $H_0: b=c$ . \* indicates significant difference at 5%, and \*\* at 1%.

Table 17. Interest in obtaining a Lease (for parcels in the possession of the households and those rented-out)

	Treatment			Control			Total			Testing (a) b≠c
Item	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean	S.D.	
% of parcels of households interested or have initiated the process of obtaining the Lease										
Interested, but not initiated	1,396	78%	42%	659	88%	33%	2,055	80%	40%	**
Has initiated	1,396	17%	38%	659	5%	22%	2,055	15%	35%	**
Not interested	1,396	5%	22%	659	7%	26%	2,055	5%	23%	
<b><u>Among parcels belong to households that are interested but have NOT INITIATED the process of obtaining the Lease... (N=1698):</u></b>										
% of parcels by the reason for their interest										
Tenure security (conflict /expropriation)	1,067	82%	38%	576	84%	37%	1,643	83%	38%	
It's a regulation / legal reasons	1,067	14%	34%	576	12%	33%	1,643	13%	34%	
Other	1,067	4%	20%	576	4%	19%	1,643	4%	20%	
% of parcels by the main reason why no one has applied for the Lease yet										
Doesn't know how to do it	1,059	34%	47%	566	41%	49%	1,625	36%	48%	*
No money	1,059	29%	45%	566	22%	42%	1,625	27%	45%	*
The process is too cumbersome	1,059	14%	35%	566	16%	37%	1,625	14%	35%	
No need	1,059	5%	23%	566	10%	30%	1,625	6%	25%	**
Doesn't know where to do it	1,059	6%	23%	566	4%	20%	1,625	5%	23%	
Other	1,059	12%	32%	566	7%	25%	1,625	11%	31%	**
The amount the household is willing to pay to obtain the Lease for this parcel (Maloti)	953	257	793	538	124	389	1491	224	716	**
<b><u>Among parcels belonging to households that have INITIATED the process of obtaining the Lease... (N=241):</u></b>										
% by main reason for initiating in obtaining the Lease										
Tenure security (conflict /expropriation)	153	84%	36%	25	73%	45%	178	83%	37%	
It's a regulation / legal reasons	153	14%	35%	25	20%	41%	178	15%	36%	
Other	153	1%	11%	25	7%	27%	178	2%	13%	
<b><u>Among parcels that households are NOT INTERESTED in obtaining the Lease with (N=116):</u></b>										
% of parcels by the reason for their disinterest										
Too costly	68	22%	42%	41	21%	41%	109	22%	42%	
Does not know how to do it	68	17%	38%	41	21%	41%	109	18%	39%	
No tenure security issues	68	5%	23%	41	15%	36%	109	8%	27%	
Other documents that secure parcel	68	12%	33%	41	6%	23%	109	10%	31%	
Does not know one is supposed to register	68	4%	20%	41	14%	35%	109	7%	25%	
The process is too cumbersome	68	12%	33%	41	7%	26%	109	11%	31%	
Takes too much time	68	15%	36%	41	10%	31%	109	14%	35%	
Other	68	12%	32%	41	5%	23%	109	10%	30%	

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

The differences between the total number of parcels in and the N indicated in the header row is the number of parcels with missing information.

(a) Significance testing  $H_0: b \neq c$ . \* indicates significant difference at 5%, and \*\* at 1%.

When asked for interest in obtaining a Lease, about 80% of parcel holders indicated that they were interested, but have not initiated the process, 15% indicated that they had initiated the process of obtaining the Lease, and 5% were not interested (Table 17). Eighty eight percent of parcel holders in the control area were interested but had not initiated the process, which was significantly more than the 78% in the treatment area that reported that same. As against this, the percentage of parcel holders that have initiated the process was much higher (17%) compared with only 5% in the control area. The top three reasons reported for having no interest in obtaining the Lease were ‘don’t know how to do it’ (36%), ‘no money’ (27%) and ‘the process is too cumbersome’ (14%) (Table 17). Among those that are interested but have not initiated the process of getting the Lease, the main reason for their interest in obtaining Lease was reported to be ‘tenure security’ (83% of parcel holders). Other reasons cited include ‘it’s a regulation/legal reasons’ (13%) and other reason (4%). This same question was also asked to parcel holders that have initiated the process of obtaining the lease, and the importance of different reasons provided for their interest is similar to the importance of reasons mentioned by parcel holders that have not initiated the process yet (Table 17).

When asked for why a household had not initiated the process of obtaining the Lease, the top three reasons provided were ‘too costly’ (22%), ‘don’t know how to do it’ (18%), and ‘takes too much time’ (14%) (Table 17). Two of these top reasons are the same as the reasons cited by those that were not interested in obtaining the Lease. Thus, it looks like the lack of knowledge, potential cost, and the perception that the process is not very friendly are the reasons, why many residents in the study area have not taken any action towards obtaining the Lease.

### *3.2.5 Land conflict and perceived risks*

As indicated in Figure 1, the LARP project’s logical framework includes several short- to medium-terms outcomes expected from issuing Leases to parcel holders. Reducing the incidence of conflicts is one of the expected outcomes. It is thus interesting to know the occurrence of conflicts or concerns about conflicts in the study area to get an assessment of the importance of this issue pre-treatment. Thus respondents were asked to provide information on actual land conflicts they have experienced in the past and potential conflicts they perceive to occur in the future. Their responses are summarized in Table 17. About 1.6% of households who owned land in the past 3 years reported having lost the ownership of that land due to conflict. In terms of conflict on land currently owned, 3.5% of parcel holders – 4% in treatment areas and 1.5% in control area--responded as having experienced conflict in the acquisition of that land parcel, 6% reported having concerns about potential conflict (Table 19). On all the indicators noted in Table 18, the treatment areas have experienced significantly more occurrence of conflicts in parcel acquisition, lost ownership of land due to conflict, or have concerns about future conflict, compared with parcels in the control areas. In terms of gender differences, parcels belonging to male-headed and female-headed households have experience same level of conflicts in the past or in parcel acquisition (Table B4). However, a significantly more percentage of female-headed households indicated having concerns about future conflict on their existing land than their male counterparts (Table B4).

Table 18. Land conflicts experienced by the household and parcel owners

	Treatment			Control			Total			Testing (a)
Item	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean	S.D.	b≠c
<b>% of households who owned land in the past 3 years but whose ownership has been lost due to</b>										
Conflict	1,054	1.9%	14%	541	0.6%	7.4%	1595	1.6%	13%	*
Other reasons	1,054	7.8%	27%	541	1.7%	13%	1595	6.4%	25%	**
Didn't lose land	1,054	90%	30%	541	98%	15%	1595	92%	27%	**
% of parcels whose owners experienced any conflict about this parcel	1,357	4.0%	20%	656	1.5%	12%	2013	3.5%	18%	**
% households concerned about being in conflict about this parcel	1,410	6.7%	25%	657	3.4%	18%	2067	6.0%	24%	**

Weighted to reflect population

The difference between total number of hh in the table and 1629 (i.e., total number of surveyed hh with no-leased land) is the number of hh with missing data.

The differences between total number of parcels in the table and 2167 is the number of parcels with missing information.

(a) Significance testing  $H_0: b = c$ . \* indicates significant difference 5%, and \*\* at 1%.

### 3.2.6 Hypothetical land sales and land rental prices

One of the impacts hypothesized from formal land registration is increased number of land market transactions in the form of land sales, purchase and rental transactions. To get a baseline assessment of the land sales price and rental price in the study area, respondents were asked to provide information on hypothetical land prices (both rental and sale) for the parcels they own (either in their possession or rented out). The results of this section are reported in Table 18 for non-Leased parcels. The average hypothetical land sales price reported for non-Leased parcels is 222,227 Maloti, ranging from 195,562 Maloti in the control area to 229,856 Maloti in the treatment area, with the difference in this mean price between the two groups significant at 5% level. On a per unit basis, the total value of the parcel for those that have parcel size and price data (about 484 parcels) is 361 Maloti per square meter. The average hypothetical rental price is about 5,050 Maloti/month, varying from 5,420 Maloti/month in the treatment area to 3,776 Maloti/month in the control area (Table 19). On a per square meter basis, the rental price is about 12 Maloti in the treatment area and 9.7 Maloti in the control area. T-test for mean differences in sale and rental prices between the treatment and control groups suggests that the per parcel sale price and rental price are significantly higher in the treatment area than in the control area (Table 19).

The same variables are also reported by the gender of the head of the household in Table B5 and show that there are no differences in the self-reported hypothetical price of land sales or rental rate for parcels belonging to the male-headed households vs. female-headed households.

Table 19. Hypothetical sale and rental prices of parcels belonging to the household surveyed

Item	Treatment			Control			Total			Testing (a)
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean (s)	S.D.	b≠c
Average total value the parcel could be sold for (Maloti)	804	229,856	271,660	337	195,562	262,105	1,141	222,227	269,843	*
Average total value the parcel could be sold for per square meter (Maloti/m <sup>2</sup> )	330	376	759	154	312	687	484	361	742	
Average monthly value the whole parcel could be rented out (Maloti)	777	5,420	13,569	339	3,776	11,432	1,116	5,054	13,137	**
Average monthly value the whole parcel could be rented out for per square meter (Maloti/m <sup>2</sup> )	318	12	53	157	9.7	39	475	11	50	

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

The differences between total number of parcels in the table and 2167 is the number of parcels with missing information.

(a) Significance testing Ho: b≠c \* indicates significant difference at 5%, and \*\* at 1%.

Table 20. Comparison of treatment and control areas in terms of rental participation

Item	Treatment			Control			Total			Testing (a)
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean	S.D.	b≠c
<b><u>Rented-out parcels:</u></b>										
% of the household that rented-out their owned parcels	1,077	8.3%	28%	552	5.2%	22%	1629	7.6%	27%	**
<b><u>Among rented-out parcels:</u></b>										
% of rented-out parcels that are for residential use	144	80%	40%	34	77%	43%	178	80%	40%	
% of rented-out parcels that are for commercial use	144	20%	40%	34	23%	43%	178	20%	40%	
Rental rate (Maloti/month)	92	1,295	2,589	19	768	751	111	1,225	2,430	
<b><u>Rented-in parcels:</u></b>										
% of the household that rented-in parcels	1,077	1.0%	9.9%	552	0.0%	0.0%	1629	0.8%	8.7%	**
<b><u>Current interest in rental market:</u></b>										
% of households interested in renting in or renting out land	1077	8.1%	27.2%	552	5.2%	22.1%	1629	7.4%	26.2%	*

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

(a) Significance testing Ho: b≠c. \* indicates significant difference 5%, and \*\* at 1%.

### *3.2.7 Land market*

Respondents were asked to provide information on their current rental participation and interest in future rental market participation. The results are reported in Table 20. The rental transactions reported include both land and any property/structures built on that land.

Overall, very few households rent out land parcels (8.3% in the treatment, which is significantly higher than 5.2% in the control area) (Table 20). Compared to renting out, renting in is even more rare as illustrated by the fact that less than 1% of all the households (1% in the treatment area and 0% in the control area) rented in land parcels (Table 20). Again, as noted before, this is not surprising, as households that only rented-in (and did not own any property in the study area were excluded from the survey). A majority of rental transactions (i.e., rented out) (80%) involve renting of parcels for residential purpose. The rental rate is available for only 111 parcels, and they range from an average monthly rental rate of 1295 Maloti per parcel in the treatment area, which is significantly higher than the average rental rate of 768 Maloti per parcel in the control areas (Table 20). However, the small numbers of observations for which this data is available makes it difficult to make any statistically robust generalizations on the rental markets in the study area.

### *3.2.8 Land investment*

Increased investments in land improvement and new construction is expected to be another major outcome of land registration being promoted under the LARP project. Respondents were asked questions about various types of investments made on land parcels in the past three years to get a baseline picture of this potential outcome variable. Table 21 summarizes shares of parcel holders who made investment on different types of land improvement during the past three years.

About 30% of parcel owners (29% in the treatment and 33% in the control area) made at least one type of investment in the past 3 years (Table 21). The most popular types of investments are related to constructions of new buildings, repairs, improvements and rehabilitation of existing buildings, and installation of electricity (10-11% of parcels each). Rehabilitation of roofs and sewage, drainage and toilet facilities was reported by about 7% and 4% of parcel owners, respectively. The percentage of parcel holders reporting making these types of investment in the past 3 years is not statistically significant between treatment and control areas, except for installing electricity. A significantly more percentage of households in the control area reported making this investment than in the treatment area, perhaps due to the fact noted earlier that relatively more number of parcels in the control area are without electricity in the control MMC 27. Comparison by the gender of the head of the household does not reveal any systematic bias in occurrence of different types of land investments made on parcels belonging to male headed versus female headed households (Table B6).

In terms of the cost of investment, the average cost incurred on land improvement per parcel surveyed (in the last 3 years) is reported for parcels that made that investment (Figure 7) and across all the parcels (Figure 8) in the study area. Since there is no considerable variation in total parcel investment across the treatment and control areas or between the gender of the head of the

household that own a parcel, only the averages for the total sample are reported in these two figures.

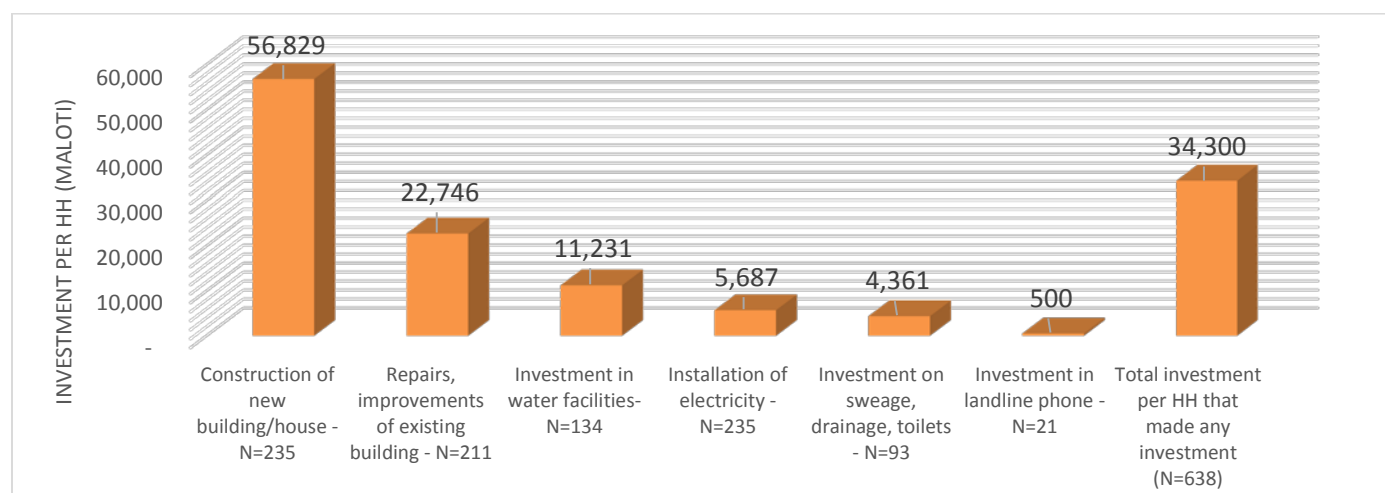
Table 21. Types of land investment made in the past 3 years (non-Leased parcels)

Table 27: Types of land investment made in the past 5 years (non-leased parcels)										
Item	Treatment			Control			Total			Testing (a)
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean	S.D.	b≠c
% of parcels that have made the following type of investment										
Construction of new buildings/houses	1,497	11%	32%	670	10%	31%	2167	11%	31%	**
Repairs, improvements and rehabilitation of buildings	1,497	10%	29%	670	10%	31%	2167	10%	30%	
Repairs, improvements and rehabilitation of roofs on buildings	1,497	7%	25%	670	6%	23%	2167	7%	25%	
Landline phone service	1,497	1%	10%	670	1%	7%	2167	1%	9%	
Install electricity	1,497	8%	28%	670	15%	36%	2167	10%	30%	
Sewage, drainage, and toilets	1,497	3%	18%	670	4%	20%	2167	4%	19%	
% of parcels that have made at least one type of investment	1,497	29%	45%	670	33%	47%	2167	30%	46%	

Source: MCC/MSU Urban Land Survey, 2013

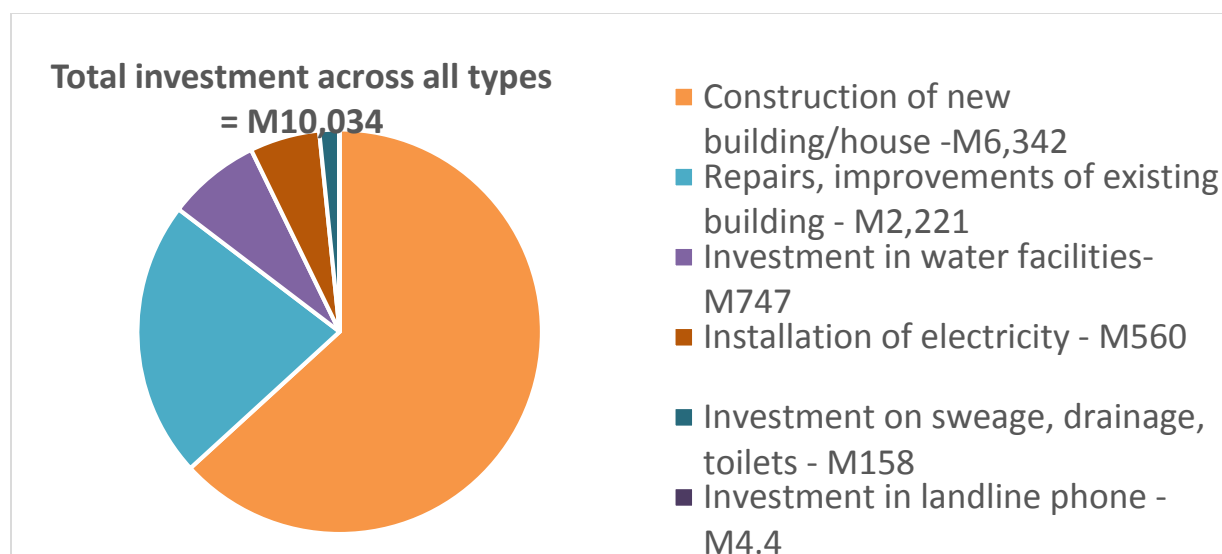
Weighted to reflect population

(a) Significance testing  $H_0: b=c$ . \* indicates significant difference at 5%, and \*\* at 1%.



Source: MCC/MSU Urban Land Survey, 2013.

Figure 7. Average investment per land parcel on different types of construction and repairs: Average across all land parcels on which a household reported making investment in the past three years (N noted for each investment type)



Source: MCC/MSU Urban Land Survey, 2013.

Figure 8. Total investment on different types of construction and repairs in the past three years: Average across all land parcels in baseline sample (N=2149)

On average the cost of investment was estimated to be 34,300 Maloti on 638 parcels that made any investment in the past 3 years (Figure 7). The most expensive type of investment in the study site is construction of new building/houses. For those that made this type of investment (i.e., 235 parcels), the average cost was reported to be more than 56,000 Maloti. The average cost of installation of electricity (for 235 parcels that made this investment) was 5,687 Maloti, and repairing/rehabilitating existing building/structure on the parcel (for 211 parcels that made this investment) was 22,746 Maloti, which were the next most common types of investment (Figure 7).

The total amount of investment costs incurred across all types of investments made in the last 3 years expressed as an average across the whole sample of 2149 parcels surveyed (which means, parcels that did not report any investment are included as zero cost) is about 10,000 Maloti. Figure 8 shows the percentage share of different types of land investment cost in this total cost. Almost two-thirds of the total cost is for construction of new building/house, followed by 22% on repairs, improvements of existing building. All other cost categories' share is less than 10% of total average cost per parcel (Figure 8).

### ***3.3 Knowledge, Perception and Opinion on Land Lease, Land Law and Land Rights***

A major component of the LARP project is to raise awareness about the Land Law and Land Rights among the treatment population, and to sensitize them about the value of land registration and its benefits. Thus, knowledge of the law and the land rights is not only an important outcome to be influenced by the LARP project, but can also shape people's perceptions and opinions, which can be confounding factors in realizing the behavioral outcomes related to land sales, rental participation, accessing credit, and investment on land. The survey thus included questions on the knowledge about Lease and the perceived impact of Lease on parcel value, market



participation, investments, conflicts, etc. Table 22 summarizes respondents' knowledge and perceived impact of having a Lease on market participation. More than 50% of respondents reported 'knowing what a Lease is.' However, this familiarity and knowledge of Lease was significantly higher among respondents in the treatment (56%) than in control villages (49%), and may indicate the 'spillover' effects of the outreach that was being conducted by LAA in villages closer to the treatment MMCs. In terms of gender comparison, a significantly more percentage of male-headed household respondents were knowledgeable about Lease than the respondents in the female-headed households (Table B7). Those that did not show familiarity with 'Lease' were explained that "land Lease is a document evidencing title to land registered with the deeds registry." All were then asked to share their perception/opinion on how a Lease would impact the value of their land, and their decision to pay for the land, sell, rent out or make investment on land. The results of these perception/opinion questions for the treatment and control areas are reported in Table 22 and by the gender of the head of the household in Table B7.

As expected, a larger proportion of households (77% overall) are willing to pay more for land with Lease than parcel without Lease (Table 22). Although counterintuitive, about 9% of the respondents across the board (10% in the treatment to 5% in the control group) are willing to pay less for parcels with Lease than parcels without Lease. Among the remaining 15% of respondents, 10% is willing to pay the same amount for land with or without Lease, and the other 5% selected "Don't know" as their answers. A formal test for mean difference between the treatment and control groups reveals that share of respondents who are willing to pay more is lower in the treatment than in the control area, and vice versa (Table 22). The difference in the willingness to pay for land with Lease compared to without Lease is not statistically different for male vs. female-headed households (Table B7).

It is also interesting to note that households are more likely to sell their parcels with Lease than land without Lease. Overall 72% of households in both the treatment and the control area are more willing to sell property with a Lease, as against to only 12-14% households who are less willing to do so (Table 22). A similar number of respondents reported the willingness to sell the property to be the same with or without the Lease. Again, the perception is consistent between the treatment and control areas and between male-headed and female-headed households (see Appendix Table B7).

Compared to 72% of households that are more willing to sell property with Lease, only 55% of households in the entire sample would be more willing to rent out parcels with Lease compared to parcels without Lease (Table 22). Meanwhile, 26% of households are less willing to rent out parcels with a Lease than those without Lease. A mean difference test indicates significant difference in the willingness to rent out land with Lease among control group parcel holders than in treatment group (Table 22). No statistical difference exists in the willingness to rent out land with Lease than without among male vs. female-headed households as reported in Table B7.

The data also reveal strong positive impact of a Lease on land investment (Table 22). A majority of the households (79% overall, with 79% in treatment area and 82% in the control area) felt that a Lease would make land improvement/investment more likely. And another 11% felt that a Lease would make land investment somewhat likely. Only 7% of households felt that a Lease would make land investment more (or somewhat more) unlikely. In terms of differences between

treatment and control villages, the difference in opinion is statistically significant only in the category of ‘more unlikely’. Perceptions on the impact of a Lease on the likelihood of making property improvements/investments were similar between male- and female-headed households (Table B7).

Table 22. Percentage of households by their knowledge about the Lease, willingness to pay, sell, rent out, and make improvements/investment for land with the Lease compared to land without a Lease

Item	Treatment			Control			Total			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean	S.D.	
% of HHs that know what is the land lease	1,077	56%	50%	552	49%	50%	1,629	54%	49.82%	*
<b>% of households that are prepared to pay more, less or same for the land with Lease than land without Lease</b>										
More	1,060	75%	44%	544	84%	36%	1,604	77%	42%	**
Less	1,060	10%	30%	544	5%	22%	1,604	9%	29%	**
Same	1,060	10%	30%	544	8%	27%	1,604	10%	30%	
Don't know	1,060	5%	22%	544	3%	16%	1,604	5%	21%	
<b>% of households that are more or less willing to sell property when they have Lease than when they don't</b>										
More	1,060	72%	45%	543	72%	45%	1,603	72%	45%	
Less	1,060	12%	33%	543	14%	35%	1,603	13%	33%	
Same	1,060	11%	31%	543	10%	30%	1,603	11%	31%	
Don't know	1,060	5%	21%	543	3%	17%	1,603	4%	21%	
<b>% of households that are more or less willing to rent out a land parcel in the case of Lease than without</b>										
More	1,065	54%	50%	543	59%	49%	1,608	55%	50%	*
Less	1,065	27%	45%	543	24%	43%	1,608	26%	44%	
Same	1,065	15%	36%	543	13%	34%	1,608	15%	35%	
Don't know	1,065	4%	19%	543	4%	20%	1,608	4%	20%	
<b>% of households that will construct and make improvements on that property with Lease</b>										
More likely	1,063	79%	41%	545	82%	39%	1,608	79%	41%	
Somewhat likely	1,063	11%	31%	545	11%	31%	1,608	11%	31%	
Somewhat unlikely	1,063	4%	20%	545	4%	19%	1,608	4%	20%	
More unlikely	1,063	3%	17%	545	1%	11%	1,608	3%	16%	*
Don't know	1,063	4%	19%	545	3%	17%	1,608	4%	19%	
<b>% of households that would go to following entities to resolve any land related conflicts</b>										
Area Chief	1077	68%	47%	552	84%	37%	1629	71%	45%	**
LAA/LSP	1077	13%	34%	552	5%	21%	1629	11%	32%	**
Courts and other entities	1077	19%	39%	552	11%	32%	1629	17%	38%	**

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

The difference between total number of hh in the table and 1629 (i.e., total number of surveyed hh with no-leased land) is the number of hh with missing data.

(a) Significance testing  $H_0: b \neq c$ . \* indicates significant difference at 5%, and \*\* at 1%.

Table 23. Knowledge about land rights

Item	Treatment			Control			Total			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	N	Mean	S.D.	
Heard about the Land Act that was passed by the parliament of Lesotho in June 2010	1,057	19%	39%	545	9%	29%	1,602	17%	37%	**
<b>Do all Basotho have a right to hold land title in Lesotho, provided they meet legal requirements under Land Act 2010 (% of households responding...)</b>										
Yes	1,058	92%	26%	543	95%	23%	1,601	93%	26%	**
No	1,058	4%	19%	543	1%	9%	1,601	3%	17%	
Don't know	1,058	4%	19%	543	4%	21%	1,601	4%	19%	
<b>Do Basotho have the right to transfer or acquire land rights from others (% of households responding...)</b>										
Yes	1,070	91%	29%	549	94%	25%	1,619	92%	28%	
No	1,070	8%	27%	549	6%	24%	1,619	7%	26%	
Don't know	1,070	1%	11%	549	1%	7%	1,619	1%	10%	
<b>Do Basotho women have the right to inherit land on an equal basis as their brothers (% of households responding...)</b>										
Yes	1,071	95%	22%	549	93%	25%	1,620	94%	23%	
No	1,071	5%	21%	549	6%	24%	1,620	5%	22%	
Don't know	1,071	1%	7%	549	0%	6%	1,620	1%	7%	
<b>Do Basotho women have the right to maintain a piece of their ex-husband's land in the case of divorce (% of households responding...)</b>										
Yes	1,069	90%	30%	545	91%	29%	1,614	90%	30%	
No	1,069	9%	28%	545	7%	25%	1,614	8%	27%	
Don't know	1,069	2%	13%	545	2%	15%	1,614	2%	14%	
<b>Do all Basotho women have the right to inherit from the deceased spouse (% of households responding...)</b>										
Yes	1,071	98%	15%	547	98%	14%	1,618	98%	15%	
No	1,071	2%	13%	547	1%	12%	1,618	2%	13%	
Don't know	1,071	0%	7%	547	1%	8%	1,618	0%	7%	
<b>Do Basotho women have the right to apply for a formal land title (Lease) on her own (% of households responding...)</b>										
Yes	1,069	95%	22%	547	94%	24%	1,616	95%	22%	
No	1,069	4%	20%	547	5%	23%	1,616	5%	21%	
Don't know	1,069	1%	8%	547	1%	7%	1,616	1%	8%	

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

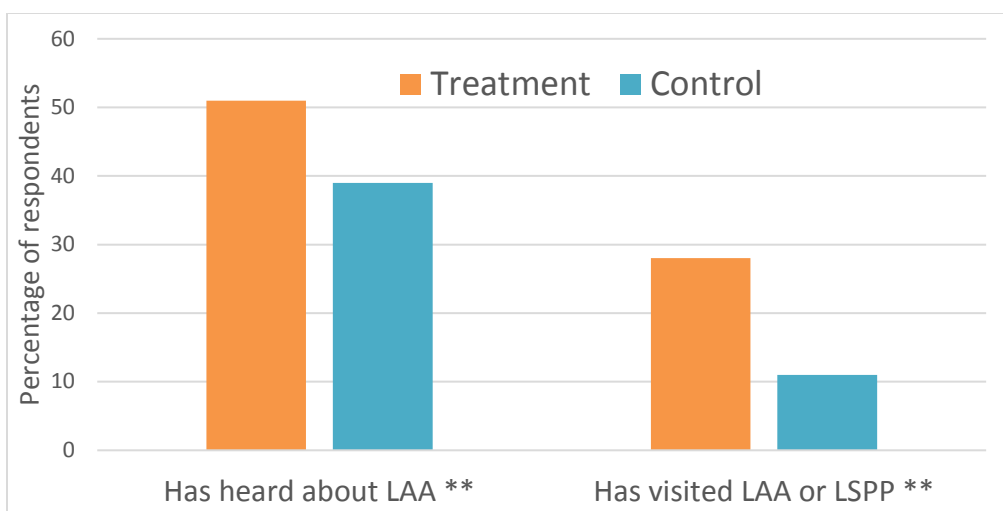
The difference between total number of hh in the table and 1629 (i.e., total number of surveyed hh with no-leased land) is the number of hh with missing data.

(a) Significance testing  $H_0: b \neq c$  -- \* indicates significant difference at 5%, and \*\* at 1%.

When asked for the most likely place/person the respondent would go to resolve any land related conflicts, more than 70% indicated ‘Area Chief’ as the main entity they would rely for conflict resolution, followed by courts and other entities mentioned by 17% and LAA or LSPP mentioned by 11% (Table 22). Not surprisingly, a significantly greater percentage of respondents in the control area (84%) mentioned the traditional authority (i.e., Area Chief) than the respondents in the treatment area (68%). Conversely, a significantly more percentage of respondents said they would go to LAA/LSPP or courts to resolve land related conflicts compared to respondents in the control areas (Table 22). Again, this higher awareness and reliance on the formal non-traditional system in the treatment area could be the spillover effects of sensitization that had already occurred in neighboring villages closer to the treatment group or the more urbanized setting of MMC 1, 2, and 3 compared with MMC 27. In fact, more than 50% of respondents in the treatment areas had heard about (i.e., had knowledge of) Lesotho Land Administration (LAA) compared to less than 40% in the control area (Figure 9). Moreover, a significantly more percentage of respondents in the treatment area (28%) had visited either LAA or LSPP in the past compared to only 11% of respondents in the control area (Figure 9).

Respondents were asked questions on their knowledge about the Land Act of 2010 and their perception on land rights according to this law. Prior to the planned LARP intervention, only 19% of households in the treatment villages and 17% overall reported to be informed about the Land Act 2010 (Table 23). The knowledge gap was statistically significant between the treatment and control group, and also between male headed (19%) and female headed households (13%) (Table B8).

More than 90% of households seem to have correct knowledge about various types of land rights Basotho men and women have under the Land Act (Table 23). These include right to hold land title, right to transfer or acquire land rights from others, right for women to inherit land on an equal basis as their brothers, women’s right to inherit land from deceased spouse, and women’s right to apply for a formal land title on her own. The category of land rights that received the most ‘no’ response was women’s right to maintain a piece of their ex-husband’s land in the case of divorce. About 8% of households indicated that women don’t have such right. In terms of gender difference in the perception of land rights, there were only few significant differences between female headed households and male-headed households, and these relate to incorrect perception of women’s right to inherit land either from parents or from deceased spouse (Table B8). At least on the correct knowledge of their own rights women were more self-aware about this than their male counter parts, which is encouraging.



Source: MCC/MSU Urban Land Survey, 2013. \* indicates significant difference at 5%, and \*\* at 1%.

Figure 9. Knowledge about the Lesotho Land Administration (LAA) office as measured by awareness and visitation to the office -- Comparison of treatment and control group respondents

### ***3.4 Exploring the Potential Use of Propensity Score Matching to Reduce Pre-treatment Sample Differences between the Treatment and Comparison Groups<sup>13</sup>***

As with any impact evaluation, the goal of the impact evaluation planned for the LARP project is to ‘rule out’ other possibilities / explanations for the effects to be observed. In other words, the goal is to have an evaluation design with high internal validity. For internal validity, the treatment and control groups should be roughly the same (or balanced) in their distributions of pre-treatment variables. This is the main justification for designing an IE based on randomization in treatment assignment. However, in this impact evaluation, this was not feasible, and thus it is not surprising that the two groups are significantly different across several characteristics reported in the tables discussed in Sections 3.1-3.3.

The differences observed between project treatment MMCs 1, 2, 3 and control MMC 27 in the baseline survey complicate the interpretation of any post-program differences to be observed between the households that will receive the land registration intervention through LARP and those that will not receive such intervention (before the follow-up survey). The post-program differences might be the result of the project, but they may also be the result of the baseline differences observed in the household and parcel characteristics. Thus one of the proposed solution we explore here is the potential use of Propensity Score Matching (PSM) research design, which is a statistical matching technique that attempts to estimate the effect of a treatment (in this case, the effect of a systematic land right registration project) by accounting for the covariates that predict receiving the treatment (Rosenbaum and Rubin, 1983).

PSM attempts to mimic randomization by creating a sample of households that receive the LARP intervention that is comparable on all observed covariates to a sample of households that do not receive the project intervention. The purpose of using this statistical technique is to reduce the

<sup>13</sup> The description of the PSM technique and discussion of the results presented in this section draws from the Baseline Report for Phase I of the MCA Mongolia Peri-Urban Rangeland Project (see Rubenson et al. 2012).

selection bias by equating groups of households that share similar observable characteristics. Furthermore, using the PSM technique after the baseline data are collected can help guide the data collection for the endline survey. For example, those households that appear to be particularly poor matches (i.e., are off-support) after conducting the matching exercise can be dropped from the follow-up survey.

We thus explore the PSM technique to identify households in the treatment and control areas that are good matches and should be retained for the follow-up evaluation survey. The matching is done at the household level, which means many parcel level characteristics were converted into household level variables. We then create a model that identifies the relative importance of individual characteristics (i.e., covariates) in the matching process, and results in a single number between 0 and 1, called propensity score, which represents that household's probability of being selected for the project intervention regardless of whether a household was in the treatment or control group. Each of the households in the treatment group is then paired up with one or more households from the control group with a similar propensity score. This then creates two groups of households – households that are targeted to receive project intervention (i.e., land registration) and households that have similar propensity scores but are not targeted for the intervention. Because the propensity score weights the importance of the different characteristics of the households, the result of the matching process is that, on average, the differences between the households from the treatment group and the matched household from the control group is much smaller than the differences observed between the two groups presented in the previous section. The quality of the matching can be assessed by two metrics which include: (1) the common support region (or overlap region) which measures how well the estimated propensity scores for the treatment households and the control households overlap each other, and (2) degree to which the covariates are balanced between the treatment and control before and after matching.

To conduct this analysis, a nearest neighbor-matching model was estimated using the Stata program *psmatch2*. A wide range of variables representing different categories of household, parcel holder and parcel characteristics were included to capture as much unobserved bias in the samples as possible. A total of 50 variables were included in the matching model as listed in Table 24, which presents the results of the matching process. For each variable included in the model, the table shows the mean values for the treatment and control group, percentage bias, difference in the mean values, and the p-value for the t-test. The first row presents the results for the unmatched sample and the second row for the matched sample. Note that due to missing data on some variables, 146 household observations (105 from the treatment group and 41 from the control group) were dropped from the PSM model estimation. Thus the number of observations on which the PSM model was estimated is 1483 households.

Table 24. Sample balance before and after matching (N=1483 households)

#	Variable	Sample	Mean		Bias		Difference	p-value	t-test
			Treated	Control	%	% reduction			
1	Female headed HH (=1)	U	0.439	0.362	15.8		2.88	0.004	**
		M	0.430	0.425	1	93.8	0.2	0.839	
2	Age of the head (years)	U	49.930	47.178	19.5		3.61	0.000	**
		M	49.542	48.524	7.2	63	1.64	0.101	
3	Age of the head – squared (years)	U	2676.4	2439.6	16.3		3.02	0.003	**
		M	2638.3	2511.2	8.7	46.3	1.98	0.048	*
4	Head knows how to read and write (=1)	U	0.945	0.930	6.6		1.23	0.220	
		M	0.941	0.930	4.7	28.1	0.98	0.326	
5	Household size	U	4.145	4.133	0.6		0.11	0.915	
		M	4.134	4.092	2.1	-253	0.46	0.648	
6	HH size in adult equivalent	U	3.526	3.384	8.5		1.54	0.123	
		M	3.504	3.474	1.8	78.9	0.39	0.696	
7	Woman as percentage of all adults (16 years of age or older)	U	0.435	0.463	-9.9		-1.8	0.071	
		M	0.440	0.428	4.4	55.4	0.95	0.342	
8	A member of the HH has stayed away from home for more than 6 m in the past 12 months (=1)	U	0.102	0.082	6.8		1.23	0.220	
		M	0.101	0.088	4.6	32.7	0.95	0.341	
9	Number of Infants (<5 years)	U	0.283	0.288	-0.9		-0.16	0.870	
		M	0.291	0.298	-1.3	-48.2	-0.28	0.776	
10	Number of children (5-14 years)	U	0.694	0.855	-17.3		-3.22	0.001	**
		M	0.707	0.743	-3.9	77.5	-0.87	0.382	
11	Number of adults (15-45 years)	U	2.114	2.133	-1.4		-0.25	0.803	
		M	2.113	2.124	-0.8	41.3	-0.17	0.865	
12	Number of adults (46-60 years)	U	0.666	0.466	29.7		5.32	0.000	**
		M	0.646	0.640	1	96.6	0.21	0.835	
13	Total net income (maloti)	U	18645.0	9918.2	27.8		4.86	0.000	**
		M	16660.0	20376.0	-11.9	57.4	-2.08	0.038	*
14	Total income per capita (maloti)	U	4862.0	2735.0	25.4		4.47	0.000	**
		M	4374.4	5001.4	-7.5	70.5	-1.37	0.169	
15	HH member is engaged in salaried income (%)	U	0.659	0.601	12.2		2.24	0.025	*
		M	0.652	0.607	9.2	24	1.95	0.052	
16	HH member is engaged in self-employment (%)	U	0.302	0.204	22.9		4.11	0.000	**
		M	0.285	0.307	-5.1	77.8	-1.01	0.311	
17	Value of non-land assets (Maloti)	U	42272.0	33847.0	12.8		2.3	0.021	*
		M	40989.0	42479.0	-2.3	82.3	-0.46	0.644	
18	Value of total food consumption (Maloti)	U	298.160	247.950	21.2		3.71	0.000	**
		M	296.570	303.300	-2.8	86.6	-0.54	0.591	
19	Household dietary diversity (HDDS)	U	5.283	4.707	23.1		4.19	0.000	**
		M	5.217	4.828	15.6	32.4	3.27	0.001	**

#	Variable	Sample	Mean		Bias		Difference	p-value	t-test
			Treated	Control	%	% reduction			
20	HH applied for credit (=1)	U	0.097	0.068	10.3		1.83	0.067	
		M	0.090	0.092	-0.6	94	-0.12	0.902	
21	Head of the HH has a bank account (%)	U	0.666	0.550	23.9		4.4	0.000	**
		M	0.657	0.679	-4.7	80.4	-1.02	0.310	
22	HH member has a credit card (%)	U	0.209	0.119	24.3		4.3	0.000	**
		M	0.187	0.216	-7.8	67.8	-1.51	0.130	
23	HH experienced any conflict in the past on any land owned (=1)	U	0.049	0.023	13.8		2.41	0.016	*
		M	0.037	0.035	1	93.1	0.2	0.841	
24	HH lost land due to conflicts in last 3 years (=1)	U	0.021	0.006	12.9		2.18	0.029	*
		M	0.014	0.017	-3.5	73.2	-0.67	0.501	
25	HH is concerned about land conflict on at least one plot of land (=1)	U	0.080	0.049	12.8		2.26	0.024	*
		M	0.066	0.064	1	91.9	0.22	0.829	
26	Number of land parcels owned	U	1.272	1.178	17		3	0.003	**
		M	1.249	1.258	-1.7	89.8	-0.32	0.752	
27	HH owns at least 1 commercial plot (=1)	U	0.064	0.053	4.7		0.84	0.399	
		M	0.060	0.076	-7.1	-52.6	-1.4	0.162	
28	HH rented-out parcels dummy (=1)	U	0.091	0.051	15.5		2.73	0.006	**
		M	0.084	0.103	-7.4	52.2	-1.37	0.171	
29	HH has at least one purchased plot (=1)	U	0.594	0.515	15.9		2.92	0.004	**
		M	0.596	0.595	0.1	99.3	0.02	0.981	
30	HH has at least one plot with no documents of ownership (=1)	U	0.101	0.184	-23.9		-4.56	0.000	**
		M	0.104	0.084	5.8	76	1.45	0.148	
31	HH has made investment in repairs/upgrades in at least one land plot (=1)	U	0.373	0.380	-1.3		-0.23	0.815	
		M	0.373	0.352	4.4	-241.1	0.93	0.355	
32	HH initiated the process of obtaining lease on at least one plot owned (=1)	U	0.140	0.051	30.6		5.27	0.000	**
		M	0.115	0.110	1.8	94.1	0.35	0.726	
33	Owner does not know process of obtaining a Lease (=1)	U	0.332	0.460	-26.3		-4.85	0.000	**
		M	0.340	0.329	2.4	91	0.52	0.606	
34	Main plot has access to paved road (=1)	U	0.110	0.012	42		6.89	0.000	**
		M	0.071	0.067	1.5	96.5	0.29	0.773	
35	Main plot has access to tap water (=1)	U	0.852	0.536	72.8		14.07	0.000	**
		M	0.838	0.840	-0.6	99.2	-0.15	0.885	
36	Main plot has no electricity (=1)	U	0.171	0.229	-14.6		-2.71	0.007	**
		M	0.170	0.173	-0.8	94.5	-0.18	0.859	
37	Main plot has private toilet facility (=1)	U	0.948	0.908	15.3		2.92	0.004	**
		M	0.946	0.962	-6.3	58.7	-1.64	0.100	
38	Main plot has indoor bath and shower (=1)	U	0.867	0.902	-10.9		-1.96	0.050	
		M	0.868	0.837	9.8	10.1	1.86	0.063	



#	Variable	Sample \a	Mean		Bias		Difference	p-value	t-test
			Treated	Control	%	% reduction			
39	Respondent has knowledge about the land lease (=1)	U	0.548	0.440	21.7		3.97	0.000	**
		M	0.539	0.579	-8	63.2	-1.69	0.091	
40	Would pay more for the land with Lease than land without Lease (=1)	U	0.740	0.826	-21		-3.76	0.000	**
		M	0.741	0.729	3	85.8	0.58	0.561	
41	Would be more willing to sell property when they have Lease than when they don't (=1)	U	0.681	0.716	-7.7		-1.4	0.163	
		M	0.687	0.708	-4.6	40	-0.97	0.333	
42	Would be more willing to rent out a land parcel in the case of Lease than without (=1)	U	0.519	0.611	-18.6		-3.4	0.001	**
		M	0.529	0.529	0.1	99.4	0.02	0.981	
43	Would be more likely to construct and make improvements on that property with Lease (=1)	U	0.727	0.822	-22.8		-4.07	0.000	**
		M	0.746	0.712	8	65	1.57	0.116	
44	Has heard about the Land Act that was passed by the parliament of Lesotho in June 2010 (=1)	U	0.174	0.090	25		4.38	0.000	**
		M	0.160	0.164	-1.1	95.5	-0.21	0.830	
45	Knows that Basotho have a right to hold land title in Lesotho, provided they meet legal requirements under Land Act 2010 (=1)	U	0.910	0.943	-12.6		-2.23	0.026	*
		M	0.917	0.924	-2.8	77.7	-0.57	0.569	
46	Knows that Basotho have the right to transfer or acquire land rights from others (=1)	U	0.889	0.916	-9.1		-1.63	0.103	
		M	0.896	0.893	1.2	86.8	0.24	0.807	
47	Knows that Basotho women have the right to inherit land on an equal basis as their brothers (=1)	U	0.943	0.926	7.2		1.34	0.180	
		M	0.946	0.945	0.5	92.6	0.12	0.903	
48	Knows that Basotho women have the right to maintain a piece of their ex-husband's land in the case of divorce (=1)	U	0.893	0.890	0.8		0.15	0.879	
		M	0.896	0.902	-1.9	-124.4	-0.41	0.684	
49	Knows that Basotho women have the right to inherit from the deceased spouse (=1)	U	0.975	0.978	-2.1		-0.38	0.703	
		M	0.976	0.978	-1.1	46.6	-0.24	0.812	
50	Knows that Basotho women have the right to apply for a formal land title on her own (=1)	U	0.941	0.930	4.8		0.89	0.373	
		M	0.943	0.932	4.3	10.2	0.92	0.357	

Source: MCC/MSU Urban Land Survey, 2013 (t-test: \*\* indicates  $p < 0.01$ ; \* indicates  $p < 0.05$ )

\a U=Unmatched; M=Matched

The distribution of propensity scores estimated based on this model is reported in Figure 10. The density distribution of propensity scores is a visual way for assessing the degree of overlap—or “common support”—between the treatment and control groups being matched. As depicted in Figure 10, there are a small number of households in the treatment group (i.e., 84 HHs) that fall outside the common support. If the impact evaluation to be conducted in few years is based on this matched sample, then it implies that these 84 households can potentially be dropped from the follow-up survey. However, the results of PSM reported in Table 24 are sensitive to the variables that are included in the model, which in turn determines the number of observations on which the model is estimated. This is due to a large number of missing data for many variables. All observations with any missing data in any variable are automatically dropped from the analysis. The list of 50 variables included in the PSM model reported in Table 24 were selected to represent a wide range of covariates that maximized the N (1483) but minimized the mean and median bias (reported in Table 24). If the missing data for the baseline values of some of the variables can be recovered during the end line survey, it is possible to re-estimate the PSM model by including more variables. This can potentially change the number and composition of households that are off-support. Due to this implication, we recommend not dropping any household sample in the follow-up survey.

Overall, as shown in Table 24, the matching has produced a treatment and control group much closer to each other in comparison across a wide range of covariates. This is evident from the fact that many of the differences between treatment and control households are large and statistically significant before matching. After matching the size of these differences is reduced considerably and become statistically insignificant (at  $p < 0.05$ ) in all but three cases.

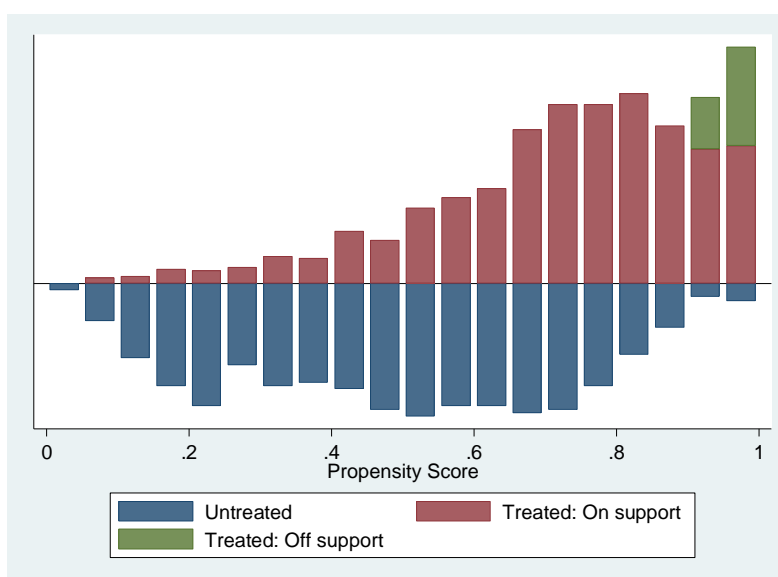


Figure 10. Density distribution of Propensity Scores and observations on support and off support in treatment and control group

Table 24 reports the t-tests for each variable included in the PSM model. Figure 11 and Table 25 provide another way to assess whether matching has worked or not by looking at the amount of bias across the range of covariates included in the estimated PSM model. Figure 11 shows the

density distribution of standardized percentage bias in the treatment and control samples—before and after matching. The standardized percentage bias<sup>14</sup> across covariates is distributed across a wide range (both positively and negatively) before matching; but after matching the density distribution is concentrated around zero, indicated a reduction in the sample bias. The average standardized bias across the covariates is 16.4%; after matching, this is reduced to 4%. Similarly, the median bias value is 15.4% before matching and is reduced to 2.9% after matching (Table 25).

Table 25. Covariate bias before and after matching

Sample	Pseudo R <sup>2</sup>	LR chi <sup>2</sup>	p>chi2	Mean Bias	Median Bias
Unmatched	0.212	404.82	0	16.4	15.4
Matched	0.027	67.1	0.054	4	2.9

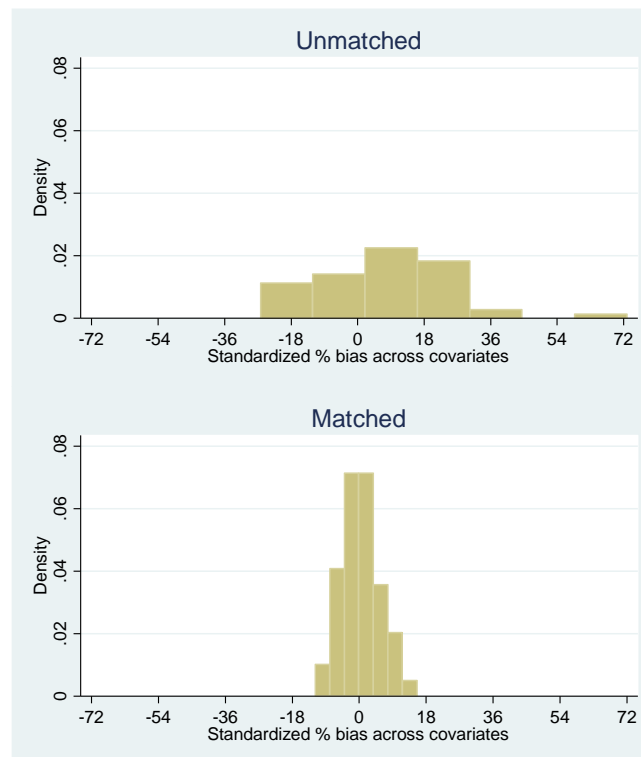


Figure 11. Density distribution of standardize percentage bias across covariates: Comparison of matched and unmatched sample

<sup>14</sup> The standardized percent bias is the percent difference of the sample means in the treated and control group (unmatched or matched) sub-samples as a percentage of the square root of the average of the sample variances in the treated and control groups (see Rosenbaum and Rubin, 1985). Table 23 also reports for each variable the percent reduction in this bias after matching.

#### 4. Baseline Assessment of the Outcome and Impact Indicators of the LARP Project

The logic framework of the Land Project depicted in Figure 1 identified nine outcome and impact indicators as the focus of this evaluation. Table 26 presents a summary assessment of the baseline scenario of these indicators that were presented in various tables throughout the report. The values are for the sample of households in the treatment group only. Moreover they include households and parcels with only non-Leased land. These estimates represent the baseline value for the planned impact evaluation so as to attribute the change in these indicators to the Land Project. As noted throughout the report, some of these indicator values are based on very few observations and were either not calculated (e.g., percent of households that applied for credit and were denied because of insufficient collateral, and average value of rent per parcel rented out) or estimated but with a cautionary note on the low statistical power on the robustness of results. In Table 26, these explanations and cautionary notes are flagged in the footnote for each indicator where they are applicable.

Table 26. Baseline assessment of key outcome and impact indicators in the treatment group from household survey data (excludes leased parcels)

Indicator	Baseline Mean Value in the Treatment MMCs (N in parenthesis)	Expected effect of the land project
a. Time/cost to conduct formal property transactions		
i. Costs incurred for tax, stamp duties, and fees to acquire a parcel (Maloti) \b	5,144 (50)	Negative (i.e., time/cost is expected to reduce)
ii. Total time it took to acquire this parcel from the start of the process to getting the possession (Days)	63 (904)	
b. Time/cost of conflict resolution		
i. Number of months from start to end of the conflict \b	30 (19)	Negative (i.e., time/money cost towards conflict resolution is expected to reduce)
ii. Number of days spent by the owner on conflict resolution \a	--	
iii. Amount of money spent by the owner on conflict resolution (incl. incentives) (Maloti) \b	1,385 (31)	
c. Transactions reflecting active land market		
i. % parcels rented out	9.6% (1,497)	Positive (i.e., rental and sales activity is expected to go up)
ii. % parcels acquired through formal purchase	60% (1,372)	
d. Parcels with Lease (sporadic)		
i. % of parcels	16.8% (1,799)	Positive (i.e., number of registered parcels is expected to go up to 100%)
ii. Number of parcels with Lease	302 (1,799)	
e. Tenure security		
i. % parcel holders not concerned about being in conflict with anyone about their parcel (indicator of tenure security)	<b>93.3%</b> (1,410)	Positive (i.e., % of parcel holders feeling secured / not concerned / not worried about losing a parcel is expected to go up)
• Residential	93.2% (1195)	
• Commercial \b	92.6% (85)	
f. Incidents of conflicts		
i. % of parcel holders experiencing conflicts	<b>4.0%</b> (1,357)	Negative (i.e., number of conflicts is expected to decline)
g. Ability to monetize land value		
i. Average total value of rent per parcel rented out (Maloti/month) \a	-- 5,420 (777)	Positive (i.e., value of land as measured by rental rate is expected to go up)

ii. Hypothetical mean value the whole parcel could be rented out (Maloti/month)	229,856 (804)	
iii. Hypothetical mean value the parcel could be sold for (Maloti)		
h. Access to formal credit		
i. % households that applied for credit	11% (1,067)	Positive (i.e., number of people accessing credit using land as a collateral is expected to go up; percentage of households denied or not applying for credit is expected to go down)
ii. % of households that applied for credit that had to present collateral \b	6% (102)	
iii. % of households that applied for credit and were denied because of insufficient collateral \a	--	
iv. % of households that didn't apply for credit (for reasons other than 'no need or do not want to have debt') because of concerns about lack of collateral	<b>16.6%</b> (279)	
i. Investments on land parcels		
i. % parcels that made at least one type of investment in the last 3 years (on improvements, repairs or construction)	29% (1497)	Positive (i.e., investments on land improvement is expected to go up)
a. Residential	33% (1253)	
b. Commercial \b	14% (101)	
ii. Total investment per parcel that made at least one investment in the past 3 years (maloti)	34,992 (432)	
a. Residential	33,872 (410)	
b. Commercial \b	66,920 (19)	
iii. Average investment per parcel (across all parcels) made in the last 3 years (maloti)	10,012 (1,495)	
a. Residential	11,091 (1251)	
b. Commercial \b	9,618 (101)	

\a Number of valid observations in the sample is too small to estimate this indicator

\b Caution: Numbers of observations are too few to derive robust estimates of these indicators

The expected effect of the LARP project on these indicators is also noted in the Table 26. In general, values of indicators that measure cost (time and money) and emotional/economic hardships (conflicts, tenure insecurity) are expected to go down, and values of indicators that measure benefits/productivity (land value, investment, land market activity, access to credit) are expected to go up. For several of these indicators, the baseline values suggest a substantial scope for improvement in the desired direction, which if it occurs will be detected in the follow-up survey 3-4 years from the baseline. However, for some indicators, the values are close to the optimal, and detecting a statistically significant improvement in these indicators over the 3-4 year period (i.e., in short- to medium term) is highly unlikely. These indicators are identified in red font in Table 26 and include: percentage parcel holders concerned about being in conflict with anyone about their parcel (indicator of tenure insecurity), percent of parcel holders experiencing conflicts, and percent of households that didn't apply for credit because of concerns about lack of collateral. The baseline values of these indicators are within the range of 5% points of the optimal value (i.e., zero), and one needs a huge sample to detect small changes in indicator values of small magnitude. Note however, that the impact evaluation to be conducted for this project is based on PSM combined with a difference-in-difference design method and the actual attribution of impact will be based on assessing the change in the values of baseline indicators in the treatment area relative to the change in the baseline values of the same indicator in the matched control group.

## 5. Correlation between Key Potential Outcome Indicators and Respondent, Household and Plot Characteristics

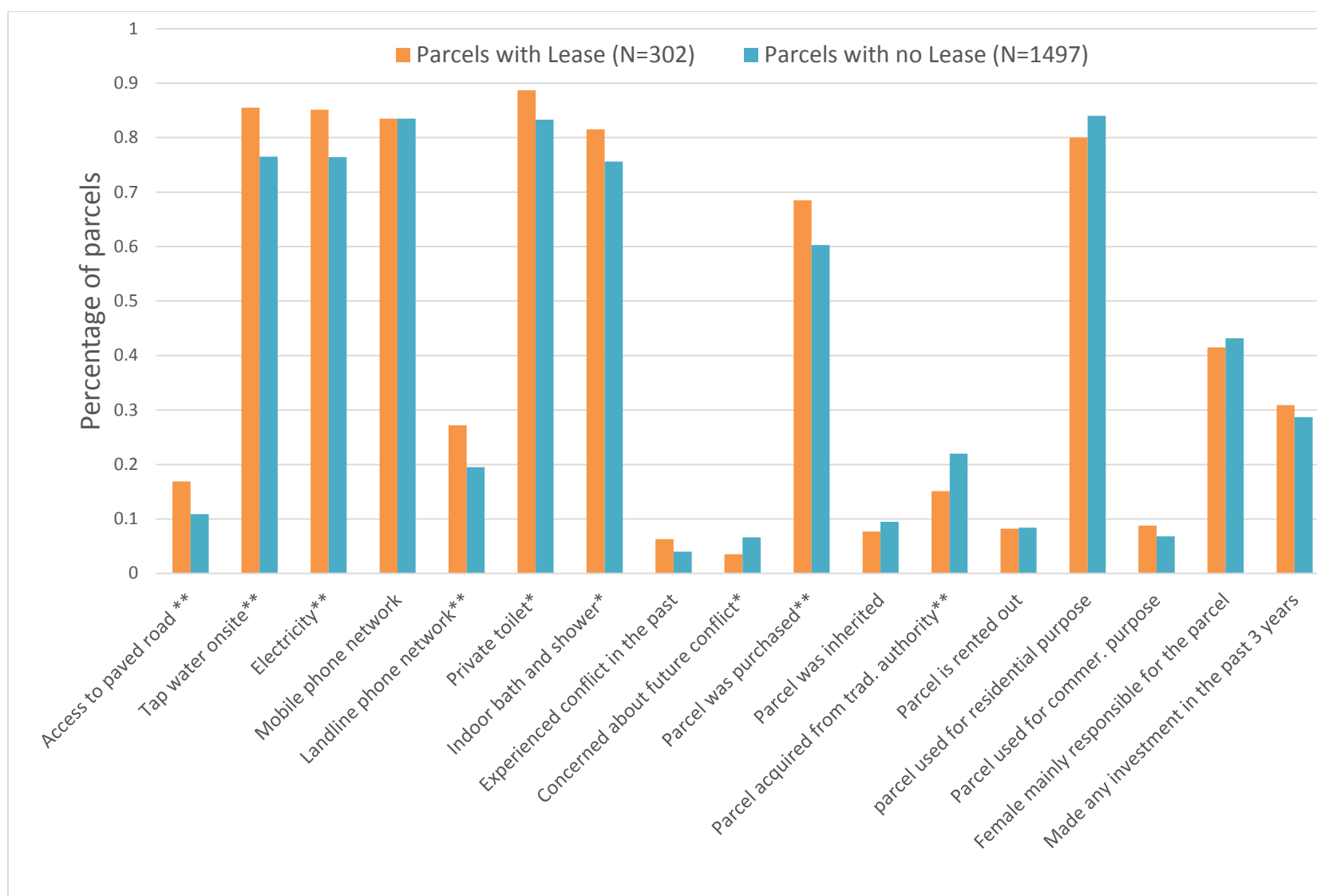
In this section we examine some of the underlying assumptions of the LARP project logic (or impact pathway) noted in Figure 1. Formally recognized titles are expected to increase investment in land, increase the frequency of sales and rentals, increase the value of land, and reduce land related conflicts. We examine the correlation between some of these outcome indicators in the baseline data with household / plot characteristics. Specifically, we do correlation tests focused on three sets of indicators: 1) lease status of the land parcel; 2) value of land as measured by hypothetical price and rental value per parcel; and 3) behavioral outcomes (i.e., sales, rental, investment, etc.) perceived to take place in a scenario when a land parcel has a Lease than without a Lease. Note that except for the first set of correlations related to the lease status, the correlation test for the second and third sets of indicators only focuses on the parcels belonging to the treatment group.

For continuous variables such as value of land, we use ordinary least squares (OLS) model and regress the outcome variable on a set of household and parcel characteristics to assess the correlation between the outcome variable and each of the independent variable. When testing the correlation between a binary treatment variable such as Lease status (yes/no) or perception/opinion on the likelihood of a behavioral outcome in a scenario of having a lease than without, and a set of continuous or discrete covariates, we use one way ANOVA technique to compare means of each of the characteristic variable across the samples of the two groups representing the binary variable. The results of the regression analysis are presented in the table format and the results of the one-way ANOVA analysis are presented in the graphical format. It should be noted that the analyses presented in this section are simple correlations and do not represent any causal relationship.

### *5.1 Correlation between Lease status, parcel characteristics and potential outcome indicators*

The unintended inclusion of the Leased parcels in the baseline survey data provides an opportunity to test some of the correlation between the lease status and potential outcome indicators. It also provides an opportunity to see what types of characteristics are associated with parcels that have a Lease and those that do not. As a reminder, the leased parcels included in the baseline survey are all a result of ‘sporadic’ Leases, implying a selection bias based on parcel (and parcel holder’s) characteristics. Thus, as noted above, the intent here is to simply examine the correlation and not establish a causality.

Figure 12 presents the association of different parcel characteristics with the lease status of a parcel belonging to households in the treatment area. As expected, there is a positive and statistically significant correlation between access to amenities/utilities and the lease status of a parcel. For example, parcels with lease have better access to paved road, have tap water onsite, electricity, landline phone, private toilet, and indoor bath and shower than parcels without the Lease (Figure 12). There is also a positive and significant association between purchased parcel and having a Lease for that parcel. Conversely, parcels acquired through a traditional authority are significantly more associated with not having a Lease. Not having a lease is also associated with concerns about future conflict. Past conflict is positively associated with currently having a Lease, but this correlation is not statistically significant. Parcels with a Lease are also positively



Source: MCC/MSU Urban Land Survey, 2013 (\*\* indicates  $p < 0.01$ ; \* indicates  $p < 0.05$  and + indicates  $p < 0.1$ )

Figure 12. Correlation between having a lease and parcel characteristics (for parcels in the treatment area only)

associated with its use for commercial purpose and having made an investment in the past 3 years. But these correlations are not statistically significant. Similarly, parcels with no Lease are positively but not statistically strongly associated with its use for residential purpose and being managed by a female member of the household (Figure 12).

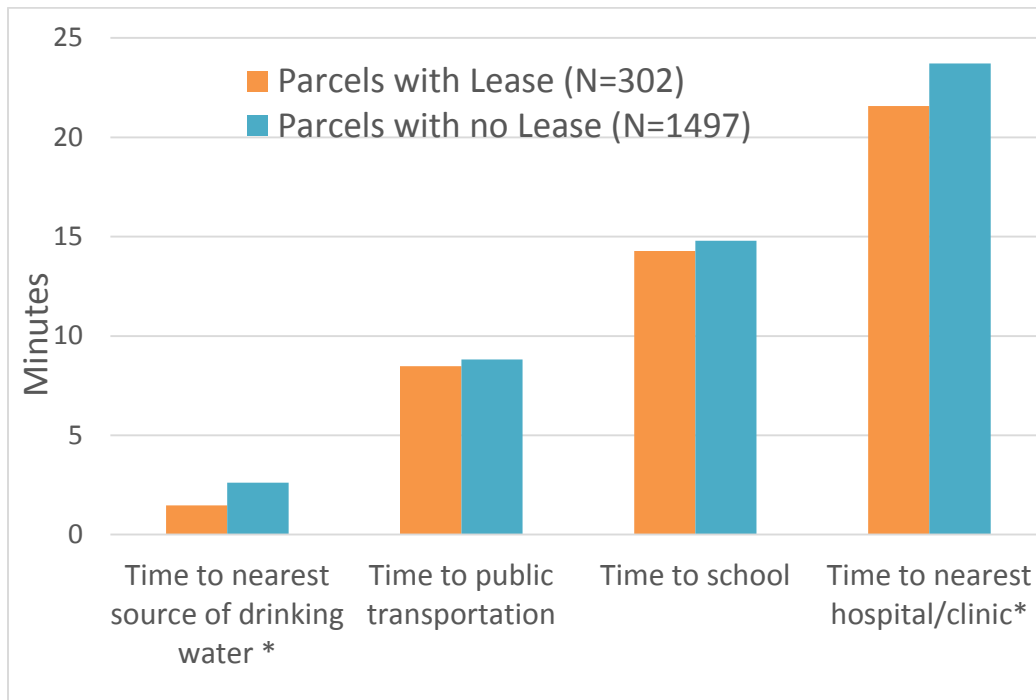
Parcels with Lease are negatively correlated with the distance (as measured by time) to different types of amenities and facilities (Table 13). For example, parcels with Lease are located closer to a source of drinking water, public transportation, school and hospital/clinic than parcels with no Lease. The average time to access drinking water and the nearest hospital is significantly less (by 1.15 minutes and 2.14 minutes less, respectively) for parcels with Lease than parcels with no Lease. For the variables that measure time to access public transportation and school, the correlation with the lease status is not statistically significant (Table 13).

One of the outcomes of having a Lease is increased land related investment by the parcel holder. However, for the existing parcels that had the Lease at the time of the survey, there is no evidence of a strong association with the amount of investment per parcel (Figure 14).

The other potential outcome expected with a Lease is the increased value of land. We look at three indicators of land value and its correlation with the lease status in Figures 15 and 16. Figure 15 provides the cost estimates for parcel acquisition and the Lease status at the time of the baseline survey. The average total cost incurred for parcel acquisition reported for the Leased parcel is more than double the cost reported for non-Leased parcels. Most of this difference comes from the payments made to the previous owner rather than the transaction costs in the form of tax, stamp duties and fees (Figure 15). In Figure 16, we present the self-reported (hypothetical) price per parcel for parcels in the treatment area that have a Lease and those that do not. As shown in Figure 16, the price at which a parcel could be sold, as reported by the respondents, is significantly higher for parcels that have a Lease than parcels with no Lease.

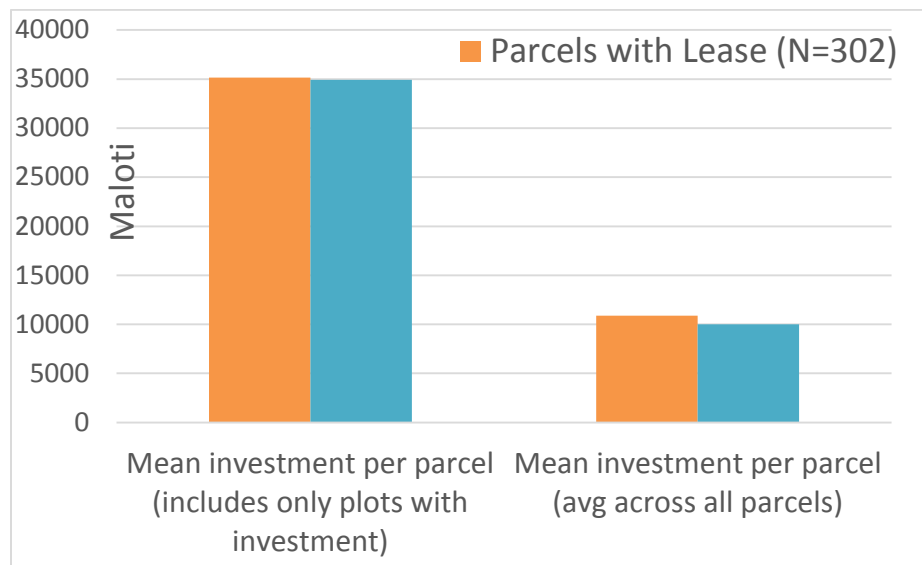
This strong association between the parcel having a Lease (at the time of acquisition or later) and the cost of parcel acquisition and the self-reported value of the parcel may be indicative of the systematic bias and tendency of owners of higher value land to obtain Lease than owners of land that have lower value. As noted before, there are many factors that determine the value of land (and thus the cost of land acquisition and the price of a parcel), such as parcel characteristics, size, location, use, time of acquisition, etc., which are not controlled for in this analysis, as the purpose is simply to examine correlations. In the following section, we look more closely at the association of the value of land with parcel characteristics to tease out some of the factors that are correlated with the price of the parcel.





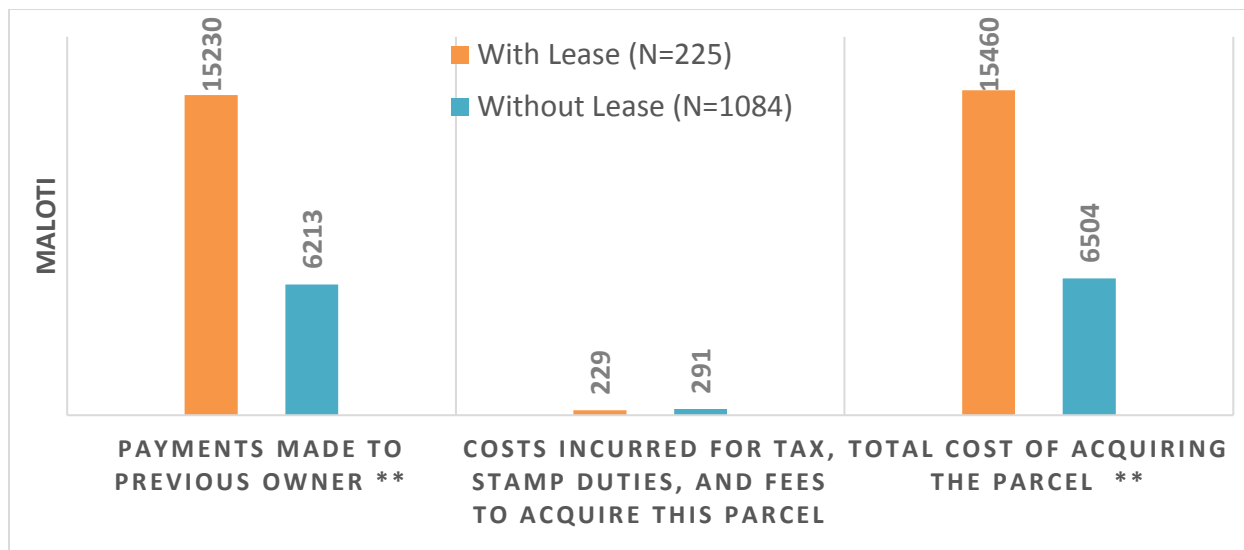
Source: MCC/MSU Urban Land Survey, 2013 (\*\* indicates  $p < 0.01$ ; \* indicates  $p < 0.05$  and + indicates  $p < 0.1$ )

Figure 13. Correlation between having a lease and parcel characteristics – Accessibility to different type of amenities (for parcels in the treatment area only)



Source: MCC/MSU Urban Land Survey, 2013 (\*\* indicates  $p < 0.01$ ; \* indicates  $p < 0.05$  and + indicates  $p < 0.1$ )

Figure 14. Correlation between having a lease and level of investment on land improvements in the past 3 years (for parcels in the treatment area only)



Source: MCC/MSU Urban Land Survey, 2013 (\*\* indicates  $p < 0.01$ ; \* indicates  $p < 0.05$  and + indicates  $p < 0.1$ )

Figure 15. Correlation between having a lease and cost of land acquisition (for parcels in the treatment area only)



Source: MCC/MSU Urban Land Survey, 2013 (\*\* indicates  $p < 0.01$ ; \* indicates  $p < 0.05$  and + indicates  $p < 0.1$ )

Figure 16. Correlation between having a lease and hypothetical price (for parcels in the treatment area)

## 5.2 Correlation between value of land and parcel characteristics

Tables 27 and 28 present the regression results of the hypothetical price and rental value of a parcel and parcel characteristics for parcels belonging to households in the treatment areas (MMC 1,2,3), control areas (MMC 27) and across all the study MMCs. The value of the coefficient corresponding to each variable denotes the size and direction of the relationship between that characteristic and the price per parcel. The statistical significance of that relationship (i.e., how strong or weak is the correlation) is noted by the asterisks and other symbols next to the coefficient.

Table 27. Correlation between hypothetical price per parcel in treatment, control and all MMCs with parcel level characteristics <sup>a</sup>

	<b>Treatment</b>	<b>Control</b>	<b>All parcels</b>
Treatment MMCs (=1)	----	----	6,416 (41,462)
Parcel has lease (=1)	113,979 * (43071.2)	111,205 ** (25419.6)	113,793 ** (39165.7)
Accessible to paved road (=1)	20,096 (41213.6)	(20,998) (36072.6)	17,672 (38469.0)
Has tap water, onsite (=1)	108,165 ** (29549.5)	77,260 + (40057.1)	97,680 ** (26464.7)
Has electricity (=1)	84,080 * (32808.4)	141,973 ** (35839.2)	97,166 ** (26319.5)
Has mobile phone network (=1)	36,138 (27704.6)	-87,998 + (40594.5)	10,418 (24722.3)
Has landline phone (=1)	65,857 + (36178.2)	33,102 (29465.5)	60,561 + (30252.3)
Has private toilet (=1)	62,213 * (23159.2)	77,077 * (31378.6)	70,447 ** (18965.4)
Has indoor bath and shower (=1)	51,503 (41214.0)	-41,777 (74332.6)	28,577 (35050.1)
Time to nearest drinking water (minutes)	637 (753.3)	223 (1953.4)	578 (688.7)
Time to public transportation (minutes)	-2,481 + (1361.5)	-2,489 (1969.2)	-2,670 * (1127.4)
Time to school (minutes)	438 (668.0)	780 (2055.0)	583 (642.8)
Time to hospital (minutes)	-387 (731.3)	-348 (1883.7)	-295 (674.8)
Experienced conflict in the past (=1)	-17,490 (59576.4)	-19,295 (64808.2)	-18,667 (55673.7)
Parcel was purchased (=1)	-46,357 (34837.9)	-158,401 * (71582.1)	-67,292 * (31079.3)
Parcel was inherited (=1)	-49,533 (41147.1)	-173,964 + (83172.7)	-73,626 * (36179.4)
Parcel acquired from traditional authority (=1)	-29,131 (31327.1)	-186,012 * (69754.2)	-58,848 + (33960.3)
Rented out parcel (=1)	15,095 (47075.3)	5,771 (71883.7)	22,758 (41581.7)
Residential purpose (=1)	-71,307 (48968.9)	79,061 (68771.8)	-41,578 (42100.3)
Commercial purpose (=1)	-85,833 (62152.5)	96,678 (206156.6)	-62,531 (58740.3)
Female managed (=1)	-12,343 (19883.8)	8,262 (32276.4)	-7,186 (17028.4)
Constant	157,229 ** (51186.5)	318,186 * (116609.0)	187,473 ** (49757.9)
N	840	306	1,146
R-squared	0.1245	0.1734	0.129

Source: MCC/MSU Urban Land Survey, 2013

<sup>a</sup> Standard errors are noted in the parenthesis. \*\* indicates  $p < 0.01$ ; \* indicates  $p < 0.05$  and + indicates  $p < 0.1$

Table 28. Correlation between hypothetical rental value per parcel in treatment, control and all MMCs with parcel level characteristics \a

	<b>Treatment</b>	<b>Control</b>	<b>All parcels</b>
Treatment group (=1)	--	--	594.85 -1079.49
Parcel has lease (=1)	1606.50 (990.8)	3024.13 (3807.6)	1890.47 + (1018.0)
Accessible to paved road (=1)	1250.65 (1757.2)	1511.05 (2030.0)	988.35 (1652.3)
Has tap water, onsite (=1)	2314.97 + (1319.2)	-1378.13 (1660.8)	1747.69 (1140.9)
Has electricity (=1)	2634.41 * (976.2)	1940.67 (3054.4)	1460.92 (1268.2)
Has mobile phone network (=1)	663.02 (1513.3)	504.13 (2042.7)	767.05 (1269.9)
Has landline phone (=1)	2498.92 * (914.8)	628.72 (1516.3)	2085.60 * (790.1)
Has private toilet (=1)	1628.68 (1652.7)	2574.08 (1570.3)	2185.70 + (1280.2)
Has indoor bath and shower (=1)	228.86 (1782.3)	-1707.9 (1875.2)	276.44 (1383.3)
Time to nearest drinking water (minutes)	210.18 (160.4)	-39.68 (35.4)	167.5621 (114.7)
Time to public transportation (minutes)	-89.24 * (40.0)	2.33 (75.2)	-101.00 * (37.7)
Time to school (minutes)	103.46 * (44.9)	-147.64 (75.5)	59.30 (44.5)
Time to hospital (minutes)	-44.23 (33.1)	84.05 (48.4)	-21.41 (30.1)
Experienced conflict in the past (=1)	4460.25 (3256.0)	51581.21 (45198.8)	7029.99 (4388.8)
Parcel was purchased (=1)	-292.61 (1707.5)	2209.82 (3189.7)	-399.77 (1378.3)
Parcel was inherited (=1)	3601.93 (2666.7)	-555.74 (3456.7)	2441.38 (2198.0)
Parcel acquired from traditional authority (=1)	2254.87 (3122.3)	3005.37 (4579.6)	2084.81 (2548.3)
Residential purpose (=1)	-3431.96 (3452.5)	2200.59 (2110.4)	-3279.04 (2707.9)
Commercial purpose (=1)	-3694.99 (3727.5)	3695.34 (2815.4)	-3332.94 (2923.1)
Female managed (=1)	-666.22 (889.0)	-44.25 (1092.0)	-423.89 (740.7)
Constant	3503.26 (2706.0)	-2564.27 (5631.4)	2777.66 (2423.1)
N	821	306	1127
R-squared	0.0563	0.2332	0.0473

Source: MCC/MSU Urban Land Survey, 2013

\a Standard errors are noted in the parenthesis. \*\* indicates  $p < 0.01$ ; \* indicates  $p < 0.05$  and + indicates  $p < 0.1$

There are several observations worth noting from the regression results presented in Tables 27 and 28. First, the strong and positive relationship between the hypothetical price of the parcel and its lease status as shown in Figure 16 is confirmed by the positive and statistically significant coefficient for the lease status indicator. This relationship is even stronger in the control area and across all the parcels. Second, some of the parcel characteristics related to access to amenities that were associated with the lease status are also correlated with the value of the parcel as reflected in the hypothetical price a parcel could be sold for (Table 27). Third, the association between modes of parcel acquisition and its value is stronger in the control area and across all the parcels than in the treatment area, indicating less influence of these factors in determining the value of the parcel in the treatment area which is the geographical focus of the LARP project (Table 27). Fourth, the hypothetical rental value of the parcel is also associated with some of the same parcel characteristics as with the price of the parcel, but this association is weaker and in some cases counterintuitive. For example, the rental value of a parcel is positively correlated with the time it takes to reach the nearest school. This is opposite of the relationship of this variable with the price of the parcel, and also counterintuitive. Fifth, none of the variables in the regression model for rental value of the parcel in the control area are statistically significant, indicating no correlation between the rental value and parcel characteristics in MMC 27.

One of the important determinant of the value of land could be the size of the parcel. To control for this, we test the correlation between the parcel characteristics noted above and the price and rental value of parcel on a per unit basis. However, due to missing data on parcel size, the number of observations to run is test by treatment and control areas is small. We thus present the results of this test for the combined sample of parcels across both treatment and control areas (Table 29). As indicated, the price and rental value per square meter is not strongly correlated with the location of the parcel in the treatment vs. control area or its lease status. On a per square meter basis, some of the variables related to access to amenities and facilities remain highly correlated with the price and rental value of land and are consistent with the results noted in Tables 27 and 28. However, unlike previous tables, parcels that experienced conflict in the price have lower value per square meter than those that did not experience any conflict. This negative correlation between past conflict and price per unit of parcel is statistically significant at  $p=0.05$ .

### ***5.3 Correlation between hypothetical behavioral outcomes and lease status***

As indicated earlier, the baseline survey included some hypothetical questions to assess parcel-holders behavioral response to lease status in terms of four assumed outcomes of the LARP project—willingness to pay a higher price, sell more, rent out more or invest more in a scenario that parcel has a Lease compared to a scenario that a parcel does not have a Lease. Although these are hypothetical questions, they provide an interesting opportunity to test the correlation between the potential market participation and investment behavior expressed by the project beneficiaries in the scenario of having parcels with or without Lease and some household and parcel-holder characteristics. For this correlation tests we only include non-lease holding households in the treatment area, which are the targeted project beneficiaries and the focus of the impact evaluation discussed in this Report. The results of the correlation tests are shown in Figures 18 to 22. In each of these tables, two groups of parcel holders are compared—those that indicated their behavior with respect to a given outcome to be in line with the assumption of the project logic, and those that indicated either an opposite behavior or were ambivalent about it (noted as ‘otherwise’).

Table 29. Correlation between hypothetical price and rental value per square meter with parcel level characteristics across all parcels \a

	All parcels	
	Land price/sq m	Rental price/sq m
Treatment group (=1)	44.0 (76.4)	-0.85 (6.00)
parcel has lease (=1)	-27.6 (71.4)	4.27 (5.72)
Accessible to paved road	4.6 (98.0)	-1.14 (9.69)
Has tap water, onsite	38.0 (105.8)	3.44 (5.60)
Has electricity (=1)	251.0 ** (64.9)	9.19 * (4.35)
Has mobile phone network (=1)	24.9 (105.1)	-33.26 (27.41)
Has landline phone (=1)	57.8 (111.3)	0.73 (4.87)
Has private toilet (=1)	-31.1 (136.1)	5.57 (7.05)
Has indoor bath and shower (=1)	163.6 + (85.5)	7.95 + (4.54)
Time to nearest drinking water (minutes)	-5.0 + (2.5)	0.24 (0.31)
Time to public transportation (minutes)	5.1 (8.2)	-0.08 (0.58)
Time to school (minutes)	3.3 (3.2)	0.71 + (0.39)
Time to hospital (minutes)	-3.0 (2.5)	-0.06 (0.09)
Experienced conflict in the past (=1)	-208.3 * (94.9)	0.92 (10.58)
Parcel was purchased (=1)	-299.6 (274.8)	3.28 (4.53)
Parcel was inherited (=1)	-216.3 (322.0)	4.84 (4.64)
Parcel acquired from traditional authority (=1)	-255.9 (278.4)	11.28 (12.05)
Rented out parcel (=1)	196.7 (145.4)	--- (145.4)
Residential purpose (=1)	0.20 (124.7)	3.66 (13.71)
Commercial purpose (=1)	-92.4 (185.0)	2.44 (14.03)
Female managed (=1)	-78.9 (99.4)	3.54 (5.27)
Constant	500.0 (384.5)	8.64 (15.41)
N	504	487
R-squared	0.073	0.059

Source: MCC/MSU Urban Land Survey, 2013

\a Standard errors are noted in the parenthesis. \*\* indicates p<0.01; \* indicates p<0.05 and + indicates p<0.1

We first examine the correlation between parcel holders' potential behavioral outcomes as per the assumption underlying the project logic and the household income. As depicted in Figure 17, the behavioral outcomes related to market participation are positively correlated with the household income. For example, people who indicated that they will be prepared to pay more, sell more or rent out more for land with Lease than without the Lease have higher incomes than respondents who were not willing to pay more, sell more or rent more or were ambivalent about these behavioral response (Figure 17). For two of these potential behavioral outcomes (pay more and rent out more), the correlation with income is statistically significant at  $p < 0.1$ . In the case of likelihood to invest more with Lease than without the Lease, the relationship with income is negative but not statistically significant.

In Figures 18 to 21, we explore for each of these behavioral outcomes, the correlation between behaving as per the assumption of the project logic and the characteristics of the household and the parcel holders. First thing to note is that there is a high correlation between a respondent's willingness to pay more, sell more, rent out more and invest more as indicated by the first three pairs of bars in Figures 18 to 21. In other words, people who indicate behaving in compliance with the assumption of the project logic for one outcome, are also highly likely to indicate behaving in line with the project assumption for other outcomes as well.



Source: MCC/MSU Urban Land Survey, 2013 (\*\* indicates  $p < 0.01$ ; \* indicates  $p < 0.05$  and + indicates  $p < 0.1$ )

Figure 17. Correlation between willingness to pay, sell, rent out and invest more with lease than without lease and net household income (total N=1077) (non-Leased parcel holders in the treatment area only)

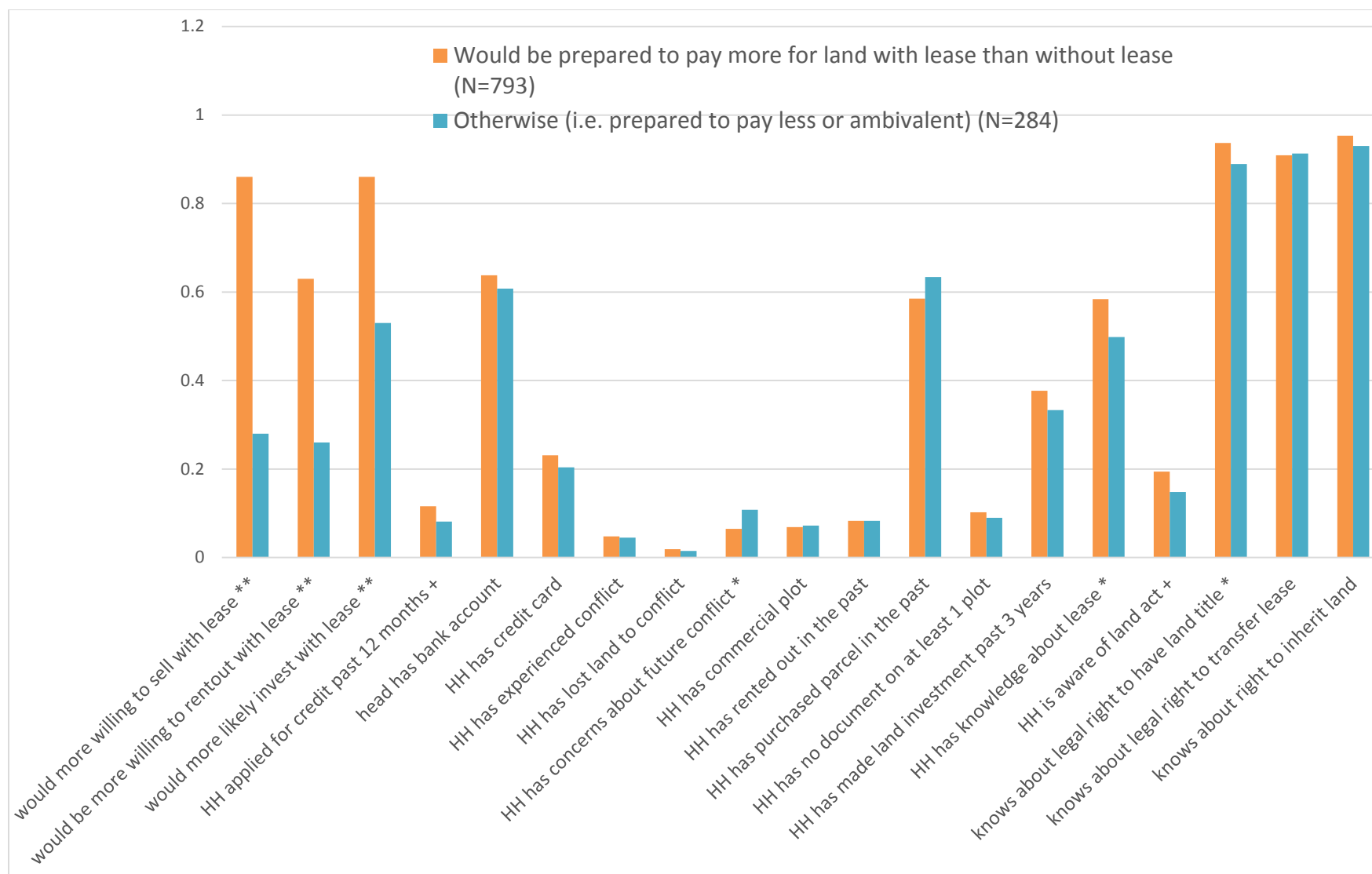
As indicated in Figure 18, 793 respondents in the treatment area indicated that they would be prepared to pay more for land with Lease than without Lease, and 284 indicated otherwise. This group of respondents are associated with households that have applied for credit in the past 12 months, have a bank account, a credit card, have no concerns about future conflicts, currently have no documents on at least one plot, have knowledge about the Lease, are aware of the Land Act, have knowledge about the legal right to have land title, and knowledge about right to inherit land. For several of these variable, the correlation is statistically significant (Figure 18).

In the case of behavior related to selling, 730 respondents indicated more willing to sell land with Lease than without Lease, and 347 indicated otherwise. Again, this hypothetical behavior is positively correlated with some of the same household characteristics and respondents' knowledge about the land right as noted for above. Surprisingly, households that rented out a parcel in the past were less willing to sell land with Lease than without Lease compared with households that had not rented out a parcel in the past. Household's willingness to sell land with Lease than without was positively correlated with the household's past land purchase behavior, but this correlation is not statistically significant (Figure 19).

Only 557 out of 1077 (or about 52%) respondents indicated that they would be willing to rent out more with Lease than without, which is the lowest response rate among the four hypothetical behavioral questions asked to test the program logic. In addition to some of the correlation between different household characteristics noted above, the willingness to rent out more was positively and strongly correlated with households who had purchased land in the past (Figure 20). One surprising result for this behavioral outcome is the negative and statistically significant association between aware of Land Act and the respondent's willingness to rent out more with Lease than without.

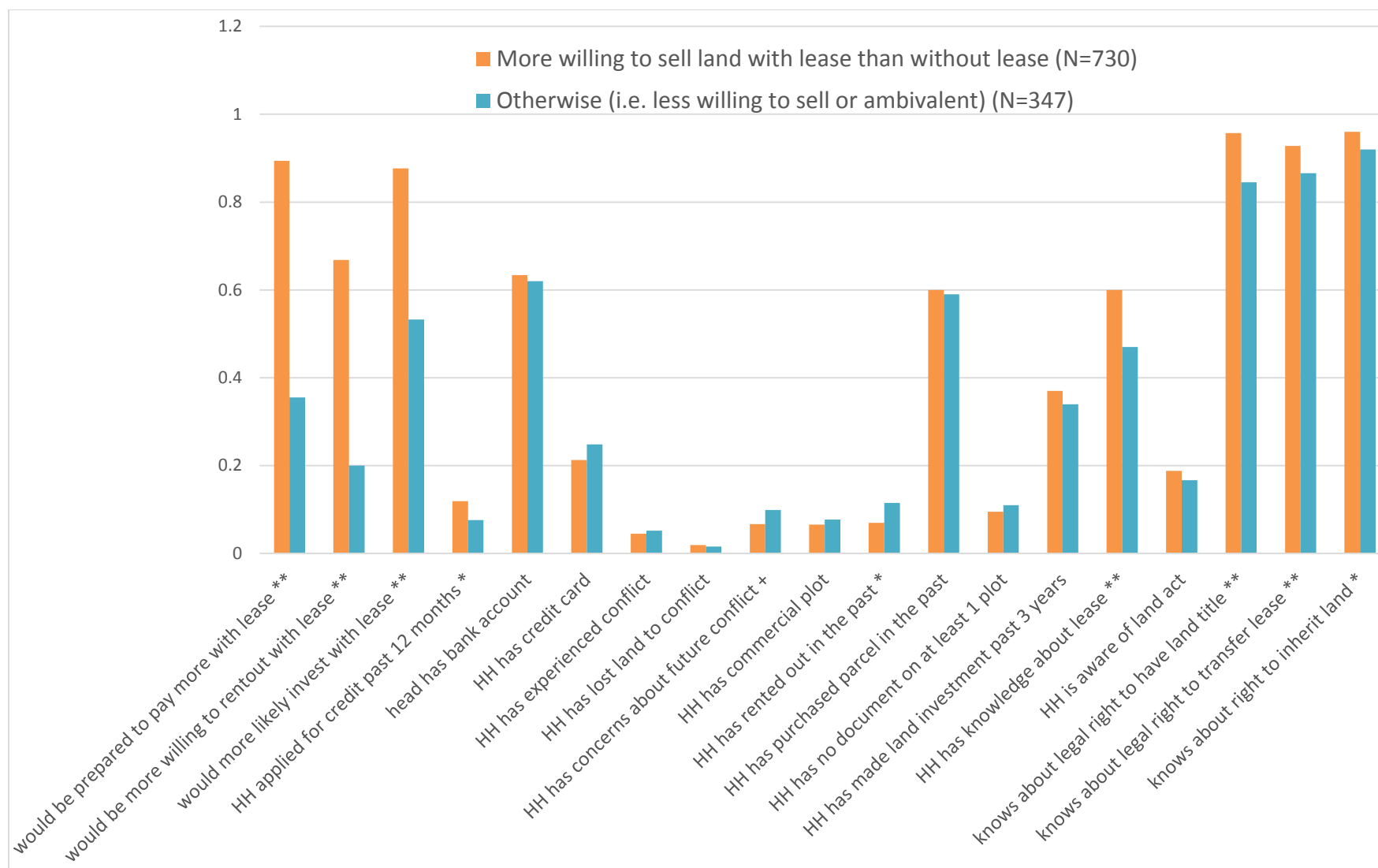
Lastly, Figure 21 presents the correlation between the same set of household and parcel holder characteristics and the respondent's likelihood to invest on land with Lease than without Lease. The results are consistent with the previous sets of correlations examined for the other three indicators. A person's likelihood to invest in land with Lease than without Lease is positively and significantly correlated all the knowledge variables, and negatively correlated with concerns about future conflict and if the household had rented out land in the past (Figure 21).





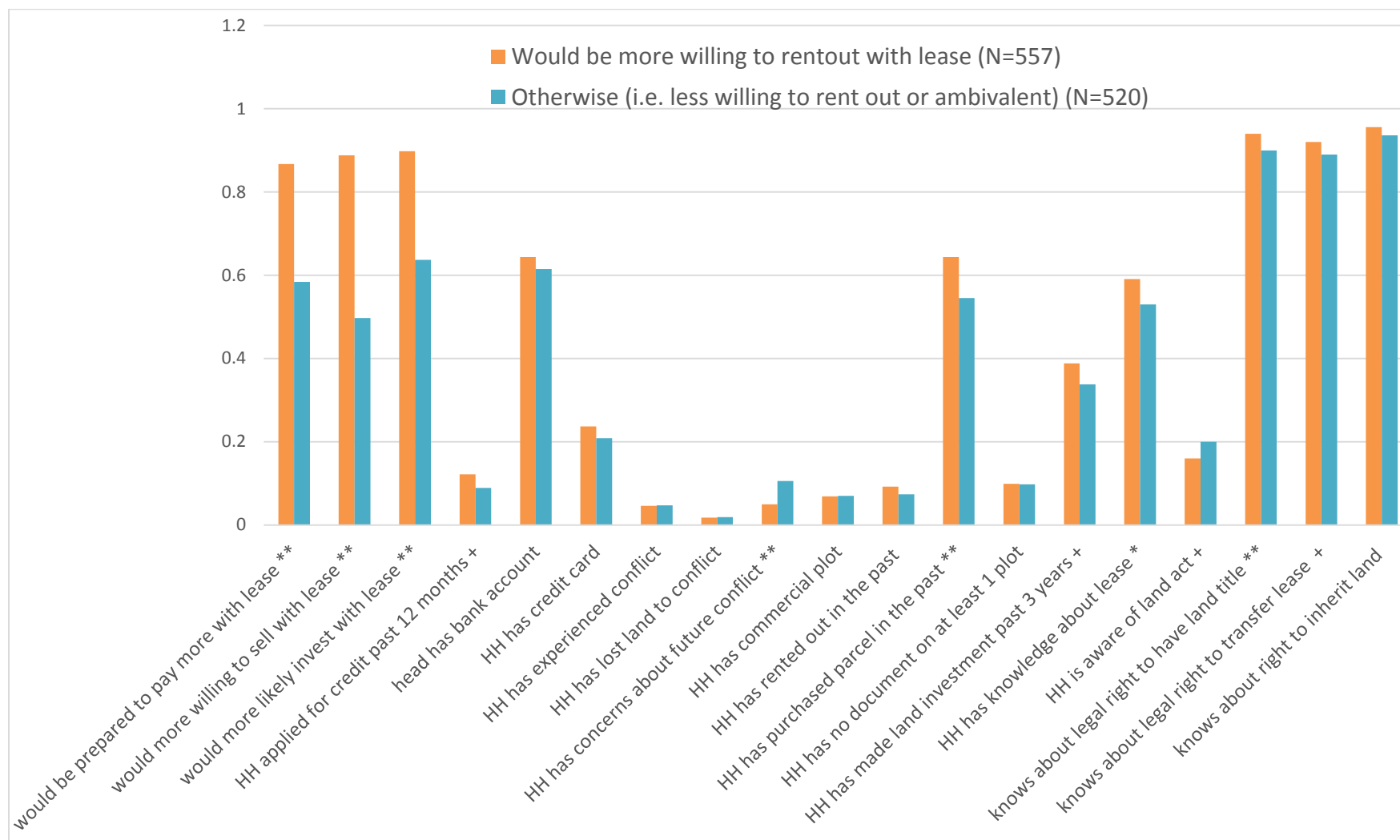
Source: MCC/MSU Urban Land Survey, 2013 (\*\* indicates  $p < 0.01$ ; \* indicates  $p < 0.05$  and + indicates  $p < 0.1$ )

Figure 18. Correlation between respondent's willingness to pay more for land with Lease than without, and personal / household characteristics (non-Leased parcel holders in the treatment area only)



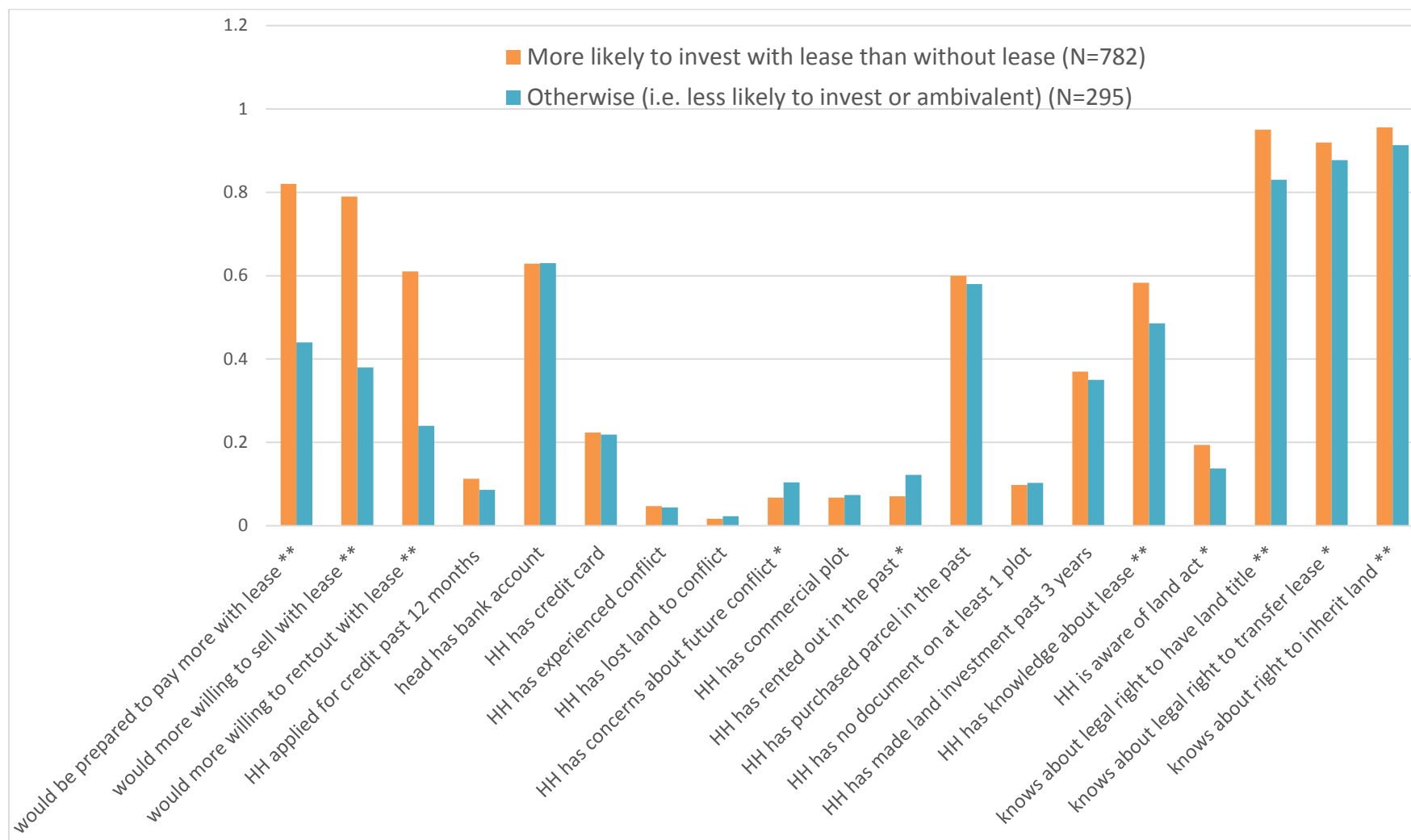
Source: MCC/MSU Urban Land Survey, 2013 (\*\* indicates  $p < 0.01$ ; \* indicates  $p < 0.05$  and + indicates  $p < 0.1$ )

Figure 19. Correlation between respondent's willingness to sell land with Lease than without and personal / household characteristics (non-Leased parcel holders in the treatment area only)



Source: MCC/MSU Urban Land Survey, 2013 (\*\* indicates  $p < 0.01$ ; \* indicates  $p < 0.05$  and + indicates  $p < 0.1$ )

Figure 20. Correlation between respondent's willingness to rent out more with Lease than without and personal/household characteristics (non-Leased parcel holders in the treatment area only)



Source: MCC/MSU Urban Land Survey, 2013 (\*\* indicates  $p < 0.01$ ; \* indicates  $p < 0.05$  and + indicates  $p < 0.1$ )

Figure 21. Correlation between respondent's likelihood to invest more for land with Lease than without and personal / household characteristics (non-Leased parcel holders in the treatment area only)

## 6. Discussion and Conclusions

This baseline survey provides extensive information on household characteristics, land ownership, land acquisition, land use, parcel characteristics, land investment, land conflict and perceived risks, land market (sales and rental), and perceptions and knowledge about the land law. It provides insights into the household economies and land market dynamics in three Maseru Municipal Councils (MMC 1, 2 and 3) targeted by the ‘Land Administration and Reform’ project in Lesotho (referred as the treatment area), and MMC 27 which is a future target site and thus serves as a control group for the planned impact evaluation. The purpose of this report is to present the baseline assessment of the study area (including both the treatment and control sites), while also describing the context and design of the impact study. This final section begins with a summary of key results and insights they reveal about the land economy in general and the targeted population more specifically. The report closes by identifying key conclusions and methodological implications that have emerged from this baseline assessment.

### *6.1 Key results and comparison between treatment and control areas*

About 13% percent of parcels belonging to the households surveyed in the study site have Lease. For those that do not have Lease, more than 70% have Form C, but 10% of parcel holders have no document that gives them property rights to that parcel. The interest and desire to obtain the Lease is very high, with 80% indicating such interest, and 15% already having initiated the process of obtaining the Lease.

Although the baseline survey does not allow us to estimate the impact of having a Lease on investment decisions, it does provide respondents’ opinion on the likely behavioral response to securing the Lease. About 80% of respondents indicated the high likelihood of them investing in new construction or making improvements on the property if they had a Lease. More than 50% indicated their interest in using the leased Land as collateral to obtain credit to do a business, and additional 30% indicated using such loan for making improvements on existing land or buying more property.

The hypothetical average sale price of land parcel in the study area was reported to be about 222,000 Maloti (or 361 Maloti/m<sup>2</sup> for a subset of plots with area estimate). Similarly, the hypothetical average monthly rental price for a land parcel in the study zone was reported to be about 5,054 Maloti (or about 11 Maloti/m<sup>2</sup> for a subset of plots with area estimate). The study area is characterized by a thin rental market. Of the total number of parcels surveyed in the study area, less than 10% were rented-out. Given the small number of observations and response rate, it is difficult to estimate the actual rental rate of land parcels from this baseline survey.

In general, the knowledge about the land law was found to be poor in the study area. Less than 20% of respondents reported to be informed about the 2010 Land Act. However, the knowledge about what the Lease is and different types of rights Basotho men and women have under the Land Act was much higher and impressive. More than 50% of respondents knew what the land Lease was and more than 90% correctly identified different types of land rights Basotho men and women have under the Land Act.

The results of the baseline survey analysis indicates that in many ways, the treatment and control areas share similar socioeconomic characteristics with respect to key demographic features,

sources of income, access to credit and source of credit. They also share many land market characteristics such as cost of parcel acquisition, hypothetical sale and rental value of land, perception of risks, rental participation (or non-participation), sources of financing land improvement investments, willingness to sell and rent out Leased parcels, and knowledge about land rights. However, in many other ways they are significantly different, including assets, dietary diversity, food consumption, total expenditures, characteristics of parcels, type and value of land investments, knowledge on Lease and the Land Act. In terms of assets, expenditures, food consumption, diversity index, the respondents in the treatment group are relatively better off. Also, parcels located in the treatment area have better access to facilities, amenities and infrastructure than parcels in the control area.

On several of these key variables, the parcels and parcel holders differ significantly. These differences bring out the urban nature of the treatment villages and the peri-urban nature of control villages. The non-experimental nature of the research design has thus resulted in underlying incongruence between the two groups that lead to the observed differences. We thus explored the propensity score matching method to demonstrate its application in reducing the bias in the sample and making the control group comparable to the treatment group. The multivariate statistical analysis model combined with PSM and the DiD framework to be used to evaluate the impact can thus handle these differences in the observable characteristics reported in this baseline Report and should not be a major concern. On several characteristics that are closely linked with non-observables, such as perception, willingness and knowledge, the differences in the estimated parameters are not significant, which is encouraging.

## ***6.2 Methodological implications***

The research plan for the overall impact assessment includes a quasi-experimental design which relies on two rounds of survey data from both the treatment and control areas for the matched sample: 1) baseline data before the intervention (2013) and 2) data from a follow-up survey planned in 2016-17. The type of analysis planned for impact evaluation is to calculate the changes that occur in the outcome variables over the three year period and to compare what happens (on average) to surveyed households in treatment areas with what happens (on average) to households in the non-treated areas that are matched using the PSM technique illustrated in this Report. Given the similar locational distribution of the two samples, we would expect any external factors which occur during the three year period to affect both populations equally. If, on a given outcome/impact variable, the change that occurs in the treatment area is more favorable than the change that occurs to non-treatment area, then that would be evidence in favor of the impact hypothesis.

However, the analysis of the longitudinal data also needs to include statistical controls for multiple effects that could be due to other independent variables. For example, we know from the baseline results and the correlation tests presented in this Report that the treatment and control samples differ in the characteristics of land parcels. We also know that parcels with better accessibility to facilities and amenities could contribute to changes in other impact variables, such as sale and rental value of land. Through the use of multivariate techniques, we can control for the effects of better accessibility / facilities / amenities and attempt to better isolate the actual relationship between tenure security (resulting from obtaining Lease) and, as in the example, sale and rental value of land parcels.

The combination of the longitudinal data and the multivariate analysis of a matched sample will allow a much more accurate and precise impact assessment than is possible through comparing individual means in the baseline data. Thus, a general implication of the baseline results for the larger impact evaluation is the critical need for good-quality second-round survey data and the importance of analyzing the resulting longitudinal data with multivariate statistical techniques. The quality of the baseline survey data was less than satisfactory, especially given the issues of inconsistency in household and parcel identifiers across files that resulted in significant delays in generating this baseline Report as the all the questionnaires were scanned and data files brought to MSU where each questionnaire was printed and the data re-entered in a new data entry template developed by MSU programmers. More time and effort will need to be devoted before the next survey round to make sure corrective actions and checks and balances are in place so that the second-round data collection meets the quality standards and the evaluation team is able to create the longitudinal data set needed for this impact evaluation.

A more specific recommendation for the second round of the survey is to carefully record the information on the location and size of the parcels, time and mode of acquisition of land, and values associated with rent, sales, purchase, and investments. The missing of size variable is particularly problematic as many of the outcome indicators are based on per unit of land. The optimistic aspect of this is that the physical size of the same parcel is unlikely to change over the next few years. It is important to collect this information in the next round of survey. For the baseline survey, these data were collected, but some ambiguities and missing data have emerged. Since the research plan for the second round survey calls for interviewing the same respondents that are included in the baseline, there will be an opportunity during the second round to verify, correct, and properly document these 'missing' data. This is necessary because some of these data will provide critical variables in the statistical analysis.

In conclusion, the baseline survey provides extensive information about the land economy in four MMCs in Maseru city. At this time, the best use of the data is to create a description of the treatment and comparison groups (as presented in this Report) or conduct some systematic econometric analysis to understand the determinants of perceived behavior that can help predict the actual impact. Following the second round of the survey, it should then be possible to draw substantiated conclusions about the impact of land regularization intervention on the parcel holders.

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## Appendix A: Maps of selected sub-villages for treatment and control groups by MMC

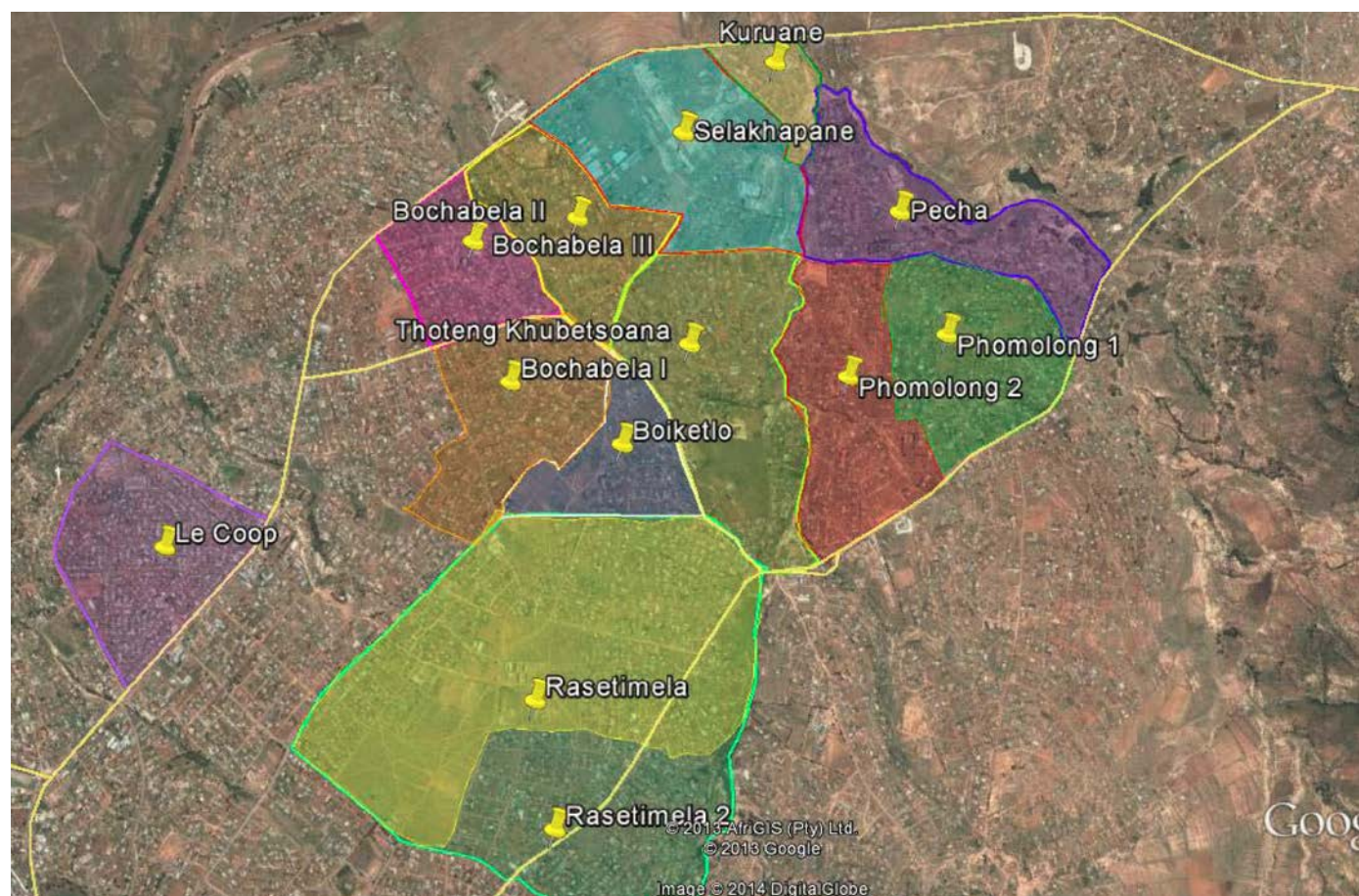


Figure A1. MMC 01—13 clusters (Treatment group)



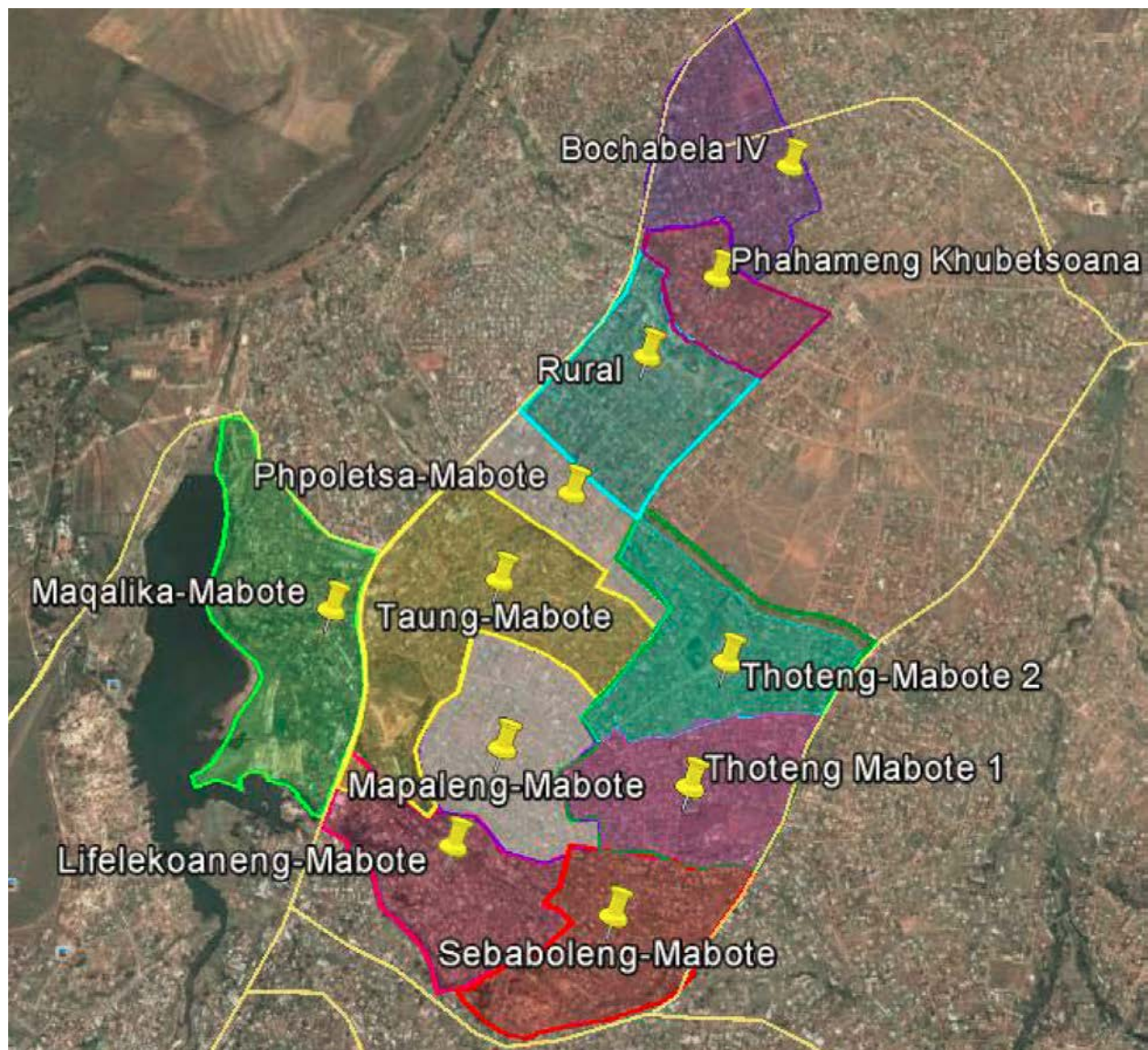


Figure A2. MMC 02—11 clusters (Treatment group)



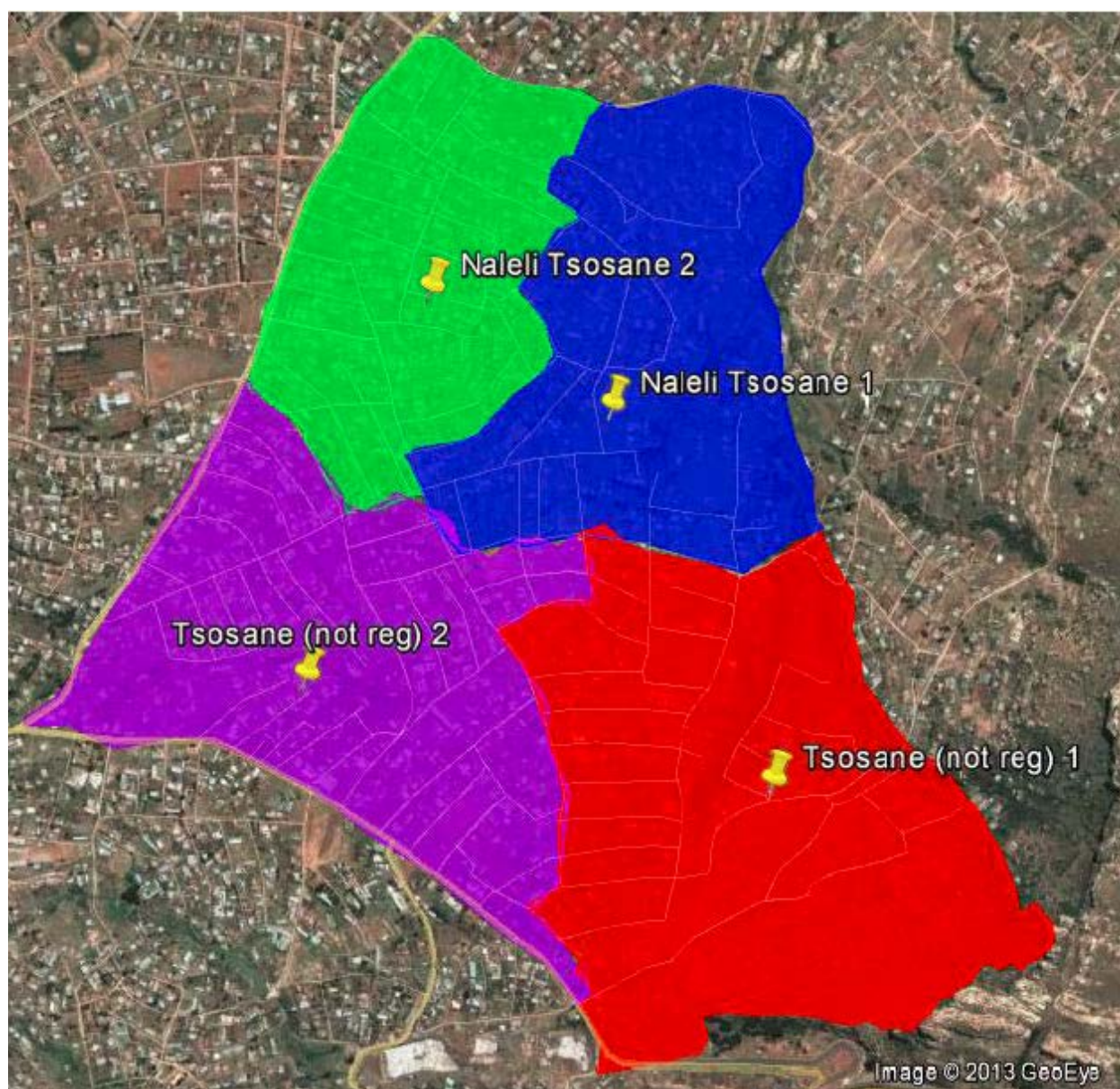


Figure A3. MMC 03—4 clusters (Treatment group)



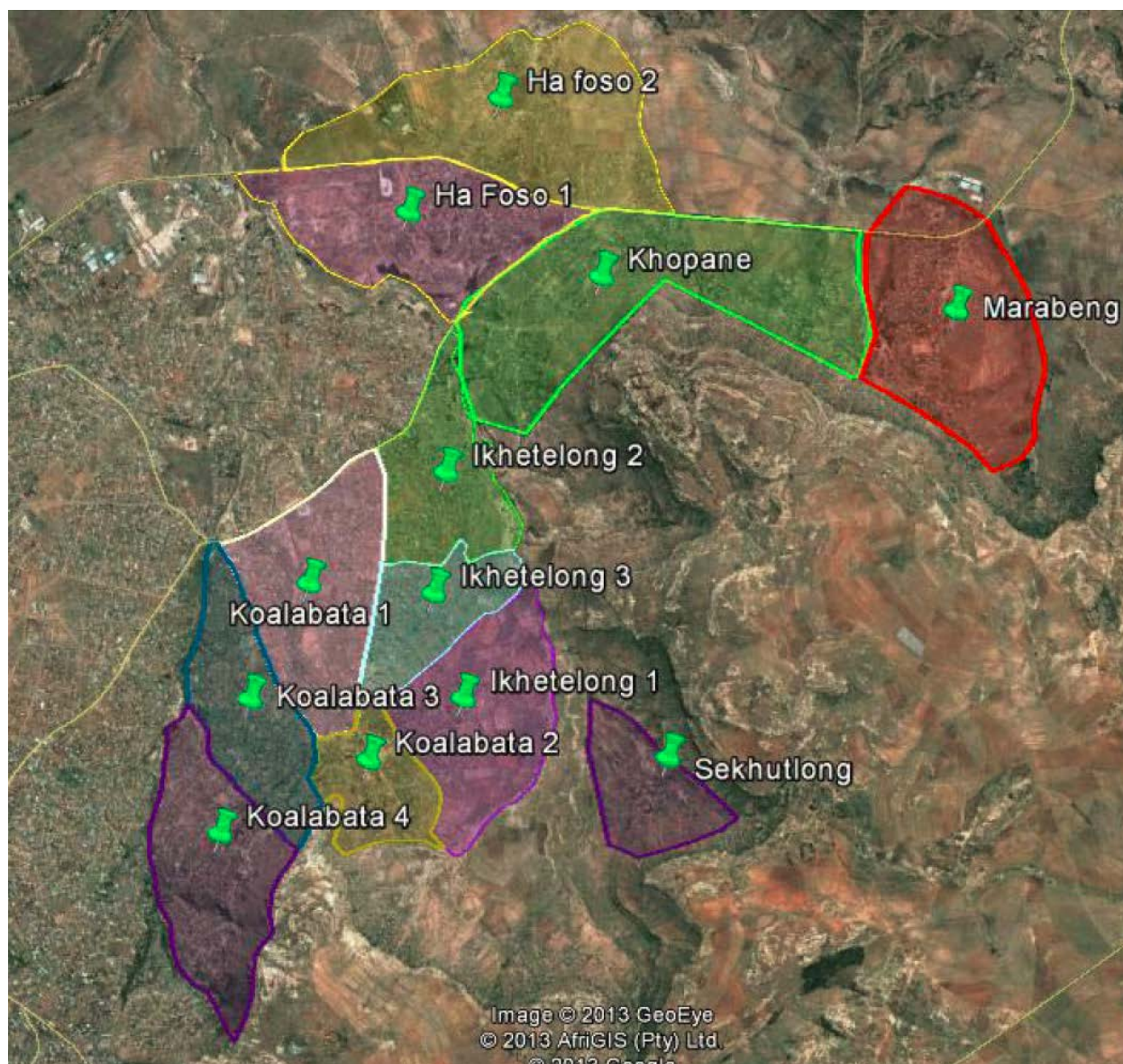


Figure A4. MMC 27—12 clusters (Control group)

## Appendix B: Key results presented by the gender of the head of the household

Table B1. Demographic characteristics

Item	Male headed			Female headed			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	
Age of the household head (years)	956	47	13	669	51	14	**
<b>Education of the head:</b>							
Know how to read and write	957	93%	25%	672	95%	21%	
Currently enrolled in school	929	4%	19%	658	4%	2%	
Went to school	892	96%	20%	637	97%	17%	
Completed at least secondary education	957	60%	49%	672	58%	49%	
<b>Household size:</b>							
Total number of members	957	4.2	2.0	672	3.9	2.3	
Total adult equivalent	957	3.5	1.6	669	3.3	1.9	
Number of members who were away more than 6 months	957	11%	32%	672	10%	30%	
Woman as percentage of all adults (15 years of age or older)	942	43%	24%	661	73%	26%	**
<b>Household composition: average number of members per age group</b>							
Infant (<5 years)	957	31%	0.55	669	22%	45%	**
Child (5-14 years)	956	0.68	0.89	669	0.72	0.89	
Adult (15-45 years)	956	2.17	1.31	669	1.99	1.55	
Adult (46-60 years)	956	0.69	0.79	669	0.55	0.61	**
Older ( >60 years)	956	0.34	0.68	669	0.45	0.75	*

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

(a) Significance testing  $H_0: b=c$ . \* indicates significant difference at 5% level and \*\* at 1%.

Table B2. Value of household food consumption, household dietary diversity score, non-food expenditure, and total expenditure

Item	Male headed			Female headed			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	
Value of total food consumption per week (Maloti)	938	312	303	654	283	237	
Value of total food consumption per capita per week (Maloti)	932	90	90	648	90	93	
Household dietary diversity (HDDS) (0-12)	943	5.2	2.6	653	5.2	2.5	
Total expenditures on non-food items per week	905	475	502	641	362	402	***
Total expenditures (food and non-food) per week	905	761	622	641	634	510	***
Total expenditures per capita per week	905	209	172	641	197	175	

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

(a) Significance testing Ho:b≠c. \* indicates significant difference at 5% level and \*\* at 1%.

Table B3. Percentage of parcels with access to utility and infrastructure (non-leased parcels only)

Item	Male headed			Female headed			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	
% of parcels whose mode of access most used is paved road	1,114	9%	29%	784	10%	30%	
% of parcels with tap water	1,098	90%	30%	780	91%	29%	
% of parcels with electricity	1,112	76%	43%	781	75%	43%	
% of parcel with landline phone	1,106	19%	40%	781	18%	38%	
% of of parcel with mobile phone	1,106	82%	38%	781	85%	36%	
% of of parcel with toilet	1,106	87%	34%	782	89%	31%	
% of of parcel with bath	1,109	81%	40%	777	84%	37%	

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

(a) Significance testing Ho:b≠c. \* indicates significant difference at 5% level and \*\* at 1%

Table B4. Land conflicts (HH with non-leased parcels only)

Table B-4. Land conflicts (HH with non-leased parcels only)							
Item	Male-headed HH			Female-headed HH			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	
<b>% of households who owned land in the past 3 years but whose ownership has since been lost due to...</b>							
Conflict	937	1.6%	13%	656	1.6%	13%	
Other reasons	937	6.5%	25%	656	6.4%	24%	
Didn't lose land	937	92%	27%	656	92%	27%	
% of parcels whose owners experienced any conflict about this parcel	1,076	2.6%	16%	755	4.4%	21%	
% households concerned about being in conflict about this parcel	1,098	4.5%	21%	777	7.0%	26%	**

Source: MCC/MSU Urban Land Survey, 2013. Weighted to reflect population

(a) Significance testing  $H_0: b=c$ . \* indicates significant difference at 5% level and \*\* at 1%.

Table B5. Hypothetical sale and rental prices of parcels belonging to the household surveyed (non-leased parcels only)

Item	Male-headed HH			Female-headed HH			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	
Average total value the parcel could be sold for (Maloti)	628	230,345	282,866	413	223,313	258,904	
Average total value the parcel could be sold for per square meter (Maloti/m <sup>2</sup> )	291	377	744	156	328	743	
Average monthly value the whole parcel could be rented out (Maloti)	598	5,104	13,139	422	4,979	13,271	
Average monthly value the whole parcel could be rented out for per square meter (Maloti/m <sup>2</sup> )	264	8	22	170	13.8	73	

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

(a) Significance testing  $H_0: b=c$ . \* indicates significant difference at 5% level and \*\* at 1%.



Table B6. Types of land investment made in the past 3 years (non-leased parcels only)

Item	Male parcel			Female parcel			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	
% of parcels that have made the following type of investment							
Constructions of new buildings/houses	1,119	10%	30%	788	13%	34%	
Repairs, improvements and rehabilitation of buildings	1,119	10%	30%	788	11%	31%	
Repairs, improvements and rehabilitation of roofs on buildings	1,119	7%	26%	788	7%	25%	
Landline phone service	1,119	1%	11%	788	1%	8%	
Install electricity	1,119	11%	31%	788	9%	29%	
Sewage, drainage, and toilets	1,119	4%	19%	788	4%	20%	
% of parcels that have made at least one type of investment							
	1,119	30%	46%	788	32%	47%	

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

(a) Significance testing  $H_0: b=c$ . \* indicates significant difference at 5% level and \*\* at 1%.

Table B7. Percentage of households by their knowledge about Lease, willingness to pay, willingness to sell and willingness to rent out, and opinion about the effect of Lease on investment decisions in the case of Lease (HH only with non-leased parcels)

Item	Male-headed HH			Female-headed HH			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	
% of HHs that know what is the land lease	955	57%	50%	671	51%	50%	*
<b>% of households that are prepared to pay more, less or same for the land with Lease than land without Lease</b>							
More	944	78%	41%	657	75%	43%	
Less	944	9%	29%	657	8%	28%	
Same	944	9%	29%	657	10%	30%	
Don't know	944	3%	18%	657	6%	24%	*
<b>% of households that are more or less willing to sell property when they have Lease than when they don't</b>							
More	939	73%	44%	661	71%	46%	
Less	939	13%	34%	661	12%	33%	
Same	939	10%	30%	661	12%	32%	
Don't know	939	4%	19%	661	5%	22%	
<b>% of households that are more or less willing to rent out a land parcel in the case of Lease than without</b>							
More	944	54%	50%	661	56%	50%	
Less	944	28%	45%	661	24%	43%	
Same	944	15%	35%	661	15%	35%	
Don't know	944	3%	18%	661	5%	22%	
<b>% of households that will construct and make improvements on that property with Lease</b>							
More likely	946	79%	41%	659	79%	41%	
Somewhat likely	946	11%	31%	659	11%	31%	
Somewhat unlikely	946	4%	21%	659	4%	18%	
More unlikely	946	3%	16%	659	2%	15%	
Don't know	946	3%	17%	659	4%	20%	

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

(a) Significance testing  $H_0: b=c$ . \* indicates significant difference at 5% level and \*\* at 1%.

Table B8. Knowledge about land rights (HH only with non-leased parcels)

Item	Male-headed HH			Female-headed HH			Testing (a) b≠c
	N	Mean (b)	S.D.	N	Mean (c)	S.D.	
Heard about the Land Act that was passed by the parliament of Lesotho in June 2010	939	19%	39%	660	13%	34%	**
<b>Do all Basotho have a right to hold land title in Lesotho, provided they meet legal requirements under Land Act 2010 (% of households responding...)</b>							
Yes	941	93%	26%	657	93%	26%	
No	941	3%	17%	657	3%	18%	
Don't know	941	4%	20%	657	4%	19%	
<b>Do Basotho have the right to transfer or acquire land rights from others (% of households responding...)</b>							
Yes	950	91%	28%	666	92%	27%	
No	950	8%	27%	666	7%	25%	
Don't know	950	1%	9%	666	1%	11%	
<b>Do Basotho women have the right to inherit land on an equal basis as their brothers (% of households responding...)</b>							
Yes	950	94%	24%	667	95%	21%	
No	950	6%	24%	667	4%	19%	**
Don't know	950	0.2%	4%	667	1%	10%	**
<b>Do Basotho women have the right to maintain a piece of their ex-husband's land in the case of divorce (% of households responding...)</b>							
Yes	946	89%	31%	665	90%	29%	
No	946	9%	28%	665	7%	26%	
Don't know	946	2%	13%	665	2%	15%	
<b>Do all Basotho women have the right to inherit from the deceased spouse (% of households responding...)</b>							
Yes	948	97%	16%	667	98%	13%	
No	948	2%	15%	667	1%	9%	***
Don't know	948	0.2%	5%	667	1%	9%	
<b>Do Basotho women have the right to apply for a formal land title (Lease) on her own (% of households responding...)</b>							
Yes	947	94%	23%	666	96%	21%	
No	947	5%	23%	666	4%	18%	
Don't know	947	0.3%	5%	666	1%	10%	*

Source: MCC/MSU Urban Land Survey, 2013

Weighted to reflect population

(a) Significance testing  $H_0: b=c$ . \* indicates significant difference at 5% level and \*\* at 1%.