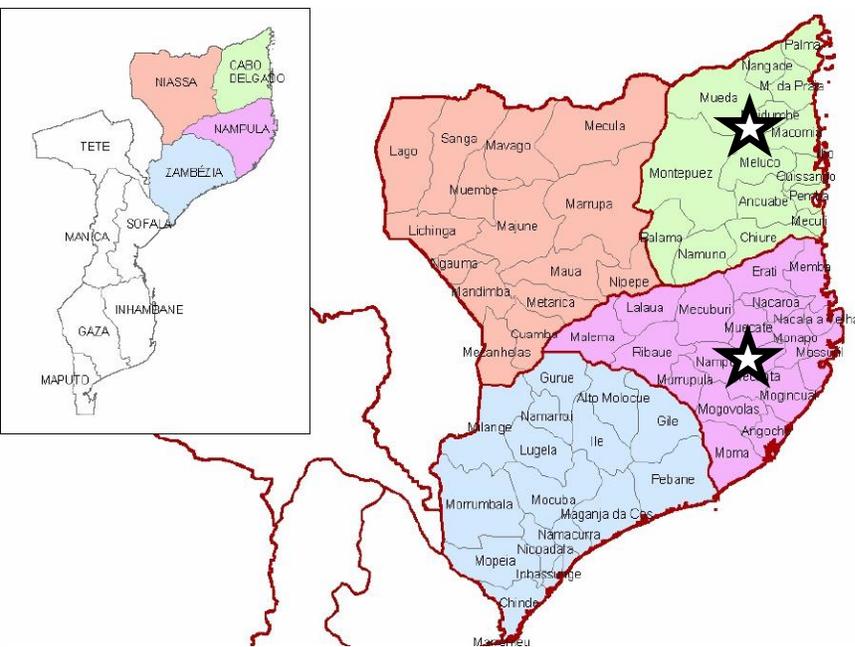


Impact Evaluation of Site-specific Activities under the Land Tenure Services Project: Report of the Baseline Survey Conducted in Two Rural Areas in Northern Mozambique



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Report submitted by
Michigan State University

April 12, 2017

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Report Submitted by Michigan State University to Millennium Challenge Corporation

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Glossary

| | |
|----------------|---|
| AFRE | Department of Agricultural, Food and Resource Economics |
| CARRS | Department of Community, Agriculture, Recreation and Resource Studies |
| CENACARTA | National Center for Cartography “ <i>Centro Nacional de Cartografia e Teledeteccção</i> ” |
| CsPro | Census and Survey Processing System |
| CSUS | Department of Community Sustainability |
| DEFF | Design effect |
| DiD | Difference-in-difference |
| DNTF | National Land and Forest Directorate |
| DUAT | “ <i>Direito de Uso e Aproveitamento de Terra</i> ” or Land Use Right (an official document provided by the land administration office providing formalized, long-term use rights for a specific land parcel) |
| EA | Enumeration Area |
| HDDES | Household Dietary Diversity Score |
| hh | Household |
| HTSPE | International Consultancy Company (acting as Service Provider) |
| IE | Impact Evaluation |
| INE | National Institute of Statistics |
| LIMS | Land Information Management System |
| MCA | Millennium Challenge Account |
| MCC | Millennium Challenge Corporation |
| MDES | Standardized Minimum Detectable Effect Size |
| MINAG-DE | Ministry of Agriculture-Department of Economics |
| MSU | Michigan State University |
| M ² | square meters |
| Mt | Meticais (Local currency) |
| NLPAG | National Land Project Advisory Group |
| PPS | Probability proportional to size |
| PSU | Primary Sampling Units |
| TIA | National Agricultural Survey |
| SPSS | Statistical Package for the Social Sciences |
| SRS | Simple Random Sampling |
| STATA | Data Analysis and Statistical Software |

EXECUTIVE SUMMARY

The Government of the Republic of Mozambique and the Millennium Challenge Corporation (MCC), on behalf of the United States Government, signed a Compact Agreement, effective September 22, 2008 for a US \$507 million grant, implemented over a 5-year period. The overall objective of the Compact is to reduce poverty through economic growth in four Northern Provinces (Niassa, Cabo Delgado, Nampula, and Zambézia). The Compact includes funding of the Land Tenure Services Project (or the *Land Project*), which is comprised of 3 activities - (1) Policy Activity (Activity I) to improve policy; (2) Capacity Building Activity (Activity II) to upgrading the public land administration agencies (the title registry and cadastre), and (3) Site-specific Activity (Activity III) to facilitate site specific land access.

Overall, the Land Project aims to establish more efficient and secure access to land by improving the policy and regulatory framework and helping beneficiaries meet their immediate needs for registered land rights and better access to land for investment. The Land Project's objectives are to: (i) increase the level and value of investment on land; (ii) increase access to land; (iii) reduce the costs associated with acquiring land user rights; and (iv) resolve and prevent conflicts over land. Investments are targeted to all four Northern Provinces (Cabo Delgado, Niassa, Nampula and Zambezia), at all levels of administration – National, Provincial, and District / Municipal – and across a range of beneficiaries, including rural individual land holders, rural communities, urban land holders, and domestic and international investors.

There are four main purposes of this baseline report. The first purpose is to present the initial evaluation strategy and the associated power calculation, and whether the strategy is still valid up to date given the deviation of actual project implementation from the original plan. The second purpose is to present results from the balance test of mean difference for the key variables between the comparison and the control groups. The third purpose of this baseline report is to conduct some basic correlation analysis to test the logic framework to see whether the intervention would lead to the expected outcomes based on the baseline survey data. The fourth purpose of this baseline report is to provide a description of socio-economic characteristics, the level of household welfare indicators and the land ownership and land tenure conditions between the treatment and comparison groups as well as across the two districts.

The overall impact evaluation strategy for the Land Project is described in a separate land evaluation design report is comprised of three components—an impact evaluation of the institutional strengthening activity (Activity II), an impact evaluation of site-specific activity (Activity III) in urban hotspot areas, an impact evaluation of site-specific activity (Activity III) in rural hotspot areas. This Report focuses on the third component and describes the impact evaluation design, including the sampling methodology used for the site-specific activities in rural 'hot spot' areas, and reports the results of the baseline survey conducted in September/October 2011 in priority areas of Malema district in Nampula (711 households) and in April/May 2012 in priority areas of Mecufi district in Cabo Delgado (706 households). It is important to note that both comparisons and treatments of this evaluation are being affected by both the nation-wide policy activity (Activity I) and the institutional strengthening activity of the local district offices (Activity II), this evaluation would essentially evaluate the effects of receiving all three activities versus only receiving Activity I and Activity II. Assuming the effects of Activity I and Activity II are

constant in both the treatment and comparison areas, then the identified effects through this evaluation exercise is to evaluate the impacts of ‘the site specific activities (Activity III) in rural hotspot areas.

The planned evaluation methodology is a quasi-experimental *difference-in-difference* (DiD) design approach. DiD is essentially measure the difference in outcomes between treatment group and control group before and after the intervention. The DiD method controls for time invariant differences between the treatment and comparison areas and is deemed an appropriate method to evaluate programs improving land tenure security in developing countries (Conning and Deb 2009). To implement the DiD evaluation strategy, the baseline data reported here will be combined with the data to be collected from the same households in a post-intervention period to form the panel data for the analysis. In the design document, an updated power calculation was conducted for each of the two districts based on the most updated information about the treatment and control groups. Despite the fact that the implementation did not follow the original plan, the updated power calculations confirm that the original design and the sample can still be good for a rigorous evaluations of Activity III in each of the two districts. Besides the DiD method, we also explore the possibility of using the propensity score matching method (PSM). In this report, we will show PSM matching could significantly reduce the existing differences between the treatment and comparison groups based on the baseline data. Applying DiD on the PSM-matched sample would further improve the accuracy of the estimated project effects.

In terms of variables covered in the analysis, The results of the baseline data analysis presented in this report provide a picture of the status of surveyed households in study areas of these two districts across three broad categories: a) socio-economic characteristics (i.e., demographics, sources of income, asset holdings, and access to credit; b) land characteristics (i.e., land ownership, land markets, land investments, perceptions on tenure security and knowledge about land law and rights); and c) welfare characteristics (i.e., level of income, consumption and expenditure, and poverty status).

A predominant majority of the land parcels located in the study areas (93%) has no documents that give the owners property rights to that parcel. For those that have some document, the most common was an affidavit of purchase/sales (4.5%). Only 13 parcels of the total 4,450 parcels (owned) have DUAT at the time of the baseline survey and only 36 parcels without DUAT are in the initial process of obtaining a DUAT. But on the other hand, 90% of parcel holders are interested in obtaining a DUAT and are willing to pay on average MT 150 per parcel (or equivalent to 0.13 MT/m²). The hypothetical average sale price of land parcel in the study area was reported to be about 88 Mt/m² for residential plots and 8 Mt/m² for agricultural plots. Similarly, the hypothetical average monthly rental price for a land parcel in the study zone was reported to be about 875 Mt for the whole parcel or 5.4 MT per square meter (1.5 MT/m² for an average agricultural parcel to 13 MT/m² for an average residential parcel). The rental market is moderately active in the study areas. Of the total number of parcels surveyed in the study area, 23% were either rented-in (15%) or rented out (8%). The rental transactions involve more than half of the households (16% renting in land) and (40% renting out land). The monthly rental price for an average agricultural parcel is 54 MT (or 0.02 MT per square meter). In general, the knowledge about the land law was found to be poor in the study area. Only 22% of the households were

informed about the law. For those who were informed about the law, only 16% reported to know fair amount about the law, and the majority of them either don't know the content of the law (14%) or know very little about it (66%). Of the 22% of households who were informed about the law, 39% of households reported to have received information from the local leaders, 22% from government authorities, and 39% from other sources.

Balance test show that the differences across the two districts are much more significant than between the treatment and the control groups, which suggest that it makes sense to analyze the data from each district separately. The difference between the treatment and control sites within the same district is typically much smaller and much less significant relative to the mean differences between the two districts. In general, the difference between treatment and control sites within Cabo Delgado is much less significant than the similar comparison within the Nampula district. For example, with a few exceptions, the difference in head's age, gender, education, and other basic household demographics, non-farm assets (except for a couple of cases) and household consumption and expenditures is statistically insignificant in Cabo Delgado. As in the social and economic characteristics, the differences in land ownership, land documents, land markets, and perception of impact of improved land tenure security between treatment and control within the same district are again smaller in magnitude and less significant in many cases than those across the two districts. Nonetheless, there are still a considerable number of cases where the difference between the treatment and control sites within the same district is statistically significant.

The significant difference in a number of indicators between the treatment and control sites within the same district is not unexpected given the non-experimental nature of the project design, and DiD controls for any time invariant differences in observed and unobserved characteristics between the treatment and control groups. However, DiD does not control for time varying unobservables. The underlying assumption behind the validity of the DiD method is “the parallel assumption” which means the change in an outcome variable due to unobserved or omitted variables is constant between the treatment and control groups in absence of intervention. Unfortunately, we are not able to check the parallel trend assumption because we need historical data to do so. Given the limitations of quasi-experimental design, we will conduct evaluation as rigorously as possible by using the combination of DiD and PSM method. PSM matches the treatment households to the control households according to their estimated likelihood of participating (*propensity score*) in the project which is determined by a set of observed variables using the baseline survey data. The main spirit of PSM is to create comparable treatment and control groups based on observed characteristics. While PSM does not automatically address the time varying unobservable problem either, it would generally help because the matched treatment households and control households are more comparable based on observed characteristics. PSM analysis in the early section has shown that PSM significantly reduces the mean differences between the treatment and control groups and changes the mean difference between the two groups from “statistically significant” to “statistically insignificant” for almost all the cases. Indeed, the combination of DiD and PSM is widely used in evaluation exercises and promoted by a number of prominent development economists (Ravallion 2005, Khander, Koolwal, and Samad 2010).

Finally, the simple correlation analysis to test logic assumptions yields some encouraging results. The OLS regression of hypothetical land sales and land rental prices on a set of land tenure security variables measured by the total number of rights of a parcel, different acquisition modes of parcels,

perceived future land conflicts generally support our expectation that better tenure security is associated with higher land sales and land rental prices. While parcels with higher total number of rights, parcels acquired through purchase or ceded by formal authorities are positively associated with hypothetical land sales and land rental prices, “fear of losing the parcel” and “parcels without any land document” are negatively associated with land sales and land rental prices. The results from probit regressions of perceived land conflicts and perceived risk of losing a parcel on land tenure security variables and other characteristics are less consistent compared to the land value regressions. Of the two perceived land tenure variables, the results for the potential future conflicts are relatively more consistent with our expectation. For example, the negative and significant coefficients on “parcels acquired in 10 or more years” and “parcels acquired through purchase” suggest that parcels in possession for longer period of time or acquired through purchase are perceived to be less likely to have potential land conflict. The coefficients on all other rights and tenure security variables are insignificant. The preexisting investments on a parcel have no to little effect on household’s perception of future land conflicts of the parcel. Compared to residential parcels, agricultural parcels and commercial parcels are perceived to be more likely to have future land conflicts. The perceived risk of losing land is not obvious, because there are two competing effects in play. On the one hand, farmers feel more secure land to have smaller risk of losing it. But on the other hand, farmers are also more afraid of losing land that are more secure and more valuable. Therefore, it is not easy to separate the two effects with just the baseline survey data.

Table of Contents

| | |
|---|-----|
| Acknowledgement | ii |
| Glossary | iii |
| EXECUTIVE SUMMARY | iv |
| 1. Introduction | 1 |
| 1.1 Mozambique Land Environment | 2 |
| 2. Project Logic and expected project outcomes | 5 |
| 3. Impact Evaluation Design for the Site Specific Activities in Rural Hotspots | 8 |
| 3.1. Geographic coverage for the impact evaluation | 8 |
| 3.2. Research questions addressed by the IE | 8 |
| 3.3. Identifying the comparison communities | 9 |
| 3.4. Evaluation approach | 10 |
| 3.5. Sample size and sample selection | 12 |
| 3.6. Power Calculation | 15 |
| 3.7. Baseline data collection | 17 |
| 3.8. Assessing the Validity of the Original Evaluation Design (As of May 2016) | 20 |
| 3.8.1. Validity of the Evaluation Design for the Malema District | 20 |
| 3.8.2. Validity of the Evaluation Design for the Mecufi District | 20 |
| 3.9. Implications and Next Steps on Evaluation of Activity III in Malema and Mecufi | 22 |
| 4. Results | 22 |
| 4.1 Socio-economic characteristics | 23 |
| 4.1.1 Household demographics | 23 |
| 4.1.2. Type of employment and income source | 24 |
| 4.1.3 Non-land family assets | 27 |
| 4.1.4. Livestock assets | 29 |
| 4.1.5. Access to Credit | 30 |
| 4.2 Land ownership, land markets and perceived tenure security | 33 |
| 4.2.1 Land profile in terms of number of plots, size, use and ownership status | 33 |
| 4.2.2. Characteristics of residential parcels | 36 |
| 4.2.3. Mode of land acquisition and agencies involved in the process | 38 |
| 4.2.4. Land documents | 39 |
| 4.2.5 Hypothetical Land sales and land rental markets | 41 |
| 4.2.6 Land conflicts and perceived risk | 44 |
| 4.2.7 Land market | 46 |
| 4.2.8 Land investment | 48 |
| 4.2.9. Perceived impacts of DUAT | 52 |
| 4.2.10. Knowledge of Land Law | 59 |
| 4.3. Income, consumption and poverty status | 61 |
| 4.3.1. Household income and income sources | 62 |
| 4.3.2. Food consumption and household dietary composition | 63 |
| 4.3.3. Household expenditures on non-food items | 66 |
| 4.3.4. Prevalence of Poverty in the study area | 66 |
| 5. Propensity Score Matching as Alternative Evaluation Strategy | 68 |
| 6. Key outcome and impact indicators and testing for logic model | 77 |
| 7. Test for logic assumptions | 78 |

| | |
|---|------------|
| 7.1. Correlation between land value, land tenure security and parcel characteristics | 79 |
| 7.2. Correlation between perceived future land tenure security and parcel characteristics | 80 |
| 8. Discussion and Conclusions | 83 |
| 8.1 Comparison of key variables across districts and between treatment and control areas | 83 |
| 8.2 Methodological implications | 84 |
| 8.3 Data quality issues and next steps..... | 84 |
| References cited..... | 86 |
| Annex 1: Survey Instruments Used for the Listing Exercise..... | 88 |
| Annex 2. Field Report for the Baseline Survey for Impact Evaluation of MCA Land Interventions in Rural Areas | 90 |
| Annex 3. Results by treatment and control groups and by the gender of household head for the pooled data | 103 |

LIST OF TABLES

| | |
|---|----|
| Table 1: Selection criteria met by the 12 districts selected for Land Project activities in four Northern provinces..... | 5 |
| Table 2: Project intervention Aldeias for rural “hotspot” site-specific activities under Pillar III ... | 8 |
| Table 3: Impact Pathway of Area-specific Activities in Rural Area | 9 |
| Table 4: HTSPE plan for rural LTR work in Cabo Delgado and Nampula as of the time of the planning of the rural IE design..... | 12 |
| Table 5: Number of households listed and selected by community and province..... | 14 |
| Table 6: Sample distribution by communities and treatment status | 16 |
| Table 7: Power calculation by district | 17 |
| Table 8: Number of households surveyed by type of community | 19 |
| Table 9: Sample distribution by communities and treatment status | 21 |
| Table 10: Demographic characteristics..... | 24 |
| Table 11: Percentage of households reporting income from different sources and type of economic activity..... | 26 |
| Table 12: Percentage of households owing various assets, by district and gender of the head..... | 28 |
| Table 13: Average number and value of purchased assets per household..... | 28 |
| Table 14: Production and sales of livestock and sub-products in the last 12 months..... | 29 |
| Table 15: Access to credit in the last 12 months | 31 |
| Table 16: Amount requested and accessed per household and reasons for not accessing credit...32 | |
| Table 17: Number of parcel by type of use and by rental status..... | 34 |
| Table 19: Access to utility and infrastructure in parcels used for residence purpose ¹ | 36 |
| Table 20: Agencies involved in land acquisition (for parcels in the possession of the households and those rented-out)..... | 38 |
| Table 21: Types of Land Documents Currently in Possession by Parcel Holder | 39 |
| Table 22: Interest and willingness to pay for DUAT..... | 41 |
| Table 23: Hypothetical sale and rental prices of parcels belonging to the household surveyed ... | 42 |
| Table 24: Land conflicts experienced in the past and or perceived in the future | 43 |
| Table 25: Information on parcels rented out by land use type (residential and agricultural land) | 45 |
| Table 26: Information on parcels rented-in | 47 |
| Table 27: Types of land investment made in the past 12 months by land use..... | 49 |
| Table 28: Average cost of land investment per parcel made in the past 12 months by land use...50 | |
| Table 29: Percentage distribution of households by their opinion on the effect of DUAT on the value of parcel..... | 52 |
| Table 30: Percentage of households by their willingness to pay, willingness to sell and rent out in the case of DUAT | 53 |
| Table 31: Households' opinion about the effect of DUAT on conflicts and expropriation | 55 |
| Table 32: Households' opinion about the effect of DUAT on investment and collateralization | 58 |
| Table 33: Knowledge about women’s rights under the land law of 1997 | 59 |

| | |
|---|----|
| Table 34: Perceptions of the Land Law of 1997 | 60 |
| Table 35: Household Income and Income sources (Meticais) | 62 |
| Table 36: Value of monthly household food and tobacco consumption (Meticais) | 64 |
| Table 37: Household Diet Diversity | 65 |
| Table 38: Average monthly expenditures per household | 66 |
| Table 39: Percent of individuals living on less than \$1.25 per day (based on PPP exchange rate) and below poverty line | 67 |
| Table 40: Sample Balance before and after Matching (N=711 households) in Malema District .. | 70 |
| Table 41: Sample Balance before and after Matching (N=706 households) in Mecufi District ... | 73 |
| Table 42: Baseline assessment of key outcome and impact indicators | 77 |
| Table 43: Determinants of land sales and rental values in rural areas (OLS)..... | 80 |
| Table 44: Determinants of perceived risk of being in future land conflict and losing land, probit models | 82 |

LIST OF FIGURES

| | |
|---|-----|
| Figure 1: Priority geographic areas of intervention for site-specific activities in four provinces in northern Mozambique under the MCA-Mozambique Land Tenure Services | 4 |
| Figure 2. Land Project Logic | 7 |
| Figure 3: Mecufi intervention area | 13 |
| Figure 4: Distribution of Propensity Scores in Treatment and Control Group in Malema (Top) and Mecufi District (Bottom) | 699 |
| Figure 5: Standardized % Bias Across Covariates before and after Matching (Malema and Mecufi District) | 766 |

Impact Evaluation of Site-specific Activities under the Land Tenure Services Project: Report of the Baseline Survey Conducted in Two Rural Areas in Northern Mozambique

1. Introduction

In June 2007, realizing the need and importance for increasing the productive capacity of the population in Northern Mozambique, the Millennium Challenge Corporation (MCC) signed a five-year, \$506.9 million compact with the Republic of Mozambique with the intended impact of reducing the poverty rate, increasing household income and reducing chronic malnutrition in the targeted districts. As part of this five year Compact (which entered into force in September 2008), the Land Tenure Services Project (or simply the ‘Land Project’) aimed to establish a more efficient and secure access to land by improving the policy framework; upgrading land information systems and services; helping beneficiaries meet immediate needs for registered land rights; and better access to land for investment. The Land Project’s objectives are to: (i) increase the level and value of investment on land; (ii) increase access to land; (iii) reduce the costs associated with acquiring land user rights; and (iv) resolve and prevent conflicts over land. Investments are targeted to all four Northern Provinces (Cabo Delgado, Niassa, Nampula and Zambezia), at all levels of administration – National, Provincial, and District / Municipal – and across a range of beneficiaries, including rural individual land holders, rural communities, urban land holders, and domestic and international investors.

The Land Project in Mozambique aimed to achieve these objectives through three mutually reinforcing Activities:

- Policy Monitoring Activity(Activity I): Improve the policy environment by addressing implementation problems with the existing land law, conducting regulatory reviews to improve upon it, and supporting training for predicTable, speedy resolution of disputes;
- Capacity Building Activity (Activity II): Build the institutional capacity to implement policies and to provide quality public land-related services by investing in human and information resources; and
- Site-specific Activity (Activity III): Facilitate access to land use by helping individuals and businesses with clear information on land rights and access and with registering their grants-of-land use (DUATs).

Empirical studies suggest that impacts of land tenure projects vary considerably from country to country, depending on market development, financial institutions, legal frameworks, and beneficiary income (Place 2009). Land tenure reform has 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 is thus essential for a results-based approach to program management. MCC thus committed to conducting independent impact evaluations of its programs as an integral part of its focus on results, and have partnered with Michigan State University and the Ministry of Agriculture Department of Economics (MINAG-DE) to implement the evaluation.

The overall impact evaluation strategy for the Land Project is described in a separate land evaluation design report and is comprised of three components—an impact evaluation of the institutional strengthening activity, an impact evaluation of site-specific activity in urban hotspot areas, an impact evaluation of site-specific activity in rural hotspot areas. This Report focuses on the third of these three components and describes the impact evaluation design, including the sampling methodology used for the site-specific activities in rural ‘hot spot’ areas, and reports the results of the baseline survey conducted in 2011-12 in priority areas of Malema district in Nampula (711 households) and Mecufi district in Cabo Delgado (706 households). It is important to note that Both comparisons and treatments of this evaluation are being affected by both the nation-wide policy activity (Activity I) and the institutional strengthening activity of the local district offices (Activity II), this evaluation would essentially evaluate the effects of receiving all three activities versus only receiving Activity I and Activity II. Assuming the effects of Activity I and Activity II are constant in both the treatment and comparison areas, then the identified effects through this evaluation exercise is to evaluate the impacts of ‘the site specific activities (Activity III) in rural hotspot areas’. The baseline surveys reported in this document will serve as a basis for estimating the impacts of ‘site specific activities in rural hotspot areas’ after a follow-up survey is completed in the post-Compact phase which is anticipated to take place in 2018/2019.

1.1 Mozambique Land Environment

The legal regime in relation to land tenure in Mozambique offers protection of land use rights (both for investment purposes and the rights acquired by existing occupiers of land) and, further, provides a framework within which informally acquired rights can be formalized, either as common holdings in the name of groups of occupiers or users or as parcel rights individually held. Mozambique’s land tenure framework has been recognized nationally and internationally as a good policy framework. However, implementation in Mozambique has been slow and registry and cadastral services are not affordable by the population at large.

According to the inception report by the land project implementing contractor, HTSPE, the current formal land and property administration systems in Mozambique handle only a very small proportion of the actual population land needs. Procedures are largely geared to meet the applications for formal DUATs for a limited section of the population – mostly consisting of investors. Demand, in comparison to the population and numbers of households is very low, either because of the perceived difficulty and high cost of obtaining a formal DUAT, or because the value of the title itself and the laws that underwrite it are not sufficiently well understood by all land occupants. Accurate figures are difficult to obtain but based on the TIA 2008 nationally representative survey it was estimated that only about one percent of land plots in rural areas had DUATs, with a high proportion (about 36%) of these being provisional DUATs (Maredia et al. 2012b)¹. According to the TIA data, in rural areas, plots allocated directly through the state represent less than 5% and through informal land markets (purchase or rental) less than 10%.

¹ DUAT (abbreviation of Direito de Uso e Aproveitamento dos Terras in Portuguese) means ‘right of use and benefit of land.’ While a DUAT does not confer full ownership, it is a secure, renewable, and long-term user right that covers a period of up to 50 years. Provisional DUAT means the temporary rights for land that is registered but not demarcated.

Access through customary systems or through occupation remains the predominant form of land acquisition in rural Mozambique district (Maredia et al. 2012b).

The underlying rights of existing occupants, if they do not have a formal DUAT, are not registered or recorded. This means that sporadic applications may be made that overlap with existing rights. There is currently no easily accessible and affordable formal land user rights registry system for the majority who already occupy the land and no provision for systematic registration. This is an important feature of current land administration in Mozambique and is the source of several of its problems.

1.2. Project Description and Project Sites

The Land Project under the MCA compact is designed to address many of these constraints and limitations of the land administration system in Mozambique against a background of a growing population, increasing demands for land for investment and a large and growing informal market in land. It is recognized that in order to guarantee rights of access to land and to reduce the bureaucracy associated with obtaining land title (i.e., DUAT), requires an efficient land administration system. It is this system as a whole that is envisioned to play the primary role in increasing land tenure security and improving access to land. This requires significant technological and technical upgrades to provincial, district and municipal cadastral offices and there is a need for institutional strengthening and a reorientation of the land administration system in general to improve efficiency within the system. While the components under Activities I and II are designed to improve policy environment in the entire country and to achieve a more streamlined and efficient land administration system in project municipalities and districts, the components under Activity III (which is the focus of this report) is designed to systematically register urban and rural land to secure land rights, to create land markets, and to improve access to land in priority areas. In the context of rural areas, the site-specific interventions planned in selected districts include support to the formalization of land use rights.

The 12 districts in the four Northern provinces depicted in Figure 1 form the universe of intervention sites in rural areas for Activity III. Within each of these 12 district, some areas (administratively known as '*Aldeia*') have been identified as priority or hotspot areas where the focus will be to pilot a sound approach to area-wide registration of land rights. In each of these priority *Aldeias*, specific interventions are planned to address some hotspot issues related to expansion, requalification and regularization. The end goal of the intervention in selected hotspot areas (i.e., also referred as 'site-specific activities') is the provision of DUATs through parcel demarcation. The impact evaluation described in this document is focused on assessing the impacts of provision of DUATs ' in rural priority/hotspot areas in these selected 12 districts.

The process that resulted in the identification of the 12 districts for Pillar III activities and then the selection of priority/hotspot villages (or *Aldeias*) within these selected districts was conducted by NLPAG (the National Land Project Advisory Group) with active involvement and participation of the local governments. A list of the 12 districts and the selection criteria they meet for Land Project activities is given in Table 1. The priority areas identified for site specific activities within these 12 districts are the smallest unit of project interventions of the Land Project in rural areas. It is important to note that the institutional strengthening (components under Activity I and Activity II)

affected both the treatment and comparison groups of the site-specific systematic titling project in the priority areas. As such, the impact evaluation of the site-specific intervention in these priority areas (Aldeias) is to evaluate the benefits of systematic titling (Activity III) in terms of improvement in tenure security, productivity, investment, land markets at the level of the project beneficiaries. On the other hand, the institutional strengthening activities (Activity II) affected both the treatment and comparison areas in the rural evaluation. The evaluation component on institutional strengthening will be able to show results of the non-titling aspects in terms of reduction in time and cost of land administration (e.g., registering a new DUAT or recording land transactions, etc.)².

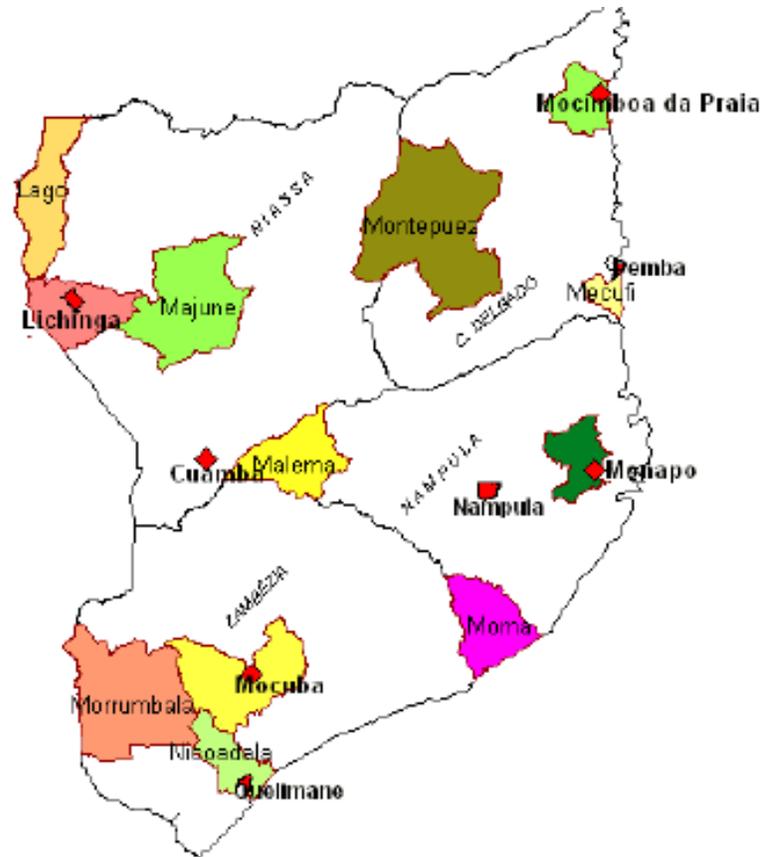


Figure 1: Priority geographic areas of intervention for site-specific activities in four provinces in northern Mozambique under the MCA-Mozambique Land Tenure Services

Legend: small areas in red correspond to selected treatment municipalities (total 8—Lichinga, Cuamba, Pemba, Mocimboa da Praia, Nampula city, Monapo vila, Mocuba and Quelimane) and areas in other colors correspond to selected treatment districts (total 12—Mecufi, Mocimboa da Praia, Montepuez, Majune, Lago, Lichinga, Monapo, Moma, Melema, Nicoadala, Morrumbala and Mocuba) for Pillar III activities

² MSU has already submitted the evaluation strategy and a baseline report for the institutional strengthening activities in separate documents.

Table 1: Selection criteria met by the 12 districts selected for Land Project activities in four Northern provinces

| | Criterion 1 | Criterion 2 | Criterion 3 | Criterion 4 | Criterion 5 | Criterion 6 |
|-------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Zambézia | | | | | | |
| Nicoadala | X | X | | | | X |
| Morrumbala | X | X | X | | | X |
| Mocuba | X | X | X | | | X |
| Nampula | | | | | | |
| Malema | X | X | X | | | X |
| Monapo | X | X | X | | | X |
| Moma | X | X | | | | X |
| C. Delgado | | | | | | |
| Mocimboa da Praia | X | X | | X | X | X |
| Montepuez | X | X | | X | X | X |
| Mecufi | X | X | | X | | X |
| Niassa | | | | | | |
| Majune | X | X | | | | X |
| Lichinga | X | X | | | | X |
| Metangula | | | | | | X |

Key for Criteria: 1 = high demand for DUATs; 2 = government priority; 3 = local technical capacity exists; 4 = support from other sources (financial and human); 5 = land use plans exist; 6 = high risk of land conflicts.

2. Project Logic and expected project outcomes

Figure 2 summarizes the activities, the outputs, the short-term and the long-term outcomes of the land project in a logic framework. The project is composed of three types of activities – Policy Activity, Capacity Building Activity and Site-specific Activity. The outputs associated with the policy activity include (1) heightened knowledge of land law, regulations and procedures and (2) regulatory changes submitted and adopted. The output out of the capacity building activity is the upgraded information systems and trained professionals. Finally, the site-specific activity is expected to generate two outputs including (1) increased number of delimitations/demarcations and registered titles and (2) information products and services provided to investors seeking land investment. The three activities are likely to reinforce each other. For example, the site-specific activity is likely to be more effective in areas where the policy activity and the capacity building activity was already implemented. However, it is more useful and policy relevant to evaluate the different activities separately. A separate report is being prepared to present the design and baseline finding for the evaluation of the institutional strengthening activities (the combination of the policy activity and the capacity building activity). In this document, we focus on the impact of the site-specific hotspot activity (provision of DUATs) in rural areas. Given that both the treatment and comparison areas received the institutional strengthening activity, and hence we are able to measure the benefits of having a DUAT. As indicated in the logic framework, the household level

effects associated with the site-specific activity can be divided into the short-term and the long-term outcomes.

The short-term (1-2 years) outcomes include:

- Increased tenure security perceived by households,
- Increased perception of land value
- Reduced conflicts and perceived low level of future conflicts

The medium- and long-term (3-5) outcomes include:

- Increased investment on land,
- Increased level of market activities,
- Increased land productivity,
- Increased household income,
- Increased land value.

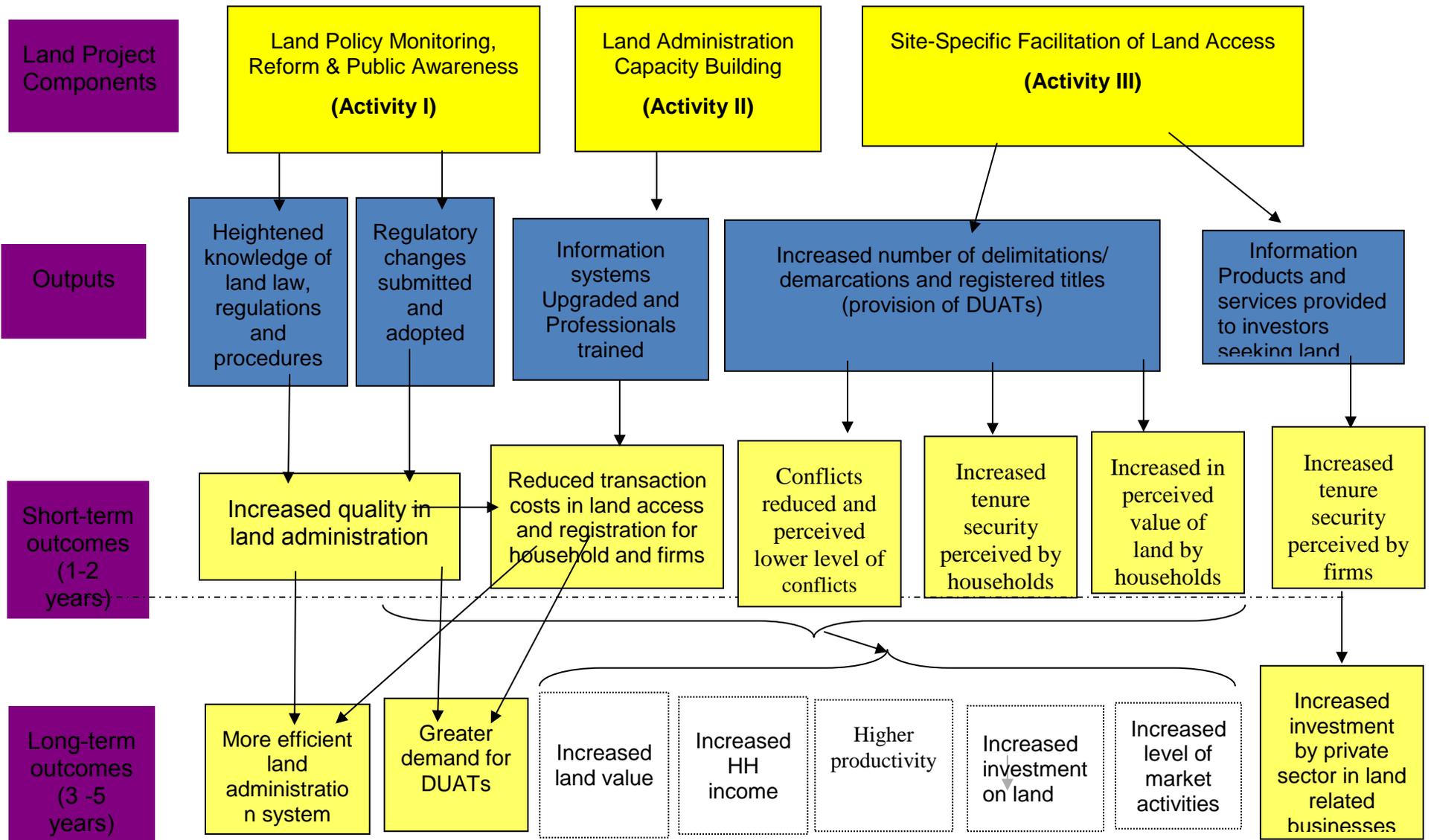


Figure 2: Land Project Logic

3. Impact Evaluation Design for the Site Specific Activities in Rural Hotspots

3.1. Geographic coverage for the impact evaluation

A list of the 12 districts and the selection criteria they meet for Land Project activities is given in Table 2. Activity III is only implemented in selected priority areas in these districts. Since, collecting primary survey data from hotspots in all 12 districts was resource intensive and not practical, it was mutually decided by MCC/MCA and MSU to conduct the rigorous impact evaluation of the ‘site-specific land intervention’ only in two rural hotspot areas. Based on the scope of the activities planned and progress made by HTSPE in relation to the timeframe of the baseline survey, it was decided that the focus of the IE will be to evaluate the impacts of interventions targeted on hotspot issue of requalification / regularization in the following two districts—Mecufi in Cabo Delgado and Malema in Nampula. These two hotspot areas were selected for evaluation based on the following additional criteria which are critical for rigorous impact evaluation:

- Ability to identify comparison Aldeias to estimate the effects of the intervention in a rigorous and robust manner
- Indication that project interventions in hotspot areas will be implemented soon after the baseline survey and there will be enough time to observe outcomes and impacts before the end-line survey.

The geographic coverage includes 2 priority Aldeias in Malema and 3 priority Aldeias in Mecufi (Table 13). These were selected and prioritized by the district authorities (and HTSPE) based on some set criteria and were outside the control/influence of the impact evaluation team.

Table 2: Project intervention Aldeias for rural “hotspot” site-specific activities under Pillar III

| Mecufi (Cabo Delgado) | Malema (Nampula) |
|------------------------------|-------------------------|
| Maueia | Cabo Miquitaculo |
| Muitua | Cabo Niquile |
| Ngoma | |

3.2. Research questions addressed by the IE

The goal of the intervention in the priority hotspot areas is to register or grant land use rights (i.e., land titles to long-term or perpetual-use rights) to individual households.³ Initiatives to strengthen the property rights (e.g, issuance of DUATs) are generally designed to result in clearly defined rights that are enforceable, transferable, and of appropriate duration and scope. Economic theory

³ Initially, there were plans to conduct rigorous IE of the community land fund project (iTC) under Pillar III. However, based on the design of the iTC project and given the vast and diverse issues to be potentially covered by iTC, it was not feasible to do a rigorous impact evaluation of this component of Pillar III.

holds that more secured tenure should lower land-transaction costs, lower the risk of expropriation or conflict and encourage more efficient land uses and land investment, and contribute to productivity improvement and land market development. 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.

But on the other hand, whether and to what degree these various impacts of more secure and transferable property rights based on economic theory are realized depends on local conditions such as market development, financial institutions, legal frameworks, and beneficiary income. The purpose of the rigorous IE design for the two rural hotspot areas is to precisely measure and monitor these impacts and assess the causality in effects outlined in the impact pathway. The key research questions to be addressed by our evaluation of Activity III in Malema and Mecufi are whether and to what extent the area-specific activities (as listed in column 1 of Table 3) leads to the various impacts as listed in column 3 of Table 3.

Table 3: Impact Pathway of Area-specific Activities in Rural Area

| Activities | Outcome | Impact indicators |
|--|--|--|
| <ul style="list-style-type: none"> • Digitized base maps for “priority areas” • Demarcated plots • Issuing DUAT for the plots | <ul style="list-style-type: none"> • Make the process simple, cost-effective and faster • Increased security of tenure | <ul style="list-style-type: none"> • Reduced incidents of conflicts • Increased new commercial enterprises and activities • Increased level of investments on land parcels • More active land markets • More effective/productive land uses • Increased off-farm opportunities (labor mobility) • Higher demand for DUATs |

3.3. Identifying the 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 prioritized Aldeias listed in Table 16 are the potential pool of treatment sites for this IE. The units of impact observation will be households. Thus, households within the boundary of these listed Aldeias serve as the treatment group. The following strategy was used to identify sufficient number of comparison households to implement the DiD design.

The current strategy for Mecufi includes Maueia, Muitua and Ngoma as treatment Aldeias and Secura A, Secura B, Zaulane A, and Zaulane B as control Aldeias. This is a deviation from our original design due to the change in the implementation plan. Originally, the implementation plan was to intervene the coastal side of all the seven Aldeias, and leave the non-coastal side of each of the Aldeias untreated. Correspondingly, our original strategy was to select the same number of treatment households (from the coastal side) and control households (from the non-coastal side) in

each of the seven Aldeias. After the baseline survey was completed, the intervention plan changed to complete treatment coverage of some villages (Maueia, Muitua and Ngoma) and leaving others (Secura A, Secura B, Zaulane A, and Zaulane B) as control due to the strong objection from its members on the original intervention plan. In light of the fact that the intervention plan changed after the baseline survey was completed, we don't have much choice but to salvage as best as we could. While the new plan is less ideal than the initial design, the four control villages are facing similar issues as the three treatment villages and will remain as control for the next few years. HTSPE's contract with the MCA ended in August 2013 (and indeed the whole MCA compact ended in September 2013). So naturally neither HTSPE nor MCA have plans to intervene in that area in a foreseeable future. And it is also important to ensure that Cabo Delgado SPGC has no such plans before the completion of the end line survey.

In the case of Monapo, the impact evaluation strategy includes two treatment Aldeias and one control Aldeias. The treatment Aldeias (Cabo Miquitaculo and Cabo Niquile) were selected by the project team and we had no influence on that decision. There were very limited choices for a comparable control area in the Monapo district. The only close match was the community of Cabo Macassa. Therefore, we selected Cabo Macassa Aldeias as the control site. Like in the case of Cabo Delgado, it is important that Nampula has no plans to intervene in the control area before the completion of the end line survey for this evaluation project.

3.4. Evaluation approach

By conducting an impact evaluation of the different activities under the Land Project (i.e., site-specific hotspot activities in urban area, site-specific activities in rural area, and institutional strengthening activities), we intend to quantitatively estimate the change in population attributes that is attributable to the implementation of the relevant activities under the Land Project. Thus we plan to compare the outcomes of the targeted population in the presence of the program relative to the population's outcomes if the program had not been implemented. In other words, the basic principle that guides our approach is the comparison between situations "with" the project activities and "without" the project activities. This is as opposed to merely comparing beneficiaries "before" and "after" the project implementation. Unfortunately, it is not possible to compare the same population simultaneously under both conditions --with and without program exposure, because a given household or community (depending on the unit of intervention) is either treated or not, but not both.

Practically, to address this problem, we estimate the average impact of the program on a group of individuals by comparing them to a similar group of individuals that are not directly affected by the program. Therefore, one critical step of any impact evaluation exercise is to establish a credible control group. A number of different empirical approaches have been employed to establish the credible comparison group (or control group). The most robust approach is randomization – in which the treatment group and control group are randomly selected from all eligible sampling units (either clusters or individuals). A randomized experiment guarantees that (on average) there are no differences in the observed and unobserved characteristics between the treatment and control group and thus, a statistically significant difference in outcomes between the two groups is attributed to the program.

While the “gold standard” of impact evaluation is randomization control trial (RCT), this is not always possible in practice. For example, the 8 municipalities and 12 districts to receive institutional strengthening activities as well as the prioritized urban areas in the 8 municipalities and prioritized rural areas in the 12 districts to receive site-specific activities, are not randomly chosen. In fact, these areas were pre-selected by national or local governments to receive these activities for economic development or other practical reasons. Given the non-random selection of program areas for all the three types of activities, we have to use (an) alternative evaluation approach(es) to evaluate the institutional strengthening activities and the urban and rural site-specific hotspots activities. Specifically, we will use the difference-in-difference (DID) approach for all the three separate evaluations.

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 communities or households), DID is a common and valid method to estimate the impact of an intervention if the assumption holds that unobserved heterogeneity is time-invariant and uncorrelated with the treatment effect. While the main advantage of DID is its ability to control for time invariant unobserved factors, its assumption of constant selection bias over time may be unrealistic in practice.⁴

Let Y be the outcome of interest (e.g., total number of DUATs issued or the average time lapse between application and issuance of a DUAT in the case of institutional strengthening intervention, or land investment, land market participation, household income, off-farm employment in the case of site-specific intervention of DUAT issuance). Our goal is to evaluate the impact of a specific intervention T (i.e., upgrading of the land administration system in the case of institutional strengthening activities, or issuing DUATs to urban or rural residents in the case of site-specific activities) on Y after a time period 1. Specifically, we can achieve this evaluation through DID as:

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

where the superscripts T and C refer to treatment and control units (municipality or district in the institutional strengthening activities, or households in the two site-specific interventions), 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 dummy to distinguish treatment group ($T=1$) from control groups ($T=0$), t is a time dummy ($t=0$ for before treatment and $t=1$ for after the treatment). 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 RCT-based data are not available (see discussion by Duflo, Glennerster and Kremer 2007; Ravallion 2005). The DID approach was also

⁴ We can also combine the DID with the propensity score matching (PSM) method to further improve the reliability of the estimated impacts.

used by similar studies on land titling projects in other countries (Deininger et al. 2011, Di Tella 2007; Field 2007).

3.5. Sample size and sample selection

At the time of the planning of rural IE surveys, MCA had made a substantial reduction in the scope and coverage of the rural intervention. As of May 2011, HTSPE estimated to capture around 2000 agricultural parcels across all provinces, targeting to cover about 500 parcels in one district per province. The plan for Cabo Delgado and Nampula for rural LTR work is indicated in Table 13.

The sample size of the rural evaluation was dictated by the size of the targeted number of treatment parcels in Mecufi and Malema as conveyed to us at the time of planning this IE, and the logistics of doing the survey in limited time available before HTSPE planned their activities in the selected villages. In Mecufi district, Cabo Delgado, our initial understanding of the LTR timeline and scope was that work would start in the village of Muaria in August of 2011 and quickly proceed northward to the village of Muitua and cover only land on the coastal side of the road linking the district capital to the provincial capital of Pemba in the north (see Figure 2).

The plan was to cover all villages to be covered by the intervention along the coast, but given that the survey could only commence around August, and public announcements were already planned for early August in the village of Muaria, this southernmost village was excluded from survey coverage. To avoid any overlap between survey implementation and HTSPE intervention, the questionnaire was divided into 2 visits. Those sections that would have been sensitive to interventions were implemented first across all the villages.

A listing was carried out in all villages and covered all households within them. Those households that owned parcels on the coastal side of the road were listed in the frame for treatment households; those with parcels only on the interior were listed in the frame for control households. The instruments used in the listing exercise are provided in Annex 1.

Table 4: HTSPE plan for rural LTR work in Cabo Delgado and Nampula as of the time of the planning of the rural IE design

| <i>Province</i> | <i>District</i> | <i>PA</i> | <i>Area</i> | <i>Size of area</i> | <i>Estimated number of parcels to be captured</i> |
|-----------------|-----------------|-----------|------------------------------|---------------------|---|
| Cabo Delgado | Mecufi | Mecufi | Highway – Sea, northern part | 25 km ² | 400-500 |
| Nampula | Monapo | Monapo | Monapo Sede - Western part | 100 km ² | 500 |

SOURCE: Interview with HTSPE staff, Tommy Kalms, **May 25, 2011**.

The number of treatment households selected in each village was calculated in direct proportion to the number of households listed in the frame for treatment households. An equal number of

control households were then selected for each village from the frame of control households. The selection of households was done by systematic random sampling by the survey manager.

However, as noted in the previous section, the definition of control and treatment areas was changed post-survey. Due to a strong objection from community members, HTSPE proposed doing complete treatment coverage of a sub-set of villages (Maueia, Muitua and Ngoma) and left others as control villages (Secura A, Secura B, Zaulane A and Zaulane B). The ratio of sample size for the treatment and control villages in Mecufi that has been used for this study.

As with Mecufi district, the plan was to cover 400 treatment households and 400 control households. The survey was carried out under a very tight deadline because HTSPE was already scheduled to move in after a few weeks. Because the last 3 kilometers to Niquile could only be covered on foot and the residents widely dispersed, the enumerators had to have, at hand, precise instructions on the listing and sampling of households. It was decided that the 400 households be allocated between Cabo Miquitaculo and Cabo Niquile according to census information given by community leaders. This resulted in a 300-100 split between the two. Both communities had smaller administrative units called *celulas*. The distribution of the sample in Cabo Miquitaculo was done in proportion to the number of households listed within each *celula*.

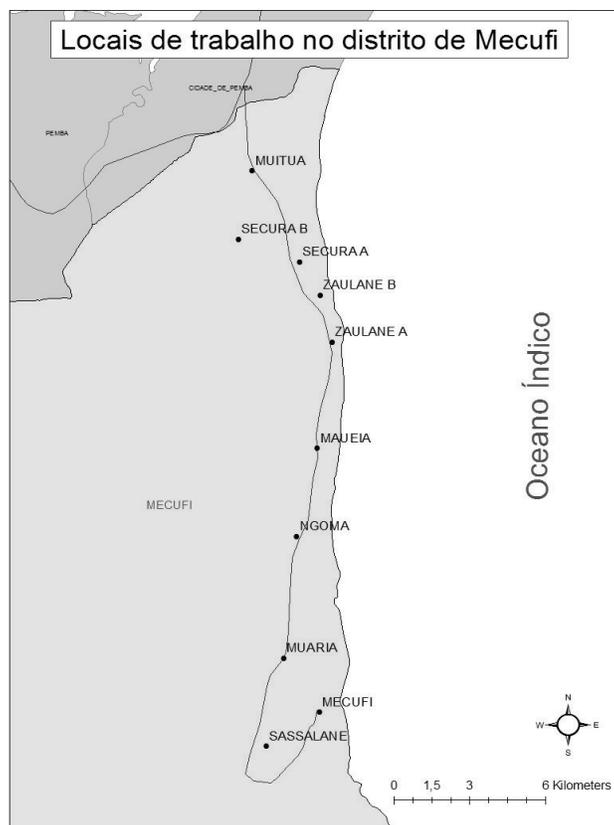


Figure 3: Mecufi intervention area

Source: Pinheiro, Andre. 2011. Actualização de Informação Cadastral na Zona Costeira de Mecufi. Report submitted by HTSPE/MCA-Mozambique/Verde Azul. February 2011.

In the case of Niquile, where the listing information could not be consolidated (owing to the highly dispersed population) before selection began, the 4 *celulas* were assigned 25 households each to facilitate the selection of households. The households were selected using systematic random sampling and the data were weighted using sampling weights.

In the Malema district, Nampula Province, the highest number of requests for DUATs came from those owning agricultural parcels in the low-lying areas along the Ligonha river. The river separates Malema district from Alto Molocue district in Zambezia. HTSPE indicated they would target this area. Most of the residents of this target area lived in the nearby communities of Cabo Miquitaculo and Cabo Niquile and so these were selected to be the treatment villages. There were very limited choices for a comparable control area. The only close match was the community of Cabo Macassa.

Table 16 summarizes the listing and selection information. The target number of interviews was not achieved in Cabo Delgado mainly due to absent respondents even after the second visit. In Malema, the main constraint was that there were only 333 households in the final frame for control households.

Table 5: Number of households listed and selected by community and province

| Community | Total number of households listed | Total number of households with parcels in low-lying areas near the river | Total number of households interviewed | Number of households interviewed as % of households | Number of households interviewed as % of households with parcels in low-lying areas near the river |
|---------------------|-----------------------------------|---|--|---|--|
| CABO DELGADO | | | | | |
| Ngoma | 473 | | 208 | 44.0 | |
| Muitua | 985 | | 211 | 21.4 | |
| Maueia | 188 | | 36 | 19.1 | |
| Secura B | 562 | | 73 | 13.0 | |
| Secura A | 574 | | 68 | 11.8 | |
| Zaulane A | 1,298 | | 66 | 5.1 | |
| Zaulane B | 1,097 | | 44 | 4.0 | |
| Total | 5,177 | | 706 | 13.6 | |

NAMPULA

| | | | | | |
|------------------|-------|-----|-----|------|------|
| Cabo Miquitaculo | 718 | 465 | 297 | 41.4 | 63.9 |
| Cabo Niquile | 258 | 153 | 98 | 38.0 | 64.1 |
| Cabo Macassa | 473 | 333 | 316 | 66.8 | 94.9 |
| Total | 1,449 | 951 | 711 | 49.1 | 74.8 |

3.6. Power Calculation

As indicated in the previous sections, due to the extremely tight schedule between the time when the implementation plan was developed and the time when the plan was implemented and the challenge of small number of targeted parcels in both Malema and Mecufi, we had little choice with regard to the selection of treatment and control villages and number of households to be selected from each village. Moreover, our original sample design was further challenged by the fact that we had to switch between treatment and control areas due to the change of implementation plan. Given all the challenges, it is useful to conduct an ex post power calculation (shown below) using information from the baseline survey to assess whether we will still be able to accomplish a valid and rigorous evaluation of the rural hotspot project.

Formula (5) implies an important tradeoff between number of clusters and number of households per cluster sampled. For a given sample size, an increase in the number of households per cluster sampled increases the precision (i.e., reduction in MDE) much less than an increase in the number of clusters sampled. Generally speaking, a relatively large number of clusters (e.g., 10 or more) is desired for an evaluation of a cluster-based intervention. For this reason, the small number of villages in the two program sites (7 in Mecufi district and 3 in Malema district) is a potential concern. One way to increase the number of clusters is to divide villages into sub-villages based on the assumption that households from different sub-villages have little interaction. It turns out that it is reasonable to divide the three villages in Malema district into 21 independent sub-villages. Specifically, the Cabo Miquitaculo Aldeias is divided into 11 subvillages (Chipaca A, Chipaca B, Murrupane, 25 de Junho, Metilili, 19 de Outubro, Nroposso, Mapecha, Lituli, 1 de Maio, and Pilani), the Cabo Niquile village into 4 subvillages (Namalelene, Nihoro, Mocuba, Chuhuro) and the Cabo Macassa village into 6 subvillages (Niessa, Euile, Murrosi, Murrunha, Uchequeche Namale). As a result, we have 21 clusters instead of 3 clusters to work with in the Malema district. The detailed distribution of sample by districts and by treatment status is listed in Table 6.

Table 6: Sample distribution by communities and treatment status

| Community | Sub-unit | Treatment | Control |
|----------------|-----------------------|-----------|---------|
| Nampula | | | |
| Miquitaculo | Miquitaculo-Chipaca B | 36 | 0 |
| Miquitaculo | Miquitaculo-Murrapane | 15 | 0 |
| Miquitaculo | Miquitaculo-Chipaca A | 32 | 0 |
| Miquitaculo | Miquitaculo-25 de Jun | 23 | 0 |
| Miquitaculo | Miquitaculo-Metilili | 58 | 0 |
| Miquitaculo | Miquitaculo-19 de Out | 12 | 0 |
| Miquitaculo | Miquitaculo-Nroposso | 32 | 0 |
| Miquitaculo | Miquitaculo-Mapecha | 14 | 0 |
| Miquitaculo | Miquitaculo-Lituli | 31 | 0 |
| Miquitaculo | Miquitaculo-1 de Maio | 25 | 0 |
| Miquitaculo | Miquitaculo-Pilani | 19 | 0 |
| Niquile | Niquile-Namalelene | 25 | 0 |
| Niquile | Niquile-Nihoro | 25 | 0 |
| Niquile | Niquile-Mocuba | 25 | 0 |
| Niquile | Niquile-Chuhuro | 23 | 0 |
| Macassa | Macassa-Niessa | 0 | 48 |
| Macassa | Macassa-Euile | 0 | 47 |
| Macassa | Macassa-Murrosi | 0 | 28 |
| Macassa | Macassa-Murrunha | 0 | 90 |
| Macassa | Macassa-uchequeche | 0 | 56 |
| Macassa | Macassa-Namale | 0 | 47 |
| Total | | 395 | 316 |

Cabo Delgado

| | | |
|----------|-----|----|
| Muitua | 211 | 0 |
| Maueia | 36 | 0 |
| Ngoma | 208 | 0 |
| Secura A | 0 | 68 |
| Secura B | 0 | 73 |

| | | |
|--------------|-----|-----|
| Zaulane B | 0 | 44 |
| Zaulane A | 0 | 66 |
| Total | 455 | 251 |

Following the traditional standard, we set the statistical power at 80% and the level of significance at 5%, which gives the multiplier value M_{j-2} to be 2.8 (corresponding to 2-sided hypothesis). Plugging $M_{j-2}=2.8$ and the other corresponding parameters for each respective district (see Table 16) into the MDE formula yields the standardized MDE (or MDE/σ) the respective district. Specifically, we will have $(MDE/\sigma) = 0.28$ for Malma and $(MDE/\sigma) = 0.35$ for Mecufi, respectively. The smaller the MDE, the more powerful the design is. According to Duflo et al. (2006), a traditional norm is that a MDE of 0.3 is considered as “small”, 0.5 as medium and 0.8 as big. Following this criteria, the design in both Nampula and Cabo Delgado is promising.

While the original sample design (small size and distribution) was not carefully designed due to the various reasons mentioned above, the MDEs for both Malma and Mecufi are reasonably small thanks to the small intracluster correlation coefficients. In other words, farmers from a given village (in the case of Cabo Delgado) or a given subvillage (in the case of Nampula) are fairly independent in physical asset endowment as well as economic variables.

Table 7: Power calculation by district

| | Cabo Delgado | Nampula |
|-----------|---------------------|----------------|
| M_{j-2} | 2.80 | 2.80 |
| P | 3/7 | 15/21 |
| J | 7 | 21 |
| N | 101 | 34 |
| ρ | 0.017 | 0.014 |
| MDE | 0.35 | 0.28 |

Note: ρ is the mean intracluster correlation coefficients of a number of most relevant variables that were calculated based on the baseline survey data (Appendix Table 2)

3.7. Baseline data collection

The baseline data were collected by interviewing the head of the households using a structured questionnaire. 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
- Land conflicts
- Rights to the land and perceptions of the risk
- Parcels rented out, rented in

- Characteristics of parcels
- Investments on land
- Perceptions about the DUAT, renting land and the land law
- Relative space occupied by crops in the plot
- Production and sales of basic food crops, cash crops, vegetables, fruits, nuts, etc., by season
- Input use by plot
- Agricultural practices
- Ownership of Assets
- Monthly expenditures
- Credit in the last 12 months
- Livestock and sub-products produced and sold in the last 12 months
- Consumption

Table 8: Number of households surveyed by type of community

| Mecufi District, Cabo Delgado | | | Malema district, Nampula | | | |
|-------------------------------|-----------------|------------|--------------------------|---------------|-----------------|------------|
| | HHs interviewed | | | | HHs interviewed | |
| Aldeia | Treatment | Control | Aldeia | Block | Treatment | Control |
| Maueia | 36 | | Cabo Miquitaculo | Chipaca A | 32 | |
| Muitua | 211 | | Cabo Miquitaculo | Chipaca B | 36 | |
| Ngoma | 208 | | Cabo Miquitaculo | Murrapane | 15 | |
| Secura A | | 68 | Cabo Miquitaculo | 25 de Junho | 23 | |
| Secura B | | 73 | Cabo Miquitaculo | Metilili | 58 | |
| Zaulane A | | 66 | Cabo Miquitaculo | 19 de Outubro | 12 | |
| Zaulane B | | 44 | Cabo Miquitaculo | Nroposso | 32 | |
| | | | Cabo Miquitaculo | Mapecha | 14 | |
| | | | Cabo Miquitaculo | Lituli | 31 | |
| | | | Cabo Miquitaculo | 1 de Maio | 25 | |
| | | | Cabo Miquitaculo | Pilani | 19 | |
| | | | Cabo Niquile | Namalelene | 25 | |
| | | | Cabo Niquile | Nihoro | 25 | |
| | | | Cabo Niquile | Mocuba | 25 | |
| | | | Cabo Niquile | Chuhuro | 23 | |
| | | | Cabo Macassa | Niessa | | 48 |
| | | | Cabo Macass | Euile | | 47 |
| | | | Cabo Macass | Murrosi | | 28 |
| | | | Cabo Macass | Murrunha | | 90 |
| | | | Cabo Macass | Uchequeche | | 56 |
| | | | Cabo Macass | Namale | | 47 |
| Total | 455 | 251 | | | 395 | 316 |
| Overall | 1,417 | | | | | |
| Treatment | 850 | | | | | |
| Control | 567 | | | | | |

Source: MCA/MINAG Rural Land Survey, 2011/12

The survey had detailed sections for each of the outcomes to be evaluated, both intermediate and final outcomes. In addition, each of the survey households was geo-referenced for ease of locating them for the panel survey. In households that were male-headed with a spouse present, the spouse was the respondent for the livestock and food consumption modules. The survey was designed to take between 1 and 1 ½ hours to complete.

The baseline survey was implemented in September/October 2011 in Mecufi, Cabo Delgado and April/May 2012 in Malema, Nampula. If the head of the household was not present at the time of the first visit, enumerators tried to make an appointment and returned again to interview the appropriate person within the time that the survey team was in the area. A total of 1,417 households were interviewed. The breakdown by province and treatment group area is shown in Table 5.

3.8. Assessing the Validity of the Original Evaluation Design (As of May 2016)

3.8.1. Validity of the Evaluation Design for the Malema District

During the field trip in May, the MSU team also visited Malema (one of the two rural hotspot areas subject to rigorous evaluation) to check whether there has been any change in project implementation that undermined the original evaluation design. The key issue identified during the visit is that 5 out of the 15 treatment blocks did not receive any intervention by the end of the compact.⁵ This finding has significant implication on the validity of the original evaluation design. In order to assess whether there will still be a rigorous evaluation using the original sample and the baseline survey data, we need to recalculate the MDE by accounting for the fact that five treatment blocks become control blocks.

Again, we use Eq. (5) to recalculate the MDE based on the updated information. The multiplier value M_{j-2} associated with the conventional power and level significance (80% and 5%) is 2.8. Plugging $M_{j-2}=2.8$ and the updated parameters ($J=21$, $P=0.48$, $N=34$, and $\rho=0.014$) into equation (5) yields the standardized MDE (or MDE/σ) = 0.25. According to Duflo et al. (2006), a traditional norm is that a MDE of 0.3 is considered as “small”, 0.5 as medium and 0.8 as big. The smaller the MDE, the better is the design. Following this criteria, we are fairly confident that the project in Malema can be rigorously evaluated if there is no further contamination in our sample. In other words, if the control units can remain valid control units before the endline survey is implemented, the baseline survey data and the data to be collected from the same households in 2017/2018 allow us to evaluate the impact of the land titling project in Malema.

3.8.2. Validity of the Evaluation Design for the Mecufi District

Compared to the Malema district, the situation in Mecufi district is much less clear. There has been a rumor that many parcels in the study areas in Mecufi were sold to investors and the original land owners were relocated to areas that are far away from their original villages. If this is indeed a case, it would be extremely challenging to collect data from those households who have moved.

⁵ These five sub-communities (highlighted in **YELLOW** in Table 9) are Mapecha, Nroposso, and Metilili in Cabo Miquitaculo communities, and Mocuba and Pilani sub-communities in Cabo Niguile communities.

Unfortunately, this rumor has not yet been confirmed. During the field trip in May, 2016, we checked with land administrators in Nampula about this rumor, they were not able to confirm it at that time. On the other hand, based on our knowledge and impression from our early field trips to Mecufi, we would not be surprised if many parcels were already sold. It is important that more information is gathered to decide whether a valid impact evaluation is possible in Mecufi.

Table 9: Sample distribution by communities and treatment status

| Aldeia | Blocks | Treatment | Control |
|--|-----------------------------|-----------|-----------|
| Nampula | | | |
| Miquitaculo | Miquitaculo-Chipaca B | 36 | 0 |
| Miquitaculo | Miquitaculo-Murrapane | 15 | 0 |
| Miquitaculo | Miquitaculo-Chipaca A | 32 | 0 |
| Miquitaculo | Miquitaculo-25 de Jun | 23 | 0 |
| Miquitaculo | Miquitaculo-19 de Out | 12 | 0 |
| Miquitaculo | Miquitaculo-Lituli | 31 | 0 |
| Miquitaculo | Miquitaculo-1 de Maio | 25 | 0 |
| Niquile | Niquile-Namalelene | 25 | 0 |
| Niquile | Niquile-Nihoro | 25 | 0 |
| Niquile | Niquile-Chuhuro | 23 | 0 |
| Miquitaculo | Miquitaculo-Metilili | 0 | 58 |
| Miquitaculo | Miquitaculo-Nroposso | 0 | 32 |
| Miquitaculo | Miquitaculo-Mapecha | 0 | 14 |
| Miquitaculo | Miquitaculo-Pilani | 0 | 19 |
| Niquile | Niquile-Mocuba | 0 | 25 |
| Macassa | Macassa-Niessa | 0 | 48 |
| Macassa | Macassa-Euile | 0 | 47 |
| Macassa | Macassa-Murrosi | 0 | 28 |
| Macassa | Macassa-Murrunha | 0 | 90 |
| Macassa | Macassa-uchequeche | 0 | 56 |
| Macassa | Macassa-Namale | 0 | 47 |
| Total | | 395 | 316 |
| Note: The rows highlighted by yellow color are the five treatment blocks that were not treated due to change in the implementation plan. | | | |

3.9. Implications and Next Steps on Evaluation of Activity III in Malema and Mecufi

A revised ex post power calculation shows that there will be a rigorous evaluation of Activity III in Malema district despite the fact several treatment communities were not treated. It is important to ensure that there will be no other land titling programs implemented in our study areas between now and the endline survey. We recommend the endline survey to be conducted in 2018/2019 to allow sufficient time for the real impact of the titling program to realize.

We are less enthusiastic about continuing the evaluation in Mecufi district. First, the ex post power calculation shows the value of MDE is much larger in Mecufi than in Malema (0.38 vs. 0.25) even with the assumption that the implementation exactly followed its original plan. Based on what happened in the Malema district as well as in the Monapo vila and the Nampula city, we are doubtful that the implementation did not deviate from its original plan. Second, there is a real possibility that many parcels have changed owners. If this turns out to be the case, it will be extremely challenging to interview the original households if they have moved far away from their original locations.

If the budget is only sufficient to implement the endline survey for one of the two rural hotspot areas, we would recommend to choose the Malema district based on the power calculation. But if MCC is interested in evaluating Activity III in both districts, it is important to gather additional information from Mecufi to recalculate the statistical power and determine whether the investment in Mecufi is really worth it.

4. Results

This section contains the results of the baseline survey data analysis in the study areas of Cabo Delgado and Nampula Provinces. The analysis focuses on three broad categories: a) socio-economic characteristics (i.e., demographics, economic activities, asset holdings, and access to credit); b) land characteristics (i.e., land ownership, land markets, land investments, perceptions on tenure security and knowledge about land law and rights); and c) welfare characteristics (i.e., income, consumption, expenditures, and poverty status).

The results are reported in two sets of Tables - the main set of Tables and a set of appendix Tables. In the main set of Tables, we first report the overall mean, the mean for the treatment group and the mean for the control group by district (cols 1-3 for Cabo Delgado and cols 4-6 for Nampula), then report the mean for the entire sample (column 7). T-tests for the mean differences between treatment and control groups within each district, and the overall mean difference between the two districts, were performed and the test results are reported in the last three columns of each Table. We identify the cases where the difference between the mean values between groups is statistically significant at 0.1 or better by the number of asterisks (i.e., *, **, and *** for 10%, 5% and 1% of level of significance, respectively). In the appendix Tables, we further compare the mean difference between treatment and control groups for the entire sample (cols 7 and 8), as well as the mean difference between male headed and female-headed households (cols 10 and 11). Again, T-tests for the difference of mean values between the groups were performed and the corresponding results are reported in the last two columns.

The results of the baseline survey analysis (comparison between districts and between treatment and control sites within the same district as well as the pooled results by treatment status and by the gender of head as presented in Annex 3) indicates that the sample households from the two districts differ vastly and statistically significantly in most of the socioeconomic characteristics (e.g., key demographics features, access to credit, economic activities and income from different sources, consumption and expenditures, etc) as well as most of the indicators in the land modules (e.g., parcel characteristics, land markets, land investment, land conflicts, perceived impact of DUATs, etc.).

4.1 Socio-economic characteristics

4.1.1 Household demographics

Table 10 reports basic demographic characteristics of the sample households. Overall eight out of nine demographic variables are statistically significant at 1% between Cabo Delgado and Nampula. The situations are more mixed when the comparison is between the treatment and comparison groups within the same district. For example, while only one variable is statistically different within Cabo Delgado, seven (five) variables are statistically at 10% (5%) within Nampula district. The drastic difference in characteristics between the two districts implies that the evaluation should be conducted at the district level, which is the case in the design. The existence of significance differences within the same district has more important implication for our design, which we will discuss later. Further details on the summary statistics of individual variables are discussed below.

The results show that 37% households are headed by female with large and statistically significant variation between Cabo Delgado (47%) and Nampula (16%). Heads in Cabo Delgado are on average 47 years old, significantly older than those in Nampula (40 years old). The results also indicate a low level of literacy rate of household heads. On average, only 40% of household heads (32% in Cabo Delgado and 40% in the control sites) are literate. The difference in literacy between the districts is statistically significant at 1% level. And among those who ever attended school, the average years of schooling is only 4.1 years in both districts.

The average household size in the study areas and the average adult equivalence are 5 and 3.7, respectively. Both the difference in household size between the two districts (5.2 in Cabo Delgado and 4.8 in Nampula) and the difference in adult equivalent (3.9 in Cabo Delgado and 3.4 in Nampula) are statistically significant at 1% level. As in the case of household, both the share of members with income from salaried work and the share of members with income from self-employment are statistically different between the two districts at 1%.

The difference in demographic characteristics between treatment and control groups within each district is much smaller compared to the difference between districts. For example, there is no statistically significant difference between the treatment group and control group for almost all the characteristics in Cabo Delgado. While the difference in demographic characteristics between treatment group and control group in Nampula is also small in magnitude, it is statistically significant in a small number of cases. For instances, the treatment group has a significantly smaller share of households that are headed by female, and a significantly higher share of heads

that are literate than the control group and among the heads who ever completed school, the average years of schooling is significantly higher in the treatment group than in the control group.

According to Appendix Table 6, the average literacy rate of female household heads is drastically lower than that of the male-headed households (16% vs. 55%, significantly different at 1%). Female-headed households are also significantly smaller in household size than their male-headed counterparts (4.7 vs. 5.2).

Table 10: Demographic characteristics

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean | | |
|---|----------------|---------|-------|----------------|---------|-------|-------|------------------|------------------|------------|
| | Cabo Delgado | | | Nampula | | | - | Difference | | |
| | Treat- ment | Control | Total | Treat- ment | Control | Total | All | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| % female-headed | 43.2 | 49.5 | 47.2 | 13.9 | 18.7 | 15.3 | 36.8 | * | | *** |
| Age of head (years) | 46.3 | 47.8 | 47.3 | 40.4 | 38.7 | 39.9 | 44.8 | | | *** |
| Education of the head | | | | | | | | | | |
| % literate | 30.9 | 34.0 | 32.8 | 59.5 | 46.5 | 55.5 | 40.3 | *** | | *** |
| % ever in school | 51.6 | 56.4 | 54.7 | 82.0 | 75.0 | 79.9 | 62.9 | ** | | *** |
| Years of schooling completed, of those ever in school | 4.2 | 4.0 | 4.1 | 4.2 | 3.8 | 4.1 | 4.1 | ** | | |
| Household Size | 5.0 | 5.3 | 5.2 | 4.8 | 4.6 | 4.8 | 5.0 | | | *** |
| Adult Equivalent Unit (AEU) | 3.7 | 3.9 | 3.9 | 3.5 | 3.3 | 3.4 | 3.7 | * | | *** |
| % with income from salaries | 24.8 | 15.1 | 18.6 | 29.3 | 19.9 | 26.4 | 21.1 | *** | *** | *** |
| % with self-employment income | 55.8 | 56.2 | 56.1 | 26.9 | 20.6 | 25.0 | 45.9 | ** | | *** |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

4.1.2. Type of employment and income source

Rural households are in general engaged in a variety of income generating activities (Table 11). The self-employment activities are by far the most important economic activities. In addition to the crop production that involves almost all of the households (98% overall, 97% in Cabo Delgado and 97% in Nampula), the other major economic activities include, livestock production (involving 58% of households – 47% in Cabo Delgado and 82% in Nampula), cutting/collection of firewood (involving 71% of households), cutting grass/reeds, cane, palm leaves (48% households), cutting branches (22%), and fishing (23%). While the participation rate for crop production is not significantly different between the two districts, the participation rate in fishing activities is significantly higher in Cabo Delgado (25%) than in Nampula (6%), the participation rate for the other major activities (livestock production, cutting/collection of firewood, cutting grass/reeds, cane, palm leaves, and cutting branches) is significantly higher in Nampula than in Cabo Delgado. The minor self-employment activities in which households in the study areas are involved include charcoal production (7%), purchase of food products (7%), purchase and sale of fish (3%), production of home-made beverages (3%), purchase and sale of medium-sized livestock (2.4%), and handicrafts/masonry/carpentry (2%), etc. However, not all the self-employment activities directly generate income as suggested by the fact that 46% of households generated non-

agricultural self-employment income (bottom of Table 11) ranging from 25% in Nampula to 56% in Cabo Delgado.

Approximately 21% of households in the study areas generated income from salaried employment (bottom of Table 11). In terms of participation in salaried work (Table 11), the two leading salaried jobs are agricultural labor (involving 9% of households with huge and statistically significant variation between the two districts – 2% in Cabo Delgado and 23% in Nampula) and mechanic/factory/ construction work (4% varying from 6% in Cabo Delgado and 1% in Nampula). In addition, 6.5% of households (8.4% in Cabo Delgado and 3% in Nampula) participated in other types of salaried employment and 1.4% of households have at least one member working as a domestic worker. The data also indicate that 6.7% of households in the study areas received pension (9.4% in Cabo Delgado and 1.1% in Nampula), and 13% of households in both districts received transfers in cash/kind from others. Except for the received transfers in cash/kind, the difference between the two districts is statistically significant in all the major salaried income activities.

The mean difference between the treatment and control group within each district is much smaller and less significant especially for the self-employment activities. Among the 6 main self-employment activities (crop production, livestock production, cutting/collecting of firewood, cutting grass/reeds, cane, and palm leaves, cutting branches, and fishing), the mean difference between the two groups is statistically significant only in the category of cutting branches in Cabo Delgado, and in the categories of cutting/collection of firewood and cutting grass/reeds, cane, palm leaves in Nampula. Among the salaried employments, the difference is significant for both the leading categories (agricultural labor and other types of salaried worker) in both districts. For example in Nampula where agricultural labor market is more active in general, the percentage of households with at least one members working as agricultural labor is 25% in the treatment group than 19% in the control group.

In terms of the gender of household heads, female-headed households are less active in majority of the self-employment and salaried work activities (though statistically insignificant for majority of the man categories except cutting branches). Female-headed households are also significantly less active in agricultural labor work (5% relative to 11% for male-headed households). On the other hand, the share of households receiving pension or remittance is higher for female-headed households than for male-headed households. While the difference is statistically significant in the case of remittance (5% level), the difference is statistically insignificant in the case of pension.

Table 11: Percentage of households reporting income from different sources and type of economic activity

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean difference | | |
|--|--------------|---------|-------|------------|---------|-------|-------|-----------------------------|--------|--------|
| | Cabo Delgado | | | Nampula | | | - | (1) | (4) | (3) |
| | Treat-ment | Control | Total | Treat-ment | Control | Total | All | vs (2) | vs (5) | vs (6) |
| % who had crop production | 99.3 | 95.9 | 97.1 | 99.8 | 99.7 | 99.8 | 98.0 | | | |
| % that raised any livestock ¹ | 47.0 | 46.6 | 46.8 | 79.6 | 87.7 | 82.1 | 58.3 | *** | | *** |
| % who sold livestock, milk, or eggs | 27.2 | 26 | 26.4 | 57.6 | 58.2 | 57.8 | 36.7 | | | |
| Remittances and pensions | | | | | | | | | | |
| % that received transfers in cash/kind | 12.3 | 13.8 | 13.3 | 14.0 | 10.1 | 12.8 | 13.1 | | | |
| % that sent cash transfers | 4.6 | 5.2 | 5.0 | 8.7 | 8.2 | 8.5 | 6.2 | | | ** |
| % that sent inkind transfers | 13.5 | 15.1 | 14.5 | 28.3 | 21.8 | 26.3 | 18.4 | * | | *** |
| % that received pensions | 8.6 | 9.9 | 9.4 | 1.5 | 0.3 | 1.1 | 6.7 | * | | *** |
| Salaried employment, % of households with members working as | | | | | | | | | | |
| Agricultural laborer | 4.9 | 0.5 | 2.1 | 24.5 | 18.7 | 22.8 | 8.8 | *** | * | *** |
| Migrant worker | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Teacher, health worker | 0.5 | 0.5 | 0.5 | 1.1 | 0.0 | 0.8 | 0.6 | | ** | |
| Mechanic, factory/construction worker | 4.1 | 6.4 | 5.6 | 1.2 | 0.6 | 1.1 | 4.1 | | | *** |
| Manager, accountant, secretary | 0.6 | 0.0 | 0.2 | 0.0 | 0.3 | 0.1 | 0.2 | * | | |
| Domestic worker | 3.4 | 1.0 | 1.9 | 0.7 | 0.0 | 0.5 | 1.4 | ** | * | ** |
| Forestry worker | 0.6 | 0.2 | 0.4 | 0.0 | 0.0 | 0.0 | 0.2 | | | * |
| Other types of salaried worker | 11.1 | 6.9 | 8.4 | 3.6 | 0.6 | 2.7 | 6.5 | * | *** | *** |
| Self-employment: % engaging in activities related to flora and fauna | | | | | | | | | | |
| Cutting/collection of firewood | 67.9 | 63.5 | 65.1 | 78.1 | 98.7 | 84.4 | 71.4 | | *** | *** |
| Charcoal production | 17.5 | 5.9 | 10.1 | 0.0 | 0.0 | 0.0 | 6.8 | *** | | *** |
| Cut grass/reeds, cane, palm leaves | 45.1 | 39.2 | 41.3 | 57.8 | 69.0 | 61.2 | 47.8 | | *** | *** |
| Cut branches | 20.5 | 14.2 | 16.4 | 32.8 | 37.7 | 34.3 | 22.3 | * | | *** |
| Collect honey, bush plants/fruits, eggs of wild animals | 0.8 | 1.6 | 1.3 | 3.2 | 1.0 | 2.5 | 1.7 | | ** | |
| Hunting | 0.6 | 0.0 | 0.2 | 4.8 | 3.8 | 4.5 | 1.6 | ** | | *** |
| Fishing | 21.9 | 26.3 | 24.7 | 5.7 | 6.7 | 6.0 | 18.6 | | | *** |
| Wood production | 0.4 | 0.8 | 0.6 | 1.1 | 0.0 | 0.8 | 0.7 | | ** | |
| Catching birds and reptiles | 0.8 | 0.5 | 0.6 | 2.3 | 3.8 | 2.7 | 1.3 | | | *** |
| Self-employment: % engaging in other activities | | | | | | | | | | |
| Production of home-made beverages | 0.7 | 0.7 | 0.7 | 7.4 | 7.9 | 7.6 | 3.0 | | | *** |
| Purchase and sale of beverages | 0.4 | 2.1 | 1.5 | 0.7 | 1.0 | 0.8 | 1.3 | * | | |
| Purchase and sale of food products | 4.3 | 9.0 | 7.3 | 6.6 | 3.8 | 5.8 | 6.8 | ** | * | |
| Purchase and sale of nonfood products | 0.6 | 0.0 | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 | * | | |
| Purchase and sale of fish | 2.0 | 4.7 | 3.8 | 1.7 | 1.9 | 1.8 | 3.1 | | | * |
| Purchase/sale of large-sized livestock and by-products | 0.2 | 0.0 | 0.1 | 0.3 | 0.0 | 0.2 | 0.1 | | | |
| Purchase and sale of medium-sized livestock and its by-products | 1.8 | 4.3 | 3.4 | 0.2 | 0.6 | 0.4 | 2.4 | | | *** |
| Purchase and sale of small-sized livestock and by-products | 0.0 | 0.5 | 0.3 | 0.0 | 0.0 | 0.0 | 0.2 | | | |
| Handicrafts/masonry/carpentry | 2.6 | 0.7 | 1.4 | 3.0 | 2.5 | 2.9 | 1.9 | ** | | * |
| Tailoring/dressmaking | 0.3 | 1.3 | 0.9 | 1.0 | 1.0 | 1.0 | 1.0 | | | |
| Radio/bike repair | 0.2 | 0.2 | 0.2 | 0.2 | 0.6 | 0.4 | 0.3 | | | |
| Bricks production, bricklaying | 1.1 | 0.2 | 0.6 | 1.2 | 0.0 | 0.9 | 0.7 | | | |
| Milling or agro-processing | 0.0 | 0.0 | 0.0 | 0.8 | 0.6 | 0.7 | 0.2 | | | |
| Other activity | 3.1 | 4.2 | 3.8 | 0.9 | 0.6 | 0.8 | 2.8 | | | *** |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

4.1.3 Non-land family assets

Rural households in Cabo Delgado and Nampula are poor households who own very few assets that are of low value (Table 12). The seven leading assets (in the order of abundance) are beds (41%), radio (40%), bicycle (31%), motorized vehicle (12%), charcoal iron (12%), cellphones (10%) and watches/clocks (10%). While the percentage of households owning radios, bicycles and motorized vehicles is significantly higher in the Nampula district (60%, 51% and 21%, respectively) than in the Cabo Delgado district (17%, 35%, and 7%, respectively), the reverse is true in the case of beds, charcoal irons, and cellphones. The drastic difference in cellphone ownership between the two districts is quite surprising. Only 5% households in the entire sample own TV, 2% own sewing machines and 1% each owned electric fans and freezers. Washing machines and air condition units are not even present.

For the majority of assets, the difference between treatment and control areas within the same district is generally small and insignificant. Among the seven leading assets, the difference is significant only for bicycle in the case of Cabo Delgado (14% in the treatment group vs. 19% in the control group) and only for bed in the case of Nampula (32% in the treatment group and 21% in the control group).

The analysis by head's gender yield more mixed results (Appendix Table 8). While there is a large and statistically significant ownership difference in the case of radios (49% of male-headed households versus 25% of female-headed households), bicycles (41% versus 14%) and motorized bicycles (16% versus 5%), the difference is extremely small and insignificant in the case of beds (41% versus 43%), charcoal irons (13% versus 11%), and cellphones (10% vs. 9%).

Table 13 reports the number and value of purchased assets. Overall, an average household in the study areas owned 2.6 purchased assets, with 0.4 recently purchased. While the number of total purchased assets is significantly larger in the Cabo Delgado district than in the Nampula district (2.7 vs. 2.3), both the number of recently purchased assets and the average value of the recent purchase in the Nampula district (0.6 with a total value of 1997 MT) is significantly bigger than those in the Cabo Delgado district with the two corresponding figures are 0.3 and 709 MT. The difference between treatment and control groups within the same district is smaller and in almost all cases insignificant. Male headed households not only accumulated more purchased assets (2.9 vs. 2.1), but the number and value of recently purchased assets is much bigger than those accumulated by the female-headed households. All the differences are statistically significant between male headed and female-headed households.

Table 12: Percentage of households owing various assets, by district and gender of the head

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean difference | | |
|----------------------------------|----------------|---------|-------|----------------|---------|-------|-------|-----------------------------|-----------|-----------|
| | Cabo Delgado | | | Nampula | | | - | (1) | (4) | (3) |
| | Treat- ment | Control | Total | Treat- ment | Control | Total | All | vs (2) | vs (5) | vs (6) |
| Car purchased brand new | 0.0 | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 | 0.1 | | | |
| Car purchased secondhand | 0.6 | 0.0 | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 | | | |
| Motorized vehicle | 5.3 | 8.1 | 7.1 | 19.5 | 24.7 | 21.1 | 11.7 | | | *** |
| Bicycle | 13.7 | 19.3 | 17.3 | 59.1 | 62.7 | 60.2 | 31.4 | * | | *** |
| Radio | 33.9 | 35.0 | 34.6 | 49.0 | 54.7 | 50.8 | 39.9 | | | *** |
| Music equipment | 4.4 | 6.6 | 5.8 | 8.1 | 15.8 | 10.5 | 7.3 | | *** | *** |
| Television | 6.9 | 6.4 | 6.6 | 1.6 | 4.1 | 2.4 | 5.2 | ** | | *** |
| Washing machine | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Ari conditioner | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Sewing machine | 0.7 | 3.8 | 2.7 | 2.4 | 3.5 | 2.7 | 2.7 | ** | | |
| Refrigerator | 0.3 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | | | |
| Freezer | 2.0 | 1.9 | 1.9 | 0.0 | 0.0 | 0.0 | 1.3 | | | *** |
| Electric iron | 1.1 | 0.2 | 0.5 | 0.0 | 0.0 | 0.0 | 0.4 | | | ** |
| Charcoal iron | 13.6 | 14.3 | 14.1 | 7.8 | 7.6 | 7.7 | 12.0 | | | *** |
| Electric fan | 1.5 | 1.4 | 1.5 | 1.0 | 0.0 | 0.7 | 1.2 | | ** | |
| Bed | 45.7 | 48.7 | 47.6 | 32.0 | 21.2 | 28.7 | 41.4 | | *** | *** |
| Telephone equipment | 0.8 | 0.7 | 0.8 | 0.2 | 0.3 | 0.3 | 0.6 | | | * |
| Cellphones | 13.0 | 14.6 | 14.0 | 2.5 | 1.6 | 2.2 | 10.2 | | | *** |
| Computer | 0.3 | 0.0 | 0.1 | 0.2 | 0.0 | 0.2 | 0.1 | | | |
| Printer | 0.0 | 0.0 | 0.0 | 0.7 | 0.3 | 0.6 | 0.2 | | | ** |
| Watches/clocks | 10.4 | 10.1 | 10.2 | 11.0 | 11.7 | 11.2 | 10.5 | | | |
| Electric stove | 0.6 | 0.0 | 0.2 | 0.2 | 0.0 | 0.2 | 0.2 | | | |
| Gas stove | 0.3 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | | | |
| Stove 'mixed' | 2.0 | 2.0 | 2.0 | 0.0 | 0.0 | 0.0 | 1.3 | | | *** |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table 13: Average number and value of purchased assets per household

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean difference | | |
|---|----------------|---------|-------|----------------|---------|-------|-------|-----------------------------|-----------|-----------|
| | Cabo Delgado | | | Nampula | | | - | (1) | (4) | (3) |
| | Treat- ment | Control | Total | Treat- ment | Control | Total | All | vs (2) | vs (5) | vs (6) |
| Number of assets owned | 2.4 | 2.9 | 2.7 | 2.2 | 2.5 | 2.3 | 2.6 | * | | ** |
| Number of new assets owned | 0.3 | 0.2 | 0.3 | 0.6 | 0.6 | 0.6 | 0.4 | | | *** |
| Total value of new assets (mt) ^a | 539 | 804 | 709 | 2094 | 1776 | 1997 | 1131 | | | *** |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

^a This is the total value of new assets, not value of per asset. For example, in column 1, 539 mt is for the 0.3 units of new assets owned.

4.1.4. Livestock assets

For rural households in Mozambique, livestock ownership is not only an important income generating activity, but also an important livelihood quality indicator. The baseline survey data show that 58% of households in the study areas raised livestock in the past 12 months (Table 14). The most important livestock is chickens, involving almost half of the households. The rest of livestock concentrates on three animals: ducks (15%), goats (8.5%), and pigs (8.4%). The share of households raising any livestock during the past 12 months is significantly higher in the Nampula district (82%) than in the Cabo Delgado district (47%). This pattern is also true for three of the four main animals. For example, the share of households raising any of the other three main animals is significantly higher in Nampula (chicken - 76%, goats - 14%, pigs - 26%) than in Cabo Delgado (37%, 6% and 0%, respectively).

The comparison between the treatment group and control group within the same district gives two different pictures across the district. While the difference is not significant for any animal in Cabo Delgado, the difference is statistically significant in three of the four main animals in Nampula. The share of households raising chickens or pigs in the control group is 81% (or 36%), which is significantly larger than that in the treatment group - 74% (or 21%). On the other hand, the share of households raising goats is significantly higher in the treatment group than in the control group (19% vs 4%). Of those who raised animals in the past 12 months, 40% of them were involved in selling slaughtered animals and 17% sold live animals without significant difference across districts or between treatment and control sites within each district.

The proportion of households that sold either slaughter animals or live animals is significantly higher in Nampula (43%) than in Cabo Delgado (37%). The difference in animal raising and animal selling is small and not statistically significant between treatment and control groups within each of the two districts. Finally, the share of households who were involved in livestock activities in the past 12 months is significantly higher among male-headed households (66%) than female-headed households (45%). Except for ducks where the share is not significantly different, the share is significantly higher for male-headed households for all the remaining three main animals.

Table 14: Production and sales of livestock and sub-products in the last 12 months

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean | | |
|--|----------------|---------|-------|----------------|---------|-------|------|------------------|------------------|------------------|
| | Cabo Delgado | | | Nampula | | | - | Difference | | |
| | Treat- ment | Control | Total | Treat- ment | Control | Total | All | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| % that raised any livestock ¹ | 47.0 | 46.6 | 46.8 | 79.6 | 87.7 | 82.1 | 58.3 | *** | *** | *** |
| <i>% by animal ^a</i> | | | | | | | | | | |
| Cattle | 0.2 | 0.0 | 0.1 | 0.9 | 0.3 | 0.7 | 0.3 | | | ** |
| Goats | 4.2 | 6.4 | 5.6 | 18.7 | 4.4 | 14.4 | 8.5 | *** | *** | *** |
| Sheep | 0.5 | 0.5 | 0.5 | 0.0 | 0.0 | 0.0 | 0.3 | | | |
| Pigs | 0.0 | 0.0 | 0.0 | 20.9 | 35.8 | 25.5 | 8.4 | *** | *** | *** |
| Donkeys | 0.3 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | | | |
| Chickens | 34.9 | 37.4 | 36.5 | 73.8 | 80.7 | 75.9 | 49.4 | ** | *** | *** |
| Rabbits | 0.3 | 0.0 | 0.1 | 0.7 | 1.6 | 1.0 | 0.4 | | | ** |
| Ducks | 22.5 | 20.2 | 21.0 | 1.5 | 3.2 | 2.0 | 14.8 | | | *** |
| Geese | 0.0 | 0.7 | 0.5 | 0.0 | 0.3 | 0.1 | 0.3 | | | |

Table 14: Production and sales of livestock and sub-products in the last 12 months

| | | | | | | | | |
|---|------|------|------|------|------|------|-------|-----|
| Turkeys | 0.3 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | |
| Guinea Fowl | 0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | |
| <i>Households raising animals*:</i> | | | | | | | | |
| Average tropical livestock units | 0.13 | 0.13 | 0.1 | 0.28 | 0.26 | 0.3 | 0.20 | *** |
| % selling live animals | 20.5 | 15.9 | 17.5 | 16.6 | 14.4 | 15.9 | 16.8 | |
| % that slaughtered animals for sale or consumption | 40.8 | 34.3 | 36.6 | 44.5 | 40.8 | 43.3 | 39.7 | * |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | |

¹excluding donkeys.

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

a All the percentages for individual animals are based on the total households surveyed.

4.1.5. Access to Credit

Consistent with the urban baseline survey report (Maredia et al. 2012a), access to formal credit is extremely rare (Table 15). Overall, only 4.1% of households in the study areas (4.7% in Cabo Delgado and 2.8% in Nampula) have applied for any formal credit in the past 12 months. Of those who applied, agricultural production is reported as the single most important reason for the loan application (66%), which is compared to other reasons such as consumption (6%) and others (24%). For the majority of households that did not apply for credit, the four leading reasons include “lack of access” (41%), “do not want to have debt” (22%), “concerned about not being accepted” (16%) and “no need” (9%).

The difference in the incidence of loan application is in general quite small and insignificant in most of cases between the two districts. While cross district comparison on reasons for not applying for credit indicates that the four leading reasons for the entire sample remain the most important reasons in both districts, the relative importance varies across districts. Except for “no need”, the difference is statistically significant at 1% for three other reasons. “Lack of access” again is identified as the most important reason in Cabo Delgado (36%) and in Nampula (51%). While the second most important reason is “do not want to have debts” in Cabo Delgado (28%), it is “concerned about not being accepted” in the district of Nampula (22%).

There is no significant difference in the incidence of applying credit, and the reasons for applying between the treatment and control groups within each district. The difference in reasons for not applying for credit between the treatment and control groups is more mixed. The proportion of households identifying “no need” or “do not want to have debt” as the main reasons for not applying is significantly different between treatment and control groups in Cabo Delgado. In Nampula, the difference is statistically significant in the case of “Lack of access” and “do not want to have debt”. Finally, in terms of gender comparison, there is no significant difference in the incidence of borrowing, and the reasons for applying between the male-headed households and female-headed households. While there are significantly more male-headed households that indicated “lack of access” as the reason for not applying for credit than female-headed households (43% vs. 36%), a significantly higher proportion of female-headed households indicates “don’t want to have debts” as the reason for not applying (29% vs. 17%). The gender difference is not

significant for other reasons. The sources of credit is reported in bottom panel of Table 15. Given the extremely small number of incidents of borrowing, it is not really meaningful to discuss the figures in detail.

Table 15: Access to credit in the last 12 months

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean difference | | |
|--|---------------------|---------|-------|----------------|---------|-------|-------|-----------------------------|------------|------------|
| | Cabo Delgado | | | Nampula | | | - | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| | Treat-ment | Control | Total | Treat-ment | Control | Total | All | | | |
| % of households that applied for credit in the past 12 months | 4.3 | 5.0 | 4.7 | 2.6 | 3.2 | 2.8 | 4.1 | | | * |
| <i>Of those that did apply, reason for applying (%)</i> | | | | | | | | | | |
| Food consumption | 0.0 | 6.2 | 4.6 | 0.0 | 27.3 | 10.1 | 5.6 | | * | |
| Agriculture | 53.7 | 71.8 | 67.2 | 69.6 | 45.5 | 60.6 | 66.0 | | | |
| Health | | | | 0.0 | 9.1 | 3.4 | 0.6 | | | |
| Purchase of assets | 3.3 | 0.0 | 0.8 | 8.7 | 18.2 | 12.2 | 2.8 | | | |
| Travel | | | | 8.7 | 0.0 | 5.5 | 1.0 | | | |
| Other | 43.0 | 22.1 | 27.4 | 13.1 | 0.0 | 8.2 | 24.0 | | | * |
| <i>Of those that did not apply, reason did not apply (%)</i> | | | | | | | | | | |
| No need | 13.9 | 7.4 | 9.8 | 8.3 | 8.2 | 8.3 | 9.3 | ** | | |
| Was refused | 3.5 | 1.1 | 2.0 | 2.3 | 2.0 | 2.2 | 2.1 | ** | | |
| Lack of access | 31.8 | 38.1 | 35.8 | 48.5 | 55.6 | 50.6 | 40.7 | | * | *** |
| Concerned about not being | | | | | | | | | | |
| Accepted | 14.9 | 12.2 | 13.2 | 22.3 | 19.9 | 21.6 | 16.0 | | | *** |
| Lack of collateral | 2.7 | 3.4 | 3.2 | 2.3 | 4.2 | 2.9 | 3.1 | | | |
| High transaction costs | 0.2 | 0.8 | 0.6 | 1.3 | 0.0 | 0.9 | 0.7 | | ** | |
| Do not want to offer collateral | 0.8 | 0.8 | 0.8 | 0.7 | 3.3 | 1.5 | 1.0 | | | |
| Do not want to have debts | 22.5 | 30.3 | 27.5 | 11.0 | 6.9 | 9.7 | 21.6 | ** | * | *** |
| Other | 9.6 | 5.8 | 7.2 | 2.5 | 0.0 | 1.8 | 5.4 | * | *** | *** |
| Received cred the past year | 0.2 | 0.0 | 0.1 | 0.8 | 0.0 | 0.6 | 0.2 | | * | |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | | |
| <i>Distribution of credit applications by source of credit (%)</i> | | | | | | | | | | |
| Government | | 90.6 | 100.0 | 97.6 | 43.5 | 18.2 | 34.1 | 86.4 | * | |
| Banks | | | | | 13.1 | 9.1 | 11.6 | 2.0 | | |
| Associations | | | | | 0.0 | 9.1 | 3.4 | 0.6 | | |
| Traders/Businessman | | | | | 8.7 | 0.0 | 5.5 | 1.0 | | |
| Relatives | | | | | 26.0 | 45.5 | 33.3 | 5.9 | | *** |
| Friends | | 9.4 | 0.0 | 2.4 | 8.7 | 18.2 | 12.2 | 4.1 | | |
| Unweighted N of Credit Applications | | 23 | 20 | 43 | 10 | 11 | 21 | 64 | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Of the 56 households who applied for credit in the past 12 months, the average total amount of credit requested per household is MT 73,851 or US\$ 2,436 (Table 16). Only 3.8% of households

who applied for loan present any collateral. Less than half of the applicants (40.2%, equivalent to 27 households) eventually received loans with the average amount of loan received being MT 1,024 (or US\$965). The average time to repay the credit is 1.4 years (0.5 years in Nampula and 1.7 years in Cabo Delgado). Of the 29 households who were denied credit, majority of them select “other reasons” (without specification of reasons) as the main reasons for rejection, 10% considered “insufficient collateral” and 4.5% “insufficient income” as the main reasons. Except for the reasons of rejection where the difference between the treatment and control sites in Cabo Delgado is statistically significant, the difference between treatment and control sites in either Cabo Delgado or Nampula is generally insignificant. The difference is generally more distinct across the two districts and the difference is also statistically significant in the amount of credit receive as well as in the reasons for rejection. There is also very little and mostly insignificant difference between male-headed and female-headed households in the amount of credit requested, amount of credit received and reasons for rejection (Appendix Table 12).

Table 16: Amount requested and accessed per household and reasons for not accessing credit

| | (1) Cabo Delgado | | | (4) Nampula | | | (7) All | Testing for mean difference | | |
|---|------------------|---------|--------|-------------|---------|--------|---------|-----------------------------|------------|------------|
| | Treat-ment | Control | Total | Treat-ment | Control | Total | | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| % of households that applied for credit in the past 12 months | 4.3 | 5.0 | 4.7 | 2.6 | 3.2 | 2.8 | 4.1 | | | * |
| <u>Of those who applied (unweighted N=56)</u> | | | | | | | | | | |
| Average total amount requested per household (MT) | 63,414 | 88,055 | 79,963 | 63,674 | 31,285 | 52,346 | 73,851 | | | |
| Average total amount requested per household (\$US) | 2,039 | 2,831 | 2,571 | 2,385 | 1,172 | 1,961 | 2,436 | | | |
| Median total amount requested per household (\$US) | 1286 | 1608 | 1415 | 375 | 37 | 375 | 1286 | | | |
| % of households that had to present any collateral | 0.0 | 4.9 | 3.3 | 8.7 | 0.0 | 5.6 | 3.8 | | | |
| % of households that present animals as collateral | 0.0 | 0.0 | 0.0 | 8.7 | 0.0 | 5.6 | 1.3 | | | |
| % of households that present other items as collateral | 0.0 | 4.9 | 3.3 | 0.0 | 0.0 | 0.0 | 2.6 | | | |
| % that received credit | 62.9 | 24.1 | 36.9 | 47.8 | 60.0 | 52.1 | 40.2 | | | |
| <u>Of those who received credit (unweighted N=27)</u> | | | | | | | | | | |
| Average amount received per household (\$US) | 1,109 | 1,713 | 1,374 | 243 | 18 | 152 | 1,024 | | | *** |
| Median amount received per household (\$US) | 643 | 1,286 | 1,286 | 37 | 13 | 37 | 965 | | | |
| Average amount to repay per household (\$US) | 1,281 | 1,873 | 1,542 | 294 | 18 | 183 | 1,152 | | | *** |
| Median amount to repay per household (\$US) | 804 | 1,447 | 1,447 | 37 | 13 | 37 | 1,093 | | | |
| Average time to repay the credit (yrs) | 1.3 | 2.2 | 1.7 | 0.6 | 0.5 | 0.5 | 1.4 | | | *** |
| <u>Of those who were denied credit (unweighted N=29)</u> | | | | | | | | | | |
| % of households by reason credit denied | | | | | | | | | | |

| | | | | | | | | | |
|----------------------------------|------|-------|------|------|------|------|-------|----|-----|
| Insufficient income | 28.2 | 0.0 | 5.5 | 0.0 | 0.0 | 0.0 | 4.5 | * | |
| Insufficient collateral | 0.0 | 0.0 | 0.0 | 66.8 | 25.0 | 54.6 | 9.7 | | *** |
| Other reasons, | 62.4 | 100.0 | 92.7 | 33.2 | 75.0 | 45.4 | 84.3 | ** | ** |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

4.2 Land ownership, land markets and perceived tenure security

Respondents were asked a detailed set of questions on land assets that includes number of parcels, parcel characteristics in terms of size, use type, model of acquisition, cost of transaction, lease documents, market participation, land value, land investment, perception about land tenure security, etc. As there are very few formal transactions in rural areas, the results on transactions largely focuses on informal/customary land transactions. This section summarizes the main findings on all these aspects.

4.2.1 Land profile in terms of number of plots, size, use and ownership status

Table 17 summarizes the inventory of land parcels owned and/used by the 1,417 households surveyed in the Cabo Delgado and Nampula districts and between treatment and control sites within each district. The parcels are divided into three categories: (1) those owned and in household's possession (4,224); (2) those owned but rented out to others (250); and (3) those rented in from others (742).⁶ As expected, majority of the 4,224 parcels in the first category are agricultural parcels (2,931), and the rest parcels are distributed between residence (1,121) and others (172). More parcels are possessed by households in the treatment sites (2,493) than in the control sites (1,731). While the number of sample households is similar between the two districts, households in Nampula possess more parcels than those in the Cabo Delgado district (2,422 vs. 1,802). This is also true for both the residential and agricultural parcels. It seems that the difference of number of parcels between the treatment and control sites mainly reflects the difference in sample size. By gender of household head, 75% of the parcels (or 3,035) are in the possession of male-headed households. The pattern is consistent for both the agricultural parcels and residential parcels.

Of the 250 parcels that were rented out, 169 parcels are used for agricultural purpose, and 78 for residential purpose, and the remaining 3 for other use. Of the 742 parcels rented-in from others, the number of parcels is almost evenly split between the residential use and agricultural use. In terms of location between the two districts, a large share of parcels that either rented out or rented in are located in the Cabo Delgado district (173 and 557 for rent-out, and rent-in respectively) than in the Nampula district (77 and 185, respectively). The relatively larger number of parcels rented-in or out in the Cabo Delgado district relative to the Nampula district suggest that the rental market is much more active in Cabo Delgado than in Nampula. In terms of distribution between use types (residential and agricultural use), while the case of rented-out parcels is similar to the case of parcels owned and in household's possession, the rented-in parcels are almost evenly distributed

⁶ While the total number of parcel stock including parcels owned but rented out is 4474, 24 parcels have no document information. As a result, only the 4450 parcels (4224 owned and in household's possession and 250 owned but rented out) with document information are used in most of the parcel level analyses.

between residential parcels (365) and agricultural parcels (370). In the district of Cabo Delgado, the number of rented-in residential parcels (329) is bigger than that of rented-in agricultural parcels (221). In Nampula, however, the number of rented-in agricultural parcels (149) is much bigger than residential parcels (36).

Table 17: Number of parcel by type of use and by rental status

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|--|---------------------|---------|-------|----------------|---------|-------|-------|
| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | - |
| | Treat- ment | Control | Total | Treat- ment | Control | Total | All |
| <i>Owned and in household's possession</i> | 1,141 | 661 | 1,802 | 1,352 | 1,070 | 2,422 | 4,224 |
| Residential | 240 | 191 | 431 | 391 | 299 | 690 | 1,121 |
| Agricultural Parcels ⁷ | 827 | 429 | 1,256 | 932 | 743 | 1,675 | 2,931 |
| Others ⁸ | 74 | 41 | 115 | 29 | 28 | 57 | 172 |
| | | | | | | 0 | |
| <i>Rented-Out</i> | 89 | 84 | 173 | 50 | 27 | 77 | 250 |
| Residential | 33 | 35 | 68 | 9 | 1 | 10 | 78 |
| Agricultural Parcels | 53 | 49 | 102 | 41 | 26 | 67 | 169 |
| Others | 3 | 0 | 3 | | | 0 | 3 |
| | | | | | | 0 | |
| <i>Rented-In</i> | 407 | 150 | 557 | 102 | 83 | 185 | 742 |
| Residential | 249 | 80 | 329 | 21 | 15 | 36 | 365 |
| Agricultural Parcels | 153 | 68 | 221 | 81 | 68 | 149 | 370 |
| Others | 5 | 2 | 7 | | | 0 | 7 |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table 18 reports the number of parcels owned and rented and distribution by major land use type in both the treatment and control groups, in both districts and by the gender of household heads. An average household in the sample has access to 3.6 parcels (1.1 residential vs. 2.5 agricultural parcels) with 2.8 parcels in owner's possession, 0.2 parcels being rented out to others and also 0.6 parcels rented in from others. The average declared land size varies considerably with parcel type and use. The declared size of agricultural parcels in owner's possession is 0.96 ha, slightly smaller than those being rented out to others (1.07 ha), but bigger than the parcels rented in from others (0.78 ha). Not surprisingly, the agricultural parcels are a lot bigger than the residential plots (0.96 vs. 0.17 ha). While the number of parcels currently in owner's possession is significantly larger in Nampula (3.4) than in Cabo Delgado (2.6), the opposite is true in the case of parcel either rented-out or rented-in (significant in both cases). While the residential parcels in Nampula is slightly bigger than those in Cabo Delgado (0.17 ha vs. 0.14 ha), the size of agricultural parcels in the two districts are not significantly different.

Further analyses by comparison between treatment and control sites within the same district suggest some heterogeneity in the size of parcels across treatment status for certain use types. Although the difference in land size between treatment and control sites in Cabo Delgado is

⁷ Only two commercial plots. Results do not change whether they are included or not.

⁸ They include 2 commercial parcels, 151 parcel not used, 16 parcels with missing information and 2 cannot be specified. The 3 "other" parcels under the rented-out panel are the 3 parcels that are not used. And the 5 "other" parcels under the rented-in panel include 4 parcels that were not used and 1 parcel that were not specified.

statistically significant for most of the use types, the magnitude of difference is generally small (e.g., 0.15 vs 0.13 ha for residential land in own possession or 1.01 ha vs 0.98 ha for agricultural parcels in own possession). As for Nampula, the difference between treatment group and control groups are even smaller. The difference for the two major types of land (i.e., residential parcels in own possession or agricultural parcels in own possession) is not significant between the treatment and control groups. It is interesting to note that a significant proportion of parcels in both districts are either owned or managed by women. In fact, more parcels (both residential and agricultural) in Cabo Delgado are managed by women than men (52% in the cases of residential and the agricultural parcels). Though not as large as in Cabo Delgado, 30% of residential parcels and 25% agricultural parcels in Nampula are owned/managed by women. The proportion of parcels owned or managed by gender is not significantly different between the treatment and control groups within the same district.

Table 18: Number and size of land parcels by land use

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Testing for mean Difference | | |
|---|--------------|---------|--------|-----------|---------|--------|--------|-----------------------------|------|------|
| | Cabo Delgado | | | Nampula | | | | | | |
| | Treatment | Control | Total | Treatment | Control | Total | Total | 1vs2 | 4vs5 | 3vs6 |
| Residential | | | | | | | | | | |
| Owned | 0.15 | 0.13 | 0.14 | 0.21 | 0.17 | 0.20 | 0.17 | ** | | *** |
| obs. | (237) | (188) | (425) | (380) | (298) | (678) | (1103) | | | |
| Rented-out | 0.77 | 0.57 | 0.61 | 0.54 | 0.06 | 0.50 | 0.61 | * | * | |
| obs. | (33) | (35) | (68) | (6) | (1) | (7) | (75) | | | |
| Rented-in | 0.13 | 0.11 | 0.12 | 0.09 | 0.11 | 0.09 | 0.12 | *** | * | *** |
| obs. | (249) | (80) | (329) | (21) | (15) | (36) | (365) | | | |
| N parcels | 519 | 303 | 822 | 407 | 314 | 721 | 1,543 | | | |
| Gender of the owner/manager (5 parcels with no information on gender information) | | | | | | | | | | |
| Male | 260 | 132 | 392 | 299 | 202 | 501 | 893 | | | |
| Female | 257 | 171 | 428 | 106 | 111 | 217 | 645 | | | |
| % owned/managed by female | 49.71 | 56.44 | 52.20 | 26.17 | 35.46 | 30.22 | 41.94 | | | |
| Agricultural | | | | | | | | | | |
| Owned | 1.01 | 0.97 | 0.99 | 0.90 | 0.97 | 0.92 | 0.96 | ** | | |
| Obs | (818) | (418) | (1236) | (907) | (738) | (1645) | (2881) | | | |
| Rented-out | 1.12 | 1.04 | 1.06 | 1.02 | 1.37 | 1.12 | 1.07 | | | |
| Obs | (52) | (46) | (98) | (38) | (26) | (64) | (162) | | | |
| Rented-in | 0.60 | 0.96 | 0.81 | 0.64 | 0.76 | 0.68 | 0.78 | ** | *** | |
| Obs | (153) | (67) | (220) | (80) | (68) | (148) | (368) | | | |
| N parcels | 1,023 | 531 | 1,554 | 1,025 | 832 | 1,857 | 3,411 | | | |
| Gender of the owner/manager (19 parcels with no information on gender) | | | | | | | | | | |
| Male | 493 | 247 | 740 | 802 | 574 | 1,376 | 2,116 | | | |
| Female | 529 | 284 | 813 | 211 | 252 | 463 | 1,276 | | | |
| % owned/managed by female | 51.76 | 53.48 | 52.35 | 20.83 | 30.51 | 25.18 | 37.62 | | | |

Note: Excluded 60 parcels with official DUATs and 10 large parcels (> 7 ha)

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Note: Number of observations in parenthesis.

4.2.2. Characteristics of residential parcels

The baseline survey collected detailed information on residential parcels in terms of access to water, roads, electricity, telecommunication services, etc. The descriptive findings on these variables are reported on Table 19. The descriptive results indicate that the three most important water sources are public fountain (64%), river/lake (19%) and private well (13%). Unlike in the urban areas where 59% of residential parcels are connected to tap water (Maredia et al. 2012a), tap water is extremely rare (1%). While river/lake and private well is significantly more important in terms of abundance in Nampula district (62% and 31%, respectively) than in the Cabo Delgado district (1% and 6%), the public fountain is overwhelmingly and significantly more important in Cabo Delgado (89%) than in Nampula (4%). In terms of comparison between treatment and control sites within each district, the two districts behave very differently. While there is no significant difference in any of the water sources in the Cabo Delgado district, the difference is statistically significant for all three major water sources. Specifically, private well and river/lake are more important in the treatment site, public fountain is more important in the control site.

Table 19: Access to utility and infrastructure in parcels used for residence purpose¹

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean difference | | |
|---|---------------------|---------|-------|----------------|---------|-------|------|-----------------------------|------------|------------|
| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | All | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| | Treat-ment | Control | Total | Treat-ment | Control | Total | All | | | |
| <i>% distribution of parcels by source of water most used in the parcels</i> | | | | | | | | | | |
| Tap | 0.4 | 1.5 | 1.1 | 0.0 | 0.3 | 0.1 | 0.8 | | | ** |
| Borehole | 2.5 | 2.5 | 2.5 | 1.1 | 2.2 | 1.4 | 2.2 | | | |
| Well private | 4.9 | 5.5 | 5.3 | 32.9 | 27.7 | 31.4 | 13.1 | | | *** |
| Public fountain | 90.9 | 89.2 | 89.8 | 5.4 | 1.0 | 4.1 | 64.0 | *** | *** | *** |
| River/lake | 0.8 | 0.0 | 0.3 | 58.6 | 68.8 | 61.6 | 18.8 | * | *** | *** |
| Other | 0.3 | 0.0 | 0.1 | 2.0 | 0.0 | 1.4 | 0.5 | *** | | ** |
| Did not indicate | 0.3 | 1.4 | 1.0 | | | | 0.7 | | | |
| <i>% distribution of parcels by route of access most used to reach the parcel</i> | | | | | | | | | | |
| Primary road | 13.5 | 12.7 | 13.0 | 4.5 | 0.0 | 3.1 | 10.0 | *** | *** | *** |
| Secondary road | 53.8 | 50.2 | 51.4 | 9.5 | 2.2 | 7.3 | 38.1 | *** | *** | *** |
| Tertiary road | 22.4 | 18.0 | 19.5 | 24.3 | 22.3 | 23.7 | 20.8 | | | * |
| Unpaved road | 9.7 | 17.8 | 15.0 | 28.1 | 30.3 | 28.7 | 19.1 | *** | | *** |
| Other | 0.2 | 0.0 | 0.1 | 33.7 | 45.2 | 37.1 | 11.2 | *** | *** | *** |

| | | | | | | | | | | |
|-------------------------------------|------|------|------|------|------|------|------|-----|-----|-----|
| Did not indicate | 0.3 | 1.4 | 1.0 | | | | 0.7 | | | |
| <i>Other amenities</i> | | | | | | | | | | |
| % with electricity | 8.4 | 8.9 | 8.7 | 0.0 | 1.9 | 0.6 | 6.2 | ** | *** | |
| % that have landlines | 0.0 | 0.2 | 0.1 | 0.0 | 0.3 | 0.1 | 0.1 | | | |
| % with access to a mobile phone | | | | | | | | | | |
| Network | 63.7 | 87.1 | 79.0 | 4.1 | 1.0 | 3.2 | 56.1 | *** | *** | *** |
| % with fruit trees | 12.6 | 11.6 | 11.9 | 49.8 | 46.5 | 48.8 | 23.0 | | *** | |
| Mean number of fruit trees | 2.8 | 3.4 | 3.2 | 6.1 | 5.7 | 6.0 | 4.3 | | *** | |
| Mean number of buildings | 1.2 | 1.2 | 1.2 | 1.8 | 1.8 | 1.8 | 1.4 | | *** | |
| Unweighted N of residential parcels | | | | | | | | | | |
| | 504 | 298 | 802 | 409 | 314 | 723 | 1525 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012
 * indicates significant difference at 10% level, ** at 5%, and *** at 1%.

In terms of road access, the most commonly used road is secondary road (37%), followed by tertiary road (21%) and unpaved road (20%), other (11%) and primary road (10%). While access to primary road and secondary road is significantly more common in Cabo Delgado (13% and 50%) than in Nampula (3% and 7%), access to tertiary road (or “other roads”) is significantly more common in Nampula than in Cabo Delgado. In terms of comparison between control and treatment sites within each district, there is no difference in access to primary road and secondary road in Cabo Delgado while the difference in access to the same roads is statistically significant in Nampula. On the other hand, the difference in access to tertiary and unpaved road is significantly different in Cabo Delgado, the difference in access to these types of road is not significant in Nampula. In the DID regressions, we need to include the initial road condition variables to directly control for difference in initial road condition between the treatment and control sites within the same district. The significant difference in road conditions between the treatment and control groups also point toward the need to use matching method (e.g., PSM) to improve the comparability between the treatment control groups.

Electricity service is rare in the study area as illustrated by the fact that only 6% of households are electrified with significant difference between the two districts (9% in Cabo Delgado vs. 1% in Nampula). The presence of landlines phone is even scarce with only 0.1% of residential parcels having access to landline phones. On the other hand, more than half of residential parcels (56%) have access to a network. The accessibility to mobile phone, however, differs drastically and statistically significantly across districts. While 78% of residential parcels in Cabo Delgado have access to mobile phone networks, only 3% in the Nampula have the same access. On the other hand, while 48% of residential parcels are planted with fruit trees in Nampula, only 11% did so in Cabo Delgado. The number of trees is also significantly bigger in Nampula than in Cabo Delgado. On average, 1.4 buildings are built on a typical residential parcel with significantly more in Nampula than in Cabo Delgado (1.8 vs. 1.2). In terms of comparison between treatment and

control sites within the same district, the share of parcels with access to mobile phone is significantly higher in the treatment than in the control site in Cabo Delgado. The difference in all other categories is extremely small in magnitude even in a couple of cases where the difference is statistically significant.

Table 20: Agencies involved in land acquisition (for parcels in the possession of the households and those rented-out).

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean difference | | |
|--|---------------------|------------|------------|----------------|------------|------------|--------------|-----------------------------|-----------|-----------|
| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | - | (1) | (4) | (3) |
| | Treat- ment | Control | Total | Treat- ment | Control | Total | All | vs (2) | vs (5) | vs (6) |
| % parcels by people involved in the acquisition of parcel | | | | | | | | | | |
| All parcels | | | | | | | | | | |
| Community leaders | 10.2 | 26.4 | 20.7 | 4.1 | 5.2 | 4.5 | 15.0 | *** | *** | *** |
| Local court | 0.0 | 0.6 | 0.4 | 0.0 | 1.2 | 0.4 | 0.4 | ** | ** | |
| District authorities | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Lawyer | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Other | 7.5 | 4.1 | 5.3 | 2.9 | 5.5 | 3.7 | 4.7 | * | * | |
| N | 497 | 273 | 770 | 458 | 421 | 879 | 1,649 | | | |
| Residential Parcels | | | | | | | | | | |
| Community leaders | 10.3 | 27.6 | 21.4 | 4.1 | 4.2 | 4.1 | 15.2 | *** | | *** |
| Local court | 0.0 | 0.7 | 0.4 | 0.0 | 0.0 | 0.0 | 0.3 | | | |
| District authorities | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Lawyer | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Other | 7.7 | 4.2 | 5.5 | 3.0 | 5.7 | 3.9 | 4.9 | * | * | |
| N | 480 | 257 | 737 | 439 | 407 | 846 | 1,583 | | | |
| Agricultural Parcels | | | | | | | | | | |
| Community leaders | 7.7 | 9.4 | 9.0 | 4.9 | 35.7 | 14.0 | 10.4 | | ** | |
| Local court | 0.0 | 0.0 | 0.0 | 0.0 | 35.7 | 10.6 | 2.8 | | *** | ** |
| District authorities | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Lawyer | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| Other | 0.0 | 3.2 | 2.6 | 0.0 | 0.0 | 0.0 | 1.9 | ** | | *** |
| N | 17 | 16 | 33 | 19 | 14 | 33 | 66 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

4.2.3. Mode of land acquisition and agencies involved in the process

Table 20 reports parcel distribution by mode of acquisition. We separate the distribution for residential parcels and agricultural parcels separately. Of all the parcels that are either currently in owner's possession or rented out to others, 29% of residential parcels (23% in Cabo Delgado and 40% in Nampula) and 40% of agricultural parcels (36% in Cabo Delgado and 48% in Nampula) were acquired through inheritance, which is overall the most important mode of acquisition. The next three most important modes of acquisition include "purchase" (29% for

residential parcels and 12% for agricultural parcels), “occupied” (26% for residential parcels and 27% for agricultural parcels), and “ceded by relatives” (23% for residential parcels and 20% for agricultural parcels). Parcels acquired through purchase is much smaller than the share of parcels that were acquired through purchase in the urban areas (51%) (Maredia et al. 2012a). While the share of parcels acquired through “inheritance” and “ceded by relative” is significantly more important in Nampula (40-48% and 35-39%) than in Cabo Delgado (22-35% and 10-12%), the reverse is true in the case of “occupied” and “purchase” (18-34% and 20-42% respectively in Cabo Delgado compared to 15-16% and 0.4-0.7% in Nampula). Although the difference in proportion of parcels acquired through different modes of acquisition between treatment and control groups within the same district is statistically less significant and in most of the cases the magnitude of difference is much small, there are still a number of cases where the difference is statistically significant, which implies that matching methods or alternative methods to control for the initial differences should be taken into consideration.

A comparison of the relative importance of different modes of acquisition across the head’s gender yields additional insight (appendix Table A3.16). The share of parcels acquired through inheritance is almost identical in both the female-headed households and male-headed households (37% in both cases). While more parcels in the male-headed households were acquired through occupation than female-headed households (23% vs. 14%), purchase is more important for female-headed households than for male-headed households (20% vs. 15%).

4.2.4. Land documents

As expected, the predominant majority of parcels do not have any land document (DUAT, a limited title or use right) (93% overall, significantly bigger in Nampula (96%) than in Cabo Delgado (92%)) (Table 21). The most common legal document is “affidavit of purchase/sales” (4.5% overall, 0.4% in Nampula and 7% in Cabo Delgado). Only 0.3% of parcels are issued with DUAT, the most important legal document to protect use rights. Analysis by treatment status and head’s gender suggests some variations in document issuance by treatment status and headship. While the share of parcels without documents is significantly more in the treatment than in the control site in Cabo Delgado (95% vs. 92%), the opposite is true in Nampula (95% vs. 99%). “Affidavit of purchase/sale” is significantly more important in the control site (9%) than in the treatment site (4%) in Cabo Delgado, the difference is not significant in Nampula. The difference of document holding is negligible between male-headed households and female-headed households (share of households without documents - 94% vs. 93%; share of households with affidavit of purchase/sale, 4.3% vs. 5%).

Table 21: Types of Land Documents Currently in Possession by Parcel Holder

(1) (2) (3) (4) (5) (6) (7) Testing for mean

| | Cabo Delgado | | | Nampula | | | All | difference | | |
|--|----------------|---------|-------|----------------|---------|-------|-------|---------------|---------------|---------------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| <i>% parcels by type of documents currently existent that give them property rights to the parcel (b):</i> | | | | | | | | | | |
| DUAT | 0.0 | 0.0 | 0.0 | 0.9 | 0.5 | 0.7 | 0.3 | | | *** |
| Provisional title | 0.9 | 1.5 | 1.3 | 1.2 | 0.0 | 0.8 | 1.1 | | *** | |
| Certificate of cadastral services | 0.0 | 0.0 | 0.0 | 2.3 | 0.0 | 1.6 | 0.6 | | *** | *** |
| Affidavit of purchase/sales | 4.0 | 8.6 | 7.0 | 0.3 | 0.4 | 0.3 | 4.5 | *** | | *** |
| Other | 0.1 | 0.0 | 0.0 | 0.6 | 0.0 | 0.4 | 0.2 | | *** | *** |
| None | 95.0 | 89.9 | 91.6 | 94.7 | 99.2 | 96.1 | 93.3 | *** | *** | *** |
| Unweighted N of parcels in respondent's possession | 1,227 | 739 | 1,966 | 1,394 | 1,090 | 2,484 | 4,450 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

The extremely low coverage of DUAT does not mean DUATs are not considered valuable by rural households. To the contrary, rural households in the study areas are very interested in obtaining DUAT for their parcels. Each respondent was asked to indicate whether he/she was willing to obtain DUAT for each parcel that is currently in his/her possession or rented out to other and if so, his/her willingness to pay to obtain the DUAT. The baseline data indicate that the percentage of parcels in which there is an interest in obtaining DUAT is 90% ranging from between 86% (residential parcels) and 88% (agricultural parcels) in Nampula to 91% (both residential and agricultural parcels) in Cabo Delgado (Table 22). Of those who are willing to invest, the average amount of willingness to pay per parcel is 150 MT (with significant difference between 92 MT for Cabo Delgado and 256 MT for Nampula in the case of residential parcels or between 97 MT for Cabo Delgado and 245 MT for Nampula in the case of agricultural parcels). Given the parcel size of an average residential parcel is much smaller than an average agricultural parcel (1/5th on average). The average amount of willingness to pay for residential parcels is 5 times higher than for a typical agricultural parcels, which is expected. Testing the mean values between the two districts further confirms that the difference between the two districts is statistically significant at 1% level in all the cases.

It is interesting to note that the interest to apply for DUAT is extremely similar between the treatment and the control sites within each district. The difference between treatment and control sites within each district is statistically insignificant in all cases and in both districts, which is encouraging from the evaluation point of view. Finally, while more female heads are willing to pay to obtain DUAT than male heads (93% vs 89%), their willingness to pay is consistently and statistically significantly lower than male-headed households in almost all cases. For example, the amount of willingness to pay to obtain DUAT for the residential land is 0.46 MT/m², more than double of the amount that an average female-headed household is willing to pay.

Table 22: Interest and willingness to pay for DUAT

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean difference | | |
|--|----------------|---------|-------|----------------|---------|-------|-------|-----------------------------|-----------|-----------|
| | Cabo Delgado | | | Nampula | | | - | (1) | (4) | (3) |
| | Treat- ment | Control | Total | Treat- ment | Control | Total | All | vs (2) | vs (5) | vs (6) |
| Residential Parcels | | | | | | | | | | |
| % parcels that have no DUAT and have initiated the process of obtaining DUAT | 0.0 | 0.0 | 0.0 | 2.3 | 0.7 | 1.8 | 0.7 | | | *** |
| N | 270 | 221 | 491 | 393 | 299 | 692 | 1,183 | | | |
| <i>Among the parcel with no DUAT and have not initiated the process of obtaining it:</i> | | | | | | | | | | |
| % parcels in which there is an interest in obtaining DUAT | 92.4 | 90.8 | 91.2 | 86.5 | 84.2 | 85.8 | 89.2 | | | *** |
| N | 265 | 221 | 486 | 383 | 297 | 680 | 1,166 | | | |
| Average amount per parcel that the HH is willing to pay to obtain DUAT (MT) | 95.2 | 88 | 90.1 | 273.5 | 215 | 256.3 | 150.4 | | | *** |
| N | 248 | 203 | 451 | 333 | 249 | 582 | 1,033 | | | |
| Agricultural Parcels | | | | | | | | | | |
| % parcels that have no DUAT and have initiated the process of obtaining DUAT | 0.5 | 0.4 | 0.4 | 1.8 | 0.8 | 1.5 | 0.8 | | | ** |
| N | 869 | 463 | 1,332 | 944 | 758 | 1,702 | 3,034 | | | |
| <i>Among the parcel with no DUAT and have not initiated the process of obtaining it:</i> | | | | | | | | | | |
| % parcels in which there is an interest in obtaining DUAT | 92.4 | 90.7 | 91.3 | 88.6 | 87.2 | 88.2 | 90.1 | | | *** |
| N | 857 | 461 | 1,318 | 924 | 748 | 1,672 | 2,990 | | | |
| Average amount per parcel that the HH is willing to pay to obtain DUAT (MT) | 85.2 | 103.4 | 96.8 | 222.5 | 295.7 | 244.8 | 151.5 | | | * |
| N | 799 | 427 | 1,226 | 820 | 652 | 1,472 | 2,698 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

4.2.5 Hypothetical Land sales and land rental markets

Respondents were asked to provide information on hypothetical sales and rental prices for parcels that they own (either in possession or currently rented out). Table 23 reports the descriptive analysis on this information. The average hypothetical sale price is 47,228 MT per parcel (or 33.7 MT/m²). Not surprisingly, the hypothetical price is much higher for residential parcels (50,619 MT per parcel or 87.6 MT/m²) than for agricultural parcels (43,807 MT per parcel or 7.9 MT/m²). The average hypothetical rental price is 875 MT/month (or 5.4 MT/month/m²), ranging from 207 MT/month (3 MT/month/m²) in Nampula to 1,526 MT/month (7.7 MT/month/m²) in Cabo Delgado. Consistent with the sale's price, the unit rental price is much higher for an average residential parcel (13 MT/month/m²) than an average agricultural parcel (1.5 MT/month/m²). The rental price of an average room for housing or for commercial purpose is 218 MT per room and 438 MT per room with the prices much higher in Cabo Delgado than in Nampula in both cases

(316 vs. 218 MT per room for housing, and 623 vs. 438 per room for commercial building). Testing for mean difference between the two districts suggests that the consistent price difference between Cabo Delgado and Nampula is also statistically significant in almost all cases.

Table 23: Hypothetical sale and rental prices of parcels belonging to the household surveyed

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean difference | | |
|---|---------------------|---------|--------|----------------|---------|--------|--------|-----------------------------|------------|------------|
| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | - | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| | Treat-ment | Control | Total | Treat-ment | Control | Total | All | | | |
| Average total value the parcel could be sold for (MT) | 80,423 | 55,853 | 64,661 | 20,148 | 19,444 | 19,955 | 47,228 | ** | | *** |
| <i>Average, by main plot use</i> | | | | | | | | | | |
| Residence | 92,212 | 64,086 | 72,388 | 22,023 | 18,913 | 21,260 | 50,619 | | | *** |
| Agriculture | 71,276 | 51,151 | 58,839 | 19,662 | 20,056 | 19,775 | 43,807 | * | | *** |
| Average total value the parcel could be sold for (MT/m ²) | 44.7 | 39.8 | 41.6 | 25.7 | 9.7 | 21.3 | 33.7 | | ** | ** |
| <i>Average, by main plot use</i> | | | | | | | | | | |
| Residence | 156.6 | 92.3 | 111.3 | 63.9 | 28.7 | 55.1 | 87.6 | | | * |
| Agriculture | 8.4 | 10.0 | 9.4 | 7.1 | 2.0 | 5.6 | 7.9 | | | |
| Average value a room for housing in the parcel could be rented out for (MT/month) | 198 | 398 | 316 | 20 | 23 | 21 | 218 | | | ** |
| Average value a room for commercial purposes in the parcel could be rented out for (MT/month) | 469 | 725 | 623 | 57 | 60 | 57 | 438 | | | *** |
| Average value the whole parcel could be rented out for (MT/month) | 968 | 1844 | 1526 | 195 | 235 | 207 | 875 | * | | *** |
| Average monthly value the whole parcel could be rented out for (MT/m ²) | 8.2 | 7.4 | 7.7 | 2.6 | 3.8 | 3.0 | 5.4 | | | ** |
| <i>Average, by main plot use</i> | | | | | | | | | | |
| Residence | 25.4 | 13.7 | 17.4 | 6.9 | 11.8 | 8.4 | 13.0 | | | |
| Agriculture | 1.4 | 3.6 | 2.7 | 0.4 | 0.3 | 0.4 | 1.5 | * | | *** |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

The difference between treatment and control sites within each district is in general much smaller and less consistent than the difference across districts. In Cabo Delgado, the sale's prices are much bigger in the treatment sites than in the control sites (80,423 MT vs 55,853 MT per parcel). The difference is also statistically significant. However, the difference between the treatment and control sites becomes statistically insignificant if price per square meter (instead of price per

parcel) is measured and the magnitude of difference also becomes much less noticeable (45 MT per square meter in the treatment site compared to 40 MT per square meter in the control site). Unlike the sale's price, the rental price in the treatment site appears to be much smaller than that in the control site. Though the difference is statistically significant, it is only at 10% level. In the case of Nampula, the difference between the treatment and control sites is insignificant in almost all the cases except for the sale's price for per square meter of land. Further analysis by head's gender suggests that hypothetical sales' and rental prices between male-headed and female-headed households behave quite differently. While the difference in sale's prices is statistically insignificant, the hypothetical rental price reported by female heads is consistently (though surprisingly) higher than that reported by male heads and the difference is statistically significant.

Table 24: Land conflicts experienced in the past and or perceived in the future

| | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | Testing for mean difference | | |
|--|--------------|---------|-------|------------|---------|-------|-------|--|---|--|---|--|---|------|-----------------------------|------|--|
| | Cabo Delgado | | | Nampula | | | Total | | | | | | | | | | |
| | Treat ment | Control | Total | Treat ment | Control | total | Total | | | | | | | 1vs2 | 4vs5 | 3vs6 | |
| Total | | | | | | | | | | | | | | | | | |
| % of parcels that had a conflict in the acquisition of a title * | 0.0 | 0.0 | 0.0 | 41.7 | 0.0 | 38.1 | 16.0 | | | | | | | *** | *** | | |
| N responses | 12 | 15 | 27 | 28 | 5 | 33 | 60 | | | | | | | | | | |
| Parcels with no responses | 1,215 | 724 | 1,939 | 1,366 | 1,085 | 2,451 | 4,390 | | | | | | | | | | |
| Unweighted N of parcels | 1,227 | 739 | 1,966 | 1,394 | 1,090 | 2,484 | 4,450 | | | | | | | | | | |
| % of parcels that could potentially be involved in a conflict | | | | | | | | | | | | | | | | | |
| Total | 15.7 | 13.1 | 14.0 | 9.1 | 8.3 | 8.9 | 12.1 | | | | | | | *** | | *** | |
| Residential | 20.0 | 14.6 | 16.2 | 11.0 | 7.7 | 10.0 | 13.8 | | | | | | | *** | | *** | |
| Agricultural | 15.1 | 11.4 | 12.7 | 8.4 | 8.5 | 8.4 | 11.1 | | | | | | | *** | | *** | |
| <i>% distribution of parcels by probability of losing the parcel</i> | | | | | | | | | | | | | | | | | |
| Highly probable | 33.9 | 25.6 | 28.8 | 19.6 | 7.8 | 16.3 | 25.3 | | | | | | | ** | | *** | |
| Moderately probable | 10.2 | 25.2 | 19.4 | 15.8 | 23.3 | 17.9 | 19.0 | | | | | | | ** | | * | |
| Somewhat probable | 13.1 | 15.5 | 14.5 | 46.0 | 41.1 | 44.6 | 22.8 | | | | | | | | | *** | |
| Not probable | 7.8 | 12.1 | 10.4 | 6.3 | 15.6 | 8.9 | 10.0 | | | | | | | | * | | |
| Does not know | 35.0 | 21.7 | 26.8 | 12.3 | 12.2 | 12.3 | 22.8 | | | | | | | ** | | *** | |
| Residential | | | | | | | | | | | | | | | | | |
| Highly probable | 30.5 | 21.5 | 24.8 | 18.3 | 8.7 | 16.2 | 22.4 | | | | | | | | | | |
| Moderately probable | 12.9 | 22.2 | 18.8 | 13.3 | 21.7 | 15.2 | 17.8 | | | | | | | | | | |
| Somewhat probable | 15.7 | 19.6 | 18.2 | 55.2 | 39.1 | 51.6 | 27.4 | | | | | | | | | *** | |
| Not probable | 3.6 | 2.0 | 2.5 | 2.0 | 8.7 | 3.5 | 2.8 | | | | | | | | | | |
| Does not know | 37.3 | 34.7 | 35.6 | 11.2 | 21.7 | 13.6 | 29.5 | | | | | | | | | | |
| Agricultural | | | | | | | | | | | | | | | | | |
| Highly probable | 36.7 | 27.2 | 31.2 | 20.8 | 7.7 | 16.8 | 27.0 | | | | | | | ** | | *** | |
| Moderately probable | 9.4 | 31.6 | 22.2 | 17.6 | 23.1 | 19.3 | 21.3 | | | | | | | ** | | * | |
| Somewhat probable | 12.4 | 12.8 | 12.6 | 40.7 | 41.5 | 41.0 | 20.9 | | | | | | | | | *** | |
| Not probable | 9.5 | 17.6 | 14.2 | 7.7 | 18.5 | 11.0 | 13.3 | | | | | | | | | | |
| Does not know | 31.9 | 10.9 | 19.8 | 13.2 | 9.2 | 12.0 | 17.5 | | | | | | | ** | | *** | |

Parcels in potential conflict

| | | | | | | | |
|--------------|-----|----|-----|-----|----|-----|-----|
| Total | 202 | 86 | 288 | 119 | 90 | 209 | 497 |
| Residential | 59 | 27 | 86 | 41 | 23 | 64 | 150 |
| Agricultural | 137 | 49 | 186 | 76 | 65 | 141 | 327 |

Source: MCA/MINAG Rural Land Survey, 2011/2012

*indicates significance difference at 10% level, ** at 5%, and *** at 1%.

4.2.6 Land conflicts and perceived risk

Table 25 provides a descriptive summary on the incidence of actual land conflicts and perceived future potential land conflicts and how these conflicts are distributed by type and by whom they had or perceived to have conflicts with. While our intention was to gather information on any past land conflicts from all respondents, it turned out that we only gathered information on past land conflicts from 60 parcels (27 in Cabo Delgado and 33 in Nampula). And all these conflicts were referred to those that respondents experienced during the process of acquiring a land title. We don't know exactly how and why this kind of mistake occurred. We did not notice this problem until we analyzed the data and it was already too late to fix this problem.⁹ Given this mistake, the analysis on past conflicts is not meaningful. The only way to partially resolve this issue is to ask respondents to provide conflict information retrospectively during the end-line survey. Hopefully, respondents were able to remember these big events like land conflicts in the past.

Unlike the case of past land conflicts, the information on perceived conflicts were collected for all parcels and was reported correctly.. Overall, 12% of households (14% residential parcels and 11% agricultural parcels) perceived to potentially have land conflicts in the future. The difference between the two districts for both residential (16% vs. 10%) and agricultural parcels (13% vs. 11%) is statistically significant. While there is no significant difference between the treatment and control groups within Nampula, the incidents of perceived potential conflicts is significantly higher in treatment than in control groups (20% vs 15% for residential parcels or 15% vs. 11% for agricultural parcels).

Respondents were asked to indicate the probability of losing the parcels in the case of future land conflicts. On average, the perceived probability of losing land seems to be high among those who think there will be future conflicts. For example, 25% of households that perceive to have future conflicts think they are likely to lose their land due to land conflicts. Meanwhile, 19% and 23% think it is moderately or somewhat probable to lose their land due to the conflict. The rest of the households either don't think they will lose their land due to conflict (10%) or don't know how to answer the question (23%). There is considerable difference across districts and between the treatment and control sites. For instance, the share of households who perceived to most probably lose land due to conflicts is 29% in Cabo Delgado, relative to only 16% in Nampula. Similarly, while 27% of respondents answered "don't know" in Cabo Delgado, only 12% in Nampula did the same. The difference in both cases is also statistically significant. The comparison between treatment and control sites within each of the district indicates statistically significant difference

⁹ Unfortunately, MSU made a mistake by collecting information on past conflicts only from the "titled" parcels and further restricting the conflicts to those associated with the acquisition of titles. This clearly limits the usefulness of this information. Therefore, we will focus on our discussion around the information on perceived future conflicts which is collected for all parcels.

in some cases (“moderately probable” and “does not know” in Cabo Delgado, “highly probable” and “not probable” in Nampula), but not in other cases.

In terms of gender comparison (Appendix Table 28), female-headed households perceive more conflict with neighbors, and less with family. And the difference between male-headed households and female-headed households is statistically significant in both cases. In terms of reasons for future conflicts, significantly more female-headed households are perceived to have “boundary disputes” and “lost parcel due to lack of DUAT” as the reasons for conflicts than male-headed households. But higher male-headed households perceived disagreement between heirs as the reason for conflicts. The difference is also statistically significant in these cases. Finally, the percentage of respondents who perceived the probability to lose land as higher or more moderately high is not statistically different between male- and female-headed households. The difference is statistically significant in rest of the categories.

Table 25: Information on parcels rented out by land use type (residential and agricultural land)

| | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | Testing for mean difference |
|--|--------------|---------|-----------|---------|-------|-------|-------|-------|-------|-------|-------|-------|---|--|-----------------------------|
| | Cabo Delgado | | Nampula | | Total | | Total | | Total | | Total | | | | |
| | Treatment | Control | Treatment | Control | Total | | | |
| Total | | | | | | | | | | | | | | | |
| % of HHs that have parcels rented- or lent-out to others | 13.8 | 23.3 | 19.9 | 9 | 5.1 | 7.8 | 15.9 | *** | ** | *** | | | | | |
| Parcels rented out % | 7.1 | 12.2 | 10.4 | 4.8 | 2.5 | 4.1 | 8.4 | | | | | | | | |
| N rented-out parcels | 89 | 84 | 173 | 50 | 27 | 77 | 250 | | | | | | | | |
| % parcels rented-out by relationship of the tenant to the owner of the parcel in the HH ¹ | | | | | | | | | | | | | | | |
| Child | | | | 8.3 | 7.4 | 8.1 | 8.1 | | | | | | | | |
| Sibling | | | | 11.1 | 11.1 | 11.1 | 11.1 | | | | | | | | |
| Parent | | | | 3.7 | 3.7 | 3.7 | 3.7 | | | | | | | | |
| Niece/nephew | | | | 6.5 | 0.0 | 5.0 | 5.0 | | * | | | | | | |
| Other relative | | | | 22.2 | 33.3 | 24.9 | 24.9 | | | | | | | | |
| Non-relative | | | | 48.1 | 44.4 | 47.3 | 47.3 | | | | | | | | |
| Residential | | | | | | | | | | | | | | | |
| Parcels rented out % | 6.1 | 10.8 | 9.1 | 1.8 | 0.3 | 1.4 | 6.6 | ** | *** | *** | | | | | |
| % parcels rented-out by relationship of the tenant to the owner of the parcel in the HH | | | | | | | | | | | | | | | |
| Sibling | | | | 25.0 | 100.0 | 29.4 | 29.4 | | * | | | | | | |
| Parent | | | | 10.0 | 0.0 | 9.4 | 9.4 | | *** | | | | | | |
| Other relative | | | | 15.1 | 0.0 | 14.2 | 14.2 | | *** | | | | | | |
| Non-relative | | | | 49.9 | 0.0 | 47.0 | 47.0 | | *** | | | | | | |
| Agricultural | | | | | | | | | | | | | | | |
| % rented-out | 8.4 | 15.6 | 13.0 | 8.0 | 4.8 | 7.0 | 11.0 | ** | * | | | | | | |
| % parcels rented-out by relationship of the tenant to the owner of the parcel in the HH | | | | | | | | | | | | | | | |
| Child | | | | 10.2 | 7.7 | 9.6 | 9.6 | | ** | | | | | | |
| Sibling | | | | 8.0 | 7.7 | 7.9 | 7.9 | | | | | | | | |
| Parent | | | | 2.3 | 3.8 | 2.7 | 2.7 | | | | | | | | |
| Niece/nephew | | | | 8.0 | 0.0 | 5.8 | 5.8 | | *** | | | | | | |
| Other relative | | | | 23.9 | 34.6 | 26.7 | 26.7 | | | | | | | | |
| Non-relative | | | | 47.7 | 46.2 | 47.3 | 47.3 | | | | | | | | |

Average total declared size of land currently rented-out (m2)

| | | | | | | | | |
|--------------|--------|--------|--------|-------|--------|--------|--------|----|
| Total | 10,130 | 9,844 | 9,910 | 9,295 | 13,237 | 10,283 | 9,964 | * |
| Residential | 7,718 | 5,690 | 6,129 | 5,425 | 600 | 5,033 | 6,079 | ** |
| Agricultural | 11,226 | 12,821 | 12,450 | 9,926 | 13,723 | 10,960 | 12,144 | ** |

Average number of years since the tenant acquired use rights over this parcel

| | | | | | | | | |
|--------------|-----|------|-----|-----|--|--|--|-----|
| Total | 7.9 | 14.1 | 9.4 | 9.4 | | | | |
| Residential | 9.4 | 1.0 | 8.9 | 8.9 | | | | *** |
| Agricultural | 7.6 | 14.7 | 9.5 | 9.5 | | | | ** |

% parcels rented-out by form of payment

| | Residential | | | | |
|------------------|---------------------|-------|-------|-------|-----|
| No payment | 100.0 | 100.0 | 100.0 | 100.0 | |
| Cash | 0.0 | 0.0 | 0.0 | 0.0 | |
| in-kind | 0.0 | 0.0 | 0.0 | 0.0 | |
| Cash and in-kind | 0.0 | 0.0 | 0.0 | 0.0 | |
| | Agricultural | | | | |
| No payment | 46.6 | 76.9 | 54.7 | 54.7 | ** |
| Cash | 26.2 | 3.8 | 20.2 | 20.2 | ** |
| in-kind | 27.2 | 15.4 | 24.1 | 24.1 | |
| Cash and in-kind | 0.0 | 3.8 | 1.0 | 1.0 | *** |

| | | | | | | | |
|--|-------|-----|-------|-------|-------|-------|-------|
| Unweighted N of parcels in respondent's possession | 1,227 | 739 | 1,966 | 1,394 | 1,090 | 2,484 | 4,450 |
|--|-------|-----|-------|-------|-------|-------|-------|

¹Information available only for Nampula.

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

4.2.7 Land market

The baseline survey also collected information on rental participation and the detailed contractual details such as relationship between rental partners, rental price, contract length, etc. The results are reported in Table 25 for rent-out parcels and in Table 26 for rent-in parcels, respectively.

Overall, 16% of households rented- or lent-out any land to others during the past 12 months with considerable variation across districts and between treatment and control sites. While 20% of households in Cabo Delgado (14% in the treatment and 23% in the control sites) rented out or lent land to others, only 8% of households (9% in the treatment site and 5% in the control site) in Nampula did so. The difference between the two districts is statistically significant. In terms of parcels, 8.4% of parcels (10% in Cabo Delgado and 4% in Nampula) were rented out or lent.

Unfortunately, MSU did not collect detailed contractual information from the district of Cabo Delgado, and our discussion on detailed contractual information will be based on the data from Nampula only. In terms of relationship between rental partners, more than half of rental

transactions in Nampula (53% in both residential land and agricultural land) involve some kind of close relationships. For example, renting to relatives, siblings and children were the top three close relationships involved in rental transactions. The difference in the relative importance of partners is generally significant in the case of residential parcels but not significant in the case of agricultural parcels. Compared to the male-headed households, female-headed households are more likely to rent their parcels to a parent (38%), compared to only 2% for male-headed households.

It is surprising to note all the rental transactions related to residential parcels do not involve rental payment. More than half of the rental transactions related to agricultural parcels also do not involve any rental payment. Of the remaining 45% of transactions involving payment, 20% of them are paid in cash, 24% paid in kind and the remaining 1% paid in both cash and in-kind. For agricultural parcels, free transactions appear to be more common in the control site than in the treatment site (77% vs. 55%) and more dominant in the male-headed households than in the female-headed households (63% vs. 0%). The difference is statistically significant in both cases.

Compared to renting-out, renting-in land is much more common in the study area (Table 26). On average 40% of households or 15% of total land parcels are involved in rental transactions. While there is no difference between treatment and control site in Nampula district, renting in land is more common in the treatment than in the control site in Cabo Delgado (56% vs 48% in terms of household participation, or 23.3% vs. 17% in terms of parcel involvement). The difference between treatment and control sites in Cabo Delgado is significant at 1%. In terms of the relationship between rental partners, the distribution of partner relationships highly resembles the case of renting-out parcels. For example, 46% and 25% of the transactions are between non-relatives or between other relatives (47% and 25% in the case of renting out). Except in two categories (niece/nephew and other relative), the difference between the treatment and control sites is not significant.

Table 26: Information on parcels rented-in

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean | | |
|--|------------------------|----------------|--------------|------------------------|----------------|--------------|------------|-------------------|------------------|------------------|
| | Cabo Delgado | | | Nampula | | | | Difference | | |
| | Treat- ment | Control | Total | Treat- ment | Control | Total | All | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| % of households that have parcels rented-in or borrowed from others | 55.9 | 47.5 | 50.5 | 16.4 | 17.4 | 16.7 | 39.5 | ** | | *** |
| % of parcels rented-in | 23.3 | 17.0 | 19.3 | 7.0 | 7.0 | 7.0 | 15.1 | *** | | *** |
| Parcels rented-in or borrowed: | | | | | | | | | | |
| % parcels rented-out by relationship of the tenant to the owner of the parcel in the HH ¹ | | | | | | | | | | |
| Spouse | | | | 1.8 | 0.0 | 1.2 | 1.2 | | | |
| Child | | | | 1.4 | 2.5 | 1.7 | 1.7 | | | |
| Sibling | | | | 9.9 | 4.9 | 8.4 | 8.4 | | | |
| Parent | | | | 3.6 | 3.7 | 3.6 | 3.6 | | | |
| Niece/nephew | | | | 18.5 | 4.9 | 14.3 | 14.3 | | | *** |
| Other relative | | | | 20.7 | 34.6 | 25.0 | 25.0 | | | ** |
| Non-relative | | | | 44.1 | 49.4 | 45.8 | 45.8 | | | |

| | | | | | | | | | |
|---|-------|-------|-------|-------|-------|-------|-------|---|-----|
| % parcels reporting having rental contract ¹ | | | | 1.4 | 0 | 0.9 | 0.9 | | |
| % parcels by people involved in the rental process ¹ | | | | | | | | | |
| Community leaders | | | | 6.3 | 0.0 | 4.3 | 4.3 | | * |
| Local court | | | | 0 | 0 | 0 | 0 | | |
| District authority | | | | 0 | 0 | 0 | 0 | | |
| Lawyer | | | | 0 | 0 | 0 | 0 | | |
| Other | | | | 11.3 | 0.0 | 7.8 | 7.8 | | *** |
| % parcels with no involvement of an agent/institution in the renting process ¹ | | | | 78.4 | 97.6 | 84.2 | 84.2 | | *** |
| Average total cost paid for the renting process per parcel (Mt) ¹ (N=14) | | | | 14.8 | | 14.8 | 14.8 | | |
| Average monthly rent paid per parcels rented-in (Mt/month) ¹ | | | | 33.7 | 29.2 | 32.3 | 32.3 | | |
| Average, by plot use | | | | | | | | | |
| <i>Residence</i> | | | | 0.7 | 2.8 | 1.3 | 1.3 | | |
| <i>Agriculture</i> | | | | 41.9 | 35.0 | 39.7 | 39.7 | | |
| Average area of land currently rented-in per parcel (m ²) | 3,048 | 4,870 | 4,080 | 5,304 | 6,455 | 5,655 | 4,328 | * | ** |
| Average monthly rent paid per parcels rented-in (Mt/month/m ²) | | | | 0.018 | 0.011 | 0.016 | 0.016 | | |

The other contract details of renting in parcels are also similar to the case of renting out. For example, almost all the transactions are informal, and do not involve any local authorities in the transaction process (84%) and more than half of the renting does not involve any rental payment. For those involving any rental payment, the average rental payment is 32 MT/month or 0.016 MT/month/m². In terms of gender difference, while a significantly higher share of female-headed households rented in land from niece/nephew (28% vs. 11%), a significantly higher share of male-headed households, on the other hand, rented in land from other relatives (30% vs. 2%). And the difference in share of renting involving in agent/institution is significantly higher among female-headed households (35%) than male-headed households (11%).

4.2.8 Land investment

Respondents were asked to provide information on investment made on land parcels during the past 12 months. Table 27 summarizes household participation in land investment, share of parcels affected and total cost of investment by investment types.

Overall 19% of households made land investments that involve 6.2% of parcels with significant and large variation across districts and between treatment and control sites within the same district. The incidence of investment both in terms of share of households and share of parcels in the Nampula district (36% and 11%, respectively) are three times as big as that in the Cabo Delgado district (11% and 4%). While the frequency of land investments is similar between the residential parcels and agricultural parcels in Cabo Delgado (5.1% vs. 5.8% households, and 4.3% vs. 3.4% parcels), this is not the case for Nampula. For example, while 32.5% of households made investments on 32.1% of residential parcels, only 7.3% of households made investments on 3.3%

agricultural parcels. The participation in investment is also significantly higher in the treatment sites than in the control sites in both districts, which is generally true for both the residential land and agricultural land.

As expected, the types of investment differ greatly across types of land. The three leading investment types for the residential parcels are repairs/improvement of roofs (66% varying from 28% in Cabo Delgado to 78% in Nampula), construction of new buildings/houses (26% ranging from 20% in Nampula to 28% in Cabo Delgado), and repairs/improvement of buildings (10%, 7% in Nampula to 21% in Cabo Delgado). For agricultural parcels, the most important investment is increasing the parcel size (80%), followed by irrigation (14%), and facilities for water supply (3.3%). There is also noticeable variation in types across districts and between treatment and control sites. For example, while the most prevalent investment for residential parcels in Nampula is repairs/improvement of roof (66%), the most important in Cabo Delgado is “construction of new buildings/houses” (44%). Similarly, for agricultural parcels, “increasing the parcel size” is the single most important investment in Cabo Delgado (97%), the same type of investment only accounts for half of the total investments made on agricultural land in Nampula.

In addition to the much more overall incidence of investments in the treatment sites in both districts, difference also exists in the relative importance of individual types.

Table 27: Types of land investment made in the past 12 months by land use

| | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | Testing for mean difference | | |
|--|--------------|---------|-------|-------|---------|-------|---------|-------|------|------|------|--|---|--|-----------------------------|--|--|
| | Cabo Delgado | | | | | | Nampula | | | | | | | | | | |
| | Treat | Control | Total | Treat | Control | Total | Total | Total | 1vs2 | 4vs5 | 3vs6 | | | | | | |
| <i>% of households that had any investment</i> | | | | | | | | | | | | | | | | | |
| Total | 13.7 | 9.0 | 10.7 | 39.2 | 29.1 | 36.1 | 19.0 | * | *** | *** | | | | | | | |
| Residential | 7.7 | 3.7 | 5.1 | 35.0 | 26.9 | 32.5 | 14.1 | *** | ** | *** | | | | | | | |
| Agricultural | 7.4 | 4.9 | 5.8 | 9.4 | 2.5 | 7.3 | 6.3 | * | *** | | | | | | | | |
| <i>% of parcels that had any investment</i> | | | | | | | | | | | | | | | | | |
| Total | 4.8 | 3.1 | 3.7 | 12.4 | 8.2 | 11.1 | 6.2 | ** | *** | *** | | | | | | | |
| Residential | 6.6 | 3.0 | 4.3 | 34.0 | 27.6 | 32.1 | 12.6 | *** | * | *** | | | | | | | |
| Agricultural | 4.2 | 2.9 | 3.4 | 4.1 | 1.1 | 3.2 | 3.3 | | *** | ** | | | | | | | |
| <i>If invested, % by type of investment</i> | | | | | | | | | | | | | | | | | |
| | Total | | | | | | | | | | | | | | | | |
| Increasing the parcel size | 54.4 | 64.3 | 59.7 | 13.6 | 11.5 | 13.2 | 31.4 | | * | * | | | | | | | |
| Constructions of new buildings/houses | 12.1 | 22.6 | 17.7 | 15.3 | 18.8 | 16.1 | 16.7 | | | *** | | | | | | | |
| Repairs/improvements of buildings | 11.9 | 6.7 | 9.1 | 6.5 | 2.1 | 5.5 | 6.9 | * | ** | | | | | | | | |
| Repairs/Improvement of roof | 18.1 | 8.7 | 13.1 | 59.6 | 71.9 | 62.3 | 43.0 | *** | | *** | | | | | | | |
| Sewage, drainage, toilets | 1.7 | 0.0 | 0.8 | 3.6 | 0.0 | 2.8 | 2.0 | | *** | ** | | | | | | | |
| Facilities for water supply | 0.0 | 0.0 | 0.0 | 2.4 | 0.0 | 1.9 | 1.1 | | ** | ** | | | | | | | |
| Installation for access to electricity | 8.7 | 2.1 | 5.2 | 0.0 | 1.0 | 0.2 | 2.2 | ** | | ** | | | | | | | |
| Landline service | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | | | | | | |
| Irrigation | 0.0 | 0.0 | 0.0 | 8.8 | 5.2 | 8.0 | 4.9 | | ** | *** | | | | | | | |
| | Residential | | | | | | | | | | | | | | | | |
| Increasing the parcel size | 7.6 | 0.0 | 4.1 | 3.1 | 6.9 | 4.1 | 4.1 | * | | | | | | | | | |
| Constructions of new buildings/houses | 23.1 | 67.6 | 43.6 | 20.0 | 20.7 | 20.2 | 25.8 | *** | | * | | | | | | | |
| Repairs/improvements of buildings | 26.7 | 13.3 | 20.5 | 8.4 | 2.3 | 6.9 | 10.1 | | ** | ** | | | | | | | |

| | | | | | | | | | |
|--|------|-------|------|------|------|------|------|----|-----|
| Repairs/Improvement of roof | 35.0 | 19.4 | 27.8 | 77.2 | 79.3 | 77.7 | 65.8 | | *** |
| Sewage, drainage, toilets | 3.7 | 0.0 | 2.0 | 1.6 | 0.0 | 1.2 | 1.4 | | |
| Facilities for water supply | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Installation for access to electricity | 19.5 | 6.4 | 13.4 | 0.0 | 1.1 | 0.3 | 3.4 | | *** |
| Landline service | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Irrigation | 0.0 | 0.0 | 0.0 | 0.0 | 1.1 | 0.3 | 0.2 | | |
| Agricultural | | | | | | | | | |
| Increasing the parcel size | 93.8 | 100.0 | 97.2 | 49.0 | 55.6 | 49.7 | 80.3 | * | *** |
| Constructions of new buildings/houses | 1.6 | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 | 0.5 | | |
| Repairs/improvements of buildings | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Repairs/Improvement of roof | 4.6 | 0.0 | 2.1 | 0.0 | 0.0 | 0.0 | 1.3 | | |
| Sewage, drainage, toilets | 0.0 | 0.0 | 0.0 | 10.4 | 0.0 | 9.3 | 3.3 | ** | ** |
| Facilities for water supply | 0.0 | 0.0 | 0.0 | 10.4 | 0.0 | 9.3 | 3.3 | ** | ** |
| Installation for access to electricity | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Landline service | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Irrigation | 0.0 | 0.0 | 0.0 | 38.5 | 44.4 | 39.1 | 13.9 | | *** |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table 28: Average cost of land investment per parcel made in the past 12 months by land use

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | | | |
|---|--------------------|---------|---------|-----------|---------|--------|--------|------|------|------|--|
| | Cabo Delgado | | Nampula | | | | | | | | |
| | Treatment | Control | Total | Treatment | Control | Total | Total | 1vs2 | 4vs5 | 3vs6 | |
| Average cost of Investment per parcel by type by use | | | | | | | | | | | |
| | Total | | | | | | | | | | |
| Increasing the parcel size | 105 | 3,046 | 2,225 | | | | 2,225 | | | | |
| Constructions of new buildings/houses | 2,407 | 3,719 | 3,323 | 625 | 1,322 | 805 | 1,836 | | | *** | |
| Repairs/improvements of buildings | 2,701 | 3,667 | 3,158 | 179 | 100 | 168 | 1,920 | | ** | *** | |
| Repairs/Improvement of roof | 1,299 | 1,511 | 1,388 | 27 | - | 21 | 259 | | *** | *** | |
| Sewage, drainage, toilets | 4,225 | | 4,225 | 53 | | 53 | 686 | | | *** | |
| Facilities for water supply | | | | 166.70 | | 166.70 | 166.70 | | | | |
| Installation for access to electricity | 1,026 | 2,000 | 1,240 | | 200 | 200 | 1,173 | | | *** | |
| Landline service | | | | | | | | | | | |
| Irrigation | | | | 250 | 400 | 272 | 272 | | ** | | |
| Total cost of investment per parcel (Mt) | 848 | 1,784 | 1,348 | 137 | 273 | 167 | 630 | ** | * | *** | |
| Total cost of investment per m2 (Mt) | 2 | 2 | 2 | 0 | 1 | 1 | 1 | | *** | *** | |
| | Residential | | | | | | | | | | |
| Increasing the parcel size | 238 | | 238 | | | | 238 | | | | |
| Constructions of new buildings/houses | 2,813 | 3,719 | 3,478 | 625 | 1,322 | 805 | 1,867 | | | | |
| Repairs/improvements of buildings | 2,701 | 2,500 | 2,626 | 179 | 100 | 168 | 1,504 | | | ** | |

| | | | | | | | | | |
|--|-------|-------|-------|-------|-------|-------|-------|----|-----|
| Repairs/Improvement of roof | 1,299 | 1,172 | 1,255 | 27 | - | 21 | 219 | ** | ** |
| Sewage, drainage, toilets | 4,225 | | 4,225 | 160 | | 160 | 1,577 | | |
| Facilities for water supply | | | | | | | | | |
| Installation for access to electricity | 1,026 | 2,000 | 1,240 | | 200 | 200 | 1,173 | | |
| Landline service | | | | | | | | | |
| Irrigation | | | | | 2,000 | 2,000 | 2,000 | | |
| Total cost of investment per parcel (Mt) | 1,888 | 3,201 | 2,494 | 149 | 301 | 187 | 737 | | *** |
| Total cost of investment per m2 (Mt) | 5 | 4 | 5 | 0 | 1 | 1 | 2 | | *** |
| Agricultural | | | | | | | | | |
| Increasing the parcel size | 0 | 482 | 358 | | | | 358 | | |
| Constructions of new buildings/houses | 0 | | 0 | | | | 0 | | |
| Repairs/improvements of buildings | | | | | | | | | |
| Repairs/Improvement of roof | | | | | | | | | |
| Sewage, drainage, toilets | | | | 0 | | 0 | 0 | | |
| Facilities for water supply | | | | 167 | | 167 | 167 | | |
| Installation for access to electricity | | | | | | | | | |
| Landline service | | | | | | | | | |
| Irrigation | | | | 250 | - | 219 | 219 | | *** |
| Total cost of investment per parcel (Mt) | 0 | 90 | 49 | 101 | 0 | 91 | 64 | | ** |
| Total cost of investment per m2 (Mt) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | * |
| Unweighted N of parcels with investments | 94 | 29 | 123 | 185 | 96 | 281 | 404 | | |
| Unweighted N of all parcels | 1,636 | 894 | 2,530 | 1,496 | 1,172 | 2,668 | 5,198 | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

In terms of cost of investment by investment types, the cost data for increasing parcel size is not available (Table 28).¹⁰ The construction of new building/houses and repairs/improvement of buildings are the most expensive investments (1,836 Mt and 1,920 Mt respectively) among all the categories with cost data. Installation for access to electricity is the third most expensive investment with an average cost of 1,173 Mt per investment. An average cost of roof repairs/improvement (which is the most popular investment) is 259 Mt. The cost of repairs/improvement of roofs and the cost of repairs/improvement of building are significantly more expensive in Cabo Delgado than in Nampula. The cost of other types of investment is not significantly different between districts. And the cost difference between treatment and control areas within each district is not statistically significant in almost all cases.

Disaggregation of investments by head's gender reveals considerable variation in investments across head's gender. Male-headed households are significantly more likely to invest than female-headed households (23% vs. 12%) when all the investments are aggregated. Except for

¹⁰ Data are missing for this cost. We believe most of the cost incurred for this type of investment is labor. Labor use should be included in the endline survey.

repairs/improvement of roof, there is no significant difference in the cost of investment between male-headed households and the female-headed households for all the other types of investment.

4.2.9. Perceived impacts of DUAT

Respondents were asked to provide information on perceived impact of DUAT on land value, on participation in land sales and rental markets, conflicts, investment and collateralization. In this section, we will summarize the descriptive findings on all these aspects.

Table 29: Percentage distribution of households by their opinion on the effect of DUAT on the value of parcel

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | (7) All | Testing for mean difference | | |
|----------------------------|-----------------------|----------------|--------------|-----------------------|----------------|--------------|------------|-----------------------------|------------------|------------------|
| | (1) Treat- ment | (2) Control | (3) Total | (4) Treat- ment | (5) Control | (6) Total | | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| Increase the value | 64.7 | 67.0 | 66.2 | 85.8 | 85.1 | 85.6 | 72.6 | | | *** |
| Decrease the value | 11.8 | 18.1 | 15.8 | 5.0 | 4.1 | 4.7 | 12.2 | ** | | *** |
| Does not affect the value | 6.3 | 3.0 | 4.2 | 3.6 | 5.7 | 4.2 | 4.2 | ** | | |
| Does not know | 17.2 | 11.9 | 13.8 | 5.6 | 5.1 | 5.5 | 11.1 | * | | *** |
| Unweighted N of households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

In the previous section, we showed that only 0.3% of parcels have DUAT (13 out of 4474). However, the importance of DUAT is apparent as 73% of households (86% in Nampula and 66% in Cabo Delgado) perceived that DUAT would increase the value of land (Table 29). On the other hand, 4.2% thought that DUAT won't make any difference in land value, and 12% (16% in Cabo Delgado and 5% in Nampula) of households perceived that DUAT would actually reduce the value of the parcel. There are also 11% (14% in Cabo Delgado and 6% in Nampula) who answered "don't know". Except for the category of "does not affect the value", the difference between the two districts is significant for the remaining three categories. In terms of comparison between the treatment and control sites with the same district, the results vary across districts. While the difference is not statistically significant in all categories in Nampula, the difference is significant in three of the four cases in Cabo Delgado. The share of households who perceived DUAT to "increase the value" is statistically insignificant between treatment and control sites in Cabo Delgado.

There is also a considerable variation in the perception of DUAT's impact on land value between the genders of household heads. The share of male-headed households that perceived that possession of DUAT could increase land value is 76%, compared to 66% for the female-headed households. The share of households that answered "don't know" is higher among the female-headed households (15%) than among the male-headed households (9%). The difference in both cases is statistically significant at 1% level.

Table 30: Percentage of households by their willingness to pay, willingness to sell and rent out in the case of DUAT

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean difference | | |
|--|---------------------|---------|-------|----------------|---------|-------|-------|-----------------------------|------------|------------|
| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | - | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| | Treat-ment | Control | Total | Treat-ment | Control | Total | All | | | |
| <i>% HHs willing to pay more, less or same for parcel without DUAT</i> | | | | | | | | | | |
| More | 25.6 | 21.7 | 23.1 | 24.8 | 21.2 | 23.7 | 23.3 | | | |
| Less | 27.9 | 32.1 | 30.6 | 55.5 | 57.3 | 56.1 | 39.0 | | | *** |
| The same | 9.9 | 14.7 | 13.0 | 10.1 | 12.7 | 10.9 | 12.3 | * | | |
| Does not know | 36.6 | 31.5 | 33.3 | 9.6 | 8.9 | 9.4 | 25.5 | | | *** |
| <i>% HHs more willing to sell property in the case of DUAT</i> | | | | | | | | | | |
| Yes | 48.8 | 41.9 | 44.4 | 28.5 | 25.0 | 27.4 | 38.8 | | | *** |
| No | 24.9 | 31.5 | 29.1 | 60.7 | 65.8 | 62.3 | 40.0 | * | | *** |
| Does not know | 26.3 | 26.6 | 26.5 | 10.8 | 9.2 | 10.3 | 21.2 | | | *** |
| <i>% HHs more willing to rent out property in the case of DUAT:</i> | | | | | | | | | | |
| Yes | 58.1 | 46.9 | 50.9 | 43.7 | 46.5 | 44.6 | 48.8 | *** | | ** |
| No | 17.0 | 23.3 | 21.0 | 43.7 | 44.6 | 44.0 | 28.6 | * | | *** |
| Does not know | 25.0 | 29.8 | 28.1 | 12.6 | 8.9 | 11.5 | 22.6 | | | *** |
| Unweighted N of households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

As expected, the share of households that are willing to pay less (39% overall, 31% in Cabo Delgado and 56% in Nampula) is larger than the share of households that are willing to pay more (23% in both districts) for parcels without DUAT compared to parcels with DUAT (Top panel, Table 30). In the meantime, 12% of households (13% in Cabo Delgado and 11% in Nampula) did not think DUAT would make much difference in their willingness to pay to acquire a parcel. There are 26% of households (33% in Cabo Delgado and 9% in Nampula) who answered “do not know”, which suggests that significant proportion of households had no experience or no knowledge about DUAT. The difference in the share of respondents who are willing to pay less or who did not know how to answer is statistically significant between Cabo Delgado and Nampula. Unlike the comparison across districts, the difference between treatment and control sites within the same district is small and insignificant in almost all the cases. In terms of gender comparison, the proportion of households who are willing to pay less is much higher among male-headed households than female-headed households (45% vs. 29%). The difference is also statistically significant. The share of female-headed households is greater than that of male-headed households in all remaining three categories with the difference being statistically significant in two of the three categories.

In terms of willingness to sell property in the case of DUAT (Middle panel, Table 30), the proportion of households that are more willing and that are less willing are almost identical (39% versus 40%). The comparison of the mean of the overall sample however masks the huge and statistically significant difference between the two districts. While the proportion of respondents who are willing to sell is significantly higher in Cabo Delgado (44%) than in Nampula (27%), the result reversed in the case of proportion of respondents who are not willing to sell (29% in Cabo Delgado vs. 62% in Nampula). Again, 21% of households answered with a response “don’t know” probably due to the lack of experience or knowledge about DUAT. The difference between the treatment and control sites within each district is small. The difference is insignificant in all cases for the district of Nampula. In Cabo Delgado, the only category where the difference between the treatment and control sites is statistically significant (though at 10% level) is the proportion of households who are not willing to sell (32% in the control sites vs 25% in the treatment sites). In terms of gender difference, the proportion of households who are more willing to sell their properties in the case of DUAT is almost the same between male-headed and female-headed households. The proportion of households who are not willing to sell is statistically significantly higher for male-headed households (43%) than for the female-headed households (35%).

Unlike the case of property sale, almost half of the households (49% overall, 51% in Cabo Delgado and 45% in Nampula) are more willing to rent out their parcels in the case of DUAT (bottom panel, Table 30), compared to 29% of households (21% in Cabo Delgado and 44% in Nampula) who are not willing to rent out parcels in the case of DUAT. This is interesting because DUAT seems to be more effective to encourage participation in rental market than in sales market. Consistent with the previous two cases, again 23% of households were not able to answer “Yes” or “No”, so selected “don’t know” as their answers. The difference between districts is again statistically significant in all three cases. The comparison between treatment and control sites within the same district yield more mixed results. While in Cabo Delgado, the proportion of households who are willing to rent out in the case of DUAT is higher (significant at 1%) in the treatment (58%) than in the control sites (47%), the proportion of household who are not willing to rent out is significantly (though at 10% level) smaller in the treatment (17%) than in the control sites (23%). In the district of Nampula, there is no significant difference between treatment and control sites in any of the categories. Gender analysis indicates that male-headed households are significantly more willing to rent out than female-headed households (52% vs. 44%). The difference in proportion of households not willing to rent out, however, is insignificant.

It is interesting to note that more households perceived that demarcation/DUAT would increase the likelihood of land conflicts than those that perceived the opposite ¹¹(top panel, Table 32). On average 27% (or 14%) of households that perceived that demarcation/DUAT would make land conflicts more (or somewhat more) likely to occur, compared to 21% (or 16%) who perceived DUAT will make land conflicts more (or somewhat) unlikely to occur. The remaining 22% of

¹¹ One potential reason why the DUAT is perceived by some to increase (rather than decrease) the likelihood of land conflicts is that demarcation/DUAT may increase the conflicts among household members. For example, we were given a following argument during our field visit to Malema, Nampula. Suppose one person was given land to farm by an uncle and then the uncle dies and some other family member shows up claiming the land. In the meantime the nephew continues to farm and the other family member is just letting him be for now. In this case, while the DUAT confers ownership of the land, the very process of demarcation and trying to settle ownership will bring the conflict to a head.

households selected “don’t know” as their response to this question. The proportion of households who perceived demarcation/DUAT to more likely increase the likelihood of conflicts is statistically the same in both districts. Proportion of households who perceived DUAT to cause conflicts “somewhat likely” or “more unlikely” is significantly higher in Nampula than in Cabo Delgado (18% vs. 11% in the case of “somewhat likely” or 31% vs. 17% in the case of “more unlikely”). The difference between the treatment and control sites within the same district is again small. The proportion of households who perceived DUAT to cause land conflicts “somewhat likely” is significantly higher (or lower) (at 10% level) in the treatment than in the control sites in Cabo Delgado (or Nampula). The difference in the case of “more unlikely” is also significant at 10% level between the treatment and control sites in Cabo Delgado. The difference between the treatment and control sites is not significant in the case of “more likely” or “more unlikely” in both districts. There is also considerable variation between male-headed households and female-headed households. Except for the case of “more likely” where the difference between male- and female-headed households is not significant, the proportion of households who perceived DUAT to cause land conflicts “somewhat unlikely” or “more unlikely” is significantly higher for male-headed households than female-headed households, the reverse is true in the case of “somewhat likely” or “don’t know”.

Unlike the impact on occurrence of land disputes, the perception of DUAT on dispute resolution is much more optimistic, as illustrated by the fact that more than 70% of households perceived that DUAT would make disputes more (56%) or somewhat more (16%) likely to be resolved. On the other hand, there are fewer than 10% of households that perceived DUAT to make disputes less likely (5%) or somewhat less (4%) to be resolved. Like in the previous cases, there is also a noticeable proportion of households (19%) that selected “don’t know” as the answer. The difference across the districts and between the treatment and control sites within the same district is all quite small and in majority of cases insignificant. The main noticeable difference across districts lies in the categories of people who responded “don’t know”. For example, the proportion of households in Cabo Delgado who answered “don’t know” is 24%, which is significantly higher than in Nampula district (7%). The difference between male-headed households and female-headed households is insignificant except in the case of “don’t know”.

Table 31: Households' opinion about the effect of DUAT on conflicts and expropriation

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean difference | | |
|--|---------------------|---------|-------|----------------|---------|-------|------|-----------------------------|------------|------------|
| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | - | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| | Treat-ment | Control | Total | Treat-ment | Control | Total | All | | | |
| <i>% HHs believing that demarcation/DUAT will make disputes more or less likely to occur</i> | | | | | | | | | | |
| More likely | 28.5 | 27.7 | 28.0 | 27.5 | 22.8 | 26.0 | 27.3 | | | |
| Somewhat likely | 14.1 | 9.6 | 11.2 | 16.7 | 21.8 | 18.3 | 13.5 | * | * | *** |
| Somewhat unlikely | 15.2 | 14.5 | 14.8 | 19.4 | 15.5 | 18.2 | 15.9 | | | |
| More unlikely | 13.5 | 18.9 | 17.0 | 30.5 | 30.4 | 30.5 | 21.4 | * | | *** |
| Don't know | 28.8 | 29.3 | 29.1 | 6.0 | 9.5 | 7.0 | 21.9 | | * | *** |

% HHs believing that demarcation/DUAT will make disputes more or less likely to be resolved

| | | | | | | | | | |
|--|------|------|------|------|------|------|-------|---|-----|
| More likely | 58.4 | 54.2 | 55.7 | 58.0 | 55.7 | 57.3 | 56.2 | * | *** |
| Somewhat likely | 9.5 | 12.5 | 11.5 | 23.2 | 29.1 | 25.0 | 15.9 | | |
| Somewhat unlikely | 3.4 | 4.6 | 4.1 | 6.6 | 4.7 | 6.1 | 4.8 | | |
| More unlikely | 3.9 | 4.7 | 4.4 | 5.2 | 3.2 | 4.6 | 4.5 | | |
| Don't know | 24.8 | 24.0 | 24.3 | 7.0 | 7.3 | 7.1 | 18.6 | | *** |
| <i>% of HHs that think a DUAT reduces the risk of land expropriation</i> | | | | | | | | | |
| Yes | 82.0 | 80.2 | 80.9 | 90.1 | 87.0 | 89.2 | 83.6 | | *** |
| No | 2.9 | 2.7 | 2.7 | 4.5 | 7.6 | 5.5 | 3.6 | * | ** |
| Don't know | 15.1 | 17.1 | 16.4 | 5.4 | 5.4 | 5.4 | 12.8 | | *** |
| <i>% HHs' that think a DUAT makes the expropriation of land more transparent</i> | | | | | | | | | |
| Yes | 82.9 | 78.7 | 80.2 | 91.6 | 87.0 | 90.2 | 83.5 | * | *** |
| No | 1.7 | 5.3 | 4.0 | 2.5 | 7.3 | 3.9 | 4.0 | * | *** |
| Don't know | 15.4 | 16.0 | 15.8 | 6.0 | 5.7 | 5.9 | 12.6 | | *** |
| Unweighted N of households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

The positive effects of DUAT on the reduction of risk of land expropriation are overwhelmingly perceived by sample households as compared to other indicators discussed so far. Overall, 84% of households (81% in Cabo Delgado and 91% in Nampula) agreed that possession of DUAT would likely reduce the risk of land expropriation. Only 4% (3% in Cabo Delgado and 6% in Nampula) perceived the opposite. The remaining 13% selected “don't know” as their answers likely due to lack of knowledge of DUAT. The difference between Cabo Delgado and Nampula is statistically significant in all three cases. The difference between treatment and control sites within the same district is small and statistically insignificant in almost all the cases. The only case where the difference is significant at 10% is the proportion of households who do not perceive DUAT to reduce the risk in Nampula (5% in the treatment and 8% in the control sites). Male-headed households are more confident with the impact of DUAT on land loss than female-headed households (86% vs. 80%, significantly different at 10%).

Respondents were also asked whether he/she thinks a DUAT makes the expropriation of land more transparent. The answers to this question are highly consistent with the previous question on the impact of DUAT on reduction of risk of land expropriation (bottom panel, Table 31). In fact, the percentage of households in each category is almost identical to the previous question. This is not surprising because the two questions are closely related.

In terms of impact of DUAT on land investments (top panel, Table 32), a predominant majority of households perceived that DUAT would make land investment more likely (64% overall, 66% in Cabo Delgado and 62% in Nampula) or somewhat more likely (12% overall, 6% in Cabo Delgado and 24% in Nampula). To the contrary, less than 5% of households thought the possession of DUAT would reduce the likelihood of land investment. The remaining 20% of households selected “don't know” as their answers. The difference between Cabo Delgado and Nampula is statistically

significant in the categories of “somewhat likely” and “don’t know”. While 25% (or 9%) of households in Nampula perceived the possession of a DUAT would somewhat increase the likelihood of land investment (or answered “don’t know”), 6% (or 26%) of households provided the same answers for the corresponding categories. The difference between the treatment and control sites within the same district is even more insignificant. The only noticeable difference between the treatment and control sites is the category of “more likely” in Nampula (64% in the treatment site vs. 55% in the control site). The difference between male-headed and female-headed households is generally small in magnitude as well (though statistically significant in three categories “somewhat likely”, “somewhat unlikely” and “don’t know”).

The analysis of the baseline data also suggests strong evidence on positive impact of DUAT on collateralization of the property (middle panel, Table 32). The proportion of households that perceived DUAT to most likely (38%) or somewhat likely (9%) to increase the likelihood of using property as collateral is more than double the proportion of households that perceived DUAT to most unlikely (14%) to somewhat unlikely (10%) to increase the likelihood of using property as collateral. A significant amount of households (30% overall, 37% in Cabo Delgado and 13% in Nampula) answered this question with “don’t know” as a response. Thirty percent of households responded “don’t know” to this question, which is the largest share among all the outcome indicators in this section. This is not too surprising given the fact that collateralization of property with or without DUAT is rarely experienced by rural households in Mozambique.

The cross districts comparison suggests that the percentage of households that perceived DUAT to have positive effect on collateralization is much bigger in Nampula (42% “most likely”, and 19% “somewhat likely”) than in Cabo Delgado (35% “most likely” and 5% somewhat likely). On the other hand, much higher number of households in Cabo Delgado (37%) answered this question with “don’t know” than those in Nampula (13%). Except for the category of “somewhat unlikely”, the difference between the two districts is statistically significant for all other categories.

The comparison between treatment and control sites within the same district varies across district. While there is no statistically significant difference for all categories in the district of Nampula, the difference is significant for three categories in Cabo Delgado (“more likely”, “somewhat likely”, and “somewhat unlikely”). On average, more households in the treatment sites perceived DUAT to have positive impact on collateralization than those in the control sites. The gender analysis indicates significant difference exists between male- and female-headed households only in a couple of minor categories (“somewhat likely” and “don’t know”).

Table 32: Households' opinion about the effect of DUAT on investment and collateralization

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean difference | | |
|--|---------------------|---------|-------|----------------|---------|-------|-------|-----------------------------|------------|------------|
| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | - | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| | Treat-ment | Control | Total | Treat-ment | Control | Total | All | | | |
| <i>Distribution of HHs (%) by the likelihood of making improvement or investments on their properties with the attribution of a DUAT</i> | | | | | | | | | | |
| More likely | 65.7 | 65.6 | 65.7 | 64.4 | 55.1 | 61.6 | 64.3 | | ** | |
| Somewhat likely | 7.0 | 5.6 | 6.1 | 22.9 | 28.2 | 24.5 | 12.1 | | | *** |
| Somewhat unlikely | 0.9 | 2.2 | 1.7 | 3.5 | 6.0 | 4.3 | 2.6 | | | ** |
| More unlikely | 0.9 | 1.0 | 1.0 | 0.8 | 1.9 | 1.1 | 1.0 | | | |
| Don't know | 25.6 | 25.6 | 25.6 | 8.4 | 8.9 | 8.6 | 20.0 | | | *** |
| <i>Distribution of HHs (%) by the likelihood of using their property as collateral with the attribution of a DUAT</i> | | | | | | | | | | |
| More likely | 40.2 | 32.7 | 35.4 | 42.6 | 40.8 | 42.0 | 37.6 | * | | ** |
| Somewhat likely | 7.1 | 3.2 | 4.6 | 17.9 | 20.6 | 18.7 | 9.2 | ** | | *** |
| Somewhat unlikely | 6.5 | 12.9 | 10.6 | 9.7 | 8.5 | 9.3 | 10.2 | ** | | |
| More unlikely | 9.2 | 13.7 | 12.1 | 16.6 | 16.8 | 16.6 | 13.6 | | | ** |
| Don't know | 37.0 | 37.5 | 37.3 | 13.3 | 13.3 | 13.3 | 29.5 | | | *** |
| <i>Distribution of HHs (%) that would use their property as collateral for credit by use of credit</i> | | | | | | | | | | |
| Agriculture | 46.1 | 34.5 | 39.4 | 74.4 | 75.8 | 74.8 | 54.5 | * | | *** |
| Improve/expand property | 15.8 | 15.9 | 15.8 | 12.3 | 17.0 | 13.7 | 14.9 | | | |
| Business | 35.6 | 49.7 | 43.7 | 13.0 | 5.7 | 10.7 | 29.7 | ** | *** | *** |
| Don't know | 2.4 | 0.0 | 1.0 | 0.4 | 1.5 | 0.7 | 0.9 | ** | | |
| Unweighted N of all households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

The final set of question related to DUAT and collateralization is about the purposes of potential loans to be obtained using property as collateral (bottom panel, Table 32). The dominant majority of households indicated that they would use the potential loans for production activities. Overall 55% and 30% of households reported their intention to use the potential loan for agricultural purpose, and business purpose, respectively. Fifteen percent of the remaining 16% would use the credit to improve/expand property. In terms of variation across districts, while agriculture production (75%) is the most important purpose of potential loan in Nampula, the most important purpose of potential loan in Cabo Delgado is business (44%). And these are the two categories where the difference between the two districts is statistically significant. The comparison between treatment and control sites within the same district yields considerable variation across districts. In Cabo Delgado, the number of households who reported to use loan for agricultural production is significantly higher in the treatment than in the control sites. The opposite is true in the case of “business”. In Nampula, the only category where the difference between treatment and control sites is significant is the “business” category (13% in the treatment vs. 6% in the control site). Finally, while a significantly larger proportion of male-headed households than female-headed households reported to use loan for agricultural production, the result is reversed in the case of “business”.

4.2.10. Knowledge of Land Law

Table 33 summarizes respondents' knowledge about women's rights under the land law of 1997. The majority of households know women's rights under the law pretty well. Specifically, the share of respondents who know women have the rights to inherit land on equal basis as their brothers, have the rights to maintain piece of their ex-husband's land in case of divorce and have the right to apply for formal land title is respectively, 84%, 80%, and 78%.

While there is a large variation across districts, the difference between the treatment and control sites within the same district is generally small. While there are more than 80% of households in Cabo Delgado who know each of the three types of women's rights, share of households that know each of the three types of rights in Nampula ranges between 63% and 73%. The difference between districts is also statistically significant in all cases except for the categories of "don't know". The main noticeable difference between the treatment and control sites in Cabo Delgado is that households who perceived positive impacts of land law on women's rights to inherit land on equal basis as their brothers (or on women's rights to apply for formal land titles) is significantly higher in the treatment (or control sites) than in the control sites. In the case of Nampula, except for a category of "don't know", there is no significant difference between the treatment and control sites. Female-headed households have better knowledge about the women's rights than male-headed households. The gender difference is statistically significant in almost all cases.

Table 33: Knowledge about women's rights under the land law of 1997

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean difference | | |
|--|---------------------|---------|-------|----------------|---------|-------|-------|-----------------------------|------------|------------|
| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | - | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| | Treat-ment | Control | Total | Treat-ment | Control | Total | All | | | |
| <i>% HHs reporting that women have the right to inherit land on equal basis as their brothers</i> | | | | | | | | | | |
| Yes | 92.2 | 86.8 | 88.8 | 71.6 | 75.0 | 72.7 | 83.5 | ** | | *** |
| No | 5.0 | 8.1 | 7.0 | 22.6 | 25.0 | 23.4 | 12.4 | | | *** |
| Does not know | 2.7 | 5.0 | 4.2 | 5.7 | 0.0 | 4.0 | 4.1 | | *** | |
| <i>% HHs reporting that women have the right to maintain a piece of their ex-husband's land in case of divorce</i> | | | | | | | | | | |
| Yes | 88.7 | 89.2 | 89.0 | 63.1 | 61.7 | 62.7 | 80.4 | | | *** |
| No | 6.2 | 6.5 | 6.4 | 30.7 | 35.4 | 32.2 | 14.8 | | | *** |
| Does not know | 5.2 | 4.3 | 4.6 | 6.2 | 2.8 | 5.2 | 4.8 | | | |
| <i>% HHs reporting that women have the right to apply for a formal land title</i> | | | | | | | | | | |
| Yes | 87.3 | 79.7 | 82.4 | 67.4 | 70.9 | 68.4 | 77.8 | ** | | *** |
| No | 3.8 | 11.2 | 8.5 | 20.8 | 20.6 | 20.8 | 12.6 | *** | | *** |
| Does not know | 8.8 | 9.2 | 9.0 | 11.8 | 8.5 | 10.8 | 9.6 | | | |
| Unweighted N of all households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Overall, the survey data show that the 1997 Land Law was not well publicized (Table 34). Only 22% of the households (22% in Cabo Delgado, and 21% in Nampula) were informed about the law. For those who were informed about the land law, only 16% of households reported to know

fair amount about the law, and the majority of them either don't know the content of the law (14%) or know very little about it (65%). The difference between the two districts is statistically significant in the three main categories. The share of respondents who don't know the law at all, know the law only a little or know a fair amount of law in Cabo Delgado is 17%, 59% and 20% respectively, compared to 8%, 82% and 8% respectively in Nampula. The difference between treatment and control sites within the same district is small and statistically insignificant in all cases.

In terms the means by which they received information about the law, 39% reported to have received information from local leaders, 22% from government authorities, and 39% from other sources. The relative importance of means by which the information is disseminated varies considerably across the districts. For example, while the share of households that received information about the law from the local leaders, from government authorities, and from other sources is 27%, 24% and 49%, respectively in Cabo Delgado, the corresponding shares are 66%, 18% and 16%, respectively in Nampula. The difference is significant in two of the three cases. While the difference between the treatment and control sites is insignificant in all cases in Cabo Delgado, the proportion of households who listed "local leaders" or "others" as the main means is significantly higher in the control site than in the treatment site in Nampula. While local leaders appear to be more important in the dissemination process for the female-headed households, and government authorities is more important for male-headed households.

Of those household that are informed about the law (22% of the entire sample), only 7% (10% in Cabo Delgado and 1% in Nampula) received dissemination materials about the law from the government. In the meantime, 35% of the households (26% in Cabo Delgado and 55% in Nampula) that were informed about the land law know the specific rights of the land law. The difference in both cases is also statistically significant across districts. On the other hand, the difference between the treatment and control sites within each district is small and insignificant in both cases. The gender analysis suggests that male-headed households are more knowledgeable about the specific rights of the law than female-headed households.

Table 34: Perceptions of the Land Law of 1997

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All</u> | Testing for mean difference | | |
|--|-----------------------|----------------|--------------|-----------------------|----------------|--------------|------------|-----------------------------|------------------|------------------|
| | (1) Treat- ment | (2) Control | (3) Total | (4) Treat- ment | (5) Control | (6) Total | | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| % of households informed about the law | 21.6 | 22.9 | 22.4 | 23.4 | 15.8 | 21.1 | 22.0 | | | ** |
| FOR HOUSEHOLDS (HH) INFORMED ABOUT THE LAND LAW | | | | | | | | | | |
| <i>Distribution of HHs (%) by how much they know about the land law</i> | | | | | | | | | | |
| None | 19.3 | 15.6 | 16.9 | 6.7 | 14.0 | 8.4 | 14.2 | | | * |
| A little | 50.5 | 63.4 | 59.0 | 83.2 | 80.0 | 82.4 | 66.4 | | | *** |
| A fair amount | 24.7 | 17.9 | 20.3 | 9.2 | 6.0 | 8.4 | 16.5 | | | ** |
| A lot | 5.5 | 3.1 | 3.9 | 1.0 | 0.0 | 0.7 | 2.9 | | | |
| <i>Distribution of HHs (%) by the means that they received information of land law</i> | | | | | | | | | | |
| Local leaders | 28.7 | 25.8 | 26.8 | 64.9 | 70.0 | 66.1 | 39.1 | | | *** |
| Dissemination by authorities | 25.6 | 23.1 | 24.0 | 22.1 | 4.0 | 18.0 | 22.1 | | *** | |
| Others | 45.7 | 51.2 | 49.3 | 13.0 | 26.0 | 16.0 | 38.8 | | * | *** |

| | | | | | | | | | | |
|---|------|------|------|------|------|------|-------|----|----|-----|
| % HHs that received information about the land law of 1997 | 10.6 | 9.7 | 10.0 | 0.0 | 4.0 | 0.9 | 7.1 | | | *** |
| % HHs that knows specific rights of the land law of 1997 | 26.0 | 25.7 | 25.8 | 52.4 | 62.0 | 54.6 | 34.9 | | | *** |
| <i>Distribution of HHs (%) by their opinions on how the land law strengthens land tenure</i> | | | | | | | | | | |
| Very useful | 73.5 | 78.5 | 76.8 | 67.3 | 72.0 | 68.4 | 74.1 | | | |
| Somewhat useful | 8.6 | 2.0 | 4.3 | 15.9 | 16.0 | 15.9 | 8.0 | ** | | *** |
| Useless | 3.3 | 3.1 | 3.2 | | | | 2.2 | | | |
| Cannot say | 14.6 | 16.4 | 15.8 | 16.8 | 12.0 | 15.7 | 15.8 | | | |
| <i>Distribution of HHs (%) by their opinion on the right to sell and buy land according to the land law</i> | | | | | | | | | | |
| Yes | 1.3 | 0.0 | 0.4 | 9.2 | 20.0 | 11.6 | 4.0 | | | *** |
| No | 31.4 | 50.6 | 44.0 | 77.4 | 76.0 | 77.1 | 54.4 | ** | | * |
| Do not know | 67.3 | 49.4 | 55.6 | 13.5 | 4.0 | 11.3 | 41.6 | ** | ** | *** |
| Unweighted N of HHs informed of the law | 101 | 55 | 156 | 92 | 50 | 142 | 298 | | | |
| Unweighted N of all households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Despite the poor implementation and generally poor knowledge about the specificity of the law, a majority of households perceived that land law is very useful (74%) or somewhat useful (8%) in strengthening tenure security (Table 34). Only 2.2% perceived the law as useless in terms of strengthening tenure security. The remaining 16% selected “cannot say” as their answers. The difference across districts and between treatment and control as well as between male-headed households and female-headed households is small and in most cases insignificant.

Finally, only 4% of households think they have rights to sell and buy land under 1997 Land Law. More than half of the households (54%) don’t think they have the rights to sell and buy land under the 1997 Land Law. The remaining 42% of households responded with “do not know”. There is considerable and statistically significant variation in the perception on rights to sell and buy under the 1997 Land Law between the two districts. For example, while 12% of households in Nampula (9% in treatment and 20% in control sites) thought they have the right to sell and buy under the Law, almost no one in the Cabo Delgado thought they have the right to do so. On the other hand, 77% households in Nampula are sure they don’t have the rights to sell or buy under the law, only 44% of households are sure about that in Cabo Delgado. There is also noticeable variation between control and treatment sites within the same district. In Cabo Delgado, the share of households who perceived to have no rights to sell and buy according to the law is significantly higher in the control sites than in the treatment sites (51% vs. 31%). On the other hand, the share of households who responded ‘don’t know’ is significantly higher in the treatment than in the control site (67% vs. 49%). In Nampula, the share of households who answered “don’t know” is significantly higher in the treatment than in the control site (14% vs. 4%), and this is the only case where the difference is significant in Nampula.

4.3. Income, consumption and poverty status

The ultimate goal of increasing land tenure security through provision of rural DUATs under the Land Project is to positively impact welfare of rural households as measured by income, consumption and expenditure. The baseline survey collected detailed information on household income, consumption and expenditures. While collecting this information both in the baseline survey and in the future follow-up survey is essential to evaluate the impact of the project on these welfare indicators using difference-in-difference approach, it is also informative to analyze the baseline data alone to see what is the average level of income and consumption of rural households in Mozambique and how they differ between the treatment and control sites, between the two study districts and also between male-headed households and female-headed households. This section presents the results of the baseline survey analysis on these aspects.

4.3.1. Household income and income sources

Average household income is Mt 27,949 (Mt 19,600 in Nampula and Mt 32,022 in Cabo Delgado) (Table 35). Farming activities is by far the most important source of income as the crop production and products from forest/fauna accounts for 53% and 20%, respectively. Income from salaried employment and income from other non-farm self-employment activities are Mt 3,714 (or 13% of total income) and Mt 3,259 (or 11%), respectively. The total household income and income from each individual source are much and statistically significantly higher in Cabo Delgado than in Nampula. There is also vast variation in incomes from different sources. The higher level of overall income in Cabo Delgado is mainly due to the more diversified income activities in Cabo Delgado than in Nampula. While more than 85% of total income in Nampula is from crop production, the crop production accounts for 44% of total income in Cabo Delgado.

While in general the difference between the treatment and control sites within the same district is small for the total income and incomes from majority of individual activities, the only category with noticeable and statistically significant difference between treatment and control sites within the same district for both districts is the salaried employment. The income from salaried employment appears to be much higher in the treatment than in the control sites in both districts (6,953 vs. 3,931 in Cabo Delgado, and 5,014 vs. 1386 in Nampula). Male-headed households generated more income than female-headed households in almost all the major income categories. And the difference is statistically significant in almost all the cases. As a result, the total household income is higher for male-headed households (Mt. 31,250) than female-headed households (Mt. 22,271).

The conversion from total household income to per capita income and per AEU (adult equivalent units) changes the value of income, but does not change the relative importance of individual income sources. The per capital income for the entire sample is Mt. 6,556. Like total household income, both the per capita income and income per AEU in Cabo Delgado (Mt. 7,347 and Mt. 9,198, respectively) are much higher than those in Nampula (Mt. 4,934 and Mt. 6,367, respectively). Per capital household income and income per AEU for male-headed households are Mt. 7,200 and Mt. 9,139, compared to Mt. 5,447 and Mt. 6,641 for female-headed households.

Table 35: Household Income and Income sources (Meticais)

(1) (2) (3) (4) (5) (6) (7) Testing for mean

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | All | <u>difference</u> | | |
|---|------------------------|----------------|--------------|------------------------|----------------|--------------|--------|-------------------|---------------|---------------|
| | <u>Treat- ment</u> | <u>Control</u> | <u>Total</u> | <u>Treat- ment</u> | <u>Control</u> | <u>Total</u> | | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| Household income | 32,377 | 31,823 | 32,022 | 19,331 | 20,213 | 19,600 | 27,949 | | | *** |
| Net crop income | 13,683 | 14,295 | 14,075 | 16,163 | 18,078 | 16,749 | 14,952 | | | * |
| Income from salaried employment | 6,953 | 3,931 | 5,014 | 1,386 | 280 | 1,048 | 3,714 | ** | ** | *** |
| Income from self-employments: products from the forest/fauna | 7,590 | 8,723 | 8,317 | 46 | 13 | 36 | 5,602 | | | *** |
| Income from self-employment: other activities (net of costs) | 3,598 | 4,377 | 4,098 | 1,447 | 1,754 | 1,541 | 3,259 | | | ** |
| Livestock income | 201 | 196 | 198 | 213 | 154 | 195 | 197 | | | |
| Income from pensions | 143 | 148 | 146 | 49 | 0 | 34 | 109 | | | *** |
| Net transfer income | 207 | 153 | 173 | -6 | -87 | -31 | 106 | | | * |
| Rental income | 3 | 0 | 1 | 32 | 20 | 28 | 10 | | | *** |
| Household income per capita | 7,785 | 7,102 | 7,347 | 4,933 | 4,936 | 4,934 | 6,556 | | | *** |
| Household income per AEU | 9,578 | 8,986 | 9,198 | 6,152 | 6,367 | 6,217 | 8,221 | | | *** |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

4.3.2. Food consumption and household dietary composition

Table 36 reports the descriptive results on household food consumption/expenditures by main food categories. The average value of total food consumption per household in the study area is estimated to be 2741.39 MT/Month (or equivalent to \$98.97 per month) varying from 1612.6 MT/month (\$58.2 per month) in the Nampula district to 3292.06 MT/month (\$118.85 per month) in the Cabo Delgado district. In value terms, the two most important food categories are the basic food items (cereals, grains, roots & tubers - 1210.18 MT/month) and meat & animal products (628.66 MT/month). These two categories account for more than two third of the value of monthly food consumption by the sample households. The other significant food categories include legumes & vegetables (44.83 MT/month) and other food categories (353.75 MT/month). Fruits and nuts (with monthly expenditure of 140.51) account for approximately 5% of the value of monthly overall food consumption. The value of monthly consumption of tobacco and meals & beverages in restaurants is respectively, 18.90 MT/month and 2.66 MT/month, almost negligible compared to the overall food expenditure. The extremely small expenditure on meals & beverages in restaurants tends to suggest that rural residents rarely eat away from their homes.

For the total food consumption per household, total food consumption per capita as well as some of the key food categories (cereals, grains, roots & tubers; meat & animal products; and fruits & nuts), the value of monthly food consumption is statistically significantly higher in the Cabo Delgado district than in the Nampula district (Table 36). The difference is much smaller and insignificant between the treatment and control sites within each district. For example, the

difference is not significant in total and per capita food consumption as well as any of the individual food categories in Cabo Delgado. Except for legumes & vegetables, and meat & animal products where the value in the control sites is significantly higher than in the treatment group, the difference is insignificant in total food consumption, per capita food consumption and any of the rest of individual categories. Except for fruits & nuts and tobacco, the difference between male and female-headed households is generally insignificant for all other categories.

Table 36: Value of monthly household food and tobacco consumption (Meticais)

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean difference | | |
|---------------------------------------|---------------------|----------|----------|----------------|---------|--------|----------|-----------------------------|-----------|-----------|
| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | - | (1) | (4) | (3) |
| | Treat- ment | Control | Total | Treat- ment | Control | Total | All | vs (2) | vs (5) | vs (6) |
| Cereals, grains, roots & tubers (mt) | 1,471.91 | 1,452.95 | 1,459.75 | 704.69 | 684.74 | 698.59 | 1,210.18 | | | *** |
| Legumes & vegetables (mt) | 381.28 | 375.74 | 377.73 | 351.69 | 413.32 | 370.53 | 375.37 | ** | | |
| Fruits & nuts (mt) | 173.25 | 175.77 | 174.87 | 72.83 | 63.88 | 70.09 | 140.51 | | | *** |
| Meat & animal products (mt) | 705.83 | 880.28 | 817.74 | 213.68 | 303.30 | 241.08 | 628.66 | *** | | *** |
| Other food items (mt) | 400.57 | 495.84 | 461.68 | 236.66 | 197.82 | 224.79 | 384.01 | | | *** |
| Meals & beverages in restaurants (mt) | 0.82 | 0.00 | 0.29 | 5.57 | 11.93 | 7.51 | 2.66 | | | * |
| Tobacco (mt) | 26.84 | 22.40 | 23.99 | 9.45 | 6.25 | 8.47 | 18.90 | | | *** |
| Total food consumption (mt) | 3133.67 | 3380.58 | 3292.06 | 1585.12 | 1675 | 1612.6 | 2741.39 | | | *** |
| Total food consumption (usd) | 113.13 | 122.04 | 118.85 | 57.22 | 60.47 | 58.22 | 98.97 | | | *** |
| Total food consumption/cap (mt) | 797.03 | 772.33 | 781.19 | 404.13 | 424.16 | 410.25 | 659.56 | | | *** |
| Total food consumption/cap (usd) | 28.77 | 27.88 | 28.2 | 14.59 | 15.31 | 14.81 | 23.81 | | | *** |
| Unweighted N of households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

The composition of different categories of food consumed by the households over the past seven days prior to the 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 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 “fruits” 9 “milk and milk products” 10 “oil and oil seeds” 11 “sugar” 12 “Miscellaneous” (Swindale and Bilinsky, 2006). The possible score ranges between 1 (least diverse diet) and 12 (the most diverse diet).

Table 37: Household Diet Diversity

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean | | |
|--------------------------------|---------------------|---------|-------|----------------|---------|-------|-------|------------------|------------------|------------------|
| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | - | difference | | |
| | Treat- ment | Control | Total | Treat- ment | Control | Total | All | (1) vs (2) | (4) vs (5) | (3) vs (6) |
| Cereals & grains | 96.1 | 95.6 | 95.8 | 99.1 | 99.7 | 99.3 | 96.9 | | | *** |
| Roots & tubers | 95.3 | 99.2 | 97.8 | 82.7 | 74.4 | 80.1 | 92 | *** | *** | *** |
| Meat | 8.1 | 11.5 | 10.3 | 16.7 | 20.9 | 18 | 12.8 | | | *** |
| Eggs | 10.9 | 9.3 | 9.9 | 5.7 | 12.7 | 7.9 | 9.2 | | *** | |
| Fish/shellfish/seafood | 84.4 | 91.6 | 89 | 68.1 | 74.4 | 70 | 82.8 | *** | * | *** |
| Legumes | 82.7 | 78.9 | 80.2 | 90.3 | 95.6 | 91.9 | 84.1 | | *** | *** |
| Vegetables | 85.7 | 91.1 | 89.2 | 87.6 | 96.5 | 90.3 | 89.6 | ** | *** | |
| Fruit | 73.9 | 78.1 | 76.6 | 67.7 | 69 | 68.1 | 73.8 | | | *** |
| Milk & milk products | 5.1 | 5.7 | 5.5 | 0 | 0 | 0 | 3.7 | | | *** |
| Oils & oil seeds | 90.6 | 93.8 | 92.7 | 71.6 | 69.3 | 70.9 | 85.5 | | | *** |
| Sugar | 65 | 69.6 | 68 | 24.3 | 19.6 | 22.9 | 53.2 | | | *** |
| Miscellaneous | 94.4 | 93 | 93.5 | 95.5 | 98.7 | 96.5 | 94.5 | | *** | * |
| HH Diet Diversity Score (HDDS) | 7.9 | 8.2 | 8.1 | 7.1 | 7.3 | 7.2 | 7.8 | * | ** | *** |
| Unweighted N of households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

The baseline survey data suggests medium to high level of HDDS among all the households in the study area (Table 37). An average household in the study area consumes 7.8 different food groups. Households in Cabo Delgado on average consume significantly more food groups than those in Nampula (8.1 vs. 7.2). An average household in the control site consumes significantly higher number of food groups than in the treatment site in both the Cabo Delgado district (8.2 vs. 7.9) and Nampula district (7.3 versus 7.1).

The results in Table 37 also indicate that the two most popular food items are cereals & grains and roots & tubers with 95% of households consuming both items. Miscellaneous items is the third most popular items (92%) followed by vegetables (87%), Oils & oil seeds (85.5 %), fish/shellfish/seafood (85.1%), and legumes (72%). Meat, eggs and milk & milk products on the other hand are among the least consumed goods with their HDDS being 8.9%, 7.5% and 3%, respectively. The relative popularity of individual food items (measured as percentage of households using the product) varies across regions and between the treatment and control groups within the same district. For example, roots & tubers are the most popular food items in Cabo Delgado (with 98% of households consuming it), but it ranks only fifth in Nampula with only 80% of households in Nampula consuming roots & tubers. While the difference across districts is statistically significant for majority of food items (10 out of 12), the difference between treatment and control sites is significant for 3 out of 12 food items in Cabo Delgado (root & tubers, fish/shellfish/seafood, and vegetables) and for 5 of the 12 items in Nampula (roots & tubers, eggs, fish/shellfish/seafood, legumes, vegetables). In terms of gender analysis, the difference in HDDS between male-headed households and female-headed households is not statistically significant. However, the difference between male- and female-headed households is statistically significant for half of the food items.

4.3.3. Household expenditures on non-food items

An average household in the study area spent 1179.17 MT/month (approximately 30% of the total household expenditures) on non-food items (Table 38). The number one non-food item in terms of expenditure is clothing which alone accounts for 44% of the total household non-food expenditures. Fuel and transportation are the second and third most important non-food items accounting for 16% and 8% of total household expenditures, respectively. Other items with noticeable expenditures include culture and recreational goods (6.6%), rent, utilities and household security (6.3%), health (6.1%), and communications (4.3%). Expenses on household appliance, durable goods, domestic services, other miscellaneous assets/services and education are extremely small. Statistical analysis also reveals that while the difference between the two districts is large and statistically significant for almost all the non-food items, the results are much less robust in the comparison between treatment and control sites within each district. Specifically, the difference is insignificant between treatment and control sites within each district for the four top items in both districts. The difference between male- and female- headed households is generally small and insignificant expect for a couple of minor items.

Table 38: Average monthly expenditures per household

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean difference | | |
|--|---------------------|----------|----------|----------------|----------|----------|----------|-----------------------------|-----------|-----------|
| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | - | (1) | (4) | (3) |
| | Treat- ment | Control | Total | Treat- ment | Control | Total | All | vs (2) | vs (5) | vs (6) |
| Clothing (mt) | 530.31 | 629.46 | 593.91 | 339.61 | 400.17 | 358.13 | 516.6 | | | *** |
| Rent, utilities, insurance (mt) | 96.29 | 113.29 | 107.2 | 10.28 | 0 | 7.13 | 74.39 | | | *** |
| HH appliance, accessories (mt) | 23.96 | 16.6 | 19.24 | 15.29 | 77.51 | 34.31 | 24.18 | | *** | |
| HH durable goods, domestic services (mt) | 19.99 | 9.87 | 13.5 | 28.31 | 50.12 | 34.98 | 20.54 | * | * | *** |
| Transportation (mt) | 105.22 | 127.59 | 119.57 | 66.73 | 74.18 | 69.01 | 102.99 | | | *** |
| Communications (mt) | 80.79 | 69.49 | 73.54 | 5.85 | 3.42 | 5.11 | 51.1 | | | *** |
| Culture and recreation (mt) | 204.15 | 60.86 | 112.23 | 1.06 | 21.85 | 7.42 | 77.86 | | | |
| Miscellaneous assests/services (mt) | 55.36 | 24.12 | 35.32 | 20.25 | 35.4 | 24.88 | 31.9 | ** | * | |
| Education (mt) | 17.93 | 16.7 | 17.14 | 9.65 | 3.66 | 7.82 | 14.08 | | *** | *** |
| Health (mt) | 111.69 | 86.37 | 95.45 | 23.2 | 25.42 | 23.88 | 71.98 | | | *** |
| Fuel (mt) | 238.33 | 253.23 | 247.89 | 76.92 | 93.98 | 82.14 | 193.54 | | | *** |
| Total non-food expenditure (mt) | 1484.02 | 1407.58 | 1434.98 | 597.16 | 785.72 | 654.81 | 1179.17 | ** | | *** |
| Total food and tobacco expenditures (mt) | 3160.51 | 3402.98 | 3316.05 | 1594.56 | 1681.25 | 1621.06 | 2760.29 | | | *** |
| Total expenditures (mt) | 4,644.53 | 4,810.55 | 4,751.03 | 2,191.72 | 2,466.97 | 2,275.87 | 3,939.46 | | * | *** |
| Total expenditures (USD) | 167.67 | 173.67 | 171.52 | 79.12 | 89.06 | 82.16 | 142.22 | | * | *** |
| Unweighted N of households | 455 | 251 | 706 | 395 | 316 | 711 | 1,417 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

4.3.4. Prevalence of Poverty in the study area

The per capita expenditure data allows us to estimate the prevalence of poverty in the study area as measured by percentage of individuals living below the global poverty line (i.e., less than \$1.25

per day based on PPP exchange rate) or below the national poverty line (14.77 MT/day using the PPT exchange rate in 2010). To convert the household level total food and non-food expenditure into per capita expenditure based on which both the poverty lines are defined, we divide the total food and non-food expenditures by household size. The household level per capita expenditure is then applied to all the members of the same household. To calculate international poverty line, the total expenditures were first converted to US dollars using the 2010 PPP exchange rate. The baseline analysis of poverty prevalence in the study area is summarized in Table 39.

Table 39: Percent of individuals living on less than \$1.25 per day (based on PPP exchange rate) and below poverty line

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | Testing for mean difference | | |
|--|---------------------|---------|-------|----------------|---------|-------|-------|-----------------------------|-----------|-----------|
| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | - | (1) | (4) | (3) |
| | Treat- ment | Control | Total | Treat- ment | Control | Total | All | vs (2) | vs (5) | vs (6) |
| Average per capita expenditures per day (USD PPP) | | | | | | | | | | |
| | 2.46 | 2.38 | 2.41 | 1.19 | 1.33 | 1.23 | 2.02 | | | *** |
| % individuals in poverty based on global measure (i.e., <\$1.25/day) | 36.7 | 39.2 | 38.4 | 74.9 | 69.4 | 73.2 | 49.2 | | | |
| Average per capita expenditures per day (Meticais) | | | | | | | | | | |
| | 36.81 | 35.53 | 35.99 | 17.74 | 19.89 | 18.4 | 30.22 | | | *** |
| % individuals in poverty based on national poverty line ¹ | 53.0 | 51.9 | 52.3 | 72.4 | 66.2 | 70.6 | 57.9 | | | |
| <i>Weighted N of individuals</i> | 5713 | 10706 | 16420 | 5168 | 2199 | 7367 | 23786 | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

¹The poverty lines for rural Nampula and rural Cabo Delgado are based on the 2010 MPD report (citation) adjusted for inflation.

Table 39 points to the high poverty rate of the study area. On average, as high as 49% (or 58%) of rural individuals live below the global (or domestic) poverty line, which is consistent with the national estimate of poverty headcount in Mozambique (Ministry of Planning and Development 2010). For example, a recent report suggested that the overall poverty rate in Mozambique in 2008/09 was about 54.6%. While it appears that the poverty prevalence is higher in the control area than in the treatment area, testing results however indicate no statistically significant difference between the two groups. This is also true within each district.

The difference across the two districts seems much bigger from the face value. While 38% (based on global measure) to 52% (based on national measure) population in the Cabo Delgado live below poverty line, the corresponding figures in Nampula are much higher (73% and 71%, respectively). However, the difference is statistically insignificant. The difference between treatment and control sites within each district is also statistically insignificant in both districts (Appendix Table 34). There is also no significant difference in poverty prevalence between male- and female- headed households. Compared to the urban baseline findings, the poverty rate is much higher in the rural areas than in the urban areas.

5. Propensity Score Matching as Alternative Evaluation Strategy

In the previous sections, we have shown a vast difference in a majority of variables between the two districts. Therefore, it makes a good sense that the districts are analyzed separately. In the meantime, we have also shown that the mean values of a number of household and parcel level variables are also significantly different between the treatment and control sites within each district. This is not surprising given that the treatment and control sites within the same districts were not selected randomly, and the preexisting difference in household and parcel characteristics between the treatment and control sites alone does not necessary invalidate the proposed DID approach if the difference in time varying unobservables between the two groups are insignificant (also known as “the parallel trend assumption” in the context of DID). Unfortunately, there are no historical data for us to test the parallel trend assumption. Given this limitation, one alternative way to further improve the DID estimates is to combine DID with propensity score matching (PSM) method. PSM is one of the matching method that is to create a sample of households that receive the land titling through the Land Project 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 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.

For practical reason, the matching is conducted at the household level, which means many parcel level characteristics were converted into household level variables. We then estimate a probit model where the left hand side is the zero-one variable (1 for households in the treatment group and 0 for those in the control group) and the right hand side variables include a whole list of individual characteristics (i.e., covariates). The predicted dependent variable for each household is a single number between 0 and 1, called propensity score, which represents that household’s probability of participating in the Land Project regardless of whether a household was actually in the treatment or the 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. The quality of the matching can be assessed according to two criteria: (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.

Figure 3 depicts the distribution of estimated propensity scores across the treatment and control groups in both the Malema district (top panel) and the Mecufi district (bottom panel). This graph is a visual way to assess the degree of overlap (or “common support”) of propensity scores between the treatment and control group. and Mecufi districts, respectively. While the graph on the left visually displays how the standardized bias in covariates before and after matching, the graph on the right displays the overlap region. As can be seen from the graph, there are only a very small number of households in the treatment group that fall outside the common support region in both districts, which suggests that the matching meets the first of the two criteria quite well in both districts.

Tables 40 and 41 report the balance test results for a large number of individual variables for the Malema and Mecufi districts, respectively. Specifically, the Tables report for each variable, its

mean values in the treatment and control group based on the unmatched total sample and the matched sample, and the associated t-tests for mean difference based on the unmatched and matched sample. The balance test results suggest that of all the 48 individual variables, the number of variables for which the mean value is significantly different between the treatment and control group decreases from 20 to 3 in Malma district, and from 9 to 3 in Mecufi district. The matching is especially useful in terms of narrowing the preexisting difference in the observed characteristics in the Malema district where the difference between the treatment and control group is more pronouncing. Finally, Figure 4 provide a visual assessment of the percentage of standardized biases (difference between the treatment and control group) reduced by matching in both districts. Again, it is clear that matching vastly reduced the bias in Malema district (top panel). The bias reduction is also noticeable (though somewhat smaller) in Mecufi district, consistent with the fact that the pre-existing bias was smaller in Mecufi than in Melema before matching.

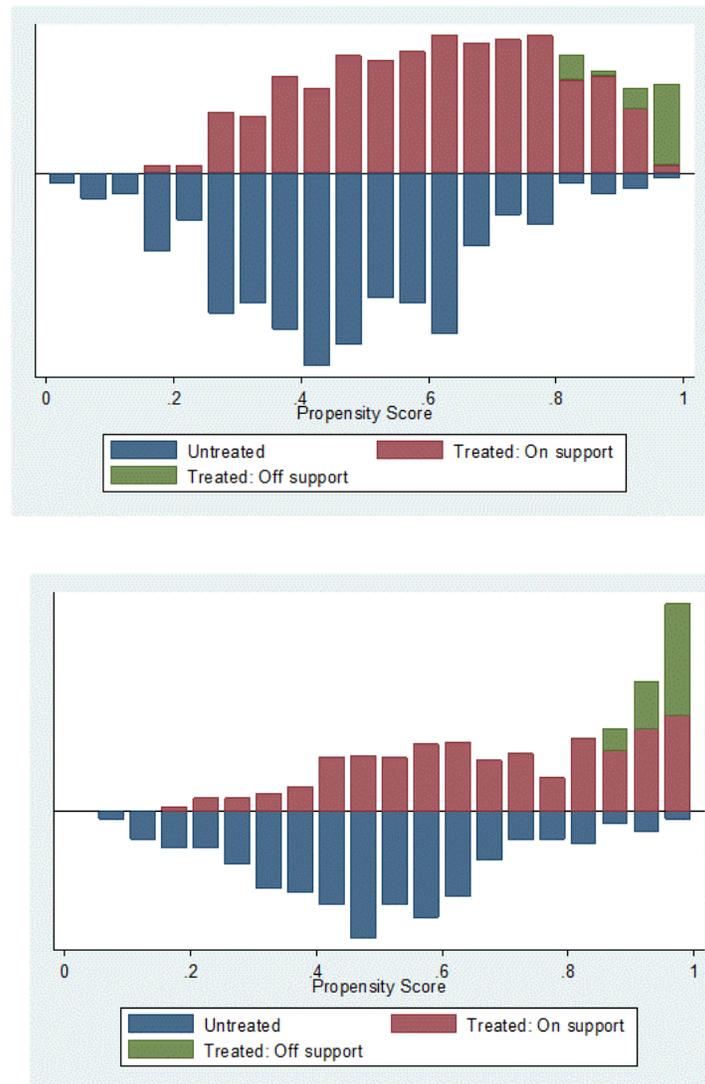


Figure 4: Distribution of Propensity Scores in Treatment and Control Group in Malema (Top) and Mecufi District (Bottom)

In summary, the fact that the matching quality is high based on the overlap and balancing test results increases our confidence that we have multiple approaches to explore in the evaluation of the land titling project. With the baseline and endline survey data, we not only can use the DID approach, but also use the combination of DID and PSM approach in our analysis.

Table 40: Sample Balance before and after Matching (N=711 households) in Malema District

| # | Variable | samp | Treatment | Control | Standardized Bias | | t-value | Difference | p-value | t-test | [V]/[C] |
|----|--|------|-----------|---------|-------------------|-------------|---------|------------|---------|--------|---------|
| | | | | | % | % reduction | | | | | |
| 1 | Male-headed HH (%) | U | 13.92 | 19.09 | -13.90 | | -1.85 | -5.17 | 0.065 | * | 0.78* |
| | | M | 14.33 | 14.95 | -1.70 | 88.00 | -0.24 | -0.62 | 0.814 | | 0.97 |
| 2 | HH head's age (years) | U | 40.43 | 38.89 | 11.20 | | 1.47 | 1.54 | 0.142 | | 1.06 |
| | | M | 40.39 | 40.02 | 2.70 | 75.60 | 0.34 | 0.38 | 0.732 | | 0.86 |
| 3 | HH head is literate (%) | U | 58.48 | 45.96 | 25.20 | | 3.33 | 12.53 | 0.001 | ** | 0.98 |
| | | M | 56.20 | 60.29 | -8.20 | 67.40 | -1.12 | -4.09 | 0.265 | | 1.03 |
| 4 | HH head currently in school (%) | U | 1.52 | 0.32 | 12.50 | | 1.59 | 1.20 | 0.113 | | 4.63* |
| | | M | 1.10 | 0.76 | 3.60 | 71.20 | 0.48 | 0.34 | 0.629 | | 1.45* |
| 5 | HH head's education (years completed) | U | 3.38 | 2.77 | 25.30 | | 3.31 | 0.61 | 0.001 | *** | 1.15 |
| | | M | 3.19 | 3.12 | 2.90 | 88.50 | 0.40 | 0.07 | 0.686 | | 0.95 |
| 6 | HH size (number of members) | U | 4.78 | 4.65 | 6.40 | | 0.84 | 0.14 | 0.401 | | 0.96 |
| | | M | 4.73 | 4.46 | 12.70 | -99.80 | 1.73 | 0.27 | 0.084 | * | 0.99 |
| 7 | HH size (AE) | U | 3.47 | 3.32 | 12.40 | | 1.63 | 0.16 | 0.103 | | 1.04 |
| | | M | 3.43 | 3.31 | 9.30 | 25.00 | 1.24 | 0.12 | 0.215 | | 0.96 |
| 8 | HH with members with wage employment (%) | U | 29.87 | 20.39 | 22.00 | | 2.87 | 9.49 | 0.004 | ** | 1.29* |
| | | M | 28.10 | 26.97 | 2.60 | 88.10 | 0.34 | 1.13 | 0.735 | | 1.03 |
| 9 | Members under 5 years (#) | U | 0.83 | 0.97 | -15.40 | | -2.05 | -0.14 | 0.041 | ** | 0.77* |
| | | M | 0.84 | 0.71 | 14.90 | 3.50 | 2.17 | 0.13 | 0.030 | ** | 1.03 |
| 10 | Members aged 5-15 years (#) | U | 1.62 | 1.50 | 8.60 | | 1.13 | 0.12 | 0.257 | | 0.99 |
| | | M | 1.61 | 1.46 | 10.30 | -19.90 | 1.40 | 0.15 | 0.163 | | 1 |
| 11 | Members aged 15-45 years (#) | U | 1.80 | 1.74 | 6.70 | | 0.88 | 0.06 | 0.380 | | 1.04 |
| | | M | 1.77 | 1.77 | 0.20 | 97.20 | 0.03 | 0.00 | 0.980 | | 0.96 |
| 12 | Members aged 45-60 years (#) | U | 0.38 | 0.35 | 5.40 | | 0.71 | 0.03 | 0.480 | | 1.03 |
| | | M | 0.37 | 0.38 | -2.10 | 60.20 | -0.28 | -0.01 | 0.778 | | 0.87 |
| 13 | Members 60 years or older (#) | U | 0.15 | 0.09 | 14.00 | | 1.81 | 0.05 | 0.070 | * | 1.58* |
| | | M | 0.15 | 0.15 | 0.90 | 93.50 | 0.11 | 0.00 | 0.913 | | 0.98 |
| 14 | Female members (%) | U | 50.71 | 53.13 | -13.40 | | -1.78 | -2.42 | 0.076 | * | 0.76* |
| | | M | 50.90 | 50.41 | 2.70 | 79.90 | 0.38 | 0.49 | 0.701 | | 0.95 |
| 15 | HH with members with wage employment (%) | U | 29.87 | 20.39 | 22.00 | | 2.87 | 9.49 | 0.004 | *** | 1.29* |
| | | M | 28.10 | 26.97 | 2.60 | 88.10 | 0.34 | 1.13 | 0.735 | | 1.03 |
| 16 | HH with members with self-employment (%) | U | 27.85 | 20.07 | 18.30 | | 2.39 | 7.78 | 0.017 | ** | 1.25* |
| | | M | 26.45 | 24.66 | 4.20 | 77.00 | 0.55 | 1.79 | 0.581 | | 1.05 |

| | | | | | | | | | | | |
|----|--|---|-----------|-----------|--------|---------|-------|----------|-------|-----|--------|
| 17 | Total Net HH income (MZN) | U | 19,327.00 | 20,149.00 | -2.40 | | -0.32 | -822.00 | 0.745 | | 0.61* |
| | | M | 18,394.00 | 18,840.00 | -1.30 | 45.70 | -0.21 | -446.00 | 0.837 | | 0.87 |
| 18 | Total Net income per capita (MZN) | U | 4,958.00 | 4,896.50 | 0.80 | | 0.10 | 61.50 | 0.918 | | 1.39* |
| | | M | 4,605.90 | 4,927.40 | -4.10 | -423.40 | -0.65 | -321.50 | 0.514 | | 1.17 |
| 19 | Total Net crop income (MZN) | U | 15,975.00 | 18,011.00 | -7.30 | | -0.97 | -2036.00 | 0.331 | | 0.81* |
| | | M | 15,904.00 | 16,287.00 | -1.40 | 81.20 | -0.22 | -383.00 | 0.828 | | 1.61* |
| 20 | Income from salaried employment | U | 1499.40 | 285.86 | 17.80 | | 2.21 | 1213.54 | 0.027 | ** | 90.13* |
| | | M | 541.68 | 670.10 | -1.90 | 89.40 | -0.95 | -128.42 | 0.344 | | 0.77* |
| 21 | Income from self-employment: forest products (MZN) | U | 48.73 | 13.69 | 9.00 | | 1.13 | 35.05 | 0.257 | | 12.44* |
| | | M | 51.65 | 13.71 | 9.80 | -8.30 | 1.26 | 37.95 | 0.209 | | 10.63* |
| 22 | HH raised livestock (%) | U | 78.73 | 87.70 | -24.10 | | -3.14 | -8.97 | 0.002 | *** | 1.55* |
| | | M | 79.06 | 79.89 | -2.20 | 90.80 | -0.28 | -0.83 | 0.783 | | 1.03 |
| 23 | Worked on non-farm self-employment (%) | U | 23.29 | 18.12 | 12.80 | | 1.67 | 5.17 | 0.095 | | 1.2 |
| | | M | 22.31 | 22.52 | -0.50 | 96.00 | -0.07 | -0.21 | 0.947 | | 0.99 |
| 24 | HH monthly food expenditures (MZN) | U | 1,570.30 | 1,661.30 | -8.70 | | -1.15 | -91.00 | 0.251 | | 0.93 |
| | | M | 1,575.20 | 1,514.60 | 5.80 | 33.30 | 0.86 | 60.60 | 0.387 | | 1.57* |
| 25 | HH monthly non-food expenditures (MZN) | U | 589.14 | 776.08 | -17.00 | | -2.26 | -186.94 | 0.024 | ** | 0.73* |
| | | M | 587.01 | 594.89 | -0.70 | 95.80 | -0.12 | -7.88 | 0.908 | | 1.48* |
| 26 | HH total monthly expenditure(MZN) | U | 2,168.70 | 2,443.70 | -15.60 | | -2.06 | -275.00 | 0.039 | | 0.82* |
| | | M | 2,169.20 | 2,115.20 | 3.10 | 80.40 | 0.48 | 54.00 | 0.631 | | 1.57* |
| 27 | HH monthly per capita food expenditures (MZN) | U | 400.76 | 421.40 | -4.90 | | -0.62 | -20.64 | 0.532 | | 2.94* |
| | | M | 406.01 | 410.57 | -1.10 | 77.90 | -0.15 | -4.56 | 0.884 | | 3.98* |
| 28 | HH monthly per capita non-food expenditures (MZN) | U | 134.17 | 176.10 | -17.70 | | -2.37 | -41.93 | 0.018 | ** | 0.56* |
| | | M | 135.80 | 157.12 | -9.00 | 49.10 | -1.30 | -21.32 | 0.193 | | 0.71* |
| 29 | HH total per capita per day expenditures (MZN) | U | 17.66 | 19.71 | -12.00 | | -1.55 | -2.05 | 0.122 | | 1.83* |
| | | M | 17.87 | 18.71 | -4.90 | 59.00 | -0.67 | -0.84 | 0.503 | | 2.32* |
| 30 | Number of assets owned | U | 2.19 | 2.40 | -10.00 | | -1.32 | -0.21 | 0.188 | | 0.88 |
| | | M | 2.16 | 2.10 | 2.70 | 73.00 | 0.40 | 0.06 | 0.691 | | 1.14 |
| 31 | Number of new assets owned | U | 0.63 | 0.62 | 0.60 | | 0.08 | 0.01 | 0.936 | | 1.45* |
| | | M | 0.62 | 0.61 | 1.20 | -88.30 | 0.16 | 0.01 | 0.872 | | 1.76* |
| 32 | Total value of new assets (Mt) | U | 2,078.40 | 1,811.50 | 5.20 | | 0.67 | 266.90 | 0.501 | | 1.33* |
| | | M | 2,076.90 | 2,613.80 | -10.40 | -101.20 | -1.24 | -536.90 | 0.216 | | 0.82 |
| 33 | HHs owning a radio (%) | U | 48.61 | 53.72 | -10.20 | | -1.35 | -5.11 | 0.178 | | 1 |
| | | M | 48.21 | 41.92 | 12.60 | -23.00 | 1.70 | 6.29 | 0.089 | * | 1.03 |
| 34 | HH owning a bicycle (%) | U | 57.47 | 62.14 | -9.50 | | -1.25 | -4.67 | 0.211 | | 1.04 |
| | | M | 57.58 | 52.89 | 9.50 | -0.30 | 1.27 | 4.68 | 0.205 | | 0.98 |
| 35 | HHs owning motorized vehicle (%) | U | 0.25 | 0.32 | -1.30 | | -0.17 | -0.07 | 0.862 | | 0.78* |
| | | M | 0.00 | 0.00 | 0.00 | 100.00 | . | 0.00 | . | | .* |
| 36 | HHs owning a cell phone (%) | U | 2.28 | 1.62 | 4.80 | | 0.62 | 0.66 | 0.534 | | 1.40* |

| | | | | | | | | | | | |
|----|--|---|----------|----------|-------|---------|-------|---------|-------|-----|-------|
| | | M | 2.20 | 1.74 | 3.30 | 30.50 | 0.44 | 0.46 | 0.657 | | 1.26* |
| 37 | HHs owning a charcoal iron (%) | U | 7.59 | 7.44 | 0.60 | | 0.08 | 0.15 | 0.940 | | 1.02 |
| | | M | 6.89 | 8.98 | -7.90 | 1278.30 | -1.04 | -2.09 | 0.298 | | 0.78* |
| 38 | HH accessed credit (%) | U | 2.53 | 3.24 | -4.20 | | -0.56 | -0.70 | 0.577 | | 0.79* |
| | | M | 2.75 | 1.24 | 9.00 | -115.00 | 1.46 | 1.52 | 0.145 | | 2.19* |
| 39 | HHs who reported lack of collateral as the key (%) | U | 2.53 | 4.21 | -9.30 | | -1.24 | -1.68 | 0.215 | | 0.61* |
| | | M | 2.48 | 2.00 | 2.70 | 71.20 | 0.44 | 0.48 | 0.661 | | 1.24* |
| 40 | Average number of members with self-employment | U | 0.33 | 0.22 | 20.50 | | 2.67 | 0.11 | 0.008 | *** | 1.54* |
| | | M | 0.31 | 0.31 | 0.70 | 96.80 | 0.08 | 0.00 | 0.935 | | 0.93 |
| 41 | HH Land Law knowledge (max.6) | U | 2.38 | 2.34 | 2.80 | | 0.36 | 0.04 | 0.717 | | 1.18 |
| | | M | 2.40 | 2.39 | 0.90 | 69.00 | 0.12 | 0.01 | 0.906 | | 1.28* |
| 42 | HHs with access to electricity in their parcels (%) | U | 0.00 | 0.00 | . | | . | 0.00 | . | | .* |
| | | M | 0.00 | 0.00 | . | . | . | 0.00 | . | | .* |
| 43 | HH with access to landline in their parcels (%) | U | 0.00 | 0.00 | . | | . | 0.00 | . | | .* |
| | | M | 0.00 | 0.00 | . | . | . | 0.00 | . | | .* |
| 44 | HH with access to mobile network in their parcels (%) | U | 4.81 | 1.29 | 20.50 | | 2.61 | 3.52 | 0.009 | *** | 3.58* |
| | | M | 4.41 | 2.73 | 9.80 | 52.30 | 1.22 | 1.68 | 0.224 | | 1.59* |
| 45 | Mubic fountain is the main water source (%) | U | 6.33 | 1.29 | 26.50 | | 3.36 | 5.03 | 0.001 | *** | 4.64* |
| | | M | 4.41 | 5.10 | -3.60 | 86.30 | -0.44 | -0.69 | 0.663 | | 0.87 |
| 46 | % HH with parcels ccessible by primary, secondary or tertiary road | U | 42.03 | 23.95 | 39.10 | | 5.11 | 18.08 | 0.000 | *** | 1.34* |
| | | M | 39.39 | 38.73 | 1.40 | 96.30 | 0.18 | 0.67 | 0.854 | | 1.01 |
| 47 | Number of adults (15-54 years) | U | 2.33 | 2.18 | 20.10 | | 2.63 | 0.15 | 0.009 | *** | 1.16 |
| | | M | 2.29 | 2.29 | -1.10 | 94.70 | -0.14 | -0.01 | 0.889 | | 0.88 |
| 48 | HH total net income/AE (MZN) | U | 6,160.20 | 6,327.10 | -1.70 | | -0.23 | -166.90 | 0.818 | | 1.01 |
| | | M | 5,820.50 | 6,173.80 | -3.70 | -111.70 | -0.57 | -353.30 | 0.567 | | 1.03 |

* if variance ratio outside [0.83; 1.20] for U and [0.82; 1.23] for M

Significance level: a significant at 1%; b significant at 5%; c significant at 10%

Notes: No defined rule-of-thumb to assess the quality of matching but it is suggested that a standardized bias below 5-10% after matching is reasonable.

^a U=Unmatched; M=Matched

Table 41: Sample Balance before and after Matching (N=706 households) in Mecufi District

| # | Variable | samp | Treatment | Control | Standardized Bias | | t-value | Difference | p-value | t-test | [V]/[C] |
|----|--|------|-----------|-----------|-------------------|-------------|---------|------------|---------|--------|---------|
| | | | | | % | % reduction | | | | | |
| 1 | Male-headed HH (%) | U | 42.70 | 51.01 | -16.70 | | -2.11 | -8.31 | 0.035 | ** | 0.98 |
| | | M | 43.94 | 41.91 | 4.10 | 75.70 | 0.56 | 2.02 | 0.579 | | 1.01 |
| 2 | HH head's age (years) | U | 46.41 | 47.03 | -3.80 | | -0.48 | -0.62 | 0.634 | | 1.02 |
| | | M | 46.59 | 47.54 | -5.90 | -54.80 | -0.80 | -0.96 | 0.425 | | 1.05 |
| 3 | HH head is literate (%) | U | 28.76 | 31.17 | -5.30 | | -0.67 | -2.41 | 0.505 | | 0.95 |
| | | M | 28.57 | 27.63 | 2.10 | 60.90 | 0.29 | 0.94 | 0.775 | | 1.02 |
| 4 | HH head currently in school (%) | U | 2.21 | 2.43 | -1.40 | | -0.18 | -0.22 | 0.855 | | 0.91 |
| | | M | 2.43 | 1.75 | 4.50 | -210.90 | 0.64 | 0.67 | 0.522 | | 1.38* |
| 5 | HH head's education (years completed) | U | 2.07 | 2.23 | -6.40 | | -0.80 | -0.17 | 0.423 | | 1.18 |
| | | M | 2.01 | 2.02 | -0.60 | 91.30 | -0.08 | -0.01 | 0.937 | | 1.41* |
| 6 | HH size (number of members) | U | 5.04 | 5.17 | -5.50 | | -0.69 | -0.14 | 0.489 | | 0.96 |
| | | M | 5.03 | 5.07 | -1.50 | 72.40 | -0.21 | -0.04 | 0.833 | | 1.07 |
| 7 | HH size (AE) | U | 3.72 | 3.85 | -8.30 | | -1.05 | -0.13 | 0.293 | | 0.93 |
| | | M | 3.71 | 3.69 | 1.30 | 84.50 | 0.18 | 0.02 | 0.857 | | 1.06 |
| 8 | HH with members with wage employment (%) | U | 23.23 | 15.39 | 19.90 | | 2.47 | 7.85 | 0.014 | ** | 1.37* |
| | | M | 21.29 | 22.64 | -3.40 | 82.80 | -0.44 | -1.35 | 0.658 | | 0.96 |
| 9 | Members under 5 years (#) | U | 0.94 | 0.94 | 0.10 | | 0.01 | 0.00 | 0.990 | | 0.91 |
| | | M | 0.93 | 0.82 | 10.70 | 10495.70 | 1.47 | 0.11 | 0.142 | | 1.04 |
| 10 | Members aged 5-15 years (#) | U | 1.51 | 1.52 | -0.40 | | -0.04 | 0.00 | 0.964 | | 0.98 |
| | | M | 1.52 | 1.76 | -17.40 | -4824.60 | -2.32 | -0.24 | 0.021 | ** | 0.95 |
| 11 | Members aged 15-45 years (#) | U | 1.73 | 1.81 | -6.40 | | -0.81 | -0.08 | 0.416 | | 0.99 |
| | | M | 1.73 | 1.67 | 4.30 | 32.50 | 0.59 | 0.05 | 0.556 | | 1.01 |
| 12 | Members aged 45-60 years (#) | U | 0.43 | 0.45 | -2.60 | | -0.33 | -0.02 | 0.745 | | 0.99 |
| | | M | 0.42 | 0.43 | -0.50 | 80.50 | -0.07 | 0.00 | 0.945 | | 1.05 |
| 13 | Members 60 years or older (#) | U | 0.42 | 0.46 | -5.20 | | -0.66 | -0.04 | 0.510 | | 0.99 |
| | | M | 0.44 | 0.39 | 7.00 | -34.90 | 0.99 | 0.05 | 0.324 | | 1.12 |
| 14 | Female members (%) | U | 55.89 | 57.84 | -9.10 | | -1.14 | -1.95 | 0.253 | | 1.00 |
| | | M | 56.79 | 57.64 | -3.90 | 56.50 | -0.53 | -0.85 | 0.595 | | 1.04 |
| 15 | HH with members with wage employment (%) | U | 23.23 | 15.39 | 19.90 | | 2.47 | 7.85 | 0.014 | ** | 1.37* |
| | | M | 21.29 | 22.64 | -3.40 | 82.80 | -0.44 | -1.35 | 0.658 | | 0.96 |
| 16 | HH with members with self-employment (%) | U | 57.97 | 53.85 | 8.30 | | 1.05 | 4.12 | 0.294 | | 0.98 |
| | | M | 54.99 | 51.77 | 6.50 | 22.00 | 0.88 | 3.21 | 0.381 | | 0.99 |
| 17 | Total Net HH income (MZN) | U | 33,835.00 | 29,804.00 | 7.80 | | 0.94 | 4,031.00 | 0.350 | | 2.13* |
| | | M | 33,105.00 | 31,156.00 | 3.80 | 51.60 | 0.52 | 1,949.00 | 0.601 | | 4.14* |
| 18 | Total Net income per capita (MZN) | U | 7,920.10 | 6,799.20 | 8.80 | | 1.06 | 1,120.90 | 0.290 | | 2.29* |
| | | M | 7,666.10 | 7,017.80 | 5.10 | 42.20 | 0.72 | 648.30 | 0.472 | | 4.07* |
| 19 | Total Net crop income (MZN) | U | 15,312.00 | 14,058.00 | 3.40 | | 0.39 | 1,254.00 | 0.695 | | 8.49* |

| | | | | | | | | | | | |
|----|--|---|-----------|-----------|--------|---------|-------|----------|-------|-----|-------|
| | | M | 15,012.00 | 16,013.00 | -2.70 | 20.10 | -0.34 | -1001.00 | 0.732 | | 8.32* |
| 20 | Income from salaried employment | U | 6,250.30 | 4,169.40 | 11.50 | | 1.36 | 2,080.90 | 0.176 | | 3.19* |
| | | M | 6,185.10 | 6,049.30 | 0.80 | 93.50 | 0.09 | 135.80 | 0.925 | | 2.62* |
| 21 | Income from self-employment: forest products (MZN) | U | 8,406.90 | 7,294.30 | 4.40 | | 0.56 | 1,112.60 | 0.572 | | 0.71* |
| | | M | 7,767.60 | 5,006.40 | 10.80 | -148.20 | 2.00 | 2,761.20 | 0.046 | ** | 2.41* |
| 22 | HH raised livestock (%) | U | 48.23 | 49.39 | -2.30 | | -0.29 | -1.16 | 0.769 | | 1.00 |
| | | M | 47.71 | 50.16 | -4.90 | -110.60 | -0.67 | -2.45 | 0.505 | | 1.00 |
| 23 | worked on non-farm self-employment (%) | U | 13.94 | 21.46 | -19.80 | | -2.56 | -7.52 | 0.011 | ** | 0.71* |
| | | M | 15.36 | 18.24 | -7.60 | 61.80 | -1.05 | -2.88 | 0.296 | | 0.87 |
| 24 | HH monthly food expenditures (MZN) | U | 3,104.40 | 3,220.10 | -5.50 | | -0.69 | -115.70 | 0.489 | | 0.94 |
| | | M | 3,141.60 | 3,439.70 | -14.00 | -157.70 | -1.87 | -298.10 | 0.062 | * | 0.70* |
| 25 | HH monthly non-food expenditures (MZN) | U | 1,444.50 | 1,359.50 | 2.50 | | 0.29 | 85.00 | 0.769 | | 5.17* |
| | | M | 1,531.90 | 1,371.30 | 4.80 | -89.10 | 0.61 | 160.60 | 0.542 | | 6.66* |
| 26 | HH total monthly expenditure(MZN) | U | 4,574.30 | 4,603.50 | -0.70 | | -0.08 | -29.20 | 0.937 | | 2.24* |
| | | M | 4,698.20 | 4,829.00 | -3.00 | -347.20 | -0.38 | -130.80 | 0.703 | | 2.39* |
| 27 | HH monthly per capita food expenditures (MZN) | U | 782.44 | 751.53 | 4.50 | | 0.54 | 30.91 | 0.590 | | 2.55* |
| | | M | 792.86 | 817.90 | -3.70 | 19.00 | -0.50 | -25.04 | 0.616 | | 2.10* |
| 28 | HH monthly per capita non-food expenditures (MZN) | U | 309.30 | 294.82 | 2.60 | | 0.31 | 14.48 | 0.755 | | 2.38* |
| | | M | 328.39 | 279.32 | 8.90 | -238.80 | 1.19 | 49.07 | 0.233 | | 4.17* |
| 29 | HH total per capita per day expenditures (MZN) | U | 36.10 | 34.60 | 4.60 | | 0.55 | 1.50 | 0.586 | | 2.29* |
| | | M | 37.05 | 36.20 | 2.60 | 43.00 | 0.35 | 0.85 | 0.725 | | 2.76* |
| 30 | Number of assets owned | U | 2.38 | 3.03 | -21.80 | | -2.81 | -0.65 | 0.005 | *** | 0.77* |
| | | M | 2.54 | 2.82 | -9.20 | 57.60 | -1.29 | -0.28 | 0.198 | | 0.97 |
| 31 | Number of new assets owned | U | 0.35 | 0.26 | 9.30 | | 1.15 | 0.09 | 0.249 | | 1.28* |
| | | M | 0.32 | 0.41 | -9.20 | 0.90 | -1.03 | -0.09 | 0.305 | | 0.50* |
| 32 | Total value of new assets (Mt) | U | 604.10 | 819.23 | -6.90 | | -0.90 | -215.13 | 0.370 | | 0.68* |
| | | M | 679.37 | 1052.00 | -11.90 | -73.20 | -1.42 | -372.63 | 0.156 | | 0.59* |
| 33 | HHs owning a radio (%) | U | 35.18 | 36.44 | -2.60 | | -0.33 | -1.26 | 0.740 | | 0.98 |
| | | M | 35.04 | 39.62 | -9.50 | -263.60 | -1.29 | -4.58 | 0.197 | | 0.95 |
| 34 | HH owning a bicycle (%) | U | 14.16 | 19.84 | -15.10 | | -1.95 | -5.68 | 0.051 | | 0.76* |
| | | M | 14.56 | 18.51 | -10.50 | 30.40 | -1.45 | -3.95 | 0.148 | | 0.82 |
| 35 | HHs owning motorized vehicle (%) | U | 0.44 | 0.40 | 0.60 | | 0.07 | 0.04 | 0.942 | | 1.09 |
| | | M | 0.54 | 0.61 | -1.00 | -79.10 | -0.12 | -0.07 | 0.903 | | 0.89 |
| 36 | HHs owning a cell phone (%) | U | 11.73 | 14.58 | -8.40 | | -1.08 | -2.85 | 0.281 | | 0.83* |
| | | M | 13.21 | 17.48 | -12.60 | -49.80 | -1.61 | -4.27 | 0.107 | | 0.79* |
| 37 | HHs owning a charcoal iron (%) | U | 13.27 | 14.17 | -2.60 | | -0.33 | -0.90 | 0.742 | | 0.94 |
| | | M | 13.48 | 14.33 | -2.50 | 4.70 | -0.34 | -0.85 | 0.737 | | 0.95 |
| 38 | HH accessed credit (%) | U | 4.87 | 5.67 | -3.60 | | -0.46 | -0.80 | 0.648 | | 0.86 |
| | | M | 4.31 | 4.09 | 1.00 | 71.90 | 0.15 | 0.22 | 0.879 | | 1.05 |

| | | | | | | | | | | | |
|----|--|---|----------|----------|--------|---------|--------|----------|-------|-----|-------|
| 39 | HHs who reported lack of collateral as the key (%) | U | 2.88 | 3.24 | -2.10 | | -0.27 | -0.36 | 0.789 | | 0.89 |
| | | M | 2.70 | 2.00 | 4.00 | -91.90 | 0.63 | 0.70 | 0.532 | | 1.34* |
| 40 | Average number of members with self-employment | U | 0.95 | 0.75 | 20.40 | | 2.51 | 0.20 | 0.012 | ** | 1.49* |
| | | M | 0.84 | 0.80 | 4.20 | 79.50 | 0.59 | 0.04 | 0.556 | | 0.91 |
| 41 | HH Land Law knowledge (max.6) | U | 2.94 | 2.87 | 7.20 | | 0.90 | 0.07 | 0.367 | | 1.01 |
| | | M | 2.90 | 2.95 | -4.80 | 33.40 | -0.65 | -0.04 | 0.514 | | 1.05 |
| 42 | HHs with access to electricity in their parcels (%) | U | 7.96 | 9.31 | -4.80 | | -0.61 | -1.35 | 0.541 | | 0.87 |
| | | M | 8.63 | 16.71 | -28.70 | -500.30 | -3.33 | -8.09 | 0.001 | *** | 0.57* |
| 43 | HH with access to mobile network in their parcels (%) | U | 53.76 | 91.90 | -94.80 | | -11.13 | -38.14 | 0.000 | *** | 3.33* |
| | | M | 64.42 | 64.69 | -0.70 | 99.30 | -0.08 | -0.27 | 0.939 | | 1.00 |
| 44 | Mublic fountain is the main water source (%) | U | 91.37 | 92.31 | -3.40 | | -0.43 | -0.94 | 0.669 | | 1.11 |
| | | M | 92.72 | 95.62 | -10.60 | -209.60 | -1.69 | -2.90 | 0.092 | * | 1.61* |
| 45 | % HH with parcels ccessible by primary, secondary or tertiary road | U | 91.81 | 89.07 | 9.30 | | 1.20 | 2.74 | 0.230 | | 0.77* |
| | | M | 91.38 | 88.25 | 10.60 | -13.70 | 1.41 | 3.12 | 0.160 | | 0.76* |
| 46 | Number of adults (15-54 years) | U | 2.58 | 2.72 | -11.60 | | -1.48 | -0.13 | 0.139 | | 0.84 |
| | | M | 2.58 | 2.48 | 8.80 | 24.20 | 1.24 | 0.10 | 0.216 | | 0.95 |
| 47 | HH total net income/AE (MZN) | U | 9,820.30 | 8,663.20 | 7.60 | | 0.93 | 1,157.10 | 0.355 | | 1.66* |
| | | M | 9,537.60 | 8,946.80 | 3.90 | 48.90 | 0.56 | 590.80 | 0.573 | | 3.72* |

* if variance ratio outside [0.83; 1.20] for U and [0.82; 1.23] for M

Significance level: a significant at 1%; b significant at 5%; c significant at 10%

Notes: No defined rule-of-thumb to assess the quality of matching but it is suggested that a standardized bias below 5-10% after matching is reasonable.

^a U=Unmatched; M=Matched

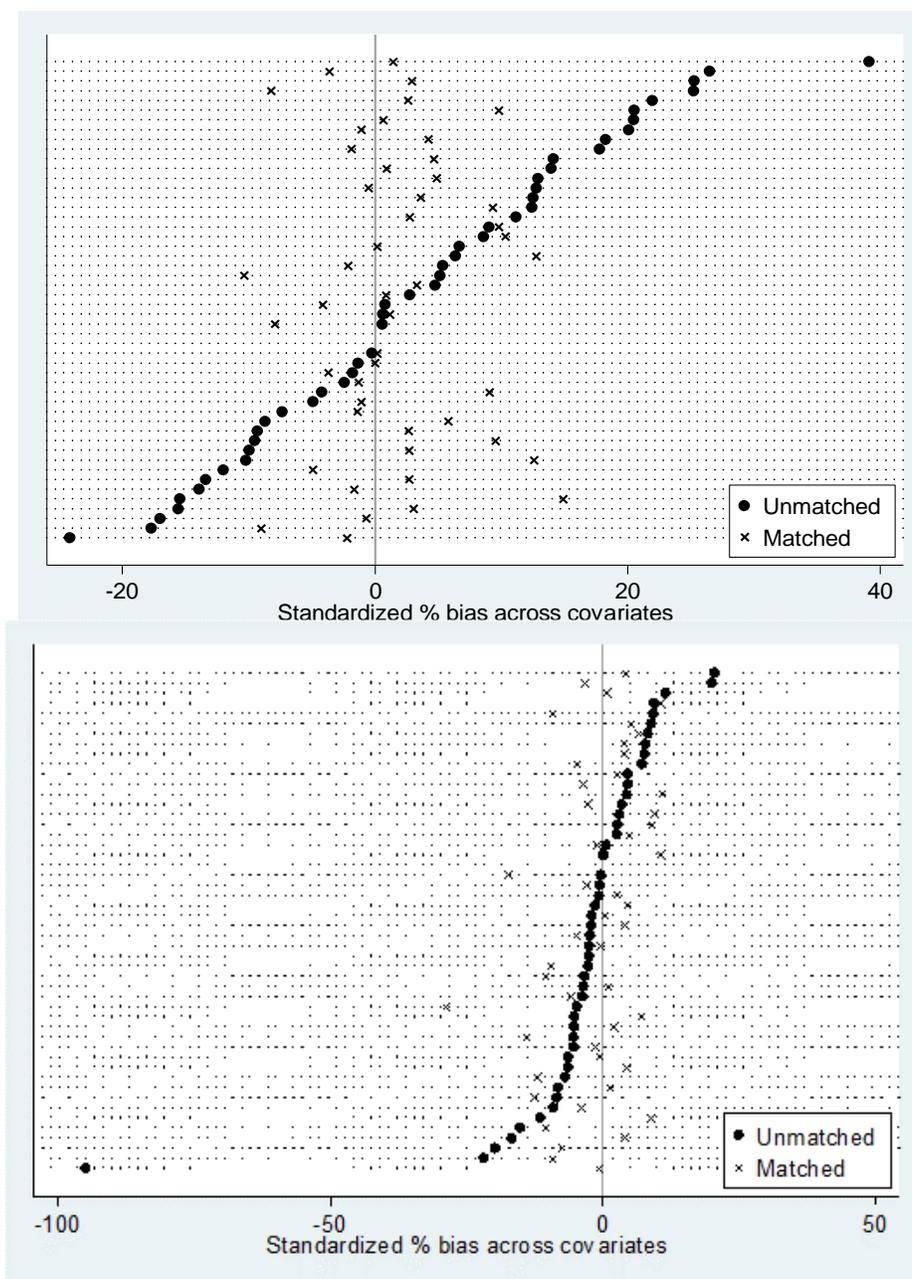


Figure 5: Standardized % Bias Across Covariates before and after Matching (Malema and Mercufi District)

6. Key outcome and impact indicators and testing for logic model

The logic framework of the Land Project depicted in Figure 1 identified key outcome and impact indicators as the focus of this evaluation. Table 42 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 entire sample of households and parcels from Malema and Mecufi districts. 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. These explanations and cautionary notes are flagged in the footnote for each indicator where they are applicable.

Table 42: Baseline assessment of key outcome and impact indicators

| Indicator | Baseline value (N in parenthesis) | Expected effect of the land project |
|--|--|--|
| a. Time to obtain DUAT | -- | Negative (i.e., time is expected to reduce) |
| b. Cost of obtaining DUAT | -- | Negative (i.e., cost is expected to reduce) |
| c. Registered property rights (DUATs) (% of parcels and number of parcels) ¹ | 0.3% (4,450) 13 | Positive (i.e., number of registered parcels is expected to go up) |
| d. Incidents of conflicts % of parcels experiencing conflicts in the past ² % residential parcels concerned of having conflict in future % agricultural parcels concerned of having conflict in future | ? 13.8% (4,450) 11.1% (4,450) | Negative (i.e., number of conflicts is expected to reduce) |
| e. Transactions reflecting active land market % parcels rented out, residential parcels % parcels rented out, agricultural parcels % parcels rented in or borrowed, residential parcels % parcels rented in or borrowed, agricultural parcels | 5.1% (1543) 23.7% (1,543) 4.9% (3411) 10.9% (3,411) | Positive (i.e., rental activity is expected to go up) |
| f. Value of land i. Hypothetical sale's value per parcel for an average residential parcel (Mt/500 m ²) ii. Hypothetical sale's value per parcel for an average agricultural parcel (Mt/500 m ²) iii. Hypothetical rental payment per parcel for an average residential parcel (Mt/month/500 m ²) iv. Hypothetical rental payment per parcel for an average agricultural parcel (Mt/month/500 m ²) | 43,800 3,950 6,500 750 | Positive (i.e., value of land as measured by rental rate is expected to go up) |
| g. Investments on land parcels % parcels that benefited from an investment Average cost of repairs/improvement of roofs per parcel (Mt) ⁴ | 6.2% (5,198) 218 | Positive (i.e., investments on land improvement is expected to go up) |

| | | |
|--|--------------|--|
| h. Access to formal credit | | |
| % households that applied for credit | 4.1% (1,417) | Positive (i.e., number of people accessing credit using land as a collateral is expected to go up) |
| % of households that applied for credit that had to present collateral | 3.8% (56) | |
| % of households that applied for credit and were denied because of insufficient collateral | 9.7% (19) | |

¹ Number of registered parcels (12) in the sample is too low to estimate this indicator

² Conflicts only experienced by households in the treatment site in Nampula (reliability of this particular indicator questionable for the reasons given the previous section).

³ It happens that none of the rent-out transfers of residential parcels involves any rental payment. So we can't report the value of rental payment of residential parcels. The rental price for agricultural parcels is drawn from the 28 rental transactions involving any rental payment. The number of observations is too small to allow us to derive robustness estimate of this indicator.

⁴ The cost of increasing the parcel size was not reported and therefore excluded from the calculation of average cost of all investments.

A predominant majority of the land parcels located in the study areas (93%) has no documents that give the owners property rights to that parcel. For those that have some document, the most common was an affidavit of purchase/sales (4.5%). Only 13 parcels of the total 4,450 parcels (owned) have DUAT at the time of the baseline survey and only 36 parcels without DUAT are in the initial process of obtaining a DUAT. But on the other hand, 90% of parcel holders are interested in obtaining a DUAT and are willing to pay on average MT 150 per parcel (or equivalent to 0.13 MT/m²).

The hypothetical average sale price of land parcel in the study area was reported to be about 88 Mt/m² for residential plots and 8 Mt/m² for agricultural plots. Similarly, the hypothetical average monthly rental price for a land parcel in the study zone was reported to be about 875 Mt for the whole parcel or 5.4 MT per square meter (1.5 MT/m² for an average agricultural parcel to 13 MT/m² for an average residential parcel).

The rental market is moderately active in the study areas. Of the total number of parcels surveyed in the study area, 23% were either rented-in (15%) or rented out (8%). The rental transactions involve more than half of the households (16% renting in land) and (40% renting out land). The monthly rental price for an average agricultural parcel is 54 MT (or 0.02 MT per square meter).

7. Test for logic assumptions

In this section we test some of the underlying assumptions of the possible effects of enhanced land rights and tenure security on some outcome variables. Specifically, we examine the correlation between some of these outcome variables in the baseline data with parcel level characteristics with focus on variables that serve as a proxy for tenure security. Our analysis focus on two sets of outcome variables: 1) value of land as measured by hypothetical sale's and rental value per M2 of land; and 2) perceived future tenure security including "perceived future conflict related to the parcel" and "fear of losing the parcel in the future". For continuous variables such as hypothetical sale's and rental 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 tenure security variables. When testing the correlation between a binary dependent variable such as perceived future tenure security of a parcel, we estimate probit models. It should be noted that the analyses presented in this section are simple correlations and do not represent any causal relationship.

7.1. Correlation between land value, land tenure security and parcel characteristics

Table 43 presents the OLS results on the correlation between the hypothetical sales and rental value of land per M² and household and parcel characteristics using all the parcels with no missing information on all the variables. 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 each of the coefficients. The first two columns report the results for sale's value regression, and the other two columns report those for rental value regression.

Several interesting results emerge from the results in Table 43. First, the coefficients of a number of tenure security variables are consistent with our expectation and are statistically significant. Parcels with higher number of rights have positive and significant effects on both the land sales and the land rental values. Each additional land right is associated with 6-9% increase the sales values and 4% increase in the rental value. Parcels acquired through purchase also has positive effects on both the sales and rental prices, though statistically significant only in the case of sales price. On the other hand, fear of losing parcel has negative and significant effect on both the land sales and land rental values. The magnitude of negative effects is quite large. For example, "fear of losing parcel" is associated with 55-63 percentage point decrease in land sales price and 41-47 percentage points increase in the land rental price. Second, though not statistically significant, the coefficients on parcels ceded by formal authorities and the parcels without any land document are also as expected. Land granted by formal authority tend to be positively correlated with both land sales and land rental price but parcels without any document tend to be negatively associated with land sales and rental prices. Third, tenure security matters in land value is also reflected by the large and statistically very significant coefficient of "interests in obtaining DUAT. "Interest in obtaining a DUAT" is associated with almost doubling of land sales price (95-96%) and with more than 50 percentage points increase in hypothetical land rental value. Fourth, the positive coefficient on "concerns about future conflict" appears to be unexpected, it could also mean that farmers value more on parcels that they perceive to have future conflicts. Finally, land sales and rental values are also highly associated with a number of land amenity variables. For example, parcels accessible by Primary/Secondary roads are associated with higher hypothetical sales and rental value.

Table 43: Determinants of land sales and rental values in rural areas (OLS)

| Variables | Sales values per m2 (MZM) | | Rental values per m2 (MZM) | |
|--|---------------------------|---------------------|----------------------------|---------------------|
| | Model1 | Model2 | Model3 | Model4 |
| Parcel acquired in 10 or more years (1=Yes) | -0.033 (-0.32) | -0.026 (-0.25) | 0.088 (1.10) | 0.078 (0.96) |
| Total number of rights in a parcel (Max.6) | 0.088** (3.34) | 0.064* (2.16) | 0.040* (2.02) | 0.043* (2.04) |
| Ceded by formal authorities (1=Yes) | 0.087 (0.12) | 0.119 (0.16) | 0.453 (0.78) | 0.415 (0.71) |
| Purchased infrastr./parcel (1=Yes) | 0.608** (3.56) | 0.590** (3.44) | 0.186 (1.28) | 0.180 (1.23) |
| Parcel with no any documentation (1=Yes) | -0.378 (-0.37) | -0.357 (-0.35) | -0.094 (-0.71) | -0.097 (-0.71) |
| Parcel area in m2 (Log) | -0.249** (-3.86) | -0.243** (-3.79) | -0.378** (-8.61) | -0.382** (-8.54) |
| Number of buildings in the parcel | 0.117** (4.96) | 0.118** (5.03) | 0.067** (3.22) | 0.067** (3.25) |
| Number of Cashew trees in the parcel | -0.012** (-2.81) | -0.012** (-2.83) | -0.007* (-2.53) | -0.007* (-2.47) |
| Number of coconut trees in the parcel | -0.066** (-2.66) | -0.066** (-2.68) | -0.053** (-3.06) | -0.056** (-3.18) |
| Tap water is the most used water source (1=Yes) | 0.522 (1.12) | 0.535 (1.15) | 0.744** (2.90) | 0.683** (2.81) |
| Parcel has access to mobile network (1=Yes) | -0.247+ (-1.86) | -0.245+ (-1.84) | -0.154 (-1.62) | -0.164+ (-1.72) |
| Parcel accessible by Primary/Secondary roads (1=Yes) | 0.548** (4.62) | 0.566** (4.77) | 0.436** (4.75) | 0.433** (4.71) |
| Interested in obtaining DUAT (1=Yes) | 0.951** (5.82) | 0.964** (5.86) | 0.527** (4.74) | 0.515** (4.59) |
| Concerned about future conflict (1=Yes) | 0.144 (0.85) | 0.254 (1.33) | 0.238+ (1.85) | 0.457** (2.90) |
| Fear of losing parcel (1=Yes) | -0.554* (-2.10) | -0.634* (-2.50) | -0.410* (-2.14) | -0.473* (-2.48) |
| Female-headed * total number of rights | | 0.072 (1.30) | | -0.017 (-0.39) |
| Female-headed * future conflict | | -0.638* (-2.22) | | -0.670** (-3.61) |
| Literate female-headed * future conflict | | 0.350* (2.45) | | 0.114 (0.96) |
| Constant | 2.728* (2.24) | 2.590* (2.10) | 2.620** (5.69) | 2.671** (5.73) |
| Observations | 3,708 | 3,708 | 3,708 | 3,708 |
| R-square | 0.056 | 0.059 | 0.056 | 0.059 |
| F-statistic | 9.795 | 7.667 | 10.731 | 13.901 |

t statistics in parentheses; + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$

Source: Author's computation from the MCA/MINAG baseline survey data, 2010 and 2012

7.2. Correlation between perceived future land tenure security and parcel characteristics

Table 44 reports the probit results on the correlation between potential future conflicts (models 1 and 2) and potential future risk of losing land (models 3 and 4) and the household and parcel characteristics. Of the two outcome indicators, the results for the potential future conflicts are relatively more consistent with our expectation. For example, the negative and significant coefficients on “parcels acquired in 10 or more years” and “parcels acquired through purchase” suggest that parcels in possession for longer period of time or acquired through purchase are

perceived to be less likely to have potential land conflict. The coefficients on all other rights and tenure security variables are insignificant. The preexisting investments on a parcel have no to little effect on household's perception of future land conflicts of the parcel. Compared to residential parcels, agricultural parcels and commercial parcels are perceived to be more likely to have future land conflicts.

Compared to the indicator on perceived future conflicts, the results on perceived risk of losing land are more mixed. While we originally expected most of the variables would affect the perceived future land conflicts and perceived risk of losing land the same way, this turns out to be not the case for many variables. For example, the coefficients on "parcels acquired in 10 or more years" and "parcels acquired through purchase" are positive and significant, which implies that farmers perceived to have higher probability to lose parcels that have been in their possession for longer period of time or were acquired through purchase (both serving as proxy for relatively stronger tenure security). These results seem quite counterintuitive at first. On the other hand, the coefficients on "the total number of rights" and "parcels without any land documents" have the expected negative sign and significant in most cases, suggesting that parcels with more rights are perceived to have smaller risk of losing and parcels without any documents are perceived to have higher risk of losing, which is what we would expect. Similar to the case of perceived future land conflicts, the set of control variables including the pre-existing investments have little and mostly insignificant effects on perceived risk of losing land.

The perceived risk of losing land is not obvious, because there are two competing effects in play. On the one hand, farmers feel more secure land to have smaller risk of losing it. But on the other hand, farmers are also more afraid of losing land that are more secure and more valuable. Therefore, it is not easy to separate the two effects with just the cross sectional data.

Table 44: Determinants of perceived risk of being in future land conflict and losing land, probit models

| Variable | Perceived future conflict | | Fear of losing land | |
|--|---------------------------------|---------------------------------|-------------------------------|---------------------------------|
| | Model1 | Model2 | Model3 | Model4 |
| Parcel acquired in 10 or more years (1=Yes) | -0.017 ⁺ (-1.78) | -0.016 ⁺ (-1.77) | 0.007 (1.50) | 0.008 ⁺ (1.69) |
| Total number of rights in a parcel (Max.6) | -0.001 (-0.45) | -0.005 (-1.52) | -0.002 (-1.42) | -0.004 ^{**} (-2.73) |
| Ceded by formal authorities (1=Yes) (a) | 0.006 (0.28) | 0.005 (0.26) | 0.093 (0.83) | 0.100 (0.87) |
| Purchased infrastr./parcel (1=Yes) (a) | -0.024 [*] (-2.12) | -0.028 [*] (-2.28) | 0.023 ⁺ (1.95) | 0.021 ⁺ (1.90) |
| Parcel with no any documentation (1=Yes) | -0.001 (-0.13) | -0.004 (-0.36) | 0.028 ^{**} (4.86) | 0.028 ^{**} (5.32) |
| Parcel area in m2 (Log) | 0.001 (0.46) | 0.001 (0.34) | -0.001 (-0.23) | -0.000 (-0.04) |
| Number of buildings in the parcel | 0.003 (1.21) | 0.003 (1.21) | -0.000 (-0.16) | -0.000 (-0.05) |
| Number of Cashew trees in the parcel | -0.001 (-0.46) | -0.001 (-0.43) | 0.000 (0.37) | 0.000 (0.52) |
| Number of coconut trees in the parcel | -0.012 (-1.34) | -0.012 (-1.36) | -0.001 (-0.99) | -0.001 (-0.96) |
| Tap water is the most used water source (1=Yes) | -0.031 ^{**} (-2.70) | -0.029 ^{**} (-2.66) | 0.032 (0.85) | 0.034 (0.89) |
| Parcel has access to mobile network (1=Yes) | -0.016 (-0.78) | -0.016 (-0.78) | 0.000 (0.03) | 0.000 (0.07) |
| Parcel accessible by Primary and Secondary roads (1=Yes) | 0.005 (0.51) | 0.007 (0.72) | 0.019 [*] (2.10) | 0.019 [*] (2.23) |
| Agricultural use (1=Yes) (b) | -0.026 ^{**} (-3.08) | -0.027 ^{**} (-3.34) | -0.002 (-0.29) | -0.001 (-0.21) |
| Commercial use (1=Yes) (b) | -0.026 [*] (-2.50) | -0.028 ^{**} (-3.20) | | |
| Female-headed * total number of rights | | 0.029 [*] (2.18) | | 0.009 ^{**} (2.93) |
| Literate female-headed* total rights | | -0.021 (-1.57) | | -0.006 (-1.62) |
| Observations | 3,708 | 3,708 | 3,708 | 3,708 |
| Pseudo R-square | 0.023 | 0.030 | 0.076 | 0.086 |
| Percent correctly predicted | 0.102 | 0.102 | 0.035 | 0.035 |

Marginal effects; *t* statistics in parentheses; significance level: ⁺ $p < 0.10$, ^{*} $p < 0.05$, ^{**} $p < 0.01$

(1=Yes) for discrete change of dummy variable from 0 to 1

(a) Reference is other modes of acquisition which are considered less secure (e.g. gifts, inheritance, occupation, etc.);

(b) Reference is residential use

Source: Author's computation from the MCA/MINAG baseline survey data, 2010 and 2012

8. Discussion and Conclusions

The baseline survey provides extensive information on household characteristics, land ownership, land acquisition, land use, parcel characteristics, land investment, land conflicts and perceived risks, land markets, and perceptions and knowledge about the land law, the status of land document issuance, and the perceived impacts of DUAT. It provides insights into the household economies and land market dynamics of two rural districts – Cabo Delgado and Nampula, two of the 12 districts initially targeted by the ‘*Site Specific Access to Land*’ project activities of MCA-Mozambique. The baseline report not only provides valuable insights about the current state of land tenure, land market and knowledge of land law and households’ perceived impact of land tenure improvement, which is of great interest in its own right, it also serves as a valuable baseline tool to guide the follow-up survey and the necessary modification of research methodology for the impact evaluation. In this final section of the report, we will summarize the main findings of the analysis conducted in the previous sections with focus on results from balancing tests, matching exercise, and logic analysis, and several identified data issues and their implications on evaluation methods and future steps.

8.1 Comparison of key variables across districts and between treatment and control areas

The difference between treatment and control sites within the same district is typically smaller in magnitude and less significant in many cases compared to the differences between the two districts. The comparison between treatment and control sites within the same district also varies across districts. While in many cases the difference between treatment and control sites in Cabo Delgado is not statistically significant, the difference for the same indicator between the treatment and control site is statistically significant in Nampula, and vice versa. While the households between treatment and control sites in the same district is significantly different in many aspects of socioeconomic characteristics (e.g., key demographic characteristics, participation in different economic activities, food and consumption, and household non-food and total expenditures), land ownership and behavioral indicators related to land (market participation, investment, conflicts), the difference is smaller and less significant in hypothetical land sale and rental participation, and the perceived impacts of DUAT on land value, land market participation, conflicts, and investment, etc.

The vast and in many cases significant differences between the two districts in household demographic and socio-economic characteristics, parcel characteristics, behavioral variables related to land, perceptions and opinion about land conflict and risks of expropriation implies that the evaluation should be done separately for each of the two districts. In fact, this strategy has already been taken into account in the evaluation design and methodological section. Though the differences are generally smaller and less significant compared to those between the two districts, the significant differences in many variables between the treatment and control groups within the same district have also important methodological implications. On the one hand, it is not surprising that the difference is significant for many variables between the two groups within the same district because the treatment and control groups were not selected randomly. On the other hand, the non-experimental design requires a different research methodology than an experimental design in order to accomplish a rigorous impact study, which is our focus in the next sub-section.

8.2 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 within the Cabo Delgado and Nampula district sites: 1) baseline data before the intervention (2011-12) and 2) data from a follow-up survey planned after 5-6 years (2017-2018). The type of analysis planned for impact evaluation is to calculate the changes that occur in the outcome variables over the 5-6 year period and to compare what happens (on average) to surveyed households in treatment areas with what happens (on average) to households in the control areas. Specifically, our primary method will be difference-in-difference (DiD) method, which compares the change in outcome indicators of households in the treatment area to change in outcome indicators of households in the control area during the same 5-6 year period. The DiD regression automatically controls for time invariant observed and unobserved characteristics. In the previous sections, we identified a number of variables the value of which is significantly different between the treatment and control groups. These differences do not necessarily cause biases if they stay constant over time. However, DiD does not control for time varying unobservables. The underlying assumption behind the validity of the DiD method is “the parallel assumption” which means the change in an outcome variable due to unobserved or omitted variables is constant between the treatment and control groups in absence of intervention. Unfortunately, we are not able to check the parallel trend assumption because we need historical data to do so.

Given the limitations of quasi-experimental design, we will conduct the evaluation as rigorously as possible by using the combination of DiD and PSM method. PSM matches the treatment households to the control households according to their estimated likelihood of participating in the Land Project (*propensity score*) which is determined by a set of observed characteristics using the baseline survey data. The main spirit of PSM is to create comparable treatment and control groups based on observed characteristics. While PSM does not automatically address the time varying unobservable problem, it would generally help because the matched treatment households and control households are more comparable in almost all the observed characteristics. PSM analysis in the early section has shown that the quality of PSM matching based on the baseline survey data is high. The combination of DiD and PSM is widely used in evaluation exercises and is viewed as a preferred method over DiD or PSM by a number of prominent development economists (Ravallion 2005, Khander, Koolwal, and Samad 2010).

8.3 Data quality issues and next steps

Throughout the data analysis for this report, we have also identified a number of data issues that should be addressed in the endline survey. A more specific recommendation for the second round of the survey is to carefully record the information on the size of the parcels, and values associated with rent, sales, purchase, and investments. For the baseline survey, these data were collected, but some ambiguities and missing data have emerged. The detailed rental information including rental prices is completely missing for Cabo Delgado in this baseline survey. It seems there is some misunderstanding of the nature of past land conflicts. As indicated earlier, MSU also made a mistake by asking the respondents to provide information on past conflicts related to the acquisition of a DUAT for parcels with DUATs. It would be much more useful to collect data on all types of land conflicts in the past for all parcels. 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 terms of the next step, it is important to make sure there will be no further violation of the design from now on. For example, all the remaining control sites should continue to remain as valid control communities before the endline survey. It has been almost five years since the intervention was implemented in the two districts. We believe 5 years is a sufficient time period for a land tiling project to have real impact on rural households' behaviors toward investment, market, and production and the ensuing effect on their income, employment and overall welfare. To avoid the risk of having further contamination, we recommend the endline survey to be implemented in 2017/2018. And it is better the specific time of survey (month/season) is consistent with that when the baseline survey was conducted.

In conclusion, the baseline survey provides extensive information about the land economy in the two rural hotspot areas in Cabo Delgado and Nampula districts. Given the fact that the sample in the two districts is vastly different, we separate the districts in our descriptive analysis in this report and we suggest to conduct the final evaluation separately for each district as well. While our originally proposed method is DiD, we suggest to use the combination of DiD and PSM method partly motivated by the fact that the mean differences between the treatment and control group is statistically significant for quite a number of variables (more so in Nampula than Cabo Delgado) and that the PSM matching quality is high. The simple correlation analysis using baseline survey data provides some evidence to support the logic frame as parcels with relatively more land rights or secure tenure are associated with higher land sale and land rental values. Furthermore, the updated power calculation taking into account of the deviation of project implementation from the original plan (e.g., some control communities becoming treatment communities) also confirms that the original design and the sample of the baseline survey are still valid for rigorous evaluation.

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Annex 2. Field Report for the Baseline Survey for Impact Evaluation of MCA Land Interventions in Rural Areas



REPÚBLICA DE MOÇAMBIQUE

MINISTERIO DA AGRICULTURA

DIRECÇÃO DE ECONOMIA

**FINAL FIELDWORK REPORT FOR THE
BASELINE SURVEYS FOR THE IMPACT
EVALUATION OF MCA LAND
INTERVENTIONS IN THE RURAL AREAS**

**Final report for Malema district
Final report for Mecufi district**

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Dr. Alfredo Jaime
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Nampula, 28 May 2012

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Alson Banze – Head, Provincial Directorate of Agriculture in Cabo Delgado/Department of Economic

Annex 2.1 NAMPULA FINAL REPORT

I. Introduction

As part of the agreement between the Ministry of Agriculture (MINAG), represented by the Directorate of Economics (DE) and the Millennium Challenge Account (MCA) to implement surveys to evaluate the impact of MCA interventions, a baseline survey was carried out in the locality of Murralelo in Malema district in Nampula province.

This baseline survey covered 3 *Cabos* (an administrative unit equivalent to a village or part of a village): *Cabo Miquitaculo*, *Cabo Niquile* and *Cabo Macassa*. The first two are areas covered by MCA project interventions (treatment areas) while the last *Cabo* represented the control area.

To implement the survey, the following took place:

- **Selection of enumerator candidates**
 - This activity was completed in a day and took place at the premises of the Provincial Directorate of Agricultura (DPA). (Additional note: Most of the candidates worked as enumerators in the urban land survey)
- **Training of enumerators**
 - The training took 11 days and also took place at the premises of the Provincial Directorate of Agriculture.
- **Fieldwork and data collection**
 - The fieldwork was implemented in Malema district, in Murralelo locality and was completed in 35 days.
- **Data entry**
 - Data entry was done in Maputo at the Agricultural Research Institute of Mozambique (IIAM).

The enumerators selected for this survey had considerable experience with the survey instrument used as well as with the recommended methodology for this type of survey given that most of them had already participated in a similar survey covering the urban areas of Monapo and Nampula in 2010, and others had worked in the rural survey in Mecufi in 2011. The questionnaires (used for the urban and rural survey) are practically the same.

II. Fieldwork

Enumerator training was carried out from March 14 to 30, 2012 at the DPA in Nampula. Twenty-two candidates participated, 4 females and 18 males. Out of the total, 20

candidates were selected while 2 were put on reserve status. The candidates were trained in conducting and completing the questionnaire (the main instrument). The candidates were given several tests and exercises (written and oral) in both Portuguese and *Macua*, the local language. They also had practice in filling out the questionnaire and in the use of GPS to get coordinates of the *Cabo* center and the location of the residence of households to be interviewed.

Actual fieldwork started on April 22 and was completed on May 26. The twenty enumerators were divided into 4 teams (see Annex 1) each composed of 1 team supervisor and 4 enumerators. Four vehicles were rented from Safari Co. in Nampula; the vehicles were driven by the company’s own personnel. The survey supervisors used the vehicle from the DPA. This supervision team was composed of 1 technician from MINAG, 1 technician from the DPA, 1 driver from the DPA and 1 technician from the District Services for Economic Activities (SDAE) of Malema.

Fieldwork was done in Murralelo locality in Malema district as follows: Cabo Miquitaculo (11 *células* or cells), Cabo Niquile (4 *células*) and Cabo Macassa (6 *células*)¹³.

We first conducted a listing of households resident in each *célula* using a listing form that asked for information on whether the household had a *machamba* or parcel in the lowland areas targeted for interventions – these households will comprise the sampling frame from which the sample was to be selected. The biggest land conflicts occur in these areas (considered the most productive areas).

Table A2.1.1: Number of households listed and selected per *cabo*

| Project Area | Cabo | Number of households listed | Number of households with agricultural parcels in the lowlands | Number of households selected for the sample |
|---------------------|--------------------|------------------------------------|---|---|
| Treatment | Miquitaculo | 718 | 465 | 300 |
| | Niquile | 258 | 153 | 100 |
| Control | Macassa | 473 | 333 | 333 |
| Total | | 1449 | 951 | 733 |

In total, 1,449 households were listed of which 951 were included in the sampling frame of households¹⁴.

¹³ For more details, see the annex tables

¹⁴ See Annex II for more details.

Table A2.1.2: Number of Households Interviewed

| Project Area | Cabo | Number of households listed | Number of households with agricultural parcels in the lowlands | Number of households selected for the sample | Number of households interviewed | Number of households not interviewed |
|---------------------|--------------------|------------------------------------|---|---|---|---|
| Treatment | Miquitaculo | 718 | 465 | 300 | 297 | 3 |
| | Niquile | 258 | 153 | 100 | 98 | 2 |
| Control | Macassa | 473 | 333 | 333 | 316 | 17 |
| Total | | 1449 | 951 | 733 | 711 | 22 |

According to Table A2.2, 733 households were selected from 3 *cabos*, of which 711 were interviewed, a response rate of 97%¹⁵.

We were able to achieve this due to the following factors:

- a) In general, we had good collaboration from the district government, the SDAE, the head of the Administrative Post, the head of Murralelo locality and all local community leaders .
- b) There villagers themselves, in general, were cooperative
- c) The survey team (supervisors, team supervisors, enumerators and drivers) worked well.

We also faced difficulties during fieldwork that also affected how the survey was implemented:

- a) Impassable roads that resulted in the team having to cover part of the distance to the respondent's household on foot.
- b) The households were also widely spread out. Note that the some parts of the survey area were mountainous and respondents can only be reached with some effort (some lived on the mountain top).
- c) In *Cabo Macassa*, there was an administrative dispute in *célula Eule* and the team had difficulties in working district. It was in this area that we had the most refusals (7 in total) and 1 respondent fled when he saw the enumerator coming.
- d) The respondents for other households that were not interviewed were absent or had traveled at the time of the interview.

III. Current Activities (as of May 2012)

¹⁵ See Annex II for more details.

The data entry is being done in Maputo within the premises of IIAM by 5 data entry clerks, the same persons who entered the questionnaires completed in Mecufi. They have had extensive experience in data entry work.

IV. Recommendations

There was a serious lack of communication and dialogue among the different institutions involved in the survey, sometimes causing misunderstanding. In the future, it is recommended that the flow of information be improved among all involved in the program/project.

The team also had to wait 3 weeks after training before a decision on vehicle rental could be made, and this delayed the start date of the fieldwork. This type of work requires timely assessments and decisions.

V. Annex

Annex I: Survey teams

| Team 1 | | | Team 3 | | |
|-------------------|-----------------------|------------|-------------------|-------------------------|------------|
| | | ID Code | | | ID Code |
| Supervisor | Atanásio Félix | 310 | Supervisor | Maria António | 330 |
| Enumerator | Ruquia Neto | 311 | Enumerator | Bonett Jacinto | 331 |
| Enumerator | Issufo Ossio | 312 | Enumerator | Amado Joaquim | 332 |
| Enumerator | Adones Intato | 313 | Enumerator | Francisco Mário | 333 |
| Enumerator | Faruk Norberto | 314 | Enumerator | Lourenco Valentim | 334 |
| Team 2 | | | Team 4 | | |
| | | ID Code | | | ID Code |
| Supervisor | André Mole | 320 | Supervisor | Amisse Rofrigues | 340 |
| Enumerator | Angela Barreto | 321 | Enumerator | Fernanda Saide | 341 |
| Enumerator | Justino Manuel | 322 | Enumerator | Ramatane Ossufo | 342 |
| Enumerator | Adolfo Paulino | 323 | Enumerator | Domingos Andinane | 343 |
| Enumerator | Aiupa Nicozeria | 324 | Enumerator | Nuro Mendes | 344 |

Annex II

Cabo Muquitaculo

| Celula Code | Célula Name | N of households listed | N of households with parcels in the lowlands | N of households selected (first round) | N of households selected (second round) | N of total households selected | N of households interviewed | N of households not interviewed | Reason for non-interview |
|---------------|---------------|------------------------|--|--|---|--------------------------------|-----------------------------|---------------------------------|-------------------------------|
| 1 | Chipaca B | 81 | 56 | 28 | 8 | 36 | 36 | 0 | |
| 2 | Murrapane | 53 | 25 | 13 | 2 | 15 | 15 | 0 | |
| 3 | Chipaca A | 77 | 52 | 26 | 6 | 32 | 32 | 0 | |
| 4 | 25 de Junho | 44 | 35 | 18 | 5 | 23 | 23 | 0 | |
| 5 | Mitilili | 94 | 85 | 43 | 16 | 59 | 58 | 1 | 1 refusal |
| 6 | 19 de Outubro | 45 | 14 | 11 | 1 | 12 | 12 | 0 | |
| 7 | Nroposso | 73 | 50 | 25 | 7 | 32 | 32 | 0 | |
| 8 | Mapecha | 56 | 25 | 12 | 2 | 14 | 14 | 0 | |
| 9 | Lituli | 86 | 51 | 25 | 6 | 31 | 31 | 0 | |
| 10 | 1 de Maio | 58 | 39 | 20 | 5 | 25 | 25 | 0 | |
| 11 | Pilani | 51 | 33 | 17 | 4 | 21 | 19 | 2 | 1 moved to Zambezia; 1 absent |
| | Total | 718 | 465 | 238 | 62 | 300 | 297 | 3 | |
| Response rate | | | | | | | 99% | | |

Cabo Niquile

| Celula Code | Célula Name | N of households listed | N of households w/ parcels in the lowlands | N of households selected (first round) | N of households selected (second round) | N of total households selected | N of households interviewed | N of households not interviewed | Reason for non-interview |
|--------------------|--------------------|-------------------------------|---|---|--|---------------------------------------|------------------------------------|--|---------------------------------|
| 21 | Niquile | 52 | 35 | 25 | 0 | 25 | 25 | 0 | |
| 22 | Nihoro | 74 | 35 | 25 | 0 | 25 | 25 | 0 | |
| 23 | Mocuba | 75 | 43 | 25 | 0 | 25 | 25 | 0 | |
| 24 | Chihuro | 57 | 40 | 25 | 0 | 25 | 23 | 2 | 2 absent |
| | Total | 258 | 153 | 100 | 0 | 100 | 98 | 2 | |
| Response rate | | | | | | | 98% | | |

Cabo Macassa

| Celula Code | Célula Name | N of households listed | N of households w/ parcels in the lowlands | N of households selected (first round) | N of households selected (second round) | N of total households selected | N of households interviewed | N of households not interviewed | Reason for non-interview |
|--------------------|--------------------|-------------------------------|---|---|--|---------------------------------------|------------------------------------|--|---------------------------------|
| 31 | Niessa | 63 | 48 | 48 | 0 | 48 | 48 | 0 | |
| 32 | Eule | 75 | 57 | 57 | 0 | 57 | 47 | 10 | 2 traveled, 7 refused, 1 fled |
| 33 | Murossi | 44 | 29 | 29 | 0 | 29 | 28 | 1 | 1 refused |
| 34 | Murrunha | 140 | 92 | 92 | 0 | 92 | 90 | 2 | 2 refused |
| 35 | Metcheketche | 83 | 59 | 59 | 0 | 59 | 56 | 3 | 3 traveled |
| 36 | Namale | 68 | 48 | 48 | 0 | 48 | 47 | 1 | 1 moved |
| | Total | 473 | 333 | 333 | 0 | 333 | 316 | 17 | |
| Response rate | | | | | | | 95% | | |

Annex 2.2. CABO DELGADO PROGRESS REPORT

Introduction

As part of the agreement between the Ministry of Agriculture (MINAG), represented by the Directorate of Economics (DE), and the Millennium Challenge Account (MCA) to implement surveys to evaluate the impact of MCA interventions, a baseline survey was conducted in Mecufi District of Cabo Delgado. The baseline survey covered seven villages: Ngoma, Maueia, Zaulane A, Zaulane B, Secura A, Secura B and Muituia. These villages are located along the road that connects the city of Pemba with the district capital of Mecufi.

The survey took almost two months to complete and involved the following activities:

- Selections of enumerators
- Training
- Fieldwork
- Data entry

To facilitate the work, the questionnaire was divided into two parts and these were referred to as the Part A questionnaire and the Part B questionnaire. The fieldwork for Part A immediately followed the training for the Part A questionnaire. Enumerators returned for training in Part B, followed by another round of fieldwork and data collection.

II. Activities Undertaken

The first activity was the selection of candidates for enumerators according to the following criteria:

- a) Written test
- b) Evaluation of CV
- c) Academic qualifications-12th class or 10 class with agro-technical experience in surveys
- d) Interview to test proficiency in the local language (*Macua*)

Close to 150 candidates were given a written test and from these, 25 were selected to be candidates for enumerators. From this group, 1 candidate withdrew, claiming that the remuneration was insufficient. The training commenced with the remaining 24 candidates, 3 females and 21 males (see annex).

The training was divided into three parts:

First part: The first part of the training was on the completion of the listing form for households, followed immediately by the actual listing work. The objective was to get estimates of the number of households in each community, and how many will fall under the two groups (treatment and control). For more details, check the results summarized in Table 1 below.

Table A2.2.1. Sample, Mecufi District

| | | Treatment | | Control | |
|-----------|--------------|--|--------|---|--------|
| Community | Total Listed | # of households with parcels on the coastal side of the highway. | Sample | # of households with parcels only on interior side of the highway | Sample |
| Ngoma | 360 | 222 | 120 | 113 | 113 |
| Muitua | 662 | 243 | 131 | 323 | 131 |
| Maueia | 117 | 37 | 20 | 71 | 20 |
| Secura B | 348 | 88 | 48 | 214 | 48 |
| Secura A | 339 | 78 | 42 | 235 | 42 |
| Zaulane A | 714 | 64 | 35 | 584 | 35 |
| Zaulane B | 637 | 54 | 29 | 460 | 29 |
| Total | 3177 | 786 | 425 | 2000 | 418 |

In total, 3177 households were listed in the 7 villages covered by the survey. Of these, 786 households had parcels on the coastal side of the highway linking Pemba to the district capital of Mecufi (original zone of intervention) from which 425 were selected for the sample. There were 2000 households who had land only on the interior side of the highway. From which 418 households were selected for the sample. The listing work took 3 days.

Second Part: The candidates were trained to complete the Part A questionnaires. During this training the candidates underwent several simulations of the interviews and they were also given written and practical tests to better assess the level of knowledge and understanding of the candidate and also as a tool for the final selection of the same (see annex for test results). As a final result of the training, 20 were selected as enumerators and 4 were put on reserve status

Third Part. Enumerators were trained in conducting and completing the Part B questionnaire. During this training, the enumerators also did practice interviews and were given tests to evaluate their performance and understanding of the questionnaire. As in Part A, 20 were selected as enumerators and 4 were put on reserve status.

III. FIELDWORK AND DATA COLLECTION

For the fieldwork, 4 teams were formed, each composed of 1 team supervisor and 4 enumerators. The teams were supervised by 1 technician from MINAG, 1 technician from the DPA and 1

technician from the District Services for Economic Activities (SDAE) of Mecufi . Two minibuses were rented to transport enumerators.

The number of interviews that were actually done during the first round (Part A) appears in Table A2.2.2.

Table A2.2.2. Number of households interviewed for Part A by village

| Village | Treatment | | | Control | | |
|-------------------|-----------|-----------------------------|--------------------------------------|---------|-----------------------------|--------------------------------------|
| | Sample | N of households interviewed | Number of households not interviewed | Sample | N of households interviewed | Number of households not interviewed |
| Ngoma | 120 | 110 | 10 | 113 | 97 | 16 |
| Muituia | 131 | 112 | 19 | 131 | 110 | 21 |
| Maueia | 20 | 19 | 1 | 20 | 20 | 0 |
| Secura B | 48 | 44 | 4 | 48 | 45 | 3 |
| Secura A | 42 | 35 | 7 | 42 | 37 | 5 |
| Zaulane A | 35 | 34 | 1 | 35 | 34 | 1 |
| Zaulane B | 29 | 27 | 2 | 29 | 25 | 4 |
| Total | 425 | 381 | 44 | 418 | 368 | 50 |
| Response rate (%) | | 89,65 | | | 88,04 | |

For Part A, 90% of households in the treatment area were interviewed; close to 88% of households in the control area were interviewed. Some interviews could not take place due to the absence of members in the household selected. The survey coincided with the harvest period for cassava. There were a few refusals to do the interview and also a few cases where the household moved to a new location. We also had cases where the households lived in Pemba during the week and returned only to Mecufi during the weekends. It also happened that some were sick and hospitalized at the Provincial hospital in Pemba during the survey.

The number of households interviewed for Part B was lower compared to Part A due mainly to the absence of respondents. The final numbers for inclusion in the analyses will be determined once information from Part A and Part B are combined.

During fieldwork, a Monitoring and Evaluation team from MCA led by Engr. Uachisso worked with us for 3 days, sitting down to observe interviews, and talking with the enumerators and local leaders. This team was well received by the Director of the DPA.

The good collaboration from all government offices from the Provincial Directorate of Agriculture (DPA) and the district offices (Government Administration Office and the District Office for Economic Activities) to the head of the Administrative Post of Murrébue and local community leaders all helped in getting the cooperation of the population and allowing the team to do their duties.

IV. Difficulties encountered

The principal difficulties encountered are as follows:

- Lack of good candidates for enumerators, those who meet the minimum requirements to do the survey. Even though there were over 150 who did the screening exam, the test results were, in general, very weak.
- In the community of Muituia, we were faced with many problems due to the rumors that spread out that the team was in the community to collect on credit that the households received. It was necessary for the community leaders to meet with the residents to explain the objectives of our survey and ask for their cooperation. There was also another survey on health that took place at the same time as our survey and this somehow confused some residents.
- Absences in the households selected because the survey coincided with the harvest of cassava. The residents returned home very late
- There were some refusals.

2. The next steps

Data entry. This activity will be done in Maputo where the experienced data entry clerks will receive some retraining. It is expected that the first data entry will be done in Pemba but given delays in the allocation of equipment, the work might be done in Maputo.

ANNEX

List of enumerator candidates



GOVERNO DA PROVÍNCIA DE CABO DELGADO
DIRECÇÃO PROVINCIAL DE AGRICULTURA

Visto

Máximo Carlos Jome

Director Provincial

RESULTADOS FINAIS DO CURSO DE TREINAMENTO DE INQUIRIDORES: INQUÉRITO DE TERRA 2011

| Nº | NOME COMPLETO | SEXO | | RESULTADOS, TESTE | | | | | | MÉDIA SIMPLES | Classificação Final | |
|----|--------------------------|------|----|-------------------|-------|------|------|------|------|------------------|------------------------|----------|
| | | 1M | 2F | T1 | T2 | T3 | T4 | T5 | T6 | | | Final |
| | | | | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 6.00 | |
| 1 | Omar Simão | 1 | | 9.00 | 14.00 | | | | | | 11.50 | Aprovado |
| 2 | Ângela J. Barreto | 1 | | 13.00 | 10.00 | | | | | | 11.50 | Aprovado |
| 3 | Mechior J. Mechior | 1 | | 10.00 | 10.00 | | | | | | 10.00 | Aprovado |
| 4 | Deolentino A. dos Santos | 1 | | 14.00 | 10.00 | | | | | | 12.00 | Aprovado |
| 5 | Carlitos Sispa | 1 | | 15.00 | 10.00 | | | | | | 12.50 | Aprovado |
| 6 | Felício M. Anatona | 1 | | 12.00 | 16.00 | | | | | | 14.00 | Aprovado |
| 7 | Pascoal A. T. Rabucane | 1 | | 11.00 | 12.00 | | | | | | 11.50 | Aprovado |
| 8 | Francisco D. dos Santos | 2 | | 8.00 | 14.00 | | | | | | 11.00 | Aprovado |
| 9 | Nacir Amade | 1 | | 16.00 | 15.00 | | | | | | 15.50 | Aprovado |
| 10 | Idrisse A. Ahamade | 1 | | 14.00 | 13.00 | | | | | | 13.50 | Aprovado |
| 11 | Betinho Maurício | 1 | | 9.00 | 10.00 | | | | | | 9.50 | Aprovado |
| 12 | Leontino Agostinuho | 1 | | 8.00 | 10.00 | | | | | | 9.00 | Reserva |
| 13 | Picair Abú | 1 | | 6.00 | 10.00 | | | | | | 8.00 | Reserva |
| 14 | Eugénio F. C. Achimo | 1 | | 14.00 | 13.00 | | | | | | 13.50 | Aprovado |
| 15 | Icbal B. I. Morripa | 1 | | 18.00 | 13.00 | | | | | | 15.50 | Aprovado |
| 16 | Ruquia F. T. Neto | 1 | | 9.00 | 15.00 | | | | | | 12.00 | Aprovado |
| 17 | Arão A. Marrihe | 1 | | 10.00 | 5.00 | | | | | | 7.50 | Reserva |
| 18 | Felizardo Agostinho | 1 | | 17.00 | 16.00 | | | | | | 16.50 | Aprovado |
| 19 | Rosália Cardoso | 2 | | 11.00 | 10.00 | | | | | | 10.50 | Aprovado |
| 20 | Ubaine A. Issufo | 1 | | 13.00 | 14.00 | | | | | | 13.50 | Aprovado |
| 21 | Atuhur C. Amisse | 1 | | 15.00 | 18.00 | | | | | | 16.50 | Aprovado |
| 22 | Gabriel Selemane | 1 | | 9.50 | 10.00 | | | | | | 9.75 | Aprovado |
| 23 | Atanásio Félix | 1 | | 18.00 | 18.00 | | | | | | 18.00 | Aprovado |
| 24 | Abibo C. António Abibo | 1 | | | | | | | | | | a) |
| | | | | 12.15 | 12.43 | | | | | | 12.29 | |

a) não participou na formação
SUPERVISOR PROVINCIAL

[Signature]

Formador

[Signature]

Pemba, aos 12 de Setembro de 2011

Survey Teams, Land Survey - Mecufi 2011

| | | | | | |
|------------|---------------------|---------|--------------|-------------------|---------|
| Team 1 | | | Team 3 | | |
| | | ID Code | | | ID Code |
| Supervisor | Icbal Morripa | 210 | Supervisor | Atuhur Amisse | 230 |
| Enumerator | Omar Simao | 211 | Enumerator | Gabriel Selemane | 231 |
| Enumerator | Carlitos Sispa | 212 | Enumerator | Pascoal Rabucane | 232 |
| Enumerator | Nacir Amade | 213 | Enumerator | Betinho Mauricio | 233 |
| Enumerator | Ruquia Neto | 214 | Enumerator | Rosalia Cardoso | 234 |
| Team 2 | | | Supervisor | | |
| | | ID Code | | | ID Code |
| Supervisor | Felizardo Agostinho | 220 | Controlador: | Atanasio Felix | 240 |
| Enumerator | Angela Barreto | 221 | Enumerator | Deolentino Santos | 241 |
| Enumerator | Felicio Anatona | 222 | Enumerator | Francisco Santos | 242 |
| Enumerator | Idrisse Ahamade | 223 | Enumerator | Eugenio Achimo | 243 |
| Enumerator | Ubaine Issufo | 224 | Enumerator | Melchior Melchior | 244 |

Annex 3. Results by treatment and control groups and by the gender of household head for the pooled data

Note: Table numbers (after A3) correspond to the Tables presenting similar results by treatment and control areas in the main body of the report

Table A3.6 Demographic characteristics

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|---|------------------------|----------------|--------------|------------------------|----------------|--------------|------------------------|----------------|--------------|-----------------|---------------|-----------------------------|----------|------------|-------------------|-------------------|
| | <u>Treat- ment</u> | <u>Control</u> | <u>Total</u> | <u>Treat- ment</u> | <u>Control</u> | <u>Total</u> | <u>Treat- ment</u> | <u>Control</u> | <u>Total</u> | <u>Male</u> | <u>Female</u> | <u>C</u> | <u>N</u> | <u>All</u> | <u>C vs N</u> | <u>M vs F</u> |
| % female-headed | 43.2 | 49.5 | 47.2 | 13.9 | 18.7 | 15.3 | 29.0 | 43.7 | 36.8 | 0.0 | 100.0 | * | *** | *** | | |
| Age of head (years) | 46.3 | 47.8 | 47.3 | 40.4 | 38.7 | 39.9 | 43.5 | 46.1 | 44.8 | 44.6 | 45.3 | | ** | *** | | |
| Education of the head | | | | | | | | | | | | | | | | |
| % literate | 30.9 | 34.0 | 32.8 | 59.5 | 46.5 | 55.5 | 44.8 | 36.3 | 40.3 | 54.7 | 15.5 | *** | ** | *** | *** | |
| % currently attending school | 2.0 | 1.9 | 2.0 | 1.4 | 0.3 | 1.0 | 1.7 | 1.61 | 1.7 | 0.9 | 2.9 | | | | * | |
| % ever in school | 51.6 | 56.4 | 54.7 | 82.0 | 75.0 | 79.9 | 66.4 | 59.9 | 62.9 | 71.8 | 47.7 | ** | * | *** | *** | |
| Years of schooling completed, of those ever in school | 4.2 | 4.0 | 4.1 | 4.2 | 3.8 | 4.1 | 4.2 | 3.9 | 4.1 | 4.3 | 3.4 | ** | | | | |
| Household Size | 5.0 | 5.3 | 5.2 | 4.8 | 4.6 | 4.8 | 4.9 | 5.1 | 5.0 | 5.2 | 4.7 | | | *** | *** | |
| AEU | | | | | | | | | | | | | | | | |
| Infant (<5 years) | 0.9 | 0.9 | 0.9 | 0.8 | 1.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | | | | | |
| Child (5-14 years) | 1.5 | 1.5 | 1.5 | 1.6 | 1.5 | 1.6 | 1.6 | 1.5 | 1.5 | 1.7 | 1.4 | | | | | *** |
| Adult (15-44 years) | 1.8 | 1.9 | 1.8 | 1.8 | 1.7 | 1.8 | 1.8 | 1.8 | 1.8 | 1.9 | 1.7 | | | | | * |
| Adult (45-59 years) | 0.4 | 0.5 | 0.5 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | | | * | | |
| Older (60 years and over) | 0.4 | 0.5 | 0.5 | 0.14 | 0.09 | 0.1 | 0.3 | 0.4 | 0.4 | 0.31 | 0.42 | * | *** | *** | *** | ** |
| % female among adults | 56.3 | 57.0 | 56.8 | 50.7 | 53.0 | 51.4 | 53.6 | 56.3 | 55.0 | 48.3 | 66.6 | | | ** | *** | *** |
| % with income from salaries | 24.8 | 15.1 | 18.6 | 29.3 | 19.9 | 26.4 | 27.0 | 16.0 | 21.1 | 23.5 | 17.1 | *** | *** | *** | *** | ** |
| % with self-employment income | 55.8 | 56.2 | 56.1 | 26.9 | 20.6 | 25.0 | 41.8 | 49.5 | 45.9 | 46.2 | 45.3 | ** | ** | *** | | |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.7 Percentage of households reporting income from different sources and type of economic activity

| | Cabo Delgado | | | Nampula | | | All Sample | | | Headship | | Treatment vs Control | | | | |
|--|--------------|---------|-------|------------|---------|-------|------------|---------|-------|----------|--------|----------------------|-----|-----|--------|--------|
| | Treat-ment | Control | Total | Treat-ment | Control | Total | Treat-ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| % who had crop production | 99.3 | 95.9 | 97.1 | 99.8 | 99.7 | 99.8 | 99.5 | 96.6 | 98.0 | 98.4 | 97.2 | | | | | |
| % that raised any livestock ¹ | 47.0 | 46.6 | 46.8 | 79.6 | 87.7 | 82.1 | 62.9 | 54.4 | 58.3 | 66.3 | 44.6 | *** | *** | *** | | |
| % who sold livestock, milk, or eggs | 27.2 | 26 | 26.4 | 57.6 | 58.2 | 57.8 | 41.9 | 32.1 | 36.7 | 43.3 | 25.3 | | | | | |
| Remittances and pensions | | | | | | | | | | | | | | | | |
| % that received transfers in cash/kind | 12.3 | 13.8 | 13.3 | 14.0 | 10.1 | 12.8 | 13.1 | 13.1 | 13.1 | 10.7 | 17.2 | | | | | ** |
| % that sent cash transfers | 4.6 | 5.2 | 5.0 | 8.7 | 8.2 | 8.5 | 6.6 | 5.8 | 6.2 | 8.1 | 2.9 | | | | ** | *** |
| % that sent inkind transfers | 13.5 | 15.1 | 14.5 | 28.3 | 21.8 | 26.3 | 20.7 | 16.4 | 18.4 | 20.8 | 14.2 | * | * | *** | | ** |
| % that received pensions | 8.6 | 9.9 | 9.4 | 1.5 | 0.3 | 1.1 | 5.1 | 8.1 | 6.7 | 5.6 | 8.6 | * | | *** | | |
| Salaried employment, % of households with members working as | | | | | | | | | | | | | | | | |
| Agricultural laborer | 4.9 | 0.5 | 2.1 | 24.5 | 18.7 | 22.8 | 14.5 | 3.9 | 8.8 | 11.1 | 5.0 | *** | * | *** | *** | *** |
| Migrant worker | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | |
| Teacher, health worker | 0.5 | 0.5 | 0.5 | 1.1 | 0.0 | 0.8 | 0.8 | 0.4 | 0.6 | 0.7 | 0.4 | | ** | | | |
| Mechanic, factory/construction worker | 4.1 | 6.4 | 5.6 | 1.2 | 0.6 | 1.1 | 2.7 | 5.3 | 4.1 | 3.2 | 5.6 | | | * | *** | |
| Manager, accountant, secretary | 0.6 | 0.0 | 0.2 | 0.0 | 0.3 | 0.1 | 0.3 | 0.1 | 0.2 | 0.3 | 0.0 | * | | | | * |
| Domestic worker | 3.4 | 1.0 | 1.9 | 0.7 | 0.0 | 0.5 | 2.1 | 0.8 | 1.4 | 1.6 | 1.0 | ** | * | * | ** | |
| Forestry worker | 0.6 | 0.2 | 0.4 | 0.0 | 0.0 | 0.0 | 0.3 | 0.2 | 0.2 | 0.4 | 0.0 | | | | * | * |
| Other types of salaried worker | 11.1 | 6.9 | 8.4 | 3.6 | 0.6 | 2.7 | 7.5 | 5.7 | 6.5 | 7.1 | 5.5 | * | *** | | *** | |
| Self-employment: % engaging in activities related to flora and fauna | | | | | | | | | | | | | | | | |
| Cutting/collection of firewood | 67.9 | 63.5 | 65.1 | 78.1 | 98.7 | 84.4 | 72.9 | 70.2 | 71.4 | 73.4 | 68.1 | | *** | | *** | |
| Charcoal production | 17.5 | 5.9 | 10.1 | 0.0 | 0.0 | 0.0 | 9.0 | 4.8 | 6.8 | 7.5 | 5.6 | *** | | *** | *** | |
| Cut grass/reeds, cane, palm leaves | 45.1 | 39.2 | 41.3 | 57.8 | 69.0 | 61.2 | 51.2 | 44.8 | 47.8 | 49.1 | 45.6 | | *** | * | *** | |
| Cut branches | 20.5 | 14.2 | 16.4 | 32.8 | 37.7 | 34.3 | 26.5 | 18.6 | 22.3 | 24.6 | 18.3 | * | | *** | *** | ** |
| Collect honey, bush plants/fruits, eggs of wild animals | 0.8 | 1.6 | 1.3 | 3.2 | 1.0 | 2.5 | 1.9 | 1.5 | 1.7 | 2.1 | 1.0 | | ** | | | |
| Hunting | 0.6 | 0.0 | 0.2 | 4.8 | 3.8 | 4.5 | 2.7 | 0.7 | 1.6 | 2.3 | 0.4 | ** | | *** | *** | *** |
| Fishing | 21.9 | 26.3 | 24.7 | 5.7 | 6.7 | 6.0 | 14.0 | 22.6 | 18.6 | 19.5 | 17.0 | | | *** | *** | |
| Wood production | 0.4 | 0.8 | 0.6 | 1.1 | 0.0 | 0.8 | 0.8 | 0.6 | 0.7 | 0.6 | 0.8 | | ** | | | |
| Catching birds and reptiles | 0.8 | 0.5 | 0.6 | 2.3 | 3.8 | 2.7 | 1.5 | 1.1 | 1.3 | 1.7 | 0.6 | | | | *** | ** |
| Self-employment: % engaging in other activities | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-------|-----|-----|----|---|----|-----|-----|
| Production of home-made beverages | 0.7 | 0.7 | 0.7 | 7.4 | 7.9 | 7.6 | 4.0 | 2.1 | 3.0 | 4.1 | 1.0 | | | ** | *** | *** |
| Purchase and sale of beverages | 0.4 | 2.1 | 1.5 | 0.7 | 1.0 | 0.8 | 0.6 | 1.9 | 1.3 | 1.9 | 0.3 | * | | * | | ** |
| Purchase and sale of food products | 4.3 | 9.0 | 7.3 | 6.6 | 3.8 | 5.8 | 5.4 | 8.0 | 6.8 | 8.3 | 4.2 | ** | * | | | ** |
| Purchase and sale of nonfood products | 0.6 | 0.0 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.1 | 0.2 | 0.4 | 0.0 | * | | | | ** |
| Purchase and sale of fish | 2.0 | 4.7 | 3.8 | 1.7 | 1.9 | 1.8 | 1.9 | 4.2 | 3.1 | 3.6 | 2.2 | | | * | * | |
| Purchase and sale of large-sized livestock and by-products | 0.2 | 0.0 | 0.1 | 0.3 | 0.0 | 0.2 | 0.2 | 0.0 | 0.1 | 0.2 | 0.0 | | | | | |
| Purchase and sale of medium-sized livestock and its by-products | 1.8 | 4.3 | 3.4 | 0.2 | 0.6 | 0.4 | 1.1 | 3.6 | 2.4 | 1.4 | 4.1 | | | | ** | *** |
| Purchase and sale of small-sized livestock and by-products | 0.0 | 0.5 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.2 | 0.4 | 0.0 | | | | | |
| Handicrafts/masonry/carpentry | 2.6 | 0.7 | 1.4 | 3.0 | 2.5 | 2.9 | 2.8 | 1.1 | 1.9 | 2.7 | 0.5 | ** | | ** | * | *** |
| Tailoring/dressmaking | 0.3 | 1.3 | 0.9 | 1.0 | 1.0 | 1.0 | 0.6 | 1.2 | 1.0 | 0.6 | 1.5 | | | | | |
| Radio/bike repair | 0.2 | 0.2 | 0.2 | 0.2 | 0.6 | 0.4 | 0.2 | 0.3 | 0.3 | 0.4 | 0.0 | | | | | |
| Bricks production, bricklaying | 1.1 | 0.2 | 0.6 | 1.2 | 0.0 | 0.9 | 1.2 | 0.2 | 0.7 | 1.0 | 0.0 | | | | | |
| Milling or agro-processing | 0.0 | 0.0 | 0.0 | 0.8 | 0.6 | 0.7 | 0.4 | 0.1 | 0.2 | 0.4 | 0.0 | | | | | ** |
| Other activity | 3.1 | 4.2 | 3.8 | 0.9 | 0.6 | 0.8 | 2.0 | 3.5 | 2.8 | 2.7 | 3.0 | | | | | *** |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.8 Percentage of households owing various assets, by district and gender of the head

| | Cabo Delgado | | | Nampula | | | All Sample | | | Headship | | Treatment vs Control | | | | |
|----------------------------------|----------------|---------|-------|----------------|---------|-------|----------------|---------|-------|----------|--------|----------------------|-----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| Car purchased brand new | 0.0 | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.1 | 0 | 0.3 | | | | | |
| Car purchased secondhand | 0.6 | 0.0 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.1 | 0.2 | 0.2 | 0.2 | | | | | |
| Motorized vehicle | 5.3 | 8.1 | 7.1 | 19.5 | 24.7 | 21.1 | 12.2 | 11.2 | 11.7 | 15.6 | 5 | | | | *** | *** |
| Bicycle | 13.7 | 19.3 | 17.3 | 59.1 | 62.7 | 60.2 | 35.8 | 27.5 | 31.4 | 41.3 | 14.3 | * | | *** | *** | *** |
| Radio | 33.9 | 35.0 | 34.6 | 49.0 | 54.7 | 50.8 | 41.2 | 38.7 | 39.9 | 48.7 | 24.8 | | | | *** | *** |
| Music equipment | 4.4 | 6.6 | 5.8 | 8.1 | 15.8 | 10.5 | 6.2 | 8.4 | 7.3 | 10.1 | 2.7 | | *** | | *** | *** |
| Television | 6.9 | 6.4 | 6.6 | 1.6 | 4.1 | 2.4 | 4.3 | 6.0 | 5.2 | 6.7 | 2.6 | | ** | | *** | ** |
| Washing machine | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0 | | | | | |
| Ari conditioner | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0 | | | | | |
| Sewing machine | 0.7 | 3.8 | 2.7 | 2.4 | 3.5 | 2.7 | 1.5 | 3.7 | 2.7 | 2.4 | 3.3 | ** | | * | | |
| Refrigerator | 0.3 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0 | 0.2 | | | | | |
| Freezer | 2.0 | 1.9 | 1.9 | 0.0 | 0.0 | 0.0 | 1.0 | 1.5 | 1.3 | 1.5 | 0.9 | | | | *** | |
| Electric iron | 1.1 | 0.2 | 0.5 | 0.0 | 0.0 | 0.0 | 0.6 | 0.2 | 0.4 | 0.4 | 0.4 | | | | ** | |
| Charcoal iron | 13.6 | 14.3 | 14.1 | 7.8 | 7.6 | 7.7 | 10.8 | 13.1 | 12.0 | 12.7 | 10.7 | | | | *** | |
| Electric fan | 1.5 | 1.4 | 1.5 | 1.0 | 0.0 | 0.7 | 1.3 | 1.2 | 1.2 | 1.1 | 1.3 | | ** | | | |
| Bed | 45.7 | 48.7 | 47.6 | 32.0 | 21.2 | 28.7 | 39.0 | 43.5 | 41.4 | 40.6 | 42.9 | | *** | | *** | |
| Telephone equipment | 0.8 | 0.7 | 0.8 | 0.2 | 0.3 | 0.3 | 0.5 | 0.6 | 0.6 | 0.9 | 0 | | | | * | |
| Cellphones | 13.0 | 14.6 | 14.0 | 2.5 | 1.6 | 2.2 | 7.9 | 12.1 | 10.2 | 10.7 | 9.2 | | | * | *** | |
| Computer | 0.3 | 0.0 | 0.1 | 0.2 | 0.0 | 0.2 | 0.3 | 0.0 | 0.1 | 0.2 | 0 | | | | | |
| Printer | 0.0 | 0.0 | 0.0 | 0.7 | 0.3 | 0.6 | 0.3 | 0.1 | 0.2 | 0.2 | 0.1 | | | | ** | |
| Watches/clocks | 10.4 | 10.1 | 10.2 | 11.0 | 11.7 | 11.2 | 10.7 | 10.4 | 10.5 | 13.4 | 5.6 | | | | | *** |
| Electric stove | 0.6 | 0.0 | 0.2 | 0.2 | 0.0 | 0.2 | 0.4 | 0.0 | 0.2 | 0.2 | 0.2 | | | * | | |
| Gas stove | 0.3 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.1 | 0.1 | 0.1 | | | | | |
| Stove 'mixed' | 2.0 | 2.0 | 2.0 | 0.0 | 0.0 | 0.0 | 1.0 | 1.6 | 1.3 | 1.1 | 1.7 | | | | *** | |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.9 Average number and value of purchased assets per household

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|----------------------------------|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|---|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| Number of assets owned | 2.4 | 2.9 | 2.7 | 2.2 | 2.5 | 2.3 | 2.3 | 2.8 | 2.6 | 2.9 | 2.1 | * | | ** | ** | *** |
| Number of new assets owned | 0.3 | 0.2 | 0.3 | 0.6 | 0.6 | 0.6 | 0.5 | 0.3 | 0.4 | 0.5 | 0.2 | | | ** | *** | *** |
| Total value of new assets (mt) | 539 | 804 | 709 | 2094 | 1776 | 1997 | 1294 | 988 | 1131 | 1501 | 496 | | | | *** | *** |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table 3.10. Production and sales of livestock and sub-products in the last 12 months

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|---|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|-----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| % that raised any livestock ¹ | 47.0 | 46.6 | 46.8 | 79.6 | 87.7 | 82.1 | 62.9 | 54.4 | 58.3 | 66.3 | 44.6 | | *** | ** | *** | *** |
| <i>% by animal</i> | | | | | | | | | | | | | | | | |
| Cattle | 0.2 | 0.0 | 0.1 | 0.9 | 0.3 | 0.7 | 0.5 | 0.1 | 0.3 | 0.4 | 0.1 | | | * | ** | |
| Goats | 4.2 | 6.4 | 5.6 | 18.7 | 4.4 | 14.4 | 11.3 | 6.1 | 8.5 | 10.1 | 5.7 | *** | *** | *** | *** | ** |
| Sheep | 0.5 | 0.5 | 0.5 | 0.0 | 0.0 | 0.0 | 0.2 | 0.4 | 0.3 | 0.4 | 0.2 | | | | | |
| Pigs | 0.0 | 0.0 | 0.0 | 20.9 | 35.8 | 25.5 | 10.2 | 6.7 | 8.4 | 11.7 | 2.7 | *** | *** | *** | *** | *** |
| Donkeys | 0.3 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.1 | 0.1 | 0.0 | | | | | |
| Chickens | 34.9 | 37.4 | 36.5 | 73.8 | 80.7 | 75.9 | 53.8 | 45.6 | 49.4 | 56.7 | 36.9 | ** | *** | *** | *** | *** |
| Rabbits | 0.3 | 0.0 | 0.1 | 0.7 | 1.6 | 1.0 | 0.5 | 0.3 | 0.4 | 0.4 | 0.4 | | | | ** | |
| Ducks | 22.5 | 20.2 | 21.0 | 1.5 | 3.2 | 2.0 | 12.3 | 17.0 | 14.8 | 15.1 | 14.2 | | | * | *** | |
| Geese | 0.0 | 0.7 | 0.5 | 0.0 | 0.3 | 0.1 | 0.0 | 0.6 | 0.3 | 0.5 | 0.0 | | | | | |
| Turkeys | 0.3 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | | | | | |
| Guinea Fowl | 0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | | | | | |
| <i>Households raising animals*:</i> | | | | | | | | | | | | | | | | |
| Average tropical livestock units | 0.13 | 0.13 | 0.1 | 0.28 | 0.26 | 0.3 | 0.23 | 0.17 | 0.20 | 0.23 | 0.12 | | | ** | *** | *** |
| % selling live animals | 20.5 | 15.9 | 17.5 | 16.6 | 14.4 | 15.9 | 18.1 | 15.4 | 16.8 | 16.2 | 18.2 | | | | | |
| % that slaughtered animals for sale or consumption | 40.8 | 34.3 | 36.6 | 44.5 | 40.8 | 43.3 | 43.1 | 36.3 | 39.7 | 39.5 | 40.3 | | | * | * | |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

¹excluding donkeys.

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.11 Access to credit in the last 12 months

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|---|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|-----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| % of households that applied for credit in the past 12 months | 4.3 | 5.0 | 4.7 | 2.6 | 3.2 | 2.8 | 3.5 | 4.6 | 4.1 | 4.7 | 3.1 | | | | | * |
| <i>Of those that did apply, reason for applying (%)</i> | | | | | | | | | | | | | | | | |
| Food consumption | 0.0 | 6.2 | 4.6 | 0.0 | 27.3 | 10.1 | 0.0 | 8.2 | 5.6 | 1.8 | 12.7 | | * | * | | |
| Agriculture | 53.7 | 71.8 | 67.2 | 69.6 | 45.5 | 60.6 | 59.2 | 69.2 | 66.0 | 68.5 | 61.3 | | | | | |
| Health | | | | 0.0 | 9.1 | 3.4 | 0.0 | 0.9 | 0.6 | 0.9 | 0.0 | | | | | |
| Purchase of assets | 3.3 | 0.0 | 0.8 | 8.7 | 18.2 | 12.2 | 5.1 | 1.8 | 2.8 | 1.5 | 5.4 | | | | | |
| Travel | | | | 8.7 | 0.0 | 5.5 | 3.0 | 0.0 | 1.0 | 1.5 | 0.0 | | | | | |
| Other | 43.0 | 22.1 | 27.4 | 13.1 | 0.0 | 8.2 | 32.7 | 19.9 | 24.0 | 25.9 | 20.6 | | | | | * |
| <i>Of those that did not apply, reason did not apply (%)</i> | | | | | | | | | | | | | | | | |
| No need | 13.9 | 7.4 | 9.8 | 8.3 | 8.2 | 8.3 | 11.1 | 7.6 | 9.3 | 9.2 | 9.3 | ** | | * | | |
| Was refused | 3.5 | 1.1 | 2.0 | 2.3 | 2.0 | 2.2 | 2.9 | 1.3 | 2.1 | 2.3 | 1.6 | ** | | * | | |
| Lack of access | 31.8 | 38.1 | 35.8 | 48.5 | 55.6 | 50.6 | 40.0 | 41.4 | 40.7 | 43.3 | 36.3 | | * | | *** | * |
| Concerned about not being accepted | 14.9 | 12.2 | 13.2 | 22.3 | 19.9 | 21.6 | 18.6 | 13.7 | 16.0 | 16.0 | 15.9 | | | ** | *** | |
| Lack of collateral | 2.7 | 3.4 | 3.2 | 2.3 | 4.2 | 2.9 | 2.5 | 3.6 | 3.1 | 3.0 | 3.2 | | | | | |
| High transaction costs | 0.2 | 0.8 | 0.6 | 1.3 | 0.0 | 0.9 | 0.7 | 0.7 | 0.7 | 0.9 | 0.2 | | ** | | | |
| Do not want to offer collateral | 0.8 | 0.8 | 0.8 | 0.7 | 3.3 | 1.5 | 0.7 | 1.3 | 1.0 | 1.2 | 0.8 | | | | | |
| Do not want to have debts | 22.5 | 30.3 | 27.5 | 11.0 | 6.9 | 9.7 | 16.8 | 25.8 | 21.6 | 17.4 | 28.6 | ** | * | *** | *** | *** |
| Other | 9.6 | 5.8 | 7.2 | 2.5 | 0.0 | 1.8 | 6.1 | 4.7 | 5.4 | 6.3 | 3.9 | * | *** | | *** | |
| Received cred the past year | 0.2 | 0.0 | 0.1 | 0.8 | 0.0 | 0.6 | 0.5 | 0.0 | 0.2 | 0.2 | 0.2 | | * | ** | | |
| Unweighted N of total HHs | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |
| <i>Distribution of credit application by source of credit (%)</i> | | | | | | | | | | | | | | | | |
| Government | 90.6 | 100.0 | 97.6 | 43.5 | 18.2 | 34.1 | 74.3 | 92.1 | 86.4 | 83.0 | 92.8 | | * | * | | |
| Banks | | | | 13.1 | 9.1 | 11.6 | 4.5 | 0.9 | 2.0 | 3.1 | 0.0 | | | | | |
| Associations | | | | 0.0 | 9.1 | 3.4 | 0.0 | 0.9 | 0.6 | 0.9 | 0.0 | | | | | |
| Traders/Businessman | | | | 8.7 | 0.0 | 5.5 | 3.0 | 0.0 | 1.0 | 1.5 | 0.0 | | | | | |
| Relatives | | | | 26.0 | 45.5 | 33.3 | 9.0 | 4.4 | 5.9 | 7.1 | 3.4 | | | | | *** |
| Friends | 9.4 | 0.0 | 2.4 | 8.7 | 18.2 | 12.2 | 9.2 | 1.8 | 4.1 | 4.4 | 3.7 | | | | | |
| Unweighted N of applications | 23 | 20 | 43 | 10 | 11 | 21 | 33 | 31 | 64 | 45 | 19 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.12 Amount requested and accessed per household and reasons for not accessing credit

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|---|---------------------|---------|--------|----------------|---------|--------|-------------------|---------|--------|-----------------|--------|-----------------------------|---|-----|--------|--------|
| | Treat-ment | Control | Total | Treat-ment | Control | Total | Treat-ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| % of households that applied for credit in the past 12 months | 4.3 | 5.0 | 4.7 | 2.6 | 3.2 | 2.8 | 3.5 | 4.6 | 4.1 | 4.7 | 3.1 | | | | | * |
| <u>Of those who applied (unweighted N=56)</u> | | | | | | | | | | | | | | | | |
| Average total amount requested per household (MT) | 63,414 | 88,055 | 79,963 | 63,674 | 31,285 | 52,346 | 63,508 | 80,736 | 73,851 | 70,154 | 83,398 | | | | | |
| Average total amount requested per household (\$US) | 2,039 | 2,831 | 2,571 | 2,385 | 1,172 | 1,961 | 2,164 | 2,617 | 2,436 | 2,341 | 2,682 | | | | | |
| Median total amount requested per household (\$US) | 1286 | 1608 | 1415 | 375 | 37 | 375 | 749 | 1415 | 1286 | 1286 | 2540 | | | | | |
| % of households that had to present any collateral | 0.0 | 4.9 | 3.3 | 8.7 | 0.0 | 5.6 | 3.1 | 4.3 | 3.8 | 1.7 | 9.2 | | | | | |
| % of households that present animals as collateral | 0.0 | 0.0 | 0.0 | 8.7 | 0.0 | 5.6 | 3.1 | 0.0 | 1.3 | 1.7 | 0.0 | | | | | |
| % of households that present other items as collateral | 0.0 | 4.9 | 3.3 | 0.0 | 0.0 | 0.0 | 0.0 | 4.3 | 2.6 | 0.0 | 9.2 | | | | | |
| % that received credit | 62.9 | 24.1 | 36.9 | 47.8 | 60.0 | 52.1 | 57.5 | 28.8 | 40.2 | 44.35 | 29.57 | | | | | |
| <u>Of those who received credit (unweighted N=27)</u> | | | | | | | | | | | | | | | | |
| Average amount received per household (\$US) | 1,109 | 1,713 | 1,374 | 243 | 18 | 152 | 850 | 1,257 | 1,024 | 892 | 1,535 | | | | | *** |
| Median amount received per household (\$US) | 643 | 1,286 | 1,286 | 37 | 13 | 37 | 514 | 1,286 | 965 | 965 | 2,572 | | | | | |
| Average amount to repay per household (\$US) | 1,281 | 1,873 | 1,542 | 294 | 18 | 183 | 986 | 1,374 | 1,152 | 1,045 | 1,567 | | | | | *** |
| Median amount to repay per household (\$US) | 804 | 1,447 | 1,447 | 37 | 13 | 37 | 514 | 1,447 | 1,093 | 1,093 | 2,733 | | | | | |
| Average time to repay the credit (yrs) | 1.3 | 2.2 | 1.7 | 0.6 | 0.5 | 0.5 | 1.1 | 1.8 | 1.4 | 1.5 | 0.9 | | | | | *** * |
| <u>Of those who were denied credit (unweighted N=29)</u> | | | | | | | | | | | | | | | | |
| % of households by reason credit denied | | | | | | | | | | | | | | | | |
| Insufficient income | 28.2 | 0.0 | 5.5 | 0.0 | 0.0 | 0.0 | 15.8 | 0.0 | 4.5 | 2.2 | 9.1 | * | | * | | |
| Insufficient collateral | 0.0 | 0.0 | 0.0 | 66.8 | 25.0 | 54.6 | 29.5 | 1.8 | 9.7 | 14.4 | 0.0 | | | * | *** | * |
| Other reasons, | 62.4 | 100.0 | 92.7 | 33.2 | 75.0 | 45.4 | 49.5 | 98.2 | 84.3 | 81.1 | 90.9 | ** | | *** | ** | |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.13 Number of parcel by type of use by location and gender of the household head

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | |
|--|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female |
| <i>Owned and in household's possession</i> | 1,141 | 661 | 1,802 | 1,352 | 1,070 | 2,422 | 2,493 | 1,731 | 4,224 | 3,035 | 1,189 |
| Residential | 240 | 191 | 431 | 391 | 299 | 690 | 631 | 490 | 1,121 | 804 | 317 |
| Agricultural Parcels | 827 | 429 | 1,256 | 932 | 743 | 1,675 | 1,759 | 1,172 | 2,931 | 2,133 | 798 |
| Others | 74 | 41 | 115 | 29 | 28 | 57 | 103 | 69 | 172 | 98 | 74 |
| | | | | | | 0 | | | | | |
| <i>Rented-Out</i> | 89 | 84 | 173 | 50 | 27 | 77 | 139 | 111 | 250 | 170 | 80 |
| Residential | 33 | 35 | 68 | 9 | 1 | 10 | 42 | 36 | 78 | 50 | 28 |
| Agricultural Parcels | 53 | 49 | 102 | 41 | 26 | 67 | 94 | 75 | 169 | 119 | 50 |
| Others | 3 | 0 | 3 | | | 0 | 3 | 0 | 3 | 1 | 2 |
| | | | | | | 0 | | | | | |
| <i>Rented-In</i> | 407 | 150 | 557 | 102 | 83 | 185 | 509 | 233 | 742 | 471 | 271 |
| Residential | 249 | 80 | 329 | 21 | 15 | 36 | 270 | 95 | 365 | 217 | 148 |
| Agricultural Parcels | 153 | 68 | 221 | 81 | 68 | 149 | 234 | 136 | 370 | 248 | 122 |
| Others | 5 | 2 | 7 | | | 0 | 5 | 2 | 7 | 6 | 1 |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.14 Number of land parcels and parcel characteristics

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|---|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|---|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| <i>Average number of parcels per household</i> | | | | | | | | | | | | | | | | |
| Owned and in household's possession | 2.54 | 2.61 | 2.58 | 3.42 | 3.39 | 3.41 | 2.97 | 2.75 | 2.85 | 2.97 | 2.65 | | | ** | *** | *** |
| Rented-out | 0.19 | 0.36 | 0.30 | 0.12 | 0.09 | 0.11 | 0.16 | 0.31 | 0.24 | 0.23 | 0.26 | *** | | *** | *** | |
| Rented-in | 0.83 | 0.61 | 0.69 | 0.27 | 0.26 | 0.26 | 0.56 | 0.54 | 0.55 | 0.54 | 0.57 | *** | | | *** | |
| Total | 3.56 | 3.57 | 3.57 | 3.81 | 3.73 | 3.79 | 3.68 | 3.60 | 3.64 | 3.74 | 3.48 | | | | *** | *** |
| <i>Average declared parcel size (ha) by parcel type</i> | | | | | | | | | | | | | | | | |
| Owned and in household's possession | 0.85 | 0.77 | 0.80 | 0.74 | 0.79 | 0.75 | 0.79 | 0.77 | 0.78 | 0.82 | 0.71 | * | | | | *** |
| Rented-out | 1.01 | 0.98 | 0.99 | 0.93 | 1.32 | 1.03 | 0.98 | 1.00 | 1.00 | 1.20 | 0.69 | | * | | | ** |
| Rented-in | 0.31 | 0.49 | 0.41 | 0.53 | 0.65 | 0.57 | 0.36 | 0.50 | 0.43 | 0.50 | 0.32 | * | | | ** | ** |
| Total | 0.73 | 0.74 | 0.74 | 0.73 | 0.79 | 0.75 | 0.73 | 0.75 | 0.74 | 0.79 | 0.64 | | * | | | *** |
| <i>Average declared parcel size (ha) by use</i> | | | | | | | | | | | | | | | | |
| Residential | 0.18 | 0.18 | 0.18 | 0.21 | 0.17 | 0.20 | 0.19 | 0.18 | 0.19 | 0.22 | 0.14 | | | | | *** |
| Agriculture | 0.96 | 1.00 | 0.99 | 0.91 | 0.98 | 0.93 | 0.94 | 1.00 | 0.97 | 1.02 | 0.86 | | * | | | *** |
| Other (mostly land not in use) | 1.37 | 1.40 | 1.39 | 1.38 | 2.15 | 1.65 | 1.37 | 1.48 | 1.44 | 1.53 | 1.34 | | | | | |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.15 Access to utility and infrastructure in parcels used for residence purpose

| | Cabo Delgado | | | Nampula | | | All Sample | | | Headship | | Treatment vs Control | | | | |
|---|----------------|---------|-------|----------------|---------|-------|----------------|---------|-------|----------|--------|----------------------|---|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| <i>% distribution of parcels by source of water most used in the parcels</i> | | | | | | | | | | | | | | | | |
| Tap | 0.4 | 1.5 | 1.1 | 0.0 | 0.3 | 0.1 | 0.2 | 1.3 | 0.8 | 0.8 | 0.8 | | | * | ** | |
| Borehole | 2.5 | 2.5 | 2.5 | 1.1 | 2.2 | 1.4 | 1.8 | 2.5 | 2.2 | 2.2 | 2.1 | | | | | |
| Well private | 4.9 | 5.5 | 5.3 | 32.9 | 27.7 | 31.4 | 18.0 | 9.1 | 13.1 | 16.4 | 7.9 | | | *** | *** | *** |
| Public fountain | 90.9 | 89.2 | 89.8 | 5.4 | 1.0 | 4.1 | 51.0 | 74.7 | 64.0 | 53.3 | 81.4 | | | *** | *** | *** |
| River/lake | 0.8 | 0.0 | 0.3 | 58.6 | 68.8 | 61.6 | 27.8 | 11.3 | 18.8 | 26.1 | 6.8 | * | | *** | *** | *** |
| Other | 0.3 | 0.0 | 0.1 | 2.0 | 0.0 | 1.4 | 1.1 | 0.0 | 0.5 | 0.5 | 0.4 | | | *** | *** | ** |
| Did not indicate | 0.3 | 1.4 | 1.0 | | | | 0.1 | 1.1 | 0.7 | 0.7 | 0.6 | | | | | |
| <i>% distribution of parcels by route of access most used to reach the parcel</i> | | | | | | | | | | | | | | | | |
| Primary road | 13.5 | 12.7 | 13.0 | 4.5 | 0.0 | 3.1 | 9.3 | 10.6 | 10.0 | 9.6 | 10.6 | | | *** | | *** |
| Secondary road | 53.8 | 50.2 | 51.4 | 9.5 | 2.2 | 7.3 | 33.1 | 42.3 | 38.1 | 30.8 | 50.1 | | | *** | *** | *** |
| Tertiary road | 22.4 | 18.0 | 19.5 | 24.3 | 22.3 | 23.7 | 23.3 | 18.7 | 20.8 | 21.0 | 20.5 | | | | * | * |
| Unpaved road | 9.7 | 17.8 | 15.0 | 28.1 | 30.3 | 28.7 | 18.3 | 19.9 | 19.1 | 22.0 | 14.5 | | | *** | | *** |
| Other | 0.2 | 0.0 | 0.1 | 33.7 | 45.2 | 37.1 | 15.8 | 7.4 | 11.2 | 15.9 | 3.7 | | | *** | *** | *** |
| Did not indicate | 0.3 | 1.4 | 1.0 | | | | 0.1 | 1.1 | 0.7 | 0.7 | 0.6 | | | | | |
| <i>Other amenities</i> | | | | | | | | | | | | | | | | |
| % with electricity | 8.4 | 8.9 | 8.7 | 0.0 | 1.9 | 0.6 | 4.5 | 7.7 | 6.2 | 7.3 | 4.6 | | | ** | * | *** |
| % that have landlines | 0.0 | 0.2 | 0.1 | 0.0 | 0.3 | 0.1 | 0.0 | 0.2 | 0.1 | 0.2 | 0.0 | | | | | |
| % with access to a mobile phone network | 63.7 | 87.1 | 79.0 | 4.1 | 1.0 | 3.2 | 35.9 | 72.9 | 56.1 | 46.9 | 71.2 | | | *** | *** | *** |
| % with fruit trees | 12.6 | 11.6 | 11.9 | 49.8 | 46.5 | 48.8 | 30.0 | 17.3 | 23.0 | 29.2 | 13.0 | | | | *** | *** |
| Mean number of fruit trees | 2.8 | 3.4 | 3.2 | 6.1 | 5.7 | 6.0 | 4.7 | 3.9 | 4.3 | 5.1 | 2.9 | | | ** | *** | *** |
| Mean number of buildings | 1.2 | 1.2 | 1.2 | 1.8 | 1.8 | 1.8 | 1.5 | 1.3 | 1.4 | 1.5 | 1.2 | | | | *** | *** |
| Unweighted N of residential parcels | 504 | 298 | 802 | 409 | 314 | 723 | 913 | 612 | 1525 | 1048 | 477 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.16 Parcel distribution by mode of acquisition

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|---|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|-----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| Ceded by traditional authorities | 2.5 | 0.3 | 1.1 | 2.0 | 0.2 | 1.4 | 2.2 | 0.3 | 1.2 | 1.1 | 1.5 | *** | *** | *** | | |
| Ceded by formal authorities | 0.2 | 0.8 | 0.6 | 0.4 | 0.4 | 0.4 | 0.3 | 0.7 | 0.5 | 0.5 | 0.5 | | | | | |
| Ceded by relatives | 13.1 | 9.3 | 10.6 | 38.0 | 31.3 | 36.0 | 26.8 | 14.0 | 20.1 | 23.0 | 14.5 | *** | *** | *** | *** | *** |
| Occupied | 32.5 | 27.0 | 28.9 | 14.3 | 17.3 | 15.2 | 22.5 | 24.9 | 23.8 | 22.5 | 26.2 | ** | ** | | *** | * |
| Purchased | 18.0 | 30.0 | 25.9 | 0.4 | 0.6 | 0.4 | 8.3 | 23.7 | 16.4 | 14.7 | 19.6 | *** | | *** | *** | *** |
| Inherited | 33.5 | 32.1 | 32.6 | 44.4 | 50.0 | 46.1 | 39.5 | 35.9 | 37.6 | 37.9 | 37.2 | | *** | ** | *** | |
| Other | 0.2 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.5 | 0.4 | 0.4 | 0.5 | | | | | |
| Unweighted N of parcels in respondent's possession | 1,227 | 739 | 1,966 | 1,394 | 1,090 | 2,484 | 1,966 | 2,484 | 4,450 | 3,188 | 1,262 | | | | | |

Note: For 5 parcels no mode of acquisition reported.

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.17 Agencies involved in and the cost of land acquisition (for parcels in the possession of the households and those rented-out)

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|---|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|----|-----|--------|--------|
| | Treat-ment | Control | Total | Treat-ment | Control | Total | Treat-ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| % parcels by people involved in the acquisition of parcel | | | | | | | | | | | | | | | | |
| Community leaders | 15.5 | 33.3 | 27.4 | 6.9 | 4.8 | 6 | 11 | 27.2 | 19.9 | 19.2 | 21.6 | *** | | *** | *** | |
| Local court | 0 | 0.9 | 0.6 | 0 | 0.8 | 0.3 | 0 | 0.9 | 0.5 | 0.7 | 0 | | ** | * | | * |
| District authorities | 0 | 0.6 | 0.4 | 0 | 0 | 0 | 0 | 0.5 | 0.3 | 0.4 | 0 | | | | | |
| Lawyer | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | |
| Other | 6.8 | 5.2 | 5.8 | 2.9 | 5.5 | 3.8 | 4.8 | 5.3 | 5.1 | 5 | 5.3 | | ** | | * | |
| Average cost (in 2011 mt) of acquiring the parcel with involvement of : | | | | | | | | | | | | | | | | |
| Community leaders (N=530) | 57.4 | 29.2 | 34.6 | 3.9 | 0 | 3 | 40.5 | 28.3 | 31.3 | 30.1 | 33.9 | | ** | | *** | |
| Local court (N=13) | | 55.2 | 55.2 | | | | | 55.2 | 55.2 | 55.2 | | | | | | |
| District authorities (N=3) | | 7.3 | 7.3 | | | | | 7.3 | 7.3 | 7.3 | | | | | | |
| Lawyer | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | |
| Other | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | |
| Amount paid to acquire parcel aside from the above fees (Mt) | | | | | | | | | | | | | | | | |
| Community leaders (N=530) | 968 | 1,504 | 1,325 | 12 | 34 | 20 | 473 | 1,188 | 867 | 740 | 1,156 | ** | | *** | *** | ** |
| Total amount paid to acquire parcel aside including fees (Mt) | 977 | 1,514 | 1,335 | 12 | 34 | 20 | 477 | 1,196 | 873 | 746 | 1,163 | ** | | *** | *** | ** |
| Total amount paid to acquire parcel including fees (Mt/m ²) | 1.7 | 2.3 | 2.1 | 0 | 0 | 0 | 0.8 | 1.8 | 1.4 | 1.2 | 1.7 | | | | *** | |
| Unweighted N of parcels in respondent's possession | | | | | | | | | | | | | | | | |
| | 1,227 | 739 | 1,966 | 1,394 | 1,090 | 2,484 | 1,966 | 2,484 | 4,450 | 3,188 | 1,262 | | | | | |

Note: Amount paid to acquire parcel includes only those plots acquired in the last 20 years, and only for those respondents were 21 years old or over at the time of acquisition.

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.18 Types of Land Documents Currently in Possession by Parcel Holder

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|--|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|-----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| <i>% parcels by type of documents currently existent that give them property rights to the parcel (b):</i> | | | | | | | | | | | | | | | | |
| DUAT | 0.0 | 0.0 | 0.0 | 0.9 | 0.5 | 0.7 | 0.5 | 0.1 | 0.3 | 0.4 | 0.0 | | | ** | *** | *** |
| Provisional title | 0.9 | 1.5 | 1.3 | 1.2 | 0.0 | 0.8 | 1.1 | 1.2 | 1.1 | 0.8 | 1.8 | | *** | | | * |
| Certificate of cadastral services | 0.0 | 0.0 | 0.0 | 2.3 | 0.0 | 1.6 | 1.3 | 0.0 | 0.6 | 0.8 | 0.3 | | *** | *** | *** | ** |
| Affidavit of purchase/sales | 4.0 | 8.6 | 7.0 | 0.3 | 0.4 | 0.3 | 2.0 | 6.8 | 4.5 | 4.3 | 5.0 | *** | | *** | *** | |
| Other | 0.1 | 0.0 | 0.0 | 0.6 | 0.0 | 0.4 | 0.4 | 0.0 | 0.2 | 0.2 | 0.1 | | *** | *** | *** | |
| None | 95.0 | 89.9 | 91.6 | 94.7 | 99.2 | 96.1 | 94.8 | 91.9 | 93.3 | 93.5 | 92.8 | *** | *** | *** | *** | |
| Unweighted N of parcels in respondent's possession | 1,227 | 739 | 1,966 | 1,394 | 1,090 | 2,484 | 1,966 | 2,484 | 4,450 | 3,188 | 1,262 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.19 Interest and willingness to pay for DUAT

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|---|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|---|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| % parcels that have no DUAT and have initiated the process of obtaining DUAT | 0.3 | 0.2 | 0.3 | 2.0 | 0.7 | 1.6 | 1.3 | 0.3 | 0.8 | 1.1 | 0.2 | | | | *** | *** |
| <i>Among the parcel with no DUAT and have not initiated the process of obtaining it:</i> | | | | | | | | | | | | | | | | |
| % parcels in which there is an interest in obtaining DUAT | 92.1 | 91.0 | 91.3 | 88.0 | 86.6 | 87.6 | 89.9 | 90.0 | 89.9 | 88.6 | 92.5 | | | | *** | *** |
| Average amount per parcel that the HH is willing to pay to obtain DUAT (MT) | 86 | 94 | 92 | 234 | 273 | 246 | 165 | 131 | 150 | 187 | 75 | | | ** | *** | *** |
| Average amount per parcel that the HH is willing to pay to obtain DUAT (MT/square meter) | 0.08 | 0.10 | 0.09 | 0.20 | 0.19 | 0.20 | 0.14 | 0.11 | 0.13 | 0.16 | 0.07 | | | | *** | *** |
| <i>Average amount per parcel that the HH is willing to pay to obtain DUAT (MT/square meter)</i> | | | | | | | | | | | | | | | | |
| Residence | 0.27 | 0.19 | 0.22 | 0.64 | 0.58 | 0.62 | 0.48 | 0.27 | 0.36 | 0.46 | 0.20 | | | ** | *** | *** |
| Agriculture | 0.02 | 0.02 | 0.02 | 0.04 | 0.04 | 0.04 | 0.03 | 0.02 | 0.02 | 0.03 | 0.02 | | | | *** | *** |
| Unweighted N of parcels in respondent's possession | 1,227 | 739 | 1,966 | 1,394 | 1,090 | 2,484 | 1,966 | 2,484 | 4,450 | 3,188 | 1,262 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.20 Hypothetical sale and rental prices of parcels belonging to the household surveyed

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|---|---------------------|---------|--------|----------------|---------|--------|-------------------|---------|--------|-----------------|--------|-----------------------------|----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| Average total value the parcel could be sold for (MT) | 80,423 | 55,853 | 64,661 | 20,148 | 19,444 | 19,955 | 46,397 | 48,066 | 47,228 | 44,536 | 54,352 | ** | | | | *** |
| <i>Average, by main plot use</i> | | | | | | | | | | | | | | | | |
| Residence | 92,212 | 64,086 | 72,388 | 22,023 | 18,913 | 21,260 | 46,265 | 54,814 | 50,619 | 50,819 | 50,126 | | | | | *** |
| Agriculture | 71,276 | 51,151 | 58,839 | 19,662 | 20,056 | 19,775 | 43,480 | 44,147 | 43,807 | 41,205 | 51,215 | * | | | | *** |
| Average total value the parcel could be sold for (MT/m ²) | 44.7 | 39.8 | 41.6 | 25.7 | 9.7 | 21.3 | 34.0 | 33.4 | 33.7 | 33.3 | 34.9 | | ** | | | ** |
| <i>Average, by main plot use</i> | | | | | | | | | | | | | | | | |
| Residence | 156.6 | 92.3 | 111.3 | 63.9 | 28.7 | 55.1 | 96.4 | 79.2 | 87.6 | 90.6 | 80.3 | | | | | * |
| Agriculture | 8.4 | 10.0 | 9.4 | 7.1 | 2.0 | 5.6 | 7.7 | 8.2 | 7.9 | 6.4 | 12.3 | | | | | |
| Average value a room for housing in the parcel could be rented out for (MT/month) | 198 | 398 | 316 | 20 | 23 | 21 | 113 | 333 | 218 | 65 | 555 | | | | | ** |
| Average value a room for commercial purposes in the parcel could be rented out for (MT/month) | 469 | 725 | 623 | 57 | 60 | 57 | 273 | 612 | 438 | 120 | 1140 | | | | | *** |
| Average value the whole parcel could be rented out for (MT/month) | 968 | 1844 | 1526 | 195 | 235 | 207 | 465 | 1329 | 875 | 647 | 1507 | * | | *** | *** | * |
| Average monthly value the whole parcel could be rented out for (MT/m ²) | 8.2 | 7.4 | 7.7 | 2.6 | 3.8 | 3.0 | 4.6 | 6.2 | 5.4 | 4.7 | 7.1 | | | | | ** |
| <i>Average, by main plot use</i> | | | | | | | | | | | | | | | | |
| Residence | 25.4 | 13.7 | 17.4 | 6.9 | 11.8 | 8.4 | 12.8 | 13.2 | 13.0 | 12.3 | 14.7 | | | | | |
| Agriculture | 1.4 | 3.6 | 2.7 | 0.4 | 0.3 | 0.4 | 0.8 | 2.4 | 1.5 | 1.0 | 3.2 | * | | ** | *** | * |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.21 Land conflicts experienced in the past and/or perceived in the future

| | Cabo Delgado | | | Nampula | | | All Sample | | | Headship | | Treatment vs Control | | | | |
|---|----------------|---------|-------|----------------|---------|-------|----------------|---------|-------|----------|--------|----------------------|-----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| % of parcels that had a conflict in the acquisition of the title* | 0.0 | 0.0 | 0.0 | 41.67 | 0 | 38.05 | 30.8 | 0.0 | 15.96 | 28.13 | 0 | | | | | |
| % of parcelsthat could potentially be involved in a conflict | 15.8 | 13.1 | 14.0 | 9.1 | 8.3 | 8.9 | 12.1 | 12.04 | 12.07 | 11.4 | 13.39 | | | | | |
| Among parcels that may be involved in a conflict: | | | | | | | | | | | | | | | | |
| <i>% distribution of parcels by the party that may be cause of conflict</i> | | | | | | | | | | | | | | | | |
| Traditional leaders | 16.9 | 20.1 | 18.9 | 6.3 | 0.0 | 4.5 | 12.5 | 17.1 | 14.9 | 12.0 | 19.6 | | | | | |
| Formal authorities | 24.8 | 26.7 | 25.9 | 3.2 | 13.3 | 6.0 | 15.8 | 24.7 | 20.5 | 24.1 | 14.7 | | | | | |
| Family | 10.6 | 13.0 | 12.1 | 60.1 | 34.4 | 52.9 | 31.1 | 16.1 | 23.3 | 27.8 | 15.9 | | | | | * |
| Neighbors | 40.1 | 29.7 | 33.7 | 25.2 | 38.9 | 29.1 | 33.9 | 31.1 | 32.4 | 27.3 | 40.7 | | | | | ** |
| Firms | 1.9 | 0.0 | 0.7 | 0.7 | 0.0 | 0.5 | 1.4 | 0.0 | 0.7 | 1.1 | 0.0 | * | ** | | | ** |
| Immigrants | 4.6 | 5.5 | 5.2 | 3.9 | 13.3 | 6.5 | 4.3 | 6.7 | 5.6 | 3.3 | 9.1 | | ** | | | |
| Other | 1.1 | 5.1 | 3.5 | 0.7 | 0.0 | 0.5 | 0.9 | 4.3 | 2.7 | 4.4 | 0.0 | | | | | ** |
| <i>% distribution of parcels by potential reason for conflict</i> | | | | | | | | | | | | | | | | |
| Boundary errors | 36.3 | 38.8 | 37.8 | 19.3 | 23.3 | 20.4 | 29.2 | 36.5 | 33.0 | 27.1 | 42.7 | | | | | ** |
| Weak cadastral services | 7.2 | 0.0 | 2.8 | 0.7 | 10.0 | 3.3 | 4.5 | 1.5 | 2.9 | 4.3 | 0.7 | *** | *** | ** | | *** |
| Disagreement between heirs | 14.9 | 7.7 | 10.5 | 62.2 | 42.2 | 56.6 | 34.5 | 12.8 | 23.1 | 29.9 | 12.2 | * | *** | *** | | *** |
| Incomplete demarcation | 4.2 | 2.5 | 3.1 | 3.2 | 5.6 | 3.8 | 3.8 | 2.9 | 3.3 | 3.3 | 3.3 | | | | | |
| Sales to more than one person | 6.8 | 4.5 | 5.3 | 0.0 | 0.0 | 0.0 | 4.0 | 3.8 | 3.9 | 3.0 | 5.3 | | | | | *** |
| Poor consultation with community leader | 0.6 | 0.0 | 0.2 | 5.3 | 2.2 | 4.4 | 2.6 | 0.3 | 1.4 | 2.3 | 0.0 | | | ** | | *** |
| Lost parcel due to lack of DUAT | 17.5 | 22.0 | 20.3 | 2.1 | 6.7 | 3.4 | 11.1 | 19.7 | 15.6 | 11.4 | 22.5 | | | * | | *** |
| Parcel recovered by the authorities | 9.4 | 23.2 | 17.9 | 4.9 | 10.0 | 6.3 | 7.5 | 21.3 | 14.7 | 15.7 | 13.3 | ** | | *** | | *** |
| Other | 3.1 | 1.4 | 2.0 | 2.5 | 0.0 | 1.8 | 2.8 | 1.2 | 2.0 | 3.2 | 0.0 | | * | | | *** |
| <i>% distribution of parcels by probability of losing the parcel</i> | | | | | | | | | | | | | | | | |
| Highly probable | 33.9 | 25.6 | 28.8 | 19.6 | 7.8 | 16.3 | 28.0 | 23.0 | 25.3 | 23.9 | 27.6 | | | *** | | *** |
| Moderately probable | 10.2 | 25.2 | 19.4 | 15.8 | 23.3 | 17.9 | 12.5 | 24.9 | 19.0 | 17.8 | 21.0 | ** | | ** | | |
| Somewhat probable | 13.1 | 15.5 | 14.5 | 46.0 | 41.1 | 44.7 | 26.7 | 19.2 | 22.8 | 27.1 | 15.9 | | | * | | *** |
| Not probable | 7.8 | 12.1 | 10.4 | 6.3 | 15.6 | 8.9 | 7.2 | 12.6 | 10.0 | 12.4 | 6.1 | | ** | | | * |
| Does not know | 35.0 | 21.7 | 26.8 | 12.3 | 12.2 | 12.3 | 25.6 | 20.3 | 22.8 | 18.8 | 29.4 | ** | | | | *** |
| Unweighted N of parcels in potential conflict | 202 | 86 | 288 | 119 | 90 | 209 | 321 | 176 | 497 | 331 | 166 | | | | | |
| Unweighted N of parcels in respondent's possession | 1,227 | 739 | 1,966 | 1,394 | 1,090 | 2,484 | 1,966 | 2,484 | 4,450 | 3,188 | 1,262 | | | | | |

Note: Title refers to DUAT or provisional title

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.22 Information on parcels rented-out

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | C vs N | M vs F |
|--|---------------------|---------|-------|----------------|---------|--------|-------------------|---------|-------|-----------------|--------|-----------------------------|----|-----|--------|--------|
| | Treat-ment | Control | Total | Treat-ment | Control | Total | Treat-ment | Control | Total | Male | Female | C | N | All | | |
| % of households that have parcels rented- or lent-out to others | 13.8 | 23.3 | 19.9 | 9 | 5.1 | 7.8 | 11.5 | 19.9 | 15.9 | 16.1 | 15.7 | *** | ** | *** | *** | |
| % of parcels rented-out | 7.1 | 12.1 | 10.4 | 3.4 | 2.5 | 3.1 | 5.1 | 10.1 | 7.7 | 7.1 | 8.8 | | | | | |
| % parcels rented-out by relationship of the tenant to the owner of the parcel in the HH ¹ | | | | | | | | | | | | | | | | |
| Child | | | | 8.3 | 7.4 | 8.1 | 8.3 | 7.4 | 8.1 | 8.3 | 0.0 | | | | | ** |
| Sibling | | | | 11.1 | 11.1 | 11.1 | 11.1 | 11.1 | 11.1 | 11.4 | 0.0 | | | | | *** |
| Parent | | | | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 2.9 | 38.3 | | | | | |
| Niece/nephew | | | | 6.5 | 0.0 | 5.0 | 6.5 | 0.0 | 5.0 | 5.1 | 0.0 | | * | * | | * |
| Other relative | | | | 22.2 | 33.3 | 24.9 | 22.2 | 33.3 | 24.9 | 25.4 | 0.0 | | | | | *** |
| Non-relative | | | | 48.1 | 44.4 | 47.3 | 48.1 | 44.4 | 47.3 | 46.9 | 61.7 | | | | | |
| Parcels rented- or lent-out: | | | | | | | | | | | | | | | | |
| Monthly rental rate (MT/month) ^{1,2} | | | | 22.1 | 19.6 | 21.5 | 22.1 | 19.6 | 21.5 | 20.9 | 46.8 | | | | | *** |
| Monthly rental rate (MT/month) excluding rent=0 | | | | 50.7 | 88.2 | 55.8 | 50.7 | 88.2 | 55.8 | 56.4 | 46.8 | | | | | |
| <i>Average, by main plot use</i> | | | | | | | | | | | | | | | | |
| <i>Residential¹</i> | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | |
| <i>Agriculture¹</i> | | | | 50.7 | 88.2 | 55.8 | 50.7 | 88.2 | 55.8 | 56.4 | 46.8 | | | | | *** |
| Average total declared size of land currently rented out (m ²) | 10,130 | 9,844 | 9,910 | 9,295 | 13,237 | 10,283 | 9,834 | 10,022 | 9,964 | 12,034 | 6,876 | | * | | | ** |
| Average total value received for rent per parcel per month(Mt/m ²) ^{1,3} | | | | 0.01 | 0.03 | 0.02 | 0.01 | 0.03 | 0.02 | 0.02 | 0.01 | | | | | |
| Average number of years since the tenant acquired the use right over this parcel ¹ | | | | 7.9 | 14.1 | 9.4 | 7.9 | 14.1 | 9.4 | 9.5 | 5.6 | | ** | ** | | |
| % parcels rented-out by form of payment ¹ | | | | | | | | | | | | | | | | |
| No payment | | | | 56.5 | 77.8 | 61.5 | 56.5 | 77.8 | 61.5 | 63.0 | 0.0 | | * | * | | *** |
| Cash | | | | 21.3 | 3.7 | 17.2 | 21.3 | 3.7 | 17.2 | 17.6 | 0.0 | | ** | ** | | *** |
| In-kind | | | | 22.2 | 14.8 | 20.5 | 22.2 | 14.8 | 20.5 | 19.5 | 61.7 | | | | | |
| Cash and in-kind | | | | 0.0 | 3.7 | 0.9 | 0.0 | 3.7 | 0.9 | 0.0 | 38.3 | | | | | |
| % parcels with rental contract with tenants | | | | 7.4 | 0 | 5.6 | 7.4 | 0 | 5.6 | 5.8 | 0 | | ** | ** | | ** |
| % parcels with buildings ¹ | | | | 0.6 | 0.1 | 0.5 | 0.6 | 0.1 | 0.5 | 8.1 | 0 | | * | * | | ** |
| Average number of buildings in the parcels rented out ¹ | | | | 0.6 | 0.1 | 0.5 | 0.6 | 0.1 | 0.5 | 0.5 | 0 | | * | * | | ** |
| % parcels renting out those buildings (N=0) | | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | |
| Unweighted N of parcels rented-out | 89 | 84 | 173 | 50 | 27 | 77 | 139 | 111 | 250 | 170 | 80 | | | | | |

| | | | | | | | | | | | |
|---|-------|-----|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| <i>Residential</i> ¹ | | | | 9 | 1 | 10 | 9 | 1 | 10 | 10 | 0 |
| <i>Agriculture</i> ¹ | | | | 41 | 26 | 67 | 41 | 26 | 67 | 65 | 2 |
| Unweighted N of agricultural parcels rented out for an actual fee | | | | 22 | 6 | 28 | 22 | 6 | 28 | 26 | 2 |
| <i>Residential</i> ¹ | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| <i>Agriculture</i> ¹ | | | | 22 | 6 | 28 | 22 | 6 | 28 | 26 | 2 |
| Unweighted N of parcels in respondent's possession | 1,227 | 739 | 1,966 | 1,394 | 1,090 | 2,484 | 1,966 | 2,484 | 4,450 | 3,188 | 1,262 |

¹Information available only for Nampula.

² Includes rent=0.

³ Agriculture only.

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.23 Information on parcels rented-in

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|--|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|-----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| % of households that have parcels rented-in or borrowed from others | 55.9 | 47.5 | 50.5 | 16.4 | 17.4 | 16.7 | 36.7 | 41.8 | 39.5 | 37.4 | 42.9 | ** | | | *** | |
| % of parcels rented-in | 23.3 | 17.0 | 19.3 | 7.0 | 7.0 | 7.0 | 15.1 | 15.1 | 15.1 | 14.4 | 16.4 | *** | | | *** | |
| Parcels rented-in or borrowed: | | | | | | | | | | | | | | | | |
| % parcels rented-out by relationship of the tenant to the owner of the parcel in the HH ¹ | | | | | | | | | | | | | | | | |
| Spouse | | | | 1.8 | 0.0 | 1.2 | 1.8 | 0.0 | 1.2 | 0.0 | 6.3 | | | | | |
| Child | | | | 1.4 | 2.5 | 1.7 | 1.4 | 2.5 | 1.7 | 2.1 | 0.0 | | | | | |
| Sibling | | | | 9.9 | 4.9 | 8.4 | 9.9 | 4.9 | 8.4 | 6.6 | 15.7 | | | | | |
| Parent | | | | 3.6 | 3.7 | 3.6 | 3.6 | 3.7 | 3.6 | 3.1 | 5.8 | | | | | |
| Niece/nephew | | | | 18.5 | 4.9 | 14.3 | 18.5 | 4.9 | 14.3 | 10.9 | 27.8 | | *** | *** | | * |
| Other relative | | | | 20.7 | 34.6 | 25.0 | 20.7 | 34.6 | 25.0 | 30.2 | 3.9 | | ** | ** | | *** |
| Non-relative | | | | 44.1 | 49.4 | 45.8 | 44.1 | 49.4 | 45.8 | 47.1 | 40.5 | | | | | |
| % parcels reporting having rental contract ¹ | | | | 1.4 | 0 | 0.9 | 1.4 | 0 | 0.9 | 1.2 | 0 | | | | | |
| % parcels by people involved in the rental process ¹ | | | | | | | | | | | | | | | | |
| Community leaders | | | | 6.3 | 0.0 | 4.3 | 6.3 | 0.0 | 4.3 | 4.6 | 3.1 | | * | * | | |
| Local court | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | |
| District authority | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | |
| Lawyer | | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | |
| Other | | | | 11.3 | 0.0 | 7.8 | 11.3 | 0.0 | 7.8 | 3.9 | 23.6 | | *** | *** | | ** |
| % parcels with no involvement of an agent/institution in the renting process ¹ | | | | 78.4 | 97.6 | 84.2 | 78.4 | 97.6 | 84.2 | 89.3 | 65.1 | | *** | *** | | *** |
| Average total cost paid for the renting process per parcel (Mt) ¹ (N=14) | | | | 14.8 | | 14.8 | 14.8 | | 14.8 | 27.5 | 0 | | | | | * |
| Average monthly rent paid per parcels rented-in (Mt/month) ¹ | | | | 33.7 | 29.2 | 32.3 | 33.7 | 29.2 | 32.3 | 39.8 | 4.5 | | | | | *** |
| Average, by plot use | | | | | | | | | | | | | | | | |
| <i>Residence</i> | | | | 0.7 | 2.8 | 1.3 | 0.7 | 2.8 | 1.3 | 1.1 | 1.8 | | | | | |
| <i>Agriculture</i> | | | | 41.9 | 35.0 | 39.7 | 41.9 | 35 | 39.7 | 48.0 | 5.4 | | | | | *** |

| | | | | | | | | | | | | | | | |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|----|----|-----|
| Average area of land currently rented-in per parcel (m ²) | 3,048 | 4,870 | 4,080 | 5,304 | 6,455 | 5,655 | 3,569 | 5,016 | 4,328 | 5,044 | 3,163 | * | | ** | ** |
| Average monthly rent paid per parcels rented-in (Mt/month/m ²) | | | | 0.018 | 0.011 | 0.016 | 0.018 | 0.011 | 0.016 | 0.019 | 0.004 | | | | ** |
| Cash and in-kind % parcels rented-out by form of payment ¹ | | | | 2.7 | 0.0 | 1.9 | 2.7 | 0.0 | 1.9 | 2.3 | 0.0 | * | * | | * |
| No payment | | | | 51.8 | 51.9 | 51.8 | 51.8 | 51.9 | 51.8 | 47.0 | 71.5 | | | | *** |
| Cash | | | | 30.6 | 19.8 | 27.3 | 30.6 | 19.8 | 27.3 | 29.2 | 19.5 | * | * | | |
| In-kind | | | | 14.9 | 28.4 | 19.1 | 14.9 | 28.4 | 19.1 | 21.6 | 8.9 | ** | ** | | ** |
| Cash and in-kind | | | | 2.7 | 0.0 | 1.9 | 2.7 | 0.0 | 1.9 | 2.3 | 0.0 | * | * | | * |
| % parcels with buildings ¹ | | | | 20.3 | 22.2 | 20.9 | 20.3 | 22.2 | 20.9 | 18.7 | 29.7 | | | | |
| Average number of buildings in the parcels rented out ¹ | | | | 0.26 | 0.30 | 0.27 | 0.26 | 0.30 | 0.27 | 0.25 | 0.35 | | | | |
| % parcels also renting-in buildings ¹ (N=38) | | | | 4.4 | 11.1 | 6.6 | 4.4 | 11.1 | 6.6 | 2.6 | 17.1 | | | | |
| Unweighted N of parcels rented-in | 407 | 150 | 557 | 102 | 83 | 185 | 509 | 233 | 742 | 471 | 271 | | | | |
| Unweighted N of parcels in respondent's possession | 1,227 | 739 | 1,966 | 1,394 | 1,090 | 2,484 | 1,966 | 2,484 | 4,450 | 3,188 | 1,262 | | | | |

¹Information available only for Nampula.

²Rent=0 for borrowed plots

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.24 Types of land investment made in the past 12 months

| | Cabo Delgado | | | Nampula | | | All Sample | | | Headship | | Treatment vs Control | | | | |
|---|----------------|---------|-------|----------------|---------|-------|----------------|---------|-------|----------|--------|----------------------|-----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| % of households that had any investment in the past 12 months | 13.8 | 9.0 | 10.7 | 39.2 | 29.1 | 36.1 | 26.1 | 12.8 | 19.1 | 23.0 | 12.2 | * | *** | *** | *** | *** |
| % of parcels that had any investment in the past 12 months | 4.8 | 3.1 | 3.7 | 12.4 | 8.2 | 11.2 | 8.6 | 4.1 | 6.2 | 7.3 | 4.2 | ** | *** | *** | *** | *** |
| <i>% of parcels that had investment by investment type</i> | | | | | | | | | | | | | | | | |
| Increasing the parcel size | 2.6 | 2.0 | 2.2 | 1.7 | 0.9 | 1.5 | 2.2 | 1.8 | 2.0 | 1.9 | 2.1 | | * | | * | |
| Constructions of new buildings/houses | 0.6 | 0.7 | 0.7 | 1.9 | 1.5 | 1.8 | 1.2 | 0.9 | 1.0 | 1.2 | 0.8 | | | | *** | |
| Repairs/improvements of buildings | 0.6 | 0.2 | 0.3 | 0.8 | 0.2 | 0.6 | 0.7 | 0.2 | 0.4 | 0.6 | 0.2 | * | ** | *** | | *** |
| Repairs/Improvement of roof | 0.9 | 0.3 | 0.5 | 7.4 | 5.9 | 6.9 | 4.2 | 1.4 | 2.7 | 3.6 | 1.0 | *** | | *** | *** | *** |
| Sewage, drainage, toilets | 0.1 | 0.0 | 0.0 | 0.4 | 0.0 | 0.3 | 0.3 | 0.0 | 0.1 | 0.1 | 0.1 | | *** | *** | ** | |
| Facilities for water supply | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.2 | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | | ** | ** | ** | |
| Installation for access to electricity | 0.4 | 0.1 | 0.2 | 0.0 | 0.1 | 0.0 | 0.2 | 0.1 | 0.1 | 0.2 | 0.0 | ** | | | ** | ** |
| Landline service | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | |
| Irrigation | 0.0 | 0.0 | 0.0 | 1.1 | 0.4 | 0.9 | 0.6 | 0.1 | 0.3 | 0.4 | 0.1 | | ** | *** | *** | *** |
| <i>Average cost of investment per parcel by type (Mt):</i> | | | | | | | | | | | | | | | | |
| Increasing the parcel size | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | | | | | |
| Constructions of new buildings/houses | 2,407 | 3,719 | 3,323 | 625 | 1,322 | 805 | 1,017 | 2,885 | 1,836 | 971 | 4,007 | | | | | |
| Repairs/improvements of buildings | 2,701 | 3,667 | 3,158 | 179 | 100 | 168 | 1,345 | 3,071 | 1,920 | 1,885 | 2,207 | | | | *** | |
| Repairs/Improvement of roof | 1,299 | 1,511 | 1,388 | 27 | 0 | 21 | 198 | 447 | 259 | 300 | 17 | | ** | | *** | ** |
| Sewage, drainage, toilets | 4,225 | | 4,225 | 53 | | 53 | 686 | | 686 | 73 | 1,697 | | | | | |
| Facilities for water supply | | | | 167 | | 167 | 167 | | 167 | 100 | 300 | | | | | |
| Installation for access to electricity | 1,026 | 2,000 | 1,240 | | 200 | 200 | 1,026 | 1,569 | 1,173 | 1,197 | 875 | | | | | |
| Landline service | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | n/a | | | | | |
| Irrigation | | | | 250 | 400 | 272 | 272 | | 272 | 280 | 185 | | | | | |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |
| Unweighted N of all parcels | 1,636 | 894 | 2,530 | 1,496 | 1,172 | 2,668 | 3,132 | 2,066 | 5,198 | 3,662 | 1,536 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.25 Percentage distribution of households by their opinion on the effect of DUAT on the value of parcel

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|----------------------------|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|---|-----|--------|--------|
| | Treat-ment | Control | Total | Treat-ment | Control | Total | Treat-ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| Increase the value | 64.7 | 67.0 | 66.2 | 85.8 | 85.1 | 85.6 | 75.0 | 70.4 | 72.6 | 76.2 | 66.3 | | | | *** | *** |
| Decrease the value | 11.8 | 18.1 | 15.8 | 5.0 | 4.1 | 4.7 | 8.5 | 15.5 | 12.2 | 10.2 | 15.7 | ** | | *** | *** | * |
| Does not affect the value | 6.3 | 3.0 | 4.2 | 3.6 | 5.7 | 4.2 | 5.0 | 3.5 | 4.2 | 4.8 | 3.2 | ** | | | | |
| Does not know | 17.2 | 11.9 | 13.8 | 5.6 | 5.1 | 5.5 | 11.6 | 10.6 | 11.1 | 8.9 | 14.8 | * | | | *** | ** |
| Unweighted N of households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.26 Percentage of households by their willingness to pay, willingness to sell and rent out in the case of DUAT

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | C vs N | M vs F |
|--|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|---|-----|--------|--------|
| | Treat-ment | Control | Total | Treat-ment | Control | Total | Treat-ment | Control | Total | Male | Female | C | N | All | | |
| <i>% HHs willing to pay more, less or same for parcel without DUAT</i> | | | | | | | | | | | | | | | | |
| More | 25.6 | 21.7 | 23.1 | 24.8 | 21.2 | 23.7 | 25.2 | 21.6 | 23.3 | 22.1 | 25.4 | | | | | |
| Less | 27.9 | 32.1 | 30.6 | 55.5 | 57.3 | 56.1 | 41.3 | 36.9 | 39.0 | 45.1 | 28.5 | | | | *** | *** |
| The same | 9.9 | 14.7 | 13.0 | 10.1 | 12.7 | 10.9 | 10.0 | 14.3 | 12.3 | 10.3 | 15.8 | * | | * | | ** |
| Does not know | 36.6 | 31.5 | 33.3 | 9.6 | 8.9 | 9.4 | 23.5 | 27.2 | 25.5 | 22.6 | 30.4 | | | | *** | ** |
| <i>% HHs more willing to sell property in the case of DUAT</i> | | | | | | | | | | | | | | | | |
| Yes | 48.8 | 41.9 | 44.4 | 28.5 | 25.0 | 27.4 | 38.9 | 38.7 | 38.8 | 39.1 | 38.3 | | | | *** | |
| No | 24.9 | 31.5 | 29.1 | 60.7 | 65.8 | 62.3 | 42.3 | 38.0 | 40.0 | 42.7 | 35.4 | * | | | *** | ** |
| Does not know | 26.3 | 26.6 | 26.5 | 10.8 | 9.2 | 10.3 | 18.8 | 23.3 | 21.2 | 18.2 | 26.3 | | | | *** | ** |
| <i>% HHs more willing to rent out property in the case of DUAT:</i> | | | | | | | | | | | | | | | | |
| Yes | 58.1 | 46.9 | 50.9 | 43.7 | 46.5 | 44.6 | 51.1 | 46.8 | 48.8 | 51.8 | 43.6 | *** | | | ** | ** |
| No | 17.0 | 23.3 | 21.0 | 43.7 | 44.6 | 44.0 | 30.0 | 27.3 | 28.6 | 29.4 | 27.1 | * | | | *** | |
| Does not know | 25.0 | 29.8 | 28.1 | 12.6 | 8.9 | 11.5 | 19.0 | 25.8 | 22.6 | 18.7 | 29.3 | | | ** | *** | *** |
| Unweighted N of households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.27 Households' opinion about the effect of DUAT on conflicts and expropriation

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|--|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|-----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| <i>% HHs believing that demarcation/DUAT will make disputes more or less likely to occur</i> | | | | | | | | | | | | | | | | |
| More likely | 28.5 | 27.7 | 28.0 | 27.5 | 22.8 | 26.0 | 28.0 | 26.8 | 27.3 | 26.5 | 28.8 | | | | | |
| Somewhat likely | 14.1 | 9.6 | 11.2 | 16.7 | 21.8 | 18.3 | 15.3 | 11.9 | 13.5 | 12.0 | 16.2 | * | * | | *** | * |
| Somewhat unlikely | 15.2 | 14.5 | 14.8 | 19.4 | 15.5 | 18.2 | 17.2 | 14.7 | 15.9 | 19.3 | 9.9 | | | | | *** |
| More unlikely | 13.5 | 18.9 | 17.0 | 30.5 | 30.4 | 30.5 | 21.8 | 21.1 | 21.4 | 24.9 | 15.4 | * | | | *** | *** |
| Does not know | 28.8 | 29.3 | 29.1 | 6.0 | 9.5 | 7.0 | 17.7 | 25.5 | 21.9 | 17.3 | 29.7 | | * | *** | *** | *** |
| <i>% HHs believing that demarcation/DUAT will make disputes more or less likely to be resolved</i> | | | | | | | | | | | | | | | | |
| More likely | 58.4 | 54.2 | 55.7 | 58.0 | 55.7 | 57.3 | 58.2 | 54.5 | 56.2 | 57.8 | 53.6 | | * | | *** | |
| Somewhat likely | 9.5 | 12.5 | 11.5 | 23.2 | 29.1 | 25.0 | 16.2 | 15.7 | 15.9 | 16.0 | 15.7 | | | | | |
| Somewhat unlikely | 3.4 | 4.6 | 4.1 | 6.6 | 4.7 | 6.1 | 5.0 | 4.6 | 4.8 | 5.2 | 4.0 | | | | | |
| More unlikely | 3.9 | 4.7 | 4.4 | 5.2 | 3.2 | 4.6 | 4.5 | 4.4 | 4.5 | 4.5 | 4.4 | | | | | |
| Does not know | 24.8 | 24.0 | 24.3 | 7.0 | 7.3 | 7.1 | 16.2 | 20.8 | 18.6 | 16.5 | 22.3 | | | * | *** | * |
| <i>% of HHs that think a DUAT reduces the risk of land expropriation</i> | | | | | | | | | | | | | | | | |
| Yes | 82.0 | 80.2 | 80.9 | 90.1 | 87.0 | 89.2 | 86.0 | 81.5 | 83.6 | 85.6 | 80.0 | | | * | *** | * |
| No | 2.9 | 2.7 | 2.7 | 4.5 | 7.6 | 5.5 | 3.7 | 3.6 | 3.6 | 3.9 | 3.2 | | * | | ** | |
| Does not know | 15.1 | 17.1 | 16.4 | 5.4 | 5.4 | 5.4 | 10.4 | 14.9 | 12.8 | 10.5 | 16.7 | | | * | *** | * |
| <i>% HHs' that think a DUAT makes the expropriation of land more transparent</i> | | | | | | | | | | | | | | | | |
| Yes | 82.9 | 78.7 | 80.2 | 91.6 | 87.0 | 90.2 | 87.1 | 80.3 | 83.5 | 85.4 | 80.2 | | * | ** | *** | *** |
| No | 1.7 | 5.3 | 4.0 | 2.5 | 7.3 | 3.9 | 2.1 | 5.7 | 4.0 | 4.5 | 3.2 | * | *** | ** | | |
| Does not know | 15.4 | 16.0 | 15.8 | 6.0 | 5.7 | 5.9 | 10.8 | 14.1 | 12.6 | 10.2 | 16.7 | | | | *** | ** |
| Unweighted N of households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.28 Households' opinion about the effect of DUAT on investment and collateralization

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|--|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|-----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| <i>Distribution of HHs (%) by the likelihood of making improvement or investments on their properties with the attribution of a DUAT</i> | | | | | | | | | | | | | | | | |
| More likely | 65.7 | 65.6 | 65.7 | 64.4 | 55.1 | 61.6 | 65.1 | 63.6 | 64.3 | 64.9 | 63.3 | | ** | | | |
| Somewhat likely | 7.0 | 5.6 | 6.1 | 22.9 | 28.2 | 24.5 | 14.7 | 9.9 | 12.1 | 13.6 | 9.5 | | | *** | *** | ** |
| Somewhat unlikely | 0.9 | 2.2 | 1.7 | 3.5 | 6.0 | 4.3 | 2.1 | 2.9 | 2.6 | 3.5 | 0.9 | | | | ** | *** |
| More unlikely | 0.9 | 1.0 | 1.0 | 0.8 | 1.9 | 1.1 | 0.8 | 1.2 | 1.0 | 1.0 | 1.0 | | | | | |
| Does not know | 25.6 | 25.6 | 25.6 | 8.4 | 8.9 | 8.6 | 17.3 | 22.4 | 20.0 | 16.9 | 25.3 | | | * | *** | *** |
| <i>Distribution of HHs (%) by the likelihood of using their property as collateral with the attribution of a DUAT</i> | | | | | | | | | | | | | | | | |
| More likely | 40.2 | 32.7 | 35.4 | 42.6 | 40.8 | 42.0 | 41.4 | 34.2 | 37.6 | 39.0 | 35.0 | * | | ** | ** | |
| Somewhat likely | 7.1 | 3.2 | 4.6 | 17.9 | 20.6 | 18.7 | 12.4 | 6.5 | 9.2 | 10.6 | 7.0 | ** | | *** | *** | ** |
| Somewhat unlikely | 6.5 | 12.9 | 10.6 | 9.7 | 8.5 | 9.3 | 8.0 | 12.1 | 10.2 | 9.1 | 12.0 | ** | | * | | |
| More unlikely | 9.2 | 13.7 | 12.1 | 16.6 | 16.8 | 16.6 | 12.8 | 14.3 | 13.6 | 14.6 | 11.9 | | | | ** | |
| Does not know | 37.0 | 37.5 | 37.3 | 13.3 | 13.3 | 13.3 | 25.5 | 33.0 | 29.5 | 26.7 | 34.1 | | | ** | *** | ** |
| <i>Distribution of HHs (%) that would use their property as collateral for credit by use of credit</i> | | | | | | | | | | | | | | | | |
| Agriculture | 46.1 | 34.5 | 39.4 | 74.4 | 75.8 | 74.8 | 61.6 | 46.2 | 54.5 | 60.6 | 42.1 | * | | *** | *** | *** |
| Improve/expand property | 15.8 | 15.9 | 15.8 | 12.3 | 17.0 | 13.7 | 13.9 | 16.2 | 14.9 | 13.6 | 17.6 | | | | | |
| Business | 35.6 | 49.7 | 43.7 | 13.0 | 5.7 | 10.7 | 23.2 | 37.2 | 29.7 | 24.9 | 39.4 | ** | *** | *** | *** | *** |
| Does not know | 2.4 | 0.0 | 1.0 | 0.4 | 1.5 | 0.7 | 1.3 | 0.4 | 0.9 | 0.9 | 0.9 | ** | | | | |
| Unweighted N of all households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.29 Knowledge about women's rights under the land law of 1997

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|--|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|-----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| <i>% HHs reporting that women have the right to inherit land on equal basis as their brothers</i> | | | | | | | | | | | | | | | | |
| Yes | 92.2 | 86.8 | 88.8 | 71.6 | 75.0 | 72.7 | 82.2 | 84.6 | 83.5 | 81.1 | 87.6 | ** | | | *** | ** |
| No | 5.0 | 8.1 | 7.0 | 22.6 | 25.0 | 23.4 | 13.6 | 11.3 | 12.4 | 13.7 | 10.1 | | | | *** | |
| Does not know | 2.7 | 5.0 | 4.2 | 5.7 | 0.0 | 4.0 | 4.2 | 4.1 | 4.1 | 5.2 | 2.3 | | *** | | | ** |
| <i>% HHs reporting that women have the right to maintain a piece of their ex-husband's land in case of divorce</i> | | | | | | | | | | | | | | | | |
| Yes | 88.7 | 89.2 | 89.0 | 63.1 | 61.7 | 62.7 | 76.2 | 84.0 | 80.4 | 75.2 | 89.3 | | | *** | *** | *** |
| No | 6.2 | 6.5 | 6.4 | 30.7 | 35.4 | 32.2 | 18.1 | 12.0 | 14.8 | 19.5 | 6.8 | | | *** | *** | *** |
| Does not know | 5.2 | 4.3 | 4.6 | 6.2 | 2.8 | 5.2 | 5.7 | 4.0 | 4.8 | 5.3 | 3.9 | | | | | |
| <i>% HHs reporting that women have the right to apply for a formal land title</i> | | | | | | | | | | | | | | | | |
| Yes | 87.3 | 79.7 | 82.4 | 67.4 | 70.9 | 68.4 | 77.6 | 78.0 | 77.8 | 75.3 | 82.1 | ** | | | *** | ** |
| No | 3.8 | 11.2 | 8.5 | 20.8 | 20.6 | 20.8 | 12.1 | 13.0 | 12.6 | 15.6 | 7.3 | *** | | | *** | *** |
| Does not know | 8.8 | 9.2 | 9.0 | 11.8 | 8.5 | 10.8 | 10.3 | 9.1 | 9.6 | 9.0 | 10.6 | | | | | |
| Unweighted N of all households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.30 Perceptions of the Land Law of 1997

| | Cabo Delgado | | | Nampula | | | All Sample | | | Headship | | Treatment vs Control | | | | |
|---|----------------|---------|-------|----------------|---------|-------|----------------|---------|-------|----------|--------|----------------------|----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| % of households informed about the law | 21.6 | 22.9 | 22.4 | 23.4 | 15.8 | 21.1 | 22.5 | 21.5 | 22.0 | 26.2 | 14.7 | | ** | | | *** |
| FOR HOUSEHOLDS (HH) INFORMED ABOUT THE LAND LAW | | | | | | | | | | | | | | | | |
| <i>Distribution of HHs (%) by how much they know about the land law</i> | | | | | | | | | | | | | | | | |
| None | 19.3 | 15.6 | 16.9 | 6.7 | 14.0 | 8.4 | 12.9 | 15.3 | 14.2 | 15.2 | 11.2 | | | | * | |
| A little | 50.5 | 63.4 | 59.0 | 83.2 | 80.0 | 82.4 | 67.0 | 65.7 | 66.4 | 64.8 | 71.0 | | | | *** | |
| A fair amount | 24.7 | 17.9 | 20.3 | 9.2 | 6.0 | 8.4 | 16.8 | 16.3 | 16.5 | 16.3 | 17.2 | | | | ** | |
| A lot | 5.5 | 3.1 | 3.9 | 1.0 | 0.0 | 0.7 | 3.2 | 2.7 | 2.9 | 3.7 | 0.7 | | | | | |
| <i>Distribution of HHs (%) by the means that they received information of land law</i> | | | | | | | | | | | | | | | | |
| Local leaders | 28.7 | 25.8 | 26.8 | 64.9 | 70.0 | 66.1 | 47.0 | 31.9 | 39.1 | 37.7 | 43.6 | | | ** | *** | |
| Dissemination by authorities | 25.6 | 23.1 | 24.0 | 22.1 | 4.0 | 18.0 | 23.9 | 20.4 | 22.1 | 24.0 | 16.1 | *** | | | | |
| Others | 45.7 | 51.2 | 49.3 | 13.0 | 26.0 | 16.0 | 29.2 | 47.7 | 38.8 | 38.3 | 40.4 | * | ** | | *** | |
| % HHs that received information about the land law of 1997 | 10.6 | 9.7 | 10.0 | 0.0 | 4.0 | 0.9 | 5.2 | 8.9 | 7.1 | 5.2 | 8.9 | | | | | *** |
| % HHs that knows specific rights of the land law of 1997 | 26.0 | 25.7 | 25.8 | 52.4 | 62.0 | 54.6 | 39.4 | 30.8 | 34.9 | 36.3 | 30.6 | | | | | *** |
| <i>Distribution of HHs (%) by their opinions on how the land law strengthens land tenure</i> | | | | | | | | | | | | | | | | |
| Very useful | 73.5 | 78.5 | 76.8 | 67.3 | 72.0 | 68.4 | 70.4 | 77.6 | 74.1 | 71.3 | 82.6 | | | | | * |
| Somewhat useful | 8.6 | 2.0 | 4.3 | 15.9 | 16.0 | 15.9 | 12.3 | 4.0 | 8.0 | 9.5 | 3.2 | ** | | *** | *** | ** |
| Useless | 3.3 | 3.1 | 3.2 | | | | 1.6 | 2.7 | 2.2 | 2.5 | 1.2 | | | | | |
| Cannot say | 14.6 | 16.4 | 15.8 | 16.8 | 12.0 | 15.7 | 15.7 | 15.8 | 15.8 | 16.7 | 13.0 | | | | | |
| <i>Distribution of HHs (%) by their opinion on the right to sell and buy land according to the land law</i> | | | | | | | | | | | | | | | | |
| Yes | 1.3 | 0.0 | 0.4 | 9.2 | 20.0 | 11.6 | 5.3 | 2.8 | 4.0 | 4.9 | 1.2 | | | | *** | ** |
| No | 31.4 | 50.6 | 44.0 | 77.4 | 76.0 | 77.1 | 54.7 | 54.2 | 54.4 | 58.4 | 42.1 | ** | | *** | * | |
| Do not know | 67.3 | 49.4 | 55.6 | 13.5 | 4.0 | 11.3 | 40.1 | 43.1 | 41.6 | 36.7 | 56.7 | ** | ** | | *** | ** |
| Unweighted N of HHs informed of the law | 101 | 55 | 156 | 92 | 50 | 142 | 193 | 105 | 298 | 227 | 71 | | | | | |
| Unweighted N of all households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.31 Household income and components

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|--|---------------------|---------|--------|----------------|---------|--------|-------------------|---------|--------|-----------------|--------|-----------------------------|----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| Household income | 32,377 | 31,823 | 32,022 | 19,331 | 20,213 | 19,600 | 26,039 | 29,633 | 27,949 | 31,250 | 22,271 | | | | *** | *** |
| Net crop income | 13,683 | 14,295 | 14,075 | 16,163 | 18,078 | 16,749 | 14,888 | 15,008 | 14,952 | 16560 | 12186 | | | | * | *** |
| Income from salaried employment | 6,953 | 3,931 | 5,014 | 1,386 | 280 | 1,048 | 4,248 | 3,242 | 3,714 | 3,865 | 3,454 | ** | ** | | *** | |
| Income from self-employments: products from the forest/fauna | 7,590 | 8,723 | 8,317 | 46 | 13 | 36 | 3,925 | 7,080 | 5,602 | 6,097 | 4,749 | | | * | *** | |
| Income from self-employment: other activities (net of costs) | 3,598 | 4,377 | 4,098 | 1,447 | 1,754 | 1,541 | 2,553 | 3,882 | 3,259 | 4,448 | 1,214 | | | | ** | *** |
| Livestock income | 201 | 196 | 198 | 213 | 154 | 195 | 207 | 188 | 197 | 251 | 105 | | | | | *** |
| Income from pensions | 143 | 148 | 146 | 49 | 0 | 34 | 97 | 120 | 109 | 108 | 111 | | | | *** | |
| Net transfer income | 207 | 153 | 173 | -6 | -87 | -31 | 103 | 108 | 106 | -95 | 451 | | | | * | *** |
| Rental income | 3 | 0 | 1 | 32 | 20 | 28 | 17 | 4 | 10 | 15 | 1 | | | ** | *** | *** |
| Household income per capita | 7,785 | 7,102 | 7,347 | 4,933 | 4,936 | 4,934 | 6,400 | 6,694 | 6,556 | 7,200 | 5,447 | | | | *** | ** |
| Household income per AEU | 9,578 | 8,986 | 9,198 | 6,152 | 6,367 | 6,217 | 7,914 | 8,492 | 8,221 | 9,139 | 6,641 | | | | *** | *** |
| Unweighted N of total households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.32 Value of monthly household food and tobacco consumption (meticaís)

| | Cabo Delgado | | | Nampula | | | All Sample | | | Headship | | Treatment vs Control | | | | |
|---------------------------------------|----------------|----------|----------|----------------|---------|--------|----------------|----------|----------|----------|----------|----------------------|-----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| Cereals, grains, roots & tubers (mt) | 1,471.91 | 1,452.95 | 1,459.75 | 704.69 | 684.74 | 698.59 | 1,099.20 | 1,308.04 | 1,210.18 | 1,221.44 | 1,190.81 | | | *** | *** | |
| Legumes & vegetables (mt) | 381.28 | 375.74 | 377.73 | 351.69 | 413.32 | 370.53 | 366.91 | 382.83 | 375.37 | 387.93 | 353.75 | | ** | | | |
| Fruits & nuts (mt) | 173.25 | 175.77 | 174.87 | 72.83 | 63.88 | 70.09 | 124.47 | 154.66 | 140.51 | 150.89 | 122.67 | | | ** | *** | * |
| Meat & animal products (mt) | 705.83 | 880.28 | 817.74 | 213.68 | 303.30 | 241.08 | 466.75 | 771.44 | 628.66 | 635.13 | 617.54 | | *** | *** | *** | |
| Other food items (mt) | 400.57 | 495.84 | 461.68 | 236.66 | 197.82 | 224.79 | 320.94 | 439.62 | 384.01 | 349.23 | 443.83 | | | | *** | |
| Meals & beverages in restaurants (mt) | 0.82 | 0.00 | 0.29 | 5.57 | 11.93 | 7.51 | 3.13 | 2.25 | 2.66 | 3.17 | 1.79 | | | | * | |
| Tobacco (mt) | 26.84 | 22.40 | 23.99 | 9.45 | 6.25 | 8.47 | 18.39 | 19.35 | 18.90 | 23.71 | 10.63 | | | | *** | ** |
| Total food consumption (mt) | 3133.67 | 3380.58 | 3292.06 | 1585.12 | 1675 | 1612.6 | 2381.38 | 3058.84 | 2741.39 | 2747.78 | 2730.39 | | | *** | *** | |
| Total food consumption (usd) | 113.13 | 122.04 | 118.85 | 57.22 | 60.47 | 58.22 | 85.97 | 110.43 | 98.97 | 99.2 | 98.57 | | | *** | *** | |
| Total food consumption/cap (mt) | 797.03 | 772.33 | 781.19 | 404.13 | 424.16 | 410.25 | 606.16 | 706.66 | 659.56 | 623.9 | 720.91 | | | *** | *** | |
| Total food consumption/cap (usd) | 28.77 | 27.88 | 28.2 | 14.59 | 15.31 | 14.81 | 21.88 | 25.51 | 23.81 | 22.52 | 26.03 | | | *** | *** | |
| Unweighted N of households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.33 Household Diet Diversity

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|-----------------------------------|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|-----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| Cereals & grains | 96.1 | 95.6 | 95.8 | 99.1 | 99.7 | 99.3 | 97.6 | 96.4 | 96.9 | 98.3 | 94.7 | | | | *** | * |
| Roots & tubers | 95.3 | 99.2 | 97.8 | 82.7 | 74.4 | 80.1 | 89.2 | 94.5 | 92 | 90.3 | 95 | *** | *** | *** | *** | *** |
| Meat | 8.1 | 11.5 | 10.3 | 16.7 | 20.9 | 18 | 12.2 | 13.3 | 12.8 | 15.1 | 8.9 | | | | *** | *** |
| Eggs | 10.9 | 9.3 | 9.9 | 5.7 | 12.7 | 7.9 | 8.4 | 9.9 | 9.2 | 10.2 | 7.5 | | *** | | | |
| Fish/shellfish/seafood | 84.4 | 91.6 | 89 | 68.1 | 74.4 | 70 | 76.5 | 88.3 | 82.8 | 81.4 | 85.1 | *** | * | *** | *** | |
| Legumes | 82.7 | 78.9 | 80.2 | 90.3 | 95.6 | 91.9 | 86.4 | 82 | 84.1 | 86.1 | 80.6 | | *** | | *** | * |
| VegeTables | 85.7 | 91.1 | 89.2 | 87.6 | 96.5 | 90.3 | 86.6 | 92.1 | 89.6 | 91.2 | 86.8 | ** | *** | *** | | * |
| Fruit | 73.9 | 78.1 | 76.6 | 67.7 | 69 | 68.1 | 70.9 | 76.3 | 73.8 | 74.9 | 71.8 | | | * | *** | |
| Milk & milk products | 5.1 | 5.7 | 5.5 | 0 | 0 | 0 | 2.6 | 4.6 | 3.7 | 4.1 | 3 | | | | *** | |
| Oils & oil seeds | 90.6 | 93.8 | 92.7 | 71.6 | 69.3 | 70.9 | 81.4 | 89.2 | 85.5 | 85.5 | 85.5 | | | *** | *** | |
| Sugar | 65 | 69.6 | 68 | 24.3 | 19.6 | 22.9 | 45.3 | 60.2 | 53.2 | 51.7 | 55.8 | | | *** | *** | |
| Miscellaneous | 94.4 | 93 | 93.5 | 95.5 | 98.7 | 96.5 | 94.9 | 94.1 | 94.5 | 96.1 | 91.7 | | *** | | * | ** |
| HH Diet Diversity Score (HDDS) | 7.9 | 8.2 | 8.1 | 7.1 | 7.3 | 7.2 | 7.5 | 8 | 7.8 | 7.9 | 7.7 | * | ** | *** | *** | |
| Unweighted N of households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.34 Average monthly expenditures per household

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | | |
|--|---------------------|----------|----------|----------------|----------|----------|-------------------|----------|----------|-----------------|---------|-----------------------------|-----|-----|-----------|-----------|
| | Treat- ment | Control | Total | Treat- ment | Control | Total | Treat- ment | Control | Total | Male | Female | C | N | All | C vs N | M vs F |
| Clothing (mt) | 530.31 | 629.46 | 593.91 | 339.61 | 400.17 | 358.13 | 437.67 | 586.21 | 516.6 | 546.48 | 465.22 | | | * | *** | |
| Rent, utilities, insurance (mt) | 96.29 | 113.29 | 107.2 | 10.28 | 0 | 7.13 | 54.51 | 91.92 | 74.39 | 70.09 | 81.78 | | | | *** | |
| HH appliance, accessories (mt) | 23.96 | 16.6 | 19.24 | 15.29 | 77.51 | 34.31 | 19.75 | 28.09 | 24.18 | 32.2 | 10.4 | | *** | | | * |
| HH durable goods, domestic services (mt) | 19.99 | 9.87 | 13.5 | 28.31 | 50.12 | 34.98 | 24.03 | 17.46 | 20.54 | 27.48 | 8.59 | * | * | | *** | *** |
| Transportation (mt) | 105.22 | 127.59 | 119.57 | 66.73 | 74.18 | 69.01 | 86.53 | 117.51 | 102.99 | 104.7 | 100.05 | | | | *** | |
| Communications (mt) | 80.79 | 69.49 | 73.54 | 5.85 | 3.42 | 5.11 | 44.39 | 57.03 | 51.1 | 49.84 | 53.27 | | | | *** | |
| Culture and recreation (mt) | 204.15 | 60.86 | 112.23 | 1.06 | 21.85 | 7.42 | 105.49 | 53.5 | 77.86 | 47.55 | 130 | | | | | |
| Miscellaneous assests/services (mt) | 55.36 | 24.12 | 35.32 | 20.25 | 35.4 | 24.88 | 38.3 | 26.25 | 31.9 | 30.03 | 35.1 | ** | * | | | |
| Education (mt) | 17.93 | 16.7 | 17.14 | 9.65 | 3.66 | 7.82 | 13.91 | 14.24 | 14.08 | 15.13 | 12.28 | | *** | | *** | |
| Health (mt) | 111.69 | 86.37 | 95.45 | 23.2 | 25.42 | 23.88 | 68.7 | 74.88 | 71.98 | 61.36 | 90.25 | | | | *** | |
| Fuel (mt) | 238.33 | 253.23 | 247.89 | 76.92 | 93.98 | 82.14 | 159.92 | 223.19 | 193.54 | 185.97 | 206.56 | | | *** | *** | |
| Total non-food expenditure (mt) | 1484.02 | 1407.58 | 1434.98 | 597.16 | 785.72 | 654.81 | 1053.19 | 1290.27 | 1179.17 | 1170.84 | 1193.5 | | ** | | *** | |
| Total food and tobacco expenditures (mt) | 3160.51 | 3402.98 | 3316.05 | 1594.56 | 1681.25 | 1621.06 | 2399.78 | 3078.2 | 2760.29 | 2771.49 | 2741.01 | | | *** | *** | |
| Total expenditures (mt) | 4,644.53 | 4,810.55 | 4,751.03 | 2,191.72 | 2,466.97 | 2,275.87 | 3,452.96 | 4,368.47 | 3,939.46 | 3942.34 | 3934.51 | | * | *** | *** | |
| Total expenditures (USD) | 167.67 | 173.67 | 171.52 | 79.12 | 89.06 | 82.16 | 124.66 | 157.71 | 142.22 | 142.32 | 142.04 | | * | *** | *** | |
| Unweighted N of households | 455 | 251 | 706 | 395 | 316 | 711 | 850 | 567 | 1,417 | 981 | 436 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

Table A3.35 Percent of individuals living on less than \$1.25 per day (based on PPP exchange rate) and below poverty line

| | <u>Cabo Delgado</u> | | | <u>Nampula</u> | | | <u>All Sample</u> | | | <u>Headship</u> | | <u>Treatment vs Control</u> | | | C vs N | M vs F |
|--|---------------------|---------|-------|----------------|---------|-------|-------------------|---------|-------|-----------------|--------|-----------------------------|---|-----|--------|--------|
| | Treat-ment | Control | Total | Treat-ment | Control | Total | Treat-ment | Control | Total | Male | Female | C | N | All | | |
| Average per capita expenditures per day (USD PPP) | 2.46 | 2.38 | 2.41 | 1.19 | 1.33 | 1.23 | 1.84 | 2.18 | 2.02 | 1.91 | 2.21 | | | ** | *** | * |
| % individuals in poverty based on global measure (i.e., <\$1.25/day) | 36.7 | 39.2 | 38.4 | 74.9 | 69.4 | 73.2 | 54.8 | 44.4 | 49.2 | 51.6 | 44.5 | | | | | |
| Average per capita expenditures per day (Meticais) | 36.81 | 35.53 | 35.99 | 17.74 | 19.89 | 18.4 | 27.55 | 32.58 | 30.22 | 28.59 | 33.02 | | | ** | *** | * |
| % individuals in poverty based on national poverty line ¹ | 53.0 | 51.9 | 52.3 | 72.4 | 66.2 | 70.6 | 62.2 | 54.3 | 57.9 | 58.0 | 57.8 | | | | | |
| <i>Weighted N of individuals</i> | 5713 | 10706 | 16420 | 5168 | 2199 | 7367 | 10881 | 12905 | 23786 | 15588 | 8198 | | | | | |

Source: MCA/MINAG. Rural Land Survey, 2011/2012

* indicates significant difference at 10% level, ** at 5%, and *** at 1%.

¹The poverty lines for rural Nampula and rural Cabo Delgado are based on the 2010 MPD report (citation) adjusted for inflation.