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# IMPACT EVALUATION OF ETHIOPIA LAND ADMINISTRATION TO NURTURE DEVELOPMENT

Report on Baseline Findings

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# Impact Evaluation of Ethiopia Land Administration to Nurture Development

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FEBRUARY 2016

## **DISCLAIMER**

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# ACRONYMS AND ABBREVIATIONS

$\mu$	Mean
$\sigma$	Standard Deviation
ATE	Average Treatment Effect
C	Pure Control
CAP	Computer Assisted Personal Interview
CLGE	Community Land Governance Entity
DD	Difference-in-Differences
ERC	Evaluation, Research, and Communication
FGD	Focus Group Discussion
FHH	Female-headed Household
GoE	Government of Ethiopia
H	Hypothesis
IBLI	Index Based Livestock Insurance
ICC	Intra-class Correlation
IDIQ	Indefinite Delivery Indefinite Quantity Contract
ILRI	International Livestock Research Institute
IE	Impact Evaluation
IRB	Institutional Review Board
KII	Key Informant Interview
LAND	Land Administration to Nurture Development
LT	Land Tenure Intervention
LTPR	Land Tenure and Property Rights
LTRM	Land Tenure and Resource Management
N	Total Number of Respondents
M&E	Monitoring & Evaluation
MDES	Minimal Detectable Effect Size
MoA	Ministry of Agriculture
NGO	Non-Governmental Organization
PA	Peasant Association

PARIMA	Pastoral Risk Manasgmenet Project
PLI	Pastoralist Livelihoods Initiative
PRIME	Pastoralists' Areas Resilience Improvement through Market Expansion
PRM	Participatory Rangeland Management
PSNP	Productive Safety Net Program
RFP	Request for Proposals
SNNPR	Southern Nations, Nationalities, and Peoples' Region
STARR	Strengthening Tenure and Resource Rights
SSA	Sub-Saharan Africa
TLU	Tropical Livestock Unit
USAID	United States Agency for International Development
USG	United States Government

# EXECUTIVE SUMMARY

This Baseline Report provides an exploratory analysis of baseline data from an impact evaluation of USAID's Land Administration to Nurture Development (LAND) program. The LAND project in Ethiopia is a five-year intervention (2013-2018) with a total estimated cost of \$11 million. LAND is initially being implemented in Ethiopia's Oromia Region in the Guji and Borana pastoral zones, which is the focus of this Baseline Report.<sup>1</sup>

LAND aims to establish a locally appropriate model to support efforts to legally recognize and protect the land and resource use<sup>2</sup> rights of pastoral communities and recognize and strengthen their customary land governance institutions. Despite the important historical role of customary governance institutions in managing rangeland tenure and resources, recent developments in Ethiopia have introduced new challenges that may be undermining the customary tenure system. There is growing scarcity of land available for pasture due to the increase in cultivation over the past few decades, human population growth and associated expansion of small towns and other settlements, and the increase in exclusive grazing areas (called *kalo* in this area) (Bassi and Tache 2011; Boru et al. 2015).

The impact evaluation research strategy has been designed to identify effects of the new formalization approach on pastoral communities and households, including the program's effect on livelihoods, resilience, and conflict, with a particular focus on differential impacts on women, agro-pastoralists, and resource-constrained and other potentially vulnerable groups, including youth. Because of its sampling methodology described later in the report, the household study focused mainly on the agro-pastoral areas of Guji and Borana zones, while qualitative data collection (key informant interviews and focus group discussions) covered both pastoral and agro-pastoral areas. Sites selected for the purpose of this study include *agro-pastoral areas* that have smaller herds than would be the case for a random sample from Borana as a whole. These more favorable, higher rainfall agro-pastoral areas have the potential for heightened land use conflicts between farming and livestock communities, as well as serve as locales where outside investment is likely to be pursued.

Baseline data detailing sample characteristics, land use, land management practices, land condition, tenure security, land governance and conflict are presented in this report. Given the focus on agro-pastoral sites, the findings discussed in this report do not mirror the results of studies that are focused on predominantly pastoral areas. While the research team can draw on secondary data from pastoral

**The overarching policy question that underlies this evaluation of LAND's Component 4 is:**

To what extent does empowering pastoral communities with stronger land use rights, improved land governance institutions, increased negotiation capacity, and better land use planning result in increased investment and equitable economic growth?

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<sup>1</sup> LAND is expected to also be implemented in Afar and Somali Regional States. Please note that discussions of treatment and control groups in this report rely on the original LAND implementation plan. As the specific locations of the intervention in the Oromia Region are still unclear, any updates to the program design will require updates to the treatment and control groups described in the Baseline Report.

<sup>2</sup> The government owns all land in Ethiopia and holds it in trust for the people.



areas to complement the primary data collection, data for the impact evaluation relies primarily on household data collected from agro-pastoral areas.

Our initial findings indicate that conditions in the study areas are changing in important but not always positive ways: continued bush encroachment and expansion of settlements and farming has reduced the absolute amount and productivity of rangelands; human population in the area has increased considerably during the past 20 years, placing further limits on land availability and mobile pastoralism; and the increased frequency of droughts is a major concern for land use and livestock management. These macro-scale processes provide a context for understanding the findings of the report, especially with regard to pressures on mobile pastoralism and competition over land. With fertile land (for pasture or farming) increasingly in short supply, this may help account for the rise in the use of enclosures (*kalos*), both communal and private.

These processes suggest an environment that is having negative impacts on livelihoods for certain sub-groups,<sup>3</sup> particularly women, youth and the poor, who herd and own fewer animals than others and who have less access to and control over pastures and farm lands. These challenges, combined with government policies that privilege sedentary farming and agropastoralism over mobile pastoralism, may be driving the increase in cultivation. As more households turn to cultivation as an alternative livelihood strategy and as a means of securing land in a context of tenure insecurity, the importance of having fair and equitable institutions to manage the process of allocating land rights is apparent. The findings in the report suggest that most households who obtained farmland do believe that the process for gaining access to farmland was fair and transparent, but it is not clear from the study whether or not those who did not acquire farmland share the same sentiment. Future follow-up research will need to ask this question from the full sample of households, those who acquired farms and those who did not.

Although the Borana and Guji areas have experienced conflicts over land and boundaries in the past decade that have resulted both in losses of human lives and properties (Tache and Oba 2009; Richards et al. 2015), less than 10% of the households that were surveyed indicated that they had experienced conflicts over resources or other issues. While not a statistically representative sample, key informant interviews and focus group discussions highlight more conflict-related issues, especially in areas where there has been agricultural encroachment onto seasonal grazing areas by non-Borana farmers (e.g., in border areas of Teltele, Yabello, and Arero districts) and disputes over administrative boundaries (e.g., borders between Guji and Borana Zones and between Region 4 [Oromiya State] and Region 5 [Somali State]).

In those cases where conflicts do arise, the baseline results show that households are most satisfied when customary elders resolve their conflicts. Elders are most likely to handle relatively minor conflicts over land and other resources that occur within an ethnic group, while larger-scale conflicts over administrative boundaries that involve loss of life and that are more likely to involve different ethnic groups are often taken to government offices for mediation and resolution. Qualitative findings suggest that government methods for resolving disputes may help to lessen ethnic tensions over land. Nonetheless, customary institutions continue to play a key role in creating rules and regulations for land use management and imposing penalties in cases of rule infractions, and this applies both for the governance of land and for the governance of water.

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<sup>3</sup> A sub-group refers to a subdivision of the larger sample. For example, the sample sub-groups analyzed in this report include female-headed households, youth-headed households and households in the bottom quartile of a socio-economic index.



Indeed, the analysis suggests that governance of these resources has been and continues to be intimately connected between government and customary authorities. Just as the lives of participants in the survey area are changing, the roles of customary and government officials is also in flux. Government officials and community elders play important roles in giving access to water points and grazing land, though the specific customs for asking permission vary based on the number of people seeking permission, the intended length of stay, and circumstances, such as drought. Government officials are more likely to be involved in sedentary areas with greater administrative presence and in cases of large-scale migration.

Based on the qualitative results, rules regarding pasture use are not nearly as common or established as rules about water governance. Some pastureland is unregulated, while other land is highly regulated, by both traditional and government authorities. Focus group discussions indicate that communities are much more aware of rules regulating water points and understand the importance of rules to ensuring that their future water rights are protected. The same understanding does not appear to apply to rangeland regulations, and there may be lessons to learn from communities' customary water regulations to implement similar regulations on pastoral land.

Under challenging conditions, mobility of herders and their animals occurs as a means to deal with rainfall and pasture variability, and our analysis finds that customary authorities play an important role here. While government authorities place some restrictions on access and migration, these restrictions do not seem to significantly limit the use of satellite grazing camps for mobile pastoralists.<sup>4</sup>

These changes have impacts on well-being, particularly for the most vulnerable. Although many households in the sample report livestock ownership across animal types (camel, cattle, sheep, goat), the reported numbers of livestock owned are low. Further, our findings suggest that while levels of spending on livestock assets, consumer durables and health and education vary across groups, female-, youth- and poor-headed households may be less able to cope with climate variability and other pressures. On 47% of farm plots, no land management practices, including fertilizing and conservation farming techniques, are being practiced. This may be an indication that returns to agriculture are low and additional allocations of both capital and labor are not worth the added efforts. Or, given the relatively limited experience with cultivation in much of the study area, it may signal there may be room for extension and education to increase awareness of these kinds of practices and techniques. We also think it is possible that in those locations of the study region where average annual rainfall is below 500 mm, rainfed agriculture is highly risky and may be pursued as a strategy to enclose land for livestock use and/or to make a more secure tenure claim to the land. Our data also show that a significant share of the farmland claimed by households (35%) were not currently cultivated and were kept in fallow and/or for use by livestock. There is some, but limited, evidence of agricultural intensification, and where this exists in the better rainfall areas (650 mm or more), it may indicate rising competition over fertile lands (for grazing or farming).

On a positive note, women's rights seem to be expanding: women are serving on more committees, including important water committees. Girls are attending primary school more frequently, and women are inheriting land more often than in the past. Finally, a social norm common in Ethiopia is also changing: women are being allowed to cultivate land when no man is available to plow for her. These are positive changes.

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<sup>4</sup> A satellite herding camp (*foora*) is a camp located far from the settlement.

Our analysis identifies very little outside private sector investment in land in the study region; however, local people are increasingly aware of the prospect that investors might come to the area and are cognizant of the experiences of other regions where outside investment has occurred. In the study region, investments in large-scale mechanized agriculture and/or commercial ranching are viable options that might be attractive to investors. While the majority of local people expressed concerns about outside investors and possible impacts on local lands and livelihoods, some noted that it might be beneficial to have some investment by outsiders.<sup>5</sup>

There was concern expressed by the communities about public investment and activities on communal rangelands where communities were not consulted or compensated. This issue came up in focus group discussions and key informant interviews that pointed to the loss of and damage to grazing lands and water points due to a major road project in the region. Not only were herding routes disrupted, but erosion occurred along the road, gravel and sand pits were excavated, and communal water points were heavily used without local consultation and/or compensation to communities. This pattern contrasts with examples of public work projects in highland farming areas, where communities and land holders are compensated for use of their farmlands. There also were concerns expressed about small-scale investments and allocations of land for farming and, in fact, this currently is a much greater problem for pastoralism in the study region than large-scale land investments. Our qualitative data reveal cases where the kebele administration allocated small farms to local investors from the community or a neighboring town, and often in important grazing and watering areas. This pattern was identified as a local problem and, again, customary leaders were typically not consulted until after the fact. The gradual loss of land through these allocations may be a greater but less spectacular threat to livestock production than large-scale private and/or public investment (so called “land grabbing”).

## **GENDER EQUALITY AND FEMALE EMPOWERMENT**

This evaluation collected quantitative baseline data on female-headed households and qualitative data from women-only focus group discussions. Given resource constraints, it was not possible to fund an intra-household survey for the LAND/Oromia impact evaluation. The study recognizes the limitations of comparing male- and female-headed households to fully understand gender differences. The subsequent baseline for the LAND Afar impact evaluation plans to incorporate more attention to women within male-headed households.

Although quantitative household survey data are limited to female-headed households, the baseline data nevertheless provides an important window into several issues related to gender equity and female empowerment. Female-headed households (FHH) comprised 20% of the total baseline sample (N=770 HHs). Of the female-headed households surveyed, the vast majority are widowed (71% of FHHs)<sup>6</sup>, while most of the remaining sample was fairly evenly split across divorced women and married or cohabitating respondents who identified as female-headed (16% and 14% of FHHs, respectively).<sup>7</sup>

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5 Information on outside investment patterns in Ethiopia can be found in “Large-scale land deals in Ethiopia: Scale, Trends, features, and outcomes to date” James Keeley, Wondwosen Michago Seide, Abdurehman Eid and Admasu Lokaley Kidewa, IIED: London, 2014; [http://www.landmatrix.org/get-the-detail/by-target-country/ethiopia/?order\\_by=&more=70](http://www.landmatrix.org/get-the-detail/by-target-country/ethiopia/?order_by=&more=70).

6 This is consistent with the finding that husband is 9.6 years older on average than the first wife in male-headed households.

7 Female household heads in the sample are significantly older than male household heads, perhaps not surprising given the large proportion of FHHs that are widowed. The size of female-headed households is also significantly smaller than male-headed households, on average, and a significantly larger proportion of female-headed households (19%, relative to 14% for male-headed households) had relocated within the past 20 years.

As expected, female-headed households differ from male-headed households (MHH) in several important ways related to broad demographics and livelihoods, as well as both farmland and rangeland use, access, and governance participation. In terms of broad livelihoods issues, female-headed households are much more likely than male-headed households to be poor. Slightly more than half of female-headed households are in the lowest quartile of earnings and assets. FHHs are less likely to engage in cash-based livelihoods activities and also own less of most assets. In terms of livestock assets, FHHs generally own and herd fewer cattle, goats, sheep, and camels; were less likely to have acquired new livestock or offtake from their holdings over the year; and were less likely to migrate their livestock to a satellite camp or access a private kalo. Overall, this suggests that the dynamics of FHHs' reliance on and use of livestock and communal rangelands in the study area may be substantially different from that of MHHs and, therefore, warrant explicit attention.

Overall, male-headed households were 9% more likely than female-headed households to earn cash income from any livelihood activity. Female-headed households who did participate in income-generating activities made approximately \$77 less than male-headed households (female average annual cash income is 59% of average male household cash income or 78% if we contrast cash income per household member). Male-headed households are more likely than female-headed households to trade livestock, sell crops, or have a salaried job. Male-headed households also earned more income from selling crops. FHHs are more likely to participate in food aid, food for work, or other similar assistance programs. They are also more likely to receive both cash and in-kind transfers over the course of a year; the cash transfer average for female headed households is 23% larger than that for male-headed households and is 88% larger for the per household member comparison. It is important to put this in the context of the overall annual cash transfer level for all households, which is around \$5. We also note that while literacy is low in the study area in general, it is even lower in poor households, and especially in female-headed households, where only 4% of such households have members who can write a simple a short note.

In terms of farmland use, access, and land allocation issues more generally, the baseline data demonstrate substantial differences in farmland access issues and rights to inherit land for women in general and for female-headed households. Just 62% of female-headed households (476) have access to farmland, 24% less than male-headed households. Qualitative data also suggested limited access to farmland for women. For example, when asked about those with the weakest rights to access farmland in their community, a focus group discussion with resource constrained individuals in Bede revealed, "If we look at access rights to farmland, men have more rights, women have the least. In nature men and women do not have equal rights." It is important to note that perceptions of women's rights did vary across the study area, as other qualitative data suggested that farmland access and rights for women were improving. Surprisingly, the baseline data indicated that female-headed households were less likely to be concerned about inequitable farmland allocation than male-headed or wealthier households.

Some FGD respondents spoke of increased land rights for women in terms of inheritance due to a recent change in inheritance laws. It was noted that while women generally did not inherit land in the past, they can now. This appears to have changed particularly for widows, who may now be able to obtain some land, especially when sons are not available to farm for her. In some places women can now obtain land in the event of divorce, as women in Mahdi explained, "It's not the same as in the past. In the past the husband claimed that the children are his own and same for the cattle and other resources because he feels that she did not bring anything from her parents when they married. That is why he

kicks her out without resources. But now they become equal: if she divorces, she can get her half, the child also gets their share.”<sup>8</sup>

We also note that while the household survey data revealed no statistically significant difference in types or frequencies of land conflicts across male- and female-headed households, focus group discussions with women suggested that, during times of conflict and drought, women commonly bear an unequal share of the household burden. A group of women in Bede explained, “There was conflict between the tribes. The main cause of conflict was grazing land and water. Due to conflict many people have been displaced from their residences, and the communities were unable to care for their children and water their animals. Women were largely affected by the problem because fetching of water and searching of grazing land is mainly the burden of women.” Another group of women described, “Women face the problem of going to a distant area to cut grass. This is the result of a shortage of pasture. The source of water is also located in distant area which usually affects women and children.” Such quotes and the relevant qualitative analysis illustrate a gendered division of roles within the study area and suggest that the responsibilities of women tied directly to natural resources leave them especially susceptible to changes in access.

Some positive trends for women and girls also emerged from the baseline data. For example, focus group interviews presented a picture of recent improvements for women’s education rights, including that cultural norms around women not going to school were relaxing, while there was also greater acknowledgement of a woman’s rights and her particular right to control her own affairs. A focus group in Renji said, “In the past times, if women go to school it has been forbidden as a culture. Recently women have been participating as committee members and in getting education to know their rights well and beinvolved in any decision making regarding their affairs.” Other positive changes also included recognition of joint rights to farmland and products produced from it for married women. A group of women in Ibda Reer said, “Women have started to raise their hands and speak out for their rights in every social gathering.”

Another positive change is that women reportedly now serve on committees that relate to their interests in a much greater proportion than earlier, particularly on water committees, but also those related to grass, forests and other natural resources, and terracing. There was also a sense that men recognize the importance of involving women in decisions, perhaps especially related to water. Focus group discussions suggested that women participate and their voices are increasingly heard at other committee meetings, as well. Another group described, “In past times women did not participate in any affairs regarding their concern. But now this has been changed. Women have started to participate in any decision making about their land and natural resources right. They can also be organized in a group.” Despite these positive changes, in general, the baseline data suggest a situation of strong gendered divisions across roles and rights and responsibilities related to customary land rights and communal land governance in the study area and present clear scope for opportunities for targeted improvements in gender equity through program activities.

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<sup>8</sup> Still, other FGDs revealed that although new laws grant women the right to inherit property, such laws are not carried out in practice. For example, women in Magado described, “These days there are rules that say women should inherit the cattle and property of their fathers. Such rules are well known in traditional gada grades as well. But women lack self-confident to enforce such rules.” Furthermore, agro pastoralists in Guyo said, “Even though we were educated by the government on the new rules, it has not changed into practices.”

## RECOMMENDATIONS

The recommendations discussed in this section are for consideration by USAID as the program begins implementation and are based only on baseline data and secondary evidence, not evidence of actual impacts.

The findings strongly suggest that considerations of private land investment on communal rangelands has to be highly participatory with strong involvement by the community, highly transparent, and with mechanisms in place to withdraw private investment if there is sufficient local resistance and the costs are too high and benefits too limited for the community. At present, the process for allocating lands for private investment is driven by the government, which identifies suitable lands for different types of investment and then allocates private certificates to companies and investors who wish to use the land. To our knowledge, there is no participation of local communities or institutions in this process in the study region, so that communities are not consulted or compensated for investments on their lands, including cases of public infrastructure investments. Because there already are customary institutions at the level of the *dheeda* (customary grazing units) with responsibility for the use of common lands, it is recommended that they be empowered to negotiate on behalf of the community to insure that compensation is provided and that impacts on livelihoods and the environment by private and public investments are minimized.

In terms of land certification, at a minimum, focus group discussions also need to be held with different pastoralist stakeholders (male/female, rich/poor, youth/elders, and others) to identify if they want their customary, communal lands registered (either on an individual or group basis), and to determine whether or not different stakeholders know what certification would mean and its implications. It is possible that different communities may hold different notions of what/where boundaries of *dheeda* and *reera* (customary grazing sub-units) are, and this should be explored. It is particularly important that all pastoralist stakeholders participate in any discussion of the registration of communal lands, even if the goal is to better protect pastoralist land rights. Particular attention will need to be paid to the gender dimension in any effort to enhance tenure security in this area. It may be beneficial to move beyond focus group discussions to undertake participatory land use planning exercises with multiple user groups represented as part of the broader land titling effort so that there is a larger shared community sense of the wider portfolio of land uses and any possible trade-offs that are under consideration.

Most respondents identified a return of abundant rain as the primary factor to improve rangeland condition. Almost all respondents indicated that a return to normal rainfall patterns would help to restore rangeland quality. However, across the sites there is a significant minority that identify steps that could be taken (water development, better land management, bush clearing) that could lead to rangeland improvement. While more regular rainfall with decreased incidences of drought are to be hoped for<sup>9</sup>, as far as development interventions within the remit of the LAND project, it appears in some of the study sites there is a base of opinion supporting other kinds of steps to improve rangeland condition, though among a minority of the population.

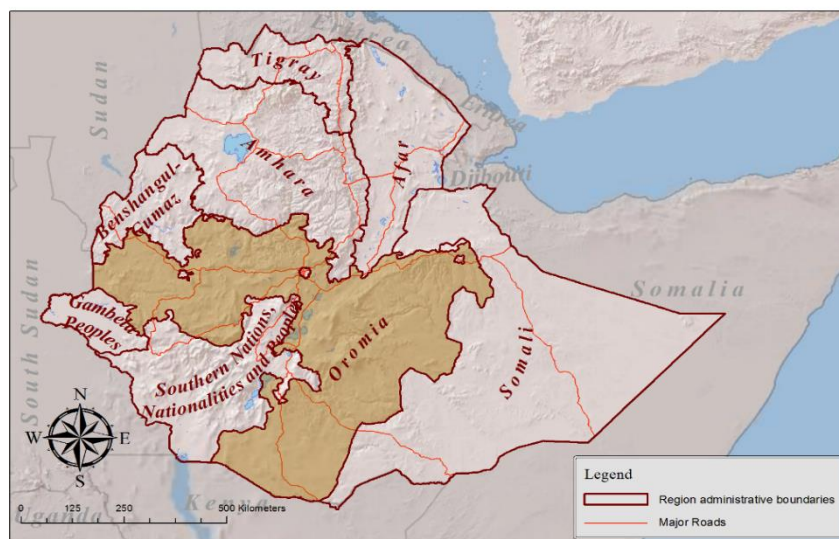
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<sup>9</sup> Climate data do not support major changes in rainfall distribution and annual amounts in Ethiopia at present, although there has been an upward trend in temperature warming (Conway and Schipper 2010). Future climate projections for Ethiopia suggest that the length of long rain periods will be shortened and rainfall patterns will be less regular, with a continued rise in temperatures (Williams and Funk 2011)

# I.0 EVALUATION PURPOSE & QUESTIONS

## EVALUATION PURPOSE

This report presents results from the baseline data collection completed as part of an impact evaluation of the USAID Land Administration to Nurture Development (LAND) program in Ethiopia. This impact evaluation is being implemented under USAID Contract Number AID-OAA-TO-13-00019, Evaluation, Research and Communication (ERC) Task Order under the Strengthening Tenure and Resource Rights (STARR) Indefinite Quantity Contract (IQC) No. AID-OAA-I-12-00030.



**FIGURE I. OROMIA REGION OF ETHIOPIA**

LAND represents an innovative approach to working with regional governments and pastoral communities and their customary governance institutions. The program is defined by a pilot formalization process that allows communal land use rights to be demarcated, recognized, and certified. It will be implemented in Ethiopia's Oromia Region—highlighted in Figure I—in the Guji and Borana pastoral zones<sup>10</sup>.

LAND aims to establish a locally appropriate model to legally recognize and protect the land and resource use rights of pastoral communities and recognize and strengthen their customary land governance institutions. By accomplishing these objectives, the project will result in more secure tenure for pastoral communities—without undermining the mobility and reciprocal access regulations that support pastoral production. Ultimately, it should also lead to reduced incidence of conflict and uncompensated expropriation, improved natural resource management, and improved economic growth.

An impact evaluation will be conducted of interventions that fall under Component 4 of LAND. These project interventions include formal recognition of customary land use rights, improving communal land

<sup>10</sup> The project plans to expand into Afar and Somali regions in coming years.

governance, as well as strengthening pastoral communities' capacity for land use planning and management and investment negotiations.

Funded jointly by USAID/Ethiopia and USAID's Land Office, the impact evaluation of LAND's Component 4 is part of a growing portfolio of land tenure and property rights (LTPR) research that seeks to build the global knowledge base on the impacts of land tenure security interventions, including formal recognition of customary land rights. The impact evaluation research strategy has been designed to identify effects of the new formalization approach on pastoral communities and households, including the program's effect on livelihoods, resilience, and conflict, with a particular focus on differential impacts on women, agro-pastoralists, youth and resource-constrained households.

## EVALUATION QUESTIONS

The overarching policy question that the evaluation of LAND's Component 4 addresses is:

**To what extent does empowering pastoral communities with stronger land use rights, improved land governance institutions, increased negotiation capacity, and better land use planning result in increased local investment in rangeland and water resources, as well as equitable economic growth?**

Based on the overarching policy question, a number of research objectives have been developed to focus the evaluation activities. Specifically, the evaluation will investigate the extent to which the package of interventions implemented under Component 4 generate the following outcomes and impacts:

1. Reduced incidence of community land expropriation without adequate consultation and fair and timely compensation;
2. Increased number of mutually beneficial contracts between communities and private sector investors;
3. Increased transparency, accountability, and representativeness of customary land governance institutions;
4. Improved land use planning and sustainable land management of communal lands;
5. Increased adoption of new or more sustainable economic (livelihood) strategies;
6. Increased or improved household/community assets, consumption, and/or investment;
7. Reduced incidence of unauthorized users encroaching on community land; and
8. Enhanced livelihood and welfare outcomes for minority or vulnerable groups, including women, the poor, agro-pastoralists, and youth within the targeted communities.

These eight evaluation objectives form the basis for a series of testable development hypotheses and indicators on the impact of LAND, as well as for measuring the magnitude of that impact. Given the rare occurrence of several outcomes, as well as the community level occurrence of several indicators, the evaluation will be underpowered to rigorously assess LAND's impact for several outcomes, including 1, 2, and 7. The study will provide a qualitative assessment for any indicators that cannot be evaluated using quantitative methods<sup>11</sup>.

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<sup>11</sup> We note that the evaluation is primarily designed to assess household-level outcomes and highlight that research questions 3,4 and 7 focus on community-level outcomes, which the evaluation aims to pursue primarily through a qualitative approach which draws on a rich, community level qualitative data collection effort per USAID's interest. Quantitative analyses of these outcomes will also be conducted, working from aggregations of household-level quantitative data, although the evaluation team highlights that such assessments will be somewhat more limited due to lower study power to detect outcomes at this level.



Prior to the rollout of project activities, the baseline data collection was carried out in the communities targeted by the project in the Guji and Borana pastoral zones of Oromia region. This data collection effort sought to gather information on baseline conditions for the key outcomes of interest and on other important contextual factors that might interact with project activities. Primary outcomes of interest include land use rights, resource governance, land use, rangeland quality, incomes, investments, conflict, and conflict resolution.

To understand the context and development challenge of recognizing customary land rights of pastoral communities and improved communal land governance, this report presents the baseline findings for customary land and resource management, land assets, rangeland access, mobility, and land loss. The data used in the analysis includes population-based household survey data collected from 3,838 households in 200 communities in the Guji and Borana pastoral zones in September and October, 2014 and information from a series of 36 Focus Group Discussions (FGD) and 69 Key Informant Interviews (KII) collected from 46 different *kebele* (clusters of villages). Key informants included customary leaders, such as *Aba Dheeda* ('a leader of a large grazing unit') (7), *Aba Reera* (38) ('a leader of a sub-*dheeda* grazing unit'), *Aba Eela* (20) ('leader or owner of a water point'), and *Aba Herrega* (4) ('water scheduler at a water point'). Data was collected from 10 women-only focus groups, 16 agro-pastoralist groups (mainly composed of men), and 9 local groups (defined as groups of resource-constrained/vulnerable households that included the poor, youth and widow/female-headed households).

This baseline survey analysis has three objectives: 1) to improve our understanding of the context in the evaluation area; 2) to provide baseline estimates of key indicators and outcomes under investigation; (this will provide a benchmark for evaluating the eventual impacts of the LAND project); and, 3) to explore baseline differences across the impact evaluation (IE) comparison (intervention) groups that will be used to measure the LAND project's impact.

## 2.0 PROJECT BACKGROUND

LAND is working in the Guji and Borana pastoral zones of Ethiopia's Oromia region. This section provides a broad overview of the development challenges that LAND seeks to address. Also, since LAND is working with customary governance structures and community leaders, this section also provides background on Guji and Borana customary institutions and territorial organization.

### COUNTRY CONTEXT

As in other pastoral areas of Africa, pastoralists in the Borana and Guji areas face cycles of drought, rangeland degradation, de-stocking of animals, rangeland recovery, and restocking of animals followed by a new cycle of drought and recovery. The ability to move livestock to different pastures is a key strategy for enhancing productivity and mitigating exposure to erratic rainfall, and reliable access to a wide range of pasture resources has long been essential to the viability and sustainability of such systems. In addition, various types of common-tenure regimes facilitate herd mobility (McCarthy et al. 2004). Pastoralists' traditional migratory lifestyle and knowledge of dryland resource management has allowed them to generally withstand drought and to maintain a healthy and biodiverse ecosystem in their communally-managed rangelands (Elias & Abdi 2010).

In the past, pastoralists had access to vast tracts of rangeland that were managed through customary institutions at different levels and for different resources. Resources were managed as common property with access derived in the first instance through being a member “of the group” (Cousins 2007). The sound management of rangelands was, and in some cases still is, promoted through norms of inclusion (and to a lesser extent exclusion) designed for pastoral activity. In Borana, these norms are called *seera marraa bisanii*—“the law of grass and water.” Social capital, explained using lineage as a proxy, plays a crucial role in facilitating the establishment of and negotiation for non-exclusive forms of rights to grazing resources. Increased threat from climate change (rainfall variability) and the absence of insurance for the livestock increase incentives to sustain inter-clan cooperation over the sharing of the grazing commons (Beyene 2010).

Once viewed as the epitome of sustainable pastoralism, the Guji-Borana pastoral zones are now confronted by numerous challenges. Fundamental misconceptions about the pastoral production system in Ethiopia (as in many other countries in Africa) have led to a general perception among policy makers that pastoral lands are underused and therefore should be developed. Such misperceptions—as well as power dynamics that allow for exploitation of pastoralists' lands—have led to the political and economic marginalization of pastoral communities. Policies favoring externally imposed development schemes have contributed to the loss of pastoral lands in favor of large-scale commercial activities (Behnke and Kerven 2012). As noted, pastoral and agro-pastoral production systems rely on mobility in shared rangelands to manage spatial and temporal variability in water and pasture availability (Elias & Abdi 2010).<sup>12</sup> Resource

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<sup>12</sup> For example, herds may be split during the year, with some of the herd, usually bulls and immature stock, being sent to distant extensive grazing areas away from settled zones, while other animals, such as milking cattle with their calves and small stock, remain in the area around the main resident settlement (Homewood 2008).

alienation and the curtailment of mobility have contributed to increased vulnerability for pastoral households (Elias & Abdi 2010).

## GUJI-BORANA CUSTOMARY INSTITUTIONS AND TERRITORIAL ORGANIZATION

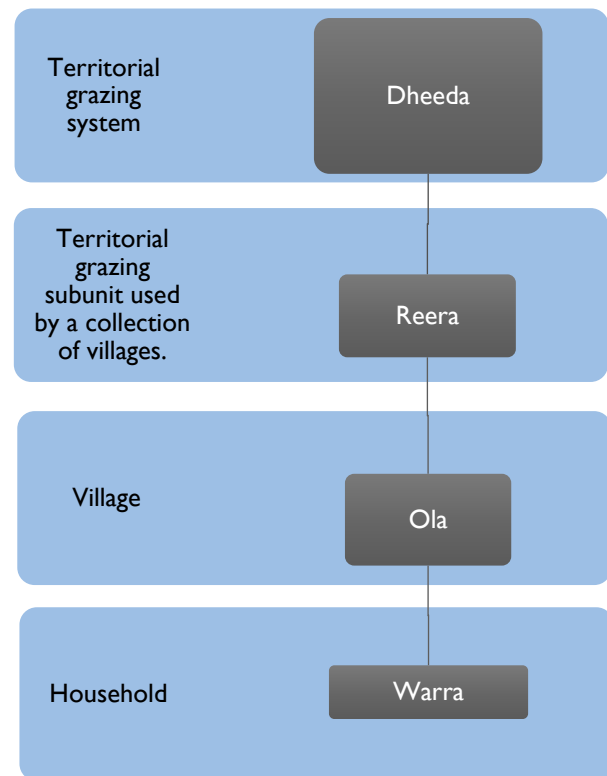
Over the past five centuries, complex mechanisms have evolved to manage grazing systems and resolve conflicts within the Guji-Borana society (Legesse 1973). Three principal and one subsidiary institution represent the building blocks of the indigenous political system. These institutions are the generational system (*Gada*, “the rulers”), the kinship organization (*Qallu*, “the electors and ritual leaders”), the supreme authority (*Gumi*, “the general assembly”), and the age organization (*Hariyya*, “the warriors”) (Legesse 2000). This indigenous political system has effectively regulated human population growth, settled disputes, interpreted and enforced resource use rules, and redistributed wealth. The regulation of population movement is of special importance to the Borana as an ecological adaptation to a finite resource base (Helland 1980).

As shown in Figure 2, the smallest unit of land and livestock management in the Borana grazing system is the *ola*.<sup>13</sup> An *ola* is a collection of multiple households (*warra*) that represents a sometimes seasonal home camp or settlement.<sup>14</sup>

These household clusters are led by an *ola* leader. The *ola* leaders make independent decisions on herd management and share access to resources, such as water and fuel wood.

A *reera* represents the next level of grazing system governance. *Reera* are sub-units of grazing systems (*dheeda*) and comprise multiple *ola*. *Reeras* are managed by an *aba reera*; ‘*aba*’ refers to the father of the system or structure. The *reera* is the smallest land management unit or “community” for the LAND project and evaluation. Figure 2 presents a graphical representation of the Guji-Borana customary territorial structure.

The next level up is a rangeland system known as a *dheeda*. *Dheeda* contain multiple *reera* and are central to the management of the Borana ethnic grazing system. There are six Borana rangeland or *dheeda* systems that will be the target of the LAND intervention, including Dida, Woyama, Dire, Malbe, Gomole and Golbo.



**FIGURE 2. GUJI-BORANA CUSTOMARY TERRITORIAL STRUCTURE (HOGG 1990)**

<sup>13</sup> A *minh* is a house or dwelling. A *warra* is the household.

<sup>14</sup> An *ola* is a household if it stands alone but can represent multiple household management units. It roughly corresponds to a camp or village unless it is located near a large town.

The degree to which *dheeda* or *reera* are understood by users as well defined spatial units is a matter of some debate. Hogg (1990) defines *madda* as a land unit corresponding to a permanent water point and composed of *dheeda* (common grazing areas) around this water point. He notes “the boundaries of the *madda* are well known, but have little significance except in times of crisis. It is at these times that herdowners who come from outside may, unless they show good reason, be denied access to *madda* wells” (p.8). Schlee, however, writing of the larger *Worr Libin* group states “...they did not have boundaries delineating surface areas. Even the words for ‘boundary’ in the local languages are loanwords from other languages...” (2009, p.4). This relates to a finding of an earlier study reported by Schlee (1990) where he tried to construct a map with a Rendille pastoralist in neighboring northern Kenya, ultimately abandoning the quest to draw boundary lines as he was informed that the only border line was ‘one of fear’ (1990, p 24) as one became more distant from a point that was clearly defined as being in land controlled by the Rendille, such as a well or ritual site.

The *gada* system represents the overarching governance institution; it is the elected council of the Borana. *Gada* is both an age-grade system and a political and judicial system that oversees laws, customs, and practices in Oromo culture (Legesse 1973). Today, *Gada* has very limited power compared to government institutions, but it still has notable ritual significance. The *Gada* council's role in resource management and administration is in establishing rules that govern resource access. The *Gada* council makes decisions at a higher level on local resource use and determines the management of grazing and water resources<sup>15</sup> (Ayana 2007). Changes are introduced based on a customary knowledge system and disseminated to the public through clan representatives. All clans have *hayyu*, legal experts who translate customary laws and regulations and settle disputes.

### SHALLOW AND DEEP WELL COMPLEXES IN THE GUJI-BORANA ZONE

The Borana and Guji pastoral and agro-pastoral systems use of remote grazing areas during dry seasons is mainly dependent on having access to clan-based wells, shown in Figure 3 (Hogg 1990, Coppock 1994). There are 8 permanent well groups, known as *tullas*, in Borana (see Figure 3), and there are numerous other wells outside the *tulla* well complexes. *Tullas* are a complex of deep wells that do not dry up even during times of harsh drought. They are located mostly in Dirre *woreda* (district) in the Dubuluk and Melbana areas. The traditional *tulla* wells are: El Gof, Ley, Melbana, Web, Gayo, Daas, Erder, and Gorille.



**FIGURE 3. DEEP WELL COMPLEXES IN THE GUJI-BORANA ZONE (MCPEAK, ET AL. 2012)**

<sup>15</sup> Even though the *gada* system is not based on the clan system, the *gada* works closely with clan organization to implement its decisions. For example, clan leaders are represented in all political, legal, and economic deliberations of the *gada* council.

In addition to tullas, there are several other key water points for pastoralists: permanent and non-permanent wells are known as *eela*, and the old ones and other shallow wells known as *adadi*. There are important non-tulla wells that are located on the floor of major craters in the area that also provide a permanent source of water in the dry season. However, the tulla deep wells have different rules of access and ownership from other water sources.

Tiki et al. (2011) report that the rangelands associated with the deep well complexes comprise less than 25% of the total grazing area in southern Ethiopia; yet, during dry seasons they support over a million head of livestock, which they estimate to be over half of the total owned by Borana. Generally, Borana cattle need to be within 25-30 km of a water source to allow watering on an every two or three-day schedule during the dry season. During the wet season, surface water is available, including from two perennial rivers (Dawa and Genale) that traverse the borders of the region, but in the dry season the main sources of water are shallow or deep wells.

Theoretically, access to deep wells is open to all groups in the Guji-Borana Zone, although the wells are under the control and management of particular clans.<sup>16</sup> Use of these wells is not restricted to members of a certain clan, and all individuals who use the wells (clan and non-clan members) must provide labor or cash to hire labor for maintaining the wells. In some cases, non-clan members may be limited to watering their herds after clan members have used it, raising the spectre that water might be limited by the time the well is used and stressing the importance of the role played by *Aba Herrega*, the one who determines the watering order. No Borana, regardless of clan affiliation, will be denied the right to water his/her animals at a Borana well. Because clans are not localized, but are dispersed across the entire region, herders can be confident that even outside their main grazing range, they are likely to find wells under the control of their clan. Any discussion of use and rights to rangelands cannot be separated from rights to water, especially in the drier parts of southern Ethiopia. Without access to a water point for the individual's animals, a herder cannot utilize the surrounding pastures (Hogg, 1990).

*Aba herregas* ('father of the well') play a key role in supervising access to tullas, mobilizing users for *naniga* (watering trough) maintenance, and building fences around water sources. In general, seniority is a significant criterion for determining access to deep wells, although it has increasingly declined in importance. For other water sources, access is based on who watered first in the previous watering order, the distance they traveled, etc. For non-permanent wells, the *aba eela* is responsible for the upkeep of the well and the watering troughs. Both the *aba herrega* and the *aba eela* are determined by descent from the person associated with the initial construction of the well (McPeak et al. 2012).

Around most of the tulla well complexes, there now are human settlements—in some cases quite large—and cultivation in areas that customarily were restricted for use as dry-season grazing. In addition, in southern Ethiopia, there has been a recent growth of enclosed grazing areas called *kalos*, some of it clearly stimulated by Non-Governmental Organizations (NGOs) and other development interventions that have encouraged their establishment. The main focus of the NGO/development work on *kalos* in Borana was to improve availability and quality of pastures through bush clearing and enclosing pastures (feed) for grazing in the dry season (or other periods of shortage). NGOs helped to reestablish some community *kalos*, which had been overtaken by bush species and to repair/reestablish their fences. Traditionally, *kalos* were used to manage pregnant, ill, or lactating animals, but today they increasingly are incorporated into seasonal grazing patterns, where large communal 'kalos' (100 ha+) are

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<sup>16</sup> The tullas and *eela* do not correspond to a *reera*, and it is difficult to know how many *reeras* actually use each well; multiple *reeras* might use one well when water is scarce.

being reserved for dry season use for all kinds of cattle rather than just the vulnerable, and this has been promoted both by NGOs and local government officials. As discussed above, wells are vital to dry-season livestock production, and the encroachment of farming (even by former pastoralists) into relatively water-abundant areas could undermine livestock access to seasonal grazing resources.

## PROJECT BACKGROUND<sup>17</sup>

USAID has invested significant resources in the development of livestock and rangeland improvement projects in the rangelands of Ethiopia, including through the Pastoral Livelihoods Initiative I (PLI I) and Pastoral Livelihoods Initiative II (PLI II) projects and the most recently awarded Pastoralist Areas Resilience Improvement and Market Expansion (PRIME) project. These projects have provided an important basis for the present formalization of pastoralist land use rights under the LAND project. This foundation consists of:

- Participatory grazing unit definition based on customary institutions and practices;
- Identification of spatial-temporal land use patterns in the Guji-Borana zones;
- Identification of customary land and natural resource tenure among Guji and Borana ethnic groups;
- Participatory grazing unit boundary identification within Guji and Borana areas.

These significant investments, however, have not resulted in the scope and scale of results sought by USAID's efforts to develop livestock production and improve rangeland conditions. The lack of results are attributed—in part—to the absence of legal recognition for communal land use rights, as well as low capacity for effective land use planning and range management (USAID 2012).

LAND is a five-year intervention (2013-2018) designed to build upon the success of PLI I, PLI II, and PRIME. It seeks to improve the security of pastoral land use rights to promote investment and development among pastoralists and reduce inappropriate expropriations. Based on Ethiopian constitutional provisions, and a regional government commitment to recognize pastoralist land use rights, the LAND project is undertaking a focused land rights formalization process in concert with the USAID PRIME Project, which will focus, among other activities, on improving rangeland management.

## MOTIVATION

Past efforts to formalize land rights on a communal or group basis have had very mixed results, particularly in pastoral areas.<sup>18</sup> The consensus on the impacts of early interventions in pastoral rangelands is that they often failed to result in the improved range quality anticipated; negatively impacted pastoralists' access to pasture; and led to elite capture (Bruce et al. 2013). A primary criticism of the designs of these interventions is that they focused too narrowly on the "grazing commons, to the neglect of other resources that migration had allowed pastoralists to access on a more temporary basis, and...the still larger network of resources and relationships around those resources that facilitated

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17 From the Draft Component 4 Action Plan prepared by Tetra Tech / LAND – March 2014

18 For example, most empirical evidence on the group ranches in the pastoral areas of Kenya indicates this intervention has done little to protect the land rights of pastoral communities and to minimize unfair transfers of their lands to outside investors and other groups (Galaty 2012; Little 2014). Likewise, in Mexico, ejidos were created by agrarian reforms following the country's revolution to redistribute land to formerly landless peasants. While ejidos have generally been upheld as an example of enlightened common property governance in rural farming areas (Gordillo 2010), there is evidence that the 1992 reform permitting privatization of ejidal land has in some cases resulted in the transfer of lands previously used for local cattle grazing to outsiders, some of whom have even been linked to narcotics trafficking (Emanuel 2006). Alternative pastoral tenure interventions focused on private land titling have had even worse environmental, economic, and social equity problems. The Kenya case, in particular, has been marred by corruption and unscrupulous elites who used group land registration to sell off large parcels of land to outsiders with little involvement of most of the community.

resource access” (Bruce et al. 2013, p. 27). Moreover, by introducing exclusive boundaries, often accompanied by fences and other barriers to mobility, these interventions may have, in fact, undermined the very system they (arguably) sought to strengthen (Mwangi and Ostrom 2009).

Scholarship suggests that pastoral tenure and production systems can be an efficient and rational way of managing production risk in rangeland environments, where the availability of key resources, namely forage and water, changes both spatially and temporally in what has been described as a “non-equilibrium model” (Briske, et al. 2003; Illius & O’Connor 1999). Likewise, recent rangeland policy guidance highlights the importance of avoiding fencing and the subdivision of land to the achievement of both livelihood and rangeland conservation outcomes (e.g., Silvestri et al. 2012). Still, the flexible and variable nature of pastoral production and tenure systems appears to contradict Ostrom’s (1990) framework for effective “common property” management, in particular the apparent lack of exclusivity and rights to alienate land. Pastoralists’ historic dependence on and control of rather limited key resource points, such as wells and pastures, as opposed to larger, more comprehensive territories, as well as the shifting historical patterns of control, access, and use resulting from continual renegotiation among clans or groups, also complicate the formal recognition of pastoral land and resource rights.

In light of these trends, officially recognizing pastoral land rights remains an important (if complicated) policy option that is expected to reduce the risk of pastoralists continuing to lose access to land by providing some degree of formal legal protection and procedural guarantees to communities. In cases where legal expropriation does occur, assuming court systems are accessible and equitable, formal land rights should also provide communities with a means to seek redress and fair compensation. Moreover, advances in the understanding of both pastoral tenure and production systems and the increasing availability of relatively low-cost high resolution spatial imagery could provide the basis for a new model of pastoral rights recognition that upholds the integral characteristics of mobility, flexibility, and reciprocal (rather than strictly exclusive) access to key forage and water resources.

Pastoral production systems in many contexts have been shown to rely on customary tenure systems that provide for flexible (but customarily regulated) access to key land and water resources (McCarthy et al. 2004). Furthermore, recent innovative geospatial research in Mali (Brottem et al. 2014) and Senegal (Kitchell et al. 2014) in West Africa and Kenya and Tanzania (Rowley 2013) in East Africa suggests that mapping key pastoral forage and water resource points and the corridors between them can be a powerful strategy for documenting pastoral claims to land and resources.

Learning from previous successes and failures, LAND will implement an innovative and flexible approach to securing pastoral tenure that integrates mapping, formalization and working through customary systems. In particular, LAND emphasizes the demarcation and official certification of entire grazing units as they are customarily governed, in addition to the recognition and strengthening of the customary land governance institutions that manage access to and use of pastoral land and resources. The project aims to strengthen tenure security for pastoral communities—without undermining the mobility and reciprocal access regulations that support pastoral production—and ultimately promote reduced incidence of conflict and uncompensated expropriation, improved natural resource management, and improved livelihoods and economic growth.



## LAND COMPONENT 4: INTERVENTIONS

Component 4 activities will be implemented across pastoral systems in Oromia, Afar, and Somali Regional States. However, the focus of this impact evaluation is initially on Component 4 activities to be implemented on a pilot basis in six Borana rangeland systems in Oromia Regional State.<sup>19</sup> Several key intervention activities are pending government approval at the time of writing.

LAND will work with Borana pastoral communities in pilot locations to establish community organizations and strengthen customary institutions to serve as a community landholding and governance entity (CLGE) in which certified community land use rights will vest. The CLGE will represent the community before the government in dealings with investors and will ensure the benefits of LAND are equitably shared among all members of the community, including women and vulnerable groups, such as those transitioning out of pastoralism.

LAND is being implemented in close coordination with PRIME, and the IE is designed to study essentially the joint impacts of the two projects. PRIME is a 5-year, USAID-funded project designed to increase household incomes and enhance resilience to climate change in Ethiopia's dryland areas. Implemented by Mercy Corps Ethiopia<sup>20</sup>, PRIME utilizes a participatory rangeland management (PRM) approach to improve the management of rangeland resources and secure access for local rangeland users. Through PRIME's participatory grazing system resource mapping and boundary demarcation activities, PRIME has succeeded in digitizing maps that illustrate the complexity of rangeland management systems practiced by the Borana and Guji pastoralists and establish the boundaries of nine grazing units (dheedas). LAND is basing its demarcation activities on communal land boundary maps produced by PRIME (USAID 2014).

Component 4 has six consecutive, often parallel tracks (activity clusters). These are:

- **Project Governance**—capacity building within the pastoral communities and coordination among the different players in securing pastoral land tenure. The main focus is on the dheeda rangeland and reera sub-units;
- **Oromia Rangeland Management Systems Description, Validation, and Institutionalization**—the confirmation of PRIME-based grazing system resource and boundary maps for six grazing units within the Borana/Guji zones of Oromia Region, and the institutionalization of these databases within a Knowledge Management System;
- **Demarcation, Surveying, Registration, and Certification**—these activities apply to dheeda grazing units once confirmed with Borana and Guji customary institutions and government authorities;<sup>21</sup>
- **Development of an Oromia Region Pastoralist Land Rights Regulation**—this is expected to acknowledge the dheeda systems as the basis for the formalization of land use rights.<sup>22</sup>
- **Land Use Planning and Governance Strengthening Efforts**—this applies to dheeda grazing systems and reera.
- **Targeted Communications**—public information and awareness activities.

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<sup>19</sup> This description is based on the latest information available as of the time of writing, and implementation is subject to change.

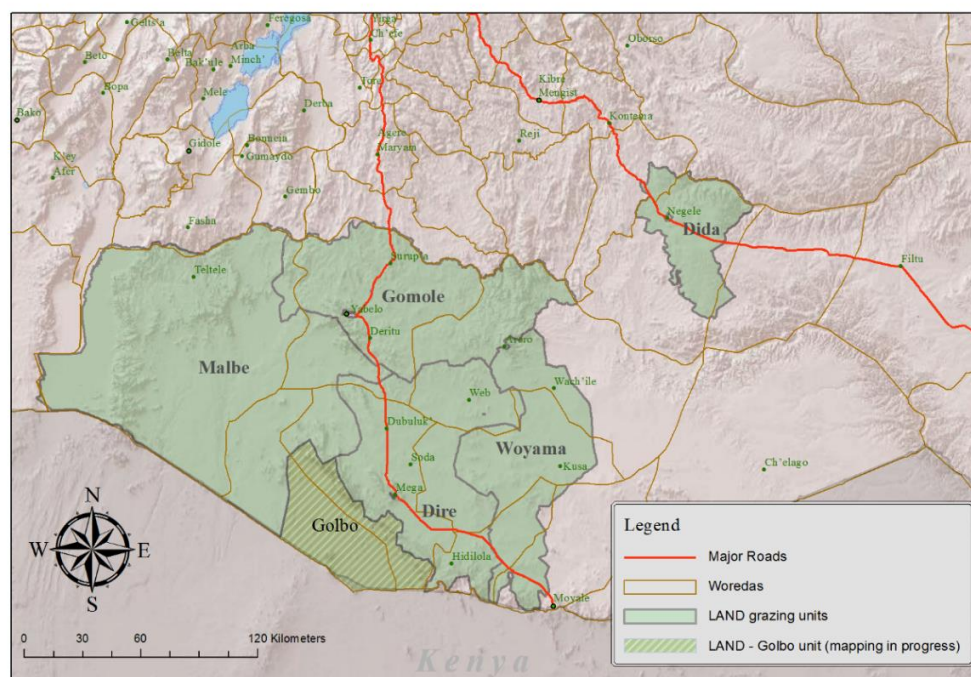
<sup>20</sup> The PRIME project is led by Mercy Corps Ethiopia in partnership with CARE International, Kimetrica, Haramaya University, Pastoralist Concern, the Aged and Children Pastoralists Association, and SOS Sahel Ethiopia.

<sup>21</sup> These plans are still pending government approval as of the time of writing.

<sup>22</sup> Ibid.

Formal recognition of customary land use rights and of customary institutions' authority to manage communal lands is expected to be the most effective mechanism for achieving sustainable, long-term economic growth in Ethiopia's pastoral areas. Nevertheless, there is also a need to strengthen pastoral communities' capacity for land use planning and management, investment negotiations, and to improve communal land governance by enhancing the transparency, accountability, and representativeness of customary land governance institutions. The more informal measures to strengthen land tenure security—including surveying, demarcation and governance strengthening activities—are anticipated to result in improved development outcomes even if formal tenure is not achieved within the lifetime of the LAND.

Pending GoE approval, the six Borana rangeland systems, shown in Figure 4<sup>23</sup>, will be the main focus of land use rights formalization, certification, boundary definition, and registration for LAND. Additional governance strengthening, land use planning, capacity building, and outreach and extension efforts will take place at the reera level within the broader dheeda systems. In particular, the five dheeda treatment sites in Borana Zone include: Woyama, Dire, Malbe, Gomole and Golbo. The LAND intervention site in Guji Zone is Dheeda Dida, which is included because it is characterized primarily by ethnically Borana communities.<sup>24</sup>



**FIGURE 4. LAND INTERVENTION SITES**

23 Sources: The country and regional administrative boundaries are from the Global Administrative Database <http://www.gadm.org/>. The road network is based on information provided by the LAND program team and the Africa Infrastructure Country Diagnostic. The elevation and shaded relief basemap is from ESRI [http://goto.arcgisonline.com/maps/World\\_Shaded\\_Relief](http://goto.arcgisonline.com/maps/World_Shaded_Relief), and grazing unit boundaries were provided by LAND and PRIME program staff.

24 Profiles of these grazing areas covering demographic, cultural, and livelihood characteristics will be provided when the information becomes available from PRIME and LAND.

# 3.0 EVALUATION METHODS & LIMITATIONS

## EVALUATION METHODS

LAND is an innovative program to strengthen land tenure security among pastoralists through a pilot formalization process. The impact evaluation seeks to assess the impact of the new formalization approach on pastoral communities and households, including the program's effect on livelihoods, tenure security, resilience, and reduced conflict. By conducting a baseline study and establishing a set of baseline indicators, we will be in a position to understand the impacts of land certification after 2-3 years of project implementation.

Despite the growing body of work on strengthening individual claims, there remains a dearth of research on the impact of strengthening *communal* tenure in the context of pastoralism. The LAND IE is designed to expand the evidence base (Lawry, et al. 2014). LAND is based on an assumption that the benefits derived from strengthening the customary rights of pastoral groups could under the correct incentive and institutional structures mirror many of the outcomes identified from strengthening individual rights, including increased investment and improved land management.

Following the completion of LAND, the impact evaluation will measure key development impacts of the LAND program in the Guji-Borana pastoral zone of Oromia. In particular, the evaluation seeks to assess the outcomes and impacts of interventions that fall under Component 4 of the LAND project, including formal recognition of customary land use rights, improving communal land governance, as well as strengthening pastoral communities' capacity for land use planning and management and investment negotiations.

Given the mixed impacts of past efforts to formalize pastoral tenure, the evaluation aims to assess the treatment's effect on a series of indicators on land rights, land use, environmental quality, incomes, investments, conflict, and conflict resolution to allow USAID to more rigorously evaluate its development hypothesis.

## CONTROL GROUP

The evaluation employs a Difference-in-Differences (DD) design that compares treatment areas to control areas. As described in the section above, the treatment areas consist of five dheeda treatment sites in Borana Zone and one LAND treatment site in Guji. Using three Guji lowland areas (Figure 5) as a control group for the treatment areas appears to be the most suitable approach for creating a counterfactual. A literature review of Oromia customary land institutions indicates that the Guji and Borana are most similar in terms of their use and adherence to the shared system of Gada customary laws (Jalata 1996), which are different from the customary laws and institutions in other neighboring communities, for example in the Somali or Afar regions. Since a primary objective of the LAND project (and key outcome of interest for this impact evaluation) is to strengthen customary land governance

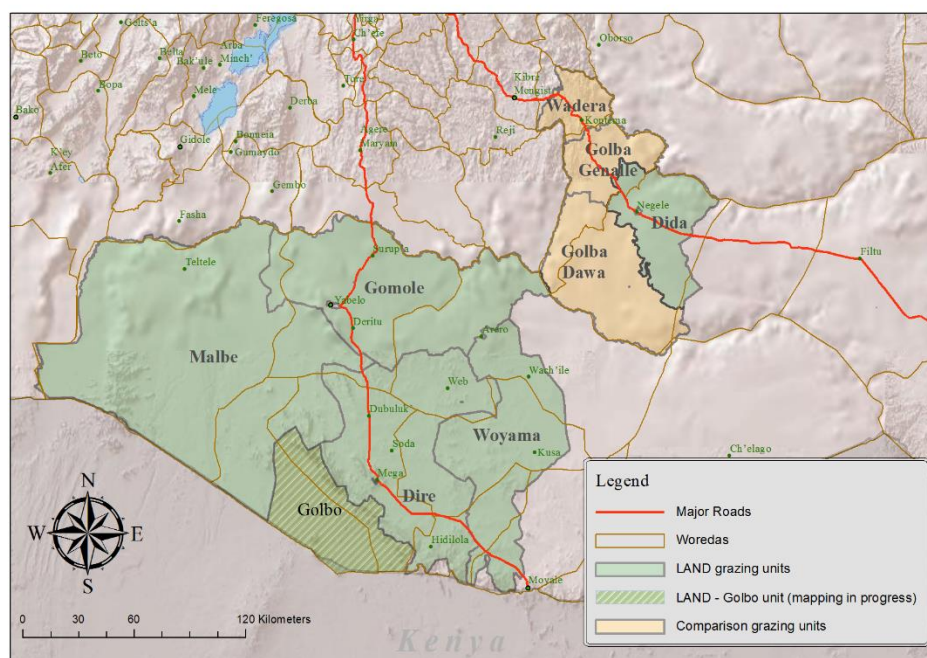
institutions, it is important to find a comparison group whose customary institutions are as similar as possible to those in the Borana Zone. Furthermore, the overlap between PRIME and LAND programming in Borana areas eliminates the use of Bale, Kereyu, or Itu areas (where PRIME is not operating) as controls, because the treatment effects of LAND could not be disentangled from those of PRIME. Since PRIME is working in both ethnic Guji systems and ethnic Borana systems—but LAND is only in ethnic Borana systems—the evaluation’s inferences will be focused on the marginal benefits from LAND programming. This does not enable a “clean” inference about the effect of LAND, because we cannot generalize outside of an intervention package that combines LAND and PRIME; however, it is a better methodological alternative than using the Bale or Itu areas or other neighboring pastoral communities with different customary governance structures.

### LAND IE INTERVENTION AREAS: BORANA RANGELAND SYSTEMS

- Dheeda Dida
- Woyama
- Dire
- Malbe
- Gomole
- Golbo

### LAND IE CONTROL AREAS: GUJI RANGELAND SYSTEMS

- Wadera
- Golba Genalle
- Golba Dawa



**FIGURE 5. LAND IE INTERVENTION AND CONTROL AREAS**

### EVALUATION DESIGN

We briefly note that the LAND intervention package consists of several intervention activities implemented across at least three units of observation: dheeda, reera and ola. At the time of the IE design and baseline data collection, the nature of several of these activities and the priority level for implementation were still under design by program implementers. Given the different potential levels of the intervention activities, and the evolving nature of the program, and particularly that the communal rangeland demarcation and certification process that will occur for each of the 6 overarching rangeland systems is too small an observation N for which rigorous IE methods can be applied, the evaluation focuses on the combined effect of that higher level intervention coupled with land governance and land management extension activities at the Reera (Kebele) level, as well as Ola level activities. In this sense, the evaluation works from a structure akin to a 3-level cluster randomized design, in which the intervention is implemented at the highest level (reera / kebele), but expected to modify outcomes for

units at lower levels (that is, for communities and households within communities). The evaluation measures outcomes at each of these two lower levels (ola and household). Due to sample limitations, the evaluation primarily focuses on and is powered to detect household-level outcomes across a series of land conflict, governance, tenure security, and livelihoods indicators. Further details on the evaluation design are available in the IE design report (Annex 4) and are summarized below.

## DATA SOURCES

The evaluation utilizes four sources of primary data collected at the community and household level to investigate customary land governance, tenure security, rangeland conditions, land use conflict, livelihood outcomes, etc. These data sources include<sup>25</sup>:

1. Household survey data—The survey was stratified to target female-headed and agro-pastoral households. The household survey represents a large-N survey involving approximately 3,800 households.
2. Focus group discussions—The evaluation collected data from focus group discussions with women, agro-pastoralists, and resource-constrained individuals<sup>26</sup>, including youth<sup>27</sup>. This data provides important contextual and perception data on overall rangeland management, governance, and ecological conditions.
3. Key informant interviews with aba gada (council chair for the gada), aba reera (grazing sub-unit managers), aba eela (semi-permanent well managers) and aba herrega (permanent well managers); these interviews provide data on shifting perceptions, attitudes, and outcomes regarding the security, governance, and condition of land and water resources.
4. Participatory mapping at the reera level by active herders, community elders, and ola leaders.

The survey instruments were developed by ERC staff and consultants with significant involvement from USAID's Land Office and input from USAID/Ethiopia and the LAND implementing partner. In line with the USAID Research Policy, the design and instruments were submitted to a rigorous peer review process led by the USAID Land Office that included external recognized subject matter experts, as well as knowledgeable USAID staff and STARR partners.<sup>28</sup> The LAND household survey instrument and selection of sites was informed by the Index Based Livestock Insurance (IBLI) household survey conducted in Oromia. It was decided that the LAND survey would not be administered in those kebeles where IBLI is conducting their research for two reasons. First, for the purposes of the impact evaluation, the study requires sample balance between treatment and control areas. This requires that we focus the treatment sample on agro-pastoralist zones to ensure overlap in important characteristics with the control area. Second, we wanted to avoid overlap and duplication of data collection efforts, as well as respondent fatigue given the length of these instruments. The overall IBLI project is a joint effort of the International Livestock Research Institute (ILRI), Cornell University, Syracuse University, and the University of California-Davis working in Kenya and Ethiopia. An overview of the IBLI-Borana initiative is found here: <https://livestockinsurance.wordpress.com/ibli-southern-ethiopia/>. Sections related to risk and insurance were reduced, the content on land use was elaborated on, and other sections were revised, but many questions are fundamentally asked in the same way as was done by IBLI to enable

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25 Please refer to Annex 2 for the data collection instruments.

26 This was defined on the basis of asset and livestock ownership.

27 Youth were defined as individuals 35 years and younger.

28 Please refer to Annex 3 for the LAND Ethiopia IE external review feedback and evaluation team responses.



comparability across the datasets. Again, please note that IBLI chose kebeles for its study where pastoralism and livestock production generally were very important, which meant that the kebeles for the LAND study tended to be more focused on agro-pastoralism. As supplemental analysis to the evaluation, we will draw on the publicly available IBLI data during the endline analysis to investigate trends in more purely pastoral areas.

The household survey is a structured quantitative instrument that was administered by an electronic data collection effort (also known as computer assisted personal interviewing, or CAPI). The broad objectives of this instrument were to collect data about household livelihoods, mobility, rangeland and farmland access, rangeland quality, disputes, etc. In addition, it was intended to collect basic social, economic, demographic, and related characteristics of the households surveyed. Table I details the different modules included in the household survey.

**TABLE I. HOUSEHOLD SURVEY**

Household information (roster)	Access to grazing land and water
Education and economic roles (household roster)	Access to farmland and land management practices
Livestock holdings	Access to rangeland and rangeland conditions
Livestock born by season	Conflicts and disputes
Livestock intake by season	Livelihoods activities and cash incomes
Livestock offtake by season	Cash, in-kind transfers, and other assistance
Livestock slaughter and loss by season	Nutrition and food consumption
Milk production	Expenditures and assets

The qualitative research, the modules of which are laid out in Table 2, was heavily concentrated in Borana Zone, with 79 percent of key informant interviews and/or focus group discussions conducted in Borana; only 21 percent were completed in Guji Zone. The qualitative instruments serve two primary purposes: 1) to add a social context within which to situate the statistics and 2) to add depth to the overall research and the descriptive IE data.

**TABLE 2. QUALITATIVE INSTRUMENTS (FOCUS GROUP DISCUSSIONS AND KEY INFORMANT INTERVIEWS)**

Rangeland condition and water availability	Women and other vulnerable groups' land use rights
Governance—Rangeland and water	Administration of rangeland and water
Conflict and security	Relationship with external companies and investors
Land allocation	Boundaries and tenure security

The qualitative research purposely sought a more pastoral population due to requests by USAID for more detailed analysis of pastoral grazing areas, thus it sought more interviews in Borana zone than in Guji. The qualitative research covered one additional woreda (Moyale) and several local grazing areas (*reera*) of Borana Zone that were not included in the household survey. Since the research team wanted to match treatment and control areas in the household survey for a difference in differences estimation strategy, it did not make sense to spread out the household survey across areas in one zone that could not be matched by areas in the other zone. However, to ensure that we covered all of the rangeland systems and sub-grazing areas of particular interest to the LAND project, the qualitative work was spread out across the kebeles/*reeras* that were not covered by the household sample.

## **BASELINE DATA COLLECTION**

### **ENUMERATOR TRAINING AND FIELD SCHEDULE**

An Ethiopian firm, the BDS Center for Development, in close cooperation with ERC, collected the baseline data. Enumerator training began with a training of the trainers at the BDS main office in Addis Ababa, led by The Cloudburst Group's ERC Country Coordinator. The field managers, supervisors, and lead qualitative data collectors were trained on the household survey, key informant interviews, focus group discussions, sampling, and electronic data collection. This training lasted five days and included a one-day pilot activity outside of Addis Ababa. The pilot activity provided feedback about the content and length of the questionnaire and allowed investigators to improve the survey instrument and sampling framework prior to enumerator training.

Enumerator training took place over six days: five days in Addis Ababa and one day in Borana. The BDS project manager led the training, with assistance from the field manager and supervisors and support from the ERC Country Coordinator. Training included a field test in Borana. Enumerators were trained on best practices for interviewing, the ethics of research with human subjects, electronic data collection devices, and the household survey instrument in Oromiffa, the language spoken in the Oromiya region. Training contained both lectures, role plays, and group exercises and provided two days for enumerators to practice the survey in small groups, share their questions and advice, and practice using Open Data Kit, the survey platform selected for electronic data collection. The lead qualitative supervisors and the BDS staff simultaneously trained the qualitative staff. The qualitative team was trained in best practices for qualitative interviewing, the ethics of research with human subjects, and the various qualitative survey instruments, including key informant interviews, focus group discussions, and community mapping.

The field team consisted of 5 supervisors, 25 enumerators, and 10 qualitative researchers and was led by the field manager. The ERC project manager worked alongside the team in Borana for the first two weeks of data collection. All enumerators were fluent in English and Oromiffa and had previous surveying experience. The majority of enumerators had at least some post-secondary education, and many had backgrounds in agriculture. Enumerators with experience living or working in the Oromia region were actively recruited.

In line with the requirements for human subjects protection, approval was received from the Clark University Institutional Review Board (IRB) in August 2014. Informed consent was received from each participant after reading a statement about the purpose of the research, the content of the survey, any risks or benefits, and the time commitment. Participants were assured their participation was voluntary and could be withdrawn at any point and their answers would be kept confidential. Participants who agreed to participate in the research gave their consent orally.

Quantitative and qualitative data collection took place between mid-August 2014 and mid-October 2014. The field team consisted of 5 teams of 5 enumerators and 1 supervisor who were each responsible for surveying 1 village (15 households) each day. The teams worked first in the Borana area and then moved to Guji following four weeks of data collection. Data was entered directly onto Android phones and downloaded and formatted into Excel spreadsheets.



## SAMPLE SELECTION

There were four levels of sample selection—reera, kebele, ola, and household.

Given the design of the LAND project, the reera system of grazing system governance represented the focus of community selection for the impact evaluation. Given the structure of the LAND set of interventions as currently outlined by implementers, in which a set of interventions at the dheeda and reera levels are expected to have household and community level impacts, the evaluation of the LAND project can be thought of as akin to a 3-level cluster randomized design, with impacts measured at household and (where possible) community (ola) levels. The structure for the LAND IE's community and household sampling involved (1) sampling kebele from reera (2) sampling ola from kebele (with probability proportionate to size) and (3) selecting a random sample of households (or warra) from within olas. At the household level, the evaluation seeks to explore differential treatment effects for female- vs. male-headed households and agro-pastoral households. The large-N household sample was stratified to provide coverage of these key sub-groups. Focus group discussions were conducted with female-headed households, agro-pastoralists, and poor households, including youth.

In particular, the impact evaluation strategy recognizes that the Borana and Guji ethnic groups have similar characteristics, including similar land use strategies in certain areas<sup>29</sup> (Solomon et al. 2007) and customary governance institutions (Hogg 1990), while the project implementation strategy will only work in the Borana area. Thus, over the planned life of the project, treatment effects will be identified by comparing household-level outcomes in communities in the Borana rangeland system to the outcomes observed in the Guji rangeland systems. It should be noted that recent boundary revisions of Borana and Guji Zones means that there are some Borana communities and customary rangeland systems in Guji Zone (an administrative unit above a *Woreda*/district but below a Region), as well as Guji communities and rangeland systems in Borana Zone.

One of the major objectives of LAND is to facilitate formal recognition and demarcation of customary communal land use rights. A challenge to the implementation of this project is that the formal administrative zones and the rangeland systems targeted by the LAND project do not precisely overlap. LAND is targeting management of well understood, but not always geographically precisely defined, rangeland systems. Households in the impact evaluation sample, which is cartographically identified in Figure 5, are drawn from the following rangeland systems:

- Borana customary rangeland systems (LAND IE intervention areas)
  - Dheeda Dida
  - Wayama
  - Dire
  - Malbe
  - Gomole
  - Golbo
- Guji customary rangeland systems (LAND IE control areas)
  - Wadera
  - Golba Genale
  - Golba Dawa

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<sup>29</sup> Generally, the ecology is different—parts of Borana are considerably drier than Guji and more pastoral. Thus, it is only some areas where land use strategies are similar.

While the primary units of intervention for the LAND program are defined as the grazing unit (*dheeda*) and the sub-grazing unit (*reera*), administratively the area is organized according to a different logic. Ethiopia is divided into 9 regions, with Borana and Guji Zones included in Oromia Regional State (also referred to as Region 4), and both zones border other regions. The lines that divide these regions have recently proven to be a source of conflict. For example, both Borana and Guji Zones share a border with Somali Regional State (Region 5), and there have been occasional conflicts over water and pastures in these border zones (Bassi 2010; Tache and Oba 2009) that were discussed in our qualitative surveys and reflected in our household level data, as will be illustrated below.

Each zone, in turn, is divided into smaller units, called *woreda* (district), and *woreda* are composed of *kebele*. A *kebele* is comprised of a set of villages or settlements. As a sampling issue, a *kebele* is the logical unit of analysis, as it corresponds to a Peasant Association (PA)<sup>30</sup> with a well-defined set of villages and members and is the smallest administrative unit. Population lists for sampling purposes do not exist for the rangeland units of *dheeda* or *reera*, which makes it difficult to utilize them for survey work even though they are the most meaningful grazing units. Importantly, the *dheeda* encompasses both wet and dry season grazing zones and, with the exception of drought years, it meets the grazing and watering needs of local pastoralists. In practice, we selected *woredas* that roughly correspond to the *dheeda*-defined rangeland systems illustrated in Figure 1 and identified *kebeles* within them to define our sampling framework. Using recent studies by the Food Economy Group, we selected paired *kebeles* in Borana and Guji Zones based on the livelihood categories reported as predominant for a given *kebele* to allow an eventual difference in differences approach to be taken with the impact evaluation (Food Economy Group). With the paired *kebeles* in place, we then randomly sampled from the list of households in the villages associated with that PA. The size of the overall household and *ola* sample was determined by conducting Power Calculations to identify a minimal detectable effect size (MDES) for key anticipated household-level outcome variables. The power analyses were calibrated using ICC values and standard deviations drawing on the survey data of the Index Based Livestock Insurance (IBLI) impact assessment repeat survey round that was fielded in early 2014 in the Borana plateau. These power calculations, which necessarily draw on several parameter estimates at the IE design stage, are subsequently updated with actual parameter values calculated from the baseline sample in order to confirm study power and take note of any limitations that may have emerged given the baseline sample (See section 5.0 BALANCE AND POWER ANALYSIS in this report).

As shown in Table 3, which gives an overview of our sampling framework, the survey research was focused on 10 *woreda* (7 Borana and 3 Guji). The largest number of *kebele* and households sampled were in the Guji Zone area. In fact, 45 percent of the total households included in the study are from just one *woreda*, Liben. This is the result of trying to match household observations in the treatment area (Borana) with those in the control (Guji) and having fewer options for matching *kebeles* in Guji given the characteristics of the zone as it transitions from lowland pastoral land use (production) to highland cultivation. This strategy, however, ruled out sampling pastoral communities in the dry areas of Borana, because they could not be matched with similar locations in Guji Zone.

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30 In the pastoral areas the *kebele* or PA often is referred to as a Pastoral Association; they have a population list available and clear boundaries.

**TABLE 3. SAMPLE BY WOREDA**

Woreda	Rangeland System	Kebeles Sampled	Olas Sampled	Household Sampled
<b>Borana Zone</b>				
Arero	Gomolle / Woyama	5	20	342
Dhaas	Woyama/Dirre	4	16	259
Dillo	Malbe/Golbo	1	4	72
Dire	Dirre	1	4	74
Miyo	Dirre / Woyama	1	4	69
Teltelle	Malbe	4	16	317
Yabello	Gomole / Malbe	6	24	440
<b>Guji Zone</b>				
Gorodolo	Golba Dawa / Dida	1	4	81
Liben	Golba Dawa / Dida	23	92	1731
Wadera	Wadera	6	24	453
Total		52	208	3838

Once the kebeles were identified, the survey firm was sent to the region to collect names and population data for each ola in the selected kebeles. The Central Statistics Office in Ethiopia does not collect population data at the level of the ola, and confirming both the population and the ola lists internally assured us our sampling plan was accurate.

After ola information was collected, olas reported to have fewer than 20 households were eliminated from the list. Out of the remaining olas, four were chosen from each kebele using Probability Proportional to Size sampling.

From each ola, households were stratified by female-headed and agro-pastoralist households. Stratification was followed by the selection of twenty randomly sampled households. The data collection supervisors in each village completed household sampling on the day the village was surveyed.

For the overwhelming majority of surveys (95%, 3,653), the respondent was the head of household or the spouse of the household head. In the remaining cases, surveys were almost always administered to a relative of the household head or a relative of the spouse of the household head.<sup>31</sup>

In the final sample, women headed 20% (770) of households, as shown in Table 4. Treatment sites generally have a higher incidence of female-headed households than control sites. Women headed 23% (509) of surveyed households in the treatment group, but only 16% of households surveyed in the control area are female-headed. The higher incidence of female-headed households among the treatment group could reflect lower incidences of remarriage after widowhood in predominately Borana areas. Where polygamy is practiced, Borana wives tend to be considerably younger than husbands and more likely to experience widowhood during their lifetime. Because of complications related to rights to children, inheritance, and repayment of bride wealth, widows with children are more likely to be supported by the deceased husband's brothers or other family members rather than remarry unless the original marriage produced no children (Bassi 2005). Female-headed households are also much more likely than male-headed households to be poor, which is defined through an asset, land holding, and

31 It was rare to have multiple respondents or have different respondents for different modules.

livestock index. Slightly more than half of female-headed households are in the lowest quartile of earnings and assets, but only 19% (569) of male-headed households are similarly resource constrained.<sup>32</sup>

**TABLE 4. HOUSEHOLDS SAMPLED BY GENDER OF HOUSEHOLD HEAD**

Head of Household	Percentage
Male	80% (N=3,059)
Female	20% (N=770)
Total N	3829

## DATA QUALITY CONTROL

The LAND baseline data collection effort utilized the following quality control measures: audits, spot-checks by supervisors, site visits by field managers, and weekly back checks by ERC staff. In the field, 15% of surveys were audited by auditors hired and trained by the survey firm. Auditors administered one of three 20 minute audit surveys to households. Auditors were provided with the original enumerator answers to assist with probing in case of a mismatched answer, but not the name of the enumerator being audited. Each enumerator was audited a minimum of three times each week, and auditors were instructed not to discuss the content of the audit questionnaire or which villages or households they interviewed during the survey. Each audit question was given a point value for each type of error, and points were tallied at the end of each audit and errors discussed one-on-one with the auditor and the enumerator once a week.

Each enumerator was spot-checked by their supervisor a minimum of five times each week, and one of those times a supervisor was present for the entire interview. Spot-checks have an accompanying checklist through which supervisors score the enumerator from 1-5 on their surveying technique, including the informed consent process, probing ability, and relationship with respondent. The checklist was designed by Cloudburst, and the scores could be used for incentive or reprimanding as the firm saw fit. In addition to supervisor checks, the field manager randomly visited each team at a survey site once a week to observe the enumerators and supervisors and confirm compliance to survey methodology. Feedback from the field manager and supervisors were continuously used to improve enumerator performance and discourage data falsification.

Finally, the most thorough checks were back checks conducted by the ERC Country Coordinator. These checks were conducted on 100% of all household surveys using STATA, and results were compiled and shared with the survey firm daily for the first two weeks, then weekly in the remaining weeks. The back checks compared survey responses by enumerator to search for patterns indicating data falsification or systematic errors that should be corrected, including short survey times, missing responses, a low average number of “other, specify” responses or multiple selections, or a low average number of rows completed on each roster.

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<sup>32</sup> Poor and resource constrained are used interchangeably in the Baseline report.

## CHALLENGES ENCOUNTERED

Data collection progressed without any major disruptions to the sampling. However, small ola populations, ola inaccessibility, and conflicts in the survey area did require some kebeles and olas to be dropped from the sample and replaced.

### SURVEY AREA INACCESSIBLE DUE TO CONFLICTS

Chari Liche and Cheri Turura kebeles in the Mio woreda in Borana were unsafe for survey teams to enter due to security problems around the Kenyan border. Two additional kebeles were sampled from Guji to replace them. The replacement kebeles were Kobadi and Hadesa, both in the Liben woreda. This resulted in a final sample of 23 kebeles in Borana and 27 kebeles in Guji.

### OLAS UNREACHABLE DUE TO RAIN AND ROUGH TERRAIN

Two olas in Guji were unreachable due to heavy seasonal rains and impassable roads. In each case, olas were re-randomized to select a replacement. In Boba kebele, Jalite Boba was replaced by Wabitore. In Siminto kebele, Dhibe Adama was replaced by Kencho.

### SMALL OLAS DID NOT HAVE 20 HOUSEHOLDS TO SURVEY

Despite collecting information about population size in advance, 10 olas had fewer households than the 20 households expected. To compensate for the smaller olas, 8 large olas in Guji were oversampled, and as many as 47 households were interviewed from each ola.

### USING NGOS TO HELP LOCATE KEY INFORMANTS

Some key informants, particularly the Aba Eelas (head or “father” of a well), were difficult for the survey firm to locate. Local offices of the NGO Mercy Corps (the PRIME implementing partner) were approached for assistance, and they provided BDS with both locations and introductions to these important customary leaders.

## 4.0 FINDINGS

This section provides a descriptive overview of the baseline sample and focuses on summarizing key quantitative and integrated qualitative information from the sample across each of the key focal areas of the survey instruments and evaluation topics: Basic household demographic information; Livelihoods strategies, economic activity and income; Rangeland governance; Pastoral livelihoods; Farmland use, investment and governance; and Rangeland conditions. The intent of this section is to describe the existing context of the study area, communities, and households and present a basic descriptive summary of the sample data, which highlights key trends and points to key baseline differences, where they exist, across subgroups or dis-aggregations of interest. From an evaluation standpoint, such information is used to inform future in-depth analyses to guide eventual analytic decisions around the use of key covariates and approaches to mitigating the influence of potential selection biases and confounding factors for endline analyses.

### SAMPLE CHARACTERISTICS

From the household survey, we calculated some basic information on the treatment and control households that are reported in Table 5.

**TABLE 5. BASIC HOUSEHOLD CHARACTERISTICS**

	Household Sample		Average Household Size		Average Age of Household Head		Settled in the Past 20 Years?	
	#	%	Mean	$\sigma$	Mean	$\sigma$	#	%
Treatment	2178	57%	5.62	2.37	45.75	17.61	371	18%
Control	1651	43%	5.79	2.62	42.76	16.83	186	11%
Total	3829	100%	5.7	2.48	44.45	17.33	557	15%

$\sigma$  = standard deviation

### HOUSEHOLD CHARACTERISTICS <sup>33,34</sup>

Table 6 shows the basic household characteristics disaggregated by subgroups. The majority of households identify as fully settled (93%, 3,568), meaning that the whole of the household (all members, including head) is permanently settled, but this does not mean that they still do not utilize mobile herd camps to seasonally move livestock (see later section on the use of remote grazing camps [*foora*]). This self-reporting may also be strategic, because it is widely known in the pastoral communities that the government's eventual objective is to settle them, so they may be preemptively or strategically identifying themselves as settled. Poor households are fully settled at a significantly higher rate than non-

33 Exploratory statistical tests were used to test the independence of sub-groups for various indicators. T-tests were used for interval data, Chi-square tests for categorical data and Wilcoxon-Mann or Kruskal Wallis for ordinal data, depending on the number of levels in the sub-groups.

34 More information from each table can be found in Annex I.

poor households ( $F=8.31$ ,  $p=0.02$ ), likely because they herd and own fewer livestock, and there are no significant differences among the other sub-groups.

**TABLE 6. HOUSEHOLD CHARACTERISTICS**

Characteristics	All	Gender of Household Head		Age of Household Head		Control or Treatment Area		SES <sup>a</sup> of Household Head	
		Male	Female	Non-Youth	Youth	Control	Treatment	Other	Poor
Head of household age (years)	44 ( $\sigma=17$ )	42 ( $\sigma=16$ )	52 ( $\sigma=18$ )	54 ( $\sigma=14$ )	28 ( $\sigma=5$ )	43 ( $\sigma=17$ )	46 ( $\sigma=18$ )	44 ( $\sigma=16$ )	45 ( $\sigma=20$ )
No education	68%	68%	69%	68%	66%	62%	72%	67%	73%
% Literate	28% (4,647)	28% (3,883)	26% (764)	27% (3,416)	30% (1,231)	34% (2,422)	23% (2,225)	29% (3,910)	22% (737)
% Monogamously married—head of household	63% (2,320)	80% (2,314)	1% (6)	53% (1,191)	81% (1,129)	65% (1,037)	62% (1,283)	68% (1,889)	48% (431)
% Polygamous married—head of household	14% (516)	18% (516)	0% (0)	19% (436)	6% (81)	17% (265)	12% (252)	17% (458)	7% (59)
Average # household members	6 ( $\sigma=2$ )	6 ( $\sigma=2$ )	5 ( $\sigma=2$ )	6 ( $\sigma=3$ )	5 ( $\sigma=2$ )	6 ( $\sigma=3$ )	6 ( $\sigma=2$ )	6 ( $\sigma=2$ )	5 ( $\sigma=2$ )

$\sigma$  = standard deviation; <sup>a</sup> = socio-economic status

The main language spoken in 96% of households (3,662), Oromiffa is the dominant language in the area. Other languages spoken in the home include Konso (2%, 82), Somali (2%, 67), and Amharic (0.3%, 12).<sup>35</sup> Respondents belong to three main religious faiths. The largest group—44% of households (1,693)—is Muslim, followed by Wakefena (customary religion) (29%, 1,097) and Protestant, Orthodox, or other Christian (23%, 885). The treatment area has far fewer Muslim households (28%, 601) than the control area (66%, 1,092) and far more Wakefena households (44%, 953) than the control area (9% 144).

Households, defined as discrete units that live and eat together from the same pot, have an average size of 5.7 members ( $\sigma=2.48$ ). For the most part, household size in the Guji sites is slightly larger than average household size in the Borana sites, a pattern that reflects the more sedentary farming orientation among the Guji as compared to the Borana. Mobile pastoralism usually is associated with smaller household sizes and considerably lower population densities than sedentary agrarian systems (McPeak, Little, and Doss 2012).

The average age of all household heads was 44 years old. With an average age of 52 years, female household heads are significantly older than male household heads.

More than two thirds (68%) of the members of households surveyed have no formal schooling. A significantly higher proportion of members of treatment households (72%) report no schooling in comparison to members of control households (62%). Similar trends are evidenced in literacy rates. Only slightly more than a quarter of the members of the households surveyed (26%, 948) are able to

35 There are significantly more Somali speakers in the control area and more speakers of Konso in the treatment area ( $F=111.88$ ,  $p<0.001$ ).



write a simple letter with several sentences in any language. The literacy rate for the control group (34%, 2,422) is almost 20 percentage points higher than the treatment group (23%, 2,225).

Qualitative responses mostly mentioned schooling as an aspiration. One Aba Eela described fundraising for schools: “We are fencing a kalo now for the sake of using its income for schooling and the community.” It is assumed the community will use the kalo to fatten their animals, sell them, and then use the cash for school fees. A focus group of women from Gabra/Guto Reera worried that “Even there are still those who disobey the rules and norms commonly agreed upon...The other thing that has saddened us is the case of those who illegally settled in our area and the embezzlement in school...[as a result of these] we were about to fail to win development achievements like education.”

Education was also mentioned in interviews in the context of women’s increasing rights. A focus group of agro-pastoralists from Renji said that: “in the past it was forbidden as a culture for women to go to school. Nowadays women have been participating as committee members and in getting an education to know their rights well so as to be involved in any decisions regarding their affairs.” A focus group of women from Golba Dawa/Bulbul Reera stated that: “...if a female is married by quitting school, she has full rights over a property produced in common...Previously male children were allowed to get schooling whereas female children were forced to tend cattle. But now women also have full rights...”

However, some respondents were skeptical about the benefits of education given their resource-poor environment. Another Aba Eela clarified: “...those graduating are jobless and coming back to us dependent on us; there is little earnings from the small land we have.” A Godansa/Guji group of female respondents cautioned: “The father can send her to school and raise her well but a female does not have rights to land when she lives with her parents.”

## LIVELIHOODS AND CASH INCOME

Shown in Table 7, the two primary economic activities of household members in the area outside of housework, child and elder care, and school are herding livestock at the warra (26%, 4,334) and farming (17%, 2,797).

**TABLE 7. PRIMARY ECONOMIC ACTIVITY OF HOUSEHOLD MEMBER**

Response Category	All	
	Number (#)	Percent (%)
Herding livestock at warra/foora	4,535	27%
House/domestic work	3,867	23%
Student	3,150	19%
Farming	2,789	17%

The most common livelihood activity to earn cash income is selling crops. This is due to the large number of agro-pastoralists in the evaluation sample and the fact that the main livestock product is mainly consumed by household members and not sold. 29% of households (1,098) report income from crop sales. Households in the control group sell their crops at significantly higher rates than households in treatment areas. Forty-five percent of households in control areas (758) sold crops in the past year versus 16% (340) of households in the treatment areas, reflecting the larger number of pastoralists in Borana Zone.

Livestock trading as an occupation is a source of cash income for 16% of households. The interviewees, consistent with the quantitative results, focused on herding livestock as a primary livelihood activity, followed by farming and then petty trade. As a woman's group in Guji Godansa stated: "Our cattle are everything for us. We can sell milk and buy sugar and coffee...to lead our life. We also plant corn if there are favorable conditions."

The drought has encouraged different forms of petty trade inimical to preserving land, including charcoal production. As one Aba Dheeda explains: "Since they [the cattle] do not get any pasture from the ground they eat the trees. Everyone cuts trees. Some people sell the trees they cut; they sell the charcoal." Female focus group participants from Bede community in Borana similarly stated that: "The current main problem is deforestation. People cut trees and sell firewood for their day-to-day life." One of the Aba Reeras also said that: "As farmers or pastoralists of peasant associations there aren't any commercial trees planted. But in areas closer to towns there is the sale of charcoal/firewood. But in the reera there isn't anything for sale."

## **RANGELAND GOVERNANCE—USE, ACCESS, AND INVESTMENT**

In the study area, there is growing scarcity of communal rangelands due to the increase in cultivation over the past few decades, the growth of human population and small towns and other settlements, and the increase in exclusive grazing enclosures (called *kalo* in this area). Wells and rangelands are vital to dry-season livestock production, and the encroachment of farming (even by former pastoralists) into relatively water-abundant areas, including near deep wells (*tula*) could undermine livestock access to seasonal grazing resources. Moreover, *kalo* are increasingly being incorporated into seasonal grazing patterns, where large communal 'kalos' (100 ha+) are being reserved for dry season use for all kinds of cattle rather than just the vulnerable. Many of these were supported by NGOs who hired community members to reestablish or create new kalos.

In this section, we describe the different uses of rangelands in the study area, with a particular focus on mobile herding in remote sites and around settlements, customary and new forms of range enclosure, and the institutional dimensions of rangeland use.

### **RANGELAND USE AND ACCESS**

Focus groups and interviews commented on the state of rangeland degradation, and often discussed the impact of decreased productivity of rangelands on mobility during times of drought. For example, focus group participants in Dubuluk described that: "In the past during droughts you could move to a better-off area with your livestock if you wanted. But now it is impossible because every area has degraded." An Aba Dheeda also lamented that: "The problem is rain, the rain is scarce." It should be noted most of the rangelands and their vegetation recover with rainfall after a drought, which means that degradation (defined as permanent loss of ecological productivity and biomass) may not be occurring despite local perceptions.

For most respondents, migration with livestock remains a key livelihood strategy and vital to the area's livestock sector. However, in some cases respondents mentioned new regulations on movements across kebele boundaries or being barred from moving animals. An Aba Eela explained: "In the past droughts everyone migrated based on their preference, everyone migrated whenever he wanted to wherever he wanted, but now because of the limited condition of land he migrates based on the established rules." Another Aba Eela explained that now certain communities require money be paid to them before

providing permission to use land: “We never asked for permission to go anywhere...Now individuals started to ban, [they] said: you do not [use] land in our Kebele and let your cattle go out...Only a person who has money buys land.” In a focus group discussion in the Ibsa Reera/Ibsa Kebele respondents lamented: “Others say the land is theirs...Wherever we migrate we are banned...Whenever we accuse them the officers in the district don’t respond.” The competing rules of land access and rights between customary and government systems of land management shown here indicate the kinds of problems that can occur when ambiguity exists over who has the authority to regulate access to pastures. The key advantage of the customary leadership and institutions, especially at the level of the dheeda, is that they represent viable ecological units for pastoralism and are well known to the communities. They encompass both dry and wet season grazing zones which are viable production units except during droughts. In contrast to this, the kebele and woreda/district are administrative units and are not viable production units either in good or drought years. In these units, livestock owners would need to seasonally send their animals across administrative boundaries for them to survive and take advantage of the uneven distribution of rainfall and vegetation in the region.

Focus group participants from Hirmaye Reera/Madar Kebele explained the perspective of those who don’t want to accept mobile pastoralists and their herds: “The government initiated our practice of differentiating grazing land for different seasons...But we didn’t get the intended benefit since other communities illegally settled around this [reserved grazing land] for pasturing...Some of the administrators allow some people to settle illegally.” This refers to cases of Borana pastoralists who migrate to the area from a neighboring kebele or woreda, or a pastoralist who has settled in a seasonal grazing area against the rules of the government. These examples also suggest that land use planning on the basis of administrative rather than customary grazing units may lead to these kinds of grazing transgressions and other problems, because they are unviable grazing units. Although this was not a problem everywhere, in some locations private farmland in conjunction with increasing population reduced rangeland access. As indicated earlier, our data suggests that the ‘chipping away’ of common pasture lands through allocations of farms is having a cumulative effect on the viability of pastoralism. In a focus group of the Ibsa Reera/Ibsa Kebele of Teltele District the respondents said: “But now, because of the large population, farmland has taken over everywhere. Now, there’s no more grazing land.” Note, however, that Ibsa Reera mainly is a farming area where population density is high, with a large population of non-Borana (Konso) farmers and is atypical of most locations in Borana. The Aba Dheeda of a Borana Dheeda explained that once land is used for farming, even on small plots, it reduces land quality: “It doesn’t have to be big farm lands, the present small farmlands affect the rangeland greatly. For example, on land that is ploughed, the grass perishes, the available vegetation is cleared, the land is then revealed: a lot of disasters occur, in short. One more example, the lands like Romso and Dida Mega were the pastureland in the past where we reared our cattle. Those lands currently are ploughed and have become bare, and the cattle have nothing to pick up from there. It causes problems with the soil...” Based on key informant interviews, customary leaders complain that sometimes individuals are granted farm plots by the kebele administration near water points and other pastoral resources that directly compete with livestock production. In these cases, the customary institutions were not consulted before farms were allocated in important grazing and near water points.

#### EXTENSIVE REMOTE (SATELLITE) CAMP GRAZING ZONES

In conditions of insecurity, herds cluster around settlements, where security tends to be better than in remote grazing areas (McPeak 2003). Only in the eastern parts of Borana Zone near the border with Somali Regional State and in parts of southern Borana near the Kenya border is security a particular

problem in the study region. One Abba Eela who resides near the borders between Regions 4 and 5 notes: “We fear for insecurity so we do not even leave animals in reserved grazing area. Cattle and goats are dying because of the shortage of the feed; in the future we are changing from rearing cattle to camel and goat...” “In the last ten years except two years, there was no peaceful condition, every day we were killing each other in armaments, and we lost many brothers.” As was indicated earlier, land-based conflicts were mainly revealed through qualitative data collection rather than the household survey, in part because focus groups and KII covered some of the conflictive border areas, such as Wachile woreda and the dry parts of Dillo woreda near Kenya, that were not included in the household study.

To explore mobility as a proxy for access and security, households were asked to report on their use of satellite herding camps (*foora*) over the past year and also their use of such camps in the drought year of 2011. Herds in 2014 are largely based in the local community and do not leave the *waara*, but with important local differences. To get a longer-term sense of the use of satellite camps, we add in data from the household survey work of the Pastoral Risk Management (PARIMA) project, which was undertaken in the area during 2000-2002 by two of the co-authors of this study (Table 8). Table 8 below reports the share of households in different sites in a given year reporting any use of a remote satellite camp. It should be noted that 2011 was recorded as a difficult drought year to compare with 2013 at the time the survey was drafted, although as it turned out 2013 was not a particularly good rainfall year either. Moreover, in the PARIMA study, the 1999-2000 period also was also characterized by a severe drought.

**TABLE 8. SATELLITE CAMP (FORA) USE BY WOREDA AND YEAR**

	2000	2001	2002	2011	2013
<b>Borana Zone</b>					
Arero				0.21	0.29
Dhas				0.23	0.39
Dillo	0.83	0.37	0.47	0.19	0.43
Dirre				0.28	0.2
Miyo				0.16	0.43
Teltelle				0.06	0.07
Yabello				0.19	0.16
Dida Hara	0.35	0.13	0.03		
Finchawa	0.28	0.19	0.19		
Korati	0	0.03	0		
Wachille	0.03	0.03	0		
<b>Guji Zone</b>					
Gorodolo				0.17	0.05
Liben				0.09	0.13
Wadera				0.07	0.04

This data includes PARIMA data for 2000–2002 for Dillo, Dida Hara, Finchawa, Korati and Wachille woredas.

Sixteen percent of households (602) migrated their livestock to at least one *foora* (satellite camp) between October 2013 and September 2014 (Table 9).<sup>36</sup> There are significant differences in *foora* use by

<sup>36</sup> Note that this relatively low use of satellite camps in part reflects the agro-pastoral nature of the sample. Both smaller herds and the availability of crop residues make reliance on satellite camps less pronounced than would be found in more pastoral sites. For example, the IBLI project's survey data for sites in Borana, where more pastoral sites were targeted, has a mean TLU per household of 19.4 and 30% of households reported use of satellite camp. In contrast our data set gathered in the same year has a mean TLU per household of 8.3 TLU and

gender, socioeconomic status, and treatment group. Poor households are significantly less likely to migrate with their animals to a foora, which is unsurprising because it makes little sense to move small numbers of animals ( $F=83.99$ ,  $p<0.001$ ). Female-headed households are also less likely to migrate their animals; 12% of female-headed households use a foora compared to 17% of male-headed households ( $F=10.54$ ,  $p=0.001$ ).<sup>37</sup> Fooras are also used more frequently by households in treatment sites (21%, 441) than in control sites (10%, 161;  $F=82.13$ ,  $p<0.001$ ). The latter finding is not surprising since the control sample mainly are Guji agro-pastoralists who are less mobile than Borana, even compared to those Borana who are agropastoralists.

It is unclear if 2013-2014 is a representative year for household migration patterns, as shown in Table 8. 43% of fooras used are typically used at the same time each year, but 57% are not. The main reason households used an atypical foora area is drought (5%, 188), and a handful of households report using fooras because of lack of water (14, <1%) and conflicts (11, <1%). In treatment sites, only 39% of fooras (194) being used this season are typically used this time of year, compared to 54% of fooras in control areas (97,  $F=11.48$ ,  $p=0.001$ ). Older and wealthier households are slightly more likely to have used a non-typical foora in the past year ( $F=5.32$ ,  $p=0.07$  and  $F=4.67$ ,  $p=0.097$ , respectively), suggesting perhaps that these households are better able to adapt their migration patterns to unexpected changes, like droughts or restricted land access, than poor or young households.

**TABLE 9. FOORA USE**

	All Households		Male-Headed Households		Female-Headed Households		Control		Treatment		Other		Poor	
	Number (#)	Percent (%)	#	%	#	%	#	%	#	%	#	%	#	%
Yes	602	16%	511	17%	91	12%	161	10%	441	21%	543	19%	59	6%
No	3077	80%	2434	80%	643	84%	1439	85%	1638	77%	2235	78%	842	88%
Don't know <sup>38</sup>	147	4%	114	4%	33	4%	91	5%	56	3%	93	3%	42	6%
Refused	3	<1%	0	0%	3	<1%	2	<1%	1	<1%	0	0%	3	<1%
Test statistic			10.54 (.001)***				82.13 (<0.001)***				83.99 (<0.001)***			

Chi-squared were used to measure the statistical significance.

\*  $p < 0.10$

\*\*  $p < 0.05$

\*\*\*  $p < 0.001$

To further probe what influences the decision to use a satellite camp, we asked those who did not use satellite camps why they did not. The 16% of households (602) who did not use fooras did not use them for a number of reasons. By far the biggest reason reported is 'small herd'—their livestock herd is small enough not to need to travel to a foora (45%, 2,095). Notably, many of the 'other' responses report a total lack of animals, accentuating this line of reasoning. Another 7% (269) believe the warra has sufficient grazing land or water.

16% use of satellite camp. Our sample is not representative of Borana as a whole as agropastoral sites were deliberately chosen to have matched sites in Guji, and the areas we had available in Guji are almost all agropastoral.

37 In cases where herds of female-headed households were moved to foora they were likely moved by an elder son or relative or combined with another household's herd and then moved.

38 These are mostly people who did not have any animals.

Limited satellite camp use thus appears to be mostly driven by household herd sizes not sufficient to make the use of a satellite camp necessary or perhaps feasible. Restrictions by authorities, by conflict, or due to settlement of satellite camp areas are noted by a minority but do not appear to be major factors limiting satellite camp use, except in a few noteworthy cases. Just 1% of households (34) report restrictions from the PA prohibiting them from migrating, and even fewer (<1%, 6) report restrictions from additional authorities.<sup>39</sup>

In two of the key informant interviews conducted in Borana communities near the border with Region 5 (Somali Regional State), conflicts with neighboring Somali communities were highlighted for their impacts on grazing patterns. One Aba Eela in the area lamented that good grazing zones are left unused because of security issues: “In our dheeda we have lands reserved for the summer and the winter but now because of the conflict between the people from region 5 that came to our land; since we fear each other we can’t use it.”

These households who do not migrate with their animals cope by allowing their livestock to graze on enclosed plots that they may also use for cultivation or by cutting grass or branches and leaves from trees (18%, 699) or feeding animals crop residue after harvesting (1%, 30). Another 9% (362) entrust animals to relatives to take to fooras on their behalf. Buying food for animals (3%, 106) and selling animals (3%, 123) also occur occasionally.

These coping strategies can come with high costs, such as traveling long distances to fetch household water. A focus group from Debii Gayaa remarked that: “Since mothers travel long distances in search of grass for animals, children do not get necessary feedings such as milk. If animals do not get grass they do not give milk. If children do not get milk they will be affected.” The cutting of tree branches and wild grasses has increased in importance in the past two decades as a drought-coping strategy. Another focus group from the Diloo Badiyaa similarly stated that: “Women travel on long journeys to fetch water. Children will be alone at home... Women suffer a lot in this situation. Pregnant women get sick and the child in the womb is also harmed when women carry water on their backs. She might spend the day and night fetching water. She has no time to milk the cows and feed her children... The children also miss their mother.”

One of the follow up questions we asked of those who did report use of a satellite camp was about the need to obtain permission to graze in a satellite area during the drought year of 2011, which impacted livestock’s access to water and grass. A minority of households (13%) used satellite camps in the drought year of 2011, and of this minority, only a few sought permission to use the site. When permission is sought, it is either from PA officials (58% of permissions) or from community leaders (34% of permissions), with the remainder of cases being local elders (6%) or woreda officials (1%) with a final percent being combinations of formal and informal officials.

Of the majority of households that were not able to migrate, some mentioned having no place to go or that migrating does not always mean finding a better situation. The focus group of agro-pastoralists in Dubuluk stated: “We live here because we have no place to go... We have no water for our livestock. We also have no water for human consumption. In addition to that we have no food.” An Aba Dheeda on the other hand warned that poorly timed, large-scale migration can be harmful: “For instance, in the middle of July it rained. Every Borana moved his cattle to that site, and it ran out of water... In this kind

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<sup>39</sup> Insufficient labor – not enough households members to migrate with the livestock – impact s2% of households (65), and conflicts with another ola impact 22 households (1%).

of condition, the pasture decayed, the crop was ruined, the pasture was ruined, and disease-bearing insects like Diranta and Silmi became pervasive.”

In accord with these quantitative findings that most households do not request permission to migrate, respondents described flexible and open migration. One Aba Dheeda explained: “As Borana we have communal land, we do not ask for permission from anyone [to migrate]....unless the hosts help you make shelter they do not talk about permission...everyone migrates towards the place where pasture is available.”

Note however, that respondents may not have considered consultation with elders to constitute asking for permission. The Aba Reera of a Borana community, for example, said that people move without permission, but at the same time said that people discuss migrating with elders: “Whenever we want to move we don’t have a process of asking for permission; we consult the customary leaders about the land, availability of kalo, and water order. We are hosted in this manner; we host in the same manner.” Others, such as the Aba Reera of another Borana community, were more specific about what one asks permission for, differentiating between water and land use: “Once you become a pastoralist you do not ask for land, you ask for water merely.”

Although the quantitative responses stressed permission from the government to migrate to grazing locations, many respondents in the qualitative interviews mentioned needing permission from traditional authorities. It may be that traditional authorities emphasized their own role in interviews. For example, one Aba Herrega said that Aba Herregas are asked for permission while the Aba Reera said the Aba Reeras are asked for permission to migrate. The Aba Herrega said that “The Aba Herrega processes requests for permission to use water when our society moves to another place. He asks the person who is responsible for the water resource, saying, “My cattle are thirsty; please allow me water.” In our culture, water and grass are not refused.” The Aba Reera of another Borana location said: “There are boundaries for the summer and the winter. When we migrate to other places for the sake of water and pasture we ask permission from the Aba Reera over there.”

Many respondents mentioned permission both from traditional authorities and the government. Another Aba Reera said: “After settling, they announce to the local administration the specific place they are. Then they ask to be allocated land and a water point.” Finally the local administration writes the case to a local customary official. Dillo is the only site where elders are reported to be more commonly asked for permission than formal government personnel, which would be expected because it is a relatively isolated district where administrative personnel are limited. A Borana Aba Dheeda said in his dheeda “I ask them orally. In our fathers’ culture I ask an elder I meet on this land ‘Father, give me landing!’ for the wells ‘schedule me water drink!’ the culture of our fathers is like that not in letter, Borana doesn’t want that.”

From key informant interviews we also found some variation in the pattern of authorities from whom to seek permission when moving herds to different grazing areas depending on different local and regional factors. Most interviews indicated that permission from local administration usually was sought if they expected the move to last a significant amount of time (2+ months), moved into another administrative zone or country (for example, Kenya), or it was an area where they did not normally migrate. For example, one local leader (*aba reera*) noted that when they graze areas outside Borana Zone, they ask permission: “We may go up to Bale to search for water and pasture. Requesting pasture and water in this case has its own procedure: first you request government and the government then asks the community and finally the issue should go to the Aba Reera (Interview, September 2014).” In more

sedentary areas, such as in the Guji communities and in Yabello district, where administrative presence is greater than in the more remote pastoral area, respondents note that they more frequently seek permission from kebele officials than from local elders.

Notification to the government may depend on the size of the community moving. An Aba Eela explained how this works: “First if the moving is on an individual basis the individual who is moving asks for permission from the person on whose land he is parking, so he is asking the land lord, Aba for water. Second, if the drought is exacerbated over here the community asks the administrators to allow them movement; this needs a letter of permission.”

As previously noted, access to clan-based wells is critical to dry season production in the Borana and Guji pastoral and agro-pastoral systems. An Aba Dheeda in Borana expounded: “Now I am in Wayyama rangeland. I came and talked to the elders who own the rangeland; they are our clan Borana. I told them I’m landing on the pasture of a new site, then the water, the well, is now of my clan and I arranged it to be free.”

### INTENSIVE HOME CAMP ENCLOSURES (KALO)

Data on access to community and private enclosed grazing areas (kalo) are presented in Table 10. Almost half of households have access to a community kalo (49%, 1864). 11% of households have access to two or more community kalos (199). Community kalos are quite large, averaging 60.62 hectares (sd=168.64), and are larger in the treatment area of Borana (65.62, sd=177.43). Private kalos are less common, but fully 18% of households (696) have access to one. Private kalos are also smaller, just 1.97 hectares (sd=3.31).

**TABLE 10. ACCESS TO KALOS**

Response Category	All		Male		Female		Non-Youth		Youth		Control		Treatment		Other		Poor	
	Number (#)	Percent (%)	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Access to community kalo	1864	49%	1471	48%	393	51%	1256	51%	608	44%	415	24%	1449	68%	1435	50%	429	45%
No access to community kalo	1941	51	1578	51%	363	47%	1165	48%	776	56%	1271	75%	670	31%	1428	50%	513	54%
Test statistic			3.39(.07)^				22.26(P<.001)***				719.72(p<.001)***				5.95(.015)*			
Access to private kalo	696	18%	614	20%	82	11%	457	19%	239	17%	469	28%	227	11%	648	22%	48	5%
No access to private kalo	3126	82%	2442	80%	684	89%	1975	81%	1151	83%	1222	72%	1904	89%	2222	77%	904	94%
Test statistic			36.23(p<.001)***				1.51(.22)				184.73 (p<.001)***				147.60(p<.001)***			

Chi-squared tests were used to measure the statistical significance.

\* p < 0.10  
 \*\* p < 0.05  
 \*\*\* p < 0.001

Female-headed households are slightly (3%) more likely to access community kalo than male-headed households, but male-headed households are 9% more likely to access a private kalo. The same pattern holds for poor households—they are 4% more likely than wealthier households to access a community kalo but 17% less likely to have access to a private kalo.. Youth-headed households are less likely to access both community and private kalos. In Guji, just 24% of households have access to a community



kalo, and an additional 28% (469) have access to a private kalo. Community kalos are much more common in Borana, where 68% of households access them (1,449), than are private kalos, which are accessed by only 11% of the sample (227).

Shown in Table 11, community kalos usually fall under the jurisdiction of the olas (50%, 1034) or the Kebele (41%, 842). Kebeles are slightly more likely to be in control in control sites (44%, 189) than treatment areas (40%, 653), and the inverse is true of olas. Only 6% of households (124) believe that the community kalo is controlled by individuals. 27% of community kalos (554) were established with help from NGOs or the government. This practice is more common in control areas, where 53% (229) of kalos were established with assistance ( $F=190, p<0.001$ ). Thirty-five percent of households (194) made payments of food or cash to help establish the kalo, and the rates are similar in both control and treatment sites.

**TABLE 11. WHO CONTROLS THE COMMUNITY KALO?**

Response Category	All		Control		Treatment	
	Number (#)	Percent (%)	#	%	#	%
Individuals	124	6%	36	8%	88	6%
Ola	1034	50%	198	46%	836	51%
Kebele	842	41%	189	44%	653	40%
Aba Reera	13	1%	0	0%	13	1%
Community	8	<1%	0	0%	8	<1%
No one	33	2%	4	1%	29	2%
Other	3	<1%	3	1%	0	0

Interviewees explained the organization of the kalo: clearing shrubs, reserving land and building fences. An Aba Herrega in Borana said: "...the community took the measure of separating and demarcating kalo for the wet and dry seasons. Land that is good for camels and goats is protected in the wet season for the dry season." The Aba Reera provided details on kalo management: "This kalo is cut and fed for pregnant cows and young calves that cannot walk far for grazing and water. We use this kalo in common. Aba Dheedas and Aba Reeras give [hay] from the kalo to the person who cultivated his land...In addition, there are shrubs to be cut and cleared. Clearing all the shrubs prepares the land for grass and helps to secure hay for the dry season."<sup>40</sup>

All interviewees were positive in their assessment of communal kalos and saw kalos as an efficient method of using pastureland. For example, one Aba Herrega in Borana, after explaining kalo management above, continued to say that: "Cattle benefit greatly from kalo. They get fatter. When they get fatter, they are priced well when we intend to sell." An Aba Dheeda pointed out that "Closing an area has three advantages: 1. for using pasture during a drought period through a cut and carry system, 2. for animal fattening and 3. for building houses. Cattle use the closed area, then sheep, camels and goats; similarly, the cattle eat more hay from the closed area than other animals."

Both the government administration and NGOs received a lot of credit for training people in the creation of kalos. An Aba Herrega said: "...The role of the local and district government administration is great in establishing kalo. They suggested and showed ordered ways of establishing a kalo; this is their role." A focus group of Guji Godansa women noted that: "They [an NGO] gave cash to participants for

40 Kalos can be used for both cut-and-carry and grazing. If households can walk to the kalo, it can be used as enclosed grazing. If households do not want the animals to spend energy walking, or it takes them too far from water, they can cut it and bring it.

clearing the bush to establish kalo. It was a large farm; forty people participated in clearing it for two months. On average they collected eight hundred birr per head.” Similarly, a focus group from Debii Gayaa stated that “[NGOs] support those who clear shrubs (bushes) and prepare grassland for animals. They pay money for those who engage in these activities.”

Several of the interviews noted that NGOs even provided training in pasture management, and many indicated that kalos were created through bush clearing activities funded by NGOs or the government. Participants in the creation or fencing of kalos often were paid by NGOs to clear bush and fence off reserved grazing areas, which raises the question of how much of the recent increases in kalos results from external interventions and how much is internally generated. In some districts, especially in Guji sites and Yabello, the use of kalos appears to be evolving into *de facto* private grazing and/or farming land, raising questions about the private appropriation of what is traditionally communal land.

In most of the Borana area, the growth of community kalos appears to be an elevation of community members’ right to exclude non-community members from access to rangeland resources, which also alters the definition of common property membership. Since common property tenure systems have historically facilitated herd mobility, including across areas dominated by different groups, this group-based privatization of the commons could potentially have implications for the viability of pastoral land use and livelihood strategies (McCarthy et al. 2004). However, evidence from southern Kenya, where historically communal rangelands have been extensively privatized, suggests that pastoralists are finding new ways to maintain mobility, for example through social networks (Archambault 2014). In follow-up work, we should be able to document perceptions on this process and establish additional information about how kalo are being obtained and used in this area, as well as potential implications for the broader pastoral land use and livelihood systems.

Overall, two important points can be highlighted based on these results. First, there are negative assessments of private kalo, which are largely in Guji, and represent a kind of privatization of the commons. In contrast, in Borana, the move towards communal kalo is viewed more positively but still is a change in land use rights; communal kalos represent a group-wide exclusion process.

There is an inverse relationship between the prevalence of community kalo lands and private kalo lands. The Guji sites, in particular, show a higher incidence of private kalo compared to community kalo, which is supported by the qualitative research that emphasizes an increase in private kalos over communal ones.<sup>41</sup> For example, one Guji Aba Dheeda said that the “Expansion of privately owned area closures has become the main reason for the reduction in water and range land availability.” The Aba Eela of another Guji location concurs: “As the population increases, the cattle lack pasture, then everyone starts to make fences. One may say ‘let me graze the calves and cattle.’ And the other protects not to graze his property. Then they were stoning each other. They are crushing each other. Still they are on that conflict because of pasture.” The female focus group from another location also said that: “The grasslands are narrowing but farmlands are expanding...As the cattle approach, individuals fence their grassland and use it alone...Those who have grassland complain that it is not enough for the calves, cattle, and old cows...Others don’t even have grassland...They are competing for survival where the calves and old cows are in danger.”

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41 direct evidence on dismantling. We do have some difference by zone on assistance in establishing community kalo. Community kalo were established with government or NGO assistance in 19% of cases in Borana and 45 % of cases in Guji. The PA was reported to control use of the kalo in 46% of the cases in Guji and 39% in Borana.

Some Guji respondents were very aware of these problems, and their area had taken steps to reduce private kalo. An Aba Reera explained: “There were some places where kalo land turned into farmland. But the elders of the society took back the land and re-established it for kalo.” The Aba Dheeda from the area told of a court case: “Before, they had started closing the area and the case has reached the Woreda and the Woreda ordered them to stop closing the area because it was causing conflict in the community. Privately owned area closures are a source of conflict. On the other hand, communal area closures improve the productivity of livestock.” The Aba Dheeda of a Borana area explained: “If the community understands that closing areas improves the productivity of livestock it does not cause any conflict among the community. There is no privately owned area closures apart from communally closed areas. Private grazing area is a problem.”

In the Borana sites, on the other hand, community kalo dominates over private kalo, with private kalo use relatively uncommon except for in Teltele, where there also is a high percentage of households that farm. In fact, Borana focus groups frequently expressed very strong sentiments against the use of private kalos. Comments include:

One Aba Herrega claimed: “Because there is no private kalo as the context of our reera, there is no conflict over the establishment of kalo.” The Aba Dheeda from the same area concurred: “If someone ploughs for a farm no one accuses him. If he fences massive land the community doesn’t keep quiet.” Resource-constrained focus group participants from another Dheeda warned: “Private area closures create conflicts between the communities. If one person closes the area without permission, other person can raise conflict over it saying the land is mine.” An Aba Reera told the interviewers that: “there is a person who fenced the land and that became the cause of conflict; this can be taken as an example of the current affair. Since it was illegal he was obliged to unfence it.”

## **RANGELAND AND WATER RULES**

Governance of the rangeland entails regulation of both pasture usage and water usage. Rules for both are similar across regions and despite considerable changes and concerns over customary versus government authority, customary rules and regulations remain in place. The customary governance structure for regulating rangeland use in the study region was discussed earlier in the report (see Figure 2), and this section will mainly address how the system operates in practice. The current uncertainties around rangeland governance center on the often competing roles of the government (especially *kebele* administration) and customary institutions for managing access to grazing, which in the past mainly was determined by controlling access to water. As Bassi and Tache note, “the governance of natural resources was centered on water rights: clans and individual invest in developing water resources (traditional wells, ponds) obtaining primary water rights. Other families/clans/individuals obtain access to water by merging with the right holders or by using a limited quota of access available for certain social categories, including non-borana herders and wildlife. Access to grazing was limited by the limited availability of water, that was the main constraining factor (2007:46).” As noted earlier in the report, the enforcement of these rules is governed by a range of customary institutions and leaders, including the Aba Dheeda and Aba Reera in the case of access to grazing and Aba Eela and Aba Herega in the case of water, and by “referring to customary law, the outcome of the *gadaa* and *qaalluu* customary institutions (ibid: 46).” The ambiguity over the authority of enforcement arises because of the increasing and overlapping roles of government in controlling movements and land use. However, because the government administers smaller units (*kebele* and *woreda*) with less ecological viability than customary

dheeda grazing units, they are unlikely to ever supersede the latter units without considerable disruption to livestock production and the area's ecology.

Reference to our qualitative interview data provides a baseline to how the governance of natural resources operates in practice. According to different interview responses, pasture might be fairly unregulated or heavily regulated either by the government or by traditional authorities, but in almost all cases respondents discussed newly demarcated wet and dry season pastures (some of these new demarcations are the result of a government-sponsored program to regulate settlement and the use of grazing and farming areas in Borana and Guji). One Aba Reera explained: "Yes, there are rules and regulations that govern how to use pasture in rainy and dry seasons...The pasturelands are usually divided into two parts. One is used only in the rainy season, while the other is used in the dry season. Individuals will be penalized if they graze their cattle in the preserved area without permission. The penalties are customarily established. Persons who violate this rule for the first time will get a warning. If the misdeed is repeated, the case will be presented to elders who will order the accused to serve as a guard of the pastureland for a month or two. One of the elders will make sure that the person assigned as a guard is carrying out his duty accordingly. These are the rules and regulations that govern pasturelands." As this narrative indicates, despite considerable changes in the region, there are existing rules that govern access to and use of grazing lands, with important roles played by customary leadership and institutions.

In key informant interviews and FGDs, many respondents focused on water usage, explaining the rules governing different bodies of water. With respect to water usage, most focused on eelas and how everyone could equally use the eela through an organized schedule of rotating water usage. As noted earlier, governing access to water is also a means of regulating access to grazing land. Without access to water, it is not possible to graze livestock in an area, and customary water leaders can control the pressure on local pastures by carefully scheduling and regulating the number of animals that are allowed to water at a certain well or other water point. In interviews respondents focused on the participation of local community members in maintaining water sources by guarding and cleaning them and administering punishments for entering out of turn, breaking a fence, or allowing cattle to enter them.

One Aba Eela provided an informative and especially detailed summary of water governance: "They water formally. Everyone has orders, it has [is governed by the] Aba Eela; Aba Eela is accountable to the Aba Herrega. The Aba Herrega has [works with] elders to facilitate the rules...that orders the water formally. No one is given priority over water out of order but everyone should get water. No one says, 'Since this Eela is mine, do not use the water'." Once again, the interviews demonstrate the strong customary institutions that operate in Borana and Guji zones, with regulations of water use being one of the most important examples.

Many respondents, including the Aba Eela mentioned above, both said that water usage is provided equally but nonetheless discuss priorities: "All have equal rights to access water points...This is done based on a first come first served basis...The water order is on a three days rotation for one man...the Aba Eela drinks first. One day is reserved for him. The three days include the Aba Eela. All the three days include Aba Guya<sup>42</sup>. All three days include Aba Laga<sup>43</sup>. For example: we, the Borana, split into the Sabo-Gona. The Sabo and Gona are dwelling on the Liben side. Out of the three days if two are for the Sabo the last one is reserved for the Gona...The Digalu-Matari clan water in the same manner. Digalu-

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<sup>42</sup> Abba Guya is a daily accountant for daily base camps.

<sup>43</sup> Abba Laga is the 'father of the river' or 'father of the water'.

Matari has a common water point order. If two days are spent for the Digalu the remaining one day is for the Matari. Conversely, if the Matari stay for two days then the Digalu stay for one day. Karayu drink in the same way. In this time, one day is for the Digalu, one day is for the Matar, and one day is for the Karayu—now is just as socialist. Now we consume together. If the water is scarce, people respect each other; they use it once in three days. To share evenly for all leaving two days they water once every third day. Aba Eela he uses in this order, he waters on the third day.” It should be noted that most wells are owned by clans so their members and herds often are given priority in the scheduling of water use in the case of wells.

This same Aba Eela continues to explain who cannot get water: “A person who is banned from drinking from this Eela is the one who harms it. If he doesn’t dig the Eela, if he refuses to offer a bull for the Eela [for people to eat while digging], this kind of person is left from this Eela, he never ever goes to the Eelas of Borana in general. Unless he leaves to the river and drinks from there, nothing is allowed to him. If he corrects his fault he is spared.”

Rivers are accessible without the need for intensive rules about maintenance and scheduling that are required for eelas, since moving water will move cattle waste away. However, the use of rivers by livestock is still sometimes managed. Focus group discussants from resource-constrained households in the Sokora Garbi Kebele said: “There is a running river which we use for water and it is controlled by the chairman of the Kebele. Most of the time cattle come from different areas and drink this river water. According to his control he appointed group leaders from all different group members to control this river and avoid conflict between people. These group leaders turn by turn help people that they take their cattle for drinking water without any obstacles.”

A focus group from Dubartootaa, the Dillo Badiyaa explained how they care for their ponds: “We build fence around ponds in order to protect them from destruction. We discuss with the accountant how to make the water source safe. He guides us on water use issues. Pipe water has a committee, an accountant and secretary. The committee members change weekly. We save money with the accountant for maintenance.”

There are also rules regulating the development of new water sources. Agro-pastoralists from the Hirmaye Reera explain: “In a time of water shortage the person entitled to manage water source usage calls the community to expand the water well. He calls up all users of the water source to help on the day he decides to dig the water well or to expand the water well. Among the users who do not participate in expanding the water well, the Aba Herrega will deny him water use. He will be banished from using the water, about five or six hundred birr. With the money collected from this, the Aba Herrega will invite [people] to drink and eat, for those who participated in expanding the water well.”

Most communities utilize similar punishments, including for violations of rules governing the use of rangelands. The Aba Reera of another Borana location, for example, stated the most common punishment for breaking rangeland governance rules: “The person who waters his cattle in the wrong way will pay 500 birr. The same is true for grazing on prohibited land.” Resource-constrained focus group participants from Bede Reera similarly stated: “The rules that are frequently violated are refusing not to clear the shrubs and the water bodies. The penalty is 500 birr.” Another Aba Reera provides additional information on rules and punishable offenses for misusing grazing resources in areas where farming also is practiced: “...During the farm time the public grazing land is free to use. During this time people can also collect [pasture] for their oxen...If someone releases animals illegally, punishment will follow...”

## RANGELAND INVESTMENT

The vast majority, 93% of respondents, reported no rangeland they were using was being managed under rangeland management techniques. Of those who were able to identify a rangeland management technique in practice restriction of livestock movements through customary institutions and regulations (42%, 108) was the most common rangeland management technique employed, followed closely by removal of unwanted bush (42%, 106), as seen in Table 12. Enclosure of the land (33%, 83) was the third most commonly cited rangeland management technique. We assume that the majority of these enclosures would be community kalos not private kalos.<sup>44</sup>

**TABLE 12. RANGELAND MANAGEMENT PRACTICES**

Response Category	All	
	Number (#)	Percent (%)
Restriction on livestock	108	42%
Removal of unwanted bush	106	42%
Enclosure of the land	83	67%
Common watering points	23	9%
Forestation	10	4%

Most interviewees mentioned the management practices discussed above, such as separating and using grazing land by season and attempting to clear bush. One Aba Reera, for example, said: “The measure we can take is to protect land in the wet season to preserve it for the dry season; [in that] season the situation becomes very bad for animals. So, to preserve the grasslands for the dry season we work on convincing the population to protect their cattle from the land...Regarding the government, they are educating people to collect and pack the straws of teff, wheat, and corn to keep for the dry season. Nothing else is done except educating us this way.” One Aba Eela noted the importance of and keeping separate seasonal grazing: “The great change is we have differentiated the dheeda land for the summer and the winter. If we had not done so the drought that hit Borana would have caused a great disaster.”

However, many respondents noted that management practices are not useful without rain. One Aba Eela in an area defined by ethnic Gabra wrote that the drought nullifies the effect of reserving pasture: “We are taking good measures...banning landing on this rangeland. You keep it only for pasture...It is not enough; because of the scarcity of water no blades of grass are observed on this pasture.” Similarly, the Aba Herrega of a Borana dheeda wrote that: “If rain conditions are promising, there is no doubt that our rangeland will improve; the improvement depends markedly on rain conditions...to make our Dheeda gorgeous we clear shrubs and wait for rain...”

One Borana Aba Dheeda had extensive plans for land and water improvement, all dependent upon rain: “We have a very vast grazing area. There is no water here in Wayama unless rain comes and the pond is filled with water...Now we are using water by constructing Meri<sup>45</sup>, but in the future we are planning to buy and use a motor for watering our livestock. We are thinking of it for the coming year. We have a

<sup>44</sup> In retrospect, we are not convinced this question was understood. We think most people interpreted the question to mean range management other than traditional range management, or above and beyond what is already going on. It is hard to reconcile these very small numbers for enclosure, for example, with the findings above on kalo.

<sup>45</sup> Meri is a structure built at the outer part of pond to protect the animal from entering the pond. It is made of mud and it moves inward as the water recedes. People supervise the watering to protect the water from pollution and enable orderly watering.

plan to water our livestock with it and produce cabbages and tomatoes using this motor. We have not started implementing this activity because of lack of water.”

A few interviewees also mentioned terracing as a successful land management technique for their area. One Aba Reera explained: “We have been given a car with its driver for transportation so as to go and make people aware around there. Thus, the land that was damaged by erosion is being kept by building terraces.” One Aba Herrega mentioned terracing in the context of the increasing role of women in public affairs: “For instance, they [women] have roles, particularly on the issue of water and grass as well as natural resource protection like forests, terracing.”

## **INTERACTIONS WITH PRIVATE INVESTMENT ON RANGELAND**

We also asked households about payments from private investors. Here, we find only one payment of 500 ETB to one person in the whole sample.<sup>46</sup> Indeed, not one of the 50+ key informant interviews mentioned a single case where an actual private investment had been made, although about 15 percent had said either inquiries had been made or they have heard about private investors and/or government approaching another community. For example, interviews with Abba Dheeda and Abba Reera key informants revealed that even in communities where investors were not present, respondents were aware of investment activities elsewhere. For example, an Abba Dheeda in Borana said, “In the rangeland Gomole, from Kebele Dharriito, we heard that two sites were asked. But nothing comes to us. We heard that they were allowed by the Kebele. In the vicinity of Gombo Dikko we heard that an investor receives a land to do something on it. We have heard this kind of thing but nothing reaches us.” An Abba Reera in Borana said, “There is different information that investors are planning to build factories of machine and skin in our area. Despite information there is no person who come and asks our land.”

Such quotes suggest that although at this point in time in this area, interactions with private investors are not yet a reality, they are an issue of which people are increasingly aware and wary. Additionally, the interviews suggest that respondents are generally opposed to the prospect of an investor operating in their community and expressed concern that private investment would lead to loss of access to their already limited land and resources. For example, the Aba Dheeda of a Borana Dheeda explained, “Yes we have fear, if private investors come to our area. It may make our vast grazing area become crowded. It reduces the grazing land. It may prevent the community from using water in order to use water for another purpose,” while the Aba Reera of a Borana area located near the tulla wells stated that: “In the last five years no investor has come to our Reera to request an investment...Our fear is if an investor comes he might snatch our kalo.” The Abba Reera in another Borana Reera explained: “They have never asked us so far. But we are in fear of that. This thing is happening through Awash...We don’t have rules to overcome their impacts”, and another said, “As for our reera, there are no private investors or the government who requested to use our land. We do not want any organization who might request to use our land because we are pastoralists and our land will be narrowed.”

The expressed concern surrounding loss of access to land and water resources suggests perceptions of low tenure security and supports the argument that private investment is seen as a threat to pastoral lands and livelihoods. Perhaps these feelings stem from the facts that many Borana and non-Borana have

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<sup>46</sup> We do not know why this one respondent received a payment. It was a female-headed household in Yabelo. She has 2.3 TLU and about a hectare of land, and therefore is not among the poorest in the sample.

been issued farm plots by the government and, as previously indicated, some of these have been in important grazing and watering areas.

Still, despite some feelings of concern and opposition, other leaders mentioned the development benefits that investment might bring. Interestingly, every key informant that stated the potential benefits of investment also stressed the caveat that investors must first consult with the community and follow the appropriate procedures for acquiring land. For example, an Abba Reera in Guji said, “Now we are animal farmers. If an investor builds leather industry in a town, it does not harm us. It helps us rather. If he/she comes this way it is welcomed. But if that can harm us we do not accept and even we suggest not coming to us. The process he must follow is respecting the rules and regulations we are governed with; and respecting the culture” Another Abba Reera in Guji explained, “If somebody comes to our Reera and claims to build a project, he/she has to ask the locality. Based on our criteria, we evaluate his/her request legally and properly. If he/she really comes based on the right procedure, the land will be given by the district land administration. There is no problem. The advantage our people can gain when the investor comes is the chance of employment for the local community.” A third Abba Reera in Guji further described, “If investors come through legal means and request land, there is no reason to oppose. Their investment could bring development to the country as a whole. If someone wants to take pastureland for investment and if what he does could benefit the community, it is ok. If not, he could be asked to see to other places.”

Other respondents explained the types of benefits that they would want to receive from an investor. For example, one Abba Reera in Guji said, “The community, the pastoral group, would ask for the benefits as precondition: school, veterinary pharmacy, clean water for the livestock. Good treatment for soil and water are tied with these. In addition, we ask if they come with any other plans that benefit the pastoral group. To sum up, we ask to get employed in the organization they come to build.” While an Abba Reera in Borna said, “We need an investor who works on the social problem of society and willing to discuss with us. They need to be legal. They should respect the culture of the village and teach the society what they do.”

Overall, the discussions of private investment in key informant interviews with Aba Dheedas and Aba Reeras revealed that, although private investment in the study area is uncommon, respondents were very much aware of investment activity elsewhere. While some expressed fear and opposition to private investors, particularly regarding concerns over lost access to land and water resources, others were open to the potential benefits that private investment may bring if their communities are properly consulted and their rules respected. The findings suggest that strengthening pastoralist’s rights to land and water and building their capacity to negotiate with investors is key to enabling communities to protect their livelihoods from unwanted investment and negotiate mutually beneficial agreements with the private sector.

## **PASTORAL LIVELIHOODS**

### **LIVESTOCK ASSETS**

As is expected for this area of Ethiopia, livestock-based livelihoods are very common amongst the surveyed households. More than four fifths of households (86%, 3,302) herd cattle, while sheep and camel ownership are less common. About one third (30%, 1,136) of households own and herd sheep, and a minority of households herd camel (18%, 676).



Table 13 below reports livestock ownership based on the household survey by woreda (Guji Zone or Borana Zone) by average herd size in tropical livestock units (TLU) and TLU per capita.<sup>47</sup> TLU is a Tropical Livestock Unit, equal to 250 KG live weight or 10 goats or sheep = 1 head of cattle = 0.7 camels = 1 TLU. Table 13 also reports the percent of the herd as measured in TLU that is female, the percent that is cattle, the percent that is small stock (sheep and goats), and the percent that is camel.

**TABLE 13. HOUSEHOLD HERDS BY SITE**

Woreda	Have Animals	TLU	TLU per Capita	Female	Cattle #	Small Stock #	Camels #
<b>Borana Zone</b>							
Arero	0.944	7.8	1.4	0.74	0.76	0.14	0.1
Dhas	0.969	9.2	2	0.71	0.77	0.15	0.09
Dillo	0.958	15.6	3.7	0.78	0.76	0.12	0.11
Dirre	1	11.7	2.4	0.76	0.73	0.19	0.08
Miyo	0.971	10.5	2.4	0.69	0.79	0.17	0.04
Teltelle	0.836	6.2	1.2	0.55	0.78	0.21	0.01
Yabello	0.926	9.8	1.8	0.7	0.71	0.16	0.13
<b>Guji Zone</b>							
Gorodolo	0.975	8.5	1.3	0.73	0.87	0.09	0.04
Liben	0.917	9.1	1.7	0.64	0.76	0.16	0.08
Wadera	0.942	8.1	1.5	0.62	0.92	0.07	0.01

These are relatively small herd sizes for pastoral systems and are lower than other survey results in the study area, including the IBLI study mentioned earlier. Ideally, a pastoral household, with some level of diversified income sources, should have per capita herd holdings around 4.5 TLU or higher to ensure viability in the face of potential climate shocks (Fratkin and Roth 1990, Dahl and Hjort 1980). There are a number of potential reasons for the smaller herd sizes reported in this sample. As noted above, the sampling strategy adopted to allow for difference in difference comparison for the impact evaluation led to the selection of sites in the Guji agropastoral area that have smaller herds than would be the case for a random sample from Borana as a whole. Thus, the relatively low herd holdings that are reported could reflect the larger orientation to cultivation in the sample, which includes a large percentage of non-Borana households and fewer households that are mobile pastoralists. We speculate it also could be strategic on the part of household responses in anticipation of the roll-out of the Productive Safety Net Program (PSNP) to the zone. The PSNP is a poverty alleviation program where means-based targeting of poorer households creates an incentive to under-report livestock wealth. For discussion of a comparative case in northern Kenya, where underreporting of livestock holdings also may have distorted ownership data in a pastoralist safety nets project area, see Kratli and Swift (2014).

## LIVESTOCK ACQUISITION AND LOSS

We summarize here key aspects of livestock acquisition and loss processes amongst the surveyed households and particularly note some of the qualitative information tying these processes to drought conditions in the area. Births were the most common way that households acquired new livestock. Overall, 78% (3,004) of survey respondents affirmed that their household has had livestock born in the previous year (since October 2013). This percentage is slightly higher for the control group (81%,

<sup>47</sup> To arrive at the average herd size by site including those with zero herd, the livestock herd owning percentage can be multiplied by the reported average TLU herd size or TLU per capita of those owning animals.

1,338). Cattle (61%, 2,341) and goats or sheep (60%, 2,310) were the most common new livestock born. Camels made up only 6% (231) of livestock born in the past year. Additional statistics for livestock acquisition and loss can be found in Table 1.8 of Annex 1.

One Aba Eela described how it was possible for animals to give birth despite the drought in his dheed: “The discourse about drought is overcome. Since then the heavens started raining slightly at least. We got a decent change. The cattle are giving birth; see they are pregnant...When a drought has passed, the government helps us by loading ‘Furushka,’<sup>48</sup> a kind of animal feed made in agroindustry. We survived after our cattle perished en mass.”

Other means of livestock increases were less common than acquiring livestock through breeding, as only 12% of households (478) reported acquiring new livestock through other means. Youth-headed households (18%, 244) were more likely to report other new livestock acquired, perhaps due to life events such as marriage and the birth of children or the need to establish a new household ( $F=50.95$ ,  $p<0.001$ ). With only 8% of households in each group reporting other new livestock intake, female-headed households (63) ( $F=16.33$ ,  $p<0.001$ ) and poor households (79) ( $F=21.00$ ,  $p<0.001$ ) were less likely to acquire livestock than male-headed households and non-poor households.

Goats and sheep were the most common animals acquired through other means (57%, 242), perhaps because they are common gifts for households at life events. Cows were also a common type of livestock acquired (45%, 190), but very few camels were acquired through other means (4%, 17).<sup>49</sup>

Outside of acquiring livestock through breeding, most new cattle and camel intake was through purchase (84%, 158 and 88%, 15, respectively). Some purchases of goats, sheep, or camel as opposed to cattle were motivated by drought conditions. Another Aba Eela clarifies that cattle were the worst affected by drought in his area: “Camels eat trees...But the cattle, if they don’t get pasture from the ground they die...” A third Aba Eela explicated: “Concerning cattle herding, people are changing their rearing situation. That is, if a person has two cattle, [the person] sells the other to buy a camel, goat and so forth.”

## LIVESTOCK OFFTAKE

More than half of survey respondent households (55%, 2,130) affirmed that they had sold or given away livestock in the past year. Treatment households were slightly but significantly less likely to have sold or gifted livestock in the previous year (53% of treatment (1,163) versus 59% (967) of control).

There were significant differences in offtake occurrence between sub-groups. Female-headed households and poor households were significantly less likely to offtake livestock, likely because their stocks were already lower than those of male-headed households and non-poor households. 45% of female-headed households (345) reported livestock offtake, compared to 58% of male-headed households (1,785,  $F=45.74$ ,  $p<0.001$ ). Only 31% (299) of poor households reported livestock offtake, compared to 64% of non-poor households (1,831,  $F=308.61$ ,  $p<0.001$ ).

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<sup>48</sup> This is made of teff straw and sometimes used as animal feed.

<sup>49</sup> Percentages do not add to 100% because respondents were allowed to select more than one type of animal obtained.

The overwhelming majority of livestock offtake was through sale in order to cope with drought. In particular, 99% (1391) of households report cattle offtake through sale, with 81% (1132) of households stating that this was to cope with drought.

Livestock loss, defined as death or loss of livestock that were not slaughtered for meat or sold, during the preceding year was reported by 60% (2,305) of households.<sup>50</sup> Overall, 4% of households (103) lost camel over the year, 49% (1,120) lost cattle, and 75% (1,738) lost one or more goats or sheep.<sup>51</sup> Table 1.9 in Annex 1 shows the average number of livestock lost per season.

The biggest reasons for animal losses over the year were starvation and drought, disease, and predators. Goats and sheep were most often lost to disease (86%, 1,498), drought and starvation (21%, 360), and predators (10%, 178). Cattle were killed by disease (78%, 871), starvation and drought (29%, 325), accidents (5%, 55), and predators (4%, 47). Camels were lost to disease (81%, 79), accidents (13%, 13), and starvation and drought (12%, 12).

The interview respondents focused on the poor conditions of livestock due to drought. Women from a focus group in Godansa stated that: “Our cattle are dying.” They continue to explain that: “those who have the capacity to feed cattle by buying grass from town do so; others have said that they have decided to die before our cattle do and feed the cattle corn—their own food—and that is why a few of the cattle survive today.” An Aba Dheeda similarly explained that: “The cattle are too exhausted to move [to find water]. They are falling and sleeping.” Many respondents also spoke of cattle that were too skinny to sell or that could not stave off diseases due to weakness and hunger.

## **FARMLAND—ACCESS, USE, INVESTMENT AND GOVERNANCE**

### **ACCESS TO AND USE OF CULTIVATED LAND**

There has also been rapid growth of cultivation in this area. The survey collected information on how much land is being cultivated and with what kinds of crops to establish a baseline on the role of cultivation currently in the production system. Questions were also asked about how land was obtained, people’s perceptions of the transparency of the procedures that led them to have land ownership, as well as the type of ownership they felt that they had. Finally, the household dataset includes information on crop-livestock land use conflict that can indicate the degree to which integrating these production systems is leading to competition and disagreements.

Eighty-one percent of all households have access to farmland. Eighty-eight percent of households (2,744) have access to a single plot, but another 12% of households (367) control two to five plots. It should be noted that a large percentage of Borana who claim access to farmland actually are not actively farming the land. All together, the average household accesses just under half a hectare of ‘watered’ land (0.49, sd=1.75). Marginalized groups have significantly less access to farmland. Just 62% of female-headed households (476) have access to farmland, 24% less than male-headed households ( $F=243.04$ ,  $p<0.001$ ).

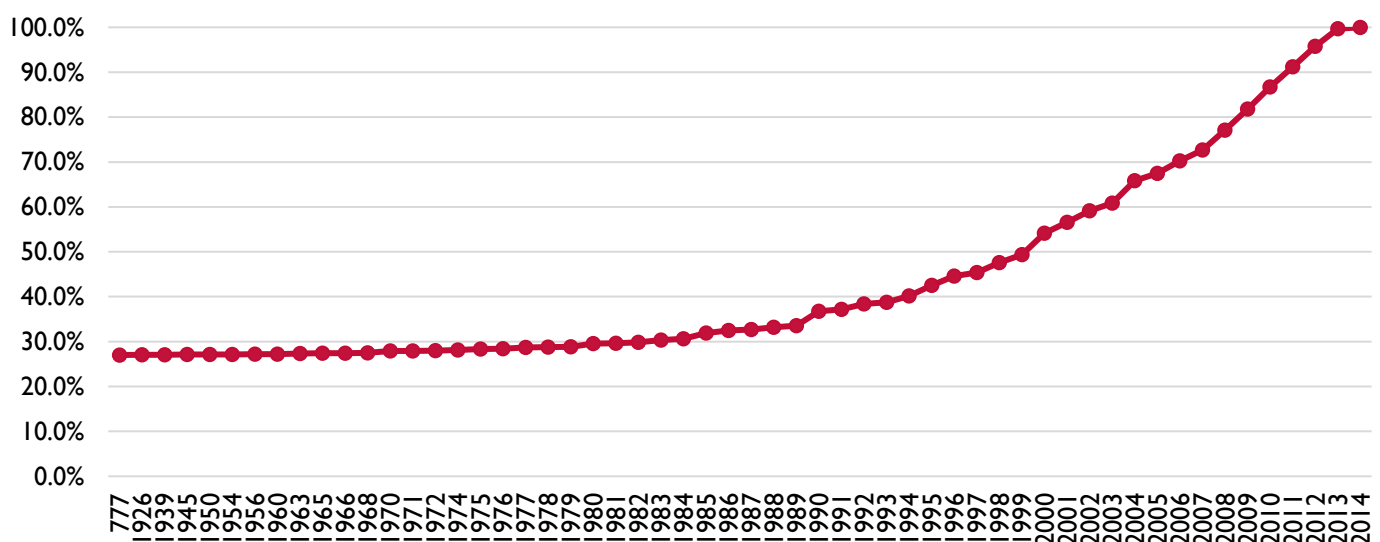
50 Only 13% of households (507) slaughtered livestock in the past year (since October 2013). Almost all of these were households who slaughtered goats or sheep (91%, 462), since no camels were slaughtered for consumption and only 7% of these households (38) slaughtered cows. Female-headed households ( $F=21.48$ ,  $p<0.001$ ) were significantly less likely than male-headed households to report slaughtering livestock. While 15% of male-headed household slaughtered livestock for consumption, only 8% of female-headed households did the same. Only 3% of poor households reported slaughtering livestock in the preceding year, a highly significant difference from non-poor households, who slaughtered livestock at a rate of 17% ( $F=123.10$ ,  $p<0.001$ ). This is likely also attributable to lower livestock holdings by female-headed households and poor households.

51 Percentages don’t add to 100 because households may have lost multiple types of animal.

Similar trends are shown with respect to socioeconomic status—poor households are 19% less likely to have access to farmland than wealthier households (60%, 571;  $F=396.52$ ,  $p<0.001$ ). There are also differences by age, but the magnitude is smaller—youth-lead households are only 4% less likely than older households to access farmland (79%, 1,101;  $F=7.47$ ,  $p<.01$ ). There is no statistically significant difference in the area of ‘watered’ land accessed among any of these groups. There are also significant regional differences in land access. In control sites, 88% of households (1,482) have access to farmland, 12% more than in treatment sites ( $F=76.19$ ,  $p<0.001$ ). However, the area of farmland in control sites is much smaller, averaging just 0.37 ha ( $sd=1.50$ ) to .60 ha in treatment sites ( $sd=1.94$ ;  $t=-3.92$ ,  $p<.001$ ), although, as mentioned above, many Borana are not actively farming their plots.

Women’s rights to farmland vary by place, but the overall trend was that women had recently gained the right to plough under certain circumstances where there is no man available to plough for her. As a woman’s discussion group in the Guji zone/Godansa reera noted: “In the past husbands claimed that the children were his own, and the cattle, and other resources because he felt that the wife did not bring anything from her parents while married.....Women cannot plough land. Females cannot claim the land as the husbands administer the farmland. [But now] Those who do not have a husband or commit divorce can share her half [of the land]. At this time he ploughs his land and she does the same.” The Aba Reera of a Guji community similarly stated: “Now a woman farms her land like a husband does. If the husband is alive, he farms. If she gets older but has a son, he inherits the land. If she doesn’t have a son, nobody takes over the land; her family inherits it.”

In the household questionnaire, plot-specific information was asked for all fields owned by the household. Figure 6 (below) provides an overview of the founding year of plots by recording the cumulative percent of all fields identified in the survey that were established in a given year. Twenty seven percent of plots (949) reported that they have had the land ‘as far back as anyone can remember’.



**FIGURE 6. CUMULATIVE PERCENT FOR WHEN A CULTIVATED PLOT WAS ESTABLISHED**

Source: LAND Survey Data

Six percent of plots were acquired earlier than 1989. In the 1990s, there is an acceleration of fields being obtained, with 16% of plots acquired between 1990-1999. From 2000 to present almost half of all fields were obtained. Thirty two percent of plots (1,131) were acquired between 2000 and 2009, and 18% of all plots (546) were acquired since 2010, including 50 (1%) acquired in the past year. This period

coincides with government-led interventions to certify household farmland rights in the Ethiopia's highland areas, including in Oromia (Deininger et al. 2011). The acquisition of land for cultivation has been extremely rapid and pervasive over the past ten to fifteen years; around 70% of fields were established in the past 25 years (Figure 6).

Table 14 reports the proportion of household survey respondents who farm and have access to a rain-fed plot (a rough proxy for productivity), along with the size of each type of plot, respectively. Rain-fed plots represent lowland fields that become inundated following heavy rains rather than plots on irrigation schemes fed by canals.<sup>52</sup> More than half of respondents report that they farm. In a few cases, households report both rain-fed and non rain-fed land holdings. Of households who farm land, 97% farm at least some non-irrigated land, and 12% farm at least some irrigated land. Perhaps surprisingly, female-headed households are slightly more likely to farm some irrigated land than male-headed households (15%, 80). Irrigation is also more common in treatment areas (18%, 338) than in control areas (6%, 91). As irrigation investments are often NGO- or government-sponsored, it may be the case that female-headed households have been specifically targeted by these investments. It is also worth noting that government certification efforts have in some arid areas been associated with irrigation investments.

**TABLE 14. HOUSEHOLD FARMS LAND, BY IRRIGATION TYPE**

	All Households		Male-Headed Households		Female-Headed Households		Non-youth		Youth		Control		Treatment		Other		Poor	
	Number (#)	Percent (%)	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Irrigated land	429	12%	349	12%	80	15%	276	12%	153	13%	91	6%	338	18%	346	12%	83	14%
Test statistic			5.67 (.02)**				.14 (.71)				132.24 (<.001)***				1.47 (.23)			
Non-irrigated land	3408	97%	2906	97%	502	97%	2220	97%	1188	97%	1645	99%	1763	95%	2824	97%	584	96%
Test statistic			.82 (.36)				.001 (.98)				57.09 (<.001)***				1.608 (.21)			

Not all land is reported to be under cultivation (Table 15). It appears that in some sites, land claims are being established on fields that are either left fallow or used for pasturing animals. 53% of plots (2,034) are currently used for cultivation, and an additional 21% (823) are fallow. 9% of plots (346) are used for grazing after harvesting.

**TABLE 15. FARMLAND USE, BY PLOT**

	No		Yes	
Response Category	Number (#)	Percent (%)	Number (#)	Percent (%)
Cultivation	1795	47%	2034	53%
Fallow	3006	79%	823	21%
Pasture	3483	91%	346	9%
Rented out	3824	100%	5	<1%
Unused	3817	100%	12	<1%
Sharecropped out	3824	100%	5	<1%
Borrowed out	3827	100%	2	<1%

52 Despite the original phrasing of the question, which asked about irrigated plots, respondents did not make the distinction between canal- and flood-based irrigation. In fact, our impression is that, with few exceptions, those who indicated using irrigated lands were referring to flood-based irrigation not canal- or channel-based irrigation.

An insignificant number of plots are also used for sharecropping (5, <1%), rented or borrowed out (7, <1%), or left unused (12, <1%). There is not much evidence that land is being claimed in order to rent it out, although there is a small degree of renting out plots in exchange for a share (usually one-third) of the harvest, which is a form of sharecropping found in Gorodolo Woreda.

Respondents were also asked how they obtained their fields. The most common response is that they went out and cleared a field (43%, 1,378); followed by receiving land from the government (17%, 661) and from community elders (14%, 546). It is highly likely that those who cleared land for small plots were making claims to unproductive, bush-filled rangelands, so that neither customary leaders nor administrators would have been overly concerned about the use of these lands. Had the individual attempted to make a claim to an important grazing or watering point, permission would likely have been sought. Four percent of plots (144) received land as a gift, usually from a family member. Households in treatment sites who claimed to have access to a plot are significantly more likely to receive land from the government (21%, 453) than households in control sites (12%, 208). Plots claimed by youth-led households are more likely to be given by community elders than plots claimed by older households (31%, 428;  $F=130.97$ ,  $p<0.001$ ). Individual user rights/control of land is the most common description of use rights to plots that they farm (76%, 2,928). The household head controls the right to use 92% of plots (2,707). The spouse is considered to control only 1% of plots (48).

Farming land that is not controlled by the household is not common. 'The community' is reported as controlling just 1% of plots (56), and another 1% (51) are controlled by the government. Only 2% of plots (80) farmed by respondents are land borrowed or rented from other households. Detailed statistics are available in Table 1.10 of Annex 1.

In a few sites, there appears to be an increasing level of control over this process by the government or the elders, but for the most part farms are still claimed by clearing vacant land. However, this does vary by woreda. In Dillo, a mainly low rainfall pastoral district of minimal farming, those families who do cultivate in the northern part of the district mainly obtain land by clearing it. By contrast, in two other Borana woreda, Yabello and Teltele, and the Guji woredas with the most farming activities and the highest demand for land, access to farm lands often is obtained from local government. In a few communities in Guji Zone, good farmland is increasingly difficult to access even when the farmer seeks permission from the administration.

As explained by the Aba Reera of a Borana community: "A person who needs farmland asks the Aba Reera...the Aba Reera asks the Aba Gada..." The Aba Dheeda of a Guji community also noted the government's involvement: "Yes, for example in Dheeda of Ganale, we discussed and identified land suitable for farms. In addition to that in our area, the Pastoralist Development Office has already identified farmland, grazing land and forestland. According to our culture you can't cultivate any land you want without permission." The Aba Dheeda of another Guji community explains how this type of process differs from the past: "In the past anybody could take land and cultivate it as he needed. There was no law that governed the proper utilization of land. But at this time if you need land for a farm you have to ask elders and the government cabinet to get it and nobody can take land on his own without permission like before. There is no farmland in the closed area for pasture; both are separated from each other." These examples highlight the increasing role of the government in managing land access.

The most common crop grown for any purpose is maize, planted on 84% of cultivated plots (1922) and teff, planted on 32% of cultivated plots (737). For the land that was cultivated in the past year, the most common crop planted is maize. Overall, most of the cultivation is grain and pulse oriented, for example,

beans and lentils (see Tables 16 and 17). Cash crops, though rare, include coffee (1%, 8), chat (<1%, 6), sugarcane (<1%, 4), and sesame (1%, 15).

Teff is 20% more likely to be planted in fields in the control area than the treatment area (43%, 454), and appears to be a substitute for other grains. Maize, wheat, and beans are all significantly less likely to be planted in control areas than treatment areas. Teff is also 11% more likely to be planted by wealthier households than poor households (34%, 641). Additional statistics about crop cultivation by subgroup are available in Table I.11 of Annex I.

**TABLE 16. CROPS GROWN, BY PLOT**

Response Category	No		Yes	
	Number (#)	Percent (%)	Number (#)	Percent (%)
Barley	2156	94%	130	6%
Beans	1599	70%	687	30%
Maize	364	16%	1922	84%
Millet	2169	95%	117	5%
Sorghum	2199	96%	87	4%
Teff	1549	68%	737	32%
Wheat	1932	85%	354	15%
Banana	2281	100%	5	<1%
Vegetables	2274	99%	12	1%
Coffee	2278	100%	8	<1%
Chat	2280	100%	6	<1%
Sugarcane	2282	100%	4	<1%
Sesame seed	2271	100%	15	1%

## FARMLAND INVESTMENT PRACTICES

For farmland, improved land management activities, such as fertilizer or conservation farming practices, are not widespread—a full 45% of plots are not engaged in any land management activity at all (1,704). The response of ‘nothing’ predominates for the majority in all but two sites (Table 17). In the two sites of Yabello and Teltele, which are the exception, there is much more evidence of intensification than in other sites. We interpret this intensification as a result of heightened competition between farming and grazing for land. The Guji sites and Yabello and Teltele show increased intensification and are characterized by strong competition between farming and grazing. These locations also have comparatively high population densities for the region and a likely shortage of farmlands, which could explain the presence of more intensive farming systems than at other sites.

**TABLE 17. FARMLAND MANAGEMENT PRACTICES**

Response Category	All	
	Number (#)	Percent (%)
No activity	1704	45%
Farmyard manure	359	9%
Chemical fertilizer	251	7%
Soil bund	199	5%
Bench terrace	84	2%
Infiltration ditches	55	1%
Composting	50	1%
Mulch	37	1%
Stone bund	25	1%
Graze animals	23	1%
Trash line	16	<1%
Minimum tillage	16	<1%
Slash and burn	7	<1%
Fallowing	7	<1%
Hedge rows/shurbs	6	<1%
Log line	4	<1%
Plant trees	4	<1%
Ridge and furrow	3	<1%

Of the remaining 55% of plots where intensification occurs, no single activity is practiced on more than 10% of plots. The most prevalent activity is spreading farmyard manure, which is done on 9% of plots (359), followed by spreading chemical fertilizer, done on 7% of plots (251). Mulching (37) and composting (50) are also used occasionally to improve soil fertility, practiced on 1% of plots each.

After harvest, it is common for animals to graze on the plots. 91% of cultivated plots (1,933, 53% of all plots) are grazed on by the household's own animals, the rest by other households in the ola (6%, 154), households in the PA (1%, 13), or rarely, households outside of the PA (<1%, 9).

### **FARMLAND GOVERNANCE**

The difference in how farmland is obtained is matched in the response to whether respondents had any kind of registration document to the land that they claimed, including a tax receipt (Table 18). Not surprisingly, there is a correlation between where the government is reported to have granted written permission or a certificate for long-term use of the land and the possession of a document attesting to the household's rights to cultivate the land. In most sites, however, documentation is rare, and ultimate ownership of the land still is vested in the state.



**TABLE 18. DOES THE HOUSEHOLD HAVE DOCUMENTATION FOR THE LAND?**

	All		Male		Female		Non-Youth		Youth		Control		Treatment		Other		Poor	
Response Category	Number (#)	Percent (%)	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Yes	1071	31%	924	31%	147	28%	737	32%	334	27%	422	25%	649	36%	910	31%	161	27%
No	2424	69%	2053	69%	371	71%	1541	67%	883	72%	1271	75%	1153	64%	1983	68%	441	73%
Don't know	12	<1%	11	<1%	1	<1%	6	<1%	6	<1%	6	<1%	6	<1%	9	<1%	3	1%
Chi-square test statistic			1.87 (.39)				10.20 (p<.01)**				50.52(p<.001)***				5.70 (.06)^			

\* p &lt; 0.10

\*\* p &lt; 0.05

\*\*\* p &lt; 0.001

31% of plots (1,071) have some type of documentation. Of plots with documentation, 83% (885) have a tax card, also called a “tax certificate,” “green card,” “registration card,” or a “registration certificate.” Another 12% have a tax receipt, proof that the household paid tax on that land in the past year. Since rural residents have to pay some form of tax, including those without a plot, the presence of a tax receipt cannot really be equated to having certification to use the land, which means that the figure of 31% with a registered farm is considerably lower.<sup>53</sup> Once again, it is those districts where farming is most important where one finds a higher incidence of some form of documentation for individual farm plots. One other finding from the analysis merits note. Significantly, 28% of female-headed households reported they have some type of documentation for their farm compared to 31% for male-headed households.

Respondents were asked if they felt the process that led them to get each plot of farmland they claimed was fair and transparent (Table 19). Those who responded yes were given a five-point scale in reaction to the statement, ‘the process by which I obtained this land was fair and transparent’ (Table 20). Generally, there is agreement that the process is fair and transparent, with less than 15% of the respondents in each site disagreeing with the statement. However, it should be noted that this question was only asked of those who obtained a plot but not those who did not obtain a farm plot. In this sense, it is not surprising there was a high level of satisfaction with the land allocation process since the question was only asked of those who had successfully obtained land.

**TABLE 18. INDICATOR 1—FAIR AND TRANSPARENT FARMLAND ALLOCATION PROCESS**

	All		Male		Female		Non-Youth		Youth		Control		Treatment		Other		Poor	
Response Category	Number (#)	Percent (%)	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Yes	867	23%	474	24%	120	16%	551	23%	316	23%	362	21%	505	24%	712	25%	155	16%
No	2789	73%	220	73%	578	75%	1768	73%	1030	74%	1301	77%	1497	70%	2066	72%	732	76%
Don't know	158	4%	90	3%	68	9%	115	5%	43	3%	27	2%	131	6%	92	3%	66	7%
Refused	6	<1%	2	<1%	4	<1%	3	<1%	3	<1%	3	<1%	3	<1%	1	<1%	5	1%
Chi-square test statistic			19.95 (p<.001)***				.04 (.85)				6.01 (.01)*				24.76 (p<.01)***			

\* p &lt; 0.10

\*\* p &lt; 0.05

\*\*\* p &lt; 0.001

53 The most common response was ‘card’ – 444. This is followed by tax paying card / tax card / card tax at 208. ID card is 124. Receipt is 108. Certificate / land certificate is 67. Tax payment is 39. Registration card is 21. Green card / green card certificate is 17. Official document is 14. All others are in single digits.

A large majority of households (81%) who received farms agree with the statement ‘The process by which I was allocated this parcel of land was fair and transparent’. The satisfaction levels are similar in treatment and control sites, as well as between female- and male-headed households. Poor and youth-headed households, however, report slightly higher rates of dissatisfaction.

**TABLE 19. INDICATOR 2—FAIRNESS OF HOUSEHOLD FARMLAND ALLOCATION PROCESS**

Response Category	All		Male		Female		Non-Youth		Youth		Control		Treatment		Other		Poor	
	Number (#)	Percent (%)	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Strongly disagree	83	2%	68	2%	15	3%	43	2%	40	3%	33	2%	50	3%	63	2%	20	3%
Disagree	221	6%	190	6%	31	6%	132	6%	89	7%	114	7%	107	6%	176	6%	45	7%
Neither agree or disagree	250	7%	217	7%	33	6%	171	7%	79	6%	125	7%	125	7%	215	7%	35	6%
Agree	2196	63%	1881	63%	315	61%	1435	63%	761	62%	1060	62%	1136	63%	1820	63%	376	62%
Strongly agree	634	18%	552	18%	82	16%	413	18%	221	18%	329	19%	305	17%	546	19%	88	15%
Don't know	119	3%	76	3%	43	8%	88	4%	31	3%	37	2%	82	5%	78	3%	41	7%
Refused	3	<1%	3	<1%	0	0%	1	<1%	2	<1%	1	<1%	2	<1%	3	<1%	0	0%
Kruskal Wallis test statistic			2.07 (.72)				10.38(.04)*				6.11 (.19)				10.62 (.03)*			

\* p < 0.10  
 \*\* p < 0.05  
 \*\*\* p < 0.001

This pattern also is reflected in the key informant interviews and focus group discussions. In many interviews, respondents said they were satisfied with the land allocation process. An agro-pastoralist focus group from Gomolee Dheeda said “In this village there is nobody complaining about the lack of or shortage of farm land. Those who get the land were those who asked for it from the kebele. Those who didn’t get it didn’t request it.” Focus group participants from Dargagota said: “Yes, it is equal for everyone, clear; many people are coming with an application letter [to the government]; after that they will be given the land.” One Aba Reera explained: “The community members agree to share one hectare of agricultural land per household for those who want to cultivate side by side with cattle rearing.”

However, they also said the process was not transparent, and some inequities were also highlighted. The agro-pastoralist focus group from Gomolee Dheeda cited above said there were no complaints about farmland allocation, but simultaneously said “The farm land allocation is not transparent. Those who need farm land directly request it from the kebele. It is the kebele administration that allocates the land for those who requested it.” One focus group of poor/resource-constrained households indicates that they differ from the survey mean response noted above in that “the poor cannot get the better land, which is given to rich persons. There is no transparency in the distribution of land.” Since most land is claimed by clearing it, this would confirm a general acceptance that if a household clears the land, they establish a claim to cultivate on it (usufruct rights), and that is generally considered fair and transparent. It will be interesting to examine this issue in the near future (4-5 years) in those Guji communities where indications are that cultivable land increasingly is limited and, thus, one cannot gain access any more to farm land merely by clearing and farming it. As one Guji respondent noted about his kebele, “the land is getting limited, because of high population and because of the utilization of Kalo and farming. Earlier, everyone who asks legally for land, was given land.”

In some cases, limited land means that the current land allocation was frozen in place or the size of newly allocated plots are smaller than previous ones. The women's discussion group in the Guji zone/Godanza reera said, "Everybody can farm if he has hands and feet, whether poor or not...People can plough only what they have so far. They are not claiming additional land by creating cases." A focus group from Dargagota noted that "[the community] it remembers us who took [land] earlier. They took big land, but since the land is diminishing the community is murmuring. The difference of farmland is diminishing as well."

Female focus group discussants in the Ibsa Reera/Ibsa Kebele noted that keeping the current land allocation and banning land sales favored elders over youth. "As the government banned the exchange of land in terms of money, the Borana themselves have taken away their land. Elders own large plots of land and little goes to youths...youths take farmland to produce crops from those who have a larger size of land on a 1/3 harvest ratio system. Previously, we used to buy parts of land from large landowners to grow crops, but now that is banned. The only thing we can do is to take land on contract for one or two years. Borana's farmland is black and fertile even though we are not allowed to use it."

Less than a quarter of households (23%, 867) say they are concerned about some households being allocated more farmland than others, and surprisingly, female-headed and poor households are less likely to be concerned than male-headed or wealthier households.

The PA land allocation process for crop farming as shown in Table 20 has impacted household grazing patterns and livestock management. Forty percent of households (1,413) report having less area available for grazing. This is a bigger issue in control sites, where 41% of households (694) have lost grazing area, compared to 34% (719) of treatment households. PA land allocation made it more difficult for 6% of households to water livestock (225), especially for older and wealthier households who have more livestock to begin with. 5% of households believe that the land allocation system has increased distance to the grazing area (186), and another 5% think the process has converted the best grazing land into crop land (191). These statistics are similar across all sub-groups. Less than 1% of households reported increased conflicts (1) or soil erosion (7) as a result of the land allocation process, and a full 27% of households (1,036) report no impact on their grazing patterns and livestock management at all.

The overall picture is general agreement that the expansion of cultivation has come at the expense of the livestock production system, and in some of the areas, increased cultivation has even resulted in conflicts. One focus group of women emphasized that: "farm lands are expanding and...many are complaining there is not enough grass for weak cows and calves" (Focus Group, October 3, 2014).

**TABLE 20. IN WHICH OF THE FOLLOWING WAYS HAS THE LAND ALLOCATION PROCESS IN YOUR PA AFFECTED THE GRAZING PATTERNS AND MANAGEMENT OF YOUR LIVESTOCK?**

Response Category	All	
	Number (#)	Percent (%)
Reduced area for grazing	1413	40%
No impact	1,036	27%
More difficult to water livestock	225	6%
Convert best grazing land to crop land	191	5%
Increased distance to grazing area	186	5%
Soil erosion	7	<1%
Conflicts	1	<1%
Lack of rain	1	<1%

## LAND CONFLICT

The qualitative and quantitative instruments also included questions about any land and resource-related conflicts that may have occurred over the past year, the nature of the conflict, the impact of the conflict, if it was resolved and—if so—how it was resolved. If it was not resolved, we asked why not and what are the consequences and steps that may follow. We have a particular focus on uncovering disputes over use of rangelands with other herders, whether they are of the same ethnic group or not, conflicts between cultivators and herders, and conflicts that involve outside investors.

From the household study, conflicts are relatively rare (shown in Table 21) and impact less than 10% of households interviewed. When conflicts do occur, they tend to be local, between households of the same ola. Conflicts are just as likely to occur between the same ethnic groups as different ones.

Conflicts, especially interethnic boundary conflicts, tend to be resolved through government interventions in a way that leaves the majority of households satisfied.

**TABLE 21. HOUSEHOLD EXPERIENCED A DISPUTE IN THE LAST 12 MONTHS**

	All		Male		Female		Non-Youth		Youth		Control		Treatment		Other		Poor	
Response Category	Number (#)	Percent (%)	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Yes	593	15%	476	16%	117	15%	345	14%	248	18%	310	19%	283	13%	479	17%	114	12%
No	3236	85%	2583	84%	653	85%	2092	86%	1144	82%	1341	81%	1895	87%	2392	83%	844	88%
Chi-square test statistic																		

Conflicts show up as more prevalent in the qualitative responses, but even in these cases, most conflicts are local. One Aba Reera held that: “There is no other tribe we are in conflict with...the most common conflicts are over grass and water...” The Aba Herrega of a tulla well similarly claimed that: “The resources that usually cause conflicts are grass and water. Such internal conflicts are solved by the efforts of elders of the community.”

When asked about inter-zone or inter-woreda conflicts, most respondents said that they usually occurred along borders with other groups and regions. Earlier in the report, we highlighted the conflicts that occur along different administrative borders, especially near the boundary between Region 4 and Region 5. All but these kinds of boundary disputes are relatively small in terms of violence and incidence.<sup>54</sup>

Boundary disputes are the most common cause of conflict: 10% of households (381) have experienced a boundary dispute in the past 12 months. Boundary disputes are more common in the control area, where 13% (217) of households experience them, compared to just 8% (164) of treatment households.<sup>55</sup> Government intervention resolved 75% of boundary disputes (286), and 60% (205) of households are satisfied with the boundary dispute resolution process. After boundary conflicts, the next most common source of conflict is access to grazing land (4%, 137), followed by water sources (2%, 57). Conflicts about forest resources, the privatization of common resources, crop damage, salt licks, raiding, or other conflicts are reported by 1% of households or less.

The control sites bordering Region 5 (Somali Regional State) and Borana Zone and Yabello and Arero sites bordering Guji zone and Region 5 seem to be where most of the problems occur. In contrast, Dillo, Dirre, and Miyo are almost conflict-free. The focus group discussions and key informant interviews that were conducted in districts that bordered Somali Regional State and other ethnic groups showed higher incidences of reported conflict. Some of these were related to the establishment of the boundaries themselves, which have changed during the past 10 years. For example, one Borana leader from Liben district indicated that neighboring pastoralists from Region 5 have created conflicts with Borana communities: “they migrate as they want and.... graze the area we reserved for the dry season. and that is what caused conflict between us” (Interview, September, 2014).

Disputes are mainly between members of the same ethnic group, with the exception of Liben, Yabello and Arero, where there are conflicts between different ethnic groups. The conflict in these sites is mostly described as Borana-Guji and Borana-Somali disputes. Conflict between communities and outside investors is at this point not experienced as a problem.

Interview respondents mentioned external conflict as mostly a thing of the past. One Aba Reera explained: “There was frequent external conflict with other ethnic groups from the Somale regional state bordering us over pasture and water. Elders from both conflicting parties (Guji and Somale) solved

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54 Most conflicts overall take place between households in the same ola (31%, 230). These inter-ola conflicts are most likely to occur about water sources (53%, 30), grazing (47%, 64), forest resources (50%, 15), and crop damage (76%, 28). Another 32% (233) of conflicts take place between households in the same reera, including 40% of boundary conflicts (151). Ola-level conflicts between reeras account for 26% of conflicts (189) and are most common about privatization of common goods and other conflicts. Conflicts with outside investors are nearly nonexistent (3, <1%), and conflicts with non-investor outsiders are also rare, comprising just 5% (38) of all disputes—but 27% (10) of all raiding disputes. After boundary disputes, raiding disputes are also the second-most likely type of dispute to occur between different ethnic groups (52%, 16). All other types of conflict are more likely to occur between members of the same ethnic group.

55 Forty percent of disputes over boundaries (151) take place between households in the same reera but different olas and are more likely than any other type of conflict to take place between different ethnic groups (59%, 223). Among those experiencing a boundary dispute, 20% of households (76) report a household member was directly impacted by the disagreement. The biggest impacts were damage to assets or property (14%, 11) and conflicts or fighting, including violent conflict (30%, 23). Land was seized in 8 cases (11% of those who reported a conflict).

the conflict traditionally, by looking at cases in a democratic way.” Far more rarely, some mentioned ongoing issues related to conflict. Another Aba Reera said: “There is a conflict with other places like Guji by war...as a result of the conflict currently the Gurumsa people emigrated and left their land, home, farmers, seeds, crops, and honey bees, etc. Now, they face serious problems such as homelessness...”

Conflicts over grazing land sometimes lead to cattle raiding. An Aba Reera of a Borana community explained that: “There is a conflict between Borana and Gabra Bakka.... They do not want to accept the people who migrate to them...they start stealing cattle...The person who took one cattle must return five cattle as a means of compensation...if this is not done the case will be taken to court.” Another Borana Aba Dheeda said: “In our dheeda the main cause of conflict is the looting of livestock.”

Most respondents who discussed conflict focused on water resources followed by pasture usage. One Aba Dheeda who was asked to provide a representative example, said: “There was a minor conflict between people [over the timing of cattle drinking]...There are also conflicts over pasture. Another person may graze the pasture you reserved for the dry season.”

Several focus group participants and key informants also said that creating private land enclosures caused conflict. One Aba Reera said “Yes, there are many conflicts created by fencing pastureland. The villages have their own pasturelands. They never use each other’s pastureland. When we move our cattle from place to place, we fight with one another most of the time. Fencing the pastureland is important.”

One rare community that had investors nearby did claim that the investors caused problems. By buying off land to make a cement factory, investors reduced pastureland available. A customary leader of the community noted: “Especially, around the cement factory, the investors expand and take land. Those that reached a consensus with the investors and receive some benefit, like money, leave the land. Consequently, the land has become small and narrow and the cattle have disappeared.”

The survey also asked about how any conflicts that were identified were resolved. In general, conflicts are most likely to be resolved through government intervention. 54% of conflicts are resolved through government (393), and nearly all of them are boundary disputes (75%, 286). Government also resolves 38% of grazing disputes (52). However, the large number of boundary conflicts relative to other types may skew the data to overshadow the importance of traditional authorities, who are consulted more often for a wide variety of conflict types. Table 22 displays the responses for dispute resolution mechanisms.

**TABLE 22: DISPUTE RESOLUTION MECHANISMS**

	All		Boundary		Water		Grazing		Forest		Privatization		Crop damage		Salt lick		Raiding	
Response Categories	Number (#)	Percent (%)	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Through local elders' council	159	22%	46	12%	24	42%	45	33%	11	37%	4	31%	15	40%	1	50%	11	28%
Through gada council	65	9%	12	3%	11	19%	21	15%	9	30%	3	23%	6	16%	0	0%	2	5%
Through government intervention	393	54%	286	75%	18	32%	52	38%	7	23%	3	23%	5	14%	0	0%	10	25%
Conflict not resolved	108	15%	36	9%	2	3%	19	14%	3	10%	3	23%	10	27%	1	50%	16	40%
Other	5	1%	1	<1%	2	3%	0	0	0	0%	0	0%	1	3%	0	0%	1	2%

Traditional authorities, including the elders council and the gada council, are consulted for conflict resolution in 31% of conflicts (224) but are the most likely to be consulted for conflicts about communal goods. The elders' council is the most common source of dispute resolution for conflicts about water sources (42%, 24) or privatization of common resources (31%, 4). The elders' council is also consulted in 40% of conflicts about crop damage (15) and 28% of raiding conflicts (11). The gada council is also consulted frequently (9%, 65), though not as often as the elder council.

In the Liben, Arero, and Dhas woredas, people clearly rely mostly on the government to resolve conflicts, especially in border communities. Recall these are the sites where most of the boundary conflict is being reported. In the words of one Borana informant in a focus group discussion: "These days there is conflict between Guji and Borana, and the government is trying to bring peace....There is now a meeting to establish peace which is being conducted in Negelle town. The dispute arose over a pastureland around a place called Waleenso which we, the Borana, used previously in dry season" (female Focus Group discussion in Golba Dawa Dheeda, Bulbul Reera, September 2014).

Many respondents credited the government with resolving violent conflicts. An Aba Eela of a Guji community said: "The conflict that is happening with Guji is getting worse...the elders speak of culture and a fighter doesn't have any culture, how can an elder solve this? This is possible for the government to solve but not for the elders." An Aba Eela described government intervention that stopped conflict in his community: "That side is Guji, that side is Gabra, and that Kusho. In the past there was an intense conflict at the place where they border each other; but now after the government interfered it is improving."

By contrast, some respondents focused on the role of traditional authorities, even for boundary disputes or violent conflicts. An Aba Eela of a nearby Reera explained: "The conflict occurred this year between Borana and Guji was not over pasture and water...Not only that—[the] school [that] previously belonged to our community was taken by the other community by force and many people were killed during that time. The conflict was resolved by the traditional system where respected elders from two conflicting communities come together and solve conflict through jarsuma<sup>56</sup>; the government took the side of the Somale and dominated the Guji people." In Yabello and Wadera especially, respondents rely more on traditional authorities to resolve conflicts. Teltele respondents stand out for being heavily

<sup>56</sup> A group of elders.

reliant on the customary Gada system to resolve disputes. Gorodolo is distinct in that it has an elevated share of issues that have not been resolved. Clearly, there are nuances to conflict resolution that exist across the sites that further research will help us to understand.

More rarely, participants credited NGOs with conflict resolution help in addition to traditional authorities. One Aba Reera said: “There were conflicts among the neighbors surrounding each other such as Borana, Guji, Shani area (Somale)...The conflicts are resolved in the traditional way by the involvement of elders and familiar people as well as from each group of society. An organization namely Mercy has provided us the necessary training in conflict resolution. If anyone killed a person, stealing animals, and the like, elder people hold a meeting under the shadow to resolve the issue.”

Sometimes traditional authorities continued to resolve recurrent conflicts after the government established peace in the first place. A focus group of resource-constrained pastoralists from the Golbo Dheeda, Magado Reera that borders both Ethiopia and Kenya explained: “We have been in conflict for many years; we were killing each other and there was looting of livestock many times. But now we are living together in peace after the government called us together and settled disputes among us. We also have peace committees from both communities. If there is a conflict between neighbors it is the elders who settled disputes among them. There is no taking of cases to government body at all.” The peace allows free migration across borders: “At this time there is no water...now our cattle are in Kenya, they drink water from Ethiopia and graze pasture from Kenya.” One Abu Reera said: “We resolve the problems with the assistance of the government body...but currently, by discussion we live together without the help of the government body, we resolve the problems by discussing the consequences of war and peace.”

Traditional authorities were often referenced with respect to water usage and kalo/pasture usage; the government’s role was often seen as only one of implementation or enforcement. One Aba Eela said: “The role of administration is not enforcing. But they are simply managing cooperatively with the people’s representatives. There is no enforcement. The Eela is administered by the Aba Herrega.” An Aba Herrega of Dirre Dheeda said: “Although the government supports the rules for grass and water, the rules were first set by farmers through the Aba Gada. Regulations are set, implemented, and put into practice by the dheeda and water committee...In our reera, there is no internal conflict and no conflicts with other groups over land and water. Thanks to God.” The Aba Reera of a tulla community explained: “The Aba Gada establishes cultural administration rules...the Aba Herrega implements the rules...Whenever there is drought the customary leaders discuss with the Aba Reera on how to escape the drought, then they establish a plan...the Government administration shares a great role, for example it maintains the rules with regards to the Eela.”

Tellingly, satisfaction rates, shown in Table 23, though generally high (64%, 399), are lowest for conflict types most often resolved by government. Only 60% of households are satisfied with how boundary disputes are resolved (205), and 62% are satisfied with the resolution of land grazing disputes (73). Satisfaction with conflicts more likely to be resolved by traditional authorities have satisfaction rates between 74%-84%. Households are most likely to be satisfied with the resolution of water source conflicts (84%, 46) and raiding (83%, 20), and privatization and crop damage conflicts also have satisfaction rates above 80%.



**TABLE 23. CONFLICT -SATISFIED WITH PROCESS OF RESOLVING DISPUTE**

Response Category	Yes		No	
	Number (#)	Percent (%)	Number (#)	Percent (%)
Regional boundary	205	60%	139	40%
Water source	46	84%	9	16%
Grazing land	73	62%	44	38%
Forest Resource	20	74%	7	26%
Privatization of common resources	8	80%	2	20%
Crop damage	22	81%	5	19%
Salt licks	1	100%	NA	NA
Raiding	20	83%	4	17%

One Aba Reera explained his dissatisfaction with a government-resolved conflict: “The external conflict our reera experienced in the past 5 years was the one that occurred between the Borana and Guji...The resolution mechanism was not good or effective. Different officials from Oromiya Regional state were here for a month but no decision was given at all...The most experienced and effective way of conflict resolution in our area is the traditional system where elders restore peace through discussion (jarsuma).”

We would note that that this could be more a statement about the tractability of the problems being brought to a given resolution mechanism than the efficacy of the resolution actors, though this remains a topic for further research. There is a difference in conflict reporting based on the perceived severity of the conflict and whether or not parties from outside the area are involved, especially members of another ethnic group, indicated in the qualitative data. The interview data show that elders more often handled minor land- and water-related conflicts, while more severe issues, especially if physical harm or death resulted, were taken to the government. Even in the latter case, a common pattern is to try to resolve the conflict through customary means and, if unsuccessful, then the next step is to seek government intervention. The government may be dealing with cases that are harder to solve due to this approach. Based on the household survey, it appears the government is sought out the most to resolve difficult and major conflicts, but the outcomes of their decisions leave respondents the least satisfied compared with decisions of customary institutions and other groups.

## RANGELAND CONDITION

We asked a broad set of questions to assess people’s sense of rangelands areas to which they feel they have some degree of access and to assess the quality of the rangelands they use. In general, people express that the bio-physical conditions of the rangeland are not good and have gotten worse over the past five years. This pattern is reflected both in the household survey work, as well as the key informant interviews and focus group discussions. However, it should be acknowledged that a “nostalgic factor” often influences interviewer responses when making comparisons to the past. Respondents often point to better conditions in the past than the present, in the case of our survey even when the time span is only five years. In short, the past frequently is seen as better than the present, especially when conditions already are difficult.

There is not much difference in assessments of range quality of foora, dheeda, and warra areas. Responses are qualitatively similar. With few exceptions, respondents in focus groups and individual interviews also indicated that conditions in grazing and water conditions had deteriorated in comparison

to the past five years. Tables I.12 and I.13 in Annex I provide local perceptions of current rangeland areas and the five year comparison of rangelands for respondents with access to rangeland.

As Table 24 illustrates, the main factor believed to be the most important cause of the decline of dheeda rangeland conditions is 'lack of rain'. 82% (1,146) percent of respondents who believe that rangeland conditions are declining cited insufficient rain as a factor causing the decline, and 61% (2,353) of respondents said it was the main factor. Other factors listed as the main reason for the decline were 'human population increase' (11%, 409) and the 'expansion of farms' (10%, 389).

**TABLE 24. FACTORS CONTRIBUTING TO WORSENING DHEEDA RANGELAND CONDITION IN LAST 5 YEARS**

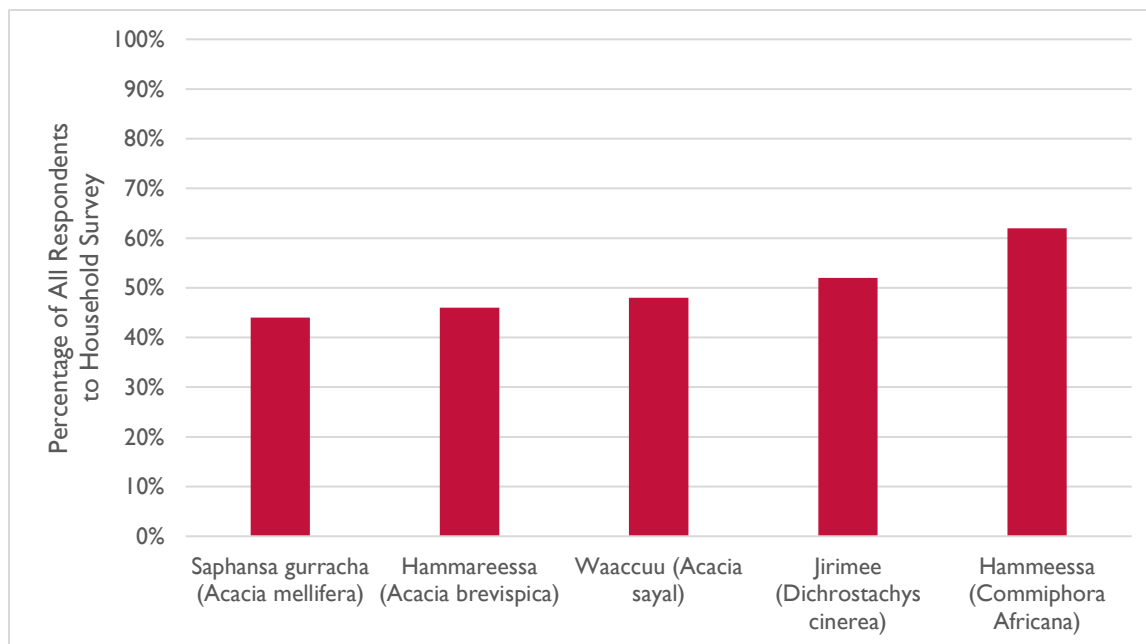
Response Category	All	
	Number (#)	Percent (%)
Lack of rain	1146	82%
Human population increase	591	42%
Expansion of farms	459	33%
Livestock population increase	350	25%
Poor rangeland management	140	10%
Soil erosion	104	7%
Expansion of kalo	60	4%

Lack of rain was also a primary reason cited by interviewees for worsening rangeland conditions, along with an increasing population and shrub growth. The focus group participants from the Ibsaa Reera focused on the drought: "The land is drying and both human and livestock are dying." Others mentioned the drought as well as human and shrub growth; for example, an Aba Dheeda in Borana said that: "The prevailing problem in the last five years is pasture has perished; cattle are not finding anything to graze, unnecessary shrubs are growing, rain is scarce...the cattle and human population have increased; these all affect pasture directly or indirectly." The focus group participants from the Hirmaye Reera said that: "...the rain and then the grass reduces yearly. The population also increases from time to time which is another main reason [for the rangeland quality reduction]."

Few interview respondents cited abundant rain as prevalent in their area. That said, even those that suffered from drought in some cases cited improvements, such as management practices to use pasture efficiently. The management practice of separating grazing land for each season was highly regarded. Another Abba Dheeda explained: "Yes there is improvement, because in the past dry and wet season grazing areas were not separated, and the separation has contributed to pasture improvement." The Dubuluk focus group participants also said: "Keeping livestock away from the dry season grazing area during the rainy season and then grazing that pasture during the dry season has great advantages."

Improved availability or care in using water was also a commonly cited improvement. Godansa female focus group participants discussed water management: "At this moment we have clean water to drink which is very good...In the past, cattle and men drank from the same pond. Men used to wash clothes, take baths, and let the cattle come into the ponds and drink...Recently, the ponds for cattle and men were separated...Thus, the purity of water is maintained for men to drink." One Aba Dheeda also discussed new water points: "We were drinking poor quality rain water with the donkeys...now it has improved because different water points operated by fuel have been constructed..." As one Aba Eela summarized: "Currently, the culture of using things wisely...that is, the ways of using land range pasture and water...increases."

From the qualitative interviews, a few individuals pointed to the fact that rain is no longer as effective as it was in the past because of degraded landscapes, which facilitate runoff. The decline in rangeland quality is also attributed to encroachment on rangelands by unpalatable shrubs, weeds, and trees. Figure 7 shows the five most commonly reported invasive bush species.



**FIGURE 7. GRAPH OF THE MOST COMMON INVASIVE BUSH SPECIES AS IDENTIFIED BY RESPONDENTS**

More than 70 percent of respondents in key informant interviews and focus groups pointed to increases in shrubs and unpalatable weeds, which in some interviews were noted to be toxic to livestock and often outcompeted quality grass species. Respondents often were very specific in giving the exact species with local vernacular names of shrubs and other plants that have proliferated in recent years, especially those that are harmful to pastures, as well as the livestock dependent on them. Table 1.14 in Annex I displays the most common invasive bush species seen in survey participants' daily herding area.

Qualitative responses stressed alien vegetation reducing the quality of rangeland conditions. For example, one Aba Reera said that: "The land...is taken by the shrubs and becoming grassless." In a Godansa women's focus group discussion, the participants explained that in Gujii: "There are acacias and small spiny trees that can spoil the grassland. These spiny trees can injure cattle's mouths when they graze." A Dargagoota focus group discussion in the Ibsaa Reera said that "there is a weed that harms the livestock; they do not give milk when they eat it. It's voraciously increasing."

A few participants noted that the government ban on the use of fires for bush clearing led to the recent increase in shrubs. One Aba Reera explained: "The land is occupied by vegetation; there is no space for pasture. The land is denuded. On the Gomole rangeland in the Yamadu reera, thorny vegetation is generally spreading across the land. According to past culture, if there was a pasture underneath thorny shrubs, the shrubs were burned out with a fire and then shoots grew into pasture. But now there are only shrubs. Now the government banned burning bushes..." Focus group participants from the

Hirmaye Reera had similar problems: “There is a tree that recently started to grow in this area; we call it Gadalla. The cattle die when they eat the plant.... We can’t destroy it because women build houses using it. We also fear the government might accuse us [of illegal deforestation] since it is part of the forest. The shrubs on the tree are also harmful.”

People identify the expansion of cultivation as a cause of rangeland loss, but in most sites it is not identified as a major cause of rangeland quality decline. Most respondents indicated that land was sufficient for both farming and livestock, and lands for farms and lands for pastures were kept separate. However, in a few important sites where there is considerable farming, such as Yabello, Wadera and Liben woredas, expansion of farms was identified as an important reason for why rangeland condition had deteriorated. In the words of one respondent, “the farmer who ploughs the land keeps the cattle away” (interview, August 29, 2014). Another notes that “in Dida Yabello the land is taken largely by farmland.” In contrast to these opinions, there is very little mention of cultivation as a problem for rangeland quality at the Dillo and Dirre sites, where there is only minimal farming.

# 5.0 BALANCE AND POWER ANALYSIS

## BALANCE

We use two approaches to check for balance across treatment and control groups on a set of anticipated household level covariates and outcome indicators. First, fixed effects linear regression models were run (Tables 25 and 26) using clustered standard errors at either the kebele or ola levels. To indicate balance, the outcome indicators listed in Table 25 below were regressed on a treatment dummy, and a non-significant treatment effect is used as an indicator that the variable is balanced across treatment and control observations. The primary advantage of this hypothesis-based approach is that it enables the inclusion of controls or design variables (e.g. village or strata fixed effects), although some scholars also view it cautiously as a reliable means to assess balance, primarily because significance rests to some extent on the sample properties and size (Imai et al 2008). Secondly, and as an additional check, we calculate the standardized difference in means for each variable across treatment and control groups, and report the standardized percent bias as a measure of balance (Austin 2009). Under this approach, variables with an absolute percent bias  $\leq 25\%$  are considered balanced (Stuart 2010). Together, both approaches indicate good overlap in means and distributions for these variables, across the treatment and control pool of observations, and do not suggest major balance concerns with the baseline data. We highlight that at this pre-analysis and pre-matching stage, the primary role of a balance check on the baseline data is to confirm that there is good overlap across the baseline treatment and control observations on key covariates and anticipated outcomes, such that we have confidence there is good potential to construct a strong and similar comparison group from the control pool of observations at the analysis stage.

The treatment site includes areas that are subject to the PRIME and LAND interventions. The control sites only include areas subject to the PRIME intervention. In this subset of variables, which includes a number of indices to measure key outcomes, the table indicates that the overall sample is balanced at baseline. At the kebele level, 2 of 16 variables are unbalanced based on the regression analyses (socio-economic status and livestock holdings), though none at the 1% level of significance.

**TABLE 25. KEBELE REGRESSION ANALYSIS**

Variables	Treatment		Intercept		Observations	R-squared
Milk production	16.623	(77.963)	22.900	(44.562)	3,829	0.105
Socio-economic status	-1.601**	(0.632)	0.910**	(0.361)	3,829	0.236
Food aid	74.209	(175.861)	98.940	(100.517)	3,829	0.250
Income	519.650	(1,499.642)	2,847.503***	(857.154)	3,829	0.205
Livestock	-7.902*	(4.368)	19.011***	(2.497)	3,829	0.224
Consumer durables	-2.406	(2.354)	15.521***	(1.346)	3,829	0.265
Owned farmland	-0.084	(0.124)	0.518***	(0.071)	3,829	0.352
Conflict frequency	-0.099	(0.130)	0.247***	(0.074)	3,829	0.306
Conflict—binary	-0.129	(0.088)	0.228***	(0.050)	3,829	0.375
Use of a foora	0.056	(0.096)	0.125**	(0.055)	3,826	0.263
Mobility during drought	-0.028	(0.090)	0.141***	(0.051)	3,828	0.225
Access to farmland	0.070	(0.107)	0.773***	(0.061)	3,829	0.214
Fairness of land acquisition (scale)?	0.235	(0.661)	3.207***	(0.378)	3,829	0.256
Land acquisition was fair?	0.091	(0.119)	0.680***	(0.068)	3,829	0.247
Literate	-0.220	(0.134)	0.741***	(0.077)	3,827	0.203
Size of household	-0.477	(0.704)	5.965***	(0.402)	3,829	0.157

Standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

**TABLE 26. OLA REGRESSION ANALYSIS**

Variables	Treatment		Constant		Observations	R-squared	% Bias
Milk production	-16.81	(27.44)	41.91***	(16.18)	-6.7	0.07	-6.7
Socio-economic status	-0.28	(0.22)	0.15	(0.13)	-18.0	0.17	-18.0
Food aid	-88.14	(67.62)	191.28***	(39.88)	-2.9	0.07	-2.9
Income	277.39	(530.46)	2,985.30***	(312.87)	-12.6	0.16	-12.6
Livestock	-1.01	(1.53)	15.08***	(0.90)	2.2	0.19	2.2
Consumer durables	0.27	(0.86)	14.00***	(0.51)	-30.1	0.16	-30.1
Owned farmland	0.01	(0.04)	0.46***	(0.02)	-14.9	0.20	-14.9
Conflict frequency	-0.08*	(0.04)	0.23***	(0.02)	-7.5	0.23	-7.5
Conflict—binary	-0.02	(0.03)	0.16***	(0.01)	-15.9	0.30	-15.9
Use of a foora	0.07**	(0.03)	0.11***	(0.02)	31.6	0.23	31.6
Mobility during drought	0.002	(0.03)	0.12***	(0.01)	20.7	0.14	20.7
Access to farmland	0.01	(0.03)	0.80***	(0.02)	-29.0	0.17	-29.0
Fairness of land acquisition (scale)?	0.21	(0.24)	3.22***	(0.14)	-28.8	0.16	-28.8
Land acquisition was fair?	0.05	(0.04)	0.69***	(0.02)	-30.9	0.18	-30.9
Literate	0.07	(0.04)	0.57***	(0.02)	-20.0	0.13	-20.0
Size of household	0.22	(0.24)	5.56***	(0.14)	-6.6	0.11	-6.6

Standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Drawing on the formal hypothesis test approach to check for balance, the regression results highlight two variables with potential balance issues. The first unbalanced key indicator is socioeconomic status.

On average, households in the control group are better-off than households in the treatment group. This includes higher expenditures and more food consumption. However, income, possession of durable goods, receipt of government aid, and milk production between the two groups are similar. The second unbalanced key indicator, significant at the 10% level, is livestock ownership. On average, control households own more livestock than treatment households; please note that this livestock index includes poultry, donkey/mules, as well as cattle, sheep, camels and goats. The final unbalanced key indicator is unbalanced only at the 5% level. Use of a foora for grazing is more common among treatment households than control households and is significant at the 5% level. However, the use of fooras during droughts is balanced between the two groups.

Drawing on the standardized difference in means, indicators that are less balanced include use of a foora for grazing (more common in the treatment group households), while control group households have somewhat more durables, believe land acquisition to be more fair, and have greater farmland access. However, the degree of imbalance is not severe, and the balance tests do not indicate major concerns for the ability to conduct strong matching across treatment and control observations for the envisioned evaluation analyses.

Overall, the baseline sample has good overlap on key covariates and outcome indicators, across treatment and control groups. Differences in baseline wealth, livestock, and rangeland use between Borana and Guji areas are noted and can be taken into account appropriately under matching-based approaches used for the endline analyses.

## POWER ANALYSIS

Power calculations for the LAND Oromia Design Report were based on a three-level cluster-randomized design with treatment at level 2 using the following standard parameters, where  $J$  represents the number of communities in the sample.<sup>57</sup>

- $\alpha = .05$
- $\sigma^2 = 0$  (fixed effects)
- $J=100, J=150, J=200, J=250, J=300$

Table 27 below provides the Minimum Detectable Effect Sizes under different assumptions about the data and sample size. While the standard parameters stay fixed, we altered (1) the number of households surveyed per cluster ( $N$ ) from 10-30, (2) the number of clusters (olas) involved in each arm of the LAND program from 100-300, and (3) the intra class correlation from .10 to .30. The results in Table 27 were used to inform the scope of the baseline data collection.

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<sup>57</sup> Please refer to the IE design document (Annex 4) for further information on the methodology.

**TABLE 27. SUMMARY OF MDES UNDER VARIOUS ASSUMPTIONS**

Ollas per arm	Power	Alpha	N	ICC	MDES	ICC	MDES
50	.80	.05	10	.10	.25	.30	.35
50	.80	.05	15	.10	.23	.30	.33
50	.80	.05	20	.10	.22	.30	.33
50	.80	.05	30	.10	.20	.30	.32
100	.80	.05	10	.10	.18	.30	.25
100	.80	.05	15	.10	.16	.30	.24
100	.80	.05	20	.10	.15	.30	.23
100	.80	.05	30	.10	.14	.30	.23
150	.80	.05	10	.10	.14	.30	.20
150	.80	.05	15	.10	.13	.30	.19
150	.80	.05	20	.10	.13	.30	.19
150	.80	.05	30	.10	.12	.30	.18

Source: Authors' calculations

In this section, we update the power calculations for the LAND Oromia IE by calculating the sample-based intraclass correlations (ICCs) for a series of anticipated outcome indicators at baseline. We use an average of the baseline LAND ICC to determine a more accurate MDES for the study. Overall, we find that the ICC for LAND household indicators ranges from .02 to .19 and has an average of .125. That being the case, our original MDES calculations in the Design Report represent valid estimates, and updated calculations based on the baseline data continue to indicate that the evaluation is powered to detect policy relevant effects for key household-level outcomes of interest. In particular, we estimate the detectable treatment effect for the following anticipated outcome indicators at baseline. The ICC for village clusters, mean ( $\mu$ ), and standard deviation ( $\sigma$ ) are included below:

- Milk Production ( $\mu = 33$ ,  $\sigma = 267$ , ICC=.02)
- Socio-economic status ( $\mu = 1.12e-09$ ,  $\sigma = 2.34$ , ICC=.12)
- Household income ( $\mu = 3143$ ,  $\sigma = 5449$ , ICC=.12)
- Livestock assets ( $\mu = .15$ ,  $\sigma = 16$ , ICC=.14)
- Consumer durables ( $\mu = 14.15$ ,  $\sigma = 9$ , ICC=.12)
- Own/use farmland ( $\mu = .47$ ,  $\sigma = .50$ , ICC=.16)
- Experienced conflict ( $\mu = .15$ ,  $\sigma = .36$ , ICC=.19)
- Satellite camp use ( $\mu = .16$ ,  $\sigma = .36$ , ICC=.19)
- Mobility during droughts ( $\mu = .13$ ,  $\sigma = .33$ , ICC=.10)
- Have access to farmland ( $\mu = .81$ ,  $\sigma = .40$ , ICC=.12)
- Fair land acquisition ( $\mu = .73$ ,  $\sigma = .44$ , ICC=.14)
- Literacy ( $\mu = .62$ ,  $\sigma = .48$ , ICC=.08)

A table of updated ICC values at each level is provided below (Table 28), calculated from the baseline dataset. We highlight that all of these ICC values are well within the range of typical for similar work within the social sciences and are also smaller than the estimated ICC values the evaluation team used in initial power calculations to design the study. They do not pose major concerns for study power or analysis<sup>58</sup>.

<sup>58</sup> The ICC is a measure of the degree of heterogeneity across clusters. Small ICCs values indicate that the similarity of response across different individuals within the same cluster, for a given variable, is not very different from the similarity in responses across individuals from different clusters (that is, responses are not strongly more similar within clusters than between clusters). When ICC values are high, typically



**TABLE 28. UPDATED ICC VALUES AT EACH LEVEL**

Variable	$\mu$	$\sigma$	ICC—Ola	ICC—Kebele	ICC—Woreda
Milk Production	32	267	.02	.02	.002
Socio-economic status	-1.12e-09	2.34	.11	.13	.06
Household income	3143	5449	.12	.12	.03
Livestock assets	15	16	.14	.11	.16
Consumer durables	14	9	.12	.19	.07
Own/use farmland	.47	.50	.16	.32	.20
Experienced conflict	.19	.50	.19	.19	.03
Satellite camp use	.16	.36	.10	.13	.09
Mobility during droughts	.13	.33	.12	.13	.09
Have access to farmland	.81	.39	.12	.11	.06
Fair land acquisition	.78	.41	.13	.14	.06
Literacy	.62	.48	.08	.09	.05

Given the actual household sample size (N=3828) and community number obtained at baseline (~200), we update the MDES using actual ICC values obtained at baseline, and then recalculate the study's ability to detect change across the indicators listed above. These results are displayed in Table 29 below. Although the study is powered to detect fairly fine-scale effects (See the MDES column in Table 42), given that some of the outcome indicators at baseline display quite large variability, the revised power analyses suggest that the study will be powered to detect an effect size ranging from 11% to 40%, depending on the outcome indicator.<sup>59</sup> For example, the study can detect a 20% change in conflict—in either direction—but may not be able to detect a smaller magnitude of effect due to the LAND program. In contrast, the study is powered to detect an 11% change in the asset holding index in the study area, which is a relatively fine-scale program effect.

**TABLE 29. POWER ANALYSIS SUMMARY**

Variables	$\mu$	%	$\sigma$	MDES	Estimated detectable effect for LAND
Milk production	33	NA	267	.05	+/- 13.35 (40%)
Socio-economic status	-1.12e-09	NA	2.34	.17	+/- .34 magnitude change
Household income	3143	NA	5449	.17	+/- 926 (29%)
Livestock assets	15	NA	16	.18	+/- 2.88 (19%)
Consumer durables	14	NA	9	.17	+/- 1.53 (11%)
Own/use farmland	NA	47%	NA	.19	+/- 19%
Experienced conflict	NA	15%	NA	.20	+/- 20%
Satellite camp use	NA	16%	NA	.20	+/-20%
Mobility during droughts	NA	13%	NA	.16	+/-16%
Access to farmland	NA	81%	NA	.17	+/- 17%
Fair land acquisition	NA	73%	NA	.18	+/- 18%
Literacy	NA	62%	NA	.15	+/-15%

As described above and in the background methods section, the evaluation is focused on identifying and measuring household level outcomes. Several household indicators can be aggregated up to explore

a greater number of observations must be sampled to detect an intervention effect at a desired level. Within the relevant literatures for this study, ICCs values above 0.30 indicate highly correlated data.

59 Please note that this analysis did not involve an attempt to remove outliers or reduce the standard deviations in any way.

group level processes at the ola level. However, based on direction from USAID, the initial study design did not include a community level survey, with the intention of investigating community level processes through the rich qualitative data. The study is underpowered to detect moderate or small changes at the community level, although the evaluation has the power to identify large treatment effects at the ola level for any treatment interventions administered at the kebele level or lower. In particular, given 52 kebele sites and 200 olas, the study has an MDES ranging from .50 - .60 for group level indicators with an ICC of .05 or less, assuming a kebele level covariate that explains 20% of the variance. As such, the baseline data suggests that the study will be powered to detect community level effects that are large in magnitude, but not finer scale effects; hence the focus on household level outcomes.

# CONCLUSION

The findings of the baseline report reveal a study area undergoing rapid change. Continued bush encroachment and expansion of settlements and farming has reduced the absolute amount and productivity of rangelands; human population in the area has increased considerably during the past 20 years, placing further limits on land availability and mobile pastoralism; and the reported increased frequency of droughts is major concern for land use and livestock management. With fertile land (for pasture or farming) increasingly in short supply, this may help account for the rise in the use of enclosures (*kalos*), both communal and private.

The findings in the report suggest that most households who obtained farmland do believe that the process for gaining access to farmland was fair and transparent, but it is not clear from the study whether or not those who did not acquire farmland share the same sentiment. Future follow-up research will need to ask this question from the full sample of households, those who acquired farms and those who did not. Although the Borana and Guji areas have experienced conflicts over land and boundaries in the past decade that have resulted both in losses of human lives and properties (Tache and Oba 2009; Richards et al. 2015), less than 10% of the households that were surveyed indicated that they had experienced conflicts over resources or other issues

In those cases where conflicts do arise, the baseline results show that households are most satisfied when customary elders resolve their conflicts. Elders are most likely to handle relatively minor conflicts over land and other resources that occur within an ethnic group, while larger-scale conflicts over administrative boundaries that involve loss of life and are more likely to involve different ethnic groups are often taken to government offices for mediation and resolution. Qualitative findings suggest that government methods for resolving disputes may help to lessen ethnic tensions over land. Nonetheless, customary institutions continue to play a key role in creating rules and regulations and imposing penalties in cases of rule infractions, and this applies both for the governance of land and for the governance of water. Indeed, the analysis suggests that there is an important opportunity for government and customary cooperation in the governance of land and water resources in the study area.

Under these challenging conditions, mobility of herders and their animals occurs as a means to deal with rainfall and pasture variability, and our analysis finds that customary authorities play an important role here. While government authorities place some restrictions on access and migration, these restrictions do not seem to significantly limit the use of satellite grazing camps for mobile pastoralists.<sup>60</sup>

On a positive note, women's rights seem to be expanding: women are serving on more committees, including important water committees. Girls are attending primary school more frequently, and women are inheriting land more often than in the past. Finally, a social norm common in Ethiopia is also changing: women are being allowed to cultivate land when no man is available to plow for her. These are positive changes.

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<sup>60</sup> A satellite herding camp (*foora*) is a camp located far from the settlement.

Our analysis identifies very little outside private sector investment in land in the study region; however, local people are increasingly aware of the prospect that investors might come to the area and are cognizant of the experiences of other regions where outside investment has occurred. In the study region, investments in large-scale mechanized agriculture and/or commercial ranching are viable options that might be attractive to investors. While the majority of local people expressed concerns about outside investors and possible impacts on local lands and livelihoods, some noted that it might be beneficial to have some investment by outsiders.

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# ANNEX I—SELECTED ADDITIONAL STATISTICS

This appendix includes additional descriptive statistics to supplement the LAND Oromia Baseline Report.

**TABLE I.I. PRIMARY ECONOMIC ACTIVITY OF HOUSEHOLD MEMBER**

Response Category	All	
	Number (#)	Percent (%)
Herding livestock at warra/foora	4,535	27%
House/domestic work	3,867	23%
Student	3,150	19%
Farming	2,789	17%
None	659	4%
Not working: too young	566	3%
Petty trade	278	2%
Casual labor	236	1%
Child/elder care	233	1%
Not working: too old	230	1%
Other	75	<1%
Not working: unable	69	<1%
Wage/salaried employment	67	<1%
Shop/business owner	36	<1%
Livestock trading	17	<1%
Unpaid work in family	15	<1%



**TABLE 1.2. HOUSEHOLD ASSETS OWNED**

	All Households (N=3829)		Female-Headed Households (N=770)		Youth-Headed Households (N=1392)		Poor Households (N=958)		Treatment Households (N=2136)	
Asset	Mean (#)	$\sigma$	Mean (#)	$\sigma$	Mean (#)	$\Sigma$	Mean (#)	$\sigma$	Mean (#)	$\sigma$
Donkeys	0.58	0.94	.40***	0.77	.43***	0.9	.11***	0.34	.55**	0.96
Poultry	2.29	3.69	1.6***	3.34	2.01***	3.46	.84***	1.82	2.02***	3.2
Plough	1.62	2.28	.91***	1.78	1.53*	2.13	.54***	1.22	1.51***	2.35
Animal Bell	0.2	0.8	.15*	1.02	.15**	0.83	.02***	0.14	0.19	0.8
Sickle	0.93	0.85	.59***	0.68	.83***	0.78	.51***	0.33	.80***	0.86
Pick Axe	0.76	0.79	.47***	0.63	.71***	0.74	.32***	0.5	0.75	0.8
Axe	0.79	0.73	.60***	0.6	.72***	0.68	.39***	0.51	.75***	0.72
Hand hoe	0.42	0.72	.25***	0.58	.38***	0.65	.16***	0.39	.32***	0.61
Spade	0.52	0.62	.32***	0.53	.44***	0.56	.12***	0.34	0.52	0.63
Machete	0.47	0.6	.30***	0.5	.44*	0.57	.15***	0.4	.36***	0.54
Beds	1.1	1.26	.92***	1.18	1.02***	1.17	1.06***	1.25	.67***	0.92
Basins	2.28	2.01	1.76***	1.53	2.35*	2.26	1.95***	1.86	1.41***	1.37
Mosquito nets	0.52	0.76	0.57	0.79	0.5	0.72	.56***	0.78	.39***	0.64
Mobile phones	0.41	0.62	.19***	0.47	.44***	0.56	.13***	0.35	.36***	0.59
Radios	0.2	0.45	.09***	0.4	.36***	0.49	.04***	0.2	.16***	0.44
Jewelry	0.47	1.72	0.46	1.66	.37***	1.28	.16***	0.83	.65***	1.99
Watches	0.33	0.57	.15***	0.43	0.34	0.54	.08***	0.27	.27***	0.56
Spears	0.37	0.71	.24***	0.66	0.34	0.68	.11***	.34	.33***	0.67
Chisels	0.18	0.49	.07***	0.46	0.18	0.43	.03***	0.19	0.18	0.49
Razors	0.79	1.14	.57***	1	.75*	0.88	.26***	0.56	.76**	1.27

- T-tests were used to measure the statistical significance.

- \* p < 0.10
- \*\* p < 0.05
- \*\*\* p < 0.001

**TABLE 1.3. EXPENDITURES IN THE PAST (IN ETB)**

	<b>All Households (N=3829)</b>		<b>Female-Headed Households (N=770)</b>		<b>Youth-Headed Households (N=1392)</b>		<b>Poor Households (N=958)</b>		<b>Treatment Households (N=2136)</b>	
<b>Expenditure</b>	<b>Mean</b>	<b>σ</b>	<b>Mean</b>	<b>σ</b>	<b>Mean</b>	<b>σ</b>	<b>Mean</b>	<b>σ</b>	<b>Mean</b>	<b>σ</b>
<b><i>In the Past 30 Days</i></b>										
Drinking water	12.1	85.2	9.5	35.1	10.6	52.7	13.4	69	14.7**	103
Clothing	182.6	425.5	103.4***	266.8	181.9	445.6	61.7***	169	148.1***	380.8
<b><i>In the Past 3 Months</i></b>										
Medicine	145.2	593.4	73.1***	267.1	143.6	742.4	79.7***	258.9	156.6	700.9
Health consultations	37.7	217.8	21.5**	122.7	29.8*	149.6	13.4***	62.27	28.3***	128.4
Traditional healer	13.3	237.2	5.6	42.9	8.5	49	3.6	24.6	15.7	310.6
Other health expenses	20.8	235.1	5.1**	52.7	25.3	313.8	4.8**	56	14	226
<b><i>In the Past 12 Months</i></b>										
School expenses	1123.3	6813.7	556.7***	2198.1	611.5***	5205.5	419.8***	3427.5	902.1**	4361
Transport	404.3	669	203.8***	458	421	667.4	185.7	428	325.3***	605.5
Water for animals	40	270.5	22.4**	118.1	33.7	166.7	13.0***	72.9	43.7	197.5
Fodder for animals	72.2	286.1	42.0***	164.6	66.2**	268.5	15.6***	78	80.8**	309.9
Veterinary expenses	102.4	266.3	58.2***	165.9	98.6	266.6	21.0***	63.3	108.4	305

– T-tests were used to measure the statistical significance.

- \* p < 0.10
- \*\* p < 0.05
- \*\*\* p < 0.001

**TABLE 1.4. CASH AND IN-KIND TRANSFERS, PAST 12 MONTHS (IN ETB)  
(HOUSEHOLD LEVEL)**

	All Households	Female-Headed Households	Youth-Headed Households	Poor Households	Treatment Households
Receive cash transfers	9% (339)	13% (103)***	8% (115)	10% (100)**	10% (221)***
Average value of cash received	1088 (331) sd=1422	793 (100)*** sd=699	1257 (113) sd=1885	615 (100)*** sd=711	963 (214)** sd=1222
Receive in-kind transfers	10% (379)	18% (138)***	9% (125)	15% (141)***	10% (223)
Average value of in-kind transfers	502 (369) sd=972	484 (133) sd=615	537 (120) sd=1319	455 (139) sd=569	563 (216) sd=1192
Provided cash transfers	8% (314)	4% (34)***	8% (106)	2% (18)***	8% (172)
Average value of cash given	967 (309) sd=1236	535 (34)** sd=547	835 (103) sd=1276	337 (18)** sd=393	974 (167) sd=1265
Provided in-kind transfers	263 (7%)	6% (48)	7% (93)	4% (34)***	7% (142)
Average value of in-kind transfers given	485 (263) sd=1020	624 (45) sd=1729	484 (92) sd=1044	568 (32) sd=1422	437 (138) sd=955

- T-tests were used to measure the statistical significance.
- \* p < 0.10
- \*\* p < 0.05
- \*\*\* p < 0.001

**TABLE 1.5. FOOD AID, FOOD FOR WORK, NGO AID, PAST 12 MONTHS (IN ETB)  
(HOUSEHOLD LEVEL)**

	All Households	Female-Headed Households	Youth-Headed Households	Poor Households	Treatment Households
Received food aid	11% (426)	5% (116)***	9% (121)***	14% (136)***	12% (259)*
Participated in a food-for-work program	8% (293)	10% (77)***	6% (80)***	9% (82)	9% (193)***
Received non-food government aid	4% (140)	6% (45)***	3% (42)	4% (41)	3% (70)
Received payment from investors	<1% (4)	NA	NA	NA	NA

- T-tests were used to measure the statistical significance.
- \* p < 0.10
- \*\* p < 0.05
- \*\*\* p < 0.001

**TABLE 1.6. AVERAGE SIZE OF COMMUNITY AND PRIVATE KALOS IN HECTARES**

Response Category	All			Control			Treatment		
	Mean ( $\mu$ )	Std. Deviation ( $\sigma$ )	N	$\mu$	$\sigma$	N	$\mu$	$\sigma$	N
Size of the community kalo	60.62	168.64	2055	40.72	128.4	430	65.62	177.43	1625
Test Statistic				-2.76(p<.001)**					
Size of private kalo	1.97	3.31	723	1.84	2.32	488	2.26	4.73	235
Test Statistic				-1.60(.11)					

- T-tests were used to measure the statistical significance.

- \*  $p < 0.10$

- \*\*  $p < 0.05$

- \*\*\*  $p < 0.001$

**TABLE 1.7. LIVESTOCK ASSETS**

Cattle	All Households	Female-Headed Households	Youth-Headed Households	Poor Households	Treatment Households
Herd cattle	86% (N=3,302)	73% (N=559)	83% (N=1,160)	64% (N=616)	85% (N=1,852)
Average herd size	7.44 (sd=7.36)	5.61 (sd=4.85)	6.21 (sd=5.61)	3.29 (sd=2.48)	7.05 (sd=7.49)
Own cattle	99% (N=3,265)	98% (N=548)	99% (N=1,150)	97% (N=595)	99% (N=1,825)
Average number owned	7.28 (sd=7.10)	5.42 (sd=4.40)	6.15 (sd=5.58)	3.10 (sd=1.78)	6.85 (sd=7.10)
Camel	All Households	Female-Headed Households	Youth-Headed Households	Poor Households	Treatment Households
Herd camel	18% (N=676)	14% (N=104)	15% (N=212)	4% (N=43)	20% (N=446)
Average herd size	4.32 (sd=4.53)	3.60 (sd=3.47)	3.93 (sd=3.99)	2.98 (sd=8.20)	4.20 (sd=4.90)
Own camels	>99% (N=673)	99% (N=103)	>99% (N=211)	95% (N=41)	99% (N=443)
Average number owned	4.45 (sd=4.12)	3.78 (sd=3.51)	4.09 (sd=3.86)	1.88 (sd=1.22)	4.35 (sd=4.31)
Goats	All Households	Female-Headed Households	Youth-Headed Households	Poor Households	Treatment Households
Herd smallstock	72% (N=2,763)	60% (N=464)	70% (N=976)	41% (N=390)	72% (N=1,576)
Average herd size	8.66 (sd=8.36)	6.70 (sd=6.41)	7.59 (sd=6.64)	3.84 (sd=2.53)	8.85 (sd=9.01)
Own smallstock	99% (N=2,741)	99% (N=458)	>99% (N=972)	97% (N=378)	99% (N=1,564)
Average number owned	8.50 (sd=7.83)	6.46 (sd=5.27)	7.53 (sd=6.55)	3.70 (sd=2.01)	8.65 (sd=8.25)
Sheep	All Households	Female-Headed Households	Youth-Headed Households	Poor Households	Treatment Households
Herd smallstock	30% (N=1,136)	25% (N=189)	26% (N=366)	13% (N=123)	39% (N=852)
Average herd size	5.10 (sd=5.20)	3.83 (sd=3.47)	4.58 (sd=5.17)	2.13 (sd=1.26)	4.96 (sd=5.25)
Own smallstock	99% (N=1,124)	97% (N=184)	99% (N=361)	93% (N=114)	99% (N=842)
Average number owned	5.07 (sd=5.18)	3.78 (sd=3.50)	4.57 (sd=5.17)	2.03 (sd=1.13)	4.92 (sd=5.23)

## LIVESTOCK ACQUISITION AND LOSS

**TABLE 1.8. LIVESTOCK ASSETS**

<b>Livestock</b>	<b>All Households</b>	<b>Female-Headed Households</b>	<b>Youth-Headed Households</b>	<b>Poor Households</b>	<b>(Treatment Households)</b>
Livestock born	78% (N=3,004)	69% (N=533)	77% (N=1,065)	51% (N=491)	76% (N=1,666)
Average number born	5.17 (sd=5.13)	4.16 (sd=4.18)	4.29 (sd=4.04)	2.40 (sd=1.85)	5.46 (sd=5.64)
Livestock intake other than birth	12% (N=478)	8% (N=63)	18% (N=244)	8% (N=79)	12% (N=267)
Average number acquired	2.28 (sd=2.96)	2.91 (sd=6.03)	2.31 (sd=2.53)	2.19 (sd=1.56)	2.42 (sd=3.37)
<b>Cattle</b>	<b>All Households</b>	<b>Female-Headed Households</b>	<b>Youth-Headed Households</b>	<b>Poor Households</b>	<b>(Treatment Households)</b>
Cattle born	61% (N=2,341)	50% (N=387)	58% (N=805)	34% (N=324)	58% (N=1,254)
Average number born	2.34 (sd=1.97)	1.93 (sd=1.22)	1.97 (sd=1.55)	1.55 (sd=0.81)	2.40 (sd=2.10)
Cattle intake other than birth	45% (N=190)	34% (N=19)	40% (N=85)	24% (N=17)	41% (N=92)
Average number acquired	1.61 (sd=1.17)	1.58 (sd=0.90)	1.55 (sd=1.20)	1.82 (sd=1.98)	1.51 (sd=1.03)
<b>Camel</b>	<b>All Households</b>	<b>Female-Headed Households</b>	<b>Youth-Headed Households</b>	<b>Poor Households</b>	<b>(Treatment Households)</b>
Camels born	6% (N=231)	4% (N=31)	5% (N=73)	1% (N=7)	6% (N=136)
Average number born	1.80 (sd=1.53)	1.74 (sd=1.15)	1.42 (sd=0.91)	1.71 (sd=1.11)	1.95 (sd=1.80)
Camel intake other than birth	4% (N=17)	2% (N=1)	3% (N=7)	3% (N=2)	5% (N=11)
Average number acquired	1.94 (sd=1.30)	1 (sd=n/a)	1.71 (sd=1.11)	2.5 (sd=2.12)	1.82 (sd=1.17)
<b>Goats/Sheep</b>	<b>All Households</b>	<b>Female-Headed Households</b>	<b>Youth-Headed Households</b>	<b>Poor Households</b>	<b>(Treatment Households)</b>
Smallstock born	60% (N=2,310)	49% (N=378)	58% (N=801)	30% (N=291)	60% (N=1,310)
Average number born	4.09 (sd=3.95)	3.62 (sd=3.76)	3.55 (sd=3.26)	2.19 (sd=1.65)	4.33 (sd=4.33)
Smallstock intake other than birth	57% (N=242)	68% (N=38)	65% (N=138)	76% (N=55)	63% (N=144)
Average number acquired	2.59 (sd=3.57)	3.47 (sd=7.10)	2.55 (sd=2.79)	2.22 (sd=1.41)	2.73 (sd=3.97)

## LIVESTOCK OFFTAKE

**TABLE 1.9. HOW MANY OF EACH LIVESTOCK TYPE HOUSEHOLD LOST BY SEASON<sup>61</sup>**

<b>Camels</b>	<b>Agaya</b>	<b>Bona Agaya</b>	<b>Ganna</b>	<b>Adolessa</b>	<b>Total</b>
Mean	1.85	2.05	2.36	1.45	1.93
SD	1.47	1.60	0.70	0.94	1.46
N	48	21	25	20	101
<b>Cattle</b>	<b>Agaya</b>	<b>Bona Agaya</b>	<b>Ganna</b>	<b>Adolessa</b>	<b>Total</b>
Mean	2.42	2.67	1.77	1.76	2.70
SD	2.52	3.13	1.42	1.54	2.91
N	435	373	261	288	1118
<b>Goats/Sheep</b>	<b>Agaya</b>	<b>Bona Agaya</b>	<b>Ganna</b>	<b>Adolessa</b>	<b>Total</b>
Mean	3.97	3.75	3.21	2.97	5.03
SD	4.21	3.72	2.91	2.61	5.34
N	707	595	569	628	1736

61 Agaya is from October – December. Bon Agaya is a short rainy season from January through February. The Ganna season extends from March through May and Adolessa is from June through September.

## FARMLAND—ACCESS, USE, INVESTMENT AND GOVERNANCE

**TABLE I.10. FARMLAND CONTROL, BY PLOT**

Response Category	All Households		Female-Headed Households		Youth Households		Poor Households		Treatment Households	
	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Household member	24% (901)	76% (2928)	46% (351)	54% (419)	27% (327)	73% (1020)	46% (444)	54% (514)	29% (627)	71% (1509)
Community	99% (3773)	1% (56)	97% (744)	3% (26)	99% (1377)	1% (15)	97% (934)	3% (24)	98% (2092)	2% (44)
Government	99% (3778)	1% (51)	98% (755)	2% (15)	99% (1382)	1% (10)	99% (948)	1% (10)	99% (2108)	1% (28)
Another family in the community	98% (3749)	2% (80)	98% (754)	2% (16)	96% (1340)	4% (52)	98% (937)	2% (21)	98% (2085)	2% (51)
Non-household family member	99% (3826)	1% (3)	NA	NA	NA	NA	NA	NA	NA	NA
Don't know	100% (3828)	<1% (1)	NA	NA	NA	NA	NA	NA	NA	NA

**TABLE I.11. SELECT CROPS GROWN, BY PLOT AND SUBGROUP**

	All Households		Male-Headed Households		Female-Headed Households		Non-youth		Youth		Control		Treatment		Other		Poor	
	Number (#)	Percent (%)	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Maize	1922	84%	1657	84%	265	87%	1247	86%	675	82%	866	82%	1056	86%	1562	84%	360	86%
Test statistic			2.98 (.084)*				6.33 (.012)***				4.92 (.027)**				1.03 (.310)			
Teff	737	32%	656	33%	81	27%	489	34%	248	30%	454	43%	283	23%	641	34%	96	23%
Test Statistics			4.85 (.028)**				3.11 (.078)*				105.69 (<.001)***				20.73 (<.001)***			
Beans	687	30%	571	29%	116	38%	453	31%	234	28%	297	28%	390	32%	592	32%	95	23%
Test statistic			11.26 (.001)***				1.982 (.16)				3.17(.08)*				13.53 (<.001)***			
Wheat	354	15%	311	16%	43	14%	236	16%	118	14%	140	13%	214	17%	299	16%	55	13%
Test statistic			.45 (.50)				1.51 (.22)				7.156 (.01)***				2.24 (.13)			

## RANGELAND CONDITION

**TABLE 1.12. ASSESSMENTS OF (CURRENT) RANGE QUALITY OF FOORA, DHEEDA, AND WARRA AREAS**

Response Category	Warra (Daily Herding)		Foora		Dheeda	
	Number (#)	Percent (%)	#	%	#	%
Very bad	17	7%	26	4%	199	5%
Bad	96	38%	313	52%	1105	29%
Neutral	36	14%	59	10%	421	11%
Good	90	35%	124	21%	596	16%
Very good	10	4%	4	1%	19	1%
Don't know	6	2%	75	12%	1458	38%
Refused to respond	0	0%	1	<1%	31	1%

**TABLE 1.13. FIVE YEAR COMPARISON OF RANGE QUALITY OF FOORA, DHEEDA, AND WARRA AREAS**

Response Category	Warra (Daily Herding)		Foora		Dheeda	
	Number (#)	Percent (%)	#	%	#	%
Much worse	380	10%	218	6%	196	5%
Worse	1700	44%	1283	34%	1210	32%
Same	782	20%	586	15%	633	17%
Better	534	14%	432	11%	409	11%
Much better	33	1%	22	1%	22	1%
Don't know	392	10%	1264	33%	1333	35%
Refused to respond	8	<1%	24	1%	26	1%



**TABLE 1.14. PREVALENCE OF INVASIVE BUSH SPECIES**

<b>Bush Species</b>	<b>Households That Have Encountered this Species in Daily Herding</b>		<b>Households Identify This as One of the Most Common Species Encountered in Daily Herding</b>	
	<b>Number (#)</b>	<b>Percent (%)</b>	<b>Number (#)</b>	<b>Percent (%)</b>
Saphansa gurracha	2,494	65%	1,749	46%
Saphansa diima	1,595	42%	843	22%
Sigirsoo	913	24%	360	9%
Waangaa	1,461	38%	528	14%
Calloo	1,516	40%	785	21%
Waaccuu	2,993	78%	2,002	52%
Fullenssa	1,995	52%	1,020	27%
Riiga (Caacannee)	1,346	35%	359	9%
Hammeessa	3,307	86%	2,373	62%
Hammareessa	2,907	76%	1,842	48%
Dabbasoo	1,815	47%	873	23%
Hiddii gaagee	2,564	67%	1,058	28%
Hiddii waatoo	2,357	62%	685	18%
Mogorree	2,169	57%	540	14%
Buutiyyee	2,794	73%	975	25%
Siltaachoo	1,185	31%	292	8%
Hoomachoo	1,527	40%	470	12%
Jirimee	3,090	81%	1,691	44%

# ANNEX 2—SURVEY INSTRUMENTS

Please see the word file titled "Annex 2: LAND IE Instruments."

# ANNEX 3—COMMENT MATRICES

Please see the word file titled "Annex 3: LAND IE External Review Comment Matrices."

# ANNEX 4—IE DESIGN REPORT

Please see the excel file titled "Annex 5: LAND IE Design Report."

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