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USAID/ETHIOPIA LAND ADMINISTRATION TO NURTURE DEVELOPMENT (LAND) AFAR

Impact Evaluation Design Report

MAY 2016

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CONTENTS

ACRONYMS AND ABBREVIATIONS

σ	Mean (average)
μ	Standard Deviation
ATE	Average Treatment Effect
CLR	Cluster Level Reliability
CLGE	Community Land Governance Entity
DD	Difference-in-Difference
DEC	Development Experience Clearinghouse
ERC	Evaluation, Research, Communication
GIS	Geographic Information System
GoE	Government of Ethiopia
H	Hypothesis
IBLI	Index Based Livestock Insurance
ICC	Intra-Class Correlation
IE	Impact Evaluation
IRB	Institutional Review Board
FGD	Focus Group Discussions
FTF	Feed the Future
KII	Key Informant Interview
LAND	Land Administration to Nurture Development
LTPR	Land Tenure and Property Rights
LTD	Land Tenure Division
M&E	Monitoring & Evaluation
MDES	Minimum Detectable Effect Size
MoA	Ministry of Agriculture

MUAC	Mid-Upper Arm Circumference
N	Number of Respondents
NGO	Non-Government Organization
PLI	Pastoral Livelihoods Initiative
PPS	Probability Proportionate to Size
PRIME	Pastoralist Areas Resilience Improvement and Market Expansion
RCT	Randomized Control Trial
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	U.S. Agency for International Development

1.0 INTRODUCTION

This report describes an impact evaluation (IE) design for work being conducted under the ERC Task Order # AID-OAA-TO-13-00019 for USAID/Ethiopia's Land Administration to Nurture Development Project (LAND, 2013–2018), which is being implemented by Tetra Tech. This evaluation will focus on land tenure security impacts in Ethiopia's Afar Region, in the Chifra and Amibara woredas, Administrative Zones 1 and 3 respectively.[1] These two woredas were identified by LAND, in consultation with the Afar regional government, for initial implementation of a pilot land certification program for Afar pastoralists.

Globally, the commons (communally managed areas) remain highly vulnerable, with land being allocated for commercial agricultural investment and infrastructure development on a regular basis. In particular this is true of the rangelands, where external interest in land for agriculture—and in its resources for other commercial ventures, such as tourism—has grown. Pastoralists are therefore concerned about the risk of expropriation and fear losing their land due to expropriation by the state, since their migratory and herding patterns may coincide or intersect with land expropriated for commercial purposes (Cotula & Vermeulen 2009). Even the most progressive policies and legislation often fail to provide adequate protection to many rangeland users and, most commonly, to the poorest and least powerful.

The USAID/Ethiopia LAND Project aims to adopt a locally appropriate model to protect the land and resource rights of pastoral communities. The Ethiopia LAND Project proposes an innovative approach to working with customary pastoral communities to increase land and resource tenure security, as well as with regional governments to develop policies and regulations that allow communal land rights to be recognized and certified. LAND represents an original program to strengthen land tenure security among pastoralists through a pilot certification process. As such, it is important to document the impact of the new formalization approach on pastoral communities and households, including the program's effect on livelihoods, resilience, tenure security, and conflict.

This impact evaluation proposes a framework for measuring the key development impacts of the LAND program in the Chifra and Amibara woredas. In particular, this 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 rights, improving communal land governance, as well as strengthening pastoral communities' capacity for land use planning and management and investment negotiations.

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

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

1 The LAND project is also being implemented in Oromia and Somali Regional States. USAID has already implemented baseline data collection for the evaluation of LAND activities in the Oromia region. This evaluation design is focused solely on the activities in Afar.

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 constituting Component 4 of USAID's LAND program 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 resource-constrained, 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. The evaluation will provide an evidence base for improved policy making and programming by testing the development hypothesis that pastoral and agro-pastoral communities with stronger communal land rights are able to more effectively connect with and benefit from livestock markets and other economic opportunities, including through partnerships with private sector investors (e.g., abattoirs). As such, the evaluation will enable LAND's program theory to be validated, and adjusted if required, before the project is implemented on a larger scale across the country.

What follows in this report is an exploration of the theoretical underpinnings of the proposed program intervention, the theory of change, and the impact evaluation design.

2.0 BACKGROUND

This section provides background information on the economic, ecological, geographic and social context of the Afar region, the focus of this IE. It includes an overview of efforts to improve tenure security in Ethiopia, which to date have concentrated almost exclusively on highland cropping areas through a certification program based on individual farm parcels. Lowland pastoralist areas in Ethiopia, including Afar region, are predominantly based on common property tenure systems and have not yet been included in certification programs. To ground the research, the discussion focuses on the development problem that LAND seeks to remedy and describes the Afar region's customary institutions and community governance structures that motivate the LAND interventions under evaluation.

Pastoralists in many developing countries suffer from insecure land tenure because they lack formalized property rights, even though there may be informal recognition that they occupy land that is collectively owned by the community. An effective formalization scheme will codify these customary claims to land and ensure that government capacity exists to implement and enforce these rights. Several other African countries have taken these steps to enhance the tenure security of pastoralists by securing customary rights to land (Flintan 2011). Projects in Niger have, under the Code Rural, adopted approaches that allow for the mapping of migration routes and the registration of household grazing parcels (Rota et al. 2009). In the Chad Basin region of northern Cameroon, pastoralists effectively maintain pastures and water sources as a secure common pool resource. This management pattern is respected by the national government, and migratory corridors are protected by national and international agreements (Moritz et al. 2013).[2]

Since the mid 1990's, Ethiopia has also made tremendous progress in reforming land policy and supporting land administration systems in the country's highlands through the implementation of one of the largest, fastest, and lowest cost land registration and certification reforms in Africa (Deininger et al. 2008). In these highland regions, where approximately 97% of all households now have some type of land use documentation (whether 1st level or 2nd level certification[3]), research suggests that formalization has had an array of benefits, including increased agricultural investment and productivity, as well as reduced incidence of land-related conflict (Deininger et al. 2011; Holden et al. 2009). Despite the success of certification efforts in the highland regions, little progress has been made to strengthen and support land administration systems in lowland areas that are home to a large number of pastoralists. Land in these areas remains communally administered through customary practices.

More than half of Ethiopia's land is used for pastoral purposes, but these activities are routinely viewed as having little economic value (USAID/Ethiopia 2014). Although pastoralists' land rights are recognized by the Ethiopian Constitution, these lands are still sometimes perceived as unoccupied and, therefore,

2 Another positive example comes from highland Bolivia, where pastoral communities have secure rights at the hamlet level which allows pastoral groups to control entry and use of scarce resources in customary ways (UNDP 2004).

3 The key difference between first level and second level certifications is the detail of spatial information captured in the certificate. Unlike first level certification where land was identified primarily by field markings and location relative to other characteristics (e.g., next to a road), second level certification uses geographic information system (GIS) to delineate the land and assigns latitude and longitude coordinates to the boundaries.

available for reallocation in pursuit of other types of economic development. In some arid lowland areas, government authorities are said to have undermined pastoralist livelihoods by expropriating land that is used by pastoralists as dry season grazing areas for agricultural projects (USAID 2011). In 2009 the Ministry of Agriculture created the Agricultural Investment Support Directorate[4] to identify, demarcate and transfer land to local and foreign investors. By 2011 the Directorate had identified approximately 6 million hectares of land that would be made available to investors in order to expedite development of land for exports and industrial crops (USAID 2011). Article 40 (8) of the Ethiopian Federal Constitution states that the government has the authority to expropriate property in the public interest, provided it pays compensation prior to acquisition in an amount commensurate with the value of the seized property. Since pastoralists' communal land rights have not been officially mapped and recognized, they are especially vulnerable to uncompensated expropriation. Much of the land in the country that has been identified by the government for investment is in the less-crowded pastoral and agro-pastoral areas.

Granting formal property rights to customary land is particularly challenging because the imposition of local government institutions can disenfranchise customary institutions (Helland 2000; Homann et al. 2008). This disenfranchisement is particularly problematic for pastoralists, as their livelihoods in Ethiopia rely primarily on customary institutions governing rangeland and water access that would have provided adequate protection in the past but have been weakened due to both internal and external influences (Flintan 2012). As a result of these various trends, tenure insecurity in the pastoral areas is limited, incentives to invest in land and other natural assets are reduced, conflicts related to land continue, resources continue to be degraded, and women continue to face challenges managing and controlling natural assets, including land (USAID 2012).

ENVIRONMENTAL AND SOCIAL CONTEXT OF THE AFAR REGION

The Afar region, highlighted in Figure 1, is considered one of the hottest places on earth. It is home of the Danakil Desert and Erte Ale, an active volcano. The average temperature year-round can be anywhere from 32–43°C (90–110°F) and ranges from 25°C up to 52°C (80–125°F). The lowest of all Ethiopia's lowlands, Afar's topography slopes downward west to east into the Afar Triangle, a geological depression caused by the junction of three divergent plates (part of the Great Rift Valley). Afar elevation ranges from 1000m above to 100m below sea level. The entire region of Afar sees ranges of about 150–850mm of rainfall per year, or less than 6–34 inches, and the majority of that rainfall is in the southern and western areas (HEA 2006).[5]

Pastoralism as a livelihood is losing ground as critical pastoralist lands and resources have been appropriated for use by large-scale irrigation and recurrent drought has accelerated the settlement and movement of ex-pastoralists the people of the region begin to settle into agro-pastoralist and sedentary lifestyles, further constraining available lands for livestock production. These processes have been particularly pronounced in in the Awash River basin.

The Ethiopian government recognizes that "there [is] no real alternative other than…itinerant pastoralism in the short and medium term," but it does not consider pastoralism a viable development

4 As of 2013, by way of Council of Ministers Regulation No. 283/2013, it is now called Agricultural Investment Land Administration Agency.

5 Rainfall patterns are bimodal in higher rainfall areas and unimodal in lower rainfall areas. The river patterns are influenced by bimodal highland rainfall.

FIGURE 1. THE AFAR REGION

strategy in the long term and implicitly or explicitly has encouraged sedentary agriculture (Ministry of Finance and Economic Development 2003, p. 58). As such, it is perhaps unsurprising that pastoralists have been significantly underserved in many land tenure security programs implemented by the Ethiopian government and donors (Hundie & Martine 2008) and that the majority of development programs for the pastoral communities of the Ethiopian lowlands have done little to strengthen mobile pastoralism and the resources that foster it (Little et al. 2010) explicitly or implicitly aim to change pastoralist cultures and livelihoods to something considered to be more "civilized," such as sedentary agriculture (Getachew 2001). Besides the already variable climate and sedentary-focused development policies and programs toward the area, the Afar region is also experiencing many other pressures that collectively all affect the viability of livestock production and pastoralism in the region.

CURRENT CHALLENGES TO LAND USE IN THE AFAR REGION

Historically, the Afar region is populated by pastoralist communities and peoples who depend on the rainy seasons that flood perennial and seasonal rivers and create large expanses of flooded basins and pastures. These seasonally flooded riverine areas which Afar and their herds depend upon, also are of interest to government and private investors for their irrigation potential. To date, several thousand hectares of riverine grazing lands already have been converted to irrigated agriculture both by government and private commercial interests, including Ethiopian and foreign companies. These outside pressures from commercial farms and land encroachment continue to diminish land availability (Beyene 2012). Internally, wealthy pastoralists are enclosing large areas for cultivation. In addition, the creation of the Awash National Park and expansion of protected areas in vital flood plains has diminished the

amount of land available for herding, especially critical dry season grazing areas. Alternative grazing and watering areas are no longer available or are severely limited. As a result, pastoralist livelihoods are beginning to fail, and herders are increasingly turning to agro-pastoral and even sedentary lifestyles. With less grazing land available, pastoralists are exposed to higher risks associated with drought. Problems posed due to land alienation are further exacerbated by demographic changes (Reda 2014), as human and livestock populations have been increasing while the supply of available land is constantly declining.

Natural factors also threaten local livelihoods, including rising temperatures and incidences of drought, flash floods, and other extreme weather events (Adem, et al. 2010). Because most of the rivers crossing Afar originate from neighboring highland regions, livelihoods in Afar depend not only on weather conditions at the local level, but also on conditions in neighboring regions. Because of these climate-related changes, as well land use changes described above, seasonal expectations of water availability are not being consistently met; perennial rivers are not flooding and seasonal rivers are going partially filled or empty unlike in contrast to past years. Furthermore, conflicts in these areas over constrained resources make it increasingly difficult for herds to access their normal grazing and water areas, exacerbating the problems for local communities (Hundie & Martine 2008). To take one example, the recent Tendaho and Kessem sugar development projects are said to have had huge impacts on dry season grazing areas of Dubti, Asayita and other neighboring woredas (Gebrehiwot and Sintayehu, 2014).

A more gradual but equally serious encroachment on Afar land is the spread of *Prosopis juliflora* (regionally referred to as Woyane) in grazing zones, which also has a deleterious effect on pastoralist livelihoods. *P. juliflora* was introduced by the Ethiopian government in the 1980s as a vegetation cover to halt land and soil erosion in the area (i.e., to halt concerns with "desertification" in the area). Since that time the plant has rapidly proliferated and expanded into prime grazing areas and is now estimated to cover 3,600 square kilometers of Afar (Helland 2015:21). It has severely invaded Amibara, one of the two woredas that is the focus of this IE. The proliferation of this invasive species limits available land, and it has had multiple additional negative effects associated with it (Admasu 2008). The fruits of the plant are edible and even nutritious, but most of the plant is unpalatable, and the seeds have been reported to cause nerve sicknesses in animals. Otherwise, *P. juliflora* can be burned and used for charcoal, and the wood produces a good quality timber with desirable color, hardness, and shrinkage values (Wakie 2012). However, because of its sturdy nature, the harvesting of *P. juliflora* usually requires power-driven saws and other equipment which most pastoral communities lack

ORGANIZATION OF COMMUNITIES IN THE AFAR REGION

The pastoralist system generally is split into two different areas of grazing based on wet and dry seasons. During the wet seasons, when most

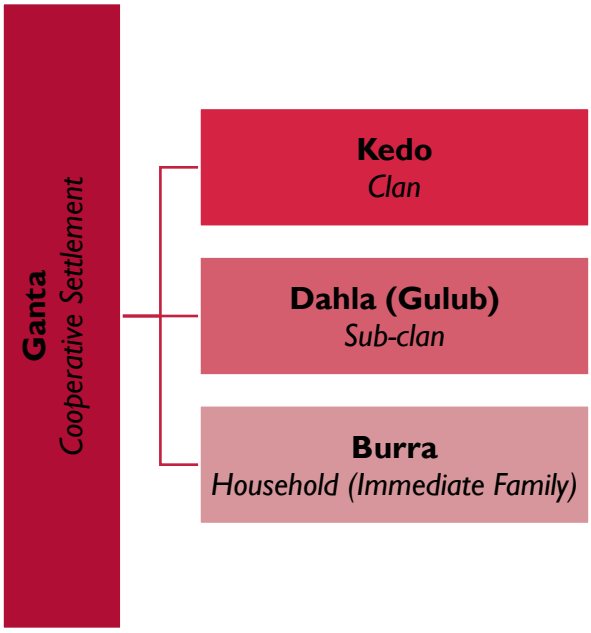

FIGURE 2. SOCIAL ORGANIZATION OF AFAR PEOPLE

herds are moved to elevated *alta* areas to avoid floods and mosquitos, land and resource use by pastoralists is not as tightly regulated as it is in the dry season. However, those elevated areas, including mountains, border neighboring ethnic groups and often are insecure and susceptible to conflict. During the dry season, when water sources and pastures are limited, resource use is more carefully restricted. Most pastoralists move their herds to *kelo*—dry season grazing areas along the river valleys. *Kelo* areas are perceived as owned by the clans, and only clan members have rights to use them or to allow other clans to use them.

The basic social structure of Afar is shown in Figure 2. The clan, *kedo*, is the broad basis for a grazing unit, and all *kedo* members usually graze their herds together. Below the clan level, there are typically *burra*, which are the households and/or immediate families, and *dahla*, the lineage or extended family members. Members of single, and sometimes multiple, clans form cooperative settlements called *gantas*, which gather in both dry and wet season grazing areas. Composition of the ganta usually is not the same in the different seasons. In contrast to the dry season settlement, the ganta during wet seasons has no defined territory based on clan affiliation, since they often settle with other clans to one another for security reasons. Ganta boundary and control of land becomes clearer during dry season, when clan members and their herds return to their riverine lands. This seasonal distinction will need to be accounted for during the implementation of the ganta-level survey as data related to land ownership, management, and allocation will likely be easier to gather during the dry rather than wet season. Thus, the survey methodology calls for sampling of dry season settlements.

There is no single leader of the *ganta*. Rather, there are respected elders who act jointly as heads. The clan head, *kedo abba*, is the lead decision-maker when it comes to land uses and use rights, including decisions about allocating land to outsiders. However, it is the clan elders, *daar idolla*, who are able to give access to their clan's lands by giving other clans an *isso* right, or a lease of sorts. Sometimes clan members hold *waamo* rights and are able to hold lands and exclude other clan members from those lands. The *fiema abba* is responsible for enforcing rules and regulations, and this customary leader works closely with other customary leaders, such as clan and sub-clan (lineage) leaders, respected elders and respected women leaders, to enforce their decisions and sanction violators. Additionally, within the *ganta,* there are chosen *duwa abbas* who manage migrations to wet season areas, thus controlling wet season mobility and its timing.

3.0 LAND INTERVENTIONS AND THEORETICAL FRAMEWORK

INTRODUCTION

The information provided below presents a synthesis of what is known to date. LAND will capture a more detailed version of Component 4 interventions in their September 2015 work planning exercise. This information will be shared with ERC when it becomes available and used to update the LAND Afar IE design document.

OVERVIEW OF LAND[6]

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 provide an important basis for the present formalization of pastoralist land rights under the LAND Project. This foundation consists of:

1. Participatory grazing unit definition based on customary institutions and practices;
2. Identification of spatial-temporal land use patterns;
3. Identification of customary land and natural resources tenure among Afar regional ethnic groups;
4. Participatory grazing unit boundary identification.

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 formal recognition for communal land rights, as well as low government capacity for effective land use planning and range management (USAID 2012).

The LAND project in Ethiopia is a five-year intervention (2013-2018) designed to build upon the work completed by PLI I, PLI II, and PRIME. It has been designed to improve the security of land rights to promote investment and development among land users 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 Afar, the LAND project will work in concert with USAID's PRIME Project in Chifra and Amibara woredas

6 From the Draft Component 4 Action Plan prepared by Tetra Tech / LAND Project—March 2014

LAND activities will be implemented with and through the Ministry of Agriculture's Land Administration and Use Department (LAUD/MoA) at the national level. At a regional level, activities will be implemented with and through the regional land administration bureaus. LAND activities in Afar will be implemented under four components:

- LAND Component 1: Improve legal and policy frameworks at national and local levels;
- LAND Component 2: Strengthen capacity in national, regional, and local land administration and use planning;
- LAND Component 3: Strengthen capacity of Ethiopian universities to engage in policy analysis and research related to land tenure and train land administration and land use professionals; and
- LAND Component 4: Strengthen communal land rights in pastoral and agro-pastoral areas to facilitate market linkages and economic growth.

Activities under Component 1 will further strengthen rural land legal and regulatory frameworks developed under USAID-supported previous projects. Technical assistance under Component 2 will focus on building capacity at the national and regional levels, improving land administration services delivery, and developing land use plans using cost effective methodologies. Well-trained and skilled land administration professionals are essential to achieving and sustaining the development impact of USAID's Land Tenure and Property Rights (LTPR) investments. LAND will employ a strategic mix of grants and technical assistance under Component 3 to strengthen the capacity of Ethiopian universities to develop undergraduate land administration curricula and summer short course degree programs for mid-level land administration officials to build land administration capacity sustainably beyond the life of LAND. Universities will also be supported to carry out research and evaluate Government of Ethiopia (GoE) policies promoting tenure security, increased agricultural production and food security, and sustainable management of land and natural resources.

Component 4 interventions include certification of customary land rights, improving communal land governance, as well as strengthening pastoral communities' capacity for land use planning and management and investment negotiations. Component 4 represents the focus of the LAND Afar IE and is described in more detail below.

LAND COMPONENT 4: INTERVENTIONS

The focus of this impact evaluation is Component 4 activities implemented in the Chifra and Amibara woredas of the Afar region from 2016-2017.

LAND will work with 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 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.

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

1. **Component 4 Project Governance**—capacity building within the pastoral communities and coordination among the different players in securing pastoral land tenure;
2. **Afar Rangeland Management Systems Description, Validation, and Institutionalization**—the confirmation of PRIME-based grazing system resource and boundary maps for grazing units within

the Chifra and Amibara woredas of the Afar Region, and the institutionalization of these databases within a Knowledge Management System;
3. **Demarcation, Surveying, Registration, and Certification** of grazing units once confirmed with Chifra and Amibara customary institutions and government authorities;
4. **Development of an Afar Region Pastoralist Land Rights Regulation** that will acknowledge the customary systems as the basis for the formalization of land use rights.
5. **Land Use Planning and Governance Strengthening Efforts** among each of the grazing systems and burra.
6. **Targeted Communications**—public information and awareness activities.

Formal recognition of customary land 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. It is expected that the more informal measures to strengthen land tenure security will result in improved development outcomes even if formal tenure is not achieved within the lifetime of the LAND project.

The Chifra and Amibara woredas in the Afar region 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 are expected to take place at the *burra* level[7] within the broader *kedo* systems.[8]

The LAND program is motivated by a body of literature linking stronger land tenure and property rights with key development outcomes. The hypotheses and research questions investigated by the impact evaluation are driven by this theoretical framework and LAND Component 4's theory of change. The following section provides a detailed discussion of the theoretical framework and theory of change.

THEORETICAL FRAMEWORK

BENEFITS OF SECURE LAND TENURE

Numerous studies have demonstrated the positive impact stronger individual land tenure security has had on investment and development outcomes in rural areas (Deininger et al. 2011; Deininger & Chamorro 2004; Feder et al. 1988; Holden et al. 2009; Jacoby et al. 2002; Rozelle & Swinnen 2004). In Ethiopia, empirical evidence suggests that the low-cost land registration and certification that took place in the 1990's increased land productivity and welfare (Holden et al. 2009b), particularly for female-headed households (Holden et al. 2009a). Research also indicates that female-headed households with certificates are more actively engaged in land markets, and certification has been shown to enhance women's participation in household decision-making related to land improvement practices (Adgo et al. 2014).

7 This will be confirmed with LAND following receipt of the September 2015 workplan.

8 Profiles of the grazing areas of focus by the LAND program covering demographic, cultural, and livelihood characteristics will be provided when the information becomes available from PRIME and LAND.

Research demonstrates that these productivity gains were motivated by better land management practices and the reinforcement of private incentives to make long-term investments (Adgo et al. 2014). In particular, land certification in the Tigray region of Ethiopia contributed to increased investment in trees, soil conservation structures, and water harvesting structures (Holden et al. 2009b). Furthermore, the evidence from Ethiopia's highlands indicates that land registration and certification programs reduced the number of conflicts arising from border and inheritance disputes, thereby enabling better market access (Deininger et al. 2008).

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 Afar IE is designed to expand this evidence base. LAND is based on an assumption that the program theory linking tenure security to development outcomes at the individual level will translate to the community level, in areas with strong customary systems for communal land strategies. That being the case, the benefits derived from strengthening the customary rights of pastoral groups to communal land areas are expected to mirror many of the outcomes identified from strengthening individual rights, including increased investment and improved land management. Nevertheless, the seasonal movements of pastoralist communities, associated with customary reliance on resources which vary across space and according to availability, coupled with transitions to more sedentary and agro-pastoralist lifestyles across some community members, does present particular challenges for clarifying rights and strengthening land and tenure security. It is important to note that the existing body of work on assumptions and strategies for improving communal land tenure security in pastoralist systems, and linking corresponding increases in tenure security to development outcomes, is currently very small.

IMPROVED INVESTMENT, MANAGEMENT, AND LAND USE PLANNING

Secure tenure and clear assignment of rights—in conjunction with institutions to uphold and enforce those rights—provide incentives for people to undertake long-term investments by providing a sense of permanence and security (Besley 1995). Secure tenure promotes longer-term investments and planning in conservation and physical capital. This logic also applies when securing the use and management rights over communal resources, such as common pasture and grazing lands.

A lack of clearly defined property and land use rights can result in land that is degraded, overused, or otherwise poorly managed, resulting in lower output—low yields in the case of cultivated land and reduced livestock carrying capacity in the case of pasture. Where property rights are poorly defined, the resulting insecurity reduces farmers'/pastoralists' incentives to maintain and manage their land resources in a sustainable manner and narrows the planning horizon to focus on short-term profits, which may favor nutrient mining and promote land degradation (Tenaw et al. 2009).

Strong tenure arrangements may help improve the governance and management of valuable natural assets in arid and semi-arid areas that are particularly prone to climate-related risks. Moreover, the participation of a broad array of community members, including women, youth, and other vulnerable groups in local land management can promote improved accountability of local leaders thereby strengthening local land governance.

In Ethiopia's highlands, research has shown that both first and second level certification has resulted in benefits for women (Adgo et al. 2014; Holden et al. 2011) ranging from increased productivity to more active engagements in land rental markets. In the pastoral areas, where customary practices prevail, recognizing and accessing rights to land can be less straightforward. Unlike men who often enjoy customary and de facto use rights even if not legally enshrined, women and minority groups often lack

the same recognition or enjoy the same rights in practice. Men and women generally have different responsibilities and tend to access and manage land resources in different ways due to traditions and status. Secure land tenure reduces the need to defend claims, which can be particularly important for women and minority groups whose rights might not be consistently recognized and enforced (Joireman 2008).

Furthermore, strengthening tenure security is expected to benefit regional governments and the national government by creating incentives for local people, as well as for private sector actors, to invest in agricultural and livestock sectors at various stages of the value chains and expand economic growth. In turn, expanded economic opportunity and economic growth may increase government revenue and household incomes and reduce local conflict. Developing strong linkages between pastoral and agro-pastoral communities, private sector investors, and the government may also help develop the pastoral sector and improve pastoralist livelihoods.

REDUCED INAPPROPRIATE EXPROPRIATION AND IMPROVED CAPACITY TO ENGAGE WITH PRIVATE SECTOR INVESTORS

Overall, LAND Component 4 is based on the assumption that by formally recognizing the customary land use rights of pastoral communities, those communities and individuals will enjoy stronger land tenure security, thereby opening the door for inclusive economic and social development.

Land that is not continuously farmed but instead used for grazing, shifting cultivation, collection of forest products or hunting is most vulnerable to expropriation and wrongful reallocation on a large scale (Anseeuw et al. 2012). Expropriation is an especially valid concern for pastoralists whose migratory and herding patterns may coincide or intersect with land the state wishes to designate for commercial purposes—particularly land with high agricultural potential in valleys and along rivers (Cotula & Vermeulen 2009). Officially recognizing pastoral land rights is expected to reduce the risk of households and communities losing access to land that they customarily use by providing some degree of formal legal protection and procedural guarantees to communities. In cases where expropriation occurs, formal land rights should provide communities with a means to seek redress and fair compensation.

Tenure security provides a level of certainty that motivates long-term planning and investment in physical capital. In areas with collateral-based land markets, it can increase access to financial support through more formal documentation of the capacity to repay. Creating positive market linkages between pastoral and/or agro-pastoral communities and investors provides a strategy to allow communities to leverage their land-based assets in order to promote rural economic growth and development, for example through collaborative contracts.

In addition to supporting community investments on communal lands, formalization of pastoral land claims is expected to empower communities to negotiate directly with the private sector on whether and under what terms to temporarily transfer some of their land use rights to a third party (i.e., alienation). The extent to which local land users enjoy secure land rights is key to protecting them from arbitrary dispossession and providing them with an asset for negotiation (Cotula 2006). Where land has high agricultural production potential or commercial value—but where communities lack the capital, knowledge, and management capacity to exploit this—formalized title provides an asset to strengthen communities' negotiating power (Cotula & Vermeulen 2009). From the community point of view, clear and defensible claims to land provide leverage to negotiate arrangements with private investors that are in the community's best interest.

There are also benefits to clear identification of legitimate right holders for private investors. A recent survey showed that 57% of firms in Ethiopia reported access to land as their main obstacle. Both large and small investors need assured rights to the land and property in which they invest (Toulmin 2009). Ensuring a stable, predictable, and relatively transparent business enabling environment for investors is also important to generating higher and more sustainable levels of economic growth.

Drawing on the body of literature described above, the theory of change for Component 4 is depicted in Figure 3. This theoretical framework and theory of change form the basis for the hypotheses tested by the impact evaluation. Through strengthened tenure security, communities should be better able to (i) make long-term land management, planning and investment decisions allowing them to increase current livestock and agricultural production (where desired), as well as respond to market signals to produce alternative goods and (ii) negotiate with the private sector to invest in livestock value chains and other economic opportunities that will directly benefit their livelihoods and food security. It is anticipated that this intervention will create a positive feedback effect, whereby better market linkages lead to better access to inputs and more market opportunities, which in turn increases private-sector interest in developing livestock value chains and other economic opportunities, which then leads to improved private sector interaction with communities and further market linkages.

Drawing on this theoretical framework and theory of change, the subsequent chapter lays out the research hypotheses that the impact evaluation is designed to test.

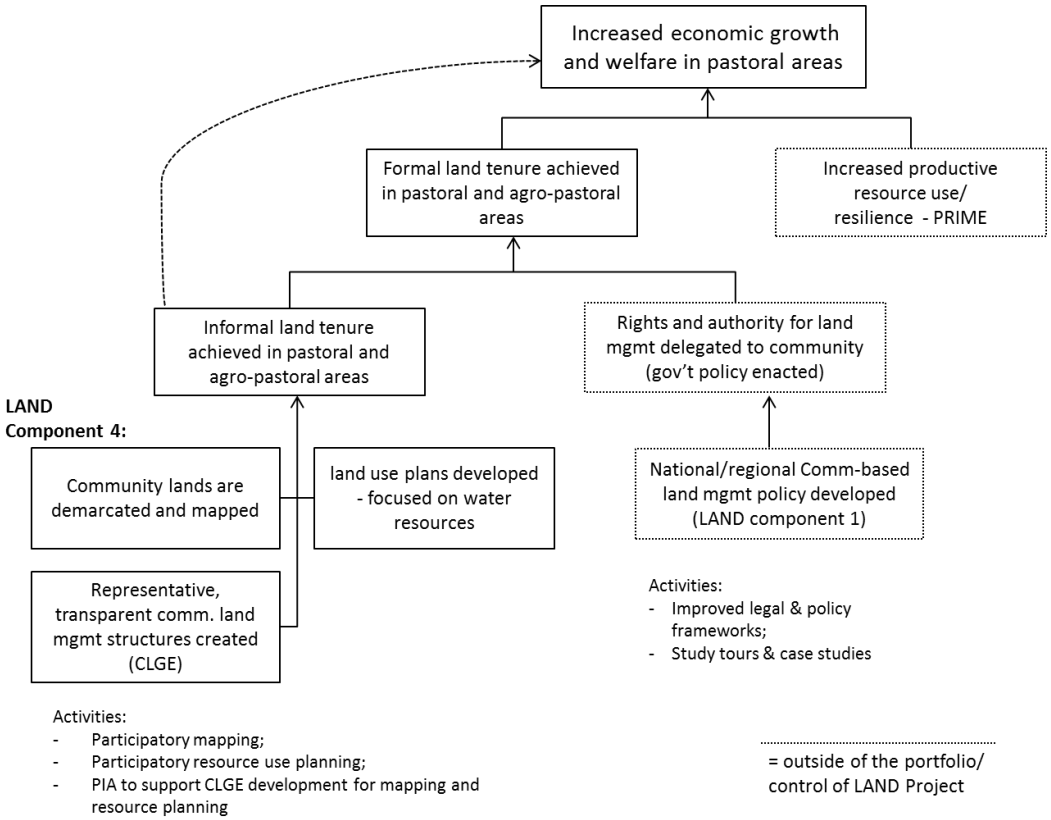

FIGURE 3. VISUAL REPRESENTATION OF THE LAND COMPONENT 4 THEORY OF CHANGE

4.0 HYPOTHESES, DATA SOURCES, & INDICATORS

This impact evaluation tests a number of research hypotheses that follow from the evaluation objectives and program theory guiding LAND. The evaluation has the scope to rigorously assess the program's impact on indicators measured at the household level. Depending on the results of the community (or ganta) listing process, the LAND Afar IE may also have sufficient power to identify community impacts measured at the ganta level.

RESEARCH HYPOTHESES (H)

At the community level, specific hypotheses in this IE include:

Communities receiving Component 4, LAND intervention (land use rights certification, boundary definition, registration and governance strengthening) will:

- *H-1*. have lower community-wide incidence of conflicts;
- *H-2*. perceive improved transparency, accountability, and representative of customary land governance institutions;
- *H-3*. have improved land use planning capacity and sustainable land management of communal land;
- *H-4*. have a reduced incidence of community land expropriation without adequate consultation and fair and timely compensation;
- *H-5*. have improved rangeland and natural resource conditions;
- *H-6*. have greater capacity to negotiate mutually beneficial contracts between communities and private sector investors;
- *H-7*. perceive greater tenure security and protection of their community grazing land;
- *H-8*. have a reduced incidence of unauthorized users encroaching on community land;
- *H-9*. invest more in improving the condition of their land, water and livestock resources.

At the household level, specific hypotheses in this IE include:

Households in communities receiving the LAND Component 4 intervention will:

- *H-10*. have improved livelihood and welfare outcomes.
- *H-11*. invest more in improving the condition of their land, water, and livestock resources.
- *H-12*. perceive improved transparency, accountability, and representation of legal and customary governance institutions.
- *H-13*. perceive greater tenure security and protection of their household's land.
- *H-14*. have lower community-wide incidence of conflicts.

DATA SOURCES

To test these hypotheses, the evaluation will use six primary sources of community and household level data to investigate customary land governance, tenure security, rangeland conditions, land-use conflict, livelihood outcomes, etc. These data sources include:

1. Household survey data—The survey will be stratified to target female-headed and youth households. The LAND Afar IE Household survey will be approximately 90 minutes in length and is based on the LAND Oromia IE Household survey to ensure larger comparability across multiple data sets for improved generalizability. The evaluation team aims to conduct the household survey as a panel survey; this involves tracking the same respondents over time between the baseline and endline data collection.
2. Wives survey data—The wives survey will be administered to wives in male-headed households and will be approximately 60 minutes in length. The Wives survey instrument will collect data on personal perceptions, expenditures, consumption, health shocks, etc. The evaluation team aims to conduct the wives survey as a panel survey; this involves tracking the same respondents over time between the baseline and endline data collection.
3. Ganta community leader data—A 90 minute close-ended survey interview will be conducted with a leader of each ganta in the study area. This will include elders and/or respected individuals from the ganta.
4. Focus group discussions—The evaluation will collect data from approximately 150 focus group discussions within a subset of the gantas involved in the evaluation. The focus group discussions will be 90–120 minutes in length and implemented in 75 communities. The sub groups of interest include women, agro-pastoralists, and resource-constrained individuals, including young males.
5. Key informant interviews with: Duwa Abba (customary leader responsible for decisions about seasonal herd movements and grazing), Kedo Abba (clan leader), Dahla (Gulub) Abba (sub-clan leader), Fiema Abba (responsible for rule enforcement), and Daar-Idolla (customary elders) in the community—these interviews will provide data on shifting perceptions, attitudes, and outcomes regarding the security, governance, and condition of land and water resources.
6. Participatory mapping—The evaluation will conduct participatory mapping exercises in approximately 50 gantas in the study area. The two groups of interest for the mapping exercise include herders and scouts. The

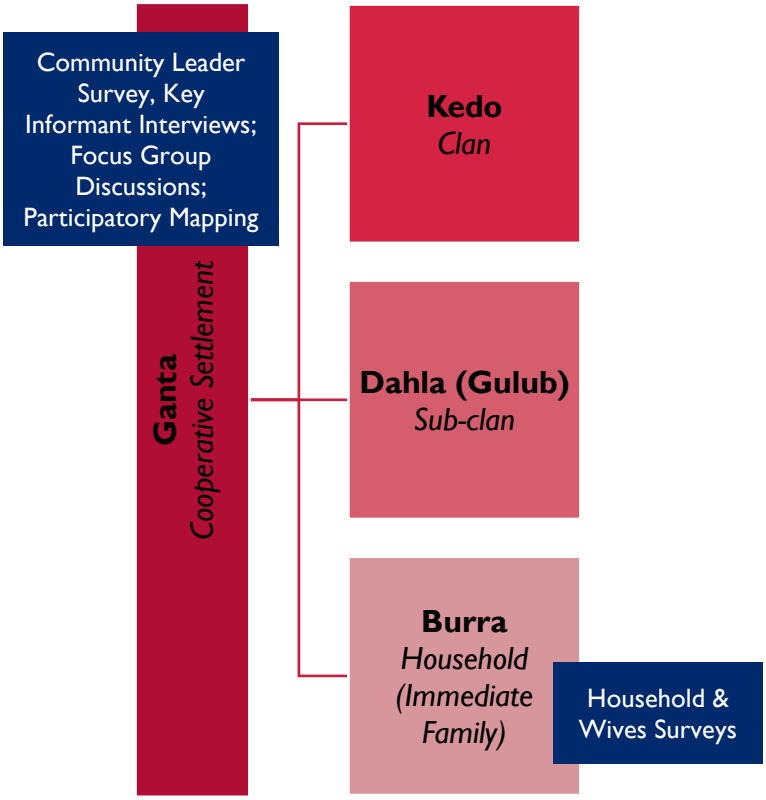

FIGURE 4. CUSTOMARY UNIT AND ASSOCIATED DATA SOURCES

exercise will be 60-90 minutes in length and is designed to incorporate local knowledge into existing maps of the study area and to enable participants to visualize and explain their resource use. With the help of facilitators, participants will draw their grazing areas during the wet and dry season, migration routes, settlement areas, water points, and important natural landmarks on large format base maps prepared by ERC. When data collection is complete, the research team will digitize the maps for analysis. The data collected from the mapping exercises will be used to help inform and complement the FGD and KII instruments, and later, may potentially be coupled with GIS and satellite imagery to help the evaluation team better understand and map out resource use, conflict areas, and mobility routes across the study area.

Tables H-1 through H-11 detail suggested indicators to test the fourteen hypotheses listed above. The tables provide specifics on outcome indicators plus corresponding details on data sources, measurement, and other considerations. Note that these outcome indicators will be refined following the analysis of the baseline data.

COMMUNITY IMPACTS (GANTA)

Communities receiving Component 4, LAND intervention (land use rights certification, boundary definition, registration, and governance strengthening) will:

H-1: HAVE LOWER COMMUNITY-WIDE INCIDENCE OF CONFLICTS.

Indicators:

- **A.** Prevalence of land and natural resource-based conflicts
- **B.** Changes in severity of conflicts
- **C.** Improved relationships between previously conflicting groups
- **D.** More positive and frequent interactions between previously conflicting groups
- **E.** Number of previously existing land and natural resource conflicts
- **F.** Improved access to water, pasture, and fuel wood
- **G.** Improved perceptions of security and peaceful environments
- **H.** Improved perceptions of freedom and security of movement
- **I.** More satisfactory resolution of conflicts
- **J.** Enhanced effectiveness and frequency of collaboration between diverse conflict resolution actors

Data sources:

- A. Household survey
- B. Wives survey
- C. Community leader survey
- D. Focus group discussions
- E. Key informant interviews
- F. Participatory Mapping

H-2: HAVE MORE TRANSPARENT, ACCOUNTABLE, AND REPRESENTATIVE CUSTOMARY LAND GOVERNANCE INSTITUTIONS.

Indicators:

- **A.** Perceptions of improved transparency, accountability, and representativeness of local governance among HH respondents
- **B.** Satisfaction with customary leaders
- **C.** Participation of women and vulnerable groups in community land governance
- **D.** Satisfaction with rules related to grazing, water, and cultivation/settlement patterns
- **E.** Assessments of fairness and transparency of rules related to grazing, water, and cultivation/settlement patterns
- **F.** Satisfaction with enforcement mechanisms for rule violations

Data sources:

- A. Household survey
- B. Wives survey
- C. Focus group discussions

H-3: INVEST MORE IN IMPROVING THE CONDITION OF THEIR GRAZING LAND, LIVESTOCK AND WATER RESOURCES

Indicators:

- **A.** Community fencing and protection of grazing enclosures and grazing reserves
- **B.** Improved water management
- **C.** Planting of supplementary sources of forage and food for livestock [9]
- **D.** Removal of invasive bush species
- **E.** Provision of veterinary facilities

Data sources:

A. Community leader survey
B. Focus group discussions
C. Key informant interviews

H-4: HAVE GREATER CAPACITY TO NEGOTIATE MUTUALLY BENEFICIAL CONTRACTS BETWEEN COMMUNITIES AND PRIVATE SECTOR INVESTORS.

Indicators:

- **A.** Institutional capacity—presence of written bylaws, number of organized internal meetings and meetings with investors
- **B.** Community perceptions of empowerment and capacity in the context of engagement and negotiation with government and investors
- **C.** The number or types of contracts entered into by the community that are more mutually beneficial to the community

Data sources:

A. Community leader survey
B. Focus group discussions
C. Key informant interviews

H-5: HAVE A REDUCED INCIDENCE OF COMMUNITY LAND EXPROPRIATION WITHOUT ADEQUATE CONSULTATION AND FAIR AND TIMELY COMPENSATION.

Indicators:

- **A.** Frequency and size of community land expropriation
- **B.** Evidence of adequate consultation as measured by household and community perceptions during expropriation process
- **C.** Evidence of fair compensation as measured by household and community perceptions and an estimate of the actual compensation received

Data sources:

A. Household survey
B. Wives survey
C. Community leader survey
D. Focus Group Discussions
E. Key informant interviews
F. Participatory Mapping

H-6: HAVE A REDUCED INCIDENCE OF UNAUTHORIZED USERS ENCROACHING ON COMMUNITY LAND.

Indicators:

- **A.** Household perceptions of greater security from encroachment
- **B.** Household reporting of encroachment by other pastoral groups/farmers
- **C.** Community perceptions of greater security from encroachment
- **D.** Leaders' perceptions of greater security from encroachment
- **E.** Leaders' reporting of encroachment by other pastoral groups/farmers

Data sources:

A. Household survey
B. Wives survey
C. Community leader survey
D. Focus Group Discussions
E. Key informant interviews

9 Please note that indicators A and C differ in that one is protecting natural generation and the other is actively planting or producing feed.

H-7: HAVE IMPROVED RANGELAND AND NATURAL RESOURCE CONDITIONS.

Indicators:

- **A.** Bush encroachment
- **B.** Subjective perceptions of past, present, and future rangeland condition
- **C.** Natural resource depletion and water availability

Data sources:

- A. Household survey
- B. Wives survey
- C. Community leader survey
- D. Focus group discussions
- E. Key informant interviews
- F. Participatory Mapping
- G. Geospatial analysis of remotely sensed imagery (TBD)

HOUSEHOLD IMPACTS

H-8: WILL HAVE IMPROVED LIVELIHOOD AND WELFARE OUTCOMES.

Indicators:

- **A.** Assets (Feed the Future (FTF))
  - Livestock holdings (# female, # male)
  - Livestock value
  - Tropical Livestock Unit (TLU)
  - Size of household farmland
  - Consumer durables and agricultural assets
- **B.** Expenditures (FTF)
  - Food, clothing, tea, sugar, coffee, and tobacco
  - Health
  - Education
- **C.** Income/prevalence of poverty (FTF)
  - Livestock income
    - Sale of butter, milk, hides
    - Increased milk production
    - Sale of animals
  - Agricultural income
  - Off farm income from trade/wage labor
- **D.** Health and nutrition
  - Health/medicine expenditures
  - School absence due to sickness
  - Food consumption diversity index
- **E.** Livelihood strategies
  - Specialized pastoralism
    - Number of grazing camps used
    - Duration of stay at grazing camps
    - Communal dry season grazing land management strategies
  - Crop cultivation
    - Household farmland management strategies
  - Agro-pastoralism

Data sources:

- A. Household survey
- B. Wives survey

H-9: WILL INVEST MORE IN IMPROVING THE CONDITION OF THEIR LAND, WATER, AND LIVESTOCK RESOURCES.

Indicators:

- **A.** Improved veterinary care for livestock
- **B.** Planting of supplementary sources of forage
- **C.** Labor contribution to developing and maintaining local wells and water points
- **D.** Household investment of labor or resources into the improvement of grazing enclosures
- **E.** Developing soil conservation or water harvesting structures for cultivated land
- **F.** Household farmland management strategies

Data sources:

A. Household survey
B. Focus group discussions with women, agro-pastoralists, and resource-constrained households, including young male representatives

H-10. PERCEIVE GREATER TENURE SECURITY AND PROTECTION OF THEIR HOUSEHOLD'S LAND.

Indicators:

- **A.** Household awareness and perceptions of bundle of land rights, including exclusion rights, land access, and land management
- **B.** Confidence in use of current land and resource assets (as measured by reported perceptions and productive investments in land and natural resources)
- **C.** Instances of inappropriate loss of local user rights to community grazing land
- **D.** Perceived risk of loss of local user rights to community grazing land
- **E.** Change in informal/customary rights over community grazing land
- **F.** Formal recognition of land and resource tenure rights of local inhabitants

Data sources:

A. Household survey
B. Wives survey
C. Focus group discussions
D. Participatory Mapping

H-11. PERCEIVE IMPROVED TRANSPARENCY, ACCOUNTABILITY, AND REPRESENTATIVENESS OF LEGAL AND CUSTOMARY GOVERNANCE INSTITUTIONS.

Indicators:

- **A.** Perceptions of improved transparency, accountability, and representativeness of local governance among respondents
- **B.** Satisfaction with customary leaders
- **C.** Participation of women and vulnerable groups in community land governance
- **D.** Satisfaction with rules related to grazing, water, and cultivation/settlement patterns
- **E.** Assessments of fairness and transparency of rules related to grazing, water, and cultivation/settlement patterns
- **F.** Satisfaction with enforcement mechanisms for rule violations

Data sources:

A. Household survey
B. Wives survey
C. Focus group discussions
D. Participatory Mapping

H-12. HAVE LOWER COMMUNITY-WIDE INCIDENCE OF CONFLICTS.

Indicators:

- **A.** Prevalence of land and natural resource-based conflicts
- **B.** Changes in severity of conflicts
- **C.** Improved relationships between previously conflicting groups
- **D.** More positive and frequent interactions between previously conflicting groups
- **E.** Number of previously existing land and natural resource conflicts
- **F.** Improved access to water, pasture, and fuel wood
- **G.** Improved perceptions of security and peaceful environments
- **H.** Improved freedom and security of movement
- **I.** More satisfactory resolution of conflicts
- **J.** Enhanced effectiveness and frequency of collaboration between diverse conflict resolution actors

Data sources:

A. Household survey
B. Wives survey
C. Focus group discussions
D. Participatory Mappings

CONTROL VARIABLES

CONTROL VARIABLES

Indicators:

A. Household demographics
  - Household size
  - Years cultivating (if applicable)
  - Education
    - Highest level of education attained
    - Number of males completing/in primary
    - Number of females completing/in primary

B. Access to and use of cellphone services and markets
C. Development support from donors, NGOs, etc.
D. Climate and elevation data
E. Relative livestock: grain price
F. Distance to roads and markets
G. Population density
K. Estimated agricultural productivity

Data sources:

A. Household survey
B. Wives survey
C. Community survey
D. Secondary and administrative data

5.0 RESEARCH & SURVEY METHODOLOGY

The impact evaluation team recommends using a Difference-in-Differences (DD) with matching design that compares Chifra and Amibara treatment woredas to a set of control woredas. The strengths and limitations of this design and different options considered are discussed below.

DD is a strategy that uses data with a time and control group dimension to control for unobserved and observed fixed confounding factors between treatment and control groups, such as differences in wealth, education or experience with agro-pastoralism. DD is one of the most frequently used methods for impact evaluations. In the context of the LAND Afar IE, a DD method will compare the changes in outcomes over time between the Chifra and Amibara woredas that are enrolled in the LAND program and woredas that are not involved in LAND. Given the inability to randomize the LAND program across these sites, an RCT is not feasible for an evaluation of LAND. DD with matching represents the next best evaluation technique for analyzing the impact of the program.

The difference-in-differences method is implemented as follows. The "first difference" in the difference in differences method represents the before and after effect in the treatment group; this controls for factors that are constant over time for the LAND treatment areas. The "second difference" represents the before and after difference in the control group to control for outside time-varying factors. Finally, the first difference is subtracted from the second difference to generate the estimate of the treatment effect.

CONTROL SITE SELECTION

USING COMMUNITY LISTING AND GEOSPATIAL DATA TO SELECT CONTROL SITES

Community listing data was combined with geospatial data to inform sample site selection prior to baseline data collection. When working in areas without administrative or secondary data, it can be difficult to select suitable control sites, due to a dearth of data on local community characteristics. Community listing represents a pre-survey census-style data collection technique that provides the research team with valuable information about the potential sample area. The survey team visited every community in the prospective treatment and control areas and conducted a short survey with a community leader on key community characteristics, and collected GPS coordinates.

Data from community listing confirmed previous assumptions about the suitability of Gewane and Telalak as control woredas. The research team examined listing data for potential spillover between treatment and control sites, and compared characteristics such as population size, number of female-headed households, settlement patterns, and livelihoods (see Annex 1). Community listing also revealed the need to sample from additional control woredas to meet the target number of gantas. Additional woredas were matched to treatment woredas based on geospatial analysis of the presence of propopsis, the distance and travel time to town, road density, and population density, drawing on geospatial data

collected during community listing. Based on analysis of the combined listing and geospatial data, Dewe and Delucha were selected as additional control woredas.

Based on the information available to the evaluation team, using Gewane and Delucha for Amibara control sites and Telalak and Dewe woredas as a control group for the Chifra woreda appears to be the most suitable approach for creating counterfactuals. Amibara was paired with Gewane and Delucha because they are along the Awash river, face similar challenges and share similar geographic features (see Annex 1). Given the small number of communities in Gewane, Delucha was added as a second control site for Amibara. Amibara and Gewane are matched in the Namalefane Ke Baaadu Pastoral livelihood zone. All three sites face the challenge of *P. juliflora* and competition between irrigated agriculture and livestock production.

For Chifra, it was important to choose control woredas that lack river access and to take spillover into account in the selection. Chifra is matched with Telalak and Dewe in the Aramiss Ke Adaar Pastoral livelihood zone. Given the small number of communities in Telalak, Dewe was added as a second control site for Chifra.

LAND AFAR IE TREATMENT AREAS

- Amibara
- Chifra

LAND AFAR IE CONTROL AREAS

- Gewane
- Delucha
- Telalak
- Dewe

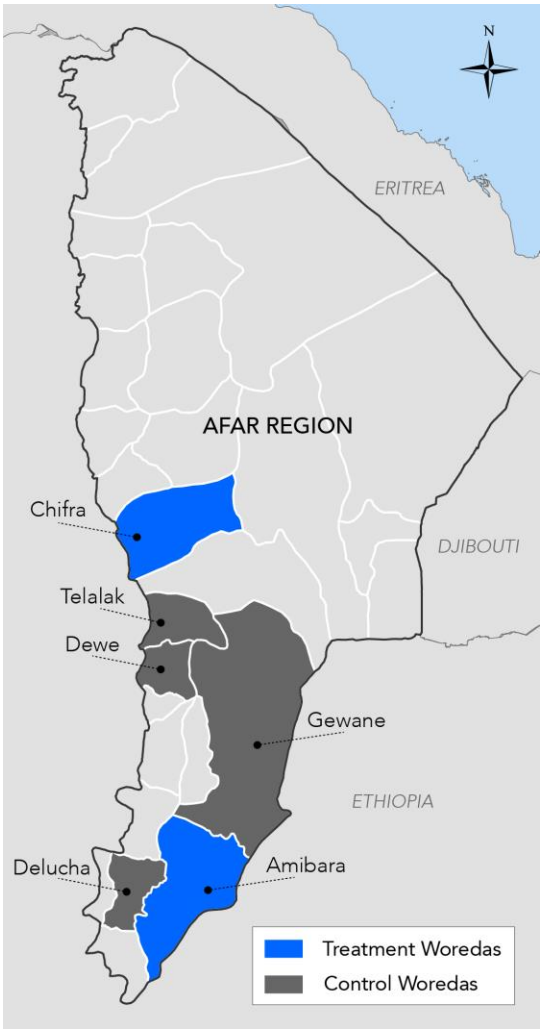

FIGURE 5. CONTROL AND TREATMENT WOREDAS IN THE LAND AFAR IE

LIMITATIONS OF THE MATCHING APPROACH

First, although woreda data is currently available for population size, geographic characteristics, and livelihood profiles, there is a lack of settlement level data on important local characteristics such as water access and livestock density. To improve the pre-treatment balance between treatment and control gantas, the evaluation team will also attempt to use secondary woreda level information on land cover (in particular water access, livelihood zones, and livestock density) as part of the matching procedure, in addition to settlement level data collected during community listing.

Second, information is not available about the boundaries of communal grazing land. The treatment unit (communal grazing land) is not likely to follow the administrative woreda boundaries; as such, woreda-

level data may not provide the best characteristics for matching. Land cover varies widely within each of the woredas identified, and it will be important to match the land cover classifications within the actual grazing units. If more geospatially-precise data on the extent of customary land boundaries is provided by the PRIME project before baseline launch, the evaluation will aim to sample for data collection within the customary land boundaries (rather than at woreda level). Otherwise, sampling will be focused within a reasonable distance away from rivers within the permanent (dry season) settlement areas in the woredas listed above.

LIMITATIONS OF DIFFERENCE-IN-DIFFERENCES

DD requires stronger assumptions than randomized selection. It is based on the assumption that the most important omitted variables are time invariant. In particular, the key identifying assumption for DD is the equal or common trends assumption, which states that the counterfactual trend behavior will be the same in the treatment and control woredas in the absence of the LAND intervention. This is a strong assumption. The DD strategy is valid if the LAND treatment is the only factor that induces a deviation from common trends for tenure security, livelihoods, and economic growth—as well as other factors of interest to the evaluation. Although the treatment and control areas can differ before the implementation of the LAND program, this difference must not be reflected in different time trends for key indicators. Therefore, the risk to the validity of this DD design is that it will not be able to effectively control or eliminate differences between the treatment and control groups that change over time (Abadie 2000).[10]

Several techniques are used to test the validity of the equal trends assumption. These include comparing changes in outcome in treatment and control units before program implementation and/or performing a placebo test with a placebo or "fake" control group. Unfortunately, this study will not have access to data from additional control groups or multiple time periods beyond the baseline and endline. Although these data limitations constrain our ability to use preferred techniques to check the equal trends assumption, the evaluation will be able to perform a placebo test with false outcomes to assess the viability of the common trends assumption. In particular, the team will estimate the impact of LAND in the control woredas on an outcome that we expect LAND to change—such as improved customary land governance—to verify whether the assumption holds.

Comparison groups can be compromised because of activity in treatment areas. This may have a geographic component (e.g., spatial spillovers as a result of being close to the border of a community whose grazing unit boundaries are being certified) or could be non-spatial in nature (e.g., members of the comparison group hear what is going on and press to have their grazing areas certified, as well). The implication of spillover would be downward pressure on LAND's effect size. Put differently, the overall 'true' impact of the project would be larger than the measured impact because spillover implies the transfer of real benefits to the control sites. USAID is working with the LAND project to reduce the likelihood of spillover to the extent possible and appropriate within the local context.

10 Discussions of DD limitations in the literature include: endogeneity of interventions (Besley and Case 2000); isolation of specific behavioral parameters (Heckman 2000, Blundell and MaCurdy 1999); linearity assumption (Athey and Imbens 2002); and large standard errors (Bertrand et al. 2004).

MATCHED OR REWEIGHTED DIFFERENCE-IN-DIFFERENCES

To improve comparability between the treatment and comparison groups, the researchers will conduct the treatment analysis using matched or reweighted difference-in-differences estimation. The evaluation will examine three separate techniques for preprocessing the data and evaluate their effectiveness based on the covariate balance they produce between treatment and control groups.[11] First, we will employ propensity score matching with weighting based on the Mahnalbois distance metric. Propensity score matching pairs treatment to control observations based on the estimated probability of assignment to the LAND treatment. Logistic regression is used to estimate the propensity score. Unmatched control observations are then discarded. Finally, the observations are reweighted using the Mahalanobis distance metric, which is a measure of how many standard deviations away a point is from the mean of a multidimensional distribution. Combining the Mahalanobis metric with propensity score matching has been found to reduce bias and improve balance over using propensity score matching alone (Rosenbaum and Rubin, 1985).

Second, we will apply propensity score matching with reweighting using a genetic algorithm (Diamond and Sekhon, 2013). This technique also matches based on the propensity score, but instead of the Mahalanobis distance metric, genetic matching uses an evolutionary search algorithm to find weights for each covariate that optimize covariate balance. In general, genetic matching finds better balance than propensity score matching, and the estimations are less biased compared to experimental benchmarks (Diamond and Sekhon, 2013).

Third, we will employ entropy balancing, a technique for preprocessing data that reweights observations without matching (Hainmueller, 2012). As with matching, the user specifies a set of covariates which form the basis for a reweighting scheme. However, in this case an entropy balancing algorithm finds weights for observations in the control group, and no discarding of observations occurs.

HOUSEHOLD AND WIVES SAMPLING METHODOLOGY

The household and wives surveys will be conducted in a subset of communities, defined as ganta, in the control and treatment woredas. This will be a Large N survey involving approximately 3000 households. The indicators measured by the household and wives surveys are noted above in Section 4. We propose modeling the LAND Afar IE household and wives surveys on the LAND Oromia IE household survey, and the 2012-2014 Index Based Livestock Insurance (IBLI) household survey[12] that was implemented in the Borana Zone of Oromia. This ensures that the questions and modules have been fully tested and promotes greater comparability across multiple data sets for improved generalizability.

The logical structure for the LAND Afar IE's community and household sampling involves (1) sampling dry season settlements within woredas involved in the LAND program (with probability proportionate

11 The study seeks to achieve balance on covariates—besides the program—that might that will have an influence on the outcomes of interest. For example, if local institutional capacity is expected to result in increased negotiating capacity with the government and investors, then we would want to have pre-treatment balance on this variable.

12 Quantitative IBLI indicators include: Increased consumption expenditure (overall and specifically on food); Increased food security (reduced reliance on food aid and reduced malnutrition); Increased asset holdings; Increased uptake of education services; Increased diversity of livelihood activities; Increased financial saving; Increased empowerment of women; Improved well-being of older people and children; Social tensions, conflict, and insecurity; and Changes to household mobility. Qualitative IBLI indicators include: Subjective poverty; Attitudes to health and education; Market supply and price fluctuations; Livelihood systems and shocks; The empowerment of women and household decision-making processes; Inter-generational relationships; and Informal transfers; Migration patterns.

to size (PPS)), and (2) sampling households (or burra) from the ganta selected as part of second-stage sampling.

Based on the small number of communities in Amibara, Gewani, and Telalak, all communities were sampled in order to achieve the study's power objectives. In Chifra, Dewe, and Delucha, we selected communities through the following process:

- Step 1: **Ganta** (dry season settlements) are selected within **woredas** with PPS.
- Step 2: **Burras**, or households, will be selected from within **gantas** with PPS

Communities in Dewe and Delucha were matched using household population data to selected communities in Chifra and Delucha, respectively.

At the household level, the evaluation will assess differential treatment effects for female- vs. male-headed households and youth-headed households. The large-N household sample will be stratified to provide coverage of these key sub-groups, thereby enabling the analysis of heterogeneous treatment effects.

Focus group discussions will be conducted with female-headed households, agro-pastoralists, and resource-constrained households, including young males. Gantas for focus group discussions and community mapping were selected randomly in Chifra and Amibara using PPS, then matched with control gantas in Gewane, Delucha, Telalak, and Dewe based on population and grazing pattern information from community listing data. Respondents for the FGD and community mapping activities were recruited with assistance from the ganta leader. Community mapping participants were requested to have lived in the ganta for at least year, and at least one participant with expert knowledge of community grazing practices, like a scout.

In carrying out the impact evaluation, investigators will give particular attention to examining the heterogeneity of impacts among particular subgroups and disaggregated by the following where applicable:

- Female- vs. male-headed households
- Resource-constrained households
- Youth

The household and community surveys will be collected through a cloud-based mobile data collection effort. While there is additional up-front effort required to program the questionnaire and train staff and enumerators on the use of phones, an electronic data collection approach reduces data entry errors and improves the quality of the data (Caeyers et al. 2010).

6.0 POWER ANALYSIS

This section describes the power calculations for the LAND Afar IE. Here, power refers to the probability of detecting an impact if one does exist; the associated power calculations indicate the sample size required for an evaluation to detect a given minimum desired effect size (MDES). For the LAND Afar IE, the research team will measure impact at the household and ganta level. However, given the absence of basic sample statistics on gantas in Afar, the research team will conduct a pre-launch listing of communities and household census in the treatment and control woredas. This information will be used to update the power calculations.

In this study, the MDES for the recommended household sample size is expected to range from .13 to .18, depending on the indicator under investigation. In particular, given the estimated data collection costs, the recommended sample size is 3000 households surveyed across 300 ganta and an intra-household wives' survey across 1500 wives in 300 communities. The MDES for group level processes is expected to range from .34 to .36, assuming data collection in 300 ganta.

We draw on data from the 2014 LAND Oromia household survey to inform our power calculations for key variables related to this study. The presence of calibrating data improves confidence in the accuracy of our estimates for several parameters of the power calculations. Correspondingly, it improves our confidence in the effect sizes expected from our power calculations. However, since this study focuses on the Afar region, the Borana survey results are used as a general reference to inform our power calculations and should be interpreted with caution.

Given an absence of ganta-level data, we will not be able to improve the precision and power of the study through pre-sampling matching on ganta characteristics across treatment and control woredas. As such, we conduct more conservative estimates of the power calculations by ignoring the panel nature of the data. This means that we expect the study will be able to detect finer-scale impacts than we currently estimate.

The LAND Afar IE treatment assignment is not random. However, our selection of DD as the estimation strategy implicitly assumes that the interventions are as good as random, conditional on group fixed effects. By relying on DD, we are making the strong assumption that our comparison group represents an appropriate control group, such as one would find in an experimental study. On the basis of these assumptions, the power calculations were obtained using the Optimal Design software package (Raudenbush et al. 2011; Spybrook et al. 2011).[13] The factors that determine the power of a study do not differ between an experimental and non-experimental design.

The discussion that follows assumes a power of 0.80 and estimates what will be the MDES of LAND's interventions under alternative scenarios for the number of gantas and burras included in the sample. Box 1 below provides details on the variables used in power calculations.

13 We also conducted the power calculations "by hand". The results were similar to the Optimal Design software but marginally more optimistic. Optimal Design is able to conduct more complex analysis that takes group or cluster effects into consideration. Therefore, we chose to present the results of the more conservative Optimal Design estimates.

BOX 1. KEY POWER CALCULATION PARAMETERS

The following describes the key parameters used to conduct the power analysis and sample size requirements for this impact evaluation.

α (alpha) is the Type I error and is also referred to as the p-value in statistics. Generally speaking, this is the probability of concluding there was an impact when no impact actually exists. Typical values of α are 0.1, 0.05, and 0.01 with lower values indicating greater confidence in results (that is, less chance of concluding there is a program effect when there is none).

β (beta) is the Type II error. Generally speaking, this is the probability of not concluding there was an impact when in fact an impact does exist. The sample power is equal to (1 - β). Typical values of β are 0.1 and 0.2. Lower values of β indicate greater confidence in the results. Stated differently, lower values of β are associated with greater power.

CLR (Cluster Level Reliability) is an estimate of measurement error and is used to correct for the precision of outcomes measured at the ganta level.

σ^2 indicates that the evaluation is a fixed effect, versus a random effect, design. This means that we do not believe the ganta in the study are necessarily representative of all ganta in Ethiopia.

J is the number of ganta in each arm of the impact evaluation design. There are two arms in this impact evaluation—the treatment arm and control arm.

Minimum Detectable Effect Size—often represented by δ—is the magnitude of impact that can be detected for a given sample. The units of measure for δ are standard deviations from the mean. For example, if referring to household income and the average value is $1000 per household with a standard deviation of $100, then a value of δ=0.5 implies that incomes of $1050 or more are expected as a result of the intervention. In general, the smaller (larger) is δ the larger (smaller) will be the required sample size since a smaller (larger) impact will require a larger (smaller) sample size in order to detect.

η is the number of households sampled per ganta.

Power is the probability of detecting an impact if one has occurred. The power of a test is equal to 1 minus the probability of a *type II error*, ranging from 0 to 1. Popular levels of power are 0.8 and 0.9. High levels of power are more conservative and decrease the likelihood of a type II error. An *impact evaluation* has high power if there is a low risk of not detecting real program impacts, that is, of committing a type II error.

Power calculations indicate the sample size required for an evaluation to detect a given minimum desired effect. Power calculations depend on parameters such as power (or the likelihood of Type II error), significance level, variance, and intra-cluster correlation of the outcome of interest.

HOUSEHOLD-LEVEL OUTCOMES

This design represents a two-level cluster design with outcomes measured at the person or household level. The first level is the ganta, and the second level is the measurement level (households). The power calculations for the Level II Design do not assume a panel survey or the taking of repeated measurements, in which the same households are re-surveyed over the lifetime of the study. A panel survey increases the power of the study. In practice, we are planning to conduct a household panel across the two rounds of data collection.

The power calculations are based on the following parameters:

- $\alpha = .05$
- $\sigma^2 = 0$ (fixed effects)
- J=100, J=150, J=200, J=250, J=300, J=350, J=400

In addition to these parameters, to estimate the household-level MDES requires information on the degree of correlation between households within a village or the intra-class correlation (ICC). The assumption here is that units within a group are correlated, which means that we do not gain completely new information from each additional unit surveyed; or, alternatively, that calculations treating these units as independent will overstate the precision resulting from the sample. This "loss" of information has to be taken into account in the power calculations through the ICC. A higher ICC indicates greater correlation between households and less new information from each additional household surveyed. Therefore, the MDES will increase with higher ICC values.

We use the 2014 LAND Oromia household survey to calculate expected ICC for a number of indicators. The ICC for community clusters, mean (μ), and standard deviation (σ) are included below in the list below. The ICC for these indicators ranges from .062 to .19 and have an average ICC of .127. Thus, based on these ICC estimates from the 2014 LAND Oromia household survey, we include ICC of .10 and .20 for our power calculations; an MDES for ICC of .30 is also provided for reference to illustrate the loss in power as ICC increases.

- Tropical Livestock Unit[14] (μ =3.03, σ = 22.12, ICC=.15)
- Total income (μ = 10896, σ =33417, ICC=.062)
- Livestock income (μ =8168, σ =33093, ICC=.064)
- Consumer durables (μ =14.15, σ =9, ICC=.12)
- Dietary diversity (30 days) (μ = 300.8, σ =196, ICC=.086)
- Own/use farmland (μ =.47, σ =.50, ICC=.16)
- Aware of conflict (μ =.15 σ =.36, ICC=.19)
- Satellite camp use (μ =.16 , σ =.36, ICC=.19)
- Mobility during droughts (μ =.13, σ =.33, ICC=.10)
- Have access to farmland (μ =.81 σ =.40, ICC=.12)
- Fair land acquisition (μ =.73 σ =.44, ICC=.14)
- Literacy (μ =.62 σ =.48, ICC=.08)

Table 1 provides the MDES under different assumptions about the sample size. While the standard parameters stay fixed, we alter (1) the number of households surveyed (N) from 5-30, (2) the number of gantas involved in each arm of the LAND program from 100-400, and (3) the ICC from .10 to .30.

14 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.

Figures 6–9 show the difference between MDES for an ICC of .10 and an ICC of .30, with each figure using an increased N.

TABLE 1. SUMMARY OF MDES UNDER VARIOUS ASSUMPTIONS

Total ganta	Power	Alpha	N	Total Sample Size	ICC	MDES	ICC	MDES	ICC	MDES
100	.80	.05	5	500	.10	.30	.20	.35	.30	.38
100	.80	.05	10	1000	.10	.25	.20	.30	.30	.35
100	.80	.05	15	1500	.10	.23	.20	.29	.30	.33
100	.80	.05	20	2000	.10	.22	.20	.28	.30	.33
100	.80	.05	30	3000	.10	.20	.20	.27	.30	.32
200	.80	.05	5	500	.10	.22	.20	.25	.30	.27
200	.80	.05	10	1000	.10	.18	.20	.22	.30	.25
200	.80	.05	15	1500	.10	.16	.20	.20	.30	.24
200	.80	.05	20	2000	.10	.15	.20	.20	.30	.23
200	.80	.05	30	3000	.10	.14	.20	.19	.30	.23
300	.80	.05	5	500	.10	.18	.20	.20	.30	.22
300	.80	.05	10	1000	.10	.14	.20	.18	.30	.20
300	.80	.05	15	1500	.10	.13	.20	.17	.30	.19
300	.80	.05	20	2000	.10	.13	.20	.16	.30	.19
300	.80	.05	30	3000	.10	.12	.20	.16	.30	.18
400	.80	.05	5	500	.10	.16	.20	.18	.30	.19
400	.80	.05	10	1000	.10	.13	.20	.15	.30	.18
400	.80	.05	15	1500	.10	.11	.20	.14	.30	.17
400	.80	.05	20	2000	.10	.11	.20	.14	.30	.16
400	.80	.05	30	3000	.10	.10	.20	.13	.30	.16

Source: Authors' calculations

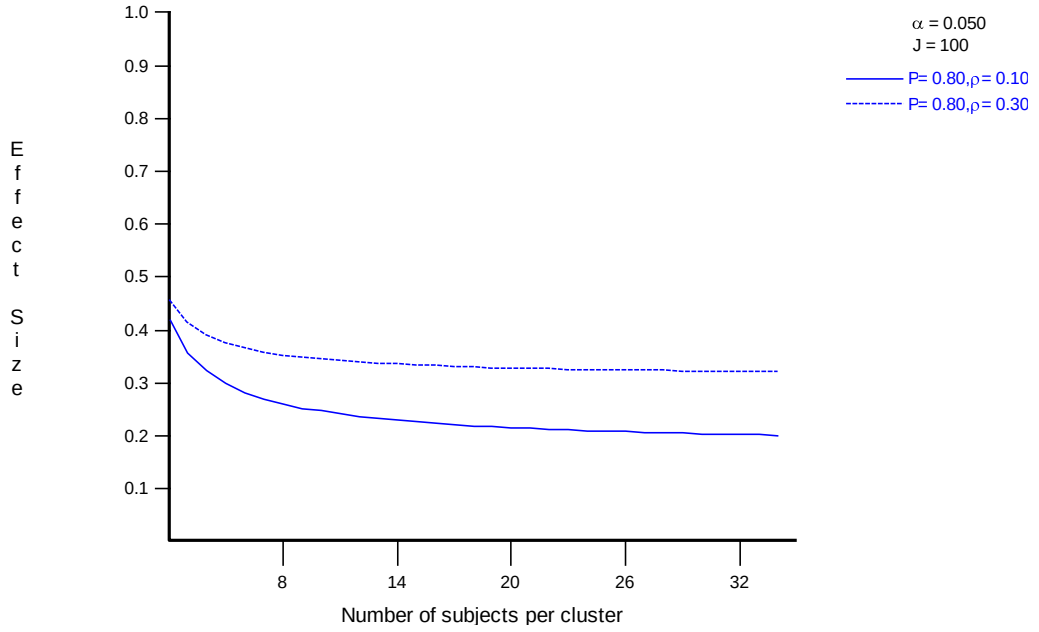

FIGURE 6. RELATIONSHIP BETWEEN MDES AND HH SAMPLE SIZE, TOTAL GANTA=100

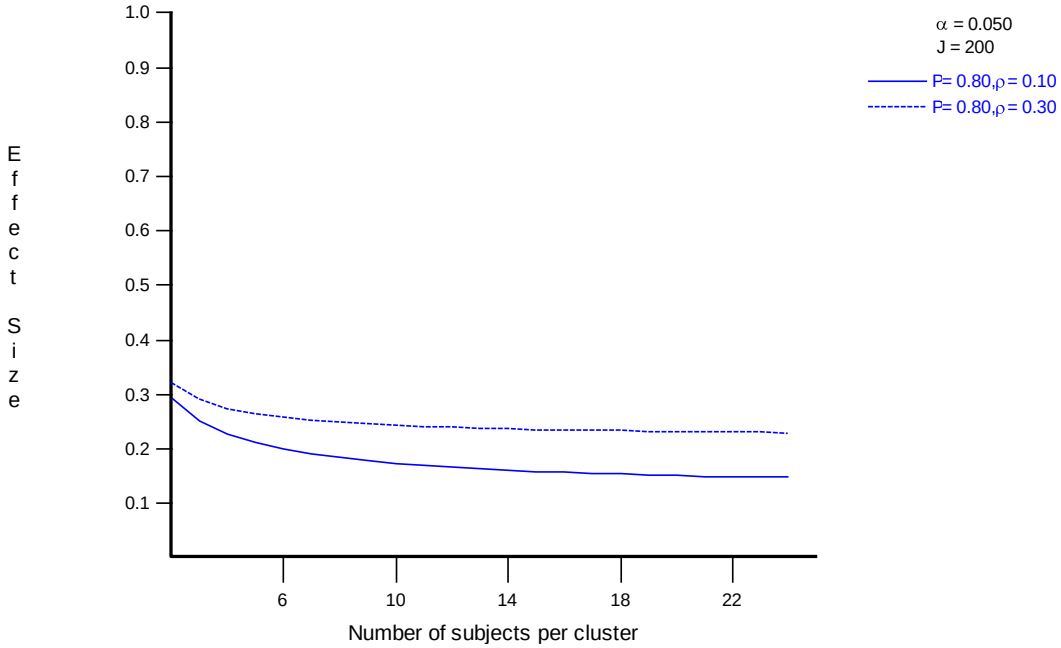

FIGURE 7. RELATIONSHIP BETWEEN MDES AND HH SAMPLE SIZE, TOTAL GANTA=200

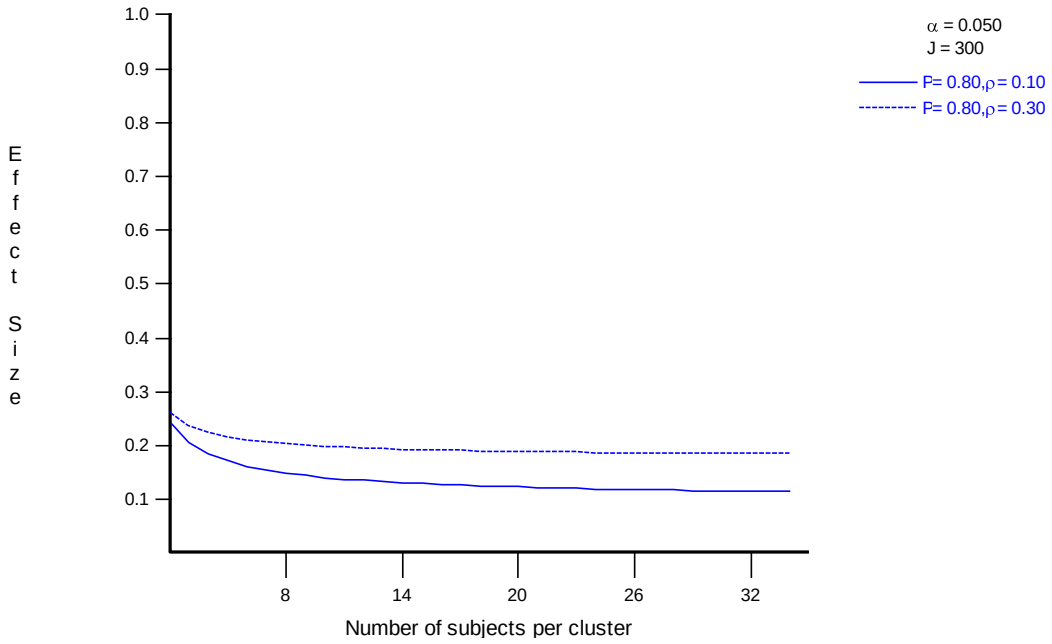

FIGURE 8. RELATIONSHIP BETWEEN MDES AND HH SAMPLE SIZE, TOTAL GANTA=300

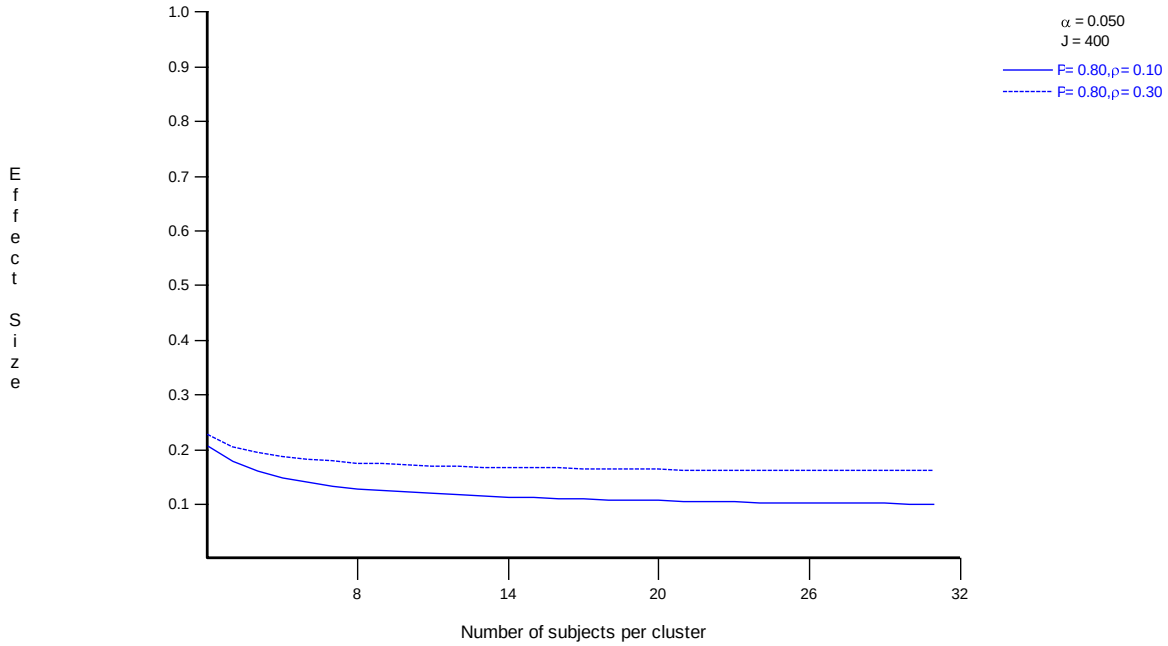

FIGURE 9. RELATIONSHIP BETWEEN MDES AND HH SAMPLE SIZE, TOTAL GANTA=100

GANTA-LEVEL OUTCOMES

This design represents a two-level community trial of group-level processes. In this case, the group-level processes of interest are the ganta-level outcomes. The power calculations are based on the following assumptions:

- $\alpha = .05$
- J=200, J=250, J=300

In addition to these parameters (definitions given in Box 1), estimating the MDES at the community level also requires an assumption of the cluster-level reliability (CLR). CLR reflects the imperfect measurement of group-level outcomes. We have to take measurement error into consideration to look at community-level outcomes. The analysis assumes a value for CLR= 0.7, as this is the publishable standard. Figure 10 illustrates the relationship between MDES and the number of communities in each treatment arm of the LAND program. Table 2 summarizes the results of the power calculations.

TABLE 2. SUMMARY OF MDES UNDER VARIOUS ASSUMPTIONS FOR DESIGN 1—AVERAGE TREATMENT EFFECTS

Total Villages	Power	Alpha	CLR	MDES
150 (75-treatment; 75-control)	.80	.05	.70	.55
200 (100—treatment; 100—control)	.80	.05	.70	.47
250 (125—treatment; 125—control)	.80	.05	.70	.42
300 (150—treatment; 150—control)	.80	.05	.70	.39
350 (175—treatment; 175—control)	.80	.05	.70	.36
400 (200—treatment; 200—control)	.80	.05	.70	.34

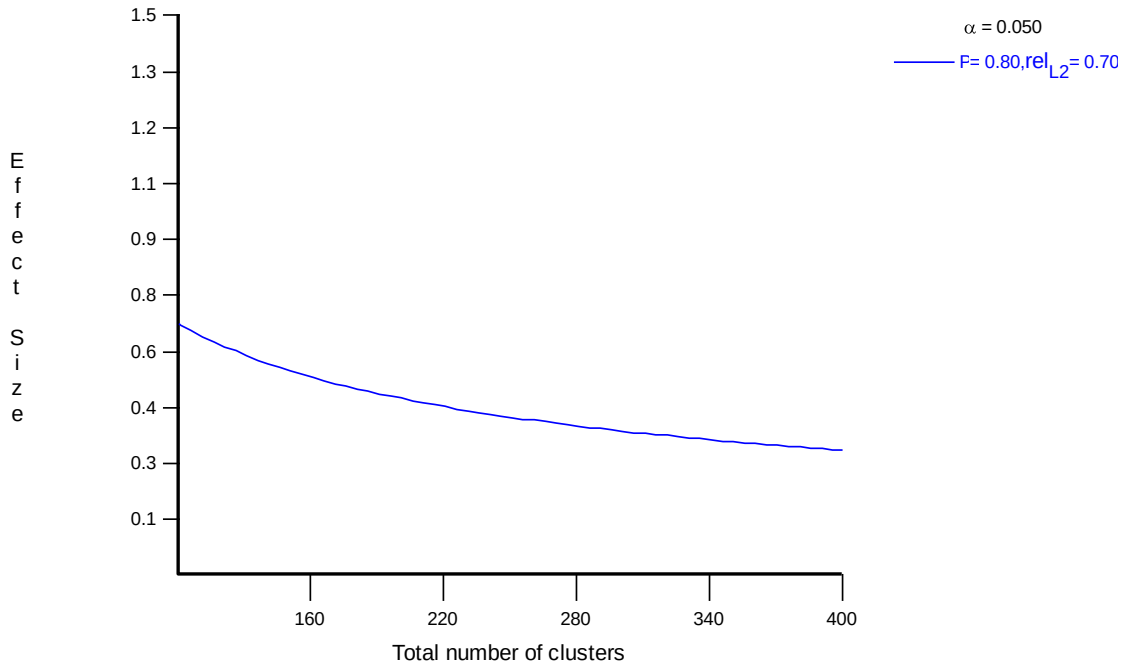

FIGURE 10. RELATIONSHIP BETWEEN MDES AND GANTA SAMPLE SIZE

Table 3 summarizes the sample implications from the ganta- and household-level analyses.

TABLE 3. SUMMARY OF VILLAGE AND HOUSEHOLD MDES UNDER ALTERNATIVE SCENARIOS

Ganta per arm	Households per ganta	Wives per ganta	MDES		Total sample for two-arm design		
			Household	Wives	Ganta	Households	Wives
50	10	3	.30	.42	100	1000	300
50	15	5	.29	.35	100	1500	500
50	20	7	.28	.33	100	2000	700
50	30	10	.27	.30	100	3000	1000
100	10	3	.22	.29	200	2000	600
100	15	5	.20	.25	200	3000	1000
100	20	7	.20	.23	200	4000	1400
100	30	10	.19	.22	200	6000	2000
150	10	3	.18	.24	300	3000	900
150	15	5	.17	.20	300	4500	1500
150	20	7	.16	.19	300	6000	2100
150	30	10	.16	.18	300	9000	3000
200	10	3	.15	.21	400	4000	1200
200	15	5	.14	.18	400	6000	2000
200	20	7	.14	.16	400	8000	2800
200	30	10	.13	.15	400	12000	4000

Source: Authors' calculations

** Model and parameter assumptions: i) power =0.80 (=1- β), ii) α==.05, iii) CLR=0.7 (for village), iv) ICC=.20 (for HH calculations)

7.0 CONCERNS AND CONSIDERATIONS

This section describes factors that present risks to the validity of the research inferences and evaluation methodology, as well as additional concerns raised by the implementing partners regarding the sensitivity of the research.

LOGISTICS AND PREPAREDNESS

The vast majority of the Afar region is a remote and minimally accessible area, except its southern part. The electronics plan and the logistics of the data collection will need to be carefully considered by the evaluation and data collection team. Additionally, the propensity for violence in the area will require extra preparation and flexibility to ensure the integrity of the data collection but especially the safety of all team members.

LACK OF INFORMATION

Due to the dearth of Afar census data and other research in the area, there is a lack of good community statistics and clan-level data. This has implications for the sampling and the power calculations. A pre-survey community listing will be conducted in the treatment and control areas prior to pilot and launch of the collection period. This information will be used to inform the sample design.

LIMITATIONS OF DIFFERENCE IN DIFFERENCE

The proposed method to identify the impact of LAND Component 4 is Difference-in-Differences. This method assumes that time trends are similar in the comparison and treatment groups before the intervention takes place and that the time trajectory will remain constant. That is, the time-varying factors are assumed to be the same between the treatment and comparison groups. If this does not hold true due to factors, such as development programs, conflict or shocks, that differentially affect the treatment and control groups, the impact estimates may be biased.

To help mitigate this weakness in the design, the estimation strategy will combine matching with DD to improve the comparability between treatment and control groups and will include covariates to control for factors that may influence the trajectory of the treatment groups over time. Moreover, supplementing endline DD regression analysis with time-varying geo-spatial information (e.g., on rangeland condition, market access, etc.) can reduce bias and improve the quality of estimated impacts.[15]

15 Inconsistent standard errors due to serially correlated time series data is a prevalent criticism of DD (Bertrand et al. 2004). We are using a very basic DD set up of two groups and two periods which does not present the same threat from serial correlation that is found in multi-period data. In addition, through cluster level random effects, our model specification will explicitly take into account the inconsistent standard errors from grouped data.

INSUFFICIENT SAMPLE SIZE

There are a large number of indicators, and the size of sample required to detect impact will depend on the parameters of those indicators (i.e. mean and variability) along with the expected impact. A given sample size may be sufficient to detect program impact for one set of indicators but not for another. Given the absence of basic sample statistics on gantas in Afar, the research team will conduct a pre-launch listing of communities in the treatment and control woredas. This information will be used to update the power calculations prior to the baseline data collection.

MATURATION

Some of the impacts may take a much longer time period to materialize than what is currently available in terms of time between the baseline and end line data collection. To allow for this, the survey data will collect information on anticipated changes for key proximate outcomes in cases where enough time will not have passed to measure a meaningful change in a more distal development indicator. For example, perceptions of land tenure security are measured in addition to some of the more long-term impacts—such as investment and livelihood improvements—that are expected from improved tenure security.

HUMAN SUBJECT PROTECTION

All data collection activities will adhere to professional and ethical standards for the treatment of human subjects. The evaluation team will submit the proposed impact evaluation to the Institutional Review Boards (IRB) at Clark University[16]. The IRB is an ethics body in charge of overseeing and monitoring research activities involving human subjects. The IRB's main role is to ensure that research procedures do not pose more than negligible risk to the participant subjects and to assess the adequacy of safeguards to protect subjects' rights, welfare, and dignity. Researchers are required by the IRB to: (1) inform the subjects about the purpose, risks, and benefits of the study so that they can make an informed decision about whether or not to participate in the research and (2) protect the anonymity of subjects and the confidentiality of the data.

The evaluation will conform to the legal and other requirements governing research with human subjects in Ethiopia. To conform to the Development Data Library Policy, the informed consent protocols for the study will include language highlighting the study's plans for public data sharing after all public identifiable information has been removed. Although there is no formal IRB requirement in Ethiopia, or official regulations regarding conducting household surveys, it is common practice to receive a letter of approval for conducting the survey from the relative ministry (Ministry of Agriculture) and from the local government (Afar regional government).

Given sensitivities over land issues, the evaluation team will also work closely with the LAND and PRIME implementing partners to ensure local leader and community buy-in and understanding of the research prior to community entry and data collection.

Furthermore, the research team will provide training to all enumerators and qualitative researchers to ensure they understand these principles. Upon completion of research activities in the field, the data will be maintained in a way that adheres to general IRB principles. All analyses and publications will respect the anonymity of respondents; no identifying information will be used in reports or presentations. The

16 Cloudburst has an established relationship with Clark University for the IRB review process.

mode of analysis will follow econometric standards for survey research, the aim of which is to make general claims about the participant and non-participant populations, not specific claims about identifiable individuals.

ATTRITION

This refers to a reduction in household sample size in the context of a panel due to migration and the inability to locate the same respondents at the midline or end line data collection. The remedy for this problem is to oversample and to collect additional contact data during baseline that can be used to locate respondents in future waves of data collection. Given the nature of pastoralists in the lowland regions, a non-negligible attrition rate is expected.

8.0 IMPACT EVALUATION TIMELINE AND TEAM COMPOSITION

The baseline data collection for the household and community surveys will be timed to coincide with the dry season, when most household members can be found at their primary residence, and will therefore be implemented from March through May 2016. A midline data collection is tentatively scheduled for March through May 2018, and the endline for March through May 2020, both subject to the availability of funds. Midline and endline will be used to assess the same features of tenure security, land governance, and livelihoods as the baseline surveys, although the midline may employ a condensed survey methodology. During these three collection periods, data from focus groups and interviews will also be collected. To avoid seasonal effects, the baseline, midline and endline surveys should be conducted at the same time each year, if feasible.

Table 4, on the next page, provides a detailed timeline for the LAND Afar IE Baseline data collection.

TABLE 4. LAND IMPACT EVALUATION ACTIVITY TIMELINE.

Activity	2015									2016												2017	2018	2019	2020
	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D				
IE Design Report—draft																									
IE design 3rd party review and revision																									
Survey instrument development																									
Survey instrument 3rd party review and revision																									
Issue RFP for data collection, proposal review, and survey firm selection																									
IRB application process																									
Community Listing																									
Survey translation																									
Develop sampling methodology and field work logistics plan																									
Survey programming																									
Country approvals, initial setup and electronic device shipping																									
Pre-testing/Finalize survey instrument																									
Enumerator training																									
BASELINE DATA COLLECTION																									
Translation of qualitative information, data cleaning, produce baseline dataset																									
Baseline data report																									
MIDLINE DATA COLLECTION																									
END LINE DATA COLLECTION																									
End line data report																									

IMPACT EVALUATION TEAM

ERC proposes the following composition of the Impact Evaluation Team:

Impact Evaluation Manager: Heather Huntington

Pastoral Subject Matter Expert: John McPeak (Syracuse University)

Pastoral Subject Matter Expert: Peter Little (Emory University)

Ethiopian Pastoral Subject Matter Expert: Waktole Tiki (Consultant)

Afar Region Subject Matter Expert: Herrie Hamedu (Consultant)

Baseline Field Manager: Aleta Haflett Starosta

Research Analysts: Lauren Persha, Kate Marple-Cantrell, Aidan Schneider, Stephanie Fenner, Nicole Walter

Survey Firm: BDS Center for Development Research

9.0 DELIVERABLES

BASELINE REPORT

ERC plans to complete a baseline report, including reviews and revisons, by January 15, 2017. The baseline report will provide rich descriptive data, including qualitative data, on communities in the study area and will flag any potential imbalances across treatment groups.

FULLY DOCUMENTED DATA SET AND CODEBOOK

Following the baseline data collection, ERC plans to submit a fully documented data set and codebook for the quantitative data sources, with all identifiers removed, to USAID by January 15, 2017.[17] This data set and codebook will then be submitted to the Data Development Library for approval, and be made public on the USAID Land Tenure Portal (http://www.usaidlandtenure.net/data).

IMPACT EVALUATION REPORT

ERC will prepare impact evaluation reports within three to six months of receipt of the midline and endline survey results. The impact evaluation reports will report the effects of the treatments versus controls on each of the outcomes of interest. In addition to investigating average treatment effects, the report will also include a discussion of heterogeneous treatment effects and qualitative data. The analysis in the impact evaluation report will follow the plan outlined in the baseline report as much as possible, as allowed by the findings.

JOURNAL ARTICLES

ERC expects to write one peer-reviewed journal article on the baseline data collection by December 2017.

PRESENTATIONS

ERC will draft at least two presentations for different audiences (e.g., policy makers, academics etc.) based on the evaluation research, as interest allows.

DISSEMINATION

All reports, data, and survey instruments are subject to review by the LTRM Office and the USAID Ethiopia Mission prior to release. When cleared for public release, documents and data will be available on the USAID Land Tenure Portal portal (http://usaidlandtenure.net/) and will also be submitted appropriately to the USAID Development Experience Clearinghouse (DEC).

ERC plans to share the results via presentations to a variety of stakeholders, including development partners and academic audiences. Given approval from USAID Mission and the LTRM Office, ERC will collaborate with the implementing partners to ensure that the data will be presented to local

17 Assuming the evaluation adheres to the scheduled midline and end line timeframe, the documented data sets for the mid-line and end line surveys would be ready by January 2019 and January 2021, respectively.

stakeholders and communities in a culturally appropriate manner. Results will be shared with development experts in the US, including a presentation at USAID in Washington, D.C. In addition, ERC will present the results at academic and policy conferences, as well as attempt to publish at least one peer-reviewed journal article based on the research.

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ANNEX 1—AFAR LAND COMMUNITY LISTING SUMMARY

On the following pages are several tables and figures demonstrating and illustrating the characteristics of the potential sample sites, using data gathered from the community listing process as well as from GIS data. This information was used to identify control woredas suitable to match with the treatment sites.

SAMPLE SIZE

TABLE 1.1—SAMPLE SIZE

Woreda	Number of villages	Average number of HH per village	Number of villages with less than 15 HH	Total Population*
Amibara	66	215	1	14,195
Gewane	48	128	0	6,105
Chifra	131	176	1	23,097
Tellalak	41	25	6	1,019
TOTAL	286	155	8	44,416

*Total population is if we were to interview every household.

PRESENCE OF WOYANE (P. JULIFLORA), WET AND DRY SEASON (SCALE OF 0-10)

TABLE 1.2—PRESENCE OF WOYANE, BY SEASON

Woreda	Wet season	Dry Season
Amibara	9.1	8.8
Gewane	7.7 ***	6.4***
Chifra	.2	.2
Tellalak	.0	.0

HERDING TRENDS

Only 38% of households in Gewane are pastoral, compared to 87% of households in Amibara – but households seem to herd animals at similar rates. Tellalak has significantly more agropastoral households than Chifra. Similarly, fewer households herd camel or cattle in Tellalak than in Chifra.

TABLE 1.3—HERDING TRENDS

Woreda	HH who herd camels	HH who herd cattle	HH who herd goats	HH who herd sheep
Amibara	100%	100%	98%	98%
Gewane	94% **	98%	100%	100%
Chifra	97%	100%	100%	100%
Tellalak	85% ***	90% ***	100%	97%*

VILLAGE DEMOGRAPHICS

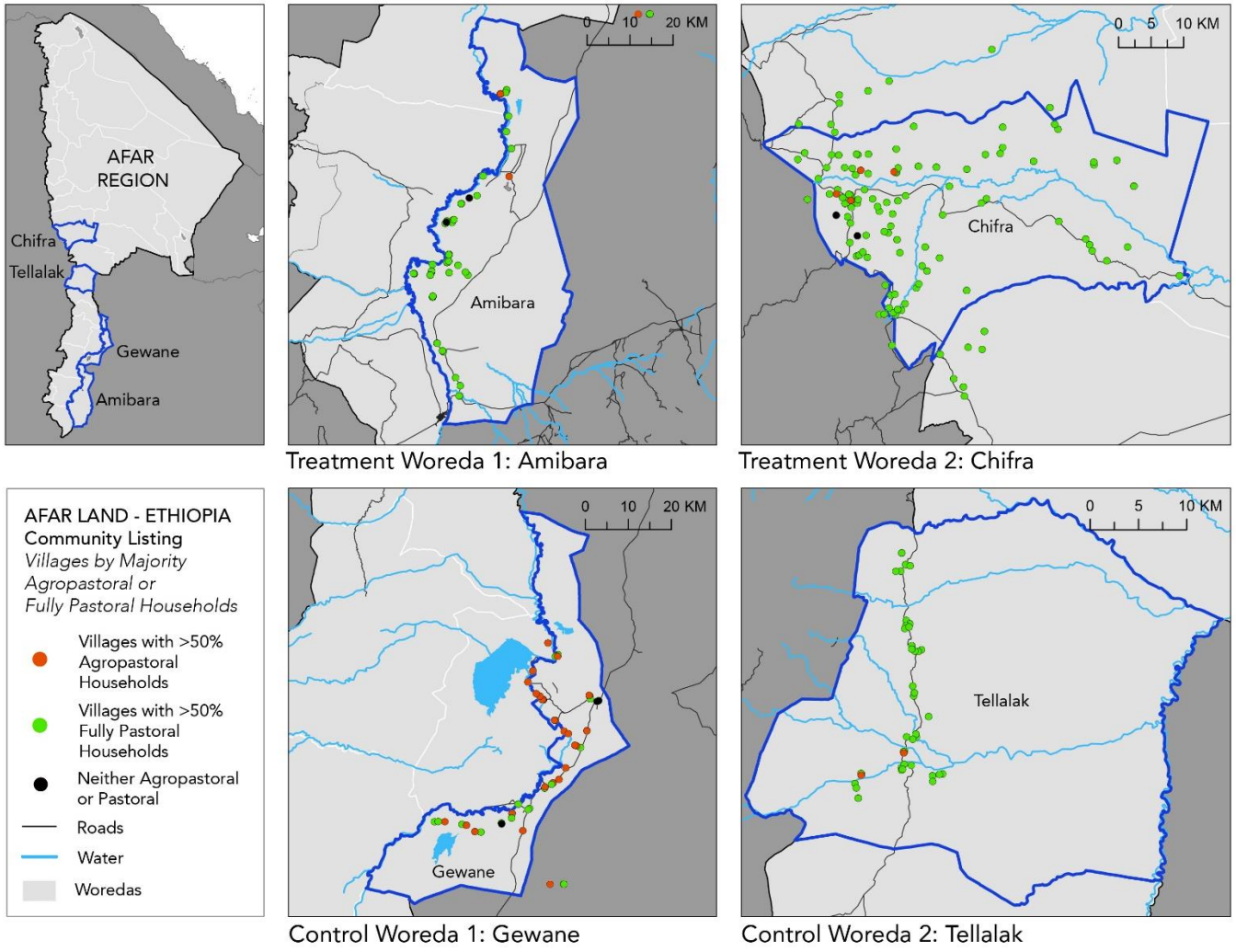
Most households are fully pastoral across the woredas. However, Gewane has a high number of agropastoral households.

TABLE 1.4—VILLAGE DEMOGRAPHICS

Woreda	% FHH	% Agropastroal HH	% Pastoral HH
Amibara	37%	14%	87%
Gewane	24% ***	50%***	38%***
Chifra	17%	8%	90%
Tellalak	17%	24%***	76%***

The map below indicates which villages have 50% or more agropastoral or fully pastoral households. Gewane has a higher number of agropastoral villages than the other woredas.

FIGURE 1.1—VILLAGE DEMOGRAPHICS



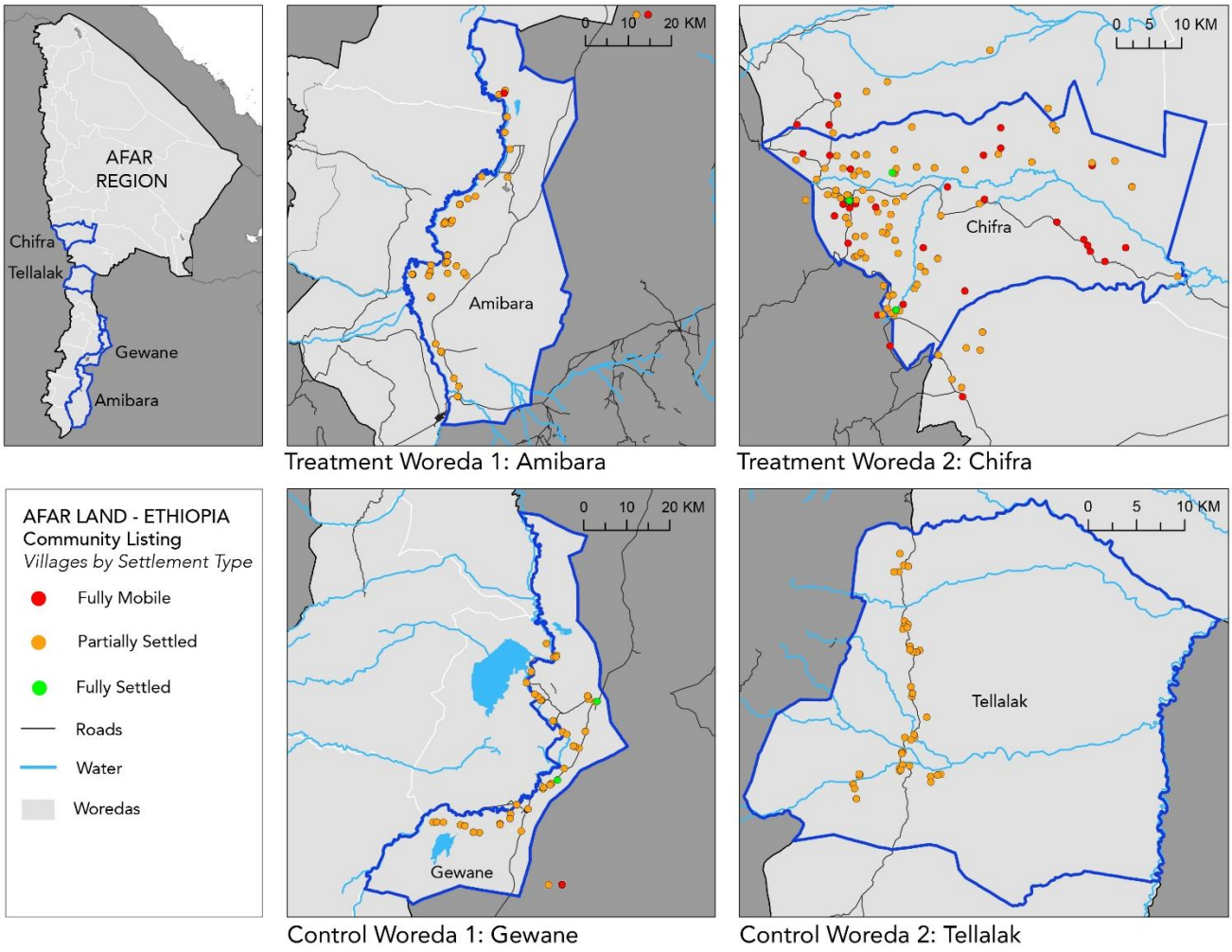
SETTLEMENT PATTERNS

The majority of villages are partially settled. Chifra has the highest percent of fully mobile villages. There are design and logistical reasons for focusing on the partially settled villages.

TABLE 1.5—SETTLEMENT PATTERNS

Woreda	Fully mobile	Partially settled	Fully settled
Amibara	3% (2)	95% (63)	2% (1)
Gewane	0% (0)	94% (45)	4% (2)
Chifra	25% (33)	69% (91)	5% (7)
Tellalak	0% (0)	100% (41)	0% (0)
TOTAL	12% (35)	84% (240)	3% (10)

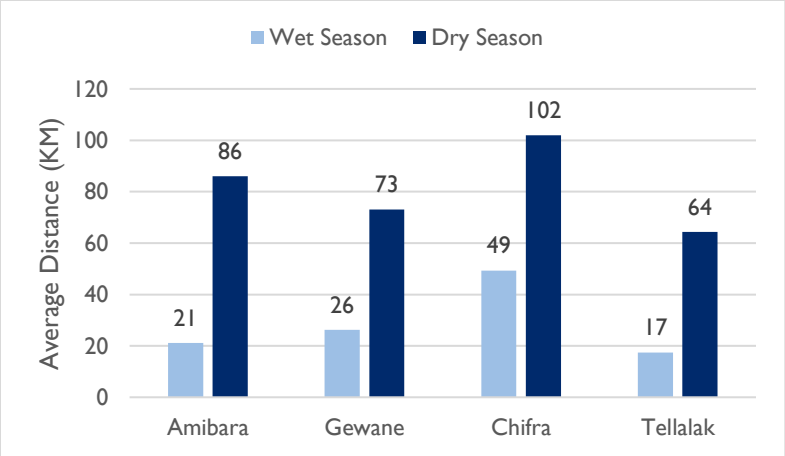
FIGURE 1.2—SETTLEMENT PATTERNS



DISTANCE TRAVELED

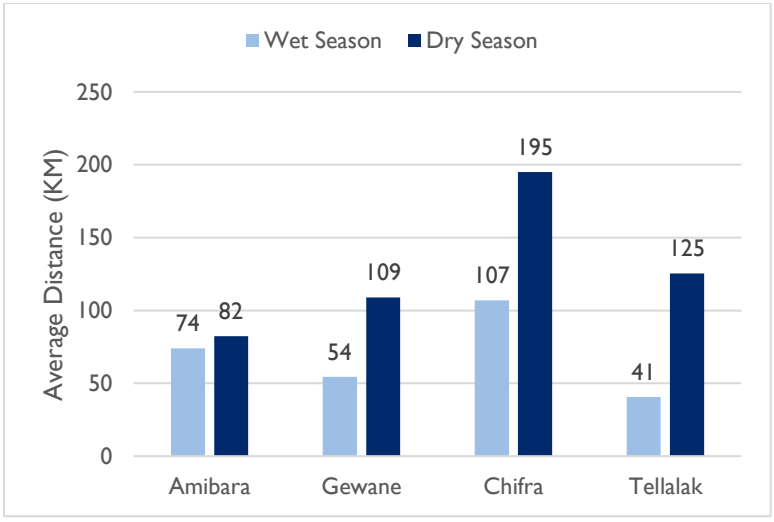
During a non-drought year, villages travel about 2-3 times farther on average during the dry season that during the wet season. Villages in Chifra travel much farther than villages in Tellalak.

FIGURE 1.3—DISTANCE TRAVELED DURING NON-DROUGHT YEARS



During drought years, villages travel farther overall on average than during non-drought years. One noticeable difference is that villages in Amibara aren't as impacted throughout the dry season as villages during a drought year as Gewane.

FIGURE 1.4—DISTANCE TRAVELED DURING NON-DROUGHT YEARS



In trying to pick a suitable control woreda for Chifra, it's important to look at villages that cross over into the surrounding woredas. According to the table below, many villages from Chifra travel through or to Mille.

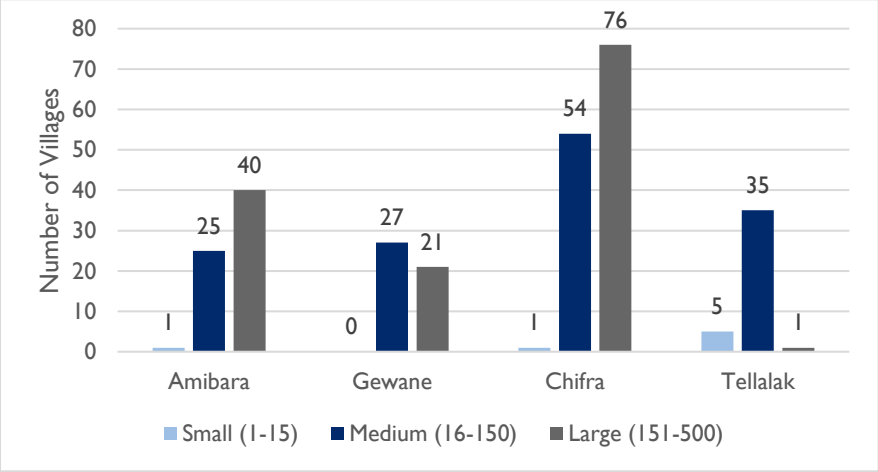
TABLE 1.6

Woreda	Regular Year	Drought Year
Chifra → Mille	41	100
Chifra → Dewe	2	2
Chifra → Ewa	19	25
Chifra →Tellalak	0	0

TABLE 1.7—VILLAGE SIZE BY NUMBER OF HOUSEHOLD

Village Size by Households	Amibara	Gewane	Chifra	Tellalak	Total Villages
Small (1-15)	1	0	1	5	7
Medium (16-150)	25	27	54	35	141
Large (151-500)	40	21	76	1	138
Total	66	48	131	41	286

FIGURE 1.5—NUMBER OF VILLAGES BY VILLAGE SIZE



Chifra has many more medium and large villages than the other woredas.

CLANS

This table shows village size compared to the number of clans by woreda. For example, in Amibara, there are 25 medium sized villages and across those villages, there are 14 clans.

TABLE 1.8—VILLAGE SIZE COMPARED TO CLAN SIZE

	Amibara		Gewane		Chifra		Tellalak	
Village Size by Households	Villages	Clans	Villages	Clans	Villages	Clans	Villages	Clans
Small (1-15)	1	1	0	0	1	1	5	3
Medium (16-150)	25	14	27	15	54	15	35	13
Large (151-500)	40	18	20	12	76	19	1	1

This table shows the number of clans per woreda. This might vary a bit as we continue to sort through the clan names.

TABLE 1.9—NUMBER OF CLANS IN EACH WOREDA

• Woreda	• Clans
• Amibara	• 24
• Gewane	• 20
• Chifra	• 29
• Tellalak	• 14

CROSSOVER BETWEEN TREATMENT AND CONTROL GROUPS

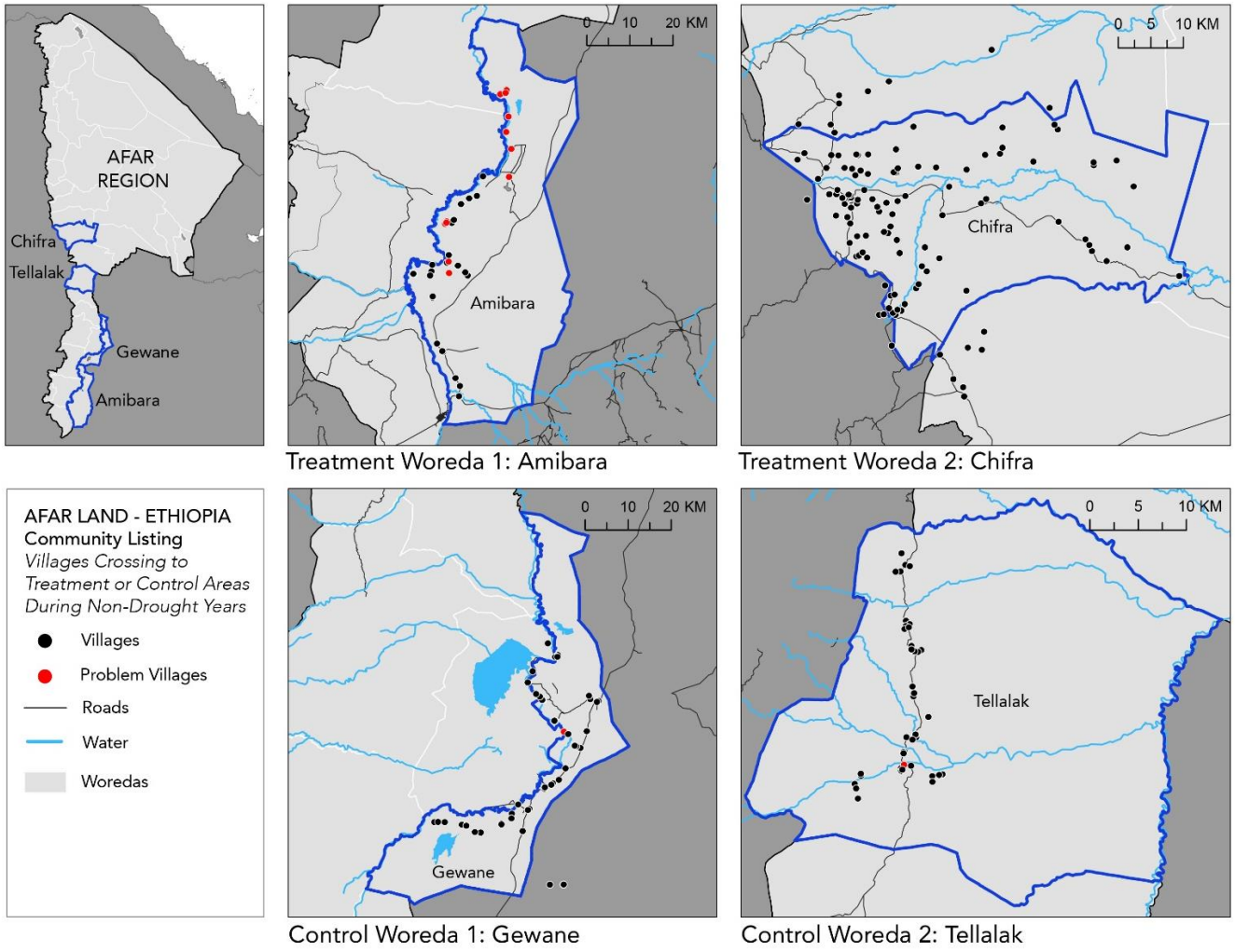
TABLE 1.10—NUMBER OF VILLAGES WITH T/C CROSSOVER

	Non Drought Year		Drought Year	
	Wet Season	Dry Season	Wet Season	Dry Season
Amibara (T1)	9	12	14	10
Gewane (C1)	1	1	3	3
Chifra (T2)	0	0	0	0
Tellalak (C2)	1	0	3	4

This table indicates the number of villages that migrate through or to their respective treatment or control woreda—assuming that Gewane serves as the Amibara control and Tellalak serves as the Chifra control.

Note: There is also crossover between treatment and control groups traveling to one another, particularly during drought years when they are traveling father (e.g., T1 crossing to T2, T2 crossing to C1 etc), but this information is not captured in this table.

FIGURE 1.6—VILLAGES WITH POTENTIAL FOR CROSSOVER



GEOGRAPHIC DATA ON POTENTIAL SAMPLE SITES

The following figures were created using GIS and community listing data. Each figure shows the locations of listed villages and potential sample sites as they relate to the characteristics deemed most important for the matching process, such as the distance to a year-round river or density of woyane growth. The final figure shows how each of these factors compare between the woredas chosen for sampling.

FIGURE 1.6—LOCATION OF POTENTIAL SAMPLE SITES AND PRESENCE OF WOYANE

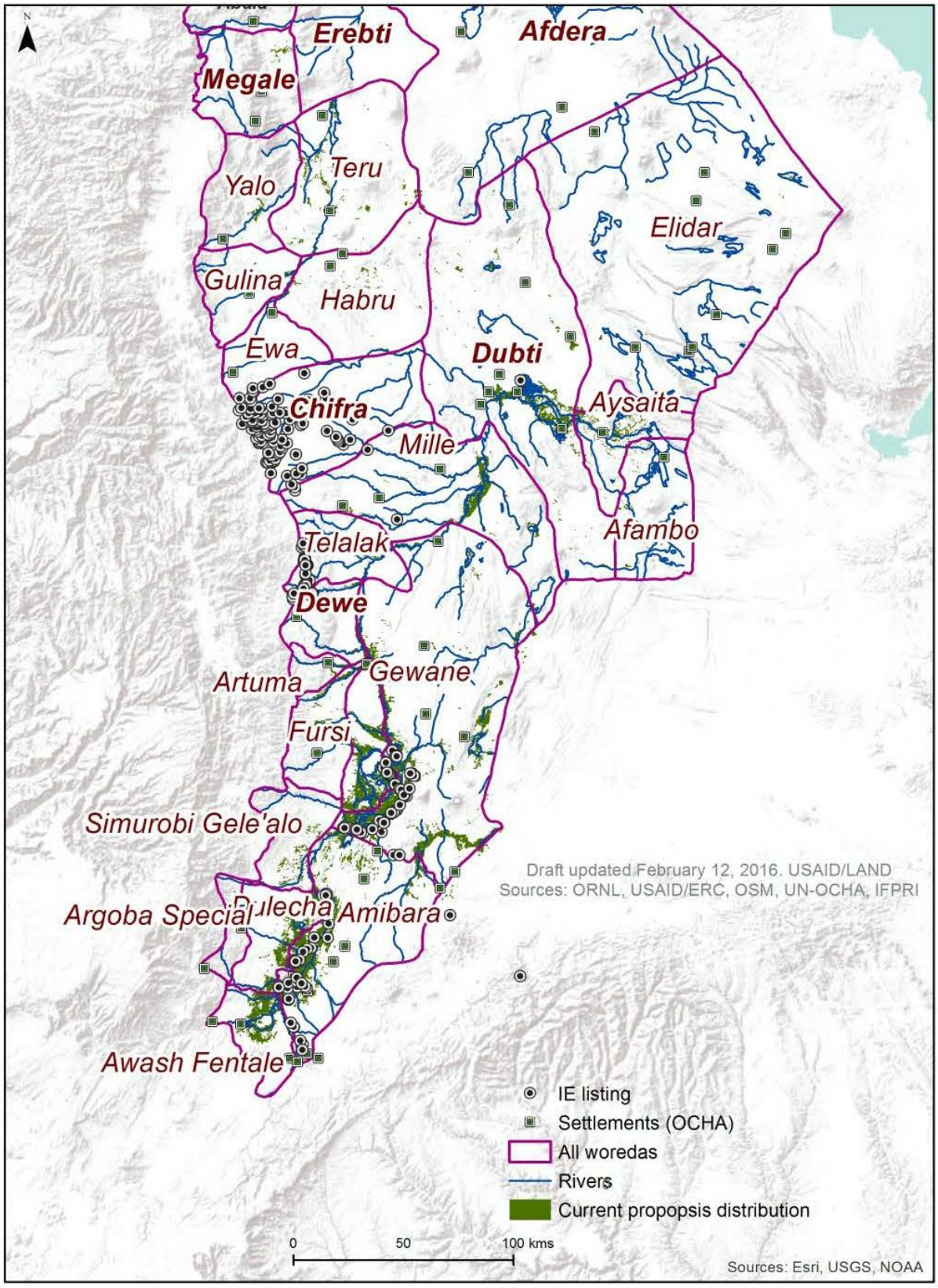


FIGURE 1.7—LOCATION OF POTENTIAL SAMPLE SITES AND ROAD DENSITY

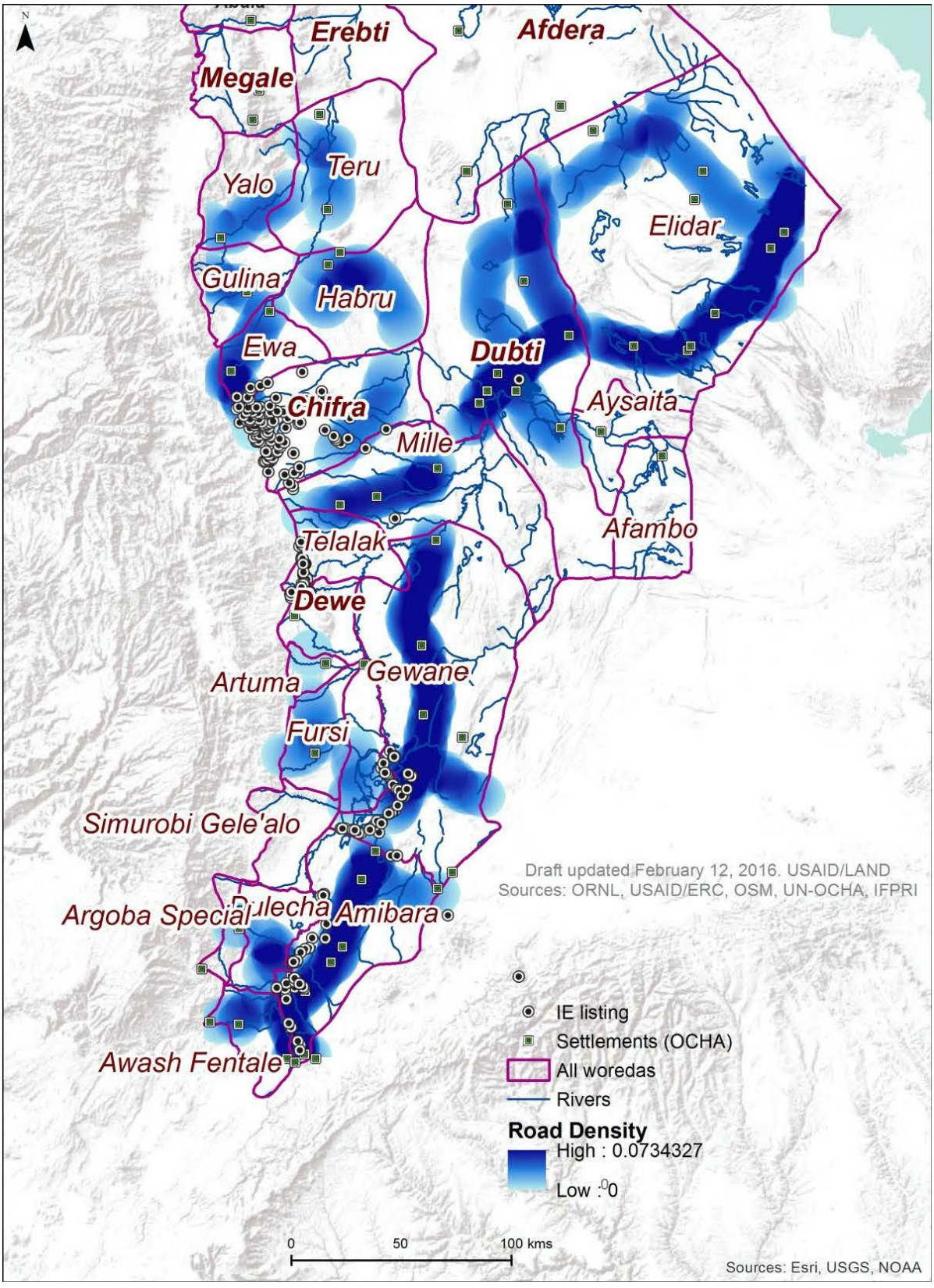


FIGURE 1.8—LOCATION OF POTENTIAL SAMPLE SITES AND TRAVEL TIME TO NEAREST TOWN

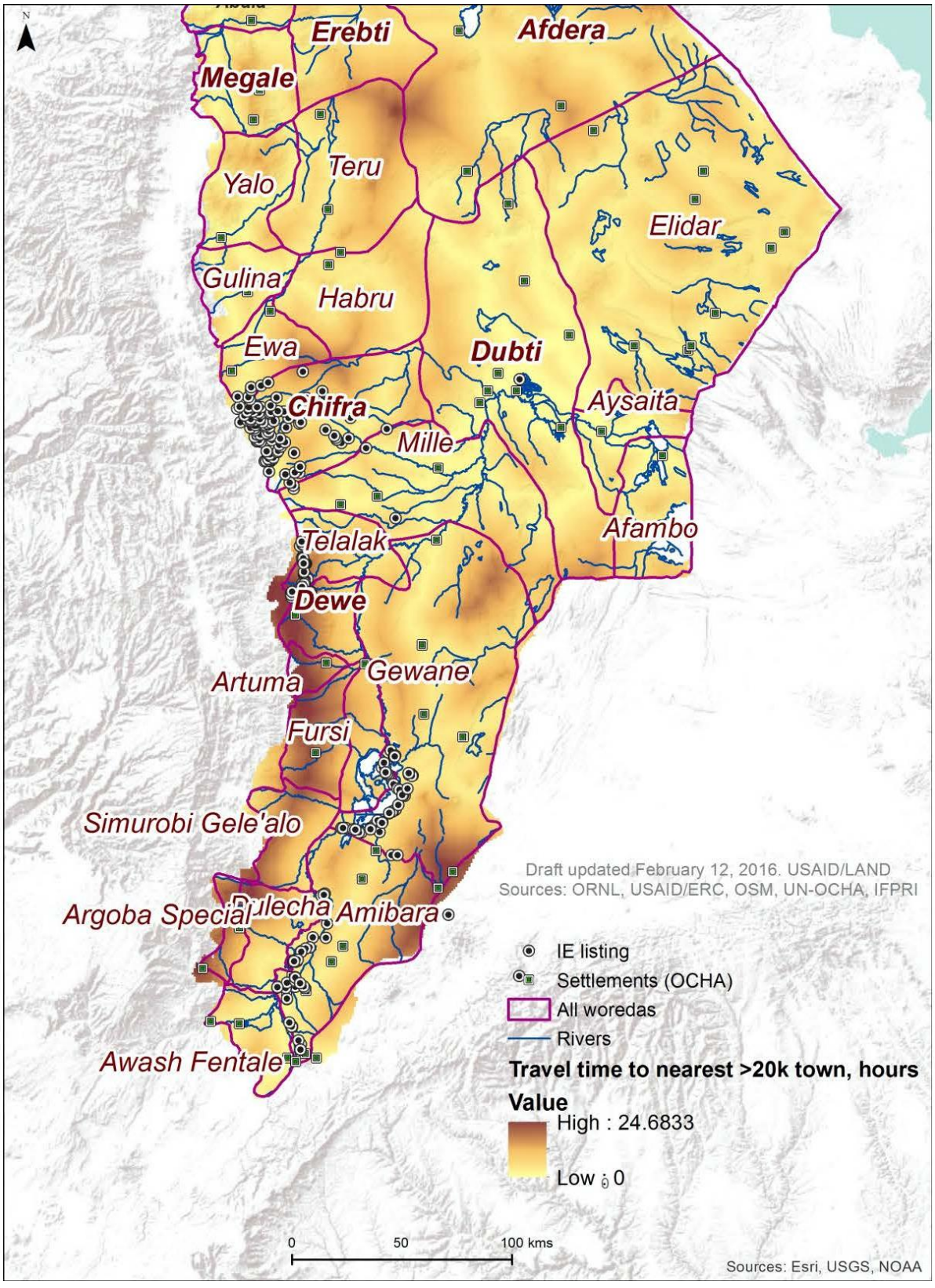


FIGURE 1.9—LOCATION OF POTENTIAL SAMPLE SITES AND POPULATION DENSITY

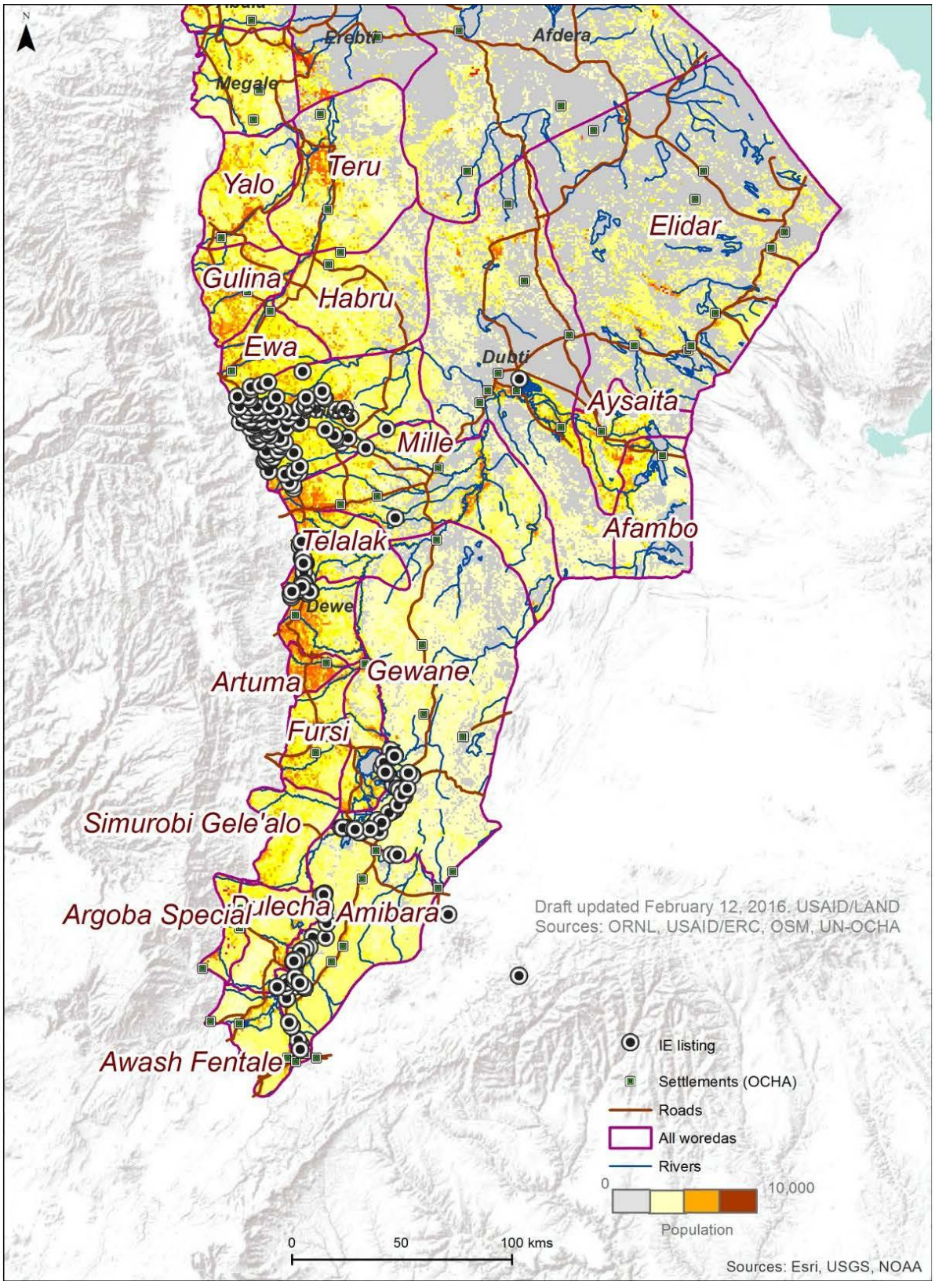


FIGURE 1.10—LOCATION OF POTENTIAL SAMPLE SITES AND DISTANCE TO RIVERS

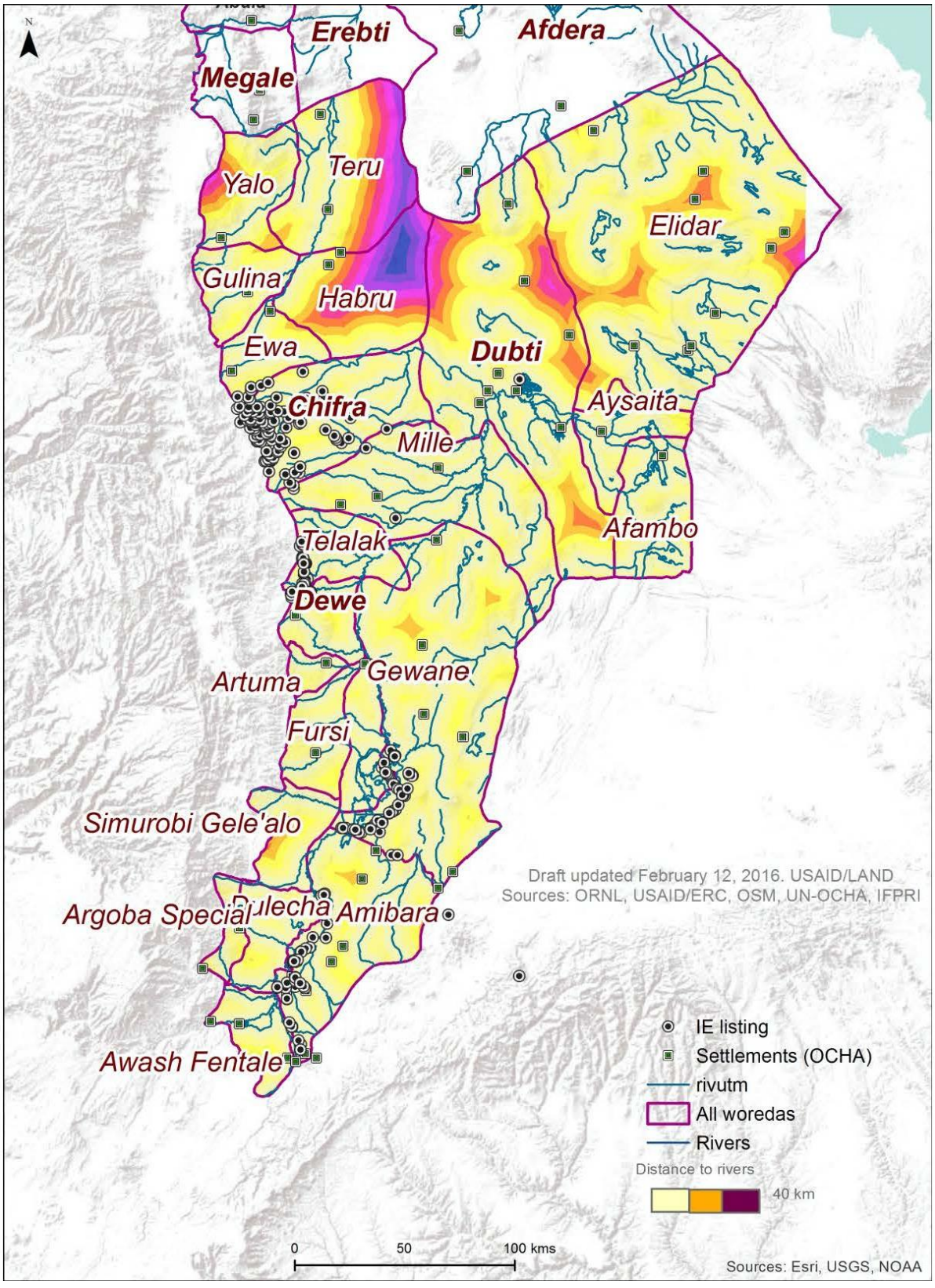
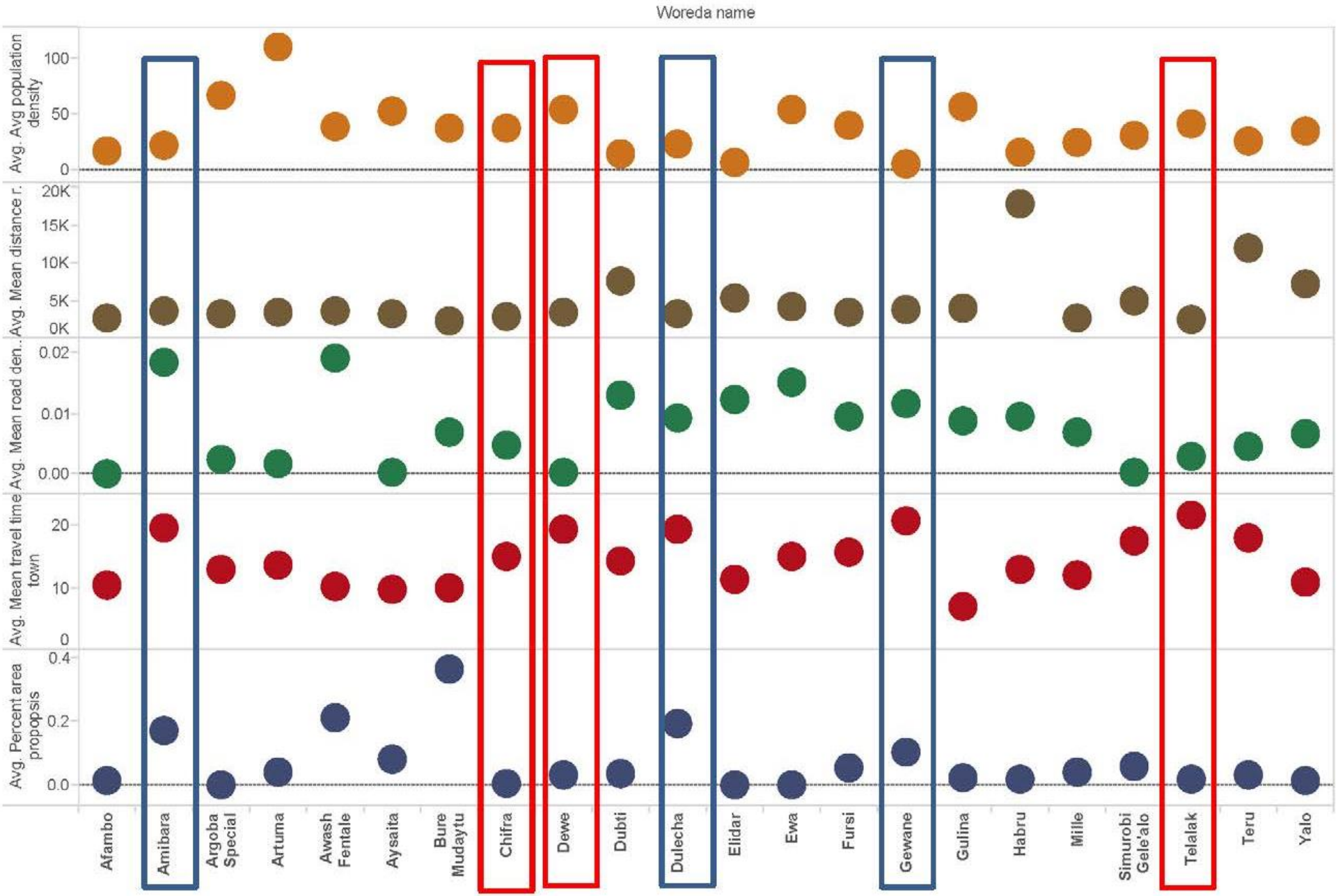


FIGURE 1.12—LOCATION OF POTENTIAL SAMPLE SITES AND PRESENCE OF WOYANE



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