UNIVERSITY OF MINNESOTA

The Whole Village Project

Village Reports for Elerai, Eworendeke, Kimoukuwa, Tingatinga, Kiserian, Sinya, and Kitendeni in Longido District

August 2010

Revised December 2010 with Addendum for Kiserian

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UC DAVIS UNIVERSITY OF CALIFORNIA

TAWIRI Tanzania Wildlife Research Institute

USAID FROM THE AMERICAN PEOPLE

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ACRONYMS

COSTECH	Tanzania Commission for Science and Technology
FGD	Focus Group Discussion
HH	Household(s)
IYCF	Infant and Young Child Feeding
KAP	Knowledge, Attitude and Practices
NGO	Non-Governmental Organization
NIMR	National Institute of Medical Research
SFTZ	Savannas Forever Tanzania
STD	Sexually Transmitted Disease
TAWIRI	Tanzanian Wildlife Research Institute
TDHS	Tanzania Demographic and Health Survey
TFR	Total Fertility Rate
THIS	Tanzania HIV Indicator Survey
TSH	Tanzania Shillings
UMN	University of Minnesota
USAID	U.S. Agency for International Development
WHO	World Health Organization
WVP	Whole Village Project

NOTE: THE VILLAGE OF KISERIAN WAS SURVEYED IN NOVEMBER 2010; MONTHS LATER, IN MARCH 2011, SINYA AND KITENDENI WERE SURVEYED, OVER ONE YEAR FOLLOWING THE SURVEYING OF THE ORIGINAL VILLAGES IN LONGIDO DISTRICT. RESULTS FROM KISERIAN, SINYA AND KITENDENI WERE NOT AVAILABLE AT THE TIME THE ORIGINAL REPORT WAS WRITTEN. A BRIEF SUMMARY OF RESULTS FROM KISERIAN, SINYA AND KITENDENI CAN BE FOUND IN APPENDIX C.

1 INTRODUCTION

The purpose of this report is to present district officials and local leaders with multi-sectoral data across several villages in this district. We hope these data may be useful in seeing the strengths and weaknesses of different sectors and the variation across villages. These data may be useful in prioritizing future development projects. The villages represented here were selected by our donors for their project purposes and therefore they cannot be seen as representatives of the district. The data however, illustrate the diversity of economic and social development activities occurring across villages in the district.

The Whole Village Project (WVP) is collecting and analyzing comprehensive data at village level over an extended period of time. A collaborative project between Savannas Forever Tanzania (SFTZ), a Tanzanian NGO, and the University of Minnesota, USA, the Whole Village Project has a **vision** to work with people in rural Tanzanian villages to acquire and use knowledge for improving long-term health and well-being while sustaining natural resources. To achieve this goal, quantitative and qualitative data are systematically collected in villages across northern Tanzania by the Savannas Forever team in partnership with staff from the National Institutes of Medical Research (NIMR) and the Tanzanian Wildlife Research Institute (TAWIRI). The data are sent to the University of Minnesota for analysis and then returned to Tanzania. The SFTZ team returns to each village to present the data to villagers for their own use and decision-making. WVP intends to return to each village every two to three years in order to assess the sustainability of development projects over time and identify best practices.

This report presents a summary of data collected within a single district. Village-level surveys were conducted in Longido district in Elerai, Eworendeke, Tingatinga and Kimoukuwa from October to December, 2009.

2 METHODOLOGY

The Whole Village Project's survey tools and methodology have been reviewed and approved by multiple Tanzanian research authorities (COSTECH, NIMR and TAWIRI) and the University of Minnesota Institutional Review Board for the ethical treatment of human subjects in research projects. Further permissions are sought from the respective regional, district and village leadership before data collection begins.

Village selection is based on the funding agency priorities and permission of government leaders. After permissions are received, Savannas Forever Tanzania (SFTZ) staff arranges dates for data collection with village leaders. A Tanzanian survey team of 5-6 personnel work in each village for 5-6 days. The team begins with a sensitization session with leaders and community members to introduce the project and staff. A standardized quantitative survey is conducted in 65-75 households per village. Village leaders provide a roster list of heads of households and the research team uses a computer generated randomization program to select households from this list.

Data collection tools include both quantitative and qualitative instruments. All interviews and focus groups are conducted in Kiswahili whenever possible. If respondents are not fluent in Kiswahili, a bi-lingual villager is identified by the leadership to translate from the local language to Kiswahili. The core household survey asks questions about livelihood, earnings, educational status of all household members, assets, health and natural resource use. From the household members, two brief individual level surveys are conducted: (1) an HIV/AIDS knowledge, attitude and practice (KAP) survey and (2) an anthropometric assessment of children under-five and nutrition questions. For the KAP survey, up to 4 adults (aged 15 years or older) in the household are asked to complete the survey. All interviews are conducted in a private space where no one else may listen. All children in the household under five are weighed and measured and the primary caretaker is asked to answer the accompanying survey.

In order to obtain more contextual data about each village, a number of focus group and key informant interview tools are used. Individual focus groups are conducted with men, women,

village leaders, and a special group of agriculturalists and livestock holders. Village leaders invite villagers to participate and try to attain balance, if not diversity, in representation by sub-village, age and gender. The research team also conducts an institutional assessment of village organizations with a mixed group of 10-15 villagers to identify the different NGOs, religious organizations, and government services working in the village and their respective strengths, weaknesses and contributions to the community. In addition, key informant interviews are conducted with school headmasters and clinic officers. A complete list of survey instruments and focus group guides can be found in Appendix A.

3 KEY FINDINGS

The research captured a broad range of information about myriad aspects of three villages in Longido district. Overarching district strengths, gaps, and opportunities were pulled from the abundance of data collected and analyzed and are presented below. Detailed results and discussion are presented in Section 4.

3.1 District Strengths

In general, vaccination rates of children under five are relatively high in Longido district. Almost 95 percent of children under five in Elerai, Eworendeke, Tingatinga and Kimoukuwa have been vaccinated against tuberculosis (BCG), DPT, and polio. Although coverage rates are lower for measles and vitamin A supplementation, the coverage is still respectable: 70-90 percent of children under five have had a measles vaccine and 80-90 percent has received vitamin A supplements.

Children under five are more likely to survive and be healthy if the biological mother is alive. In Longido district, the biological mother is alive in almost every household surveyed. Furthermore, either both parents or the mother alone are the primary caretakers of the children indicating a relatively strong family structure, which further contributes to the long-term health and well-being of children under five.

3.2 District Gaps

Education levels are very low in the villages surveyed in Longido District although Tingatinga's adult primary school completion rate is twice that of the other three villages. Eworendeke's education levels are particularly low where over three-quarters of the adult population has had no formal education and only one in seven head of households (14%) have completed primary school. A proxy measure of the relative development of a community is often the education levels of its

female population. In Eworendeke, only 7 percent of female adults (n=4) surveyed have completed primary school and no female household head has. Eworendeke also has the highest dependency ratio (the ratio of the combined under 14 and over 65 years population to 15 to 64 year olds) of 2.4 compared to 2.0 in Kimoukuwa, 1.8 in Elerai and 1.5 in Tingatinga.

All villages surveyed in Longido district suffer from high food insecurity and have households, in general, and children under five, specifically, consuming too little food and too limited a diet. It should be noted that these surveys were conducted in late 2009, during a drought when food insecurity was most acute. Elerai and Eworendeke are the most food insecure; in the four weeks preceding the household survey, two-thirds of households in Elerai and Eworendeke had no food, almost three-quarters had a household member go to sleep hungry, and over half had a household member go one day and one night without food. Yet, Kimoukuwa has the highest percentage of children under five (12.7%) considered severely malnourished.

Livestock keeping is the primary source of income for most households surveyed, yet the close proximity of the villages to wildlife habitat and protected areas creates frequent wildlife-human conflict, most frequently livestock loss to predators such as lions and hyenas. In addition, over one-third of households in Eworendeke and one-fifth of households in both Elerai and Kimoukuwa ate bush-meat in the last 12 months compared to just 8% of households in Tingatinga. Such frequent consumption of bush-meat could reflect easy access due to close and regular wildlife-human contact, or attempts to supplement limited diets.

Only 1 in 10 households have any mosquito net in Elerai and fewer than 1 in 30 Elerai homes have a mosquito net treated with insecticide, which is the lowest mosquito net coverage rate among villages surveyed in Longido district. Kimoukuwa has the highest coverage rate, yet only one-third of households own any mosquito net. Low mosquito net coverage is reflected in high disease burden, specifically fever, among children under five. Over 90 percent of children under five in households surveyed have suffered from fever.

3.3 Opportunities

Livestock keeping is the main source of income for all households surveyed. Yet in all four villages, over 90 percent of households have lost livestock to either drought or disease. Such high loss exacerbates the financial security of a household since it depends mainly on that livestock for income. Although more livestock are lost to drought than disease, livestock in Longido district are

at high risk of disease due to very low vaccination rates. For example, no cows in either Elerai or Kimoukuwa were vaccinated against any disease. To increase financial security at household and village level, the district has the opportunity to decrease risk of infection, and thereby livestock and income loss, by increasing vaccination rates.

Given the significant proportion of households headed by women, it is disheartening to see that girls are at a disadvantage when it comes to education. Low enrollment and attendance rates, in addition to other obstacles, prevent girls from acquiring skills and knowledge that may be of great use to them as future heads of household. Correcting this disparity by enrolling girls in school at the same rate as boys, removing unnecessary impediments to their learning, and instituting vocational training for girls and boys alike would not only benefit girls individually, but would have a positive effect on the rest of the village as well.

Each village surveyed in Longido district has a primary school, each of which has teacher-to-student and classroom-to-student ratios that are manageable. Despite such encouraging information, primary school completion rates are very low–especially among girls–and student attendance is sporadic. An exploration of the root causes of such low rates of attendance and primary school completion should be undertaken in order to appropriately address these shortcomings.

Health treatment-seeking behavior among households surveyed reflects the challenges families have in reaching health services. For example, as many as 70 percent of households surveyed (in Eworendeke) takes a child under five to a hospital for treatment when sick, as there is no clinic or dispensary in the village. No village surveyed has a dispensary, which means all families accessing services from a health clinic must travel to do so. Thus access to health services is not limited by behavior, but by availability (existence, proximity) of services. The district has an opportunity to increase access by providing more health clinic services that are closer to the people, thereby capitalizing on the current treatment-seeking behavior. Increasing access to treatment could contribute to decreasing the high disease burden among children under five in the district.

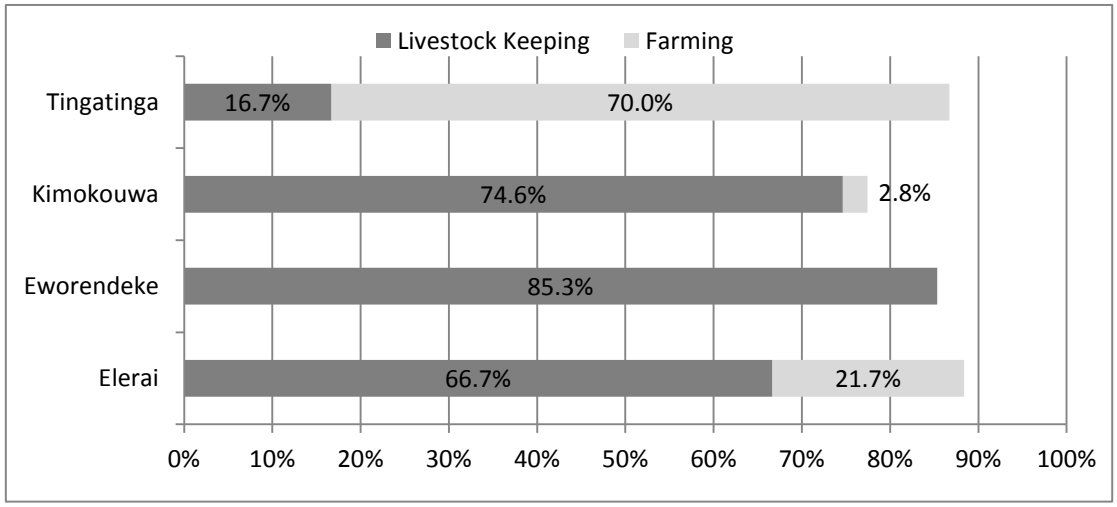
Although there are relatively low rates of agricultural production in these villages, in focus groups villagers all cited that severe soil erosion is a problem. All villages would benefit from some training on improved agricultural techniques and methods to control for soil erosion.

4 RESULTS AND DISCUSSION

4.1 Household Livelihood and Assets

Livestock keeping is the main occupation of the household head in each village surveyed, with the lowest percentage in Elerai (66.7%), followed by Tingatinga (70%), Kimoukuwa (74.6%) and Eworendeke (85.3%) (see Figure 1). Income from livestock sales is the most common source of income for all households surveyed: more than two-thirds of households earned some income from livestock sales and 20-25 percent earned over Tsh 500,000 in the last 12 months. Households earning income from a source other than livestock keeping are most likely to earn it through business, salary or trade (Elerai, Kimoukuwa, Tingatinga) or remittances (Eworendeke). Neither farming nor the sale of livestock products or natural resources is a primary or significant source of income for households in any village surveyed. Farming is the main occupation of the household head in very few households surveyed: 0-3 percent in Eworendeke and Kimoukuwa, 17 percent in Tingatinga, and 22 percent in Elerai.

Figure 1. Main Occupation of Household Head



Men who participated in focus group discussions (FGDs) conducted in each village named livestock keeping and agriculture/farming as the main ways of making a living. Male FGDs as well as FGDs held among women and village leaders, respectively, proposed potential activities that could improve the livelihoods of villagers. The highest-ranked recommendations of each of these three groups are listed in Table 1. As one can see from the results, there is little innovative thinking and this micro focus on what may be possible could be hindering further development of entrepreneurial activities.

Table 1. Village Recommended Activities to Improve Local Livelihoods

Village	Male	Female	Village Leader
Elerai	Microfinance	Beekeeping	Livestock
Eworendeke	Microfinance	Microfinance	Livestock
Kimoukuwa	Microfinance	Microfinance	Livestock
Tingatinga	Irrigation dam	Microfinance	Livestock

Asset ownership is an additional indicator of a household's socioeconomic status. Tingatinga households had a higher percentage of durable goods than in the other villages. If a household owns a durable good in Longido district among the three other villages, it is most likely in Elerai and Kimoukuwa that the durable good is a radio, while in Eworendeke it is slightly more likely to be a mobile phone. However, the likelihood of owning either of these is still relatively low: only 25-40 percent of households own a radio, and 20-30 percent owns a mobile phone. Among the four villages, Tingatinga households are most likely to own a bicycle (43%), a mobile phone (50%), or a radio (45%).

A majority of houses in Elerai, Eworendeke, Kimoukuwa and Tingatinga are built with natural materials. Almost all homes (94-100%) have floors of earth/clay and over 83 percent use a grass or palm thatch with poles or simply thatching grass to construct the roof. Over 90 percent of homes in Eworendeke, Tingatinga and Kimoukuwa have walls constructed of mud and poles; 80 percent of homes in Elerai also use mud and poles and 18.3 percent have wood walls. Although use of non-natural materials is uncommon in home construction in Longido district, if a household does use a non-natural material it is most likely corrugated iron sheeting roofs: Tingatinga has the highest percentage of homes with corrugated iron sheeting roofs (16.7%) followed by Elerai (13.3%).

4.2 Civic Engagement

Household level civic engagement was measured by the household survey respondent's membership in village government or committees, participation in village assemblies, and engagement with village leaders in regard to village problems. Nearly 1 in 5 respondents in Elerai is a member of either the village government or a village committee, which requires the highest level of personal investment of time and resources. This is in contrast to Eworendeke where less than one-third of respondents participated in a village assembly meeting in the last 12 months. As

expected, civic participation among household survey respondents in all villages is highest in that activity that requires the least personal investment: participation in village assemblies (see Table 2).

Table 2. Civic Participation by Village by Percentage of Respondents

	Elerai	Eworendeke	Kimoukuwa	Tingatinga
Village government or committee member	18.3%	8.0%	11.4%	16.7%
Participated in village assembly (last 12 mo)	52.5%	29.3%	52.9%	53.3%
Asked village leader for assistance (last 12 mo)	22.0%	12.0%	25.7%	15.3%

Opportunities for civic participation at village level were assessed by number and type of village assemblies held in the last 12 months. Kimoukuwa held the greatest number of village assemblies during the previous 12 months (10), while Elerai held eight village assemblies, Eworendeke held seven and Tingatinga held six.

4.3 Village Institutions

Table 3 presents a summary of the institutional analysis conducted in each village surveyed in Longido district. Each institution is categorized by type–ranging from village-based administrative and service bodies, to regional, national, and international organizations–and sector to which its work pertains. The total number of institutions reported to have a presence in each village in the district ranges from 15 to 22. A qualitative assessment of some of these institutions is provided in the ratings assigned by participants in village focus group discussions. Numbers in the village columns represent the extent to which villagers are satisfied with the institution's work in their village—the higher the number, the greater the satisfaction, with 100 being the highest score attainable.

*Table 3. Institutional Resources by Village**

Institution Name	Sector	Type of Institution	Elerai	Eworendeke	Kimoukuwa	Tingatinga
Community Health Worker						x
Court of Law	legal/law enforcement	village institution		x		
Education	education	village institution	100	80	100	x
Health Service	health	village institution				x
Religious Institution (church, mosque, etc.)	multiple	village institution	80	80	100	x
Veterinary Services	multiple	village institution	x	x		85
Village Council	politics/government	village institution	10	50	80	x

/Government						
Village Market	business development	village institution				x
Community/publicly owned water	water/civil service	village institution		30		x
Environment/Natural Resources Committee	multiple	village institution	x	x	x	x
Education Committee	education	village institution	x	x	x	x
Water Committee	water/civil service	village institution	x	x	x	x
Ag & Livestock Committee	farming/agriculture	village institution	x	x	x	x
Elder's Committee	multiple	village institution			x	
Women's Committee	multiple	village institution				x
Land Committee	multiple	village institution	x	x	x	x
Hazards/Disaster Committee	multiple	village institution	x	x	x	x
Farmers Coop/Ag Assn	multiple	village institution				x
Health, HIV/AIDS Cmte	multiple	village institution				x
Security Committee	multiple	village institution	x		x	
Community Development/ Planning/ Financial Committee	multiple	village institution	x		x	
Arusha Archdiocesan Integrated Development and Relief Office	aid/development	faith based	x			95
African Wildlife Foundation	wildlife/conservation					60
Born Free						50
Community Based Organization						100
Community Research and Development Services (CORDS)	aid/development	regional	100	70	90	85
DENSH				50		
Enduimet Wildlife Management Area			x			
Haki Kazi Catalyst	education			3		
Kibo			70			
Kilimanjaro Elephant Research Project			75			
Longido Community Integrated Program (LOOCIP)		regional				50
Mission				x		
Mtandao wa Vikundi vya Wakulima Tanzania (MVIWATA)				50		
Maasai Women's Economic Development Organization (MWEDO)	aid/development	regional		30	95	
OLPOPONG						50

Participative Agriculture Development and Empowerment Program (PADEP)	farming/agriculture		80			
Pathfinder Int'l	health	international	80			
Savings and Credit Cooperative Society (SACCOS)	financial/socioeconomic	village institution		x		
Savannas Forever Tanzania (SFTZ)	multiple	regional	60			95
Tanzania National Parks Association (TANAPA)	wildlife/conservation		60	50		
TANESCO				15		
Tanzania Social Action Fund (TASAF)	social welfare	national				80
Tanzania Travel Company						60
Tanzania Education and Micro-business Opportunity (TEMBO)	education, financial/socioeconomic	regional			80	
Techno Service	business development				x	
Wingeti				x		
World Food Program	food/hunger	international				100
World Vision	social welfare	international	99			95
TOTAL INSTITUTIONS WORKING IN VILLAGE			**22**	**21**	**15**	**29**

**Numbers represent the ratings which villagers assigned the top institutions operating in their respective villages. Not all institutions were rated; "x" signifies that an institution has a presence in the corresponding village, but was not discussed in the village focus group.*

The table indicates several notable trends. First, focus group members in Kimoukuwa seem to be relatively pleased with the institutions present in the village. Kimoukuwa also reported the fewest organizations of the villages in the district, suggesting an emphasis on quality rather than quantity of institutions in Kimoukuwa. Second, there seems to be general contentment among the three villages in regard to education and religious institutions, while the exact opposite appears to be the case with village councils/governments. In particular, Elerai assigns a very low score to its village governing body, while the other institutions in the village receive much higher scores. This suggests that leaders in Elerai's governing body could stand to take a cue from the more well-received institutions in the village. Eworendeke as a whole was more critical of institutions working in its village – either governmental or non-governmental – than other villages although Tingatinga was relatively unhappy with the agencies working in wildlife and conservation in its village. Another institutional observation suggests that more unified regional- or district-level work might serve to benefit the villages in the area more equally. There are a number of NGOs and government agencies which received mid-range scores while others (such as World Vision) repeatedly received high

scores. There seemed to be great potential for institutions to expand and improve and even collaborate with other like-minded institutions, to achieve more satisfactory results.

4.4 Education

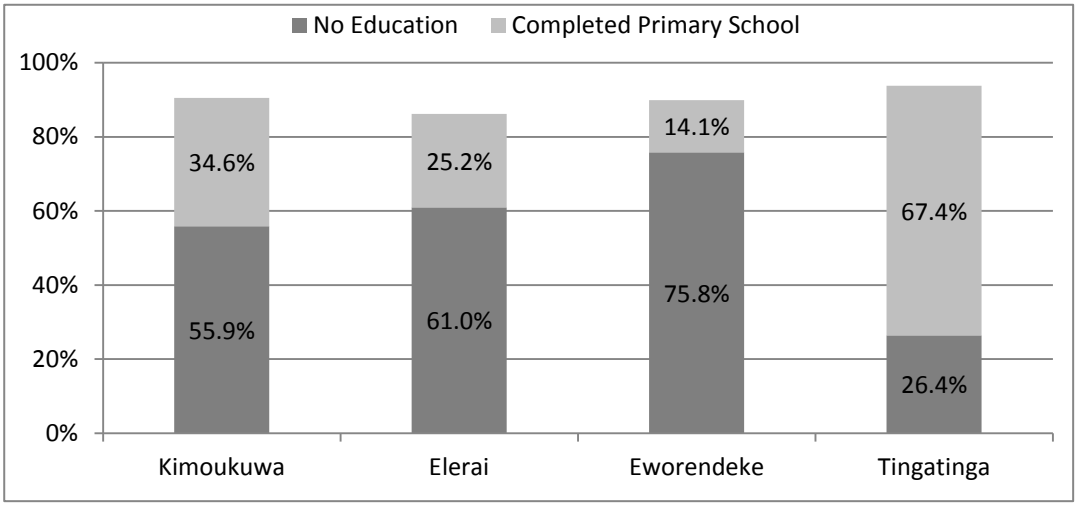
4.4.1 Household-Head Education

With the exception of Tingatinga, it is more likely for the head of a household to have no formal education than to have completed primary school. Primary school completion rates among household heads range from 6.7 percent (Eworendeke) to 15 percent (Elerai) to 25.4 percent (Kimoukuwa) to 45 percent (Tingatinga). Seventy-six percent of household heads in Eworendeke have had no formal education. No head of household surveyed has completed secondary school. When disaggregated by sex, primary school completion by household head is lower for female heads of household than male. No female household head in Eworendeke has even the slightest amount of schooling, while in Kimoukuwa and Elerai 21.4 percent and 14.3 percent of female household heads, respectively, have completed primary school.

4.4.2 Primary School Completion

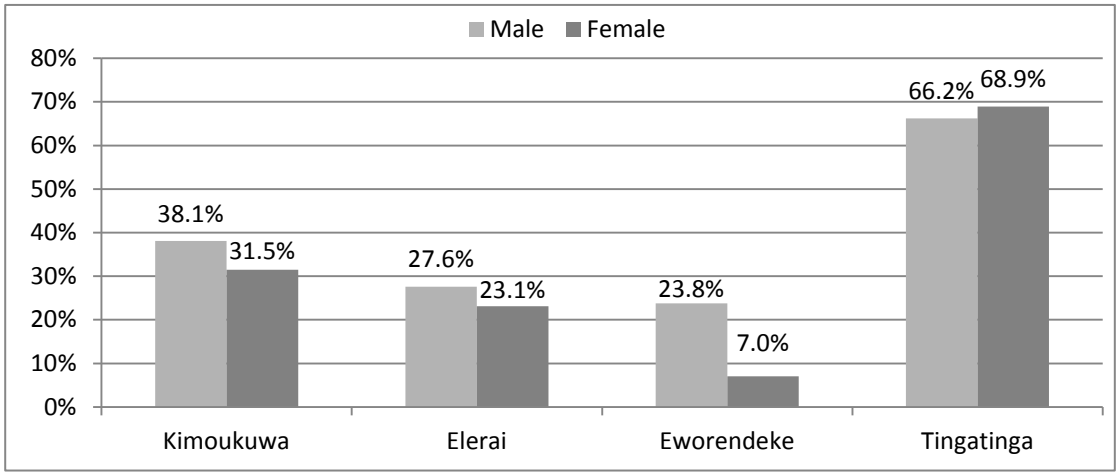
Figure 2 presents data on primary school completion among adults (age 15 and over) in households surveyed in Longido district. In each village, at least half of the adults have had no education; in Eworendeke this number surpasses 75 percent. Primary school completion rates in Tingatinga are more 67% but are relatively low in the other three villages with no adult primary school completion rate greater than 35 percent. Primary school completion is less likely among females than males, and in Eworendeke only four adult females surveyed (7%) have completed primary school (see Figure 3.).

Figure 2. Percent Adults with No Education versus Completed Primary School



Tingatinga has the highest percentage of adults with at least some secondary education (11.6%), but this is still low; only two villages, Kimoukuwa and Tingatinga had anyone complete secondary school, in both cases this was a single female.

Figure 3. Adult Primary School Completion Rates, Disaggregated by Sex



4.4.3 Access to Primary Education

Each village surveyed in Longido district has one primary school; only Eworendeke has a secondary school. Access to primary education is not only measured by presence of a primary school, but also by resources on hand (teachers, classrooms, textbooks, etc.). Data presented in Table 4 were compiled from questionnaires completed during interviews with school headmasters.

Table 4. Primary School Environment

Village	Students Enrolled	Teacher to Student Ratio	Classroom to Student Ratio	Textbook to Student Ratio	Students Regularly Attending		
					Total	Boys	Girls
Elerai	317	1 : 35	1 : 39	-	68%	35%	33%
Eworendeke	493	1 : 38	1 : 70	1 : 4	85%	46%	39%
Kimoukuwa	460	1 : 49	1 : 65	1 : 4	76%	44%	32%
Tingatinga	178	1 : 59	1 : 59	1 : 1	99%	52%	47%

In general, the primary schools in Longido district have inadequate teacher-to-student, classroom-to-student, and textbook-to-student ratios. Shortage of classrooms and teachers are noted by male and female FGD participants as some of the weaknesses of the primary schools in their villages.

Another measure of access is regular school attendance. Regular primary school attendance in Elerai, Eworendeke and Kimoukuwa is low (70-85%) among both boys and girls (see Table 4), but girls are less likely than boys to regularly attend school in Eworendeke and Kimoukuwa. The factors negatively affecting regular attendance, and specifically low attendance among female students, are not readily apparent given the available data. However, when asked to consider the main weaknesses of the primary schools in their villages, FGD participants listed the following: long distance from homes to schools, poor teachers, and the risk of girls becoming pregnant while at school. Each of these weaknesses, whether real or perceived, could decrease regular student attendance.

Access to a quality primary school education is further affected by the physical condition of the learning child. Children who are malnourished or sickly are less likely to have the mental stamina required to learn. From 90 to 100 percent of students attending the primary schools surveyed in Longido district arrive at school on an empty stomach (see Table 5). However, each school surveyed with the exception of Tingatinga provides at least one meal during the school day, typically consisting of porridge or a mixture of maize and beans. This is a good sign for those schools yet additional data are necessary to determine causality of low student attendance rates.

Table 5. Percent of Students Attending Primary School Hungry

Village	% Students Attending School Without Eating Food or Having Tea Only	School Meals Provided
Elerai	100%	Breakfast; Lunch
Eworendeke	96%	Lunch

Kimoukuwa	100%	Breakfast; Lunch
Tingatinga	90%	None

4.5 Health

4.5.1 Access to Health Services

Access to health services is central to the delivery of quality care and positive health outcomes. For the purpose of this analysis, service availability and service quality are considered as a measure of "access." Service availability can include the physical distance of a health facility (or trained health providers), hours of operation, qualified on-staff personnel, and the availability and accurate use of necessary equipment and resources; service quality may address proper staff training and appropriate treatment (and availability of commodities) according to established guidelines.

Qualitative information on the problems facing villages in Longido district was collected through focus group discussions with men and women, as well as questionnaires completed by village leaders. In each village assessed, respondents ranked "problems with health and health care" among the top three problems facing the village seven out of nine times (see Table 6). Health-related issues were cited as the number-one problem facing the village nearly 50 percent of the time.

Table 6. Problems with Health and Health Care, Problem Ranking by Village

Village	Men	Women	Village Leader	Average Rank
Elerai	1	2	1	1.33
Eworendeke	1	1	0	0.67
Kimoukuwa	2	0	3	1.67
Tingatinga	2	2	2	2

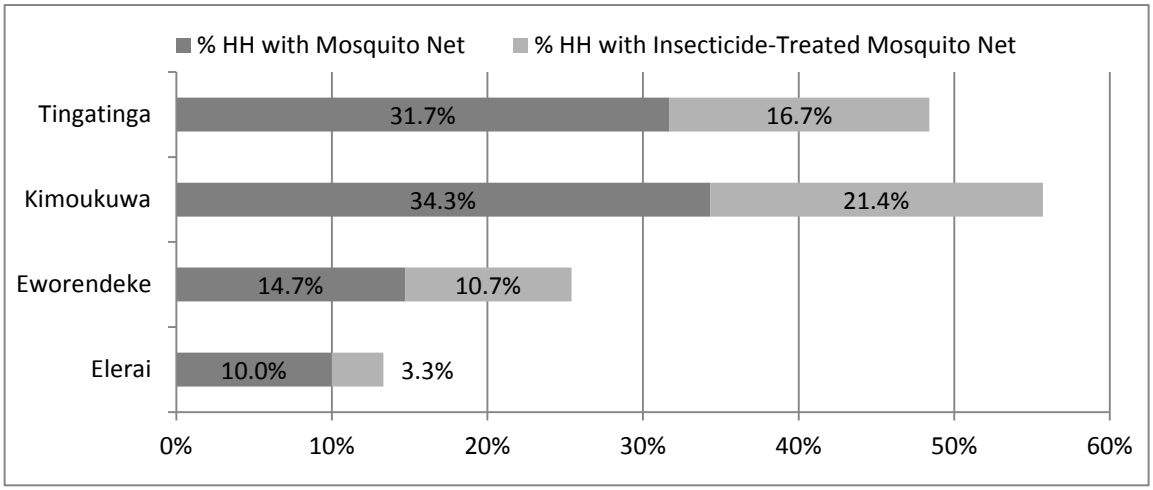
Qualitative data on use of traditional healers indicate that only men in Kimoukuwa seek treatment from traditional healers and only for diarrhea. Quantitative data collected through the household surveys, which tabulated frequency of traditional medicinal plant use by anyone in the household over the last 12 months provide additional information. Sixty-eight percent (68%) of people surveyed in Eworendeke had used a traditional medicinal plant "often" or "very often" in the past 12 months, which was the highest percentage among the three villages. According to FGD participants, there are no traditional healers in Elerai, yet the household survey indicates that almost half of households surveyed in Elerai had used a traditional medicinal plant "often" or "very often" in the past 12 months. More than one-third of households in Kimoukuwa and Tingatinga

used medicinal plants and more than two-thirds of households in Eworendeke had used a traditional medicinal plant "often" or "very often" in the past 12 months.

4.5.2 Malaria and Other Illnesses

In all three villages, malaria was the health problem most frequently identified by participants in the male and female focus group discussions (FGDs); malaria was identified almost 6 times per FGD. Figure 4 depicts the percentage of village households owning any mosquito net, as well as the percentage of households owning a mosquito net treated with insecticide.

Figure 4. Households with Mosquito Nets, Treat and Untreated



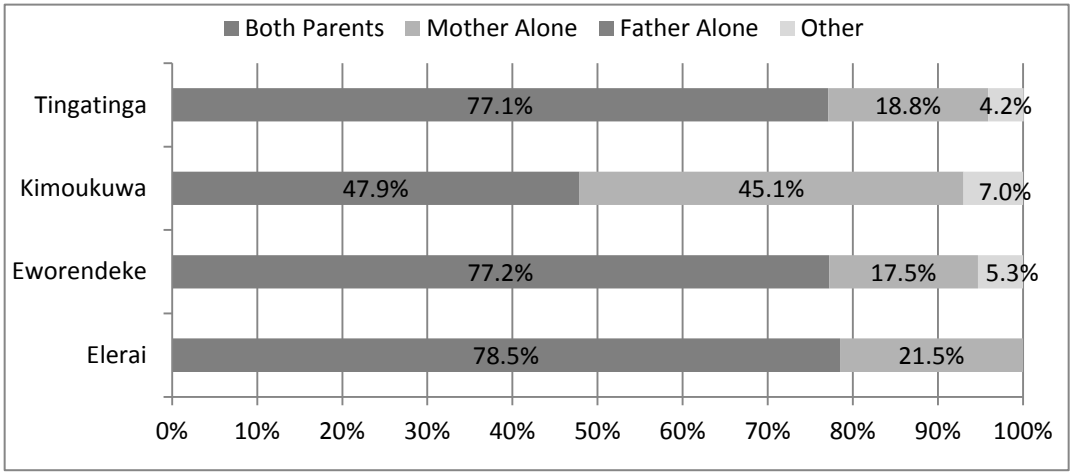
Household mosquito net coverage is low in Longido district; only 1 in 10 households has a mosquito net in Elerai. As expected, coverage with insecticide-treated mosquito nets is even lower. In Elerai, coverage drops to only 1 in 30 households when considering only those mosquito nets ever treated with an insecticide. In Tingatinga, the Clinical Officer interviewed identified "lack of mosquito nets" as the most cause of morbidity (illness) in the village in the last 12 months.

Tingatinga was the only village of those surveyed in Longido district that had a dispensary. After malaria, diarrhea was the health problem most frequently mentioned by FGD participants in Elerai and Kimoukuwa; Elerai participants identified ante- and postnatal issues at the same rate as diarrhea. Measles/mumps were the second most frequently mentioned health problem in Eworendeke. With qualitative data only, however, general statements on district trends in disease, illness, and death cannot be made.

4.5.3 Under-Five Health Status

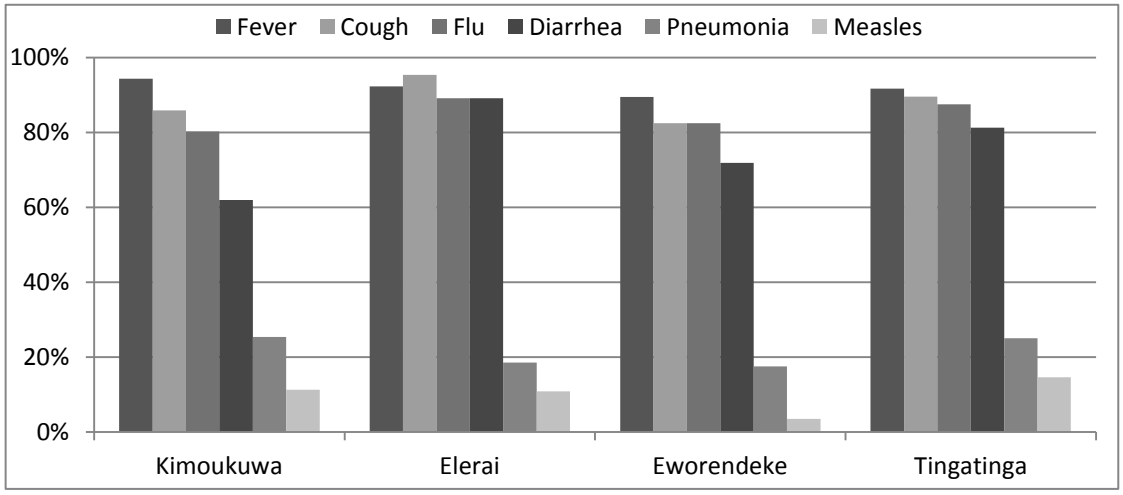
The health status of children under five can be correlated to the presence or absence of biological parents, especially the biological mother. Figure 5 indicates that almost 100 percent of mothers of children under five in households surveyed are still living and that childcare is mostly shared between the mother and father. Kimoukuwa is the exception to this; in Kimoukuwa a similar proportion of children under five are cared for by both parents and by the mother alone.

Figure 5. Primary Caretaker of Children Under Five



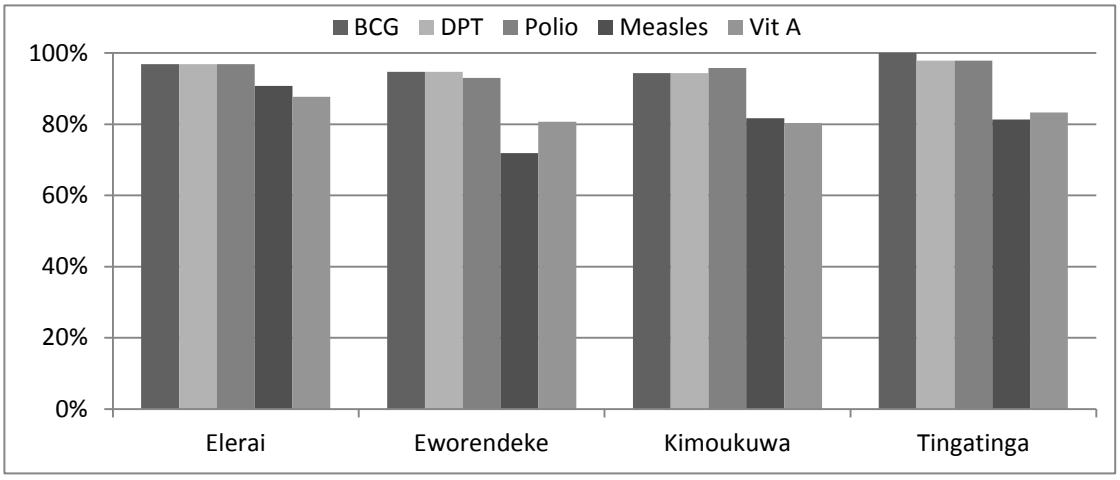
Less than 15 percent of children under five are considered frequently sick in Eworendeke and Kimoukuwa, which contrasts with the almost 40 percent considered frequently sick in Elerai. Similar trends are seen in the percentages of children under five who were sick in the four weeks preceding the survey: 40-45 percent in Eworendeke and Kimoukuwa, 65 percent in Elerai. In the three villages in the last two years, four households have lost a child under five years of age (two deaths each in Elerai and Kimoukuwa). The most common cause of illness among children under five in Kimoukuwa, Tingatinga and Eworendeke is fever, while in Elerai, a slightly higher percentage of children have suffered from cough than fever. Figure 6 provides an eye-opening representation of the disease burden for children under five in Longido district.

Figure 6. Percent Children Under Five Who Have Ever Had a Disease



According to World Health Organization (WHO) guidelines, children are considered fully vaccinated when they have received a vaccination against tuberculosis (BCG), three doses each of the DPT and polio vaccines, and a measles vaccination by the age of 12 months. Figure 7 depicts the percentage of children under five in each village who have been vaccinated. These data do not take into account the age at vaccination or number of doses, so a determination of whether or not children are fully vaccinated is not possible. Data were also collected on percentage of children under five who had received a vitamin A supplement.

Figure 7. Percent Children Under Five Vaccinated

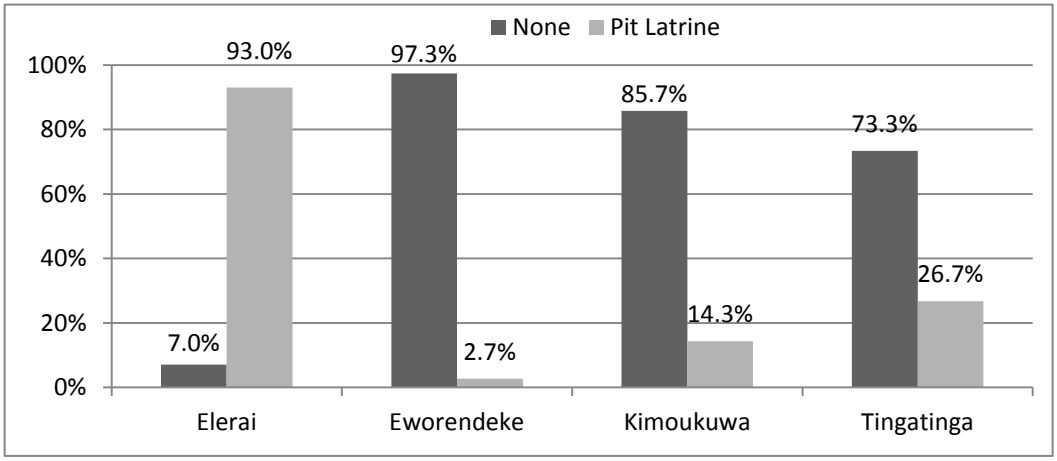


Measles vaccination rates are the lowest of any vaccine regularly given to children under five in each of the three villages surveyed. Given the fact that measles were among the more frequently cited health problems for children, this information seems to present a clear correlation.

4.5.4 Environmental Health

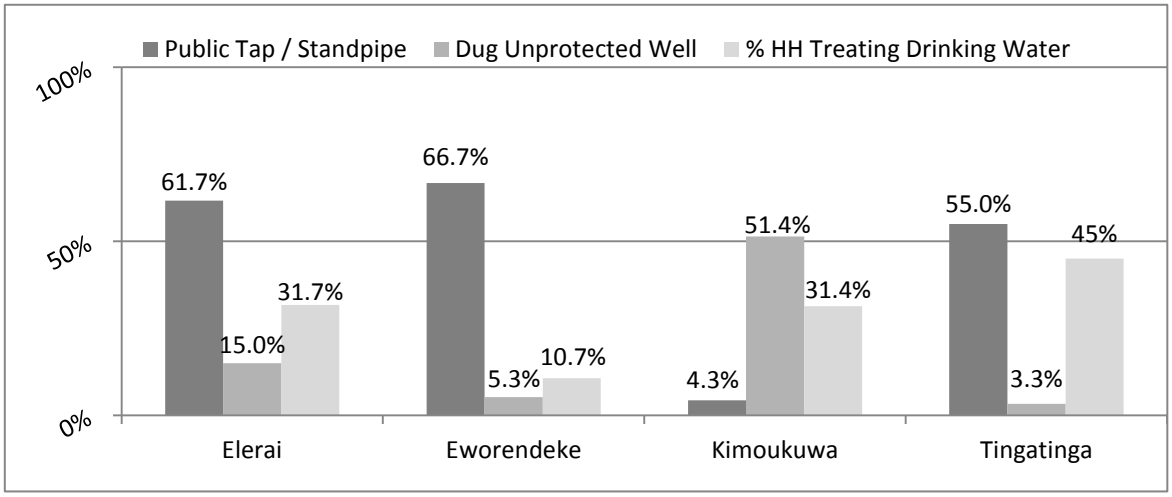
In three of the four villages surveyed in Longido district, households where most members did not use any type of toilet comprised a majority (see Figure 8). Conversely, about 9 in 10 villagers in Elerai use a pit latrine. Such an immense disparity in the usage of sanitation facilities raises questions about both the causes and effects of the situations in each village.

Figure 8. Type of Toilet Used by Most Household Members



The necessity of collecting water impacts Longido district to varying degrees. Kimoukuwa residents travel the furthest distance to access drinking water (almost 2 kilometers), while Elerai residents travel the longest time (almost 100 minutes). Eworendeke residents travel the shortest distance (less than ½ kilometer) in the least time (15 minutes) to access water (see Table 7). As shown in Figure 9, the most common source of drinking water for households in Elerai and Eworendeke is a public tap or standpipe; a dug, unprotected well is the most common water source in Kimoukuwa. Other, less widely-used sources of drinking water, such as dug protected wells (Elerai, Eworendeke) and water from unprotected springs (Kimoukuwa) are not included in Figure 9. Few households employ methods to make their drinking water more potable, but for those that do, boiling is the most common method for doing so.

Figure 9. Primary Sources of Drinking Water



Cooking fuel type and primary cooking location affect respiratory health, primarily in women and children. The majority of households in all villages cook with wood (95.7-100%) over an open fire (95.7-98.7%).

Table 7. Average Time to Collect Water

Village	Minutes to Collect
Elerai	98.85
Eworendeke	15.21
Kimokouwa	73.64
Tingatinga	59.6

4.5.5 HIV/AIDS

Knowledge, Attitude and Practice (KAP) surveys on HIV/AIDS provide a comprehensive understanding of the scope of HIV/AIDS knowledge among those surveyed. This section focuses exclusively on correct knowledge of HIV prevention according to the KAP results. A more detailed report on HIV/AIDS knowledge, attitudes, and practices is available from Savannas Forever Tanzania (refer to Acknowledgements section for contact information).

This discussion of HIV knowledge examines the differences in knowledge level between men and women. Therefore, a comment on the survey sample is necessary, specifically that the male sub-sample is unlikely to be representative of all adult males in the village surveyed. In aggregate, there is a wide divergence in response rates between eligible males (95) and females (266) in Longido District. (Eligibility is defined as anyone 15 years or older living in the household.) The main

reason for this variance in response rate is that men were less likely to be present when the KAP survey was conducted. The non-representativeness of the male sub-sample should be kept in mind when interpreting sex differences.

To assess an individual's correct knowledge of HIV/AIDS, the KAP survey asks six questions:

1. Can people reduce their chances of getting the HIV/AIDS virus by having just one sex partner who has no other partners?
2. Can people get the HIV/AIDS virus from mosquito bites?
3. Can people reduce their chances of getting HIV/AIDS by using a condom every time they have sex?
4. Can people get the HIV/AIDS virus by sharing food with a person who has HIV/AIDS?
5. Is it possible for a healthy looking person to have HIV/AIDS?
6. Can HIV/AIDS be transmitted from mother to child?

Correct responses to the six questions are added together to compute a composite HIV/AIDS knowledge score, which can range from 0 (no correct answers) to 6 (all correct answers).

Average HIV/AIDS knowledge scores are summarized in Figure 10, along with disaggregated averages by sex. Average knowledge scores are weighted by the proportion of respondents of each sex. Averages for the three villages are in the middle range, with the lowest scores achieved in Eworendeke. Although knowledge scores for women are lower than those of men in all villages, the markedly low average score for women in Eworendeke is particularly striking (see Figure 10). Women made up 75 percent of the KAP respondents in Eworendeke, and more than half of these women received a knowledge score of 0 (see Figure 11). Therefore, the low average score for Eworendeke is largely a result of the poor results of a small number of women respondents.

Figure 10. Village HIV/AIDS Knowledge Scores, Disaggregated by Sex

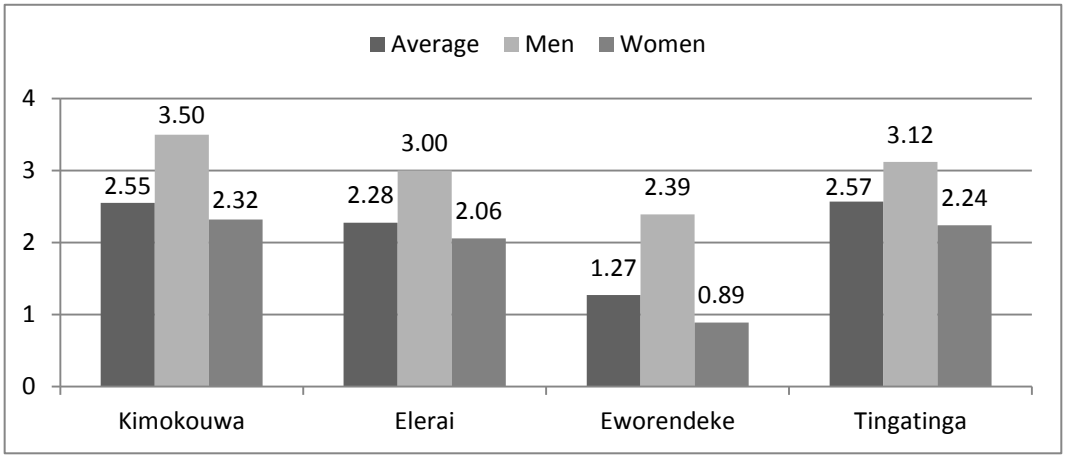
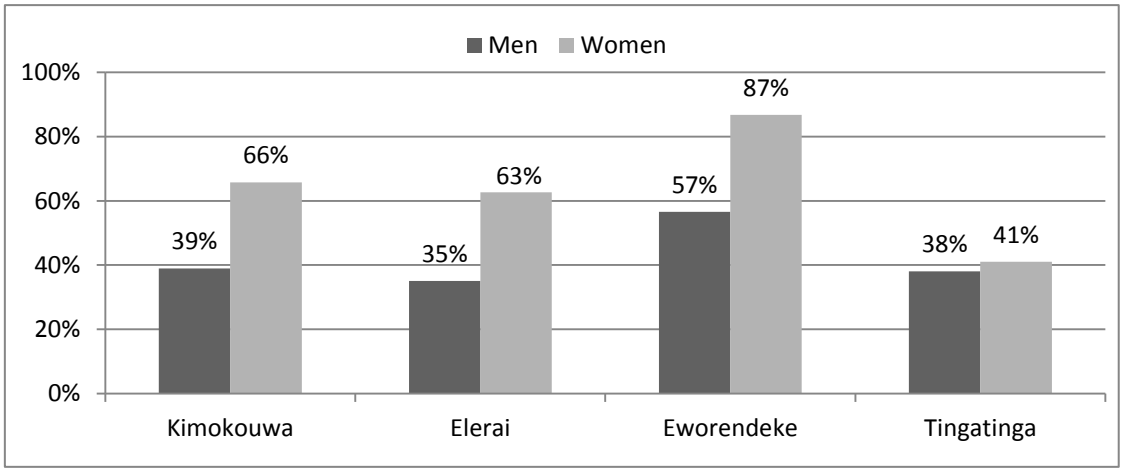
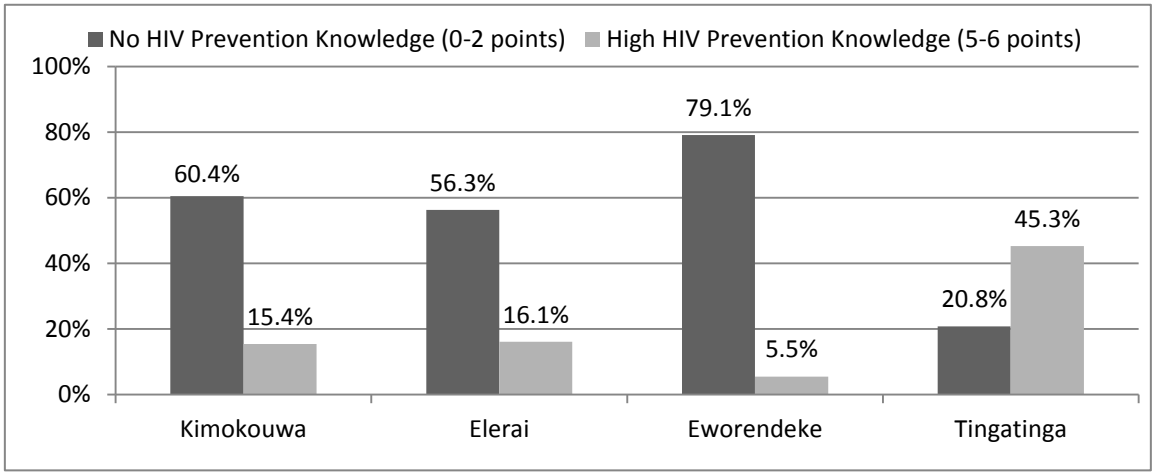


Figure 11. No HIV Prevention Knowledge (score of 0), Disaggregated by Sex



In comparing high knowledge scores (5 to 6 points) to low knowledge scores (0 to 2 points), it is clear that the majority of knowledge scores in each respective village are low, with around half the surveys in both Kimoukuwa and Elerai resulting in low scores, while nearly 80 percent of Eworendeke respondents receiving low scores (again, due to the disproportionately low scores of female respondents). An interesting point to draw from Figure 12 is that between 16 and 28 percent of knowledge scores fall in the middle range, reinforcing the fact that HIV/AIDS knowledge is highly varied among at-risk populations.

Figure 12. Percent Eligible Adults with No versus High HIV Prevention Knowledge

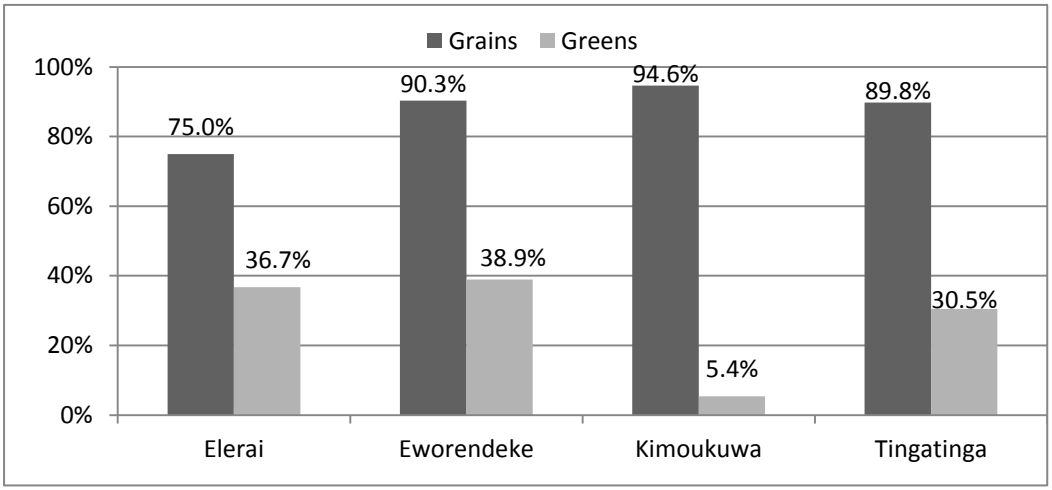


4.6 Nutrition and Food Security

4.6.1 Household Nutrition

In Longido district, diversity of daily diets and consistent intake of recommended vitamins and nutrients is limited. A majority of households surveyed in all villages have a heavily grain-based diet (see Figure 13). Green vegetables are the next most common food in Elerai and Eworendeke, but in Kimoukuwa nearly half of households have not eaten green vegetables in the last seven days. Additionally, vegetable-consuming households eat greens no more than three days per week on average, and only 5.4 percent of households in Kimoukuwa eat green vegetables daily.

Figure 13. Households Eating Grains & Green Vegetables All (or More) of Last 7 Days

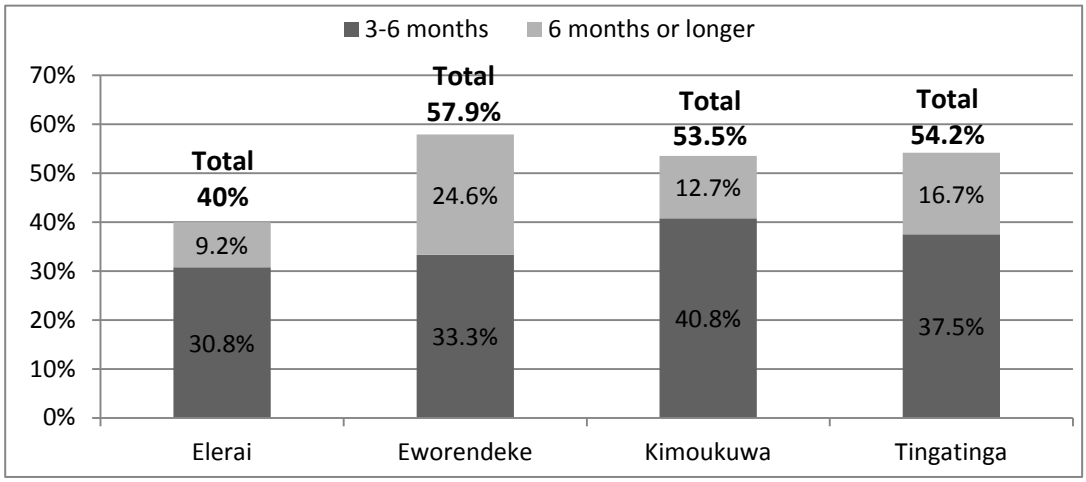


In general, root vegetables, mango, papaya, and dairy are the least commonly consumed foods. Other rarely consumed foods include red vegetables (e.g. pumpkin, carrots, etc) and fats. Protein is consumed infrequently: approximately one-third of households surveyed consumed protein (either meat/eggs or legumes) between 1 and 2 of the last seven Days. Protein consumption is generally balanced between meat/eggs and legumes, although slightly weighted toward legumes. Meat/egg consumption is highest among Eworendeke residents; the percentage of households consuming meat/eggs in Eworendeke jumps to 50 percent when those eating meat/eggs three of the last seven days are considered.

4.6.2 Infant and Young Child Feeding

Optimal infant and young child (age 6-23 months) feeding practices (IYCF) include early initiation of breastfeeding, exclusive breastfeeding during the first 6 months, continued breastfeeding for up to two years and beyond, timely introduction of complementary feeding at 6 months, frequency of feeding solid/semisolid foods, and the diversity of food groups fed to children 6-23 months. One hundred percent of children in the villages surveyed had been breastfed or were still breastfeeding. In Elerai and Kimoukuwa, 100 percent of the children breastfed were exclusively breastfed; in Eworendeke, this figure was 89.5 percent. Figure 14 presents the rates at which infants were exclusively breastfed during their first six months, which is the standard IYCF practice. Between 40 and 60 percent of infants weaned at the time of the survey were exclusively breastfed for 3 months or longer, with most infants being exclusively breastfed for fewer than 6 months. Among infants who had been weaned at the time of the survey, the average weaning age was 24 to 35 months.

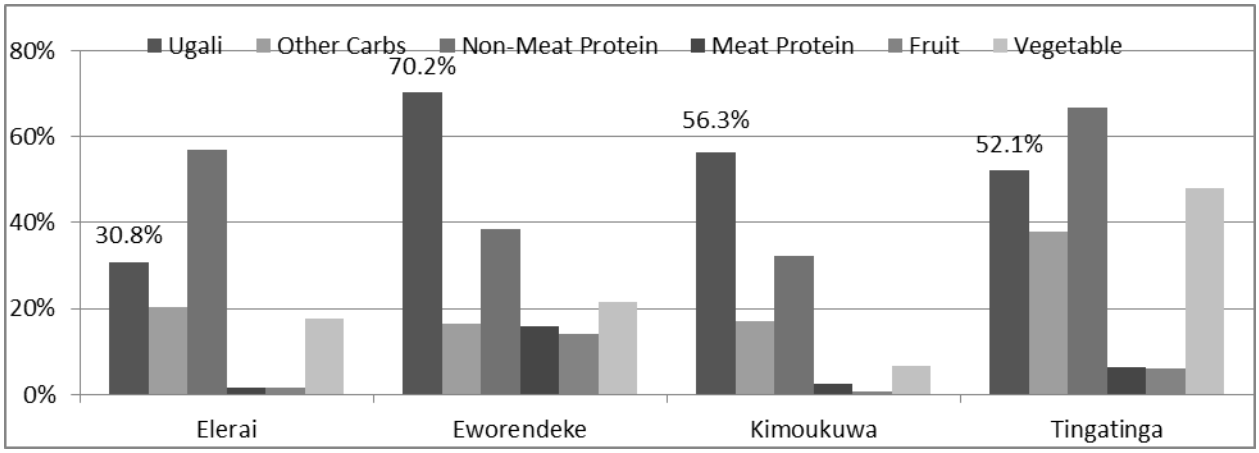
Figure 14. Percent Children Exclusively Breastfed by Length of Time



4.6.3 Under-Five Nutrition

Figure 15 presents a nutritional breakdown of the diets of children under five years of age, for the 24 hour period prior to the commencement of the household survey. Ugali is listed separately from other carbohydrates since it is the most commonly consumed food of children under five in the last 24 hours.

Figure 15. Percent Children Under-5 Eating Food Item in Last 24 Hours

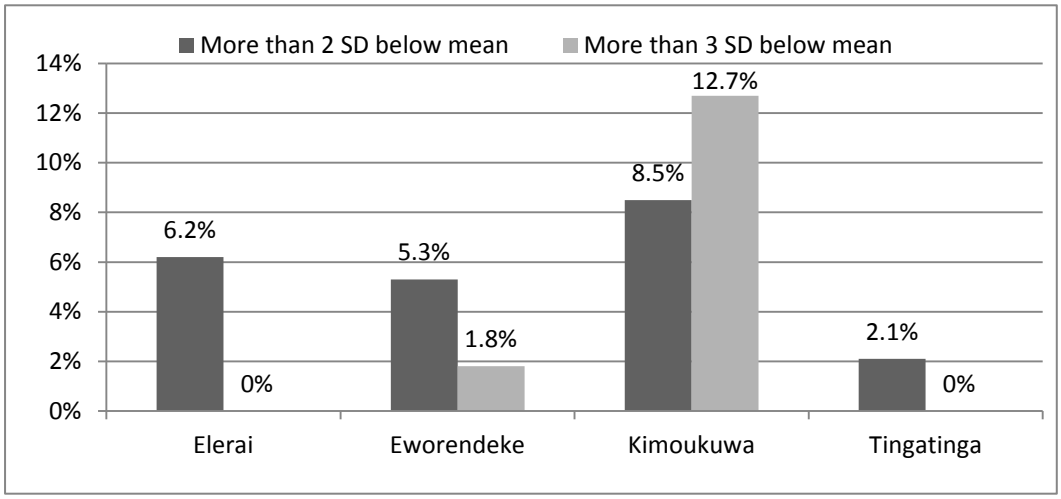


Goat is the most common source of meat protein followed by chicken; banana is the most commonly eaten fresh fruit; and greens are the most commonly eaten vegetable. It is more likely that a child under five will get protein from a non-meat source, specifically milk or legumes (eggs and peanuts are rarely eaten), than a meat. Protein consumption from either a non-meat or meat source is noticeably greater among children under five in Tingatinga, while children's meat consumption is quite uncommon in both Elerai and Kimoukuwa. In all villages, more children consumed a vegetable than a fruit in the 24 hours preceding the survey. Fruit consumption was almost non-existent among children in Elerai (n=5) and Kimoukuwa (n=3).

The weight-for-height index describes current nutritional status for children under five based on their current weight, height and age. According to the WHO standards for child growth, children whose Z-scores are below two negative standard deviations (-2 SD) are considered wasted (thin) and are defined as acutely malnourished, while children whose weight-for-height is below negative three standard deviations (-3 SD) are considered severely wasted. Wasting represents the failure to receive adequate nutrition in the period immediately preceding the survey. Wasting may occur as a result of inadequate food intake due to a recent illness, for example, provoking weight loss and the

onset of malnutrition. According to the data collected through household surveys, (see Figure 16, between 5 and 10 percent of children under five in these three villages are wasted or considered acutely malnourished. Severe wasting was not observed in any children in Elerai, but 1.8 percent of children under five in Eworendeke, and 12.7 percent of children under five in Kimoukuwa, were found to be severely wasted.

Figure 16. Percent Children Under-5 Malnourished



4.6.4 Food Security

Table 8 shows that food insecurity is generally high in all villages surveyed in Longido district. Data show that 78 to 92 percent of households were concerned that there was not enough food and ate fewer meals in the four weeks preceding the survey. With regard to more severe incidents of food insecurity–e.g. no food in the household, household members going to sleep hungry, household member going one day and one night without food–each of the three villages suffers a high degree of food insecurity. The greatest relative food insecurity was seen in Elerai and Eworendeke where two-thirds of households had no food, 70 percent had a household member(s) go to sleep hungry, and 50 to 60 percent had a household member(s) go one day and one night without food.

Table 8. Percent of Households that Experienced a Food Insecurity in Last 4 Weeks

	Elerai	**Eworendeke**	**Kimoukuwa**	**Tingatinga**
Worried not enough food	86.7%	84.7%	78.4%	72.9%
Ate fewer meals	91.7%	91.7%	87.8%	61%
No food	66.7%	68.1%	59.5%	55.9%
Went to sleep hungry	70%	70.8%	56.8%	45.8%

One day and night without food	48.3%	62.5%	37.8%	39%

4.6.5 Kitchen Gardens

Very few households surveyed have received training on kitchen gardens (ranging from 4.2 percent in Eworendeke to 10.0 percent in Elerai) and only a small percentage of households are currently growing a kitchen garden: 1.7 percent in Elerai, 3.4 percent in Tingatinga, and 6.8 percent of households in Kimoukuwa. Although three households received training on kitchen gardens in Eworendeke, no one in this village is currently growing a kitchen garden.

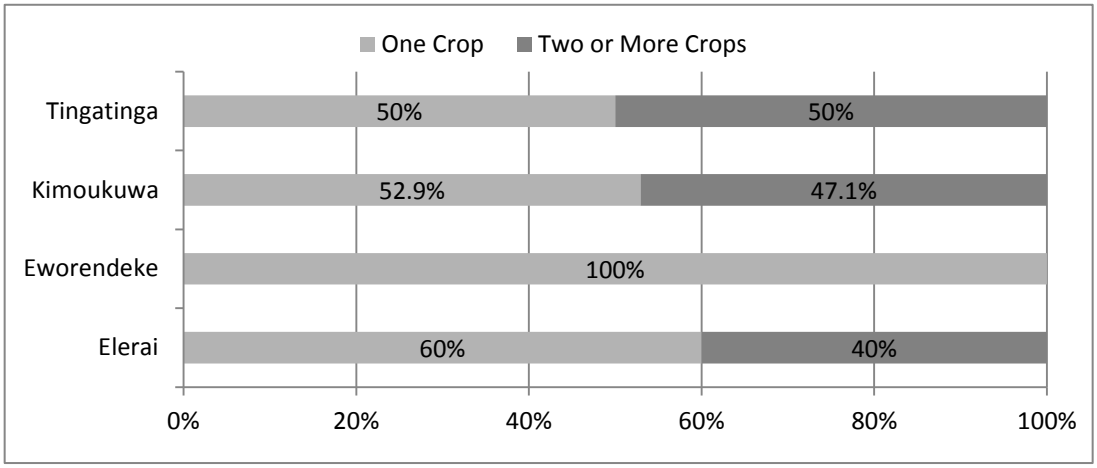
4.7 Agriculture

Of the few farmers in Longido district, most are small-scale subsistence farmers. The average number of acres cultivated per household in each village surveyed ranges from just over one-half to just over one acre. The percentage of households cultivating five acres or more of land ranges from 5 percent in Elerai to 8.5 percent in Kimoukuwa. Household ownership of agricultural land is greatest in Kimoukuwa, at 85.7 percent, while land ownership is lowest in Eworendeke at 70.7 percent

Maize and beans are the two most commonly grown crops among households cultivating land. Knowledge of jatropha is extremely low, with only 0 to 6.9 percent of households having heard of jatropha, and only two households (in Eworendeke) ever having grown jatropha. Current jatropha cultivation is non-existent in Longido district–no household has harvested jatropha in the past 12 months.

Given the geography, it is not surprising that crop cultivation is low in Longido district. In Kimoukuwa, only one in four households cultivate any kind of crop, and a crop-cultivating household is almost as likely to tend two or more crops as a single crop. In Elerai, nearly 17 percent of households tend crops, while in Eworendeke; only two households currently cultivate crops. In general, among all crop-cultivating households in these villages, it is more likely to find a single crop being tended than multiple crops.

Figure 17. Percent Households Cultivating Crops



In order to further explore the state of agriculture in Longido district, focus group discussions (FGDs) were held among top farmers (typically 4 to 6 farmers per village, as defined by village leaders), and agricultural extension officers, where possible, in each village. Pertinent qualitative data from these FGDs are presented in Table 9.

Table 9. Qualitative Data on District Agricultural Environment

			% HH using Fertilizer		
Village	**No. Farming Seasons**	**% HH that Irrigate Plot**	**Inorganic**	**Organic**	**% HH with Soil Erosion as Serious Problem**
Elerai	2	0%	10%	10%	70%
Eworendeke	1	0%	2%	5%	70%
Kimoukuwa	2	0%	0%	10%	75%
Tingatinga	2	100%	0%	0%	90%

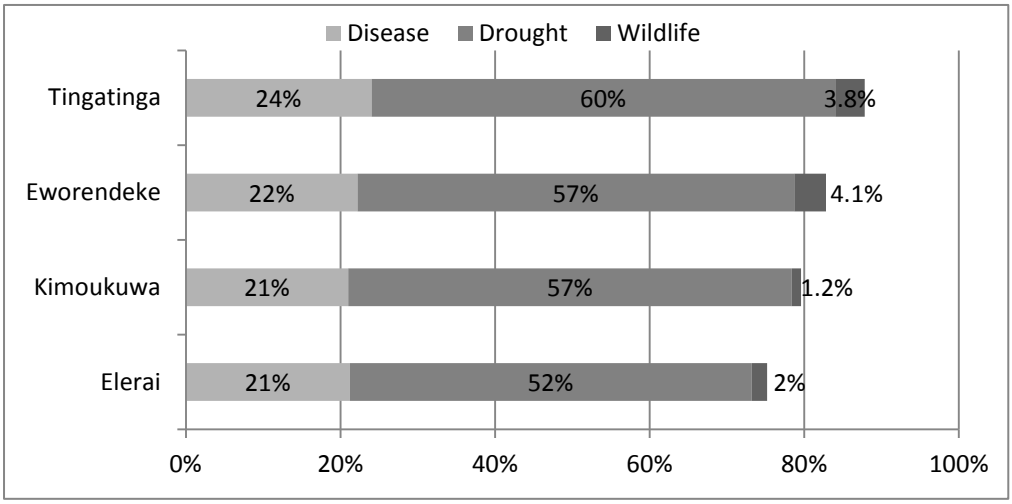
As the table shows, irrigation is non-existent in the three villages, use of fertilizers (inorganic or organic) is low, and soil erosion is quite pervasive. FGD participants in each village described soil erosion as a "very serious" problem.

According to the FGD participants, major reasons for crop loss before harvest include drought, poor quality seeds, insects, destructive animals, and lack of labor. Crop loss after harvest is predominantly attributed to pests (such as rats) and insects.

4.8 Livestock

During the period of data collection (October to December 2009), a high percentage of cattle in Longido district were reported lost to either disease or drought. Cattle were also susceptible to attacks from area wildlife, although to a negligible degree in comparison to the greater challenges of drought and disease. At the time of the survey, northern Tanzania was experiencing a severe drought so it is not surprising to see these high rates of livestock loss attributed to drought. As Figure 18 shows, households surveyed in each village lost nearly 75 to 90 percent of cattle for either reason, but significantly more cattle were lost to drought than disease.

Figure 18. Cattle Owned, Lost to Disease and Drought



Information gathered from livestock owners who participated in village-level FGDs shows Eworendeke to be the only village with widespread vaccination of both cows (95%) and goats (95%). In Elerai, 80 percent of goats were vaccinated, while cows were vaccinated in neither Elerai nor Kimoukuwa. Typical cattle vaccinations included those for East Coast fever, foot-and-mouth disease, and Rift Valley disease. Goats were usually vaccinated against anthrax in Eworendeke, and against pneumonia in both Eworendeke and Elerai. Only Elerai and Eworendeke had veterinary services in their villages which may reflect the differences in vaccinations rates compared to Kimoukuwa and Tingatinga.

Household survey data show that less than 18 percent of households in villages surveyed own chickens. Among chicken-owning households, just 15 to 20 percent vaccinate the chickens against Newcastle Disease, the most common cause of chicken mortality.

4.9 Human-Wildlife Conflict

Qualitative data on human-wildlife conflict was collected through FGDs with men and women, respectively, and key informant interviews with village leaders. According to these data, common human-wildlife conflicts include livestock loss to predators; environmental and crop destruction by elephants; attacks on humans; and crop and farmland destruction. Village leaders cite several reasons for these human-wildlife conflicts: the close proximity of homes, pastures, and farmland to animal habitats in protected areas; the animals' tendency to stray from protected areas in search of food and water; and recent conservation efforts that have increased the number of animals in the area.

According to household survey data, a majority of households did not eat bush-meat in the 12 months preceding the survey. The village with the most households eating bush-meat was Eworendeke (34.7%), within which 12 percent of household reported eating bush-meat often, and 6.7 percent doing so very often. Eight households surveyed in Longido district ate bush-meat very often in the last 12 months.

Although bush-meat consumption by villagers is generally rare, poaching by outsiders is not. Data from key informant interviews conducted in Eworendeke and Kimoukuwa suggest that outsiders come into these two villages to poach very often. These two villages also have the greatest bush-meat consumption among residents. The main reasons cited for poaching by outsiders was to acquire bush-meat to eat and to sell.

5 CONCLUSIONS

5.1 Recommendations

Specific recommendations we leave to district and village leaders and other local government authorities who understand the local context and can better apply these results. Our general recommendations include the following:

- An exploration of the root causes of low rates of primary school attendance and completion—especially among girls—should be undertaken. Creating an incentive-based program which would show children that school attendance is beneficial might be one way to increase attendance.
- In order to boost financial security at the household and village levels, and simultaneously reduce the risk of livestock loss to infection, vaccination should occur at higher rates. As WVP data have shown, villages that have access to Community Animal Health Workers are

often more likely to have higher rates of vaccinations. Acquiring the help of professionals and para professionals would contribute to efforts to protect livestock assets in Longido district.

- Access to health services is limited due to lack of proximity to services. Providing health clinic services within each village would begin to address the demand for health care, as well as likely improve villager health, particularly among children under five years of age. Making reproductive/maternal health services available at the village level should be a priority. By collaborating with some of the health-oriented organizations operating in the area, the villages of Longido district can benefit from the construction of health clinics and accompanying services in the near future.
- Although the correlation between nutrition and diet, environmental conditions, and health is not as yet verifiable in the context of Longido district, there is strong evidence in many parts of the world that health outcomes are impacted by a number of factors. Thus, working toward achieving a kind of "total health" would involve the systematic accomplishment of the following:
    - acquiring a permanent source of good-quality water to which all villagers have open access, and implementing the practice of irrigation in farming/agriculture;
    - enact standards for the human and animal waste disposal, with the aim of ensuring sanitation;
    - educate villagers about the benefits of a healthy diet—especially among children; consider implementing a program which would increase access to more nutritious foods;
    - achieve a high rate of vaccination for both children and animals, respectively. Vaccinate children against measles at the same rate as other vaccines are administered;
    - inform couples about family planning methods available to them and provide to all villagers information about prevention of communicable diseases, STDs and particularly HIV/AIDS;

5.2 Next Steps

The data and analysis presented in this report will be compiled with similar data gathered and analyzed from other districts participating in the Whole Village Project (WVP). WVP will eventually conduct a big picture analysis of all compiled data to achieve its long-term project objectives, which are to:

- Identify interdisciplinary strategies that improve public health, nutrition, education, conservation and food security to help alleviate poverty and sustain natural resources, villages and wildlife in rural Tanzania;
- Establish a long-term monitoring and evaluation system to measure the effectiveness of foreign assistance programs and aid over 10-20 years in purposefully selected rural villages using validated survey methodologies;
- Provide an avenue for village empowerment and capacity building that leads to greater civic engagement and community capacity; and to
- Create a model for translational research and application in multiple settings.

WVP intends to return to each village surveyed in Longido district in 2 to 3 years to reassess the current status of each village. In the immediate future, the Savannas Forever Tanzania (SFTZ) team will return to each village to present the data collected and to discuss the results and conclusions of this report. Data and reports will also be shared with government officials and policy makers in Tanzania, and non-governmental and local government partners working on the ground in the villages surveyed.

APPENDIX A – SURVEY INSTRUMENTS

Household level:

- Household survey
- Food security, nutrition and jatropha

Individual surveys:

- HIV/AIDS knowledge, attitude and practice (KAP)
- Under-five child anthropometric measures and health

Focus group and key informant interview questionnaires:

- Village Resources
- Agriculture & livestock focus group
- Village leadership
- Village institutional analysis
- Women's focus group
- Men's focus group
- Headmaster questionnaire
- Health Officer questionnaire

		Elerai	Eworendeke	Kimoukuwa	Tingatinga	Kiserian	Sinya	Kitendeni
THE HOUSEHOLD AND HOUSING								
	Number of households surveyed	60	75	70	60	75	60	60
	Average household size	5.28	4.03	4.97	5.2	7.8	6.32	6.77
	% households in polygamous marriage (more than 1 wife)	60%	49.3%	51.4%	42%	63%	55%	35%
	% of households headed by women	48.3%	46.7%	59.2%	38%	77.3%	55%	47%
	% of households with corrugated roof	13.3%	8%	12.9%	17%	3%	0%	20%
	% of households using a toilet	13.3%	2.7%	14.3%	27%	3%	1.7%	41.7%
	Avg time (minutes) required to collect water	98.85	15.21	73.64	59.6	230.2	173.8	27.5
	% households use firewood as primary energy source for cooking	100%	96%	95.7%	97%	98.3%	98.3%	100%
EDUCATION								
	% of all adults without education	61%	75.8%	55.9%	26%	61.3%	47.8%	43.5%
	% of household heads completed primary school	15%	6.7%	25.4%	45%	5%	16.7%	30%
	% of adult men completed primary school	27.6%	23.8%	38.1%	66%	33.4%	29.1%	50.5%
	% of adult women completed primary school	23.1%	7%	31.5%	69%	25.3%	14.1%	42.6%
	Average primary school teacher to student ratio	1:35	1:38	1:49	1:59	8:398	1:84	1:66
	Average primary school textbook to student ratio	1:2	1:4	1:4	1:1	1:3	1:3	1:3
	Average secondary school teacher to student ratio	--	1:64	--	--	--	--	--
	Average # of years teachers stay at primary school	5 years	3 years	4 years	3 years	14 years	9 years	10 years
	Average # of years teachers stay at secondary school	--	3 years	--	--	--	--	--
	Ratio of female to male gross enrollment rates (primary school)	155:162	236:257	202:258	84:94	178:220	215:451	193:159
	Ratio of female to male gross enrollment rates (secondary school)	--	163:225	--	--	--	--	--
HEALTH								
	% of households with at least one mosquito net	10%	14.7%	34.3%	32%	84%	90%	76.7%
	% of households with access to protected drinking water	80%	85.3%	20%	87%	13.3%	30%	100%
	% of households that take measures to make the water safe	31.7%	10.7%	31.4%	45%	28%	25%	43%
	# of hospital/dispensary/clinic in the village	0	0	0	1	1	1	1
CHILDREN UNDER 5								
	% of infants exclusively breast fed through 6 months of age	9.2%	24.6%	12.7%	16.7%	31%	11.2%	4.3%
	% of children whose birth mother is still alive and inside the hh	100%	96.5%	95.8%	100%	96.0%	--	--
	% of children moderately to severely underweight	0%	1.8%	12.7%	2%	7%	1.2%	0%
	% of children who are vaccinated for BCG	96.9%	94.7%	94.4%	100%	94.9%	97.8%	95.9%
	% of children who are vaccinated for polio	96.9%	93%	95.8%	98%	95.9%	97.8%	97.9%
	% of children who are vaccinated for DPT	96.9%	94.7%	94.4%	98%	94.9%	93.4%	96.9%
	% of children who are vaccinated for measles	90.8%	71.9%	81.7%	81%	81.4%	75.8%	78.4%
	% of children received Vitamin A supplement	87.7%	80.7%	80.3%	83%	77.3%	79.1%	76.3%
	% children with fever	92.3%	89.5%	94.4%	91.7%	57.7%	44%	63.9%

AIDS KNOWLEDGE								
	% of men with high AIDS knowledge score (5-6 points)	15%	8.7%	22.2%	26%	29%	5%	36%
	% of women with high AIDS knowledge score (5-6 points)	16.4%	4.4%	13.7%	10%	16%	0%	22%
	% of women who know that a person can protect themselves from HIV	51.7%	25.9%	61.4%	59.3%	67%	22%	62%
	% of men who know that a person can protect themselves from HIV	84.2%	61.9%	86.7%	61.8%	53%	35%	92%
FOOD SECURITY AND NUTRITION								
	% of households worried about food in the past 4 weeks	86.7%	84.7%	78.4%	73%	68%	81.4%	69.5%
	% of households ate limited variety of food in the past 4 weeks	95.0%	90.3%	94.6%	85%	93%	89.8%	79.7%
	% of hhs went one day and night with no food in the past 4 weeks	48.3%	62.5%	37.8%	39%	43%	44.1%	8.5%
	% of households that are currently growing kitchen garden	1.7%	0.0%	6.8%	3%	0%	--	--
	Avg # of days/times hhs ate meat protein in past week	0.9	2.0	1.3	1.2	0.8	1.1	0.9
	Avg # of days/times hhs ate legumes in past week	1.0	1.6	1.6	1	1.3	0.4	2.7
	Avg # of days/times in last week hh ate foods with Vitamin A	8	6.5	3.1	6.2	0.5	1.0	3.0
	# of different types of food eaten in last week OR NUTRITION DIET DIVERSITY SCORE	4.6	4	3.4	4	3.2	3.3	5.9
ECONOMIC ACTIVITY, AGRICULTURE AND INCOME								
	% households own any agricultural land	76.7%	70.7%	85.70%	80%	83%	8.3%	93.3%
	Average acres cultivated per household	1	0.6	1.1	0.8	2.4	0.3	3.6
	Average # of cattle owned per household	5.4	3.1	5.1	6.2	3.1	5.4	7.8
	Average # of goats/sheep owned per household	10	6.1	9.4	13.6	11.4	15.5	11.7
	Average # of chickens owned per household	0.3	1.4	0.7	1.7	0.2	--	5.8
	% of hhs whose chicken are vaccinated for Newcastle disease	20%	17%	20%	18%	0%	0%	5.6%
	% of cattle lost to disease in the past 12 months	19%	29%	34%	23%	33.4%	23%	39%
	% of cattle lost to drought in the past 12 months	73%	62%	58%	57%	43.4%	43%	37%
	% of cattle lost to wildlife in the past 12 months	20%	4%	1%	4%	3.5%	7%	7%
	% of chickens lost to disease in the past 12 months	6%	4%	31%	38%	0%	0%	20%
	% of chickens lost to drought in the past 12 months	17%	0%	0%	0%	0%	0%	2%
	% of chickens lost to wildlife in the past 12 months	34%	4%	5%	11%	50%	0%	28%
	% of goats/sheep lost to disease in the past 12 months	25%	19%	25%	29%	30%	25%	36%
	% of goats/sheep lost to drought in the past 12 months	35%	35%	34%	34%	23%	27%	23%
	% of goats/sheep lost to wildlife in the past 12 months	6%	16%	10%	12%	8%	12%	9%
	% of household heads with the main occupation of farming	22%	0%	3%	17%	11%	0%	80%
	% of hh heads with the main occupation of livestock keeping	67%	85%	75%	70%	84.9%	93.3%	11.7%
	% of HHs that irrigate the plots in village (from focus group data)	0%	0%	0%	100%	0%	NA	0%
	% households with bicycle	8%	11%	20%	43%	9.3%	8.3%	23.3%
	% households with radio	35%	24%	40%	45%	13.3%	11.7%	35%
	% households with cell phone	22%	27%	31%	50%	50.7%	28.3%	38.3%
KEY INSTITUTIONS								

	Distance to major weekly market	--	--	--	20 km	41 km		
	# of village committees/groups	8	6	9	10	1		
	# of NGOs	10	8	3	10	5		
	# of credit, banking services or VICOBA	1	0	0	0	0		
DEMOGRAPHICS								
	Religion (% Christian; % Muslim; % Traditional)	95%; 0%; 5%	57%;1%; 19%	80%;1%;19%	90%;0%: 10%	41.3%;0 %;2.7%	86.7%;0 %;1.7%	88.3%;0%; 0%
	Dependency Ratio (# of child (0-14 years) and aged (65+) population per 100 intermediate age (15-64 years)	1.8	2.4	2	1.5	1.34	1.75	1.23
	Child-Woman Ratio (# of children aged 0-4 years per 1,000 women in the age group 15-44 years)	1.15	1.2	0.98	0.79	0.66	0.85	0.56
	Sex Ratio (# of males per 100 females)	1	0.92	0.87	1.1	1.12	1.09	1.09

APPENDIX C – KISERIAN, SINYA, KITENDENI

Kiserian and Sinya are primarily pastoralist villages where virtually the entire population is Maasai. In Kitendeni, farming is the primary occupation and though Maasai comprise the majority of the population, 20% of those surveyed report being of Arusha ethnicity. Overall, the villages have low rates of adult levels of education, low numbers of household assets, high mosquito net ownership, low usage of toilets, high rates of polygamy (with the exception of Kitendeni), and thus high numbers of female-headed households.

Food insecurity is severe in all three villages. Significant percentages of villagers reported losing goats, chicken and cattle to drought, disease, and wildlife. Villagers in Kiserian and Sinya averaged three food types in their diet in a given week while Kitendeni reported 6 food types. Access to clean drinking water is a major issue in Kiserian for both households and the local primary school. Sinya reported 30% of households had access to protected drinking water while Kitendeni reported 100% of villagers had access.

Most household heads are livestock keepers in Kiserian (83%) and Sinya (94%). In Kitendeni, the majority of household heads are farmers (86%). Kiserian and Sinya stand out by the fact that less than one in five households has a radio. Nearly 50% of households in Kiserian have a cell phone. Though numbers are less in Sinya and Kitendeni, nearly 30% of households report having cell phones.

The majority of household heads are women in Kiserian (77%) while in Sinya (55%) and Kitendeni (47%) nearly half of households are headed by women. This high proportion of female heads can be partly be attributed to polygamous households. The Tanzanian government considers all households of second, third and additional wives as “female-headed.”