

UNIVERSITY OF MINNESOTA



The Whole Village Project

Village Reports for Oldonyowasi, Mzimuni and Lengijave in Arusha Rural District

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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

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.

In this report, we present a summary of data collected within a single district. Household surveys, interviews and focus groups were conducted in Mwang'halanga and Runele villages, Kwimba District during the month of September 2010.

2 METHODOLOGY

The Whole Village Project's survey tools and methodology has been reviewed and approved by multiple Tanzanian research authorities (COSTECH, NIMR and TAWIRI) and the University of Minnesota institutional review board for the ethical conduct of human subjects research. Further, permissions are sought by the respective regional, district and village leadership before beginning data collection.

Village selection is based on the funding agency priorities and permission of government leaders. After permissions are received the Savannas Forever Tanzania (SFTZ) staff arrange dates for data collection with district officials and village leaders. A Tanzanian survey team of 6-7 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. Village leaders provide a roster list of heads of households and the research team uses a computer generated randomization program to select 60-75 households from this list. A standardized quantitative survey is conducted in each selected household.

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) a 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 (15 years or older) within 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. Focus groups are conducted with men and women, village leaders, and a special group of agriculturalists and livestock holders. Village leaders invite villagers to participate and try to obtain diversity of 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 detailed 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 from three villages in Arusha Rural District: Oldonyowasi, Mzimuni and Lengijave. 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

The three surveyed villages of Arusha Rural District have high outcomes with respect to some environmental health indicators and under five health and nutrition. In terms of environmental health, Oldonyowasi, Mzimuni and Lengijave have high access to quality water, widespread toilet ownership and high levels of mosquito net ownership. Over 85% of respondents from all villages report getting water from a protected water source (mostly from a public tap). Conversely, very few must rely on unprotected sources such as surface water. Relative to other WVP villages, the percentage of households with protected water access is a tremendous advantage in terms of general public health.

Nearly 80% of all households in the surveyed villages own mosquito nets, though the numbers that have been re-treated with insecticide varies. Although a little over one in five respondents does not have mosquito net coverage, consistent levels of ownership implies that there is reasonable access to mosquito nets regardless of village differences. Additionally, over 95% of households in Oldonyowasi and Mzimuni have a latrine compared to just 51% in Lengijave.

The health status of young children under five years is generally good among the surveyed villages. There is already near universal vaccination against polio, DPT and BCG. Moreover, aside from fever or cough, relatively few children have been afflicted by diseases in the past three months. Low disease or symptom outcomes for children may also be attributed to their fairly good nutritional intake. While most children are primarily given ugali, milk, and green vegetables, consumption of fruits is on average much higher in Arusha Rural District than other participating district villages. The strong nutrition habits of children are further evidenced by the low number of cases of underweight children (either moderately or severely).

The district also has a fairly large number of kitchen gardens to supplement household food supplies or incomes. This is especially true for Oldonyowasi in which 45% of households have a kitchen garden (most often for selling at nearby markets). Lengijave and Mzimuni households have

far fewer households with kitchen gardens (approximately 10%) but this should be kept in the context that few participating villages are shown to have higher kitchen garden ownership.

3.2 District Gaps

Tremendous gaps exist in the district and the analysis reveals that there are a number of high concern areas. Most of the district gaps center on the relative position of Lengijave with respect to Oldonyowasi and Mzimuni on matters of HIV/AIDS knowledge and village education levels. Overall, there appears to be a significant loss of livestock to disease and drought as well as a general lack of health care access within the villages.

Lengijave HIV/AIDS knowledge and prevention scores are substantially lower than the other two villages. Not only are the scores lower, but nearly 70% of participants' tests revealed that they had no prevention knowledge. The scores were lower for women than for men but both groups are shown to be inadequately informed of safety measures. Given the potential ramifications for low knowledge, this is of considerable concern for residents of Lengijave (the scores in Oldonyowasi and Mzimuni were actually high relative to other district villages). Lengijave also contrasted with the other villages in terms of the education levels of adults. Over 70% of adults in Oldonyowasi and Mzimuni completed primary school while only 34% in Lengijave achieved the same level. Moreover, 44% of adults in Lengijave have no education. These are very low figures for any district villages.

Lastly, during the time of the surveys no village had any type of health facility present. Construction of a dispensary had already commenced in Lengijave but was not completed. All residents had to travel outside the village for medical services. Most residents in Lengijave go to Arusha town to Selian hospital which is approximately 20 kilometers from the village.

3.3 Opportunities

The district villages have strong foundations in multiple sectors which would lend themselves toward the enhancement of health and livelihoods. The district boasts early universal access to protected water, high vaccination rates of under five children, and widespread mosquito net coverage. The already high levels can act as an impetus to reaching all households with the above tools and services, benefiting public health as a whole. However, improving access to medical facilities, of which none is present in any village, is another important step. As in the case with

Lengijave, the villages may find avenues for supporting the construction of medical facilities from outside organizations and NGOs.

Improved education can produce tremendous results for the livelihoods and socioeconomic status of households among the villages. For example, the two villages with the highest educational attainment levels among adults also have higher wealth measured in the wealth index. Oldonyowasi and Mzimuni have among the highest averages of adults with at least a primary education compared to all villages in the WVP data set. Lengijave adults lag substantially in this regard and moreover, nearly one in three children between the ages of 5 and 15 are not enrolled in school. Such figures suggest that lower levels of education (and subsequently lower levels of wealth and productivity) may be perpetuating. Closing the education gap in Lengijave relative to the other villages could produce tremendous long term gains for households with short term investments in enrollment.

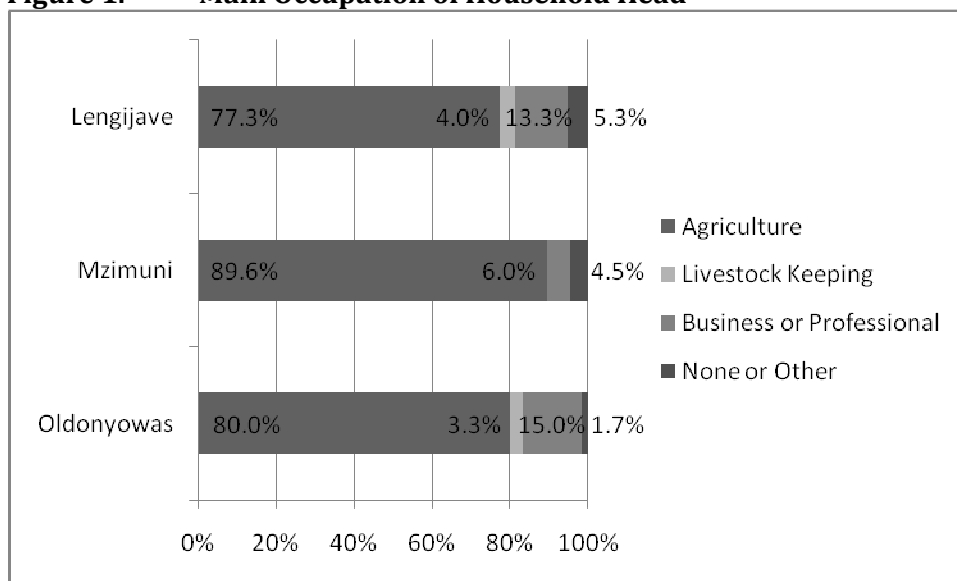
Increasing the number and types of livestock are highly demanded activities in the three villages. Given the number of NGOs that provide livestock village proximity to water streams and channels, livestock keeping could flourish. However, the data shows that there is a fairly low level of vaccination for livestock, generally due to inhibitive cost. Organizations that provide livestock to households may be called upon to provide vaccinations against prevalent diseases. Reducing losses could be as effective as adding to the herd, which is an important source of money, food and fertilizer.

4 RESULTS AND DISCUSSION

4.1 Household Livelihood and Assets

The vast majority of household livelihoods depend on agricultural production while relatively few rely on other activities. Mzimuni in particular is the least diverse with respect to types of main occupation as the village has no household heads who are primarily livestock keepers and relatively few work as business owners or professional (see Figure 1). Despite the low number of households that focus on livestock keeping, it is an important source of either food or cash. Qualitative information from village leaders ranked subsistence farming and livestock keeping as the two most common ways of making a living. Each village has access to a livestock meat market in close proximity, which constitutes an important supplement to agricultural activities.

Figure 1. Main Occupation of Household Head



While the majority of households are headed by men, a large percentage of households are headed by women in Arusha Rural District. Almost half of household heads in Lengijave (47%) and over one-third in Oldonyowasi (37%) are female. While displaying the lowest level of female headed households at 24%, Mzimuni also has a higher percentage of female household heads relative to other districts. Disaggregating primary occupation by gender results little change as farming remains the most common livelihood activity among men and women. However, approximately one-fourth of male household heads in Lengijave and female household heads in Oldonyowasi work in the business or professional sector.

Cash is generated through sales of goods (crops, livestock meat and alcohol) and small business activities. The village leader survey in Oldonyowasi also mentions beekeeping and honey sales and car and tractor rentals as important cash sources. Despite listing crop sales as an important cash source, only 1% of households in Lengijave report selling any cash crops such as beans or maize. The low percentage may be partially attributed to the fact that Lengijave residents do not sell to a market, instead selling to other villagers from the home. Farmers from Mzimuni and Oldonyowasi sell crops at a market that is 4 km and 3km, respectively, away from the village.

Focus group discussions facilitated with men, women and village leaders investigated activities that could improve the livelihoods of village members. Table 1 displays recommendations by participant type by village.

Table 1. Village Recommended Activities to Improve Local Livelihoods

Village	Men	Women
Oldonyowasi	<ul style="list-style-type: none"> • Beekeeping • Exotic goat keeping • Exotic cows for milk 	<ul style="list-style-type: none"> • Borehole • Beekeeping • Sewing machines
Mzimuni	<ul style="list-style-type: none"> • Borehole • Modern livestock raising • Microfinance, small business 	<ul style="list-style-type: none"> • Poultry keeping • Keeping dairy cattle/goats • Microfinance, small business
Lengijave	<ul style="list-style-type: none"> • Keeping dairy goats • Borehole • Microfinance, small business 	<ul style="list-style-type: none"> • Modern agriculture • Keeping chickens • Hybrid goats

The recommended activities generally center on obtaining new livestock, increased water sources and microfinance for small business development. Both men’s and women’s focus group discussions indicated a high demand for improved livestock production. Every group also mentions an interest in constructing more boreholes to improve livelihoods. It is possible that more boreholes are necessary to support a growing number of livestock as well as meeting water consumption demands. Other recommended activities that are not displayed revolve around the improvement of agricultural and livestock production.

Ownership of certain material goods and assets acts as a proxy indicator of a household’s socioeconomic status. To assess relative socioeconomic levels among the villages, households were asked whether they owned a bicycle, a radio or a cell phone. 53% to 68% of households in the three villages own a radio and a similar range of households own a cell phone. However, bicycle ownership is very low in Arusha Rural District. While 49% of households in Mzimuni have at least one bicycle, only 8% in Lengijave and 5% in Oldonyowasi claim bicycle ownership in part due to the hilly terrain.

The type of roof or floor material is often used in the development field as a partial indicator of socioeconomic status. The type of floor material among the three villages is fairly consistent as 76% of households in Mzimuni and Oldonyowasi to 90% of households in Lengijave have floors made of earth or clay. The rest of the households have cement floors, generally indicative of a higher socioeconomic status. While the vast majority of households in Oldonyowasi (84%) and Mzimuni (97%) have corrugated metal roofs, 50% of households in Lengijave use natural material such as grass and mud.

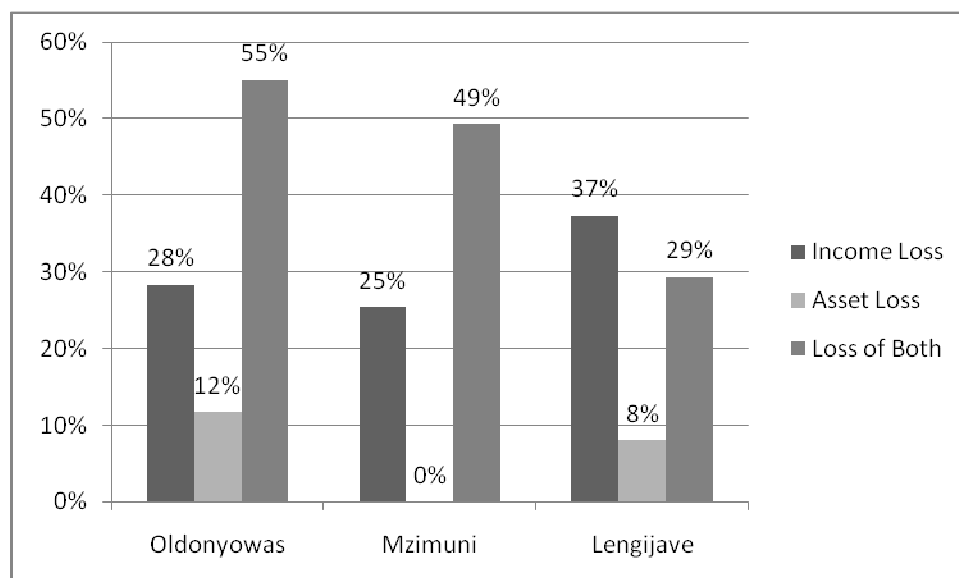
We have created a wealth index based on holdings of 30 non-livestock assets and characteristics of these assets (such as house building materials). The index assesses “wealth” or assets within the domain of Whole Village Project villages surveyed to date (48 villages). Household or village assets are scaled to compare to one another but not to a national standard of income or assets. The index scale ranges from zero to 15 with zero being no wealth. There is substantial variation in the average wealth index scores among the villages with Oldonyowasi having the highest score of 5.24 followed by Mzimuni at 4.71 and Lengijave at 3.77. The low score for Lengijave is not surprising given its relatively low level of asset ownership and higher percentage of households made of natural materials.

4.2 Unexpected Loss of Income or Assets

In a given year, a household may experience unanticipated crises such as the death of a family member, the loss of a job or the loss of crops or livestock. Some families or households are able to cope with these losses better than others.

Although most households appear to be coping with significant economic setbacks in the past year, nearly all residents in Oldonyowasi (95%) mention some type of loss (see Figure 2). Asset losses are generally endured in conjunction with income loss and by itself have impacted a small proportion of households. However, income losses have been felt by the majority of households, most of whom attribute their situation to crop loss due to weather in all three villages. In Oldonyowasi, 72% of farms have been affected by the weather. Mzimuni residents further specified that a severe water shortage had been damaging to agricultural production.

Figure 2. Impact of Unexpected Loss



The reality that over three-fourths of the village populations suffered a significant income or asset loss in the past year suggests the economic instability of the local population. Oldonyowasi in particular had a cause for concern since notable losses had been almost universally felt in the village.

4.3 Village Institutions

Table 2 presents a picture of the institutional analysis conducted in the villages surveyed in Arusha Rural District. Village institutions and services are categorized according to the following types: village-run, village committee or group, and operated by third party. The sector column indicates the type of service or resource that the institution provides. The sector of an institution provides a general description of services provided; however, such descriptions are not exhaustive nor do organizations necessarily provide the same services to different villages.

The tally of total institutions in each village is listed in the last row of Table 3, and sub-totals by type of institution is listed within the table immediately following each sub-section. Although these tallies do not give a full picture of the types of services available in each village, they do indicate the relative level of activity by type of service providers.

Table 2. Institutional Resources by Village

Institution	Oldonyowasi	Mzimuni	Lengijave	Sector
Village Run				
Community Health Worker		x	x	Health
Community Animal Health Worker		x		Animal Health
Court of Law				Legal/Law Enforcement
Education	x	x	x	Education
Health Service	x			Health
Political Parties				Politics/Government
Religious Institution (church, mosque, etc.)	x	x	x	Religion, Social Welfare
Veterinary Services			x	Animal Health
Village Council /Government	x	x	x	Politics/Government
Community/publicly owned water	x			Water
Sub Total Village Run	5	5	5	
Village Committee/Group				
Environment/Natural Resources Committee	x		x	Energy/Environment, Farming Agriculture
Education Committee	x			Education
Water Committee	x			Water
Elder's Committee				Social Welfare
Women's Committee	x			Social Welfare
Land Committee	x			Environment
Hazards/Disaster Committee	x			Environment
Security Committee	x	x		Legal/Law Enforcement
Social Services/ Social Welfare Committee		x	x	Social Welfare
Sub Total Village Committee/Group	7	2	2	
Non-Governmental Organizations				
AAIDRO		x		Food/Hunger, Environment,

Institution	Oldonyowasi	Mzimuni	Lengijave	Sector
				Farming/Agriculture
ADP		x		Aid/Development (Distributes seeds, sponsors students)
CARE	x		x	Financial/Socioeconomic
College of Theology	x			Education
Dorcus		x		Aid/Development, Education (Builds houses, sponsors students)
Heifer Project		x		Farming/Agriculture (Distribute cattle, teach to raise cattle)
OIKOS	x			Energy/Environment (Provide solar energy, making biogas)
PADEP			x	Farming/Agriculture (Built trough for cattle, water tank, planted trees)
RECODA			x	Education (Distribute livestock, teach to raise livestock)
Roman Catholic Secondary School	x			Education
SACCOS		x		Financial/Socioeconomic
Selian Hospital			x	Health, HIV/AIDS (Supervise construction of dispensary, HIV testing services)
TASAF		x	x	Social Welfare
Techno Service/Safe			x	Business/Development
USAID		x		Aid/Development, Health (Trains health workers)
World Vision	x		x	Social Welfare (Built classrooms, provide livestock)
Sub Total Non-Governmental Organizations	5	7	7	
TOTAL	17	14	14	

The three villages have similar total numbers of institutions but many organizations are unique to each village. Among local institutions, there is a commonality with respect to education, health, religion and governance. However, Oldonyowasi has a considerably larger number of village run committees which seems to indicate that there is a greater degree of local involvement. Village governments are credited with constructing schools and assisting people through crises but are generally believed to provide poor law enforcement and lack accountability. The schools in the

community are in need of improved infrastructure (particularly clean water services) and face a significant teacher shortage.

The wide range of NGOs in the district villages usually provide local residents with livestock and education support. For example, World Vision, ADP, Heifer Project, PADEP, and RECODA have all provided livestock, livestock training or school funding to the villages. Health services are also provided whether through helping to finance dispensary construction (TASAF), providing medical training or giving food to the sick (USAID). Despite the services, comments on such organizations suggest that goals are often unmet. Five out of seven NGOs in Mzimuni, two out of five in Oldonyowasi, and three out of seven in Lengijave have not met the expectations of residents. For example, the Tanzania Social Action Fund (TASAF) operating in two villages received poor ratings because it no longer operates in one village, Lengijave, and in Mzimuni is accused of misusing “funds allocated to village projects.”

4.4 Education

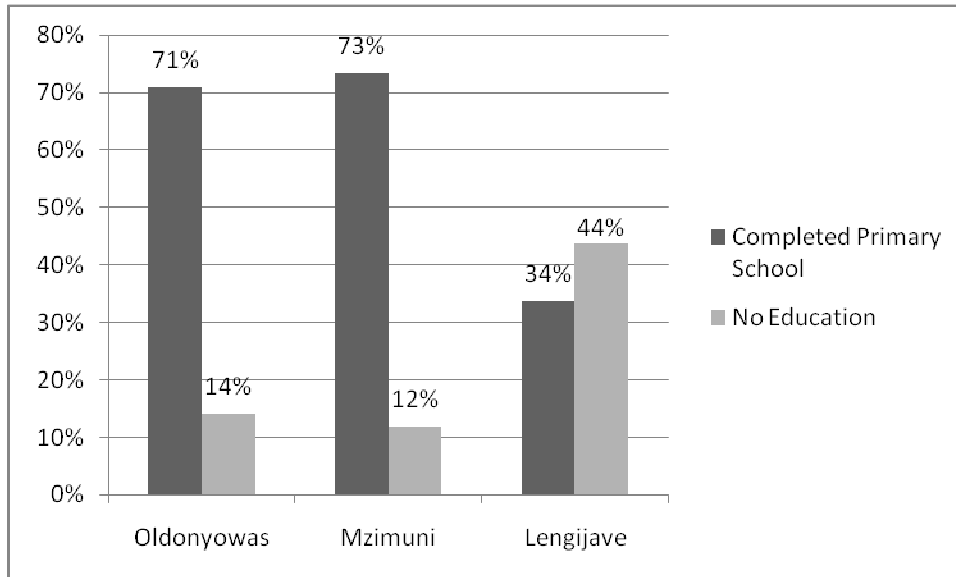
4.1.1 Household-Head Education

The level of education attained by the household head can have a profound impact on a family’s overall income and resources. The data indicate that while the majority of household heads in Oldonyowasi and Mzimuni (62% and 65%) have at least a primary school education, a considerable percentage have little or no education. Lengijave stands in sharp contrast with the other surveyed villages as 55% of household heads report having no education. When disaggregated by gender, male household heads are more likely to have completed primary school in the three villages while less than half of female household heads have the same education level. Moreover, half of female household heads in Oldonyowasi and Lengijave have no education though it should be noted that education levels are comparably low in Lengijave for male household heads as well.

4.1.2 Primary School Completion

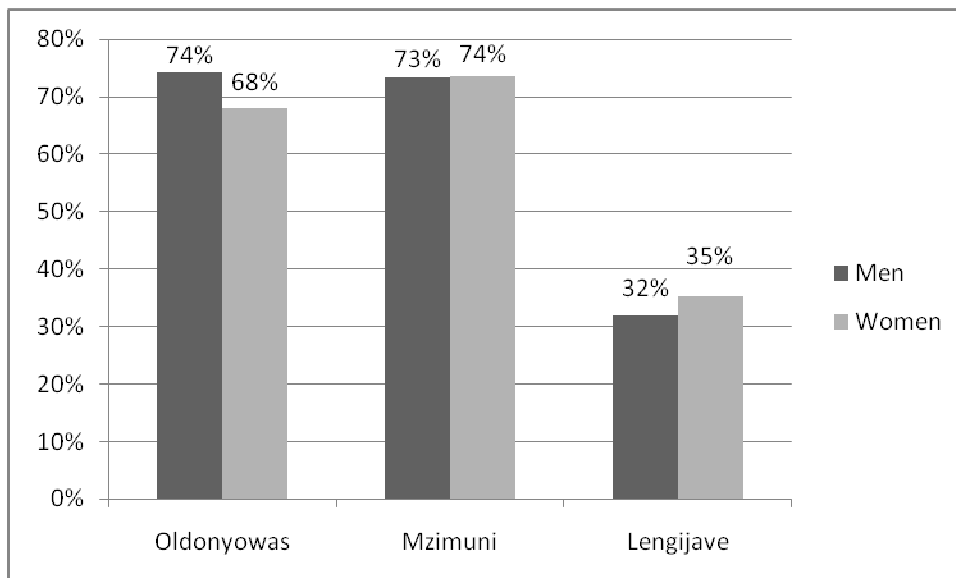
Figure 3 shows the percentage of adults (aged 15 years or more) who have completed primary school and those who have received no education. The graph indicates that adult education levels are comparable in Oldonyowasi and Mzimuni and most have at least a primary education. However, education among adults is an area of concern in Lengijave given that only one in three adults have completed primary school and the majority of adults have no education.

Figure 3. Percent Adults Completed Primary School versus No Education



There is generally little gender difference with respect to adult primary school completion (see Figure 4). As expected, the averages for both males and females in Lengijave remain substantially lower than in Oldonyowasi and Mzimuni. While a slightly higher percentage of female adults than males have no education, education outcomes are fairly uniform across sexes.

Figure 4. Adult Primary School Completion Rates, Disaggregated by Sex



Younger generations are assumed to be less likely to have no education. Table 3 shows the percent of adults by age groups that have no education. Generally, respondents in the higher age brackets

are the most likely to have no education in Oldonyowasi and Mzimuni. However, over half of the respondents with no education are under 45 years old, which stands in sharp contrast to Oldonyowasi and Mzimuni.

Table 3. Adults with No Education by Age

Age	Oldonyowasi	Mzimuni	Lengijave
15 to 24	9.1%	0.0%	12.8%
25 to 34	9.1%	0.0%	22.1%
35 to 44	13.6%	13.1%	22.1%
45 to 54	4.6%	39.1%	19.8%
55 to 64	13.6%	13.0%	12.8%
65+	50.0%	34.8%	10.5%

4.1.3 Access to Primary Education

Lengijave has two primary schools present in the village while Mzimuni and Oldonyowasi each have one primary school and one secondary school. Qualitative data obtained from focus group discussions revealed that the primary schools are suffering from a shortage of teachers and inadequate infrastructure. The concerns regarding the lack of teachers is reflected by the high number of students per teacher, ranging from 65 to 87 students for each teacher in Lengijave and Oldonyowasi (the number of teachers in Mzimuni was not available). Moreover, the data shows that classrooms tend to be overcrowded in all primary schools. The Mzimuni primary school has the lowest classroom to student ratio at 1 to 70 students while Oldonyowasi has the highest at 1 to 112 students.

As well as teacher shortages, men and women focus group discussions also mentioned poor or no access to water as a serious issue in the schools in Lengijave and Oldonyowasi. Water issues were stated to be a time consuming constraint as primary school students must spend a portion of their day retrieving water for themselves and the teacher. Additionally, school headmasters in Lengijave and Mzimuni mentioned that they lacked important educational tools such as books and desks for the students. In Lengijave, problems regarding school infrastructure, teacher shortages and insufficient learning material are compounded by assertions by the headmaster that parents do not appreciate the importance of education. Studies have shown that parent education levels have a strong relationship with child education outcomes. As most adults in Lengijave have little or no education and headmasters do not believe education is highly valued by parents, the village as a whole may be facing a dual problem of poor education opportunities and low demand for schooling children (see Table 3).

Table 4. School Environment

Village/School	Students Enrolled	Teacher to Student Ratio	Classroom to Student Ratio	Textbook to Student Ratio	% Teachers completed Form IV
Lengijave (Primary School)	709	1:65	1:101	NA	91%
Lengijave (Primary School)	627	1:70	1:78	1:5	78%
Mzimuni (Mzimuni Primary School)	490	NA	1:70	1:6	10 (Total Frequency)
Mzimuni (Nduruma Secondary School)	786	1:87	1:61	1:3	0%
Oldonyowasi (Oldonyowasi Primary School)	785	1:87	1:112	1:6-9	100%
Oldonyowasi (Arusha Catholic Seminary)	150	1:15	1:15	1:2	100%

Compounding the issues with education that have been noted are hunger and fees for uniforms. The physical condition or undernourishment of the student can have a profound impact on his or her learning ability and the return on investment in education. 80% to 90% of primary school students go to school without eating or only having tea in Arusha Rural District. The only primary school that offers food is in Oldonyowasi though it is unknown what the cost is for the meal. The cost of school uniforms is generally between 13,000 to 20,000 TSH. However, the cost is considerably higher in Orbaki primary school in Lengijave where the cost is 50,000 TSH. Such fees may account for a substantial portion of a family's income which may detract from money for food during school if available.

Table 5. Percent of Students Attending School Hungry

Village	% Students Attending School Without Eating Food or Having Tea Only	School Meals Provided
Lengijave - Primary School (1)	80%	No
Lengijave - Primary School (2)	80%	No
Mzimuni Primary School	90%	No
Mzimuni - Nduruma Secondary School	80%	Yes
Oldonyowasi Primary School	90%	Yes
Oldonyowasi - Arusha Catholic Seminary	NA	Yes

There is a government run secondary school in Mzimuni (Nduruma Secondary School) and a private secondary school in Oldonyowasi (Arusha Catholic Seminary). While the seminary school in Oldonyowasi provides small class sizes compared to Nduruma secondary school, its fees are over 11 times higher at 800,000 TSH compared to 70,000 TSH. Moreover, many parents complained that the school does not accept students from the village, noting that local children do not attend the school. While parents in Mzimuni feel that the infrastructure for Nduruma secondary school is sufficient, they conclude that hiring more teachers and providing water and electricity for a boarding school is needed.

4.5 Health

4.5.1 Access to Health Services

Access to health services is central to the delivery of prevention and care services and health outcomes. Here we consider service availability and service quality as a measure of “access.” Service availability can include distance or time required to reach the facility (or trained health providers), hours of operation, appropriate personnel on-staff, and necessary equipment to run laboratory tests; 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 Arusha Rural District was collected through focus group discussions with men and women. Among all demographic groups, malaria is the most commonly reported disease (see Table 6). Diseases of the chest or lungs such as tuberculosis and pneumonia also seem prevalent in the district villages, especially in Oldonyowasi and Lengijave.

Table 6. Top Ranked Health Issues for Men, Women, and Children

	Men	Women	Children
Oldonyowasi	Chest Disease, Pneumonia, Malaria, Bone Disease, Ulcers, Heart Pain	Malaria, Pneumonia, Chest Disease, Bone Pain, Ulcers, Heart Pain	Malaria, Ammonia, Worms, Pneumonia
Mzimuni	Typhoid, Urinary Tract Infection, Malaria	Malaria, Back Pains, Intestinal Worms, Foot Aches	Malaria, Chest Problems, Typhoid, Amoeba
Lengijave	Urinary Tract Infection, Tuberculosis, Swelling,	Pneumonia, Tuberculosis, Malaria	Malaria, Pneumonia, Coughing,

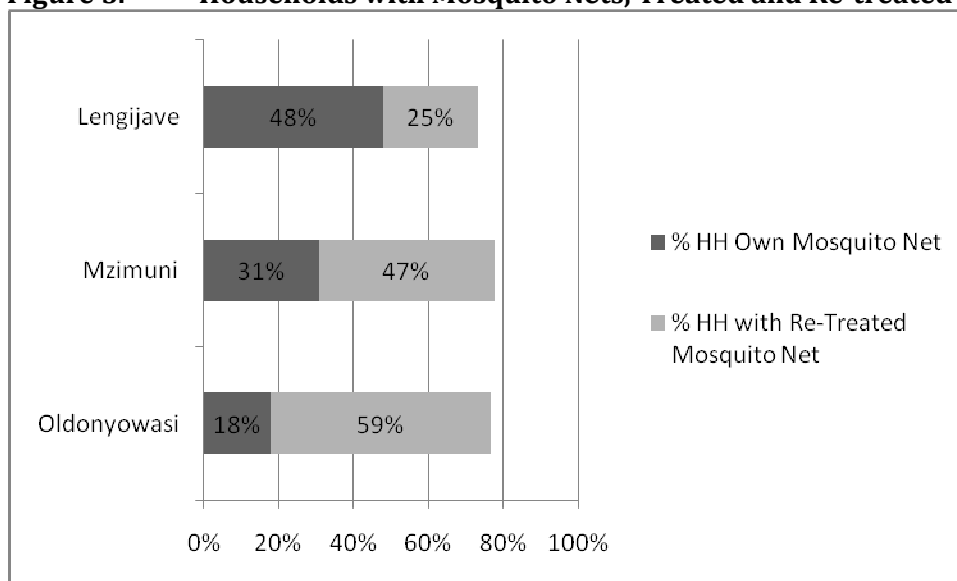
	Men	Women	Children
	Malaria, Diabetes		Worms

Residents in Arusha Rural District do not have adequate health services to meet their needs. Qualitative surveys for village leaders reveal that no participating village has any type of health facility present. However, results from men’s and women’s focus group discussions show that all seek treatment at a clinic, dispensary or hospital. In focus groups, residents report that they must travel outside of the village to the nearest dispensary or hospital. There is only one instance in which progress toward improved health care access within the village has been made. In Lengijave the village government is working with TASAF, which contributed 11 million TSH, and Selian Hospital (the primary source of medical service for Lengijave residents, in the outskirts of Arusha) to construct a dispensary. There is no indication of plans to construct a health facility in Oldonyowasi or Mzimuni.

4.5.2 Malaria and Other Illnesses

Given the prevalence of malaria, all households are asked if they own at least one mosquito net and if it has been treated with insecticide. Figure 5 presents data by village on percentage of households owning a mosquito net. Most households in the villages own at least one mosquito net leaving one in five households with no net coverage throughout the district. Over time, nets must be re-treated with insecticide depending on when the net was given or purchased. Most nets in Mzimuni and Oldonyowasi have been re-treated while Lengijave while only one in four nets are re-treated in Lengijave.

Figure 5. Households with Mosquito Nets, Treated and Re-treated

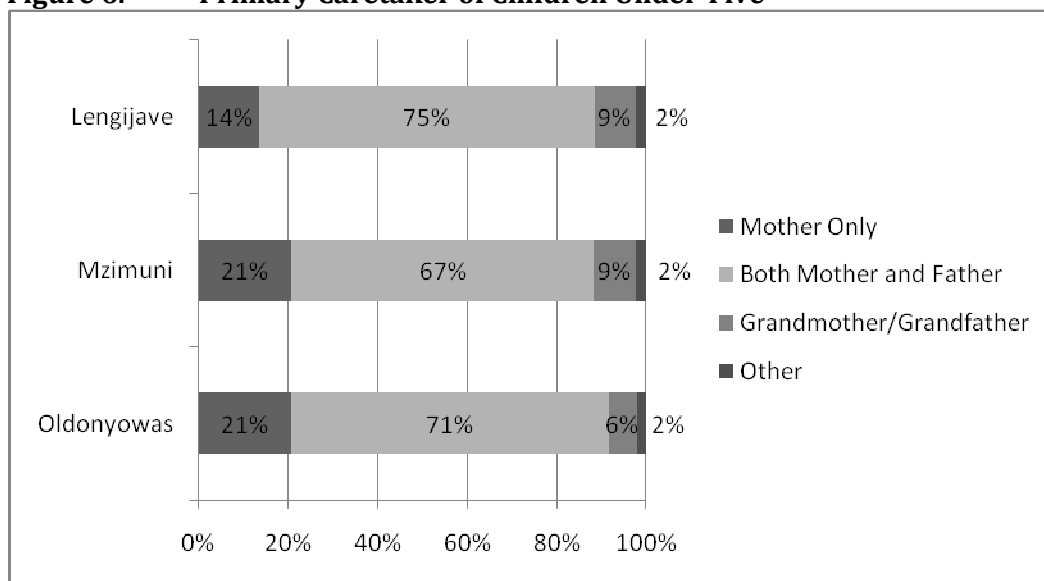


4.5.3 Under-Five Health Status

The health status of children under five is critical to their future physical, mental and emotional quality of life as well as expected mortality. In order to assess the quality of children's health at this age we inquire about primary caretakers, exclusive breastfeeding as an infant, primary food eaten, vaccines, and experience with disease. In addition, the field team weighs and measures the height of children to determine how close they are to a normal growth curve and if they are over or undernourished.

The morbidity and mortality of children under five years can be correlated to the presence or absence of biological parents, especially the biological mother. Ultimately, a young child living with his or her biological parents is likely to have higher health outcomes. The data indicate that almost all mothers in the three villages are living with the under five child with approximately 7 to 9% living outside the household. While almost all natural fathers are alive, 15 to 24% live outside the household with Lengijave having the highest proportion. The reason for not living with the child is not provided but generally both parents care for under five children as primary guardians (see Figure 6).

Figure 6. Primary Caretaker of Children Under-Five



Despite having the fewest fathers living with the under five child, primary care giving by both parents is the highest in Lengijave. There were no cases of only fathers but a considerable number of only mothers caring for a young child.

Child health with respect to sickness is generally considered good by 88 to 92% of respondents. While some are reported to be “frequently sick”, the district has low disease or mortality among the youngest age groups. Within the last two years, there were two under five deaths in Lengijave, one in Oldonyowasi and none in Mzimuni.

Figure 7. Percent Children Under-5 Who Have Had a Disease in the Past 3 Months

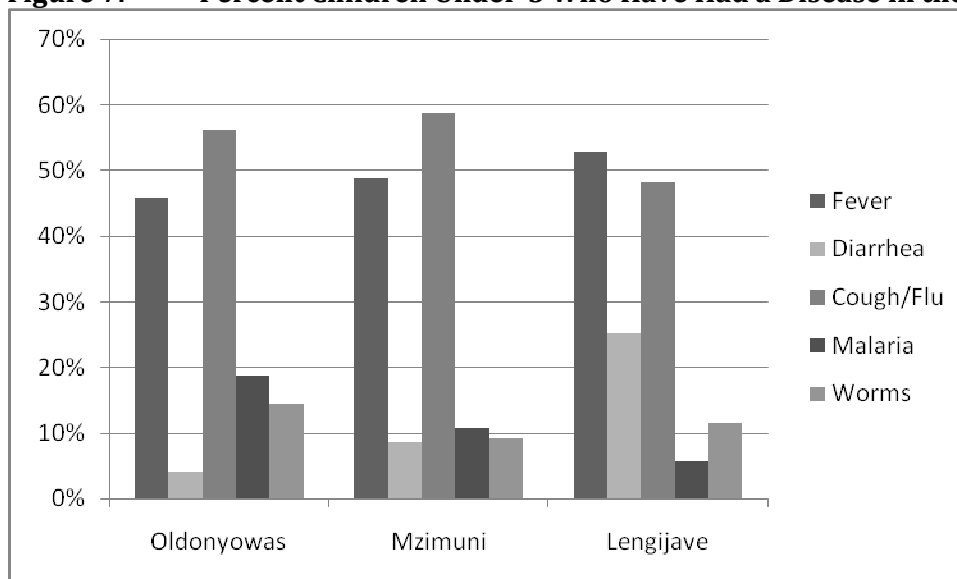
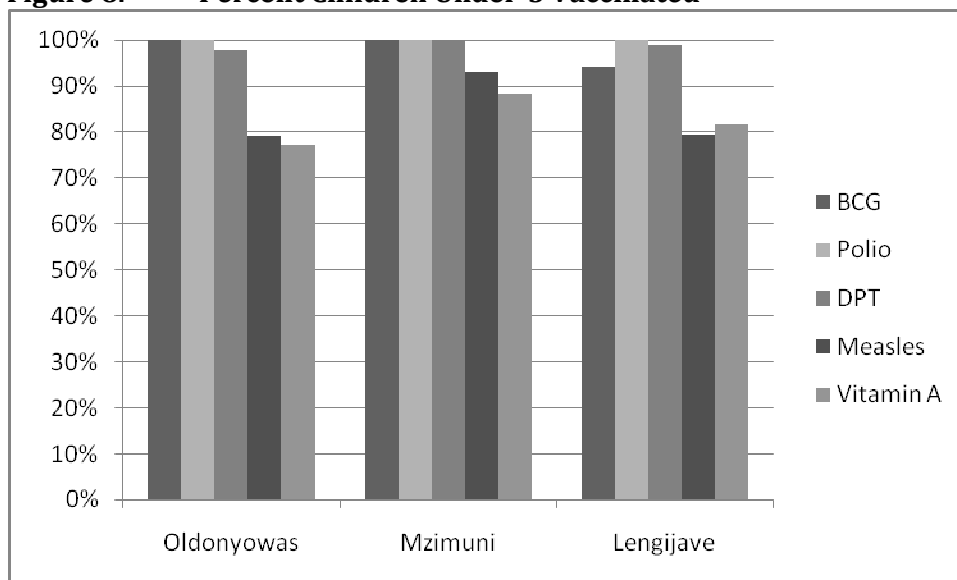


Figure 7 provides information on the types of diseases that afflicted under five children in the past three months. Overall, reports of diseases are fairly low with fever, cough or flu being the most common. Fewer than 20% of young children suffered from any other type of disease except in Lengijave in which one in four had diarrhea within three months of the survey. Low incidence of disease among the youngest reflects the common view that child health is in good standing. The high health outcomes are also encouraging as they are fairly consistent among the villages in the district.

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 8 shows the percentage of children under five who have been vaccinated by village; data were also collected on percentage of children under five who had received a vitamin A supplement.

Figure 8. Percent Children Under-5 Vaccinated



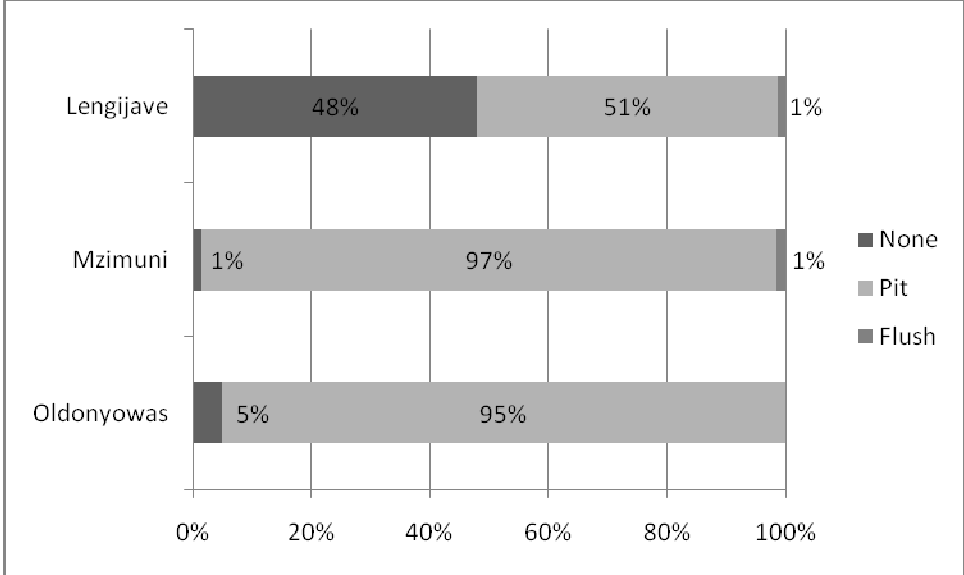
Encouragingly, there is near universal vaccination for BCG, polio and DPT. However, the lower rates of measles vaccination and Vitamin A supplementation are a concern and should be addressed.

4.5.4 Environmental Health

Many infectious diseases, especially diarrheal diseases, can be a result of poor hygiene and contaminated water and food sources. Figure 9 shows that there is a considerable gap between Lengijave and the other two villages in terms of latrines per household. With nearly half of

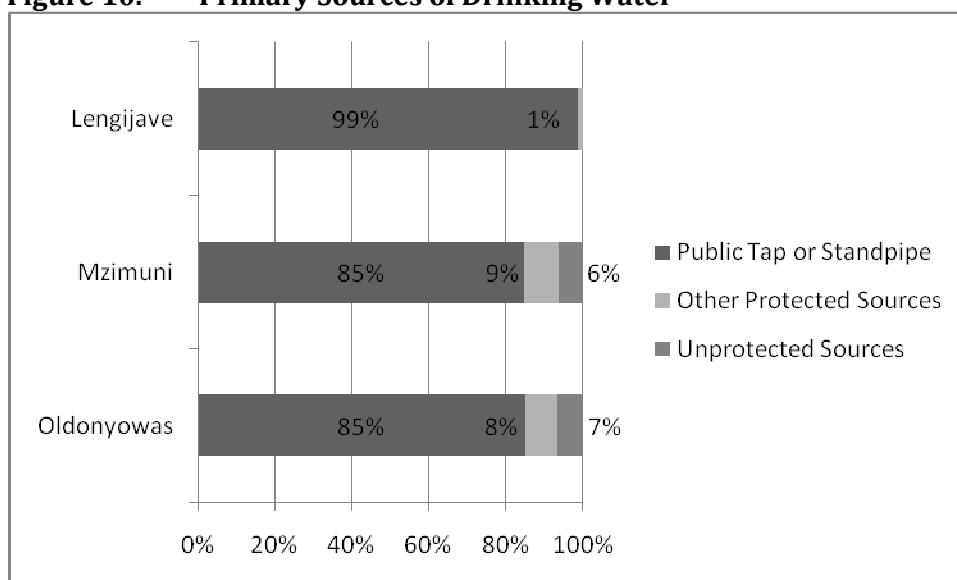
Lengijave households without a latrine, “indiscriminate disposal” of waste is fairly common in the village. Otherwise, burying waste in a compound is the most common waste disposal method throughout the district villages.

Figure 9. Type of Toilet Used by Most Household Members



The quality of water can have a tremendous impact on health outcomes as those with access to protected sources (public taps, protected wells, etc.) are less likely to be afflicted by diseases associated with poor water quality. Our data indicates that almost all households in the three villages have access to protected water sources, ranging from 93% in Mzimuni and Oldonyowasi to 100% in Lengijave. Figure 10 provides a summary of the primary sources of drinking water, which is generally a public tap throughout the district villages.

Figure 10. Primary Sources of Drinking Water



Very few households depend on unprotected water sources (unprotected wells or surface water) which constitutes a major strength of the surveyed villages. However, water quality from protected sources can be further improved by certain sanitation measures such as boiling. Such methods may be particularly helpful for Lengijave residents who describe their water as both “clean and muddy” whereas the other two villages describe theirs as “clean.” Surprisingly, Lengijave households are least likely to do anything to make water safer with 20% of respondents compared to 58% in Mzimuni and 38% in Oldonyowasi. Overall, water quality may not be a pressing issue for the villages but the data indicate that there is already a strong foundation for further improvement.

The government of Tanzania defines adequate access to clean water as the ability to retrieve water within 30 minutes. The range in the amount of time necessary to retrieve water varies widely among the villages (see Table 7).

Table 7. Average Time to Collect Water

Village	Minutes to Collect
Oldonyowasi	33.21
Mzimuni	61.18
Lengijave	92.72

Households in Oldonyowasi come close to the definition of adequate access while Mzimuni and Lengijave require double and triple the time, respectively. However, it should be noted that the large differences are attributable to single outliers that are substantially higher than the rest of the observations. In all, the distance of the public tap to the village is between 0.5 to 1 kilometer in

Mzimuni and Oldonyowasi. There appear to be multiple taps used by residents in Lengijave with distances beginning at 1.5 kilometers and beyond. Thus, it is not surprising that Lengijave requires the most time on average to retrieve water.

As is the case with most other villages, nearly all households rely on firewood as their primary cooking fuel. Lengijave residents get firewood from a nearby forest and Oldonyowasi residents from a government forest; in focus groups village leaders noted that these supplies were dwindling. Oldonyowasi residents noted that people outside the village frequently harvest firewood which exacerbates the situation.

4.5.5 HIV/AIDS

In addition to the household survey, up to four adults were interviewed in each household on their Knowledge, Attitude and Practice (KAP) regarding HIV/AIDS. This section focuses exclusively on correct knowledge of HIV prevention data as collected through these KAP surveys. A more detailed report that includes additional data and analysis on HIV/AIDS knowledge, attitudes, and practices is available from Savannas Forever Tanzania (refer to Acknowledgements section for contact information).

This discussion on HIV knowledge examines the differences in knowledge level between men and women. Eligibility was defined as anyone 15 years or older living in the household. As shown in Table 8, the majority of survey participants were female due to the fact that men were less likely to be present when the KAP survey was conducted.

Table 8. Sample Size of KAP Survey, by Sex

Village	Sample size		Total
	Male (%)	Female (%)	
Oldonyowasi	28 (34%)	55 (66%)	83
Mzimuni	39 (39%)	61 (61%)	100
Lengijave	24 (23%)	81 (77%)	105

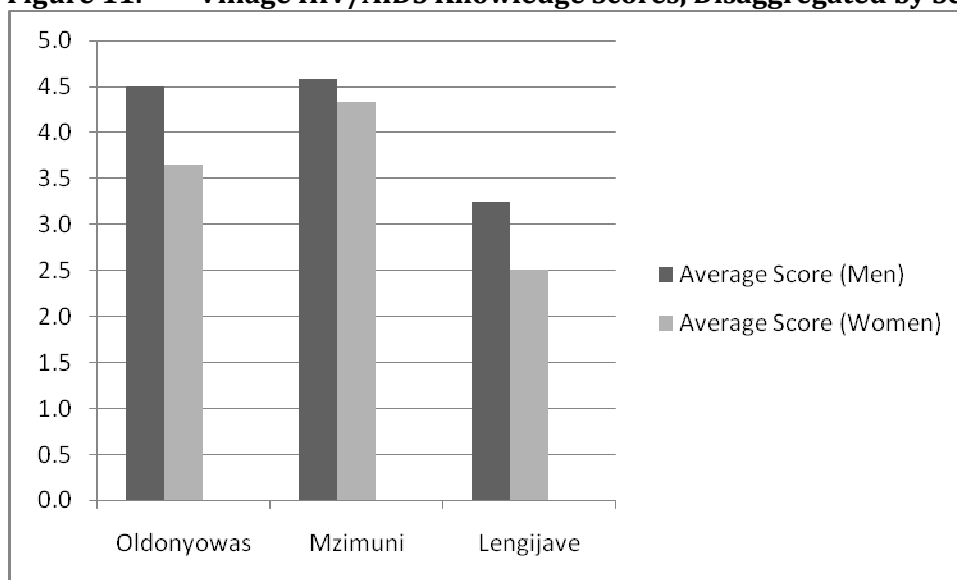
To assess an individual's correct knowledge of HIV/AIDS, the KAP survey asks six questions:

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). Village and sex differences in average HIV/AIDS knowledge scores are summarized in Figure 11.

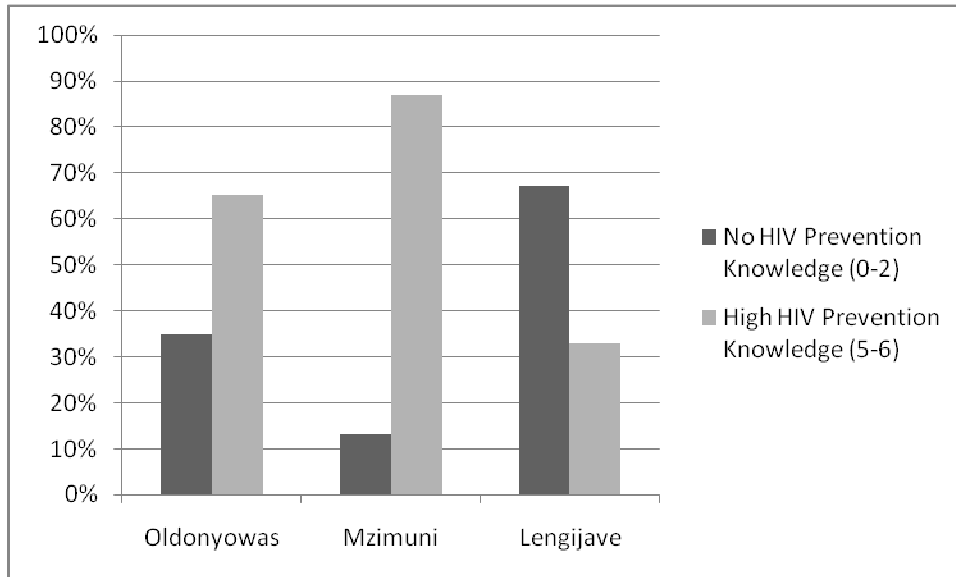
Figure 11. Village HIV/AIDS Knowledge Scores, Disaggregated by Sex



The data show that Lengijave has substantially lower knowledge scores for both men and women compared to the other two villages. Throughout the villages, women consistently scored lower than men. Relative to other villages surveyed in the WVP data set, men and women from Mzimuni rank among the top scores by their respective genders and Lengijave among the lowest scores. This indicates a significant disparity within the district regarding HIV/AIDS knowledge. It is noted in qualitative surveys that multiple organizations in Lengijave provide assistance to orphans “living under difficult circumstances” though information on the exact services is not provided.

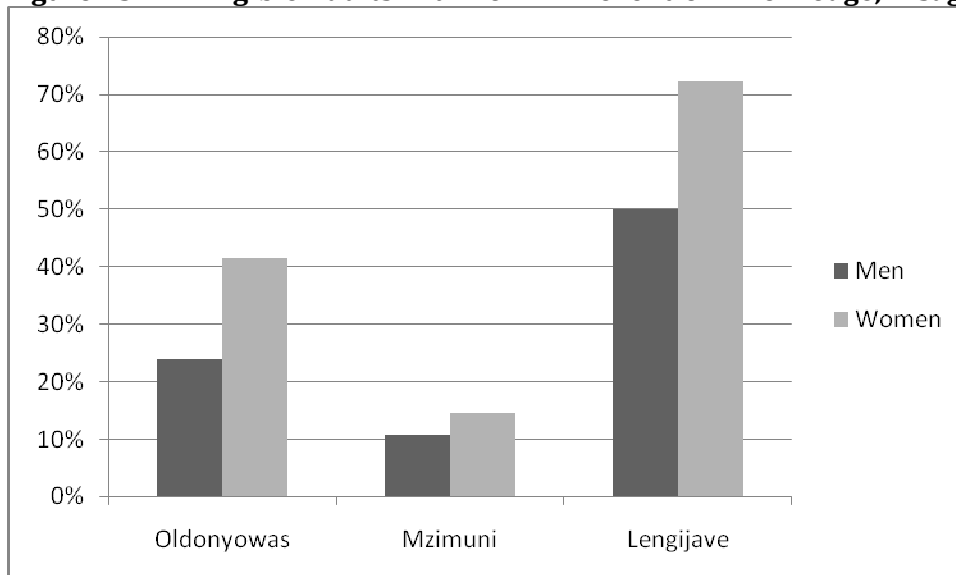
Figure 12 shows that the majority of eligible participants in Lengijave have no prevention knowledge. Conversely, survey participants in Oldonyowasi and Mzimuni are more knowledgeable, particularly in Mzimuni.

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



When disaggregated by gender, women are more likely to have no prevention knowledge than men (see Figure 13). Again, scores from Lengijave are a cause for concern as half of male respondents and nearly three-quarters of female respondents do not have any prevention knowledge. While some have suggested that it may be possible that women feel less comfortable discussing HIV prevention methods, thus artificially lowering their overall knowledge scores, it is unclear from the data why there are large gender gaps. Regardless, the large number of participants with no HIV prevention knowledge represents a critical problem with severe consequences.

Figure 13. Eligible Adults with No HIV Prevention Knowledge, Disaggregated by Sex



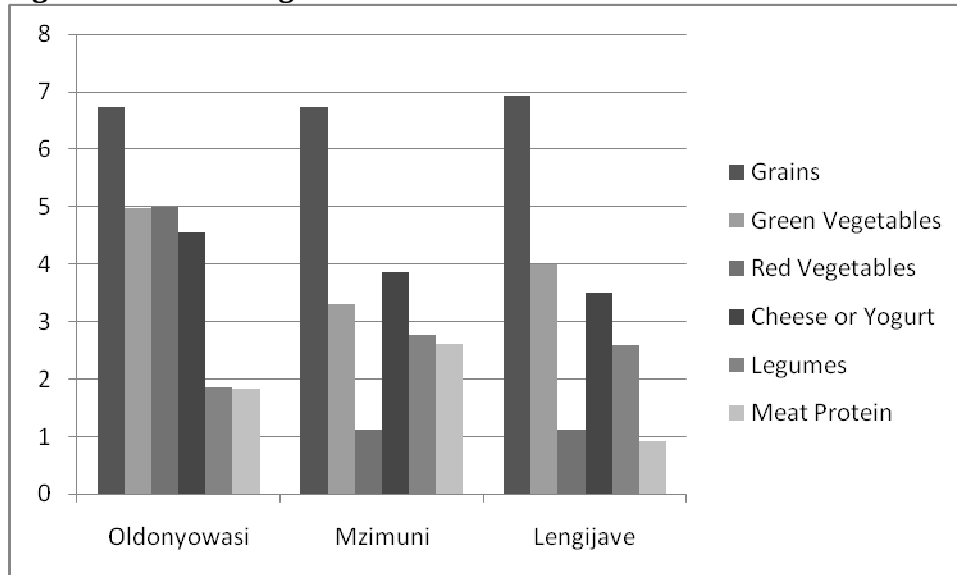
When asked if a participant knows anyone with the virus that causes AIDS, the majority of respondents in Oldonyowasi and Mzimuni responded “yes” while most in Lengijave replied “no.” However, that difference may be attributed to the fact that similar proportions of survey respondents had tested for HIV/AIDS. Overall, 65% of participants in Oldonyowasi and 72% of participants in Mzimuni had tested for AIDS compared to just 29% in Lengijave, the majority women.

4.6 Nutrition and Food Security

4.5.6 Household Nutrition

Relative to other WVP villages, Oldonyowasi and Mzimuni residents consume a fairly high diversity of food types. Households in Oldonyowasi and Mzimuni eat on average 7.5 and 7 different types foods per week, respectively. Comparatively, fewer types of food are available for Lengijave households with a 6 average food types per household. Foods such as grains, legumes, cheese or yogurt, red and green vegetables, and meat proteins are consumed at least once a week per household. Other vegetables, poultry and fruits are rarely eaten. Figure 14 summarizes the frequency of consumption by the most common food types.

Figure 14. Average Number of Different Foods Consumed in the Last 7 Days



4.5.7 Infant and Young Child Feeding

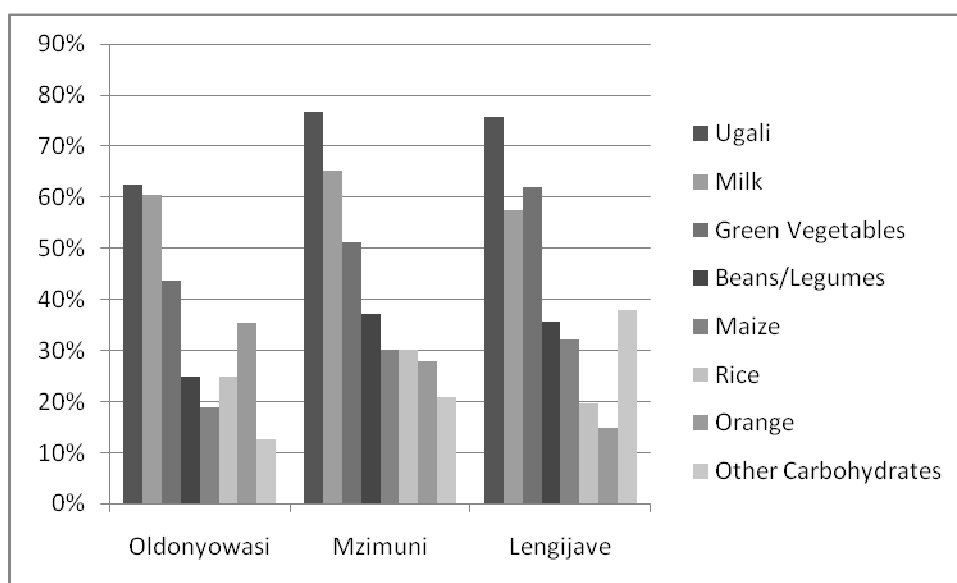
Optimal infant and young child (age 6-23 months) feeding practices (IYCF) include: early initiation of breastfeeding, exclusive breastfeeding during the first 6 months, continued breastfeeding for up to two years and beyond, timely introduction of complementary feeding at 6 months, frequency of feeding solid/semisolid foods, and the diversity of food groups fed to children 6-23 months. Almost

all children have been breastfed; however, over 80% stopped exclusive breastfeeding before the recommended sixth month time frame and almost half of the children within 3 months. Introduction of solid foods generally began on average 5 months in Oldonyowasi to 5.4 months in Lengijave.

4.5.8 Under-Five Nutrition

The most commonly eaten foods by children under five in the last 24 hours in households surveyed are listed in Figure 15. (Percentages labeled in Figure 15 indicate the most commonly eaten food by children under five in that village.)

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



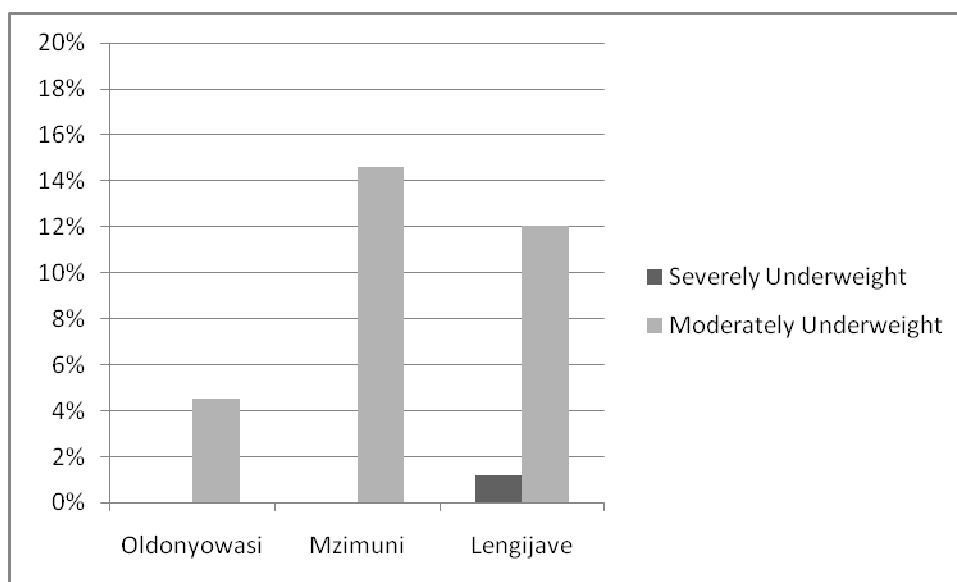
Most children in the district villages have eaten ugali, milk and green vegetables in the last 24 hours. Arusha Rural District villages provide a significantly higher percentage of fruits relative to other villages in the WVP data set. However, provision of meats such as cow, goat and chicken is much lower throughout the district villages relative to other districts. Almost no under five children in Oldonyowasi consumed any meat or eggs in the last 24 hours. Nutrition for the youngest in the villages appears to depend heaviest on carbohydrates and green vegetables and supplemented by a relatively high amount of fruits.

The World Health Organization (WHO) established a standardized set of measures for expected child weight and height measurements given a child's age producing what is called a z-score statistic. The three under-5 anthropometric measures include: length/height for age z-score (stunting), weight for length/height z-score (wasting), and weight/age z-score (malnutrition). The

z-score is displayed across standard deviations (SD). Any SD that is -2 or below is considered to be moderately below the norm and SD at -3 or lower is considered severely below the norm.

The data reveal that most young children have an appropriate weight for their age although 12% of children in Lengijave and 15% in Mzimuni are found to be moderately malnourished. There are fewer observations of wasting (height for length) with 2% of children falling under the -2 SD categories in any of the villages. Stunting is far more prevalent in the villages and is significantly higher in Lengijave. In that village, over half of young children are either moderately or severely stunted compared to approximately one third in Oldonyowasi and Mzimuni. These figures are troubling but should be kept in context as Tanzania's national averages on stunted growth have been an area for concern for many decades.

Figure 16. Percent Children Under-5 Malnourished



The low incidence of malnutrition in Arusha Rural District is encouraging, especially in Oldonyowasi. Figure 16 shows that there are almost no cases of children who are severely underweight and the vast majority have an average or above weight for their height. With such weight levels, reducing the percentage of malnourished under five children to zero is possible.

4.5.9 Food Security

A series of nine questions are used to create a food security scale. Sample questions include, have you gone a day and night without food in the past month; or have you had to eat a limited number of foods in the previous week or reduced how much you eat. The higher the food security score, the greater the average food insecurity experienced. Both Oldonyowasi and Mzimuni score low on

the Food Security Index at 2.9. Comparatively, Lengijave’s average score of 3.8 indicates substantially higher food insecurity.

Table 8 shows the percent of households that faced specific food insecurities in the last 4 weeks. As expected from the Food Security Index scores, Lengijave households are generally more likely to have an insecurity issue than the other villages.

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

	% of Households worried about food last week	% of Households ate limited foods last week	% of Households went one day and night without food	% of Households that had no food in house in last week
Oldonyowasi	33%	75%	3%	10%
Mzimuni	29%	79%	9%	24%
Lengijave	48%	80%	8%	33%

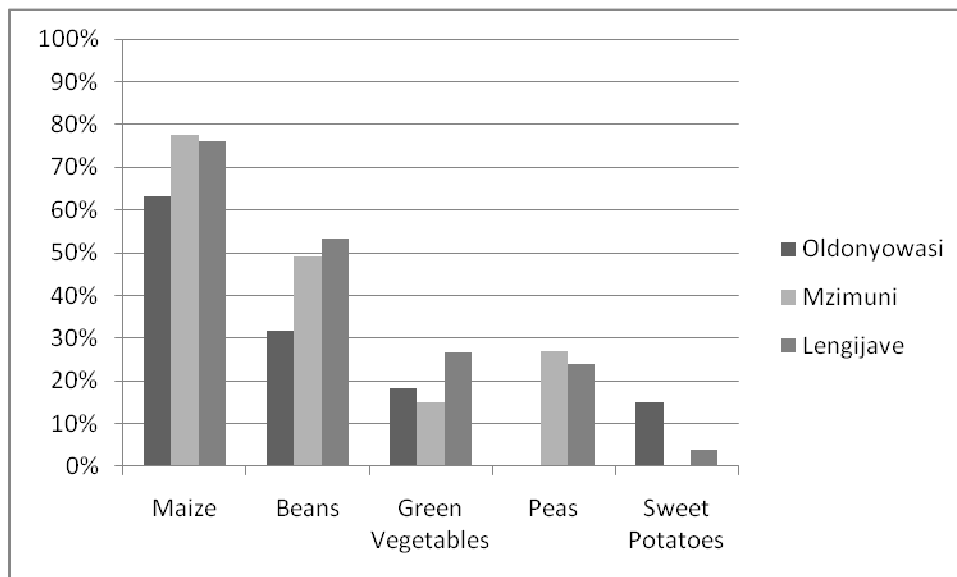
4.5.10 Kitchen Gardens

Kitchen gardens are one means that households can help protect themselves from periods of food insecurity when there is general high crop or livestock loss. Oldonyowasi stands in sharp contrast to the other villages as 45% of households have a kitchen garden compared to 12% of households in Mzimuni and 11% in Lengijave. Twelve percent of households in Oldonyowasi and Mzimuni received kitchen garden training; therefore it is unclear why so many more households in Oldonyowasi have kitchen gardens. Households in Mzimuni and Lengijave consume about half or more of the produce from their kitchen gardens. It appears that kitchen gardens are used more as an income supplement in Oldonyowasi as 70% of households sell more than half of their kitchen garden produce.

4.7 Agriculture

As noted earlier, the majority of respondents in all villages are subsistence farmers although in Lengijave about a third of households report livestock keeping as their primary role. The land available for cultivation by households (acres either owned or rented) is on average highest in Mzimuni and lowest in Lengijave. The majority of surveyed households in Mzimuni and Lengijave grow at least two crops. A surprisingly large number of households in Oldonyowasi report that they grow no crops at 22% or only one crop at 40%. Figure 17 shows the most common crops grown per village.

Figure 17. Percent Households Cultivating Various Crops by Village



The above figure indicates that there is a lack of crop diversity among farmers in the district villages. While maize and beans are more common, far fewer households grow other produce such as green vegetables, peas and potatoes. Moreover, less than 3% of all households grow any other type of crop with the exception of Mzimuni in which 5% to 9% of households grow fruits such as bananas, mangoes and papaya. Qualitative survey results show that households do depend on subsistence crops that are not listed such as millet, onions, and tomatoes; however, such crops appear to be grown infrequently or by very few households.

Cash crops are an important source of income among households in all the villages according to focus group discussions. However, agricultural focus group discussions revealed that almost no households sell cash crops in Lengijave. The opposite is the case in Oldonyowasi and Mzimuni where nearly three quarters to all households sell cash crops, often at markets at 3 to 4 kilometers away from the villages. Yet, Oldonyowasi farmers state that they primarily sell to “black marketers” or domestic and international traders. In Lengijave, subsistence crops are generally sold at home to other villagers. Price comparisons are not available as different villages sell different crops but maize and cassava in Mzimuni are the highest priced crops at 45,000 TSH and 30,000 TSH per sack.

Focus group discussions (FGDs) were facilitated with top farmers (typically 4-6 farmers per village), as defined by village leaders, and agricultural extension officers (if applicable) to further assess the agricultural environment in each village. Qualitative data collected and analyzed from these FGDs are presented in Table 9.

Table 9. Qualitative Data on District Agricultural Environment

Village	% HH that Irrigate Plot	% HH using Fertilizer		% HH with Soil Erosion as Serious Problem
		Inorganic	Organic	
Oldonyowasi	60%	30%	70%	70%
Mzimuni	100%	50%	100%	25%
Lengijave	0%	NA	50%	50%

Soil erosion problems vary tremendously by village with the highest concern in Oldonyowasi. Farmers in that village combat soil erosion by planting reeds, trees, and terracing. There are also significant differences among villages with regard to irrigation. Mzimuni farmers benefit from the proximity of Nduruma River and many farmers in Oldonyowasi fuel sprinklers with piped water from mountain springs. No was no evidence of irrigation in Lengijave. Organic fertilizer (usually manure) is used by about half of respondents across the villages. A few farmers indicated that they also use inorganic fertilizers purchased from village shops.

4.8 Livestock

The majority of households own cattle, sheep/goats, and chickens in all three villages. While comparable percentages of households own cattle among the villages, Mzimuni households are more likely to own sheep/goats and chickens while Lengijave households are less likely. Table 10 provides information regard the mean number of livestock per household. According to the data, Mzimuni households are not only more likely to own livestock; they also tend to have the most per household.

Table 10. Mean Number of Livestock Owned per Household by Village

	Cattle	Goats/sheep	Chickens
Oldonyowasi	2.4	6.2	6.7
Mzimuni	4.3	9.0	7.8
Lengijave	2.3	5.3	3.5

Given the importance of livestock for food and income, losses due to disease, drought or wild animals can place a heavy burden on households. It appears that each village faces significant losses of livestock due to the above mentioned causes. Cattle losses are often attributed to disease and drought, accounting for the loss of 20% of the herd in Mzimuni to 34% and 38% in Oldonyowasi and Lengijave, respectively. Drought is particularly threatening to cattle in Lengijave

which took over one fourth of the herd compared to only 2% of the herd in Mzimuni. Cattle loss to disease could be mitigated with increased vaccination which ranges from 5% in Mzimuni to 10% in Oldonyowasi (no information was provided for Lengijave). Generally, vaccinations focused on protection against East Coast Fever (ECF) and pneumonia. A major constraint for administering vaccinations to cattle is the high cost as cited by livestock keepers in Oldonyowasi.

In Oldonyowasi and Lengijave, sheep or goats are more likely to be lost to drought though approximately 8% and 10% of the herd had fallen to disease. In Mzimuni, few cattle were lost to drought. Only Oldonyowasi livestock keepers provided vaccinations for goats, protecting against lung fever and skin disease. The vaccinations were administered to 70% of the herd which might have impacted the village's low rate of loss to disease.

Newcastle Disease is the primary cause of chicken mortality in Tanzania. Less than 20% of households in Oldonyowasi and Lengijave vaccinated chickens against the disease while 74% in Mzimuni vaccinated. However, Mzimuni households report the highest amount of loss to disease relative to the other villages, accounting for nearly 40% of the total herd. Chickens appear to have been afflicted the heaviest by disease but are also the most sensitive livestock animal to wildlife; Oldonyowasi lost 19% of its chickens to wild animals.

The data suggest that drought takes a significant toll on livestock in Oldonyowasi and Lengijave and disease on all three village livestock herds. Each village has at least one community animal health worker (4 in Mzimuni) though the assessment of their service is mixed. Focus group respondents from Mzimuni and Oldonyowasi stated that the services provided by animal health workers are insufficient and requires more funding or support.

5 CONCLUSIONS

5.1 Recommendations

The villages in Arusha Rural District have many social and economic similarities and differences. As district and village leaders review these results, it would be helpful for them to consider how best to increase access to government services and align the priorities of NGOs and companies with that of residents. 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:

- District leaders share these results with other appropriate leaders and use these data to inform the design of future interventions at the village and district level

- Build on existing strengths within these villages such high mosquito net coverage; child vaccination rates for BCG, DPT and polio. All villages should be encouraged to strive for 100% coverage in each of these areas.
- Significant infrastructure support is needed for schools and clinics or dispensaries need to be built. Working with organizations in the villages and cultivating new relationships with other NGOs may provide new avenues of support for needed services.
- A little over half of households have access to clean drinking water. However, that does not mean that water quality could not be improved. Increasing the number of those who take measures to make water safer could further boost health in the villages.
- Build on existing momentum of HIV prevention awareness to decrease the number of men and women with low knowledge. In the case of Lengijave, launching new awareness campaigns on HIV/AIDS prevention is needed.

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 data in a meaningful way for village self-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 Iramba District in 2-3 years to re-assess 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.

5.3 How You Can Help

The purpose of this report is to provide data to district and local leaders in order to inform your decision-making for future social and economic development activities. Please communicate with the Whole Village Project staff and leaders to discuss the usefulness of these data, whether or not there are other indicators that would be useful to you, and if we have missed anything in our assessment and analysis of your village and/or district.

APPENDIX A – SURVEY INSTRUMENTS

Household level

- Household survey
- Food security, nutrition and jatropha

Individual surveys:

- HIV/AIDS knowledge, attitude and practice
- 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

APPENDIX B – TABLE OF SELECTED INDICATORS BY VILLAGE

		Oldonyowasi	Mzimuni	Lengijave
THE HOUSEHOLD AND HOUSING				
	Number of households surveyed	60	67	75
	Average household size	4.68	5.43	5.77
	% households in polygamous marriage (more than 1 wife)	10.00%	10.45%	42.67%
	% of households headed by women	36.67%	23.08%	43.48%
	% of households with corrugated roof	81.67%	97.01%	49.33%
	% of households using a toilet	95%	98.5%	52%
	Avg time (minutes) required to collect water	33.21	61.18	92.72
	% households use firewood as primary energy source for cooking	96.67%	95.45%	96%
EDUCATION				
	% of all adults without education	13.58%	11.86%	43.07%
	% of household heads completed primary school	58.34%	64.62%	31.08%
	% of adult men completed primary school	71.42%	71.29%	32.29%
	% of adult women completed primary school	64.71	72.04%	34.91%
	Average primary school teacher to student ratio	1:87	N/A	1:67
	Average primary school textbook to student ratio	1:6-9	1:6	1:5
	Average secondary school teacher to student ratio	1:15	1:87	N/A
	Average # of years teachers stay at primary school	2	5	4
	Average # of years teachers stay at secondary school	4	3	N/A
	Ratio of female to male gross enrollment rates (primary school)	1:0.9	1:1.1	1:0.9
	Ratio of female to male gross enrollment rates (secondary school)	No Females	1:0.9	N/A
HEALTH				
	% of households with at least one mosquito net	76.67%	77.61%	73.33%
	% of households with access to protected drinking water	93.33%	92.51%	100.00%
	% of households that take measures to make the water safe	38.33%	57.58%	20.00%
	# of hospital/dispensary/clinic in the village	0	0	0
CHILDREN UNDER 5				
	% of infants exclusively breast fed through 6 months of age	20%	4.88%	19.05%
	Average age in months at introduction of complementary feeding	5.02	5.31	5.39
	% of children whose birth mother is still alive and inside the hh	93.75%	93.02%	89.66%
	% of children moderately to severely underweight	0%	0%	1.2%
	% of children who are vaccinated for BCG	100%	100%	94.25%
	% of children who are vaccinated for polio	100%	100%	100%
	% of children who are vaccinated for DPT	97.92%	100%	98.85%
	% of children who are vaccinated for measles	79.17%	93.02%	79.31%
	% of children received Vitamin A supplement	77.08%	88.37%	81.61%
	% children with fever in past 3 months	45.83%	48.84%	52.87%
AIDS KNOWLEDGE				
	% of men with high AIDS knowledge score (5-6 points)	67.9%	64.1%	37.5%
	% of women with high AIDS knowledge score (5-6 points)	43.6%	57.4%	21.0%
	% of women who know a person can protect themselves from HIV	78.2%	90.2%	59.3%
	% of men who know a person can protect themselves from HIV	82.1%	94.9%	70.1%
	Perception of risk of mother-to-child transmission of HIV	Yes (90.14%)	Yes (87.06%)	Yes (90.91%)
	% of men who have talked with their wife/primary partner about ways to prevent HIV/AIDS	40.54%	42.86%	30.56%
	% of women who have talked with their husband/primary partner about ways to prevent HIV/ AIDS	59.46%	57.14%	69.44%
FOOD SECURITY AND NUTRITION				
	% of households worried about food in the past 4 weeks	33 %	29%	48%
	% of households ate limited variety of food in the past 4 weeks	75%	79%	80%
	% of hhs went one day and night with no food in the past 4 weeks	3%	9%	8%
	% of households that are currently growing kitchen garden	45%	12%	11%
	Avg # of days/times hhs ate meat protein in past week	1.8	2.6	0.9
	Avg # of days/times hhs ate legumes in past week	1.8	2.7	2.6

	Avg # of days/times in last week hh ate foods with Vitamin A	6.40	2.26	1.58
	# of different types of food eaten in last week	7.47	6.96	5.89
	Food Security Index	2.88	2.92	3.79
ECONOMIC ACTIVITY, AGRICULTURE AND INCOME				
	% households own any agricultural land	83%	96%	100%
	Average acres cultivated per household	2.15	2.57	1.52
	Average # of cattle owned per household	2.40	4.26	2.31
	Average # of goats/sheep owned per household	6.20	8.96	5.30
	Average # of chickens owned per household	6.70	7.80	3.50
	% of hhs whose chicken are vaccinated for Newcastle disease	16.6%	74.2%	19.7%
	% of cattle lost to disease in the past 12 months	15%	18%	12%
	% of cattle lost to drought in the past 12 months	19%	2%	26%
	% of cattle lost to wildlife in the past 12 months	0%	0%	0%
	% of chickens lost to disease in the past 12 months	20%	39%	31%
	% of chickens lost to drought in the past 12 months	2%	0%	2%
	% of chickens lost to wildlife in the past 12 months	19%	5%	9%
	% of goats/sheep lost to disease in the past 12 months	8%	10%	11%
	% of goats/sheep lost to drought in the past 12 months	16%	3%	18%
	% of goats/sheep lost to wildlife in the past 12 months	0%	0%	1%
	% of household heads with the main occupation of farming	80%	90.7%	76.8%
	% of hh heads with the main occupation of livestock keeping	3.3%	0%	34.3%
	% of HHs that irrigate the plots in village (from focus group data)	60%	100%	0%
	% households with bicycle	5%	49%	8%
	% households with radio	68%	69%	53%
	% households with cell phone	63%	58%	68%
KEY INSTITUTIONS				
	Distance to major weekly market	3 km	4 km	N/A
	# of village committees/groups	12	7	7
	# of NGOs	5	7	7
	# of credit, banking services or VICOBA	1	1	1
DEMOGRAPHICS				
	Religion (% Christian; % Muslim; % Traditional)	98% Christian, 2% Other	74% Christian, 22% Muslim, 3% Traditional/ Other	58% Christian, 27% None, 5% Traditional
	Dependency Ratio (# of child (0-14 years) and aged (65+) population per 100 intermediate age (15-64 years)	87	99	124
	Child-Woman Ratio (# of children aged 0-4 years per 1,000 women in the age group 15-44 years)	0.37	0.33	0.50
	Sex Ratio (# of males per 100 females)	0.912	1.135	0.891