

UNIVERSITY OF MINNESOTA



The Whole Village Project

Village Reports for Nduguti and Nkinto in Iramba 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 Nduguti and Nkinto villages, Iramba District during the month of May 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 two villages in Iramba District, Nduguti and Nkinto. 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

There are a number of common strengths observed between the two villages. In particular, there is relatively high mosquito net ownership, high rates of child vaccinations for BCG, DPT and polio, widespread latrine usage, and a moderately high HIV knowledge score.

In Nduguti, 79% of households own at least one net and 87% in Nkinto. Despite this strength, only 60% of nets in Nduguti and 40% in Nkinto had recently had their nets dipped in insecticide treatment. Given the high rates of malaria in the area increasing bed net coverage to 100% and regular dipping of nets should be encouraged.

Infant and young child vaccination rates for BCG, DPT and polio were over 95% in both villages. However, vaccination rates for measles drop to about 75%; given the virulence of this disease, clinic officers and health committee members should identify strategies to meet the gaps in measles vaccination. Although more than 70% of infants and children took Vitamin A supplements, again the community should strive for 100% coverage given the low Vitamin A intake in local diets and the significant impact that Vitamin A deficiency has on child development.

Among the two villages surveyed, there was a high percent of households with latrines. Access to latrines and appropriate waste disposal reduce opportunities for communicable disease transmission and water borne diseases. Over 93% of respondents in Nduguti and Nkinto have a pit latrine, which is higher than most other districts.

General AIDS knowledge is relatively good among the two villages surveyed in Iramba district. The average AIDS knowledge scores ranged from 4.3 to 4.4 among males and 3.5 to 3.8 among females (on a scale of 6). The score for males is higher than most districts. However, the average female HIV/AIDS knowledge score is low. The high average male AIDS knowledge scores in Iramba district are largely due to the low percentage of respondents with no HIV prevention knowledge (0-2 points). 1 in five female respondents in both villages reported no HIV/AIDS prevention knowledge.

Again, although there is an overall strength here, both communities should strive to increase women's HIV knowledge in order to better protect themselves and their families.

3.2 District Gaps

The level of one's education is often a predictor of other quality of life factors such as economic productivity, food security, and overall health. In both villages, the quality of schools is a concern and the significantly lower percent of girls attending secondary school. Girls' education often is a predictor of family health in the future; further Tanzania has set increasing girls' participation rate in secondary school as a Millennium Development Goal. Other quality factors include a low teacher to student ratio, poor student exam results, and the limited food available at school. Only Nkinto provides any school meals, consisting of maize and beans for breakfast and ugali with peas and beans for lunch. Children are the future. However, if they are not able to access quality education their chances for improved quality of life as adults are greatly reduced.

Access to quality health services is also limited in the district. Most respondents in this district felt the treatment at local dispensaries was not helpful. According to men's and women's focus group discussions, malaria is the number one problem followed by reproductive and sexual health. In addition, maternal and child health services are offered only in Nduguti.

Any level of acute malnourishment among children under five must be considered a gap. Nearly 5% of children under five in Nduguti are acutely malnourished and parents have indicated in focus groups that kwashiorkor, a disease of malnutrition, is a problem. In Nkinto fewer children under five (2%) were identified as severely malnourished but these households also have greater food insecurity. In both villages, the main source of food for children under five is ugali, which itself cannot meet a child's nutrition needs. There was also a significant lack of green vegetables and fruit in the diet of children and the limited intake of the nutrients these foods offer affect child development.

Farming, as the main source of income, is vulnerable to the problem of soil erosion. In both villages surveyed, over 75% of households considered soil erosion to be a serious problem, which is harmful to the sustainability and reliability of farming. Further, there is little to no irrigation of plots and very limited use of fertilizers. Both villages indicated that they had had no visits from agricultural extension officers in the past year and none of the NGOs working in these villages provide training in agricultural conservation techniques.

Newcastle Disease is the number one cause of chicken mortality in Tanzania. Vaccination rates against Newcastle Disease are low in Iramba District. Only 1 in every 2 households owning chickens vaccinate those chickens against Newcastle Disease. The highest vaccination rate (9% in Nduguti) is still low given the severe consequences of infection with Newcastle Disease. Household surveys revealed that 37% to 45% of chickens had been lost to disease in the past year in these villages.

3.3 Opportunities

Girls' participation in secondary school is quite low. The education committees in both villages have an opportunity to work with district leaders to identify opportunities for identifying solutions to this and improving the quality of schools in the district overall. As education creates a foundation for overall family health and economic opportunities, prioritizing education is critical for the future development of this district.

Farmers in both villages reported that did not receive a visit by an agricultural extension worker in the past year. These agricultural extension workers typically train a small group of local farmers in agricultural best practices and established model farms (growing maize, sunflowers, etc.) as demonstration plots. The trained farmers are expected to transfer knowledge and skills learned to their own farms. Given that the most common complaints of farmers was lack of knowledge of improved farming techniques and other measures, there appears to be an opportunity to further spread agricultural knowledge from model farmers to others and improve the productivity of farming. The district should monitor the impact of the work done by agricultural extension workers.

Increasing livestock vaccination rates will reduce the rate of cattle and goats lost to disease, which is still relatively high. In addition, although many households have heard of Newcastle disease, only a small proportion of chickens are vaccinated. Therefore, villages have an opportunity to reallocate resources to increase livestock vaccination rates, which is effective in reducing livestock lost to diseases.

Households with kitchen gardens tend to have less serious food insecurity problems. Specifically, villages with higher coverage of kitchen gardens tend to have a lower percentage of households that went to bed hungry, ate limited variety of food, and fewer underweight children. However, kitchen

garden training remains very limited in the villages surveyed in Iramba district. Village leaders have the opportunity to convey knowledge about kitchen gardens as a means to alleviate food insecurity.

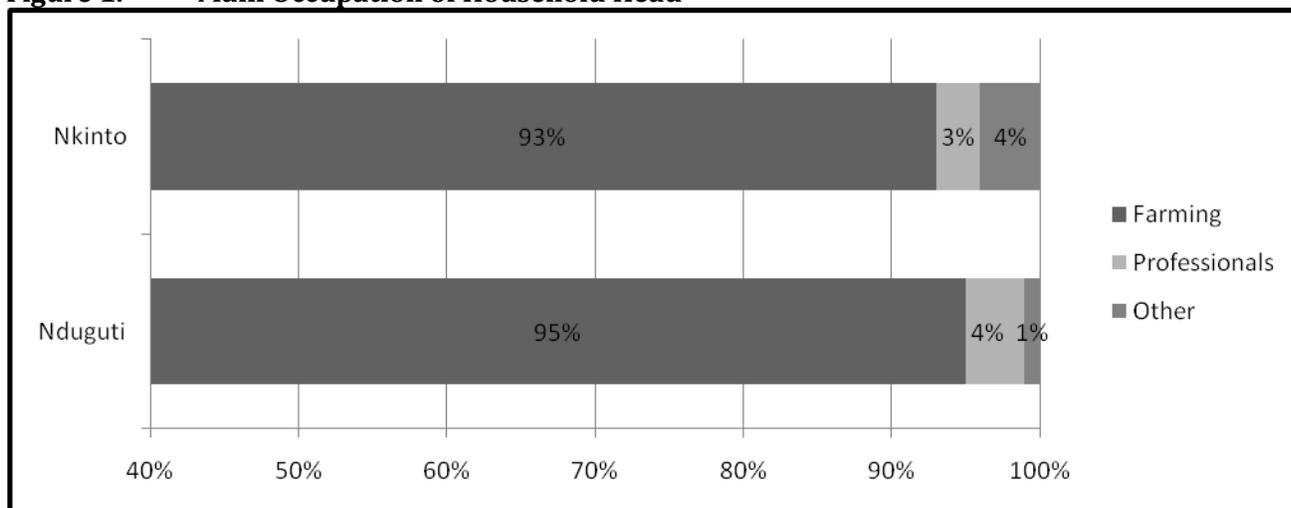
District leadership also has an opportunity to further protect the children in the district from vaccine-preventable disease. A high percentage of children under-five in Iramba District are vaccinated against tuberculosis (BCG), DPT, polio, and measles, as recommended by the World Health Organization (WHO). However, vaccination coverage is not universal. Given the already high level of vaccination, the district has an opportunity to reach universal coverage against vaccine-preventable disease given the proper allocation of resources.

4 RESULTS AND DISCUSSION

4.1 Household Livelihood and Assets

Over 90% of household heads surveyed in the Iramba District report farming as their main occupation (see Figure 1). The remaining primary occupations of household heads include professionals and small business owners. Although not listed as a main occupation, a number of households own livestock in the form of cattle, goats and sheep, and chickens.

Figure 1. Main Occupation of Household Head



More households are headed by a man than a woman in all villages surveyed. The average percentage of households headed by women in the villages of Nduguti and Nkinto is 11%.

Income, in the form of cash or goods, is most commonly generated through agricultural production. Village leaders in Nduguti and Nkinto listed crop production and sales to be the primary source of

income. This is reflected by the percentage of households that sell cash crops in Nduguti (100%) and Nkinto (100%). Livestock and alcohol sales (Nduguti), and small businesses (Nkinto) are additional non-agricultural income generators.

Focus group discussions (FGDs) facilitated with men, women, and village leaders investigated activities that could improve the livelihoods of village members. The highest ranked recommendation by participant type by village is listed in Table 1.

Table 1. Village Recommended Activities to Improve Local Livelihoods

Village	Men	Women	Village Leader
Nduguti	Microfinance	Microfinance	Subsistence Farming
	Borehole	Sewing machines	Livestock
	Poultry production	Vegetable farming	Small business
Nkinto	Borehole	Microfinance	Subsistence Farming
	Sunflower processing machine	Poultry production	Cash crops
	Vegetable farming	Borehole	Livestock

The recommended activities did not vary significantly between gender focus groups. Other recommendations included alternative income generating activities such as beekeeping, working with poultry, and obtaining a sewing machine. Village leaders focused on selling cash crops and livestock production.

Asset ownership, a proxy indicator of a household's socioeconomic status, was polled. When households were asked about ownership of durable goods such as mobile phones, radios or bicycles, the most common item owned in Nduguti was a radio (64%) followed by a bicycle (48%). In Nkinto, a bicycle (56%) is the most common item followed by a radio (48%). Among the villages, average ownership of a mobile phone was 22%.

The vast majority of houses surveyed in Iramba District were built with natural materials, with walls made of mud and baked bricks and floors made of earth or clay. Houses surveyed in Iramba District were divided nearly in half based on roofing types. Nearly half built with natural materials, such as mud/straw/poles and grass/palm thatch, while the other half built with corrugated metal. Nkinto has a greater percentage of households with corrugated metal roofs (57%) than Nduguti (41%).

4.2 Unexpected Loss of Income or Assets

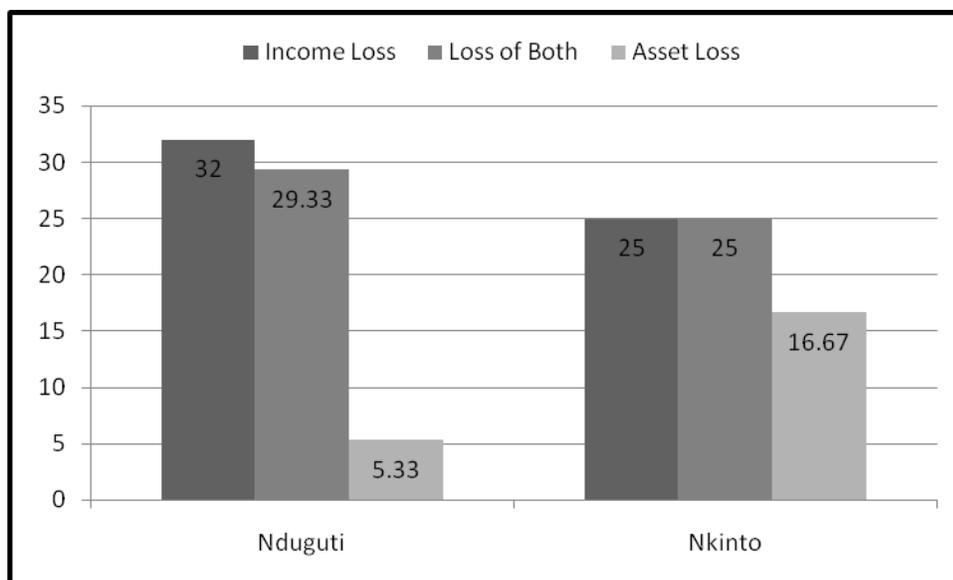
In a given year, a household may experience unanticipated crises such as the death of a family member, the loss of a job or the loss of crops or livestock. Some families or households are able to cope with these losses better than others.

When we asked households in Nduguti and Nkinto about unanticipated income or asset losses it became apparent that the villages as a whole were coping with significant economic losses this year due to poor crop production and the high price of foods.

85% of households in Nkinto reported unexpected loss in the past year. While the figures were slightly lower in Nduguti (76%), nearly 1 in 4 households reported unexpected loss.

For the majority of households in Nduguti, 40%, they cited loss of crops due to weather as the primary cause of unexpected loss. In Nkinto, large increases in food costs was reported by 40% of respondents as the most reported unexpected loss.

Figure 2. Impact of Unexpected Loss



As demonstrated in Figure 2, unexpected losses result in a significant setback to stability within both households and the villages themselves. Twenty-nine percent of respondents in Nduguti

reported both income and asset loss; the percentage of both income and asset loss was slightly less in Nkinto at 25%.

4.3 Village Institutions

Table 2 presents a picture of the institutional analysis conducted in the villages surveyed in Iramba 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 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	Nduguti	Nkinto	Sector
Village-Run			
Court of Law	x		Legal/Law Enforcement
Education	90%	60%	Education
Health Service	50%	55%	Health
Police	x		Legal/Law Enforcement
Post Office	x		Government
Religious Institution	x	x	Religion, Social Welfare
Veterinary Services	x	x	Animal health
Village Council/ Government	90%	60%	Politics/Government
Village Market	x		Business Development
Community/Publicly Owned Water	x		Water
Sub-Total Village-Run	10	5	
Village Committee/Group			
Environment/Natural Resources Committee	x		Energy/Environment
Education Committee	x		Education
Water Committee	x		Water
Agricultural & Livestock Committee		x	Agriculture
Elder's Committee		x	Social Welfare
Land Committee	x	x	Environment

Hazards/Disaster Committee		x	Environment
Security Committee	50%	x	Legal/ Civil Service
Community Development/ Planning/ Financial Committee	x	x	Business Development, Financial, Social Welfare
Health, HIV/AIDS Committee		x	Health, HIV/AIDS
Social Services/ Social Welfare Committee		x	Social Welfare
Sub-Total Village Committee/Group	6	8	
Non-governmental Organizations			
Health Action Promotion Association (HAPA)	50%		Health [training in HIV/AIDS]
Mennonite Economic Development Associates (MEDA)		75%	Social Welfare [training/distribution of treated mosquito bednets]
SACCOS	10%		Financial [still in formation stage]
Sustainable Environment Management Action (SEMA)	90%		Environment [training in use of tap water]
Tanzania Christian Refugee Services (TCRS)		65%	Social Welfare [built wells]
Environmental NGO (no name)	10%		Environment [training in environmental conservation]
World Food Program		85%	Food [periodically provides food to schools]
World Vision International		75%	Social Welfare [Provided support to orphans]
WWHKMZ	90%		Social Welfare [provided support to orphans]
Sub-Total NGO	5	4	
Total Institutions	21	17	

Although these tallies only give a glimpse of the types of services available in each village, they do indicate the relative level of activity by type of service providers and sector. Nduguti has twice as many village run institutions as Nkinto. Nkinto has more village committees, perhaps to make up for the limited number of other services available through physical institutions. A large focus of many of the village run organizations and committees are on environmental and health issues and improving access to credit. In focus groups, villagers were asked to provide an assessment in the form of a percentage of some of the major institutions in their village. Nduguti is generally favorable about its village run institutions and committees with the exception of the Security Committee and the schools. Nkinto is more critical of its local institutions and committees; although villagers in focus groups acknowledged that the village government, schools and dispensaries each were making some positive contributions, they also named an equal number of weaknesses.

Neither village had a large presence of NGOs, just five or four in total. They focused their services in the area of health, improved water access, environmental conservation and support to orphans or other children in difficult circumstances. In general, Nkinto provided average scores for NGOs

working in its community whereas in Nduguti there was a wide variation from highly favorable to critical. Most of the criticism in all cases was because NGOs had only reached a few number of people or had not fulfilled all the services that were expected.

4.4 Education

4.1.1 Household-Head Education

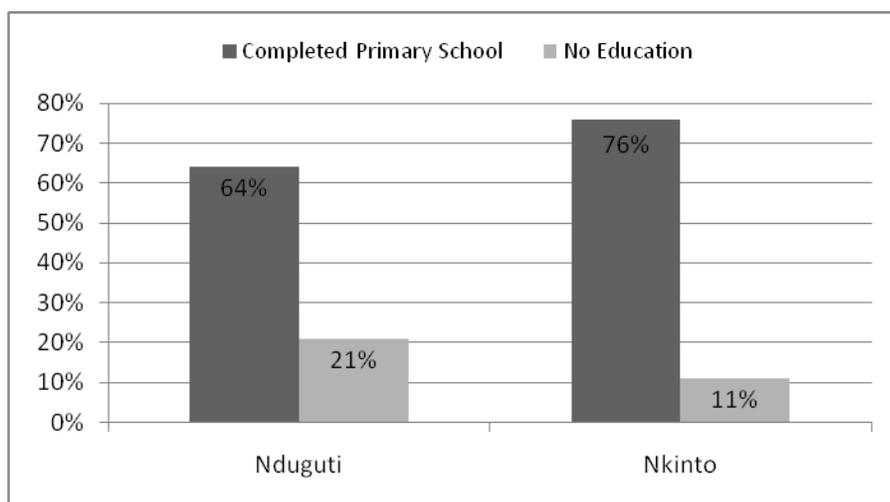
Among household heads in Nkinto and Nduguti, proportions of primary school completions are nearly equal. Nkinto had a slightly higher rate at 56% while Nduguti had 54%. Nduguti had the highest number of household heads with no education at 21% compared to Nkinto at 15%. Nkinto was the only village that had some household heads that attended secondary school (3.4%), though none had completed their secondary education. Other types of education, such as adult or vocational education, were low. Nduguti had 1 household head that had completed a diploma program.

There did not appear to be a sharp education contrast between male and female household heads. Primary school completion rates were 50% of male household heads for both villages. Female completion rates varied from 42% in Nduguti (12 respondents) to 75% in Nkinto (4 respondents). The percentage variants may be attributed to the low number of respondents.

4.1.2 Primary School Completion

We also assessed the primary school completion rate for all adults (age 15 and over) and saw slightly higher rates of primary school completion as compared to household heads (see Figure 2).

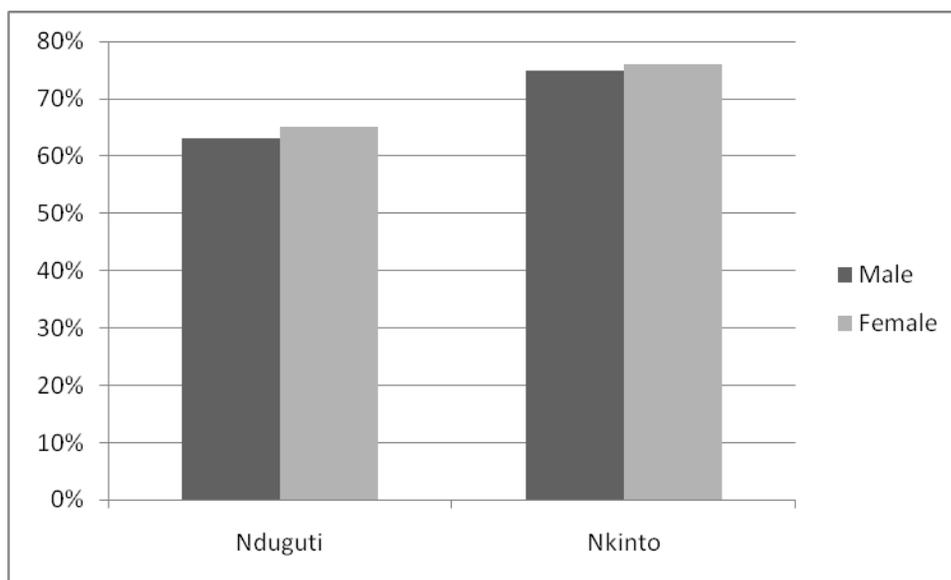
Figure 3. Percent Adults Completed Primary School versus No Education



Between one-fifth and one-tenth of the adults in Nduguti and Nkinto has had no education with nearly twice as many women as men in Nduguti. Primary school completion rates are relatively good with Nkinto having higher rates at 76%.

As shown in Figure 4, adult women have slightly higher primary school completion rates than men although it is not a statistically significant difference.

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



As with other education figures, Nkinto has the highest percentage of adults with at least some secondary education, but this is still low at only 1 in 6 adults. Nkinto and Nduguti each report one adult surveyed having completed secondary school. In Nkinto, twice as many boys attend secondary school as girls and in Nduguti only a third as many girls attend. Both schools need to work harder at retaining female students.

4.1.3 Access to Primary Education

Both villages surveyed in Iramba District have at least one primary school and one secondary school; Nduguti has two primary schools. Access to primary education is not only measured by presence of a primary school, but also by resources – teachers, classrooms, textbooks – available at that primary school. Data presented in Table 3 were compiled from questionnaires completed during interviews with school headmasters.

Table 3. Primary School Environment

Village/School	Students Enrolled	Teacher to Student Ratio	Classroom to Student Ratio	Textbook to Student Ratio	% Teachers completed Form IV
Nduguti	635	1:91	1:78	1:2	53%
Nkinto	904	1:83	1:101	1:3	45%

A shortage of classrooms/studying facilities and teachers and staff/student housing are noted by school headmasters and male and female focus group discussion participants as the greatest weaknesses of the primary schools in their villages. As supported by the data presented in Table 3, in general, the primary schools in Iramba District have poor teacher-to-student ratios (Nduguti teacher-student ratio is 1:91), classroom-to-student ratios (Nkinto, 101 students need to use one classroom), and textbook-to-student ratios. In the institutional focus group in Nkinto, parents remarked that they were unhappy with the quality of teachers, the low pass rate of their students on exams, and a generally poor parent-school relationship. It is not surprising that the quality of teachers are in question when so few have completed Form IV themselves; they are likely under-trained and lack sufficient education themselves to be teaching.

Another measure of access is regular school attendance. Attendance rates are high in the primary schools: Nduguti (98%) and Nkinto (90%) and are nearly equal between boys and girls in these cases.

Access to a quality primary school education is further affected by the physical condition of the learning child. Children who attend school hungry are less likely to be able to learn. The primary schools of Nduguti have a vast majority of students coming to school hungry (see Table 4). The headmaster at the primary school of Nkinto stated that they provide food to students (at a cost) although curiously the World Food Program has been providing food to the schools for three years so it is not clear why parents are paying extra fees for this.

Table 4. Percent of Students Attending Primary School Hungry

Village	% Students Attending School Without Eating Food or Having Tea Only	School Meals Provided
Nduguti	90%	None
Nkinto	25%	Breakfast of maize/bean mixture, stiff porridge with peas/beans at cost of TSH 450

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 Iramba District was collected through focus group discussions with men and women. In both villages assessed, respondents ranked malaria as the number one ranked health issue facing men, women, and children (see Table 5). Other issues for adults included reproductive and sexual health and infectious diseases. For children, pneumonia, diarrhea, and kwashiorkor (a disease of malnutrition) were also mentioned by parents as disease of primary concern.

Table 5. Top Ranked Health Issues for Men, Women, and Children

Village	Men's Health	Women's Health	Children's Health
Nduguti	1. Malaria 2. Sexually Transmitted Diseases 3. Reproductive Health	1. Malaria 2. Reproductive Health 3. Typhoid	1. Malaria 2. Pneumonia 3. Kwashiorkor
Nkinto	1. Malaria 2. Reproductive Health 3. Tuberculosis	1. Malaria 2. Reproductive Health 3. Foot/Back Pain	1. Malaria 2. Coughing 3. Diarrhea

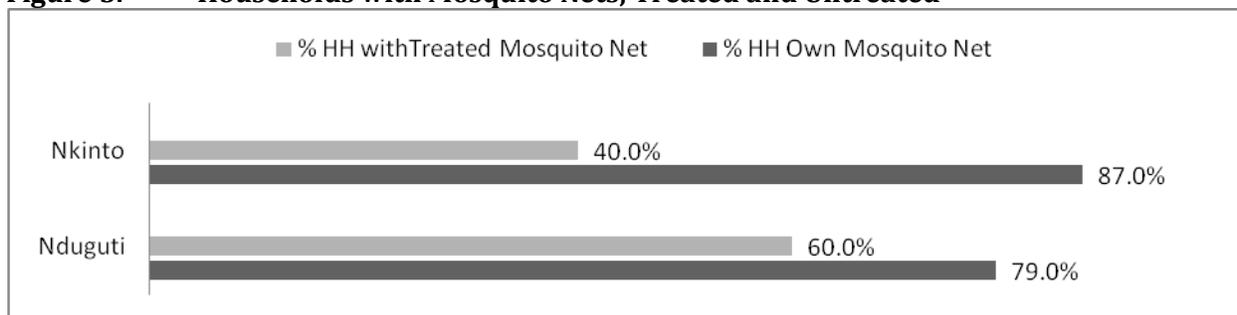
In Iramba District, both villages surveyed were fortunate to have a government dispensary although some services and drugs or equipment are lacking. Each dispensary is staffed by one assistant medical officer; Nduguti has two nurses. Both dispensaries have one refrigerator each. Additionally, they both offer maternal/child health and family planning services. In focus groups, villagers complained that they lacked transport to take critically ill patients to a hospital, and that they had insufficient medicines, too few staff and no laboratory equipment.

Household surveys indicate that the vast majority of households in this district seek treatment for ill children under-five from an established health facility: 100% of households surveyed take their children to a dispensary or hospital when sick.

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 3 presents data by village on percentage of households owning a mosquito net insecticide treatment. Overall, both villages have high rates of mosquito net ownership with Nkinto having the highest at 87% and 60% treatment and Nduguti with 79% ownership but only 40% treatment. An NGO, MEDA was providing training in Nkinto on the use of insecticide treated nets for children under-5 and pregnant women; this may explain their higher rates of insecticide treatment. If consistent mosquito net use is practiced by household members, they should begin to see their malaria rates decrease as well.

Figure 5. Households with Mosquito Nets, Treated and Untreated



Although malaria was the most frequently identified health problem by participants in male and female focus group discussions (FGDs) other health problems were also mentioned as concerns. These included: pneumonia, back problems, swellings of legs, diarrhea, sexually transmitted diseases, impotence (for men) and tuberculosis. The Health Officers in both villages noted that the most common symptoms treated in the village over the past 12 months for adults were high fever, coughing, and diarrhea. Both health officers expressed concern about the lack of laboratory equipment for diagnosing symptoms (e.g., malaria or worms) and lack of working instruments (e.g., scissors, delivery kits).

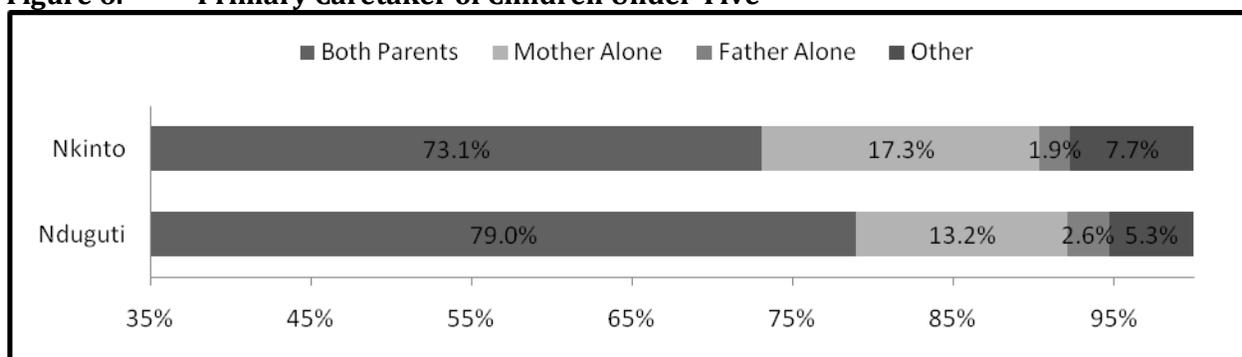
4.5.3 Under-Five Health Status

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 measure 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. 95% of mothers of children under 5 in the two villages are alive and in the household. Three mothers in Nkinto are alive but not living in the household and one mother in Nkinto has died. One household had lost the natural father, although the percentage of households with the father still alive remains high at 97-100%. In roughly 12% of households, the father is alive but lives outside the household. Figure 6 indicates that childcare is mostly shared between the mother and father. It is rare for the father to be the primary caretaker of the children; the father was the primary caretaker in only two households surveyed in Iramba District.

Figure 6. Primary Caretaker of Children Under-Five



In households surveyed where the primary caretaker is someone other than the mother and/or father, the primary caretaker tends to be a grandparent.

In the villages surveyed, approximately 8% of children under five are considered frequently sick. None of the households have lost a child less than five years old in the last 2 years.

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

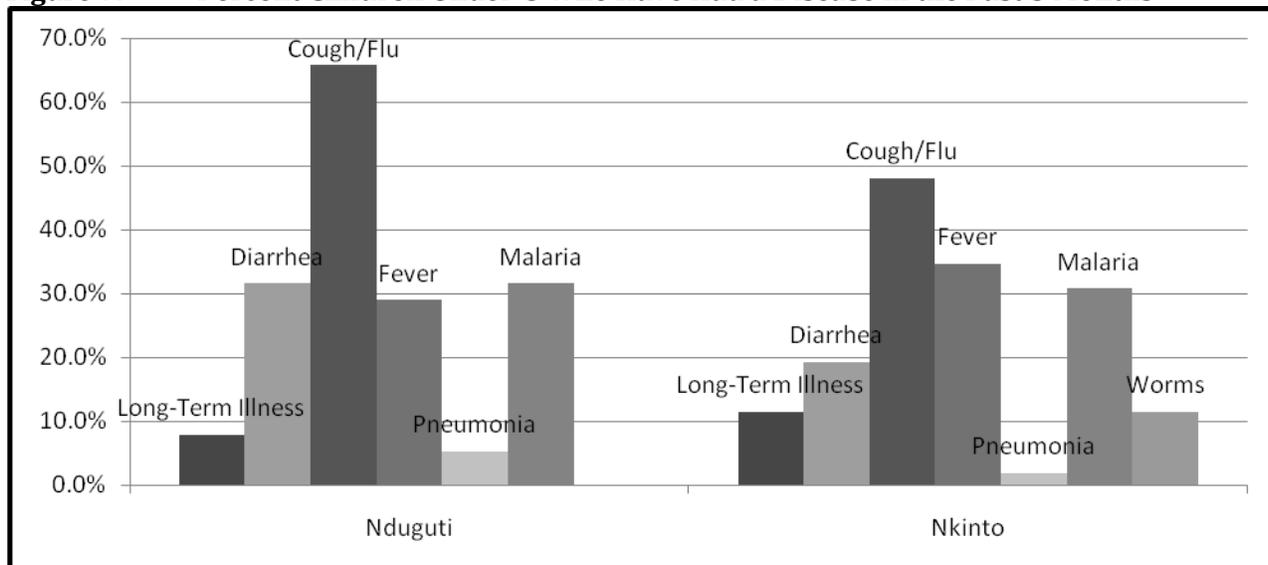
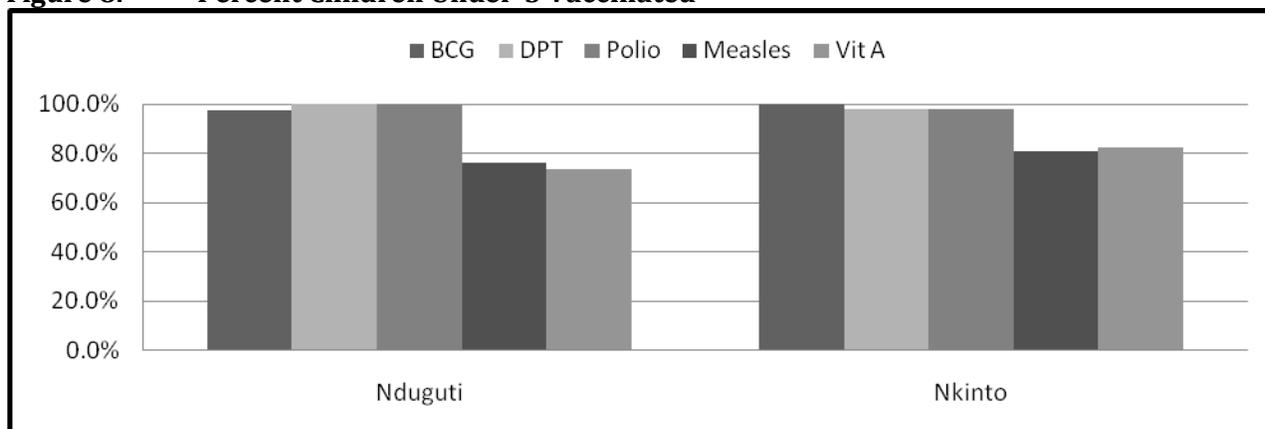


Figure 7 gives a picture of the disease burden for children under-five in these villages in the past three months with Nduguti showing a slightly higher disease burden overall. The most commonly reported illness in the past three months was a cough or flu with 66% of children in Nduguti compared to 48% in Nkinto. On average, about 30% of children under five in both villages had suffered from fever, malaria and diarrhea. The incidence of pneumonia in children under five is very low among these villages and no cases of measles were reported. Approximately, 11% of children in Nkinto suffered from worms; and both villages had on average about 10% of children under five suffering from a long-term illness.

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

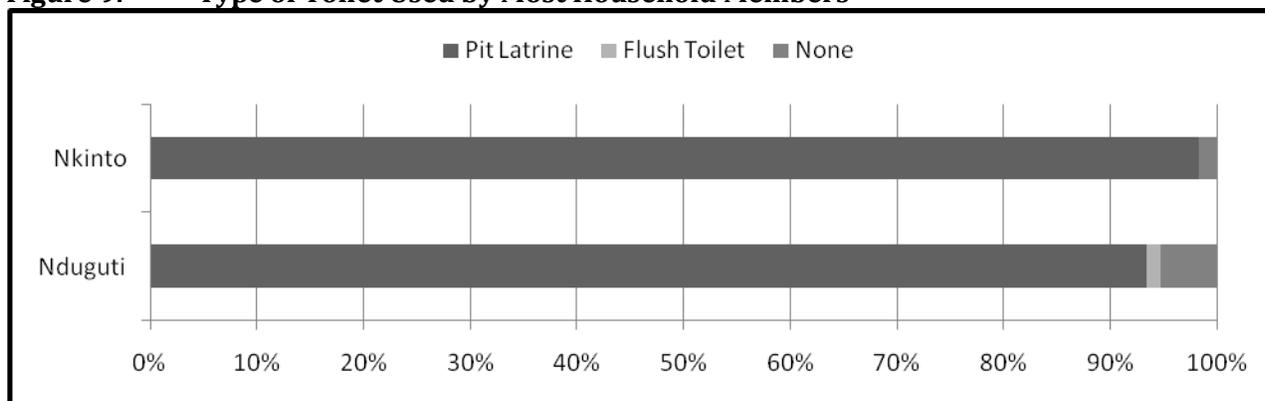


Over 97% of children under-five in Iramba district have received a DPT, BCG, or polio vaccine. Among all recommended vaccines, measles vaccination rates (76-81%) are the lowest within each village surveyed, Nduguti with the lowest rates for measles vaccinations and Vitamin A supplements. The data shown in Figure 8 do not take into account age at vaccination or number of doses, so a determination of whether or not children are fully vaccinated is not possible.

4.5.4 Environmental Health

Many infectious diseases, especially diarrheal diseases, can be a result of poor hygiene and contaminated water and food sources. Both villages have high rates of 95% to 97% latrine coverage which is very positive.

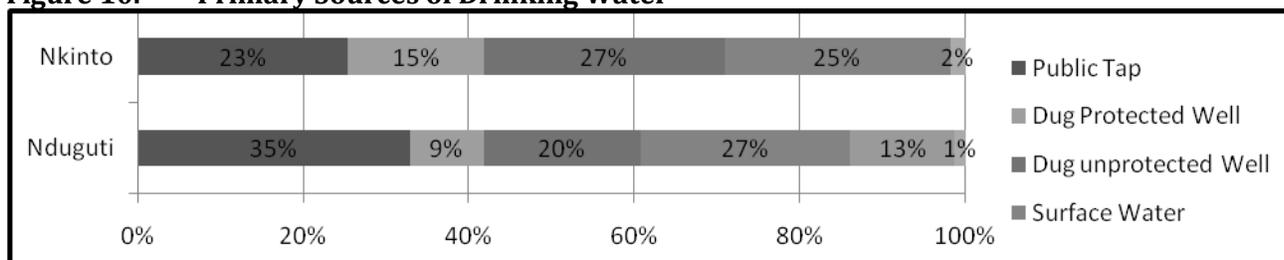
Figure 9. Type of Toilet Used by Most Household Members



Qualitative data indicates the primary modes of refuse disposal in Iramba District villages are to bury refuse on a household compound (Nkinto) and an organized community collection system in (Nduguti).

Less than half of surveyed households have access to protected drinking water in the villages surveyed in Iramba district. Of respondents with protected water sources, Nduguti (47%) ranked higher than Nkinto (38%). As shown in Figure 10, sources of protected drinking water were generally public taps or a standpipe. In both villages, surface water (unprotected) represents nearly 25% of water sources.

Figure 10. Primary Sources of Drinking Water



Given that the majority of households are drinking unprotected water, treating the water through boiling, a filter, bleach tablets or other means is important to protect the health of all family members. In Nduguti, 80% of households are treating their water in some way but in Nkinto only 48% of households treat the unprotected water.

Table 6 shows the average amount of time households from each village spend collecting water. The total water collection time encompasses the time it takes a household member to get to the water source, collect the water, and return home. In addition to significant time required to collect water, access to drinking water is further limited by long distances. Nkinto residents have the farthest distance to travel to access drinking water (3-7 kilometers) and the longest time to travel (Table 6); Nduguti residents have the shortest distance (2 kilometers) and thus spend less time collecting water.

Table 6. Average Time to Collect Water

Village	Minutes to Collect
Nduguti	22.7
Nkinto	38.6

Cooking fuel type and primary cooking location affect respiratory health, primarily of women and children. In addition, accidents around fires lead to more burns for women and children. The majority of households in all villages cook with wood (97%).

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. As shown in Table 7, a higher percentage of women than men participated in the survey with 54% women in Nduguti and 59% in Nkinto. Eligibility was 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.

Table. 7 Sample Size of KAP Survey, by Sex

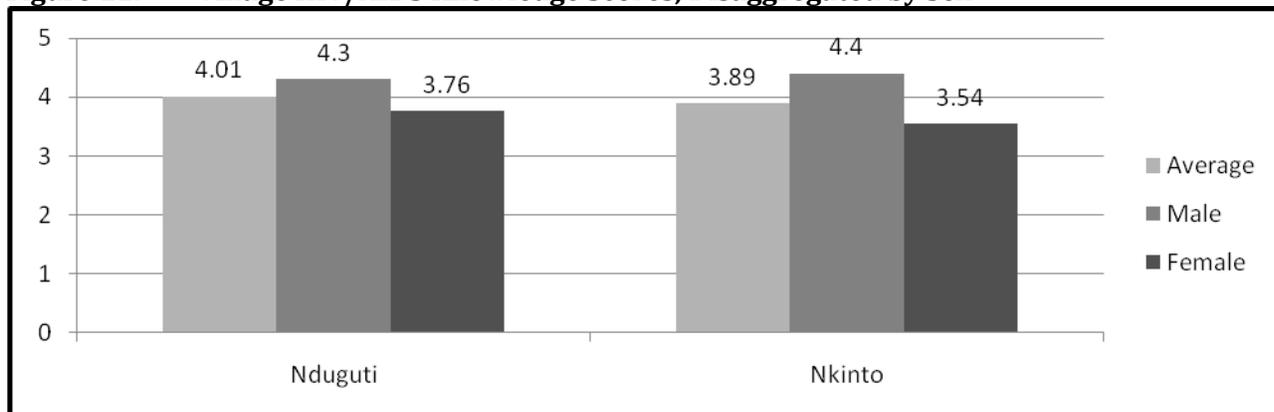
	Sample size		
	Male (%)	Female (%)	Total
Nduguti	56 (46%)	66 (54%)	122
Nkinto	43 (41%)	61 (59%)	104

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.

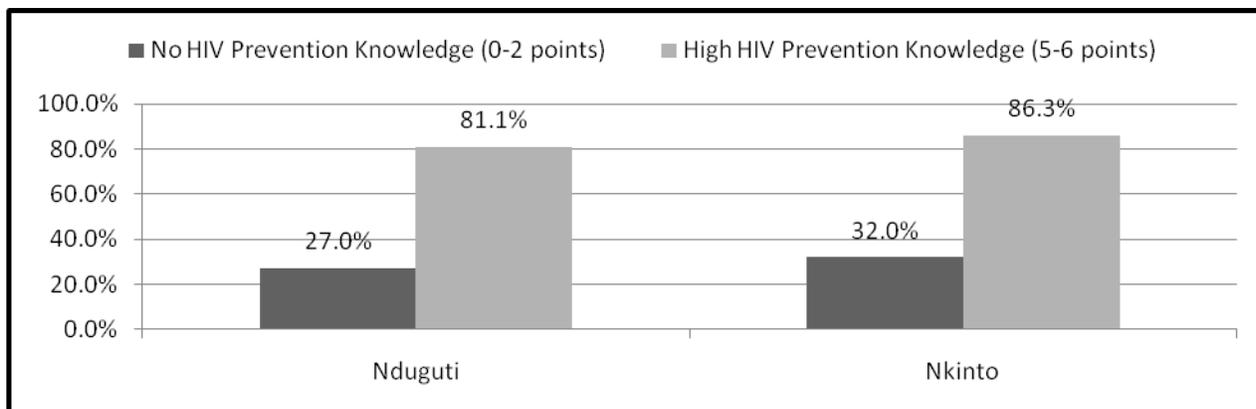
Figure 11. Village HIV/AIDS Knowledge Scores, Disaggregated by Sex



Nduguti has a slightly higher average HIV/AIDS knowledge score (average 4.0) than Nkinto (3.9) although this difference is not statistically significant. The men's score is very close in both Nduguti (4.3) and in the slightly higher ranked Nkinto (4.4). The greater variance is among the women's knowledge scores. In Nduguti, women's scores are higher (3.8) than in Nkinto (3.5). In all villages surveyed, the women's average knowledge score is lower than the men's.

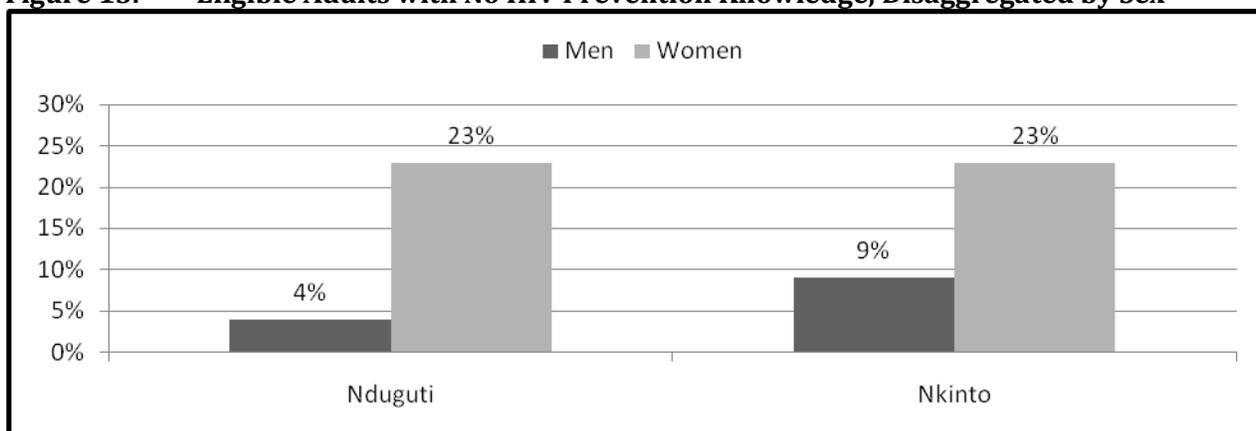
The skip pattern of the KAP questionnaire means that individuals who say they have not heard of HIV/AIDS do not answer any of the six questions, and individuals who say they do not know of any ways to prevent HIV infection do not answer the first four questions, which concern prevention. Since the responses that trigger these skip patterns imply lack of knowledge, skipped questions earn zero points. Therefore, those who say they have not heard of HIV/AIDS get a score of zero, while those who have heard of HIV/AIDS but report no knowledge of prevention measures receive a score between 0 and 2 based on their answers to questions numbers 5 and 6. As shown in Figure 12, 86.3% of eligible adults in Nkinto, which is the highest, have high knowledge of HIV and its prevention. Nduguti also has over 4 in 5 eligible adults scoring 5-6 points on the HIV knowledge assessment. The greatest percentage of adults with no HIV prevention knowledge is also in Nkinto where 3 in 10 adults (32%) know no correct method of preventing HIV.

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



As shown in Figure 13, there is a significant percentage of women in both villages with no knowledge of HIV prevention methods as compared to men in that village.

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



There appears to be a tendency among women in some villages to deny knowledge about HIV/AIDS prevention, possibly because they do not feel comfortable discussing it. It is impossible to know how much of the sex differences reported in Figures 11 and 12 result from this phenomenon versus actual lack of knowledge. Since the questions about prevention strategies are skipped if the respondent says s/he does not know if there are any ways to prevent HIV infection, such denial would artificially lower the overall knowledge scores of women.

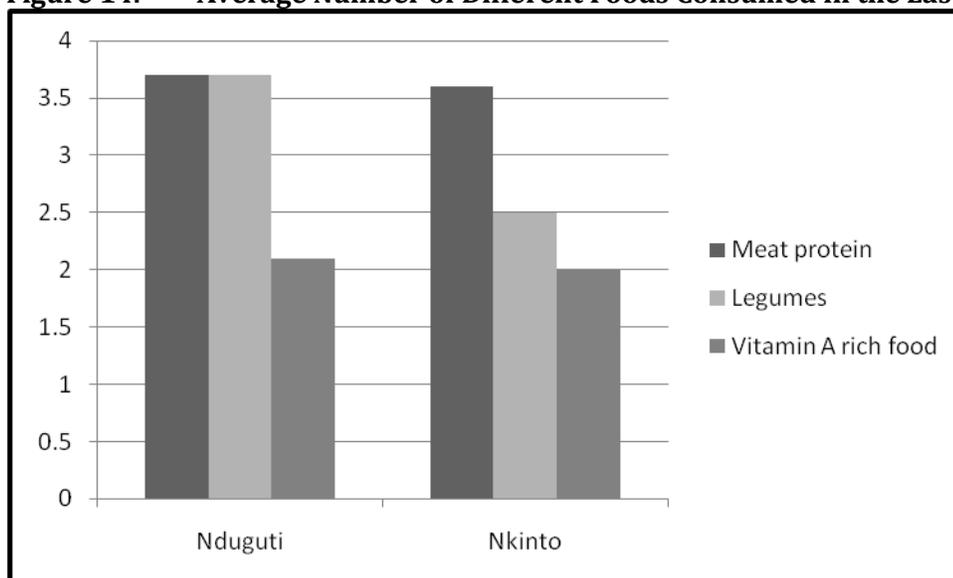
We also ask men and women if they have ever been tested for HIV. The response rates for men and women were very similar within each village. More people in Nduguti had tested for HIV, 70% of men compared to 65% of women. In Nkinto, 54% of men and 52% of women had ever been tested.

4.6 Nutrition and Food Security

4.5.6 Household Nutrition

Diversity of daily diets and consistent intake of recommended vitamins and nutrients is limited. On average, household ate a variety of 6.4 (Nkinto) to 7.2 (Nduguti) types of different foods in a week with a range from 3 to 11. In Nduguti, households eat more legumes than in Nkinto but otherwise appear to have similar diets when comparing consumption of meat protein, legumes and Vitamin A nutrient foods as shown in Figure 14.

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



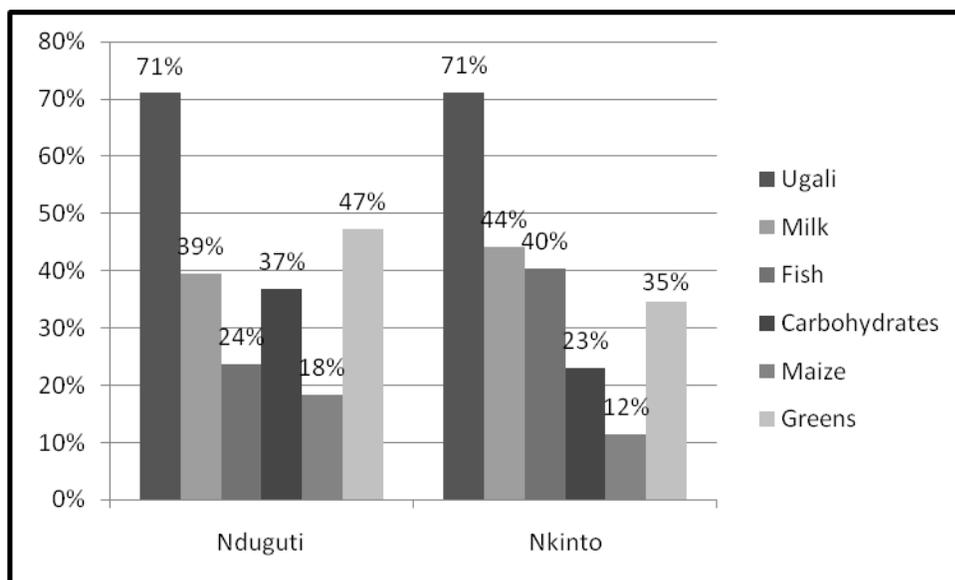
4.5.7 Infant and Young Child Feeding

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. Although the majority of babies and children were breastfed, only 30% of babies in Nduguti and 24% in Nkinto were exclusively breastfed during their first 6 months of life. Among children that had been weaned at the time of the survey, the most common age of weaning was 22-23 months.

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



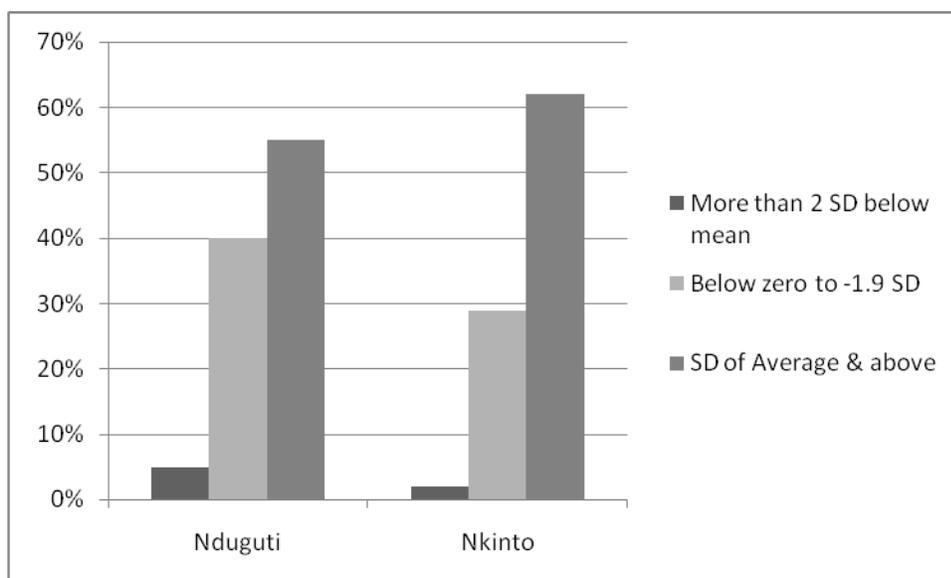
Ugali was the most commonly consumed food by children under five in the last 24 hours in both villages, at 71%. Milk and fish were the second most commonly consumed foods. Although milk and fish consumption was the highest in Nkinto, consumption of any type of meat or fruit was extremely low. Nkinto had the lowest consumption of fruit: only one child had banana and three had other fruits in the past 24 hours in Nkinto: no children had banana whole 10 had other fruits. In general, consumption patterns shown in Figure 15 indicate that children in Iramba District have limited variety in their daily diet.

Children under five are mostly likely to get protein from a non-meat source, specifically milk or fish. Similarly, greens were the most commonly eaten vegetable and the most commonly eaten fruits were not specified. According to Figure 15 then, a greater percentage of children in the two villages surveyed consumed a vegetable than a fruit in the 24 hours preceding the survey.

The weight-for-height z-score describes current nutritional status and is based on a child’s height and weight compared to international averages established by the World Health Organization (WHO). Children whose Z-scores are below two standard deviations (-2 SD) from the norm are considered moderately underweight, and those below three standard deviations (-3 SD) are considered severely underweight. According to the data collected in the survey of children under-five (see Figure 15), nearly 1 in 19 children under five in Nkinto are moderately underweight compared to 1 in 52 in Nkinto. No severely underweight children were identified. On average,

Nduguti had significantly more children under five who were borderline underweight, 40% compared to 29% in Nkinto.

Figure 16. Percent Children Under-5 Malnourished



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. Of the two villages surveyed in Iramba District, households in Nduguti were the most food secure with a mean index score of 3.0 compared to 3.8 in Nkinto.

Consistent with this finding, one can see in Table 8 that households in Nkinto worried about food more often than those in Nduguti.

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
Nduguti	39%	72%	3%
Nkinto	67%	85%	7%

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. Very few households surveyed had received training on kitchen gardens, only one person in Nkinto and 8 individuals in Nduguti. This correlates to a low number of households from our sample currently growing a kitchen garden: 15 in Nduguti and 2 in Nkinto. The fact that there are more kitchen gardens in Nduguti is consistent with the greater food security experienced there in comparison to Nkinto.

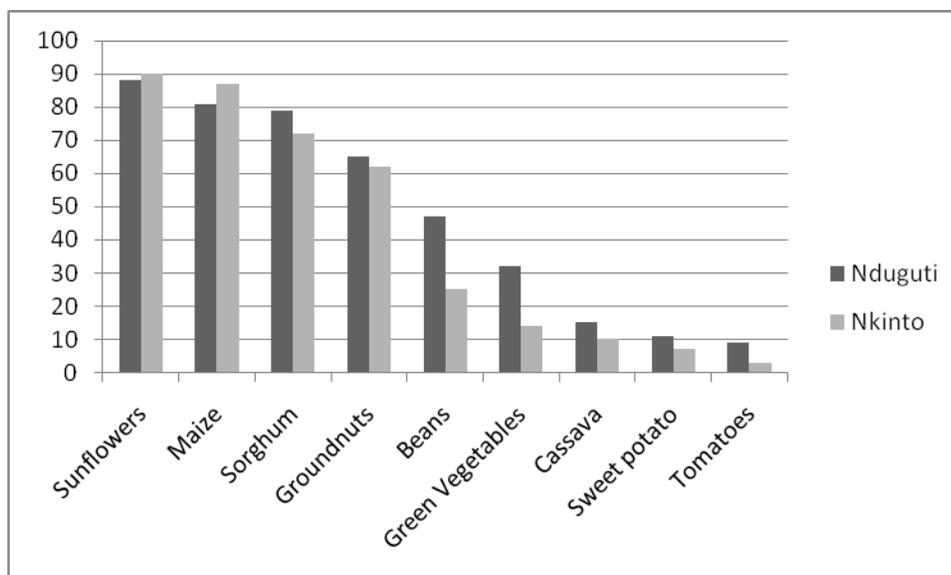
4.7 Agriculture

Farmers in Iramba District are predominantly small-scale, subsistence farmers with a portion going towards cash crop production. Nearly 50% of farmers in both villages cultivate 1 to 5 acres of land and another 30% cultivate 5 to 10 acres. The average land under cultivation per household is a little over 5 acres in each village. Nduguti farmers own slightly more land than Nkinto, 93% to 88%; but Nkinto farmers rent more land: 37% compared to 28%. According to villagers participating in an agricultural focus group, 70% of households own land without title in Nduguti and 100% in Nkinto.

Most households grow a diversity of crops with nearly equal proportions between the two villages as shown in Figure 17. Sunflowers are grown by nearly 90% of farmers followed by maize (80-87%), sorghum (72-79%) and groundnuts (62-65%). In Nduguti, nearly twice as many households grow beans and green vegetables as compared to Nkinto. Fewer than 5 households in the sample in each village were growing any kind of fruit (e.g., banana, mango, papaya) although guava is grown more commonly but it was not included in the survey.

Although similar crops are grown and sold among the surveyed villages, there are large variations in the prices of certain crops. For example, a sack of groundnuts sold for 10,000 TSH in Nduguti compared to 40,000 TSH in Nkinto. A potential cause of the discrepancy, Nduguti reports the nearest market is a 5 kilometer distance and 20% proportion of crops left over from harvest. However, with weekly market access, Nkinto reports only 2% left over in crops.

Figure 17. Percent Households Cultivating Various Crops by Village



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	
Nduguti	None	None	80%	Very serious
Nkinto	None	None	20%	Somewhat serious

Farmers in both communities indicated that they used intercropping and terracing to control for erosion. Both villages expressed disappointment that they had had no visits from agricultural extension workers in the previous year. They reported no access to inorganic fertilizers, herbicides or pesticides and expressed the need for new seeds.

4.8 Livestock

Overall, households in Nduguti own more livestock (e.g., cows, goats and chickens) than households in Nkinto. Farmers in Nduguti own nearly a third more cattle and chickens and almost twice as many goats and sheep.

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

	Cattle	Goats/sheep	Chickens
Nduguti	3.4	6.4	5.7
Nkinto	2.2	3.6	4.8

In the agricultural focus groups, farmers in Nduguti indicated that 80% of cows had been vaccinated but none of their goats; villagers in Nkinto explained no cows or goats had been vaccinated in the past year in part due to the lack of a visit from a government extension worker. Nduguti also had the advantage of a community animal health worker in the village. Despite the low vaccination rates, there were few animals lost to disease or drought; only 5.4% of cattle in Nkinto and 1.5% in Nduguti were said to have died due to disease.

On the other hand, both villages experienced a relatively high loss of chickens to disease. Nkinto lost nearly half their chicken population (45%) and Nduguti farmers lost 37% to disease.

Newcastle Disease is the number one cause of chicken mortality in Tanzania yet despite this, only 13% of Nduguti and 8% of Nkinto chicken-owning households vaccinated against this disease.

5 CONCLUSIONS

5.1 Recommendations

Both villages share many commonalities in their profiles although overall Nduguti has greater resources both socially and economically. As district and village leaders review these results, it would be meaningful for them to consider how best to increase access to government services in villages such as Nkinto as well as encourage wider participation by relevant NGOs. 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 and widespread latrine ownership. Both villages should be encouraged to strive for 100% coverage in each of these areas.
- Significant infrastructure support is needed for schools and clinics in order to improve the quality of services they are able to deliver. .
- Reducing health outcomes and food security in both villages is the limited access to protected drinking water for most villagers; this should be a primary target for improved quality of life for all villagers.
- Women’s education rates are particularly low and this in turn may be affecting the lower nutrition intake and cases of malnutrition identified in the villages. Increasing women’s literacy skills and in particular, their knowledge of nutrition, water quality, and HIV/AIDS could improve health outcomes for the whole family.
- There is a need to expand access to agricultural services, the coverage of extension workers to rural villages and access to vaccinations for livestock. In addition, community level training on the value of kitchen gardens and Newcastle disease vaccinations could also significantly improve food security.

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

		Iramba District	
		Nduguti	Nkinto
THE HOUSEHOLD AND HOUSING			
	Number of households surveyed	75	60
	Average household size	5.0	6.5
	% households in polygamous marriage (more than 1 wife)	9.3%	8.3%
	% of households headed by women	15.8%	6.8%
	% of households with corrugated roof	41.3%	56.7%
	% of households using a toilet	95%	98%
	Avg time (minutes) required to collect water	23	39
	% households use firewood as primary energy source for cooking	95%	100%
EDUCATION			
	% of all adults without education	21.1%	10.9%
	% of household heads completed primary school	54%	56%
	% of adult men completed primary school	63%	75%
	% of adult women completed primary school	65%	76%
	Average primary school teacher to student ratio	1:91	1:83
	Average primary school textbook to student ratio	1:2	1:3
	Average secondary school teacher to student ratio	1:41	1:80
	Average # of years teachers stay at primary school	3	15
	Average # of years teachers stay at secondary school	3	3
	Ratio of female to male gross enrollment rates (primary school)	.92	.98
	Ratio of female to male gross enrollment rates (secondary school)	.74	.43
HEALTH			
	% of households with at least one mosquito net	78.7%	86.7%
	% of households with access to protected drinking water	46.7%	38.3%
	% of households that take measures to make the water safe	81.3%	48.3%
	# of hospital/dispensary/clinic in the village	1	1
CHILDREN UNDER 5			
	% of infants exclusively breast fed through 6 months of age	30%	24%
	Average age in months at introduction of complementary feeding	4.7	4.9
	% of children whose birth mother is still alive and inside the household	97.4%	94.2%
	% of children moderately to severely underweight	5%	2%
	% of children who are vaccinated for BCG	97.4%	100%
	% of children who are vaccinated for polio	100%	98.1%
	% of children who are vaccinated for DPT	100%	98.1%
	% of children who are vaccinated for measles	76.3%	80.8%
	% of children received Vitamin A supplement	73.7%	82.7%
	% children with fever in past 3 months	71%	65.4%
AIDS KNOWLEDGE			
	% of men with high AIDS knowledge score (5-6 points)	77.8%	84.4%
	% of women with high AIDS knowledge score (5-6 points)	87.5%	85%
	% of women who know that a person can protect themselves from HIV	94.4%	92.2%
	% of men who know that a person can protect themselves from HIV	98.2%	97.5%
	% of men who have talked with their wife/primary partner about ways to prevent AIDS	72.3%	73%

	% of women who have talked with their husband/primary partner about ways to prevent HIV/ AIDS	78%	51%
FOOD SECURITY AND NUTRITION			
	% of households worried about food in the past 4 weeks	39.2%	66.7%
	% of households ate limited variety of food in the past 4 weeks	71.6%	85%
	% of hhs went one day and night with no food in the past 4 weeks	2.7%	6.7%
	% of households that are currently growing kitchen garden	20.3%	3.3%
	Avg # of days/times hhs ate meat protein in past week	3.7	3.6
	Avg # of days/times hhs ate legumes in past week	3.7	2.5
	Avg # of days/times in last week hh ate foods with Vitamin A	2.1	2
	# of different types of food eaten in last week	7.2	6.4
	Food Security Index (Scale of 1 to 9; 1 is greater food security)	3.0	3.8
ECONOMIC ACTIVITY, AGRICULTURE AND INCOME			
	% households own any agricultural land	93.3%	88.3%
	Average acres cultivated per household	5.5	5.1
	Average # of cattle owned per household	3.4	2.2
	Average # of goats/sheep owned per household	6.4	3.6
	Average # of chickens owned per household	4.8	5.0
	% of hhs whose chicken are vaccinated for Newcastle disease	9.3%	8.3%
	% of cattle lost to disease in the past 12 months	1.5%	5.4%
	% of cattle lost to drought in the past 12 months	0.8%	0.5%
	% of cattle lost to wildlife in the past 12 months	2.5%	1.1%
	% of chickens lost to disease in the past 12 months	37%	45%
	% of chickens lost to drought in the past 12 months	0%	0%
	% of chickens lost to wildlife in the past 12 months	7.1%	5.5%
	% of goats/sheep lost to disease in the past 12 months	7.3%	15.5%
	% of goats/sheep lost to drought in the past 12 months	0.5%	3.8%
	% of goats/sheep lost to wildlife in the past 12 months	1.2%	8.8%
	% of household heads with the main occupation of farming	94.7%	93.2%
	% households with bicycle	48%	56.7%
	% households with radio	64%	48.3%
	% households with cell phone	28%	16.7%
KEY INSTITUTIONS			
	Distance to major weekly market	5 km	1-3 km
	# of village committees/groups	6	8
	# of NGOs	5	4
	# of credit, banking services or VICOBA	1	0
DEMOGRAPHICS			
	Religion (% Christian; % Muslim; % Traditional)	68%; 16%; 0%	88.3%; 3.3%; 3.3%
	Dependency Ratio (# of child (0-14 years) and aged (65+) population per 100 intermediate age (15-64 years)	1.0	1.2
	Child-Woman Ratio (# of children aged 0-4 years per 1,000 women in the age group 15-44 years)	.71	.79
	Sex Ratio (# of males per 100 females)	1.1	1.1