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The Roads to a Healthy Future (ROADS II) Project

Report

**Assessment of the Nutrition and Food Security
Situation in Rusizi District, Rwanda**

Report compiled by
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ABBREVIATIONS AND ACRONYMS

ARI	Acute Respiratory Infection
CI	Confidence Interval
ENA	Emergency Nutrition Assessment
FDS	Food Diversity Score
FGD	Focus Group Discussion
GAM	Global Acute Malnutrition
GCM	Global Chronic Malnutrition
GUM	Global Underweight Malnutrition
HAZ	Height-for-age z-core
ITN	Insecticide Treated Net
MOH	Ministry of Health
MUAC	Mid Upper Arm Circumference
OPV	Oral Polio Vaccine
PHSC	Protection of Human Subjects Committee
PPS	Proportion to Population Size
RDHS	Rwanda Demographic Health Survey
RNEC	Rwanda National Ethics Committee
SAM	Severe Acute Malnutrition
SCM	Severe Chronic Malnutrition
SD	Standard Deviation
SFP	Supplementary Feeding Programme
SMART	Standardized Monitoring and Assessment of Relief & Transition
SPSS	Statistical Package for Social Sciences
SUM	Severe Underweight Malnutrition
USAID/EA	Unites States Agency for International Development/East Africa
WAZ	Weight-for- age z-score
WHZ	Weight-for-height z-scores

EXECUTIVE SUMMARY

INTRODUCTION

With support from USAID/East Africa and bilateral missions, ROADS II has been extending HIV/AIDS and related programming in transport corridor hotspots since 2005. ROADS II uses a cluster community-organizing model that works through community networks. ROADS II will harness these structures to initiate nutrition programming in the program sites in Rusizi district. This will position the nutrition component as part of a comprehensive effort to address broader health and development challenges in the community, in addition to HIV, gender-based violence, alcohol abuse and economic disparity, already being addressed through cluster structures. The nutrition program will complement the current ROADS II economic livelihoods component, which presents a multi-tiered behavior change and technical assistance program for empowering ROADS II beneficiaries to establish a foundation of economic resilience. As a starting point, ROADS II conducted a nutrition and food security assessment to inform program design and benchmark nutritional status of vulnerable groups in the district and at ROADS II programme sites in Rusizi district.

METHODOLOGY AND SURVEY AREAS

The overall purpose of the survey was to determine the nutritional status and underlying causes of malnutrition in the district with a view to recommending appropriate interventions that will inform programming. The target population for the anthropometric survey was children aged 6 – 59 months who are considered the most sensitive to nutritional stress. The two stage sampling methodology was used to randomly identify survey households and clusters for the survey. The probability of any cell being selected for the survey was proportional to the population size.

The survey was conducted by a team of 36 led by a nutrition consultant from the School of Public Health - University of Nairobi, Kenya. The household survey was carried out in 40 clusters/cells spread over the entire district. Three sets of structured questionnaires uploaded in PDAs were used in collection of information from households in the sampled clusters. A total of 822 children were from 614 households were covered in the survey. A combination of quantitative and systematic qualitative research methods were utilized including administration of pretested questionnaires, anthropometric measurements, focus group discussions and in-depth interviews with selected key informants. A total of 10 focus group discussions were held with caregivers as follows: Four (4) FGDs with mothers of children aged 0 – 2 years Ethical approval for the study was obtained from FHI360 Protection of Human Subject Committee and the Rwanda National Ethics Committee. The research team was trained for 4 days and survey tools pretested prior to implementation of the survey.

KEY FINDINGS

Malnutrition among children: The prevalence of Global Acute Malnutrition (GAM) among all children was 1.7 % (1.0 - 2.8 95% C.I.). The sub-sample that coincides approximately with the weaning period in a child's life cycle (6-29months) had a higher burden of wasting (GAM - 4.9%) compared to children 30 – 59 months. The prevalence of underweight among the children was 15.4 % (13.0 - 18.1 95% C.I.) while 4.1 % (2.9 – 5.7 95% C.I.) were severely underweight. The prevalence of underweight was found to increase with age with the highest prevalence noted in children aged 54-59 months. The overall global chronic malnutrition (GCM) rate was 45.3% (41.8 – 48.9 95% C.I.) and a severe chronic malnutrition (SCM) rate of 16.1 % (13.7 – 18.9 95% C.I.). The highest prevalence in global stunting (56.6%) was found in children 18-29 months followed by those aged 54-59 months with a prevalence of (52.8%). Children 6-17 months had the lowest level of stunting (28.6%).

Morbidity and Vitamin A supplementation

Overall, Vitamin A supplementation for children 6-59 months during the preceding year was low in the district at 59%. Among those who were reported to have received Vitamin A supplementation, a sizeable proportion (39.3% and 29%) of children 6-11 and 12 – 17 months respectively had received only one dose. There was a high prevalence of morbidity since close to half (48.2%) of the under-five child population was reported to have had an episode of illness two weeks prior to the survey. The most prevalent illnesses were diarrhoea 13.8 % of the children followed by malaria (13.2%), ARI (12.9%) and others (8.3%).

Infant and young child feeding practices

Initiation of breastfeeding within the recommended time after birth was good at 81%. However, only 49 % of infants were breastfed exclusively for the recommended period of 6 months. Frequency of feeding among young children was low, with half (50 %) of children 6 – 24 months receiving only two feeds per day. Diets of young children were of poor quality and lacked variety. The dietary diversity score for study children based on a 24-hour recall was a low 3.4 indicating limitation in the diversity of nutrients supplied by the meals consumed. Least consumed category of foods were meat, eggs, milk/milk products and vitamin A rich plant vegetables.

Household Food Consumption and Dietary Diversity

The previous 24-hours' food intake by mothers was used as a proxy to assess household dietary diversity. Slightly more than half (51%) of the caretakers consumed less than four food groups in the previous 24 hours (below the threshold for a diverse diet). However, based on the FAO classification, 42% and 7% of households had medium and high diet diversity scores respectively. The main source of food consumed at household level were purchases (59.3%) and own production (37.8%).

CONCLUSION

The current food and nutrition situation of households in Rusizi district as determined through this survey is very precarious as it is characterised by high prevalence of stunting and underweight among children under five years. Findings of this survey reveal that the key underlying causes of malnutrition among children in Rusizi district are; household food insecurity, poor infant and young child feeding practices, low rates of exclusive breastfeeding, feeding frequency and dietary diversity; high incidence of diseases, low access to essential nutrition services such as supplementation with vitamin A and de-worming; poor hygiene and lack of adequate and safe drinking water.

RECOMMENDATIONS

- ❑ The district needs to put in place a comprehensive strategy and plan to reduce malnutrition with specific interventions and actors. Establishment of a district multi-sectoral forum for elimination of malnutrition in line with the national goals would be a good starting point for this.
- ❑ Establishment of a community based nutrition program which has already been pilot tested in the district would enable the government and development partners to address the challenge of malnutrition in the district meaningfully. Interventions such as food security, outreach immunization, nutrition and health education on hygiene, water and sanitation, livestock promotion and bio-intensive agricultural techniques such as orange flesh sweet potatoes should be integrated into the CBNP.
- ❑ An integrated package comprising of high impact nutrition interventions and focusing on the vulnerable period from pregnancy to the age of two years should be implemented through the community based nutrition program and health facilities. Particular attention should go be given to promotion of exclusive breastfeeding, feeding a variety of foods frequently to young children while observing hygiene, micronutrient supplementation and improved maternal nutrition.
- ❑ The ROADS II cluster organizing approach which has led to behaviour change with other initiatives in the district could be used to organize peer-led mother-to-mother support groups and to cluster existing groups. These would provide a forum to dialogue on local causes of malnutrition and how these can be overcome, and also to reinforce key messages on nutrition and childcare.
- ❑ Strengthen programmes and strategies currently addressing infant and young child nutrition with a view to improving the protection, promotion, and support of optimal infant and young child feeding practices. This could be addressed through training of community based volunteers to counsel and provide on-going support to caregivers. Mothers should be trained in preparation of nutritious foods for infants and young children using what is locally available.

- ❑ Given the high prevalence of malnutrition in the district, regular screening should be carried out at community level and malnourished children identified for focused follow-up and supplementary feeding. Community based volunteers should be trained to conduct growth monitoring and to make referrals of malnourished children for follow-up at local health facilities.
- ❑ Behaviour change communication messages targeting mothers and caregivers should address key barriers to appropriate feeding practices identified through this survey such as giving of pre-lacteal feeds, early introduction of supplementary foods, low frequency of feeding and variety of foods fed to young children.
- ❑ Delivery of key nutrition messages above could use the following channels: community-based promotion through CHWs, peer-led mother support groups, community groups/meetings and religious forum and through the ROADS II community organizing structure (the cluster model). Facility-based promotion would include- delivery of context and culturally specific IYCN messages.
- ❑ Promotion of hygiene practices to reduce the incidence of diarrhoeal disease associated with contaminated water in the household. This could include awareness to the community on domestic treatment of drinking water and effective hand washing (using soap) after using the latrine, during food preparation and before child feeding. This should be backed-up with provision of free water treatment chemicals where feasible.

Medium/Long-Term Interventions

- ❑ Focus on programmes by relevant actors that improve and sustain dietary diversity and consumption of micronutrient-rich foods. This would address improved complementary food access for children six months to two years.
- ❑ Underlying cultural factors and beliefs hindering uptake of recommended feeding behaviors identified through this study will need to be addressed. Engaging influential household members such as grandmothers and fathers is strongly recommended.
- ❑ Improving coverage for child health programmes, especially for Vitamin A supplementation and de-worming. This is feasible through strengthening of the outreach component, ensuring that these are distributed concurrently during vaccination campaigns.
- ❑ Promoting increased uptake of family planning in the district as this contributes to malnutrition because many families can't afford to properly feed the large number of children. A key role that fathers could take to improve nutrition of young children is taking the lead in family planning.

- ❑ As a long-term measure, developing the economic capacity of the community to be able to meet household food needs is critical. This will enhance household food security.
- ❑ Strengthen interventions for high impact nutrition interventions, including maternal micronutrient supplementation during pregnancy (iron and folate), and critical hygiene and sanitation practices and messages.
- ❑ Establish regular nutrition surveillance in the district through nutrition surveys.
- ❑ Improved farming and animal breeding techniques, as well as fighting soil erosion so as to improve food production and household food security will be critical to reduction of malnutrition in the district.
- ❑ The government needs to increase the technical and financial capacity of the district to be able to deal with malnutrition. The one cow for each poor family project should be scaled up.

1.0 INTRODUCTION

1.1 Background Information

Rwanda is a landlocked mountainous country located in the Great Lakes region, with a surface area of 26,338 km². According to the National Institute of Statistics (Rwanda National Institute of Statistics, 2009), Rwanda population is projected to be 10,412,820 with an annual growth rate of about 2.8 %. The population density is one of the highest in Africa, at approximately 395 inhabitants per km². The country has a high birth rate, at 43 per 1000 in 2010. With an annual per capita income of US\$ 531, Rwanda is one of the poorest countries in the world but with a rapid GDP growth of over 10% in the last 2 years. The GNP is around 1.8 billion US dollars. Agriculture is the country's main source of foreign currency and the principal means of subsistence for the population. The Government of Rwanda in its National Nutrition Policy (GOR, 2007) recognizes that adequate food and nutrition are a universal right and are essential for the physical, mental and emotional development of children as well as the quality of life for adults.

1.2 Nutrition situation in Rwanda

The nutritional situation in Rwanda remains poor. For the last two decades, under nutrition remains a significant public health problem contributing to high infant, child and maternal mortality. According to the Rwanda Demographic and Health Surveys (RDHS 2005 and 2010), rates of malnutrition remain high in Rwanda though some improvement has been realized. Between the two surveys, prevalence of stunting reduced (51% to 44%), underweight (18% to 11%) and wasting (5% to 3%). According to the RDHS 2010, anaemia, which is a common manifestation of iron deficiency, affects 38% of children under five years in Rwanda and is most pronounced in children from six to 23 months of age. In addition, anaemia affects 17.3% of all women of reproductive age. Anaemia is an important cause of maternal mortality, low-birth weight, and reduced attention and cognitive development in children. This situation can partly be explained by the consumption of a diet based mainly on cereals and tubers that is a poor source of iron or only includes iron with low bioavailability.

The government of Rwanda has shown a firm commitment to the elimination of malnutrition among the most vulnerable population groups in the country including children under five, pregnant and lactating women and people living with HIV/AIDs⁽⁵⁾. The country position is in tandem with global and regional efforts to address malnutrition. The government of Rwanda recognizes that the problem of malnutrition is not a health sector problem but a multi - sectoral challenge that requires all sectors to work together in synergy to deliver efficient, safe and nutritious food and essential health and sanitation packages to the most vulnerable groups. Consequently, the country in 2010 developed a national Multisectoral Strategy to Eliminate Malnutrition (GOR, 2010) which is implemented by several sectors including health, agriculture, education, local government, infrastructure and commerce. The national strategy

contains eight strategic interventions and an initial three year action plan of implementation (2010-2013) which will guide the government and its partners. An important intervention is development of district action plans which will ensure that each district has a well elaborated Multisectoral Plan to Eliminate Malnutrition that is informed by the national strategy and local food and nutrition situation. The district nutrition plan will be integrated in the overall district plan to ensure that malnutrition is addressed alongside other sectoral challenges.

1.3 ROADS II Nutrition Program in Rwanda

With support from USAID/East Africa and bilateral missions, ROADS II has been extending HIV/AIDS and related programming in transport corridor hotspots since 2005. Programming has focused on most-at-risk populations in Rwanda. ROADS II uses a cluster community-organizing model that works through community networks. Through this model, ROADS II has helped to mobilize a vast array of local groups - formal and informal, for-profit and not-for-profit, governmental and nongovernmental, to lead programming from initial needs assessments to program planning to collaborative implementation. This promotes joint cooperative action of like-minded groups to address local needs, increases coverage and ensures participation of grassroots groups that otherwise would generally not be involved in community health programming. ROADS II will harness these structures to initiate nutrition programming in the program sites in Rusizi district. This will position the nutrition component as part of a comprehensive effort to address broader health and development challenges in the community, in addition to HIV, gender-based violence, alcohol abuse and economic disparity, already being addressed through cluster structures. ROADS II will build on work already conducted in Rwanda working with PLHIV, OVC and their caregivers. The nutrition program will complement the current ROADS II economic livelihoods component, which presents a multi-tiered behavior change and technical assistance program for empowering ROADS II beneficiaries to establish a foundation of economic resilience. As a starting point, ROADS II conducted a nutrition and food security assessment to inform program design and benchmark nutritional status of vulnerable groups in the district and at programme ROADS II sites in Rusizi.

1.4 Rationale for the survey

There is ample scientific evidence which shows the impact of under nutrition on infant and child mortality. This evidence also shows largely irreversible, long-term negative effects of under-nutrition on health, cognitive development and normal growth. Recently, convincing evidence has been drawn together to show that a set of proven and available interventions can solve these problems, and save millions of lives (Lancet, 2008). Several of these nutrition interventions focus on the period from pregnancy to two years old because this is a “window of opportunity,” where effective nutrition interventions have a high impact in reducing death and disease and avoiding

irreversible harm to health and cognitive development. Recent economic studies, found that such interventions are highly cost-effective, with major returns to individual intellectual development, earnings and national economic growth (World bank, 2006). This has led to renewed global commitment by the United Nations and development agencies to fight malnutrition

In 2006, the World Bank called on all developing nations to reposition child nutrition toward the centre of economic and social development (Shekar M, 2005; Bezanson K 2010). A new global policy brief “Scaling up Nutrition: A Framework for Action” (Revised African Regional Nutrition Strategy ,2010) was released in February 2010 by the World Bank and a wide range of bilateral donors, UN organizations, major foundations and technical groups and civil society organizations working on nutrition and agricultural reform. The brief calls for major increases of investment in nutrition, noting that under-nutrition among children can be eliminated at a cost of approximately US\$ 10+ billion per year. This is led to emergence of the Global Health Initiative (GHI) which aims to reduce malnutrition in children under 5 by 30 percent in food-insecure countries. The Feed the Future Initiative (investment area # 4) focuses on reducing malnutrition through improved diet quality and diversity and improved delivery of nutrition services by health systems linked to community-based programs. Further, the Africa Regional Nutrition Strategy (ARNS) 2005-2015 recognizes that “sustainable food and nutrition security at national and household levels is a pre-requisite for effective implementation of any policy on socio-economic development.” (Prudhon C. 2002). The Rwanda governments strategy of eliminating malnutrition by (among other strategies) supporting development of district nutrition plans informed by findings local nutritional surveys is in tandem with these regional nutrition priorities.

Further, design of the ROADS II nutrition interventions to be implemented in a selected SafeStop community in Risizi district needs to be informed by a comprehensive assessment of the food and nutritional situation of vulnerable groups in the district and at programme sites. This is a critical first step to inform planning and implementation of relevant interventions. Mapping of related interventions and partners in the district will facilitate identification of potential areas of synergy in addressing the challenge of malnutrition, and provide information on the programming context. Using a mix of methods allowed identification of feasible community level nutrition interventions that can address causes of malnutrition identified through consultations with community members, leaders, government officers and other carefully selected stakeholders in the target areas. A review of relevant documents helped identify policies and strategies that will contribute to programmatic efforts to eliminate malnutrition in Rusizi district.

1.5 Survey objectives

The overall purpose of the survey was to determine the nutritional status and underlying causes of malnutrition in the district with a view to recommending appropriate interventions that will inform programming. Findings of the survey will provide baseline information for the ROADS II nutrition program in Rusizi.

The following objectives guided implementation of the survey:

- ❑ To determine the prevalence of acute and chronic malnutrition among children aged 6 to 59 months in the district.
- ❑ To generate qualitative information on the likely causes of under nutrition and barriers to optimal child health and nutrition practices in the district.
- ❑ To assess community awareness of malnutrition
- ❑ To estimate the prevalence of common childhood diseases (measles, diarrhea, malaria, and Acute respiratory infections among children 6-59 months.
- ❑ To establish coverage of key health services, including vitamin A supplementation, de-worming and immunization status.
- ❑ To assess infant and young child feeding practices
- ❑ To describe the current household food security situation in Rusizi
- ❑ To describe the situation of water and sanitation in the district
- ❑ To identify best practice nutritional programming including Government of Rwanda /NGO community and facility-based interventions.
- ❑ To provide recommendations to ROADS II for future community-based nutrition programming, including preventive and treatment approaches.

2.0 SURVEY METHODOLOGY

The survey was undertaken using a participatory process by a team comprising of an external lead consultant, FHI360/ROADS II programme staff, field supervisors and trained field data collection teams (Appendix 1). A mix of quantitative and qualitative methods was utilized in data collection. The household survey was used to assess nutritional status, prevalence of common childhood diseases, infant and young child feeding practices and household food security. Three questionnaires were used for the survey: A household questionnaire, a child's (6-59 months) questionnaire and an infant feeding questionnaire. Anthropometric measurements of weight and height were taken for all children 6 – 59 months in sampled households. Qualitative methods including focus group discussions and in-depth key informant interviews with selected individuals provided information on the underlying causal factors for these conditions and practices.

2.1 Survey design and sampling

Sample size determination

The target population for the anthropometric survey was children aged 6 – 59 months who are considered the most sensitive to nutritional stress. The two stage sampling methodology was used to randomly identify survey households and clusters for the survey. The probability of any cell being selected for the survey was proportional to the population size.

To obtain the required sample size for anthropometry, the following parameters were used:

- Desired precision - 5 %
- Malnutrition levels - 20 %
- Desired design effect - 2
- % of under-fives – 16.2
- Estimated number of <5's/household – 1.2
- % of non response households – 5 %

The EPI/ENA software was used to automatically compute the sample size based on these parameters yielding a sample size of 764 children. This was increased by 5% to cater for non response, giving 802 children.

Cluster and household selection

The survey employed a two-stage cluster sampling methodology with probability proportional to size (PPS) design for selection of the study areas and subjects. Stage one identified the number of clusters (cells) per sector while stage two identified the villages and households for the actual data collection within each sampled cluster/cell (Appendix 2).

Stage one: Selection of survey clusters

The cell was used as the cluster since it was the smallest geographical unit with a known population in the district. The clusters sampled were selected using probability proportional to size (PPS). All the cells along with their respective populations and proportion of children under five years (estimated at 16.2% of the total population) were entered into the ENA software which automatically selected the clusters (cells) with a number assigned to each sampled cluster/Cell. The survey covered a total of 40 clusters/Cells in the entire district. All villages within each sampled cell were listed and one village was randomly selected.

Stage two - Selection of villages and survey households within clusters

Sampling of households was undertaken from the approximate centre of each sampled village. To commence sampling of households in a given village, the survey teams with the assistance of a local leader moved to the centre of the sampled cluster. A random direction was selected by spinning a pen. The team then moved in the selected direction listing all the households until they reached the edge of the village. The first household to be sampled was then randomly chosen from the listed households. Every subsequent nearest household was visited until at least 20 (6 – 59 months old) children had been assessed. In households where there was no eligible child, only household information was collected. A household was defined as people living together and sharing food from the same pot. To qualify as a household member, one had to have lived in the household for at least three months preceding the survey.

In polygamous families with several structures within the same compound, but with different wives having their own cooking pots, the structures were considered as separate households and assessed separately. In cases where there was no eligible child, a household was still considered part of the sample and household data was collected. If a respondent was absent during the time of household visit, the teams left a message and re-visited later to collect data for the missing person, with no substitution of households allowed. If the chosen direction did not yield the required number of households, the same process was repeated and a different direction chosen. This resulted in a total of 822 children sampled in 614 households in the district.

2.2 Training of the survey team

The enumerators were all conversant with the local language and had prior experience in conducting field surveys. The survey team was trained intensively for 4 days. A participatory, adult centered training approach was used throughout the training. The training provided theoretical background for the enumerators, measurers, team leaders and supervisors. The training included the following aspects:

- ❑ Objectives of the survey
- ❑ Definitions of nutrition and malnutrition
- ❑ Causes of malnutrition
- ❑ Indicators of malnutrition
- ❑ Anthropometric measurement techniques/equipment standardization
- ❑ Reading and recording of anthropometric measurements
- ❑ Development of calendar of events
- ❑ Administration of household questionnaire
- ❑ Obtaining consent and ethics in field data collection
- ❑ Survey methodology
- ❑ Fieldwork procedures and cluster mapping
- ❑ Field pre-testing
- ❑ Use of PDAs in data collection
- ❑ Completing data collection log

Practical training in taking of measurements and administration of the questionnaire was done both during the training and pretesting of survey tools. Discussion of the protocol for taking anthropometrical measurements as well as demonstrations on the actual procedures was done in class using two volunteer mother-child pairs. Further, to build the skills of the enumerators and supervisors in taking of anthropometric measurements, a practical session on weighing and measuring children and women was conducted at 3 busy clinics. Each team of enumerators took weight, height and MUAC measurements of children and measured Mid Upper Arm Circumference (MUAC) of the child's mother for at least two mother-child pairs. A calendar of events was developed and the research team showed how to use it to quickly determine whether a child was eligible for the study on the basis of age, that is, within the 6 – 59 months age bracket.

All team members participated in weighing and measuring children and mothers prior to the pretest and the survey.

2.3 Pre-testing tools

The theoretical training was followed up with practical field training and pre-testing of the survey questionnaires in one of the cells that had not been sampled for the actual survey. Teams under the guidance of supervisors pre-tested the questionnaires and took measurements of children and caregivers in at least two households each. Data collected was entered into PDAs. Subsequently, final adjustments were made to questionnaires in the PDAs after the pretest. Job descriptions were provided for the team leaders, supervisors and enumerators. Every member of the team was provided with a 'Surveyor's Manual' which had a summary of key issues covered during the training for quick reference during field data collection.

2.4 Data collection

2.4.1 Household Survey

Both quantitative and qualitative methods were used in information gathering. Eight (8) teams conducted the survey, each consisting of a team leader and three enumerators. All children aged 6-59 months in every household visited were included in the anthropometric survey and infants in the 0-6 month category included for assessment of infant feeding practices. Eligibility for nutritional status assessment for children was based on known child ages either using a calendar of events and available documents such as clinic cards. In all households where there was at least a child aged 6 – 59 months, the MUAC of a female caregiver (16 – 49 years) and the anthropometric measurements of the child were taken. MUAC was also used for screening for acute adult undernutrition as well as in estimating the prevalence of undernutrition at population level. All children aged between 6 and 59 months of the same household were included in the survey for anthropometric measurements.

Prior to conducting an interview, enumerators explained the purpose of the survey and sought for written consent from respondents. The respondent to the questionnaire was the main caregiver who in most cases was the mother. Those who consented were assured of confidentiality in handling of the information provided. In households with a child under five years, the enumerators explained to the mother the measurements to be taken from the index child. In a household that did not have a child aged 6 – 59 months, only household information was collected.

Three sets of structured questionnaires uploaded in PDAs were used in collection of information from households in the sampled clusters. These included Questionnaire A (household questionnaire) (Appendix 5); Questionnaire B (anthropometry and maternal nutrition) 6-59 months and caregivers (Appendix 6), and Questionnaire C (Infant and Young Child Feeding) 0-6months (Appendix 7).

The following general information was collected from all the households using the household questionnaire: Household demography; Household food consumption and coping strategies; Maternal health care; Water and sanitation and use of insecticide treated nets. In households where there was at least one child aged 6 – 59 months, weights, height/length and MUAC of the children was taken and MUAC of female caretakers aged 18 – 49 taken to assess their nutritional status. The weights of children were taken using a UNI Scale and the heights/lengths taken using height boards with an accuracy of 0.1 cm. Recumbent length was taken for children less than 24 months or those between 65 and < 85 cm while standing height was taken for children over 24 months (85 – 110cm). MUAC measurements of children were taken using an insertion tape while those of the caregivers were taken using adult MUAC tapes, all with a precision of 0.1 cm. The following information was also obtained: Child's age; MUAC measurements of the caregiver; Child's measurements of weight, height and MUAC; Child's immunization status, de-worming and vitamin A supplementation and Infant and Young Child Feeding practices.

2.4.2 Qualitative assessment

Qualitative information was gathered using key informant interviews and focus group discussions. This complemented the quantitative data and provided in-depth understanding of underlying factors and practices influencing the nutritional situation of the vulnerable groups.

Focus group discussions (FGD) were conducted with mothers, fathers and grandmothers of children 0-24 months. This provided insight on community perspectives and underlying beliefs and practices influencing prevailing maternal and infant and young child feeding practices in the district and specifically in the ROADS II project sites. The focus group discussions were moderated by trained facilitators who were fluent in the local language and conversant with the local culture. Structured guides were used in facilitation of the discussions.

A total of 10 focus group discussions were held with caregivers as follows: Four (5) FGDs with mothers of children aged 0 – 2 years to cover infant feeding and maternal nutrition issues; Three (3) FGDs with fathers of children 0-2 years and 2 FGDs with grandmothers who are known to wield considerable influence in decisions on feeding of young children at household level (Appendix 3). Each focus group comprised of 10 – 12 participants. Focus group participants were mobilized by community health workers in collaboration with community leaders using criteria provided by the consultant. The discussions were held in local meeting venues identified in consultation with the local leaders in each area.

Key informant interviews (KII) were conducted with selected persons including government officers, community leaders, health care providers and programme coordinators (Appendix 4). Secondary information was gathered through review of vital documents relating to previous food and nutrition surveys as well as national

strategic and policy documents on nutrition. This provided vital information on the nutrition policy and programming context in Rwanda.

2.5 Quality control and data analysis

The following specific steps were taken to ensure collection of good quality data:

- ❑ Thorough training of the research team on data collection tools and methods.
 - Extensive practical training of research team on procedures of taking anthropometric measurements.
 - Detailed review of the questionnaires including how to record responses.
- ❑ Each survey team was provided with a 'quick reference' field manual providing a summary of core issues covered during the training and describing procedures of sampling as well as taking anthropometric measurements of children and adults.
- ❑ Clinic cards were used to ascertain age of the child.
- ❑ A calendar of events (developed with study team during the training) was provided to enable enumerators quickly assess whether a child was eligible in on the basis of age (6 – 59 months) in cases where clinic cards were not available.
- ❑ A team leader accompanied each team of three enumerators for the whole duration of the survey.
- ❑ All teams were regularly supported by experienced supervisors who included the ROADS II nutrition technical officer, Rusizi district nutritionists and an MOH nutritionist.
- ❑ Daily review meetings were held. The consultant provided feedback to each team based on review of data collected and plausibility checks for anthropometric measurements conducted using the ENA soft ware.

2.6 Data analysis

All data was collected using PDAs and downloaded into a computer at the end of each a day. Data cleaning and harmonization of the data sets was conducted by the monitoring and evaluation officer and the consultant using Windows access and SPSS version 16. Anthropometric data was entered in excel and cleaned and analyzed using the EPIINFO/ENA software and nutrition status indicators of height for age, weight for height and weight for age computed. The distribution of the sample Z- Scores was obtained and children classified on the basis of their nutritional status. All other data

was analyzed by the consultant using the Statistical Package for Social Sciences (SPSS) version 16.

Qualitative data analysis: Content analysis of qualitative information gathered through FGD's, in-depth and key informant interviews was analyzed by elucidating key themes and illustrative examples from the focus group discussions and key informant interviews conducted. No comments were however attributed to specific individuals. Key ideas and views emerging were summarized along the main themes/issues investigated.

2.7 Ethical considerations and Consent

FHI's Protection of Human Subject Committee (PHSC) and the Rwanda National Ethics Committee reviewed and approved the protocol, survey tools and the informed consent forms prior to the survey. Participation in the study was voluntary. Informed, written consent to participate in the study was sought and obtained from potential participants prior to data collection. Enumerators explained the purpose of the study, survey procedures, duration of the interview and potential use of findings of the study. Eligible respondents were informed that the information obtained was confidential. Participants signed the consent form, while those who could not write made a thumbprint next to their name to indicate their consent. The study team was trained on the content and method of seeking consent. Field supervisors monitored the process of seeking informed consent to ensure it was implemented consistently and correctly. The supervisors also accompanied enumerators in turns during data collection to ensure that due process was followed in seeking consent from eligible participants.

3.0 RESULTS AND DISCUSSION

3.1 General characteristics of study population

A total of 614 households with an average of 5.8 persons per household (s.d 2.1) and 821 children under five years were included from the 40 clusters sampled for the survey. The under fives comprised of 429 (52.3%) girls and 391 (47.7%) boys (Table 1). Despite the fact that there were more girls than boys in the sample, the overall sex ratio was 0.9 which is within the recommended range of 0.8 – 1.2 demonstrating an unbiased sample as a whole. The age and sex distribution of the study group is shown in Table 1. A small proportion (11.3%) of the female caregivers covered aged 18 – 49 years were pregnant.

Table 1: Distribution of sampled children by age and sex

AGE (mon)	Boys		Girls		Total		Ratio
	no.	%	no.	%	no.	%	Boy:Girl
6-17	87	46.8	99	53.2	186	22.7	0.9
18-29	104	50.5	102	49.5	206	25.1	1.0
30-41	85	45.2	103	54.8	188	22.9	0.8
42-53	82	50.0	82	50.0	164	20.0	1.0
54-59	33	43.4	43	56.6	76	9.3	0.8
Total	391	47.7	429	52.3	820	100.0	0.9

3.2 Nutritional status - Anthropometric results based on WHO standards (2006)

Under-nutrition places children at increased risk of morbidity and mortality and has also been shown to be related to impaired mental development. Three nutritional status indices of height-for-age; weight-for-height; and weight-for-age which assess the prevalence of stunting, wasting and underweight respectively were computed. The three indices are expressed as standard deviation units from the median for the international reference population recommended by the World Health Organization (WHO).

The anthropometric data was analysed using ENA/EPI Info 2002 software package. A total of 821 children were weighed and measured. Children with incomplete age information or implausibly high or low height and weight measurements were not included in the analysis. Z-scores are used in reporting prevalence of malnutrition. Children whose indices of nutritional status are more than two standard deviations below (-2 SD) the reference median are regarded as undernourished, while those whose indices of nutritional status are more than three standard deviations (-3 SD) below the reference median are considered severely undernourished. The following analysis is

based on children 6 – 59 months for whom complete and plausible anthropometric data was collected.

3.2.1 Prevalence of Wasting (Global Acute Malnutrition) based on Weight for height (WFH) z-scores

The weight for height index as a measure of acute malnutrition (wasting) is the most appropriate index to quantify wasting in a population and reflects the current nutrition/health status of the community. Besides having a true statistical meaning, the use of z-scores (standard deviation scores) conveys malnutrition rates very precisely and allows for inter-study comparisons. The information presented here is based on the analyzable sample of eligible children whose plausible anthropometric data were collected. 45 (5.4%) of the children for the WFH analysis were excluded due to flagged values.

Table 2 shows that the prevalence of Global Acute Malnutrition (GAM) among all children was 1.7 % (1.0 - 2.8 95% C.I.). This is indicative of an acceptable nutritional situation based on the WHO standards¹. The prevalence of Severe Acute Malnutrition (SAM) was 0.0 % which falls short of emergency levels². Analysis of the data by sex shows that a higher proportion of girls 2.2 % (1.2 - 4.1 95% C.I.) is malnourished than boys 1.1 % (0.4 - 2.8 95% C.I.). However the overlapping confidence limits indicates that the difference in malnutrition between the boys and girls was NOT statistically significant. Both boys and girls are at equal risk of malnutrition.

Table 2: Prevalence of acute malnutrition based on WFH z-scores (and/or oedema) by sex

Nutrition Status indicators	All N = 776		Boys N = 369		Girls N = 407	
	n (95% CI)	% (CI)	n (95% CI)	% (CI)	n (95% CI)	% (CI)
Prevalence of Global Acute Malnutrition (<-2 z-score and/or oedema)	(13)	1.7 % (1.0 - 2.8)	(4)	1.1 % (0.4 - 2.8)	(9)	2.2 % (1.2 - 4.1)
Prevalence of Moderate Acute Malnutrition (<-2 z-score and >=-3 z-score, no oedema)	(13)	1.7 % (1.0 - 2.8)	(4)	1.1 % (0.4 - 2.8)	(9)	2.2 % (1.2 - 4.1)
Prevalence of Severe Acute Malnutrition (<-3 z-score and/or oedema)	(0)	0.0 %	(0)	0.0 %	(0)	0.0 %

The prevalence of oedema is 0.0 %

To analyze the effect of age on nutritional status, the sample of children 6-59months was disaggregated into age-groups (Table 3). It is noteworthy that the sub-sample that

¹ WHO cut off points for wasting using Z scores (<-2 Z scores in populations: <5% acceptable; 5-9% poor; 10-14% serious; >15% critical).

² Emergency Level SAM >4%

coincides approximately with the weaning period in a child's life cycle (6-29months) had a higher burden of wasting (GAM - 4.9%) compared to children 30 – 59 months. However, there was no difference between acute malnutrition rates observed among children aged 6-29 months and the whole sample ($p>0.05$).

Table 3: Prevalence of acute malnutrition by age

Age Mon		Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (> = -2 z score)	
Age (mon)	Total no.	No.	%	No.	%	No.	%
6-17	173	0	0.0	6	3.5	167	96.5
18-29	196	0	0.0	3	1.5	193	98.5
30-41	177	0	0.0	0	0.0	177	100.0
42-53	158	0	0.0	2	1.3	156	98.7
54-59	72	0	0.0	2	2.8	70	97.2
Total	776	0	0.0	13	1.7	763	98.3

3.2.2 Prevalence of Acute Malnutrition by MUAC

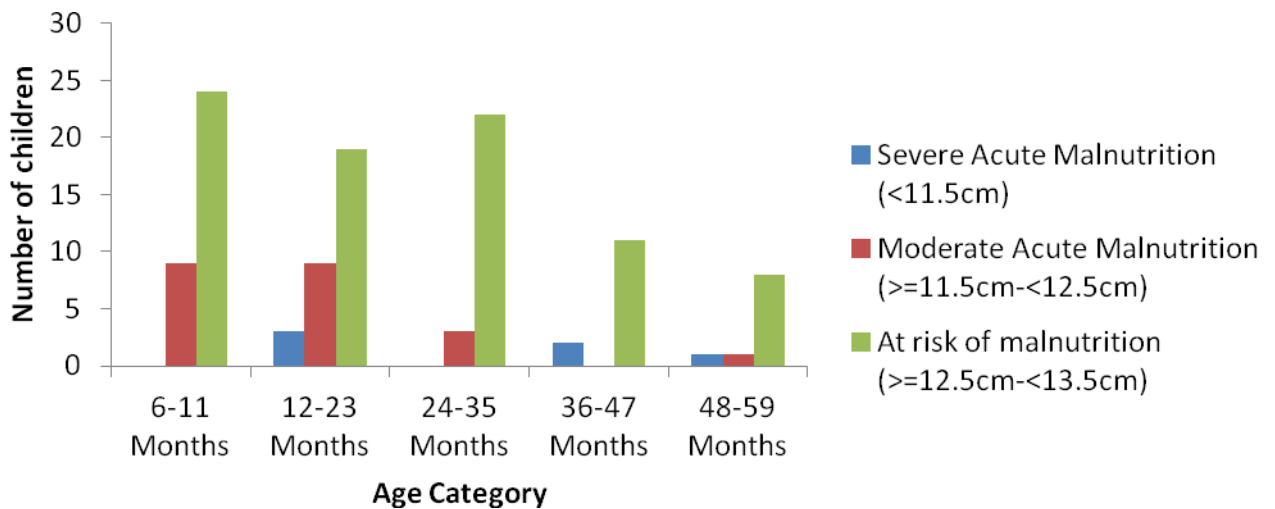
Compared to WFH z-scores, the mid-upper arm circumference (MUAC) is a less sensitive indicator of acute malnutrition and tends to overestimate acute malnutrition for children below one year of age. Overall, MUAC usually tends to indicate lower GAM levels compared to WFH z-scores. It is, however still used as a rapid screening tool for admission into nutrition intervention programmes in Rwanda.

Table 4: Nutritional Status of children 6-59 months based on MUAC

Nutritional Status	MUAC Criteria	N	%
Severe malnutrition	<11.5cm	6	0.7 (0.3-1.7 95% C.I.)
Moderate malnutrition	>=11.5 and <12.5cm	22	2.7 (1.8-4.2 95% C.I.)
At risk of malnutrition	>=12.5 and <13.5cm	84	10.5 (8.5-12.8 95% C.I.)
Satisfactory nutritional status	>=13.5cm	691	86.1 (83.4-88.3 95% C.I.)
	TOTAL	803	100

According to the MUAC index, overall prevalence of malnutrition i.e. GAM (MUAC<12.5cm) in 803 children was 3.4% and severe malnutrition (SAM)(MUAC<11.5) at 0.7%, with 10.5% being at risk of malnutrition (MUAC 12.5cm-<13.5cm).

Figure 1: Acute Malnutrition based on MUAC by Age Group



From Figure 1, it is evident that the younger children have a higher rate of GAM compared to those aged 24-59 months. Overall, the younger children (6-23m) seem more affected than the older age groups.

3.3.3 Prevalence of underweight based on Weight-for -Age z-score by sex

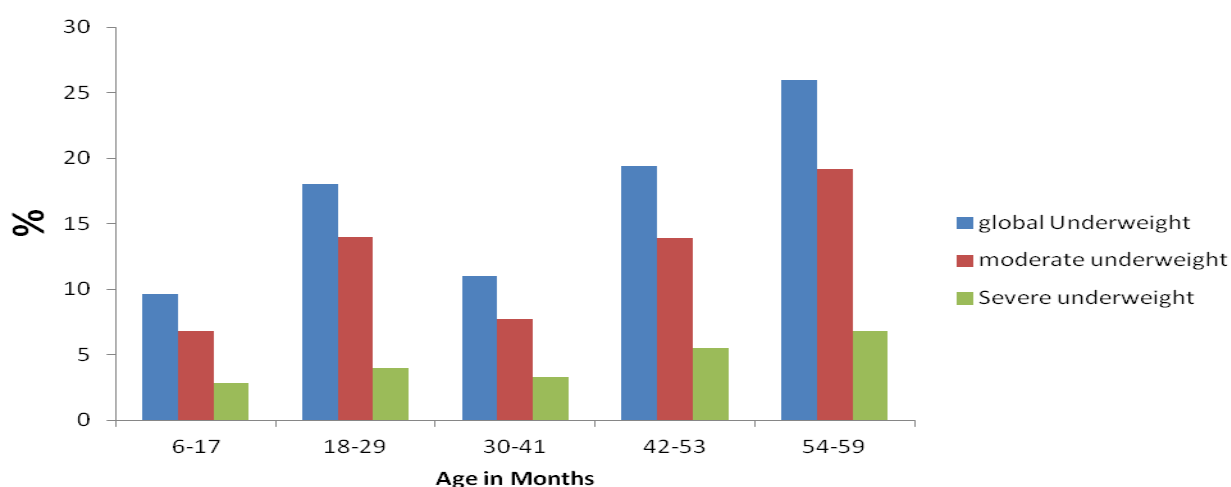
The weight-for-age (WFA) index provides a composite measure of wasting and stunting and is commonly used to monitor the growth of individual children using child health cards since it enables mothers to easily visualise the trend of a child’s weight against age. The prevalence of underweight among the children was 15.4 % (13.0 - 18.1 95% C.I.) while 4.1 % (2.9 – 5.7 95% C.I.) were severely underweight as shown in Table 5. Analysis of the data by gender shows that a higher proportion of boys 16.2 % (12.8 - 20.3 95% C.I.) are underweight compared to girls 14.6 % (11.5 – 18.4 95% C.I.). However the overlapping confidence intervals indicated that the difference in underweight between the boys and girls was NOT statistically significant. Both boys and girls are at equal risk of being underweight.

Table 5: Prevalence of underweight based on Weight-for-Age (WFA) z-scores by gender

Prevalence	All N = 786		Boys N = 376		Girls N = 410	
	n (95% CI)	% (CI)	n (95% CI)	% (CI)	n (95% CI)	% (CI)
Prevalence of Global underweight (<-2 z-score)	(121)	15.4 % (13.0 - 18.1)	(61)	16.2 % (12.8 - 20.3)	(60)	14.6 % (11.5 - 18.4)
Prevalence of Moderate underweight (<-2 z-score and >=-3 z-score, no oedema)	(89)	11.3 % (9.3 - 13.7)	(44)	11.7 % (8.8 - 15.3)	(45)	11.0 % (8.3 - 14.4)
Prevalence of Severe underweight (<-3 z-score)	(32)	4.1 % (2.9 - 5.7)	(17)	4.5 % (2.8 - 7.1)	(15)	3.7 % (2.2 - 5.9)

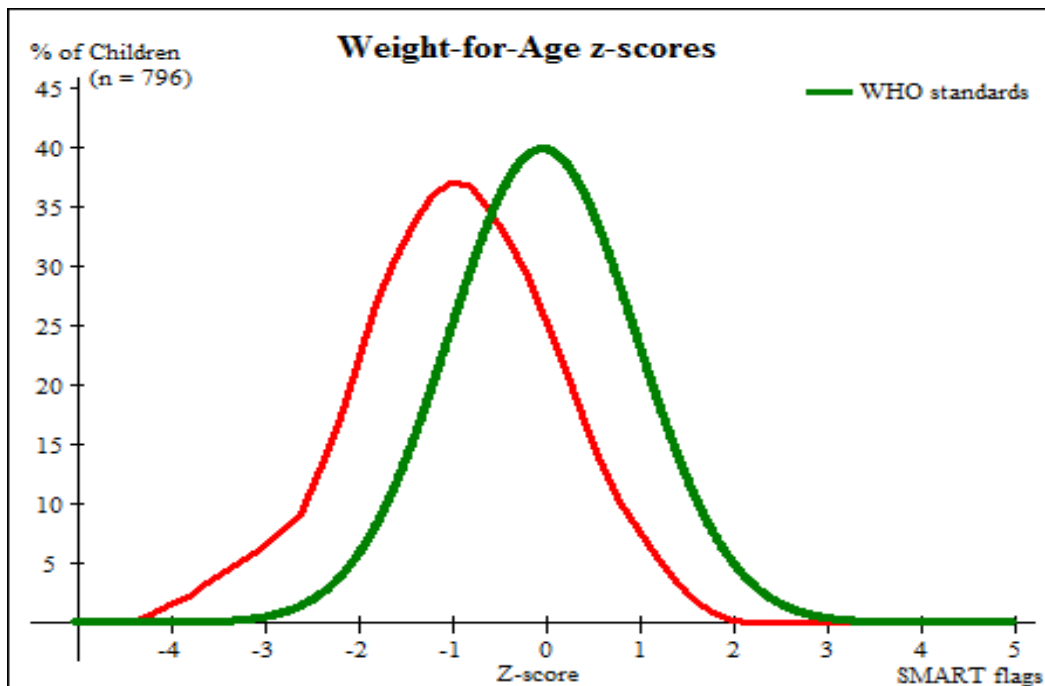
Table 5 and Figure 2 show the distribution of prevalence of underweight in terms of gender and age groups. The prevalence of underweight was found to increase with age with the highest prevalence noted in children aged 54-59 months.

Figure 2: Prevalence of underweight based on Weight for Age z-scores by age



From figure 3, the WFA z-score distribution curve of the survey sample relative to the WHO-GS curve indicates a shift to the left of the sample curve, with a mean score of -0.96 and a standard deviation of 1.06, which indicates that overall, the population exhibits a poorer nutritional status compared with the WHO reference population.

Figure 3: Distribution of WFA z-scores for the sampled children



3.3.4 Prevalence of Chronic Malnutrition (Stunting) based on Height-for-age (HFA) z-scores (WHO-GS)

Height for age (stunting) is an indicator of chronic (long-term) malnutrition arising from deprivation usually related to a persistently poor food security situation, micronutrient deficiencies, recurrent illnesses and other factors which interrupt normal growth. Unlike wasting, it is not affected by seasonality but is related to the long-term effects of socio-economic development and long-standing food insecurity situation. A low height-for-age reflects deficits in linear growth and is referred to as stunting.

The findings (Table 7) indicate an overall global chronic malnutrition (GCM) rate of 45.3% (41.8 – 48.9 95% C.I.) and a severe chronic malnutrition (SCM) rate of 16.1 % (13.7 – 18.9 95% C.I.). There was significant difference in the overall stunting between the boys and girls as judged by the overlap in the Confidence Intervals. Boys were more likely to be stunted than girls.

Table 7: Prevalence of stunting based on height-for-age z-scores by Gender

Prevalence	All n = 763		Boys n = 361		Girls n = 402	
	N (95% CI)	% (95% CI)	N (95% CI)	% (95% CI)	N (95% CI)	% (95% CI)
Prevalence of Global CM (<-2 z-score)	(346)	45.3 % (41.8 - 48.9)	(178)	49.3 % (44.2 - 54.4)	(168)	41.8 % (37.1 - 46.7)
Prevalence of Moderate CM (<-2 z-score & >=-3 z-score)	(223)	29.2 % (26.1 - 32.6)	(116)	32.1 % (27.5 - 37.1)	(107)	26.6 % (22.5 - 31.1)
Prevalence of Severe CM (<-3 z-score)	(123)	16.1 % (13.7 - 18.9)	(62)	17.2 % (13.6 - 21.4)	(61)	15.2% (12.0 - 19.0)

As indicated in Table 8, the highest prevalence in global stunting (56.6%) was found in children 18-29 months followed by those aged 54-59 months with a prevalence of (52.8%). Children 6-17 months had the lowest level of stunting (28.6%).

Table 8: Prevalence of Stunting based on Height for Age Z-Scores by age

Age (mon)	Total no.	Prevalence of underweight (<-2 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Severe underweight (> = -2 z score)	
		No.	%	No.	%	No.	%
6-17	175	50	28.6	36	20.6	14	8.0
18-29	191	108	56.6	62	32.5	46	24.1
30-41	173	82	47.4	59	34.1	23	13.3
42-53	154	69	44.8	44	28.6	25	16.2
54-59	70	37	52.8	22	31.4	15	21.4
Total	763	346	45.3	223	29.2	123	16.1

Figure 4 depicts the HFA z-score distribution curve of the survey sample relative to the WHO-GS curve. The findings indicate a shift to the left of the sample curve, with a mean score of -1.83 and a standard deviation of 1.2, which indicates that overall, the population exhibits a poorer chronic malnutrition compared with the WHO reference population.

Figure 4: Distribution of HFA z-scores for Sampled Children

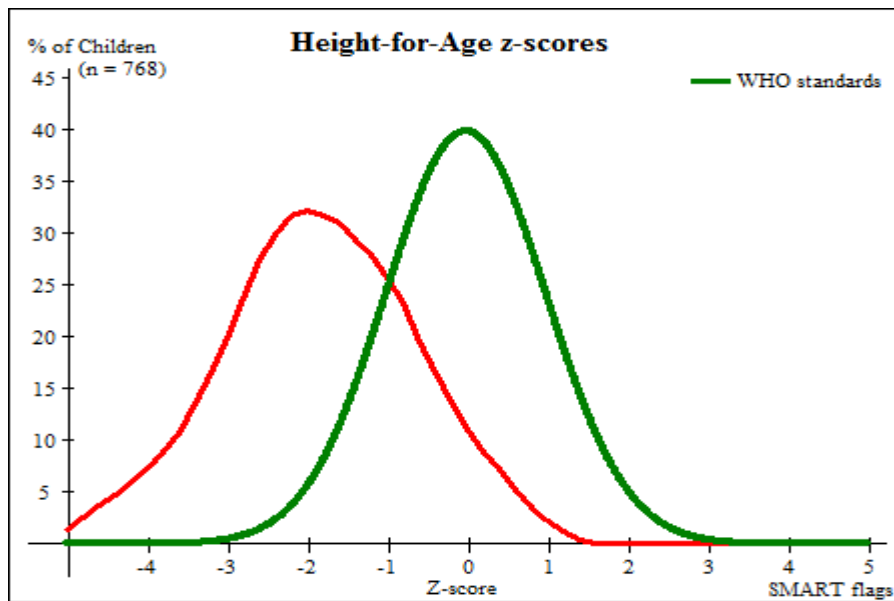


Table 9 shows the number of children included in the analysis of nutritional status by each index, mean z-scores, design effects and excluded subjects. Of the eight hundred and twenty one (821) children included in the survey, the excluded subjects for WFH, WFA and HFA either due to z-scores not available or z-scores out of range were 5.5%, 4.3% and 7.1% respectively. The standard deviation for a well conducted survey especially in WFH index should be between 0.8 – 1.2. The SD of this survey as shown in table 9 indicates a well conducted survey.

Table 9: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	776	0.10±0.99	1.00	33	12
Weight-for-Age	786	-0.96±1.06	1.00	22	13
Height-for-Age	763	-1.83±1.19	1.00	27	31

* The table above indicated the flagged values due to aberrant values

3.5 ITN Utilization, Hygiene and Sanitation

Use of Insecticide treated nets (ITN's) is one of the National Malaria Control strategies currently being implemented in Rwanda. ITN's are regarded as a promising malaria control tool when used by all or most members of the community¹⁸. A high proportion of households (92.3%) reported having mosquito nets, most of which (97.9%) had been sourced from the MoH, while 1.8% and 0.3% had obtained the nets from shops and non-

governmental organizations (NGOs), respectively. The MoH provides free insecticide treated mosquito nets (ITNs) to expectant mothers attending antenatal clinic (ANC) clinics.

While the nets obtained from hospitals and NGO'S are treated with long-term insect-repellents, the ones obtained from shops or vendors may not be treated, which makes it necessary to treat them at home. The proportion of households that reported treating nets they had obtained from shops was 30%, with 33% having treated them more than six months prior to the survey. Two thirds (66.7%) of the households had however never treated the nets. The reported utilization of the nets during the night preceding the survey was highest (86.8%) among children under five years followed by non pregnant women (77.1%), fathers of children (74.4%) and children above five years (64.0%). Surprisingly, the utilization of the mosquito nets was lowest among pregnant women (10.6%). It is necessary to facilitate acquisition of nets for the households without and further sensitize the community on the importance of ITN use especially by pregnant women whose utilization is very low in order to achieve universal utilization rates.

3.6 Child Immunization, De-worming and Vitamin A Supplementation

The vaccination coverage was calculated as children immunized based on records and recall (Table 10). Results on immunization showed that 99.6% of eligible children had received the first dose of oral polio vaccine (OPV1) with a slightly lower proportion (98.4%) having received 3 OPV doses indicating a small dropout rate of 1.2%. Coverage for measles immunization was equally high at 95.6%. When estimating measles coverage, only children 9 months of age or older were taken into consideration as they are the ones who were eligible for routine vaccination. De-worming was equally high at 90%, although close to two thirds of this information (63.2%) was from recall. Approximately 70% of the immunization coverage reported here was based on evidence from an EPI/ANC health card.

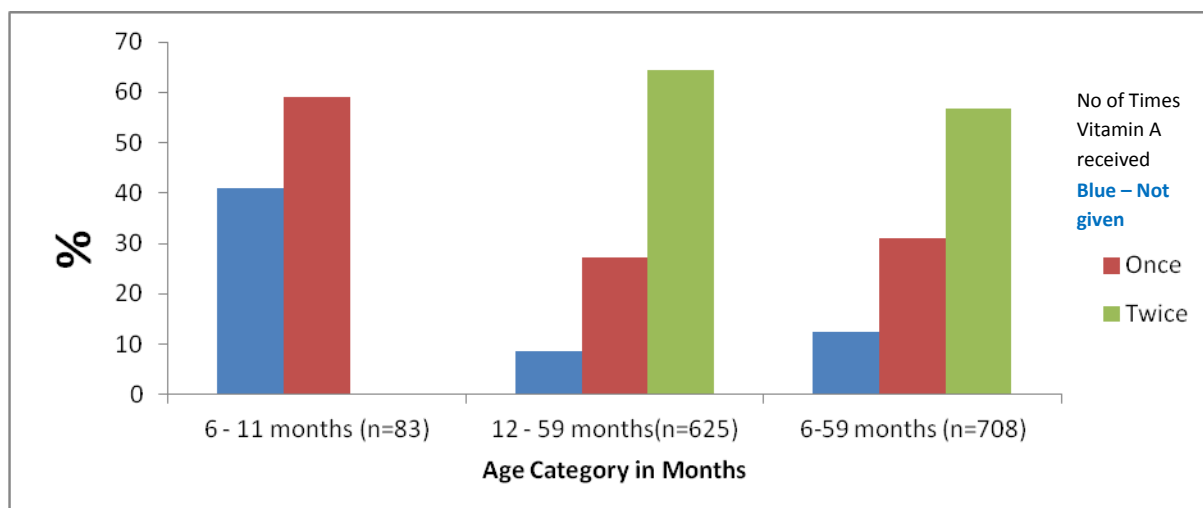
Table 10: Vaccination coverage and De-worming

Type of vaccination	% of children (N-822)			
	Confirmation by card	Confirmation by recall	Not received	Don't know
OPV 1	71.4	28.1	0.3	0.2
OPV 3	70.0	28.4	1.5	0.1
Measles	67.4	28.1	4.3	0.1
De-wormed within the last 6 months	26.8	63.2	10.0	0

3.6.1 Vitamin A supplementation

The Rwanda MOH policy states that children under the age of 5 years should receive Vitamin A supplementation every six months. Overall, Vitamin A supplementation for children 6-59 months during the preceding year was low in the district. Close to half (41%) of children had not received Vitamin A supplementation in the past year. Among those who were reported to have received Vitamin A supplementation (Figure 5), a sizeable proportion (39.3% and 29%) of children 6-11 and 12 – 17 months respectively had received only one dose.

Figure 5: Proportion of children supplemented with Vitamin A



3.7 Morbidity levels and health seeking behaviour

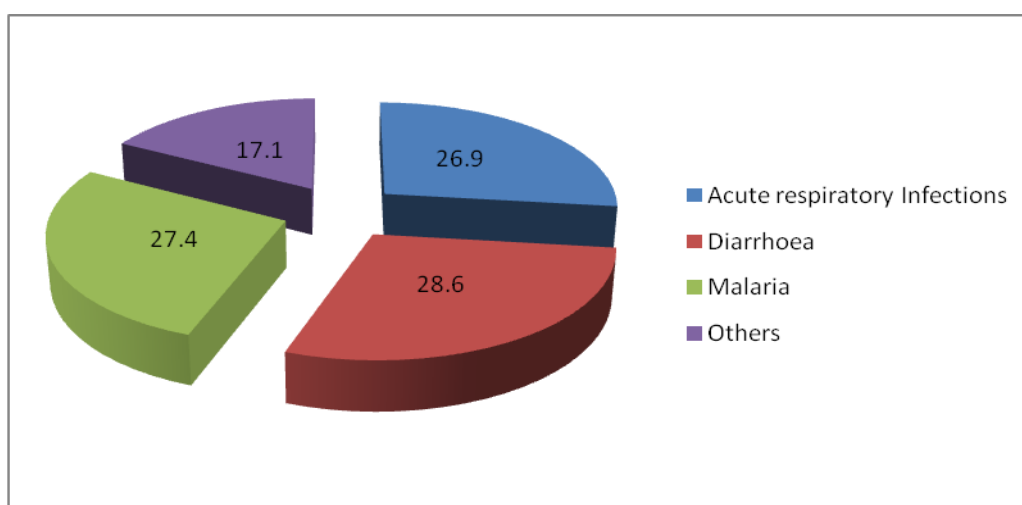
Child Morbidity

Morbidity is a well known cause of malnutrition among young children. A two week child morbidity recall (inclusive of the day of survey) was conducted to establish the prevalence of common illnesses among the study children. There was a high prevalence of morbidity since close to half (48.2%) of the under-five child population was reported to have had an episode of illness two weeks prior to the survey (Figure 6). The most prevalent illnesses were diarrhoea suffered by 28.6 % of the children followed by malaria (27.4%), ARI (26.9%) and others (17.1%). Other illnesses mentioned included skin infections, intestinal worms, stomach-ache, chicken-pox, pneumonia, vomiting and ear and eye infections. Given that these children were receiving an inadequate diet further increases their vulnerability to malnutrition and infections.

Data from the MoH (Rusizi district hospital) also confirmed these as leading causes of child morbidity in the district in 2010. An analysis of the relationship between morbidity and nutritional status of children 6 – 59 months (Wasting - WHZ, underweight - WAZ and stunting - HAZ) established that there was no relationship between nutritional status and morbidity profile of the children. Chi-square analysis done to determine whether there was any association between sickness and malnutrition showed that there was NO significant association ($p > 0.05$).

Figure 6: Prevalence of illnesses reported in children two weeks prior to survey

(n= 395)



3.8 Caregivers health seeking behaviour

Healthcare seeking behaviour of caretakers determines the preference and quality of health care services obtained whenever a child falls ill. Quality of health care services and duration taken before a sick child receives medical attention contributes to the severity of the illness. The health seeking behaviour by mothers of sick children was assessed by asking the respondents what they did the last time the child was sick. Commendably, 82% of mothers reportedly sought medical assistance during the last episode of illness (Table 11). Of these, the majority (90.1 %) sought assistance from a health facility (cumulative of public/mobile/private clinic). A small proportion of caregivers (2.6%) reportedly sought assistance from traditional healers or none at all. Care givers who reported seeking assistance from a community health worker accounted for only 6.7%.

Table 11: Health seeking behaviour

Health seeking behavior	N=673 % of cases
Public Health Facility	83.7
Private clinic	4.8
Traditional healer	2.2
No assistance sought	0.4
Community Health Worker	6.7
Shop/kiosk	0.4
Relative/friend	0.2
Mobile clinic	1.6

3.9 Infant and Young Child Feeding and Care practices

3.9.1 Breastfeeding Practices

Breast milk is the optimal source of nutrients for infants. Children who are exclusively breastfed receive only breast milk. Exclusive breastfeeding is recommended during the first 6 months of a child's life because it limits exposure to disease agents as well as providing all of the nutrients that a baby requires. Exclusive breastfeeding for six months has been shown to be the most effective preventive intervention for ensuring child survival and is estimated to save 13 percent of all deaths of children younger than 5 years. Appropriate complementary feeding could prevent an additional 6 percent of all deaths in this age group (Jones *et al.*, 2003).

Information on infant and young child feeding practices was obtained based on a 24-hour recall, in line with the WHO guidelines to minimize recall bias and thus obtain more valid information. The majority of women interviewed (98.9%) as expected, had breastfed their children. However, at the time of the survey, only 48.4% were currently breastfeeding (Table 12). Mothers who had ceased breastfeeding were asked for the age at which they had stopped breastfeeding the index child. The mean age for cessation of breastfeeding was 24.4 months (Sd 25.8). The mean age at which prelacteal feeds were introduced after delivery was 5.4 days (Sd 10.4).

Table 12: Summary of Breastfeeding Practices

Breastfeeding Practices					
<u>Initiation of breast feeding:</u>					
	Age Group	n	%	Target	Comment
• Ever breastfed	0-5m	(86)	100%	>80%	✓
• Ever breastfed	6-59m	(812)	98.9%(97.9-99.5 C.I)	>80%	✓
▪ Given colostrums	0-5m	(86)	97.7%(91.9-99.7 C.I)	>80%	✓
▪ Given pre-lacteals within 3 days of birth	0-5m	(86)	14.0%(7.0-23.1 C.I)	n/a	Unsatisfactory
▪ Early introduction to complementary foods	0-5m	(86)	25.6%(16.8-36.1 C.I)	n/a	Unsatisfactory
▪ Breastfeeding on Demand(>12 times)	0-5m	(86)	26.7%(17.8-37.4 C.I)	n/a	Unsatisfactory
<u>Key Indicator 1</u> Timely Initiation of Breastfeeding (within 1 hr.)	0-5m	(86)	81.4%(71.6-89.0 C.I)	>80%	✓
<u>Key Indicator 2</u> Exclusive Breastfeeding	0-5m	(86)	74.4%(70.2-78.7 C.I)	>50%	✓
<u>Key Indicator 3</u> Currently Breastfeeding	0-24m	(372)	90.6%(90.4-90.8 C.I)	>80%	Satisfactory
<u>Key Indicator 4</u> Median Duration of Breastfeeding	0-36m	(134)	18 months	≥24 Months	Unsatisfactory

All infants 0 – 5 months covered in the study (86) had been breastfed. Global recommendations on infant feeding require that breastfeeding commences immediately after birth, or within the first hour after delivery, and that no pre-lacteal feeds are given to newborn infants. This first milk is rich in colostrum and anti-infective properties, hence nourishing and protecting new born infants from common infections.

Findings of the study showed that majority of the mothers (81.4%) had initiated breastfeeding within the recommended one hour after birth which is commendable. A majority of the mothers (98%) also reported giving colostrum to infants. However, some mothers (7%) reported having given infants pre-lacteal feeds including plain water (7%) and glucose water (7%) within the first week of life. These are not recommended as they delay establishment of lactation and may be contaminated leading to diarrhoea. Commendably, all infants in this age category were breastfeeding at the time of the study. The pre - lacteal feeds most commonly given were plain water and sugar/glucose water each reported to have been used by 7% of the respondents.

WHO recommends that infants should be breastfed at least twice every 2 hours, which translates to 12 times a day. Only 26.7% of the infants had been breastfed more than 12 times the previous day. Close to one third of infants aged 0 – 6 months (25.6%) were already receiving other fluids, water and feeds in addition to breastmilk. Mothers were asked for the age at which these other feeds were introduced. Overall, infants were introduced to these other feeds at 2.8 months (sd 1.5). Findings show that 74.4% of the infants were exclusively breastfed which is lower than the national rate of exclusive breastfeeding at 85%.

Table 13: No of times child breastfed the previous day (N=86)

No of times Infant breastfed previous day	%
<5times	9.3
5-9 times	25.6
10-11 times	29.1
>12 times	26.7
Don't know	9.3
Total	100.0

3.9.2 Cultural beliefs influencing breastfeeding practices

From focus group discussions, mothers and other caregivers were aware that babies should be breastfed exclusively for six months. However, there are various beliefs and myths impeding the practice of exclusive breastfeeding narrated as follows:

- A widespread belief that babies can thrive on breastmilk alone for 2 – 3 months only. Some mothers start giving other feeds as early as two weeks as noted by a mother in a focus group discussion.

“ To tell the truth, exclusive breastfeeding is only done for the first week here. In the second week, a baby starts receiving chewed banana because mothers do not have enough milk”. FGD participant, Butanda.

This is driven by the belief that breastmilk is hot and makes an infant thirsty, necessitating giving water to quench thirst.

- **Water is important good for a babys health.** Focus group participants felt that during the first 6 months, babies should be breastfed but also given other fluids such as water or cows milk “when necessary”. Moreover, there was also the perception that an age limit for exclusive breastfeeding should not be fixed since introduction of other feeds is determined by an individual baby’s needs.
- **Introduction of other foods before 6 months enhances a babies health** as aptly captured by a mother in a FGD at Butanda.
“ A healthy mother breastfeeds for a maximum of 4 months and starts feeding the baby porridge to ensure good health of the baby”.
- **Mothers do not feed well enough to breastfeeding exclusively for six months:** Both fathers and mothers expressed concern that mothers do not get enough food to eat and work away from home for many hours, hence are not able to breastfeed babies regularly. Mothers in FGDs explained that other feeds are introduced to babies before six months because “ *most mother are not able to satisfy the infant with breastmilk owing to their poor nutritional status*”.
- **Pregnant women should not breastfeed:** Early weaning of young infants when women become pregnant is practiced in all areas. This arises from the belief that pregnant women should not breastfeed because their milk is unhealthy and hinders an infants growth. A common practice is to send the young child to grandmother.
“When a mother notices she is pregnant, she stops breastfeeding immediately because she cannot feed two people at the same time – the one in her womb and the one who is still breastfeeding since the health of both the mother and the two babies will deteriorate”. FGD participant, Kamashangi cell.
 - Another belief cited is that the breastmilk of a pregnant women is dirty and a baby who feeds on it will get diarrhea, become malnourished and not grow properly. *“When a mother becomes pregnant, she immediately*

stops suckling to protect the baby from diarrhea” FGD participant, Buhokoro cell.

- Yet another belief is that the milk of a pregnant women may cause the breastfed child to have stunted growth (FGD Participant, Bugarama).
- ***Babies should be given food after the name giving ceremony***: Culture has it that at the name giving ceremony, a baby should start eating bananas. An FGD participant at Buhokoro noted that *when a baby cries, it is due to hunger*, and that it should be given bananas.
- *HIV positive mothers should not breastfeed so as not to transmit virus to their babies.*

3.9.3 Complementary Feeding Practices

The complementary feeding aspects relating to infant and young children (6 – 23 months) assessed in this study include; continued breastfeeding, frequency of feeding and dietary diversity. Continued breastfeeding up to the age of 2 years is recommended for continued optimal growth and development of young children. Typically, the onset of malnutrition in infants and young children coincides with initiation of complementary feeding from the age of 6 months and peaks at 18 – 24 months. A father in a focus group discussion in Gatereri cell observed that *“usually from the age of six months, small children stop gaining weight which seems to suggest that their diet is rather inappropriate”*.

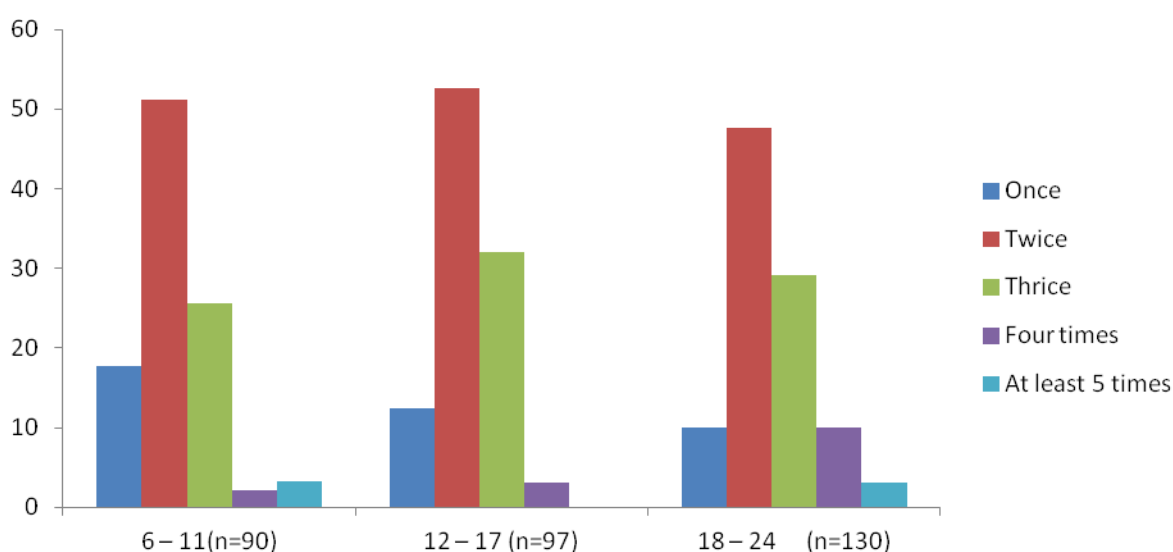
Caregivers were asked for the age at which they had introduced fluids or foods other than breast milk to children (if the child was not being exclusively breastfed). Global guidelines on infant feeding recommend introduction of complementary foods from 6 months. This is because breast milk alone is not sufficient to provide all the nutrients required for a child’s optimal growth from this age onwards. Introduction of other foods and fluids too early frequently leads to early onset of malnutrition due to replacement of breastmilk with nutritionally inferior feeds which may also be contaminated leading to diarrhoea.

The mean number of meals (apart from breastmilk) consumed by children 6 – 59 months was 2.4 (s.d 0.18). The proportion of children that were having at least five meals per day was a paltry 3.3% (Table 14). Half (50.1%) of children 6 – 24 months were receiving only two feeds per day. This reveals that the majority of children were not having the optimal frequency of feeding per day. Given the high nutrient requirements during this stage, this very low frequency of feeding may be a key contributor to the high stunting levels observed among children surveyed. Since children are expected to feed more frequently per day (at least five times), the finding indicates that there is acute food stress in the majority of households hence are unlikely to provide the required food to the children.

Table 14: Number of meals taken by children 6-59 previous day

Frequency of feeding	% of responses N=821
Once	9.5
Twice	50.1
Thrice	32.4
Four times	6.6
Five or more times	1.4

Figure 7: Feeding frequency 6 – 23 months (N=317)



Dietary diversity

The number of different foods or food groups consumed provides a measure of the quality of the diet by reflecting dietary diversity. To capture dietary diversity, the variety of food groups consumed is evaluated. The kind of food items consumed by children in the previous day's meal is indicated in Table 15. The main food items consumed were fruits and vegetables, pulses, fats and oils and grains and tubers. From this table, it is evident that the least consumed category of foods were meat, eggs, milk/milk products and vitamin A rich plant vegetables.

The mean dietary diversity score for children who had received foods/drinks based on the 24-hour recall was 3.4. The diversity score of 3.4 out of an ideal score of 8 implies that the children's meals did not have an adequate range of food groups and is thus likely to be limited in the diversity of nutrients supplied by the meals.

Table 15: Types of Foods consumed by children

Complementary Feeding Age Categories		Complementary Food Categories								
		Grains Roots and Tubers	Vitami n-A Rich Foods	Fruits and Vegeta bles	Meat, Poultry and Fish	Eggs	Pulses and Legum es	Fats and Oils	Milk and Product s	Total
6-11 month	Count	48	5	33	6	0	20	13	5	130
	%	8.5	7.7	7.2	4.4		6.6	5.2	15.6	
12-17 month	Count	71	6	52	16	0	29	26	2	202
	%	12.6	9.2	11.3	11.9		9.6	10.4	6.3	
18-23 month	Count	70	7	56	21	1	36	32	2	226
	%	12.4	10.8	12.2	15.6		11.9	12.7	6.3	
24-35 month	Count	126	13	114	25	2	67	63	11	421
	%	22.3	20.0	24.8	18.5		35.6	25.1	34.4	
36-47 month	Count	130	20	101	32	1	68	62	5	419
	%	23.0	30.8	22.0	23.7		22.4	24.7	15.6	
48-59 month	Count	120	14	104	35	1	83	55	7	423
	%	21.2	21.5	22.6	25.9		27.4	21.9	21.9	
Total	Count	567	65	460	235	5	303	251	32	
	%	100	100	100	100	100	100	100	100	

Table 16: Age disaggregation of children 6-59 months by dietary diversity

Age Categories	N	Dietary Diversity Score (DDS) Mean (SD)
6 – 11 months	57	3.0 (1.1)
12-17 months	72	3.2 (1.3)
18-23 months	74	3.4 (1.2)
24–35 months	142	3.4 (1.2)
36-47 months	133	3.6 (1.3)
48-59 months	117	3.6 (1.2)
6-59 months (OVERALL)	595	3.4 (1.2)

3.9.4 Challenges with complementary feeding

Key challenges relating to complementary feeding cited by mothers, fathers and grandmothers who participated in focus group discussions in the district include:

- **Early supplementation.** “At 2 – 3 months, we start giving maize or sorghum porridge to the child and by five months, we have already added other foods such as grilled bananas because breastmilk alone is not enough for a baby”. FGD participant, Gatereri.
- **Limited variety of foods given:** Maizemeal porridge and roasted chewed bananas emerged as the predominant foods given because they are easily available locally. In several areas, cow’s milk which many families have to buy is rarely given to young children because most families prefer to sell. Meat in the diets of young children was

extremely rare. Other foods given to a lesser extent mentioned in Gatereri by focus group discussants included mashed potatoes, rice, fruits and fish and sometimes vegetables for children around 2 years. In Rusayo, fathers reported that young children are fed porridge from a mixture of sorghum and cassava flour, with milk added by those who can afford.

- **Low agricultural productivity leading to limited access to food** were blamed by fathers as the cause for poor diets for children and breastfeeding mothers. “*You offer small children the same food you eat because that is what is available in the home*”. A father in a focus group discussion held at Gatereri lamented that “*Our soils have become infertile and fields are no longer productive. When one is lucky to get a casual job, the pay is also very low, about Rwf 400 which is not even enough to buy 1 kg of beans*”.
- **Low feeding frequency**: Discussions with mothers who are primary caregivers revealed that feeding patterns of young children typically follow those of adults with frequency of eating limited to 2-3 times per day. This however tended to vary from area to area. It was also pointed out that the high number of young children in a family (under five years) and attendant poverty means that many families are unable to feed children frequently. An FGD participant in Ryankana pointed out that from the age of 6 – 12 months, infants eat twice a day, at lunch time and in the evening. Only small children eat three times a day”.

Inadequate knowledge on appropriate child feeding: Fathers in focus group discussions asserted that women generally do not prepare nutritious diets for young children because they do not have knowledge on appropriate ways of feeding young children. A father in the FGD at Gatereri contended that babies are mostly given bananas which explains why many have stunted growth and are underweight.

Maternal workload and poor child care practices emerged from FGDs as a contributor to poor feeding practices of young children in the district. In all areas, mothers and fathers observed that women both during pregnancy and while breastfeeding are engaged in farming or income earning activities that take them away from home for long hours. An FGD participant at Rusayo pointed out that mothers prefer to leave babies from one year at home while they work in the farms. Young children are then left under the care of other siblings, grandmothers, neighbours and in some cases unattended, exposing them to poor hygienic and unsupervised feeding. Fathers at Rusayo asserted that “due to the heavy workload, mothers cannot produce enough breastmilk to feed their babies”.

In all the areas, it was emphasized that babies and young children generally eat the same food as the rest of the family. Preparing special foods for children or enriching foods to meet the special needs of young growing children was said to be rare in the district. However, a few mothers reportedly add avocado pear to mashed bananas to enrich. Other foods mentioned by mothers that are sometimes used to enrich babies

foods are beans and soya bean porridge and vegetable soup. These are however given rarely by those who can afford. Families that can afford buy soya, sorghum and maize meal (SOSOMA) flour for porridge.

3.10 Nutritional status of caregivers of children under five years

Poor adult nutritional status is a key pointer to household food insecurity. Out of the mothers/caretakers 16 – 49 years assessed 8.5% were pregnant, 78.9% were breast-feeding, 2.5% were both pregnant and lactating while 10.1% were neither lactating nor pregnant. The mid-upper arm circumference (MUAC) was measured to assess the nutritional status of the mothers/caregivers. Pregnant and lactating mothers with MUAC <23cm are classified as malnourished while non pregnant and non-lactating are classified as malnourished when the MUAC is <21cm.

Table 17 and Figure 8 show the distribution of the physiological and nutritional status of the mothers/care givers in the survey. Pregnancy imposes an increased nutrient-need load on mothers, which in the absence of adequate extra nutrients may lead to utilization of body nutrient reserves leading to malnutrition. Subsequently, gestational malnutrition leads to low birth weights and may culminate in poor child growth and development.

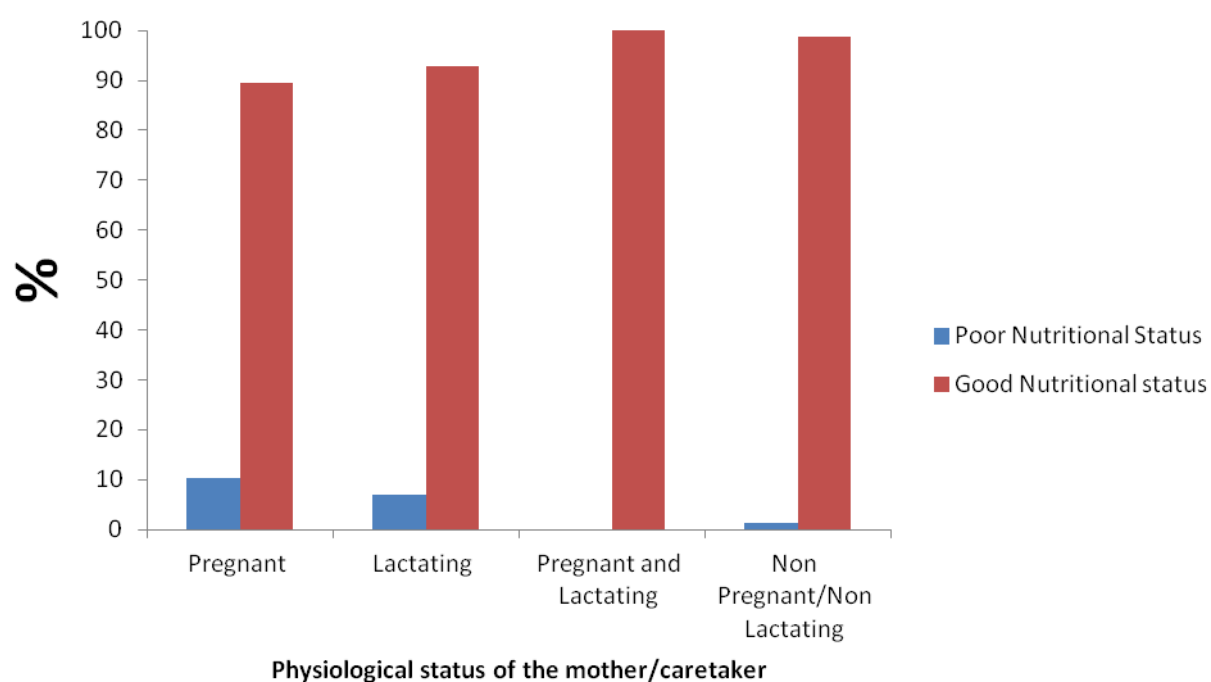
Table 17 indicates that pregnant women and lactating mothers were relatively more vulnerable to malnutrition compared to their non-pregnant counterparts. Malnutrition among pregnant and lactating mothers leads to an increased a risk of growth retardation and/or low birth weight to the foetus.

Survey findings showed that overall, 6.6% (n=52) of caretakers had poor nutritional status. The magnitude of under-nutrition was highest (10.4%) among pregnant women followed by lactating women (7.1%). Only one woman among the non pregnant/non lactating had poor nutritional status while none of those who were both pregnant and lactating had poor nutritional status.

Table 17: Nutritional status of mothers/caregivers

Physiological status of the mother	Poor Nutritional Status	Good Nutritional status
Pregnant (N=67)	(7) 10.4 (4.3-20.3 95% C.I.)	(60) 89.6 (79.7-95.7 95% C.I.)
Lactating (N=624)	(44) 7.1 (5.2-9.4 95% C.I.)	(580) 92.9 (90.6-94.8 95% C.I.)
Pregnant and Lactating (N=20)	(0) 0.0	(20) 100 (100-100 95% C.I.)
Non Pregnant/Non- Lactating (N=80)	(1) 1.3 (0.00-6.8 95% C.I.)	(79) 98.8 (93.2-100 95% C.I.)

Figure 8: Caregivers of U5s nutritional status based on MUAC as an indicator of wasting



3.11 Diets of Pregnant and Breastfeeding mothers

Discussions held with fathers in focus group discussions showed consensus among men that pregnant mothers require special care and good nutrition both during pregnancy and while breastfeeding. As one man at Kamashangi put it *“pregnant women should be taken care of because they lose a lot of blood during delivery”*.

A male participant at Ryankana further pointed out that: *“if a mother is not well fed and does not drink properly, she cannot produce enough breastmilk and the baby will go hungry and she will also lose weight”*.

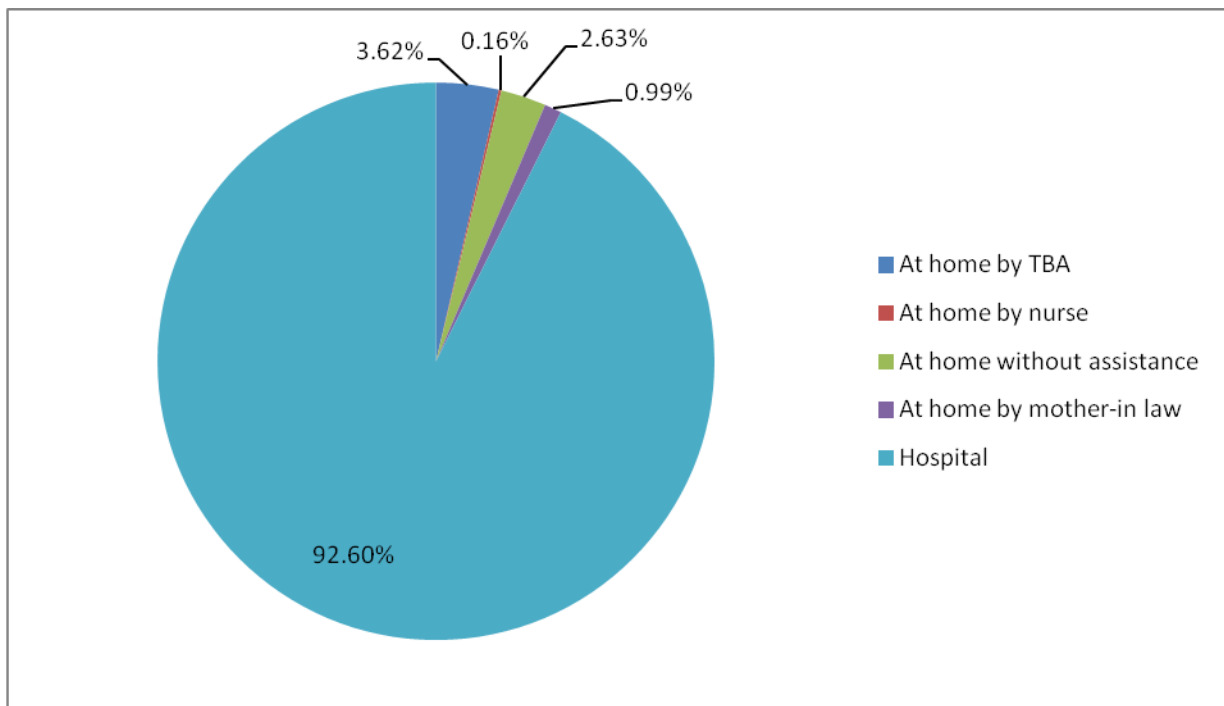
Diets of pregnant and breastfeeding mothers were however said to be largely similar to those of everyone else in the family. *“A pregnant woman eats what other people eat. She cannot afford to eat differently because of poverty”*. FGD participant, Pera. Diets of breastfeeding mothers reportedly comprise of bananas and sorghum porridge.

Foods that pregnant women should not eat that were cited include avocado pears, because *“the baby will grow very big and cause complications during delivery”*. Other foods that should be avoided for this same reason are cassava leaves, pumpkins and pork. Sweet potatoes should be avoided because they cause heartburn. Foods believed to increase production of breastmilk that were cited are cassava leaves, boiled meat and sorghum porridge.

3.12 Caregivers health seeking behaviour

Health care seeking behaviour of caretakers determines the preference and quality of health care services obtained during pregnancy/delivery. Quality of health care services during pregnancy and the duration before a new born receives medical attention after delivery contributes to the survival rate of newborns. Utilisation of antenatal, delivery and postnatal services was used to gauge the health seeking behaviour of mothers.

Figure 9: Reported place of delivery



A high proportion of mothers 98.2% (96.7-99.1 95% C.I) reported having attended ANC during the last pregnancy. Close to half of those who attended (45.1%) made four ANC visits followed by mothers who made three ANC visits (39.0%). Only 2% of mothers expressed knowledge on availability of mother support groups in the community, and only two mothers belonged to a support group.

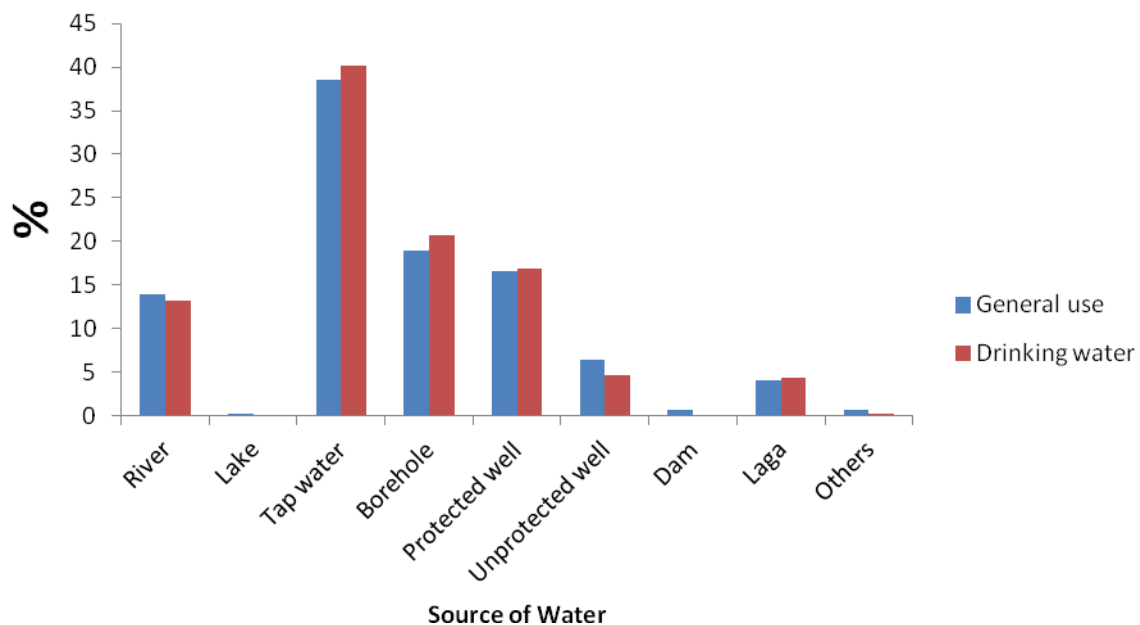
A majority of the mothers (92.6%) delivered in a health facility while the rest delivered at home. Of those delivering at home, a small proportion (3.6%) were assisted by a TBA, 1.0% by mother-in law and 0.2% by a nurse. Others (2.6%) delivered without any assistance (Figure 8). Of those who delivered at home, almost three quarters (73.3%) took their newborns to a health facility within the first two weeks while 20% reported taking their infant to health facility after one month. A small proportion (6.7%) did not/were not intending to take their infants to a health facility. Around three quarters (73.2%) of the mothers reported having received a vitamin A supplement after delivery during their last pregnancy.

3.13 Water, Sanitation and Hygiene Practices

There were several sources of water for household use reported by the survey respondents. A large proportion of households (74.1%) were using drinking water from safe sources like water tap (38.6%), boreholes (18.9%), and protected wells (16.6%). The rest were using drinking water from unsafe sources such as rivers (14.0%), unprotected wells (6.4%), dams (0.7%) and digging along the river bed (4.1%). The main sources of water for general household use include tap water (38.6% and 40.1%), borehole (18.9% and 20.7%) and protected well (16.6% and 16.9%) respectively (Figure 10).

On average, households took 30.2 minutes (sd 28.5) to access the main source of water, and used 49.0 (sd 29.4) litres of water daily (which translates to about two and half 20-litre jerricans). Households buying water in jerricans paid on average 6.6 francs (SD 23.0) per 20-litre jerrican. Only (55.4%) of the households reportedly treated their drinking water either by boiling (48.8%) or use of water treatment chemicals (48.5%). A small proportion (2.7%) were using traditional herbs to treat the water. Clearly the role of untreated water as a cause of childhood diarrhoea and malnutrition cannot be underestimated. Communities should be encouraged to boil their drinking water at the household level, being the most viable and cheap method.

Figure 10: Main Household Water Source



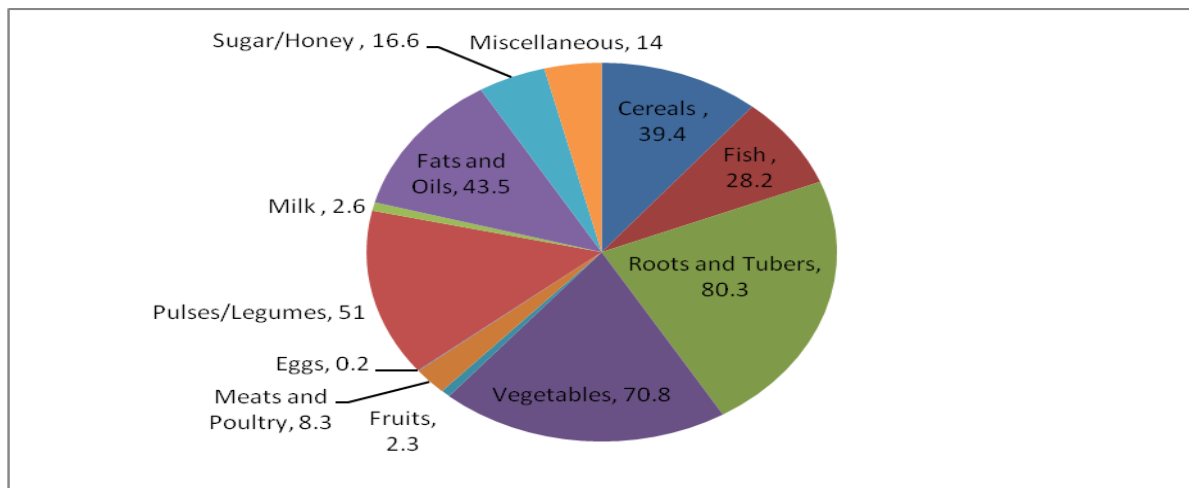
Almost all households 95.9% (94.2-97.1 95% C.I) had access to toilet facilities. The alternative sanitation measures used by households who did not own a latrine (4.1%) included going to the bush and behind the house. A significant proportion of households disposed children's faeces immediately and hygienically (30.8%). A small proportion

(5.2%) of the households had faeces observed scattered in the compound. The use of open bush/field for faecal disposal coupled with consumption of water from open sources, poses a risk of contamination of drinking water, a pre-disposing factor to diarrheal diseases and acute malnutrition. This makes it necessary to educate the community on the health implications of unhygienic faecal disposal. 1.9% and 6.1% of the mothers reported not washing hands and only wash hands sometimes before feeding their children while 92.7% (89.8-93.7 95% C.I) practiced basic hygienic hand washing practices. The types of toilet facilities available in the survey area were mostly traditional pit latrines (82.9%) with a small proportion (16.6%) using buckets. A small proportion of well-off families were using ventilated improved pit latrines (0.3%) and flush toilets (0.2%).

3.14 Household Food Security

Table 18 show the distribution of foods consumed by the mothers/caregivers. The majority of the mothers/caregivers (80.3%) had eaten roots and tubers followed by vegetables (70.8 %) in the previous day. More than a third (39.4%) had consumed cereals and cereal products while half (51.0%) had consumed pulses, legumes, nuts and seeds. A small proportion 0.2%, 2.3% and 8.3% of the mothers/caregivers had consumed eggs, fruits and meats/poultry respectively the previous day. In the surveyed households, the major sources of protein are pulses/legumes (51.0%) and fish/sea foods (28.2%).

Figure 11: Foods consumed in 24-hour recall



On average, the reported usual frequency of taking meals by households was 1.95 (sd 0.56) times while the one reported for the previous day was 1.87 (sd 0.58). A comparison of meals analysis shows a significant variance between the frequency for the meals of usual intake and that of the previous 24 hours ($P < 0.001$).

Dietary diversity

The number of different foods or food groups consumed in a household provides a measure of the quality of the diet by reflecting dietary diversity. As a food security indicator, dietary diversity is usually highly correlated with factors such as caloric and protein adequacy, percentage of protein from animal sources (high quality protein) and household income. To accurately capture dietary diversity, the variety of food groups consumed is evaluated. The set of food groups used in this study (Table 15) was adapted from that used by FAO to reflect dietary and economic patterns in food selection in the study households.

The previous 24-hours' food intake by mothers/caregivers was used as a proxy to assess household dietary diversity in this survey. Food intake by caretakers is a good estimation of the variety of what other members of the households took (excluding the U5s). The dietary diversity questionnaire is a simple qualitative measure of food intake at household or individual level. At the household level, the dietary diversity score (DDS) is indicative of the ability to acquire a variety of foods, including foods that may not have high nutrient value such as beverages and condiments (FAO/FANTA, 2006). The reference period for the DDS may be one, three, or seven days. This survey used the 24 hour recall method to obtain information on the type of food consumed, using a slightly modified version of the FAO tool (FAO, 2006). The dietary diversity section of the questionnaire assessed the variety of the foods by summing the number of food groups eaten by caregivers in the 24 hours prior to the interview. The 12 major food groups inquired about are cereals, tubers, vegetables, fruits, meat, fish, eggs, legumes, milk and milk products, fats and oils, sugar and sweets and miscellaneous (spices, sweets, unsweetened beverages).

Figure 12: Diet Diversity Classification

Diet diversity classification

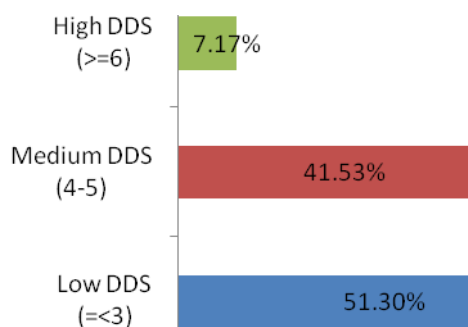


Figure 12 shows the distribution of dietary diversity score in mothers/caretakers. The analysis of findings was conducted using the FAO classification framework. A diverse diet was indicated by consumption of four or more food groups. Analysis of aggregate data of the 614 caretakers indicates a mean Individual Diet Diversity Score (IDDS) of 3.6 (SD 1.29) and median of 3.0 for the number of food groups consumed. Slightly more than half (51.3%) of the caretakers consumed less than four food groups in the previous 24 hours (below the threshold for a diverse diet) which may highlight serious food insecurity.

Table 18: Main Sources of Foods Consumed

Dietary diversity classification		Main Source						Total
		Own production	Purchases	Gift from relatives	Food aid	Wild food	Others	
Low DDS (= <3)	Count	109	192	2	6	1	5	315
	% of Total	17.8%	31.3%	.3%	1.0%	.2%	.8%	51.3%
Medium DDS (4-5)	Count	104	147	2	0	0	2	255
	% of Total	16.9%	23.9%	.3%	.0%	.0%	.3%	41.5%
High DDS (>=6)	Count	19	25	0	0	0	0	44
	% of Total	3.1%	4.1%	.0%	.0%	.0%	.0%	7.2%
Total	Count	232	364	4	6	1	7	614
	% of Total	37.8%	59.3%	.7%	1.0%	.2%	1.1%	100.0%

Respondents were asked to identify the main source of food. The main source of food consumed at household level were purchases (59.3%) and own production (37.8%).

3.15 Qualitative assessment findings

A summary of findings from in-depth interviews held with key persons and focus group discussions conducted with selected target groups is presented in this section. The focus group discussions sought to explore underlying factors influencing the nutrition situation of vulnerable groups (young children and pregnant and lactating mothers) in the district. Key informant interviews were conducted with a range of government officers and focal persons from organizations implementing nutrition, health and agriculture related interventions in the district. The discussions focused on factors influencing the nutrition situation in the district and possible solutions.

Key informants interviewed noted that there is a serious problem of malnutrition mostly affecting young children in the district, and expressed hope that the survey would generate critical information to enable the district formulate a plan to eliminate malnutrition and also to design targeted and focused responses/interventions. They were concerned that malnutrition is still rampant in a district which produces a lot of food. The crops that are mainly grown in Rusizi are maize, beans, cassava, rice, coffee and Tea. An agronomist interviewed observed that in general, there is enough food in the district. However a lot of nutritious food is sold to DRC because food is more expensive in DRC and therefore demand is high.

Sectors with high levels of malnutrition in the district were named as follows:

Mururu: Due to high levels of ignorance on foods that are nutritious, the community

was said to have a tendency to sell their produce which includes foods high in protein like eggs and fish to DRC and use the money to buy bulky food like rice or potatoes for their families.

Nkombo: The soil in this sector is very infertile and therefore crops do not thrive well. There are also high rates of polygamy in the sector.

Bugarama: High levels of ignorance relating to proper feeding/nutrition of children.

Bweyeye: This sector is deep in the forest with generally poor accessibility.

Butare: Largely inhabited by the bush men community that is historically a marginalized community with no value for education.

3.16.1 Underlying causes of malnutrition

Widespread malnutrition among children in the district was attributed to the following:

- **Poor infant and young child feeding practices** was cited as a key cause of malnutrition in the district by nutritionists and health care providers interviewed. It was noted that this includes early introduction of complementary foods to young children (by two months), coupled with poor hygiene in preparation and feeding leading to frequent diarrhoea and worm infestation. Low feeding frequency for young children (one – two times per day) was also highlighted as contributing to malnutrition.
- **Low crop and livestock production:** Households typically have small lands with low crop production due to minimal use of manure. Few families keep livestock.
- **Very low uptake of family planning services** (20% compared to national uptake of 40%). This was attributed to the fact that Rusizi district is predominantly Catholic, therefore limited acceptance of conventional methods of family planning. This has resulted in very many children sharing the little food that is available.
- **High rates of polygamy** which translates to too many people sharing the little produced or bought by the main provider (husband) was also given as a cause of malnutrition in the district.
- **Inadequate nutritional surveillance:** The health director observed that before the war, there was an effective system of screening and surveillance on malnutrition because health centres had a department where children were monitored and followed up regularly. However since 2000, this surveillance is conducted at community level making it difficult for timely response.
- **High levels of poverty** lead to households selling most of the food produced in DRC for much higher prices than in Rusizi. This has in turn led to high prices of food commodities in Rusizi.
- **Inadequate knowledge:** Despite the district being on the shores of Lake Kivu with lots of protein dense food such as fish, beans and eggs, mothers sell these in the neighbouring DRC for money which they use to buy rice or potatoes for their children.
- **Irregular de-worming of young children** in the district leading to worm infestation was considered a key cause of prevailing malnutrition.

- ***Inadequate care for young children*** due to high workload of mothers with young children.

3.16.2 Recommended actions/strategies to address malnutrition

The following were highlighted by key informants interviewed as actions that should be taken to eliminate malnutrition in the district.

- ❑ The district needs to put in place a comprehensive plan to reduce malnutrition with specific interventions and actors.
- ❑ Effective measures should be put in place for early detection of malnutrition among children under 5 years in the district.
- ❑ The ROADS II project could support establishment of a district level multisectoral forum to deliberate on a district focused strategy for elimination of malnutrition and provide oversight in implementation of nutrition interventions. A first step would be finalization of the district nutrition work plan.
- ❑ There needs to be intensive community sensitization on proper nutrition and malnutrition targeting mothers, fathers and grandmothers.
- ❑ Behaviour change communication with messages targeting increased uptake of exclusive breastfeeding, food preparation and feeding young children, hygiene and diets for pregnant and lactating women.
- ❑ Use FHI 360 cluster approach to organize mothers and fathers and promote nutrition because it has been proven to lead to behaviour change with other initiatives.
- ❑ The government needs to increase the technical and financial capacity of districts to be able to deal with malnutrition.
- ❑ Promoting increased uptake of family planning in the district as it is very low and contributes to malnutrition because many families can't afford to properly feed the large number of children.
- ❑ Provision of small livestock (such as chicken, rabbits, Kobai (guinea pigs) to each family with a malnourished child to increase access to protein rich foods
- ❑ Teach and conduct demonstrations to mothers and caregivers on food preparation and preservation methods at umudugudu level.

3.16.3 Existing nutrition and food security interventions

Various initiatives to address malnutrition in the district implemented by the government and partners cited by key informants interviewed include:

- **Monthly nutritional screening of children** (6-59 months): This was initiated in 2010 by the mayor in line with the national goal of eliminating malnutrition in the country. It is implemented by trained CHWs at Umudugudu level. During these sessions, mothers are educated on nutrition although this is not done regularly.
- **Presidential initiative to alleviate poverty** through provision of a cow to poor families, a while ensuring vulnerable households have access to milk.
- **Supplementary feeding:** CARITAS works with CHWs at village level to screen children for malnutrition and refer accordingly. Children who are moderately malnourished are referred to the health centre for outpatient supplementary feeding while those who are severely malnourished are referred to the hospital for inpatient care and therapeutic feeding. During screening sessions, community health workers provide training to the mothers on proper food preparation methods. The government also supplements children in nursery school in the district with a cup of milk daily.
- **Increased agricultural production** through promotion of organic farming, land consolidation and promoting increased production of food crops. Extension agronomists in each Umudugudu assist and provide technical support to the community on appropriate farming methods. They also have technicians at each cell who are in charge of development and who collaborate well with the department of social affairs.
- **Kitchen gardening:** FHI 360/ ROADS II project has supported capacity building of cluster members in Kamambe and Bugarama in kitchen gardening to increase availability of food for vulnerable groups in these communities. This included provision of fruit trees for clusters in Bugarama. This has been expanded to include increased agricultural production at the project sites. In addition, health centre run by CARITAS have demonstration gardens where mothers and other members of the community learn about farming and livestock rearing. Community members are taught how to start and manage kitchen gardens in their homes and how to rear small livestock like chicken and rabbits.
- **Capacity building:** ROADS II project partnered with the government agronomists to train 200 cluster members in organic farming to increase productivity. The agronomy department in Kamembe sector has trained CHWs to educate and sensitize the community on food security issues. Cluster members have also been trained in mushroom production for home consumption and sale. During this study, one cluster was in the process of initiating a unit to produce mushroom seeds to sell to the other 5 clusters.
- **Nutritional screening:** In urban areas such as Kamembe, CHWs have been trained to conduct screening and education of mothers on child nutrition under supervision

of the hospital nutritionist. It was reported by key informants interviewed that during screening sessions, cooking demonstrations are sometimes conducted.

- **Micronutrient supplementation:** All health centres provide vitamin A supplementation to children (6-59 months) in line with the ministry of health guidelines.
- **Community based nutrition programme:** A pilot community based nutrition project was undertaken in Mibirizi by UNICEF but it was discontinued in 2009.

3.16.4. Making feeding decisions and sources of nutrition information

Decisions on feeding of young children are made by women because “traditionally, that is their job”, FGD participant, Kamashangi. These decisions are however influenced by men since what they earn determines type of foods consumed in the household.

Findings of this study reveal that the role of men in nutrition of young children is mostly limited to provision of money to purchase foodstuffs for the family. Men also cultivate and produce food consumed. An FGD participant at Pera however observed that “generally, men do not take interest in nutritional information and do not know much about it”. The participants therefore recommended that men should specifically be targeted and given information on appropriate nutrition for children”.

Sources of information for the community on nutrition cited include NGOs such as compassion in Kamashangi, health workers, village meetings, health programmes aired on radio, community health workers and local health facilities when children are taken for immunization. FGD participants at Rusayo pointed out that some men receive information on nutrition when they accompany their wives to the clinic during pregnancy and also when taking babies for immunization.

Asked what their sources of information on diets of children are, men mentioned radio broadcasts and public meetings with local leaders. However, health care providers were rated as the most trusted source of information on feeding of infants and young children by men in the district. This was attributed to the fact that health workers had advised families on how to feed children which led to a big reduction in number of children with Kwashiorkor in the district.

The key messages given through the various methods cited were:

- Types of foods that are good for young children
- What to do when babies and young children are not gaining weight
- Importance of family planning so that families only get the number of children that they can feed and care for.
- Promotion of kitchen gardens where families are encouraged to grow vegetable

- Use of boiled water and proper waste disposal to prevent diarrhea among young children.

4.0 Conclusion and recommendations

4.1 Conclusion

The current food and nutrition situation of households in Rusizi district as determined through this survey is very precarious as it is characterised by high prevalence of stunting and underweight among children under five years. These rates are slightly higher than the national rates of chronic malnutrition and underweight according to DHS report 2010. Findings of this survey reveal that the key underlying causes of malnutrition among children in Rusizi district are; household food insecurity, poor infant and young child feeding practices, low rates of exclusive breastfeeding, feeding frequency and dietary diversity; high incidence of diseases, low access to essential nutrition services such as supplementation with vitamin A and de-worming; poor hygiene and lack of adequate and safe drinking water.

Consequently, integrated approaches should be undertaken to address risk factors such as sub-optimal childcare and feeding practices, household food insecurity, poor sanitation and unsafe drinking water. Measures to improve coverage of nutrition programmes would play a critical role both in preventing and treating morbidity and malnutrition.

- ❑ In the long term, it is important to address the causes of chronic malnutrition. Almost one in two children are stunted ($\approx 45.3\%$ GCM). Adequate food alone does not result to improved nutritional status if other child care practices such as hygiene, timely treatment of illnesses, de-worming and infant and young child feeding practices such as breastfeeding are poor.
- ❑ Findings of the survey show that the 6-29 age-group is the most vulnerable group to malnutrition. However, the high levels of malnutrition among all the age groups further demonstrates the influence of factors beyond poor child caring practices on the nutritional status of children in the district. Promoting optimal infant and young child feeding practices by education of caregivers would go a long way in improving the health and nutrition of children under five years. Increased knowledge on dietary diversity for caregivers would benefit the whole family.

4.2 Recommendations

Efforts that address both immediate and underlying causes of malnutrition in the vulnerable population should be instituted. In addition, developing longer term strategies to enhance the provision of basic services, sustainable strategies for livelihood support and social protection mechanisms are recommended. The following are specific recommendations.

Immediate/short term Interventions

In line with the findings of this survey, the following immediate and short term actions to avert worsening of the nutrition situation of children in the district are recommended. Medium and longer term recommendations are also highlighted.

- ❑ The district needs to put in place a comprehensive plan to reduce malnutrition with specific interventions and actors. A first step would be establishment of a district multi-sectoral forum to develop a district focused strategy for elimination of malnutrition and to provide oversight in implementation of nutrition interventions.
- ❑ Establishment of a community based nutrition program which has already been pilot tested in the district would enable the government and development partners to address the challenge of malnutrition in the district meaningfully. Interventions such as food security, outreach immunization, nutrition and health education on hygiene, water and sanitation, livestock promotion and bio-intensive agricultural techniques such as orange flesh sweet potatoes should be integrated into the CBNP.
- ❑ An integrated package comprising of high impact nutrition interventions and focusing on the vulnerable period from pregnancy to the age of two years should be implemented through the community based nutrition program and health facilities. Particular attention should go be given to promotion of exclusive breastfeeding, feeding a variety of foods frequently to young children while observing hygiene, micronutrient supplementation and improved maternal nutrition. As this is rolled out, there will be need for continued monitoring of both facility and community based interventions to track progress.
- ❑ The ROADS II cluster organizing approach which has led to behaviour change with other initiatives in the district could be used to organize peer-led mother-to-mother support groups and to cluster existing groups. These would provide a forum to dialogue on local causes of malnutrition and how these can be overcome, and also to reinforce key messages on nutrition and childcare.
- ❑ Strengthen programmes and strategies currently addressing infant and young child nutrition with a view to improving the protection, promotion, and support of optimal infant and young child feeding practices. This could be addressed through training of community based volunteers to counsel and provide on-going support to caregivers. Mothers should be trained in preparation of nutritious foods for infants and young children using what is locally available.
- ❑ Given the high prevalence of malnutrition in the district, regular screening should be carried out at community level and malnourished children identified for focused follow-up and supplementary feeding. Community based volunteers should be

trained to conduct growth monitoring and to make referrals of malnourished children for follow-up at local health facilities.

- ❑ Behaviour change communication messages targeting mothers and caregivers should address key barriers to appropriate feeding practices identified through this survey such as giving of pre-lacteal feeds, early introduction of supplementary foods, low frequency of feeding and variety of foods fed to young children.
- ❑ Delivery of key nutrition messages above could use the following channels: community-based promotion through CHWs, peer-led mother support groups, community groups/meetings and religious forum and through the ROADS II community organizing structure (the cluster model). Facility-based promotion would include- delivery of context and culturally specific IYCN messages.
- ❑ Promotion of hygiene practices to reduce the incidence of diarrhoeal disease associated with contaminated water in the household. This could include awareness to the community on domestic treatment of drinking water and effective hand washing (using soap) after using the latrine, during food preparation and before child feeding. This should be backed-up with provision of free water treatment chemicals where feasible.

Medium/Long-Term Interventions

- ❑ Focus on programmes by relevant actors that improve and sustain dietary diversity and consumption of micronutrient-rich foods. This would address improved complementary food access for children six months to two years.
- ❑ Underlying cultural factors and beliefs hindering uptake of recommended feeding behaviours identified through this study will need to be addressed. Engaging influential household members such as grandmothers and fathers is strongly recommended.
- ❑ Improving coverage for child health programmes, especially for Vitamin A supplementation and de-worming. This is feasible through strengthening of the outreach component, ensuring that these are distributed concurrently during vaccination campaigns.
- ❑ Promoting increased uptake of family planning in the district as this contributes to malnutrition because many families can't afford to properly feed the large number of children. A key role that fathers could take to improve nutrition of young children is taking the lead in family planning.
- ❑ As a long-term measure, developing the economic capacity of the community to be able to meet household food needs is critical. This will enhance household food security.

- ❑ Strengthen interventions for high impact nutrition interventions, including maternal micronutrient supplementation during pregnancy (iron and folate), and critical hygiene and sanitation practices and messages.
- ❑ Establish regular nutrition surveillance in the district through nutrition surveys.
- ❑ Improved farming and animal breeding techniques, as well as fighting soil erosion so as to improve food production and household food security will be critical to reduction of malnutrition in the district.
- ❑ The government needs to increase the technical and financial capacity of the district to be able to deal with malnutrition. The one cow for each poor family project should be scaled up.

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APPENDICES

Appendix 1: Study Team

Enumerators & FGD Facilitators	Supervisors	Survey Co-coordinators
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Aziza Cyamazinga	Mediatrice Ntirushwa	
Solange Uwantege	Shadrack Habimana	
Innocent Rwigema	Bertin Ntigimana	

Appendix 2: Study Areas

SECTOR	CELL	SAMPLED UMUDUGUDU
BUGARAMA	NYANGE	Rusayo
	PERA	Murambi
	RYANKANA	Ruhwa
BUTARE	GATERERI	Nyakibanda
	BUTANDA	Gasihe
	RWAMBOGO	Cyaruhiza
GASHONGA	BUHOKORO	Gihanga
	RUSAYO	Ryagatebe
	BIREMBO	Rurama
GIHEKE	GIHEKE	Rwumvamgoma
	NTURA	Karambi
GIHUNDWE	BURUNGA	Karorabose
	GIHAYA	Budorozi
	KAMATITA	Gahwazi
GIKUNDUMVURA	KIZURA	Hinduka
	MPINGA	Nyabihanga
GITAMBI	MASHESHA	Busasamana
	GAHUNGERI	Kamagaju
KAMEMBE	KAMASHANGI	Mucyamo
	RUGANDA	Kadashya
MUGANZA	CYARUKARA	Gashinjano
	GAKONI	Rebero
	SHARA	Gakenke
MURURU	KABAHINDA	Kabahire
	KARAMBI	Gihango
	TARA	Cyandarama
NKANKA	KAMANYENGA	Kavogo
	RUGABANO	Karambo
NKOMBO	BUGARURA	Rurembo
	RWENYE	Rutarakiro
NKUNGU	KIZIGURO	Kabuga
	MATABA	Migazo
NYAKABUYE	GASEBEYA	Kabuye
	KIZIHO	Rwimbogo
	MASHYUZA	Rukamba
	NYABINTARE	Gakungu
NYAKARENZO	KANOGA	Kanyovu
NZAHAHA	NYENJI	Murindi
	BUTAMBAMO	Muguri
	REBERO	Gatovu

Appendix 3: Key Informants Interviewed

Francoise Nirere	Vice mayor - Social Affairs
Juliet Muhawenimana	District Health Director
Anastasio Mukakayumba	Nutritionist - Gihudwe Hospital
Vincent Habimana	Supervisor - Gihundwe district hospital
Leonard Ntakirutimana	Health coordinator - CARITAS
Naima Uwinama Butoyi	Sector agronomist - Kamembe
Emmanuel Bwimana	Nutritionist
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Melchiade Ruberintwari	ROADS II Project country manager, FHI360, Rwanda
Albert Webale	UNICEF/GOR Nutrition consultant
Ephraim Kamarampaka	ROADS II Rusizi Site coordinator

Appendix 4: Household Questionnaire Nutrition and Food Security Survey

Name of District	Name of Sector	Sect or No	Name of Cell	No of Cell	Name of Village	No of Village	Household No	Date of Interview (dd/mm/yy)	Name of Interviewer	Name of Team Leader	Team No
								_ / _ / _			

Note: This Questionnaire must be filled in **ALL** the households visited regardless of whether they have children 6-59 months or not.

Household Demographic Information:

1. How many people live in this household together and share meals? (**Household size**) [_____] .
2. How many of them are: Total < 5 years [_____] Total 0-<6 months [_____] Total 6-59 months [_____] Total > 5 years [_____]
3. Who is the head of this household? [_____] (**Codes: 1=Husband 2=Self (Mother) 3=My parent 4=Other (specify) _____**)
4. Is your family monogamous or polygamous? [_____] (**Codes: 1=Monogamous 2=Polygamous 3=Single parent**) (If Monogamous **SKIP** to Q6)
5. If polygamous (i.e. Q4 =2), how many wives does your husband have? [_____]

6. Household Water Sources and Consumption

<p>6.1 What is your <u>current</u> MAIN source of water for general household use?</p> <p>Codes: 1=River 7=Public pan 2=Lake 8=Water 3=Tap water bowser/tanker 4=Borehole 9=Dam 5=protected well 10=Digging along the 6=Unprotected well Laga 11=Rain water 12=Other _____</p>	<p>6.2 How long does it take to go to the MAIN source of water, fetch it and come back (including waiting time at the water point) in minutes?</p>	<p>6.3 On average, how many jerricans of water does the household use per day?</p> <p>[Enter in litres]</p>	<p>6.4 How much do you pay for a 20 litre jerrican of water <u>currently</u>?</p> <p>(enter zero if water is free)</p>	<p>6.5 What is your <u>Current</u> main source of DRINKING water?</p> <p>Codes: 1=River 7=Public pan 2=Lake 8=Water 3=Tap water bowser 4=Borehole 9=Dam 5=Protected well 10=Digging along the 6=Unprotected well Laga 11=Rain water 12=Other Specify____ _____</p>	<p>6.6 Do you do anything to the water before drinking it?</p> <p>Codes: 1=Nothing 2=Boiling 3= Add chemicals 4= Use traditional herbs 5=Filters/Sieves 6=Decant</p>
Main source	Minutes	Litres	Rwanda currency		

Household Food Consumption

7. **Usually**, how many times does your household take meals in a day? [_____]
8. How many times did the household take meals **YESTERDAY**? [_____]
9. Did **all eligible** members of your household (excluding those who are away from home or very young children) take all the meals prepared **YESTERDAY**? [_____] (**Codes: 1=Yes 2=No**)
10. (If **NO**), for what reason did some members who were present not take ALL meals? [_____] **Codes: 1=Not enough food 2=Took meals elsewhere 3=Food prepared not suitable for them 4=Others**

Maternal Health Care Information

11. Are you aware of any mother support/breastfeeding groups in your village? [Excluding HIV/AIDS/Self help groups, merry-go rounds, home-based care groups] [_____] Codes: 1=Yes 2=No
12. **[IF YES]**, are you a member of any of the groups? [_____] Codes: 1=Mother Support group 2=Breastfeeding group 3=No
13. During your last pregnancy, did you attend Ante-Natal Clinic (ANC)? [_____] Codes: 1=Yes 2= No 3= Mother never delivered **[If Never delivered SKIP to Q 19]**
14. **[IF YES]**, how many times did you attend the clinic? [_____]
15. **[IF NO]**, why did you not attend? [_____] Codes: 1=Not aware of existence/importance of ANC 2=Health facility too far 3=Unfriendly health workers 4=TBA services adequate 5= Cultural barriers e.g. staff too young, male staff etc 6=Other (Specify)_____
16. Where did your last delivery take place? [_____] Codes: 1=At home by TBA 2=At home by Nurse 3=At home without assistance 4=Hospital 5=Mother –in-law
17. **[If at HOME]**, how long did it take before you took child to clinic? [_____] Codes: 1=Within first 2 weeks 2= Between 2 weeks and 1 month 3=After 1 month 4= Child not taken/does not intend to take child to clinic
18. After your last delivery, did you receive vitamin A supplementation? (Show mother Vitamin A Capsule) [_____] 1= Yes 2= No
19. **Food consumption for mother or primary child giver:** Since you (mother) woke up yesterday morning to the time you slept in the evening, what types of food and drinks did you take? Enter 1 for food groups reported as having been consumed and 0 for those not consumed. If a food group was consumed more than once, entre 1 only once. [Do not read the list to the respondent]. [This question applies only to the caretaker and not any other household member]

	Food group	Examples	1=Yes 0=No		19b) What was the <u>main</u> source of food consumed in HDD yesterday?
19.1	Cereals and Cereal Products	Maize, rice, pasta, ugali, porridge, bread, biscuits, millet, sorghum, wheat [and any other locally available grains]		19.1	Codes: 1= Own production 2= Purchase 3= Gift from relatives 4= Food aid 5= Bartered 6= Borrowed/credit 7= Wild food 8= Other (Specify) [_____]
19.2	Fish and Sea Foods	fresh or dried fish or shellfish		19.2	
19.3	Roots and Tubers	Irish potatoes, sweet potatoes, yams, cassava, or foods made from roots or wild roots and tubers		19.3	
19.4	Vegetables	Sukuma wiki, cabbages, carrots, spinach, Mushrooms, and any other locally available vegetables including wild vegetables		19.4	
19.5	Fruits	Oranges, ripe bananas, mangoes, avocados, pineapple, pawpaw		19.5	
19.6	Meats and Poultry	Camel, beef, lamb, goat, rabbit, wild game, chicken, pork, or other birds, liver, kidney, heart or other organ meats or blood-based foods		19.6	
19.7	Eggs	Chicken, bird eggs		19.7	
19.8	Pulses / Legumes / Nuts and Seeds	Beans, peas, lentils, nuts, groundnuts, seeds or foods made from these		19.8	
19.9	Milk and Milk Products	Fresh/fermented milk, cheese, yogurt, or other milk products		19.9	
19.10	Fats and Oils	Oil, fats, ghee, margarine, palm oil, or butter added to food or used for cooking		19.10	
19.11	Sugars / Honey and Commercial Juices	Sugar in tea, sugarcane, honey, sweetened soda or sugary foods such as commercial juices, chocolates, sweets or candies		19.11	
19.12	Miscellaneous	Spices, sweets, unsweetened beverages,		19.12	

20. Sanitation – Toilet facility

20.1. Does your household have access to a toilet facility that you use? [If NO, Skip to 20.3] 1=Yes 2=No	20.2. (If yes), what type of toilet facility do you have? 1=Bucket 2=Traditional pit latrines 3=Ventilated improved pit latrine 4=Flush toilet 5=Other Specify _____	20.3. (If No), where do you go/use? (probe further) 1= Bush 2=Open field 3.=Near a water source 4.=Behind the house 5.=Other (specify)_____	20.4 [OBSERVE] how children's faeces is disposed 1= disposed of immediately and hygienically 2= Not disposed (scattered in the compound) 3=Not observed	20.5 Do you wash your hands before you feed your child? 1 = Yes 2 = No 3=Sometimes	20.6 [OBSERVE] Is the compound clean? 1 = Yes 2 = No

21 Possession and Utilization of ITNs

21.1 Does this household have a mosquito net or nets? Codes: 1 = Yes 2 = No [IF NO, GO TO Q 22]	21.2 [If YES], Where did you get it from? Codes: 1 = A shop/vendors 2 = An agency/NGO 3 = MOH/Mission hospital [If 2 or 3 Skip to Q 21.5]	21.3 [If from the shop] Have you ever treated your net (soaked or dipped it in dawa or chemical to repel mosquito or insects)? 1 = Yes 2 = No [If NO, Skip to 21.5]	21.4 [If YES], When did you last treat it? Enter code 1) Less than one month ago 2) Between one and six months ago 3) More than six months ago 4) Cannot remember	21.5 Who slept under the mosquito net last night? (Probe - enter all responses mentioned) 1) Children less than 5 years 2) Children over 5 years 3) Pregnant woman 4) Non-pregnant woman 5) Father 6) Nobody used 7) Other sp

22. Livestock Situation

Livestock Size	
22.1	Do you have livestock (Cows, goats, sheep) 1=Yes 2=No (If No, skip to Que 23) Codes
22.3	Has the number of your livestock changed since this time last year? Codes: 1=Increased 2=Reduced 3=Remained the same
22.3	If increased/decreased what are the reason(s)? Note: Multiple responses possible Codes: (1= Animals gave birth 2= Bought 3= Given 4= Death because of drought 5= Death because diseases 6= Sold 7= Raid 8= Other (specify)-----)

23. Sources of income

23.1	Main Source of Income In the last three months [i.e. Since June this year] what was the MAIN source of income for your household? Codes: 1= Sale of livestock 2= Sale of livestock products 3= Sale of food ration 4= Sale of own crop 5= Wage labour 6= Salaried employment 7= Petty trade 8= Remittances 9= Sale of charcoal/firewood 10= Beadwork 11= Business 12= Quarrying 13= Other (Specify) _____
23.2	In the last three months [i.e. Since June this year] what was the MAIN expenditure? Codes: 1= Food 2= Clothing/Household Items 3= Rent 4= School Fees 5= Purchase of livestock 6= Other (Specify) _____

Appendix 5: Child Immunization, Anthropometric and Breast Feeding Data Form (Only for Children 6-59 months Old)

DD/MM/YY

Name of District _____ Name of Sector _____ Sector Number _____ Cell _____ Cluster No. _____ Date of Interview ___/___/___ Team Leader _____ Team No. _____

1	2	3	4		5	6	7	8	9	10	11	12	13	14	15	16		17	18
HHD No. (Copy from main HHD Qnn for ALL children)	Child No	Child's <u>Intra-Household ID</u> number and Name Give youngest child in the household ID no 1. If more than one child, record them sequentially by age) Child Intra-HHD** ID No	Age of child (Use Clinic Cards and Calendar of EVENTS)	DOB	Mon	Child age Verification 1= Vaccination card 2= Birth certificate 3= Baptism card 4= Recall	Child Sex 1= M 2= F	Oedema present? 1=Yes 2=No	Height in cm (Nearest 0.1cm) Write down the decimal and <u>do not round off</u>	Weight in KGs (Nearest 0.1kg) Write down the decimal and <u>do not round off</u>	MUAC in cm (Nearest 0.1cm) Write down the decimal and <u>do not round off</u>	How many times has (Name) received vit A capsules in the last 1 Year? (Show the mother the Red capsules) If none, enter zero	Has (Name) Been Immunized against measles?*	Has (Name) received OPV1?	Has (Name) received OPV3?	Has (Name) been dewormed in the last 6 months?)	Has (Name) ever been breastfed? 1=Yes 2=No	Is (Name) currently breastfeeding? 1=Yes 2=No If NO , for how long was he/she breastfed? (in months)	At what age was (Name) given any liquid or solid food other than breast milk for the first time after birth including water? Convert and record in DAYS . If given immediately record zero
																		B/F	Duration
	1.																		
	2.																		
	3.																		
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Note: ** Child Intra-HHD Id No = Number/serial number for each child in a given household starting with the youngest to the oldest child and repeated in each of the households visited. If there is only one child 6-59 months in the household, the Intra-household number for this child = 1

Rusizi District Survey – Child Morbidity and Child Feeding Data Form (Only for Children 6-59 months Old) [Continue from Page 1]

Name of District _____ Name of Sector _____ Sector Number _____ Cell _____ Cluster No. _____ Date of Interview ____/____/____ Team Leader _____ Team No. _____

1	2	3	19	20	21	22	Questions 23.1 – 23.8 I would like to ask you about the type of foods and drinks the index child(ren) aged 6-59 months ate or drank yesterday from the time they woke up in the morning to the time they slept. [Enter 1 against a food group that is reported as having been consumed by each child 6-59 months assessed in the household and 0 for foodstuffs NOT consumed]. <u>Do not read the list of foodstuffs in the table below to the respondent.</u> Note: 1=Yes 0=No									
HHOLD No. Copy HHD Numbers in exactly the same order in which they appear on page 1	Child No.	Child's <u>Intra- HHD ID number and Name</u> Copy child <u>intra-household ID Numbers and Names</u> in exactly the same order in which they appear on <u>page 1</u>	Has (Name) been sick in the last TWO (2) WEEKS* 1= Not sick 2= Cough/ARI 3= Measles 4= Eye infect 5= Diarrhoea 6= Malaria 7= Stomache 8= Skin infect 9= Others specify____ (Enter all mentioned) responses	When (Name) was sick the LAST time did you seek assistance? IF YES, where? 1= Public Clinic/Hospital 2= CHW 3= Mobile Clinic 4= Private Clinic/Pharmacy 5= Shop/Kiosk 6= Relative/Friend 7= Traditional Healer 8= No Assistance sought	Is (Name) currently enrolled in the hospital Feeding Programme? 1=Yes 2=No [If YES, for how long? [convert time and indicate how long in days] [If YES, indicate which type of programme] 1=Supplement Feed Prog 2=Theraptic Prog (OTP) 3=Inpatient management In Prog? Duration Progmm	How many times was (Name) given meals since he/she woke up in the morning up to the time of sleeping at night yesterday ?	23.1 Grains, Roots or Tubers Eg Maize, Bread, Sorghum, Wheat, Rice, Pastas, Irish and Sweet Potatoes, Porridge	23.2 Vitamin-A rich Plant Foods E.g. Dark green leafy vegetables (e.g. Sukuma wiki, Spinach,...) and Bright-colored vegetables e.g. Carrots, tomatoes, Pawpaw, and Orange/Yellow Flesh Sweet Potato	23.3 Fruits and Other Vegetables Any other vegetable s or fruits eg Oranges, Mangoes, Avocado, Ripe bananas, Cabbages	23.4 Meat, Poultry, Fish, Seafood E.g. Beef, Poultry, Fish Shellfish, Organ meats e.g. Matumbo, Liver, Kidney	23.5 Eggs E.g. Chick en Bird eggs	23.6 Pulse s Legumes Nuts and Seeds E.g. Beans, Peas, Nuts, Seeds, Ground Nut	23.7 Fats and Oils E.g. Food cooke d in oil, Anim al fats Ghee Butter , BBand d	23.8 Milk and Milk products Milk, Chee se Tea with milk	23.9 Sugar Sweet s Honey Choco lates Soda	
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Rusizi District Survey – Maternal MUAC Data Form [Continued from page 2]

Name of District _____ Name of Sector _____ Sector Number _____ Cell _____ Cluster No. _____ Date of Interview ____/____/____ TeamLeader _____ Team No. _____

1	2	3	24	25	26		
HHOLD Number Copy HHD Numbers in exactly the same order in which they appear on pages 1 and 3	Child No	Child's Intra-Household ID number and Name Copy child intra-household ID Numbers and Names in exactly the same order in which they appear on pages 1 and 3 <table border="1"> <tr> <td>Child Intra-HHD** ID No.</td> <td>Child Name</td> </tr> </table>	Child Intra-HHD** ID No.	Child Name	Age of Mother/ in years	Physiological status of mother/child care taker 1=Pregnant 2=Lactating 3=Preg &lact 4=Not preg/ not lactating (Multiple response)	Maternal MUAC <u>Mother MUST be between 15-49 years For MUAC to be taken</u> Record maternal MUAC in mm
Child Intra-HHD** ID No.	Child Name						
	1.						
	2.						
	3.						
	4.						
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Appendix 6: 0- 6 month-old child breast feeding questionnaire

ONLY to be filled for Children 0 to <6 Months Old found in the Households visited

- Make every effort to speak with the mother. If she is not available, speak with the primary caregiver responsible for feeding of the child.
- Fill in the identification information in the table below from the **Main Household Questionnaire**

Name of district	Name of Sector	Sector No	Name of Cell	No of cell	Name of Village	No of Village	Household Number	Date of Interview (dd/mm/yy)	Name of Team Leader	Team No
								___/___/___		

1	2	3	4	5	6	7	8	9	10	11	12	13	14
HHD No.	Child No.	Child Name	Child Age in DAYS (Convert months to days)	Sex of child 1= M 2= F	Did (Name) ever breastfeed? 1= Yes 2= No	(If No), why did (Name) not breastfeed? Codes: 1= No milk from breasts 2= Refused to breastfeed 3= Traditional beliefs 4= Child deformity 5= Other (Specify) (Child not breastfed so end interview)	(If yes), How long after birth did you put (Name) on the breast? (For those who do not answer immediately, probe why) Codes: 1=Immediate (within 1 hr) 2= Within first day 3= Within first 3 days 4=After 3 days 5=Other (specify) 6= Don't know	(If Yes), During the first 3 days after delivery, did you give (Name) the fluid/liquid that came from your breasts? Codes 1= Yes 2= No	In the first 3 days after delivery, was (Name) given anything to drink other than breast milk? Codes: 1= Plain water 2= Sugar/glucose water 3= Animal milk 4= Infant formula 5= Fruit juice 6= No 7= Other (Specify)	Is (Name) still breast-feeding? Codes: 1= Yes 2= No	(If Yes) how many times did (Name) breastfeed Yesterday? Codes: 1= <5 times 2= >5 times 3= >10 times 4= >12 times 5= Don't know	Is (Name) taking other foods or drinks including water currently? Codes: 1= Yes 2= No	(If Yes), at what age did you start giving (Name) other foods and drinks (including water) in Days? (Convert if months to days)
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