

**Bi-annual Nutrition Survey Report for
Tanqua Abergele Woreda
Tigray, Ethiopia**

**Early Warning Response and Food Security Sector (EWRFS)
Bureau of Agriculture and Rural Development (BoARD)
Tigray Regional State**

**In collaboration with
Woreda Health and Agriculture & Rural Development Offices**

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Executive Summary	
Demographic Characteristics	
Woreda	Tanqua Abergele
Administrative Zone	Central
Livelihood Zone	Middle Tekeze Livelihood Zone
Farming System	Mixed Farming 100% Kiremt (Azmera & Tsedia rain) dependent
Estimated Number of Survey Population	104,582
Total number of households	23,769
Total number of under five children	15,896
Proportion of Children U5	15.2%
Average Household Size	5.85
Average size of under five children	0.84
Survey Overall Objective	
<ul style="list-style-type: none"> To assess the nutrition, health, food security situation and contextual factors and determine determinants of the existing nutrition and food security status of the rural population 	
Specific Objectives	
<ul style="list-style-type: none"> To estimate the current prevalence of acute malnutrition in children aged 6-59 months (65-110 cm length/height when age is unknown) To estimate the retrospective Crude Death Rate (CDR) and Under five death rates (U5DR) To estimate morbidity among under five children; To assess the food security situation of the surveyed population at the time of the survey To estimate Measles, BCG vaccination and Vitamin A supplementation for children 9-59 months and 6-59 months respectively To assess the association between contextual factors collected during the survey and nutrition situation in the survey Woreda. To make recommendations based on survey findings To serve as nutrition information systems, monitoring and early warning (surveillance tool) when conducted bi annually for long period of time 	
Methodology	Cross sectional, two stage cluster sampling based on SMART methodology
Date of Survey: Training the survey team : Actual field work	04 - 08 June 2015 09 - 19 June 2015
Sample size : Anthropometry	
Number of households (Planned/Actual)	1200 (1020)
Number of children (Planned/Actual)	755 (860)
Sample size: Mortality	
Number of households (Planned/Actual)	115 (1020)
Number of population (Planned/Actual)	527 (5969)
Number of clusters surveyed	60
Number of survey teams	6
Number of sample size per cluster per day	17
Number of actual surveys (field work)	10 days
Key Findings	
Wasting (GAM based on WHZ score)	10.2 % (8.1 – 12.9) (95% C.I.)

Stunting (GAM based on HAZ score)	40.8 % (36.8 – 44.9) (95% C.I.)
Underweight (GAM based on WAZ score)	43.4 % (39.4 – 47.4) (95% C.I.)
MUAC (National/International cut-off points)	5.0 % / 13.0% (95% C.I.)
Crude Mortality Rate (CDR)	0.09 (0.04 - 0.22) (95% CI)
U5 Mortality Rate (U5DR)	0.24 (0.06 – 0.97) (95% CI)
Prevalence of illness	15.7%
BCG Vaccine Coverage	77.1%
Measles Coverage (on card & mother recall)	97.3%
Vitamin A supplementation	90.5%
Safe drinking water coverage (% piped treated + tube well/borehole + protected well + protected spring)	77%
Sanitation (Toilet)	77% (out of which 60.5 are functional and clean at the time of the survey)
Bed net (ITN) coverage and utilization	93.8% / 42.6%
Meher Rainfall	FGD: Normal (65%) & Below normal (32%) KII: Below normal
Food Security Situation:	
Crop	below normal
Water and pasture for livestock	Normal, except FOUR Kebeles (Tabias) recognized as drought affected pocket areas of concern.
Food Stock Availability in the Surveyed Households	30 % HHs - No stock 19 % HHs - Up to one month 42 % HHs - Enough to last for 2- 3 months 9 % HHs - Enough to last for 4- 6 months
PSNP beneficiaries (KII)	19,782 (19%)
Relief beneficiaries (KII)	13,000 (12.4%)
<p>Conclusion: As per the national nutrition interim guideline (2008) with a GAM prevalence rate of 10.2 % and the nutrition situation of the surveyed Woreda, is characterized as “Poor”</p> <p>The prevalence of stunting and underweight, as per the WHO guideline and the cut-off points, showed a serious public health concern.</p> <p>Meher assessment findings (conducted in November 2014) report revealed that a total of 13,000 beneficiaries had been in need of food assistance for nine months.</p>	
<p>Recommendations: Based on the findings from the survey, the following short term and long term action points are recommended:</p> <p>Regional and Woreda level early warning in collaboration with stakeholders should closely assess, monitor and follow up the food security, health and nutrition situation of the surveyed Woreda with special attention given to the communities of the four highly drought affected pocket areas of concern: Felegehiwet, Emabrufael, Gera and Hadush Tekli.</p> <p>Effective coordination, timely allocation and distribution of PSNP, Relief food and TSF supplies would be very vital at the moment since closer to 50% of surveyed households have got noting and/or a little food reserve at household that may not go beyond one month.</p>	

Strengthen community mobilization and sensitization activities to implement and monitor preventative and promotive nutrition and health interventions.

Strengthen active case finding (through RHD and GMP services) and treatment of malnourished children under five and pregnant & lactating mothers as per the guidelines and protocols.

Build / strengthen the capacity (knowledge & skill) of front-line workers or service providers (Woreda Agriculture and Health experts, HEW, DAs, Women and Men Development Armies in nutrition specific and nutrition sensitive interventions.

Promote health & nutrition education to bring about the individual behavior and community social change (focusing on the identified gaps such as immunization, water treatment, CBN, sanitation and hygiene and proper use of ITN) by implementing evidence-based and result-based IEC / BCC nutrition and health interventions.

Improve the supply of agricultural inputs (crops and livestock - high yielding, drought /disease resistant varieties, veterinary supplies and services, encourage use of local and/or commercial fertilizer) and up-to-date agricultural technologies and tools.

Strengthen key WaSH activities (Safe water supply, water treatment) and sanitation & hygiene at household, community and institution levels.

Promote the use of small and large scale irrigation schemes to cultivate varieties of crops, vegetables and fruits to increase production and diversify foods including promotion of fruit and tree nurseries.

Promote livelihood diversification activities such as bee keeping, poultry, shoats and other income generating activities. Including strengthen linkages with credit and microfinance institutions to benefit communities in need of financial assistance.

Promote proper use and protect /maintain natural resources

Advocate for and strengthen multi-sectoral approach (make use of the already established regional to Tabia level Nutrition Coordination Body and Nutrition Technical Committee platforms) to tackle the multi-dimensional problems of the underlying causes of malnutrition by identifying the gaps, prioritize key intervention areas and incorporate nutrition programming into the existing sectors' (signatories of NNP) AWP. Planning and implementation of both nutrition specific and nutrition sensitive interventions reflected in the NNP document and the Lancet.

1. Background Information: Tanqua Abergele is one of the 34 rural and 14 urban Woredas of Tigray regional states. It is located in central zone at a distance of approximately 115 Km away from Mekelle, the capital city of Tigray regional state and 898 Km from Addis Ababa. Yechilla is the capital city of Tanqua Abergele Woreda. Administratively, it is divided into 20 Tabias (Kebeles) and 72 Kushet (Villages or Gottes) with a total population of 104,582 out of which 52,604 (50.3%) are males and 51,978 (49.7%) are females with a total of 23,769 households. The population density is 0.72/ha or 137 people/square km. There are 23769 (19596 male and 4173 female headed) household heads and 16,280 children under five years of age.

Tanqua Abergele shares a border with Sekota and Amhara region to the South, Degua Tembien and Sahirti Samre to the East, Kola Tembien to the North, and Woreda Tselemti to the West. It is located with an altitude range of 938 -2,201 meters. Annual average rainfall ranges between 210 and 700 mm. The annual temperature is between 28 and 40°C.

Tanqua Abergele Woreda covers an area of 144,564 hectare (ha) of which 29,498 ha is arable and 98271 is not. Out of 115,091 ha 29498 is used for growing crops, 37,890 ha is pastureland, 15,381.5 is covered by natural forest, 29,452 ha is covered with bushes and shrubs and 950 ha of land is covered with residential areas.

Tanqua abergele lies in Middle Tekeze Livelihood Zone. It is a dry, lowland (*kolla*) agro-ecological zone. The terrain is undulating, hills alternating with plains and valleys. Most villages are surrounded by mountains. Vegetation cover is made up of scattered acacia trees, riverine forests, and bush scrub. Rainfall is a low and erratic 350-550mm per year. Agro-ecologically, 95% is lowland (*Kolla*) and 5% mid highland.

Agricultural production is 100% *kiremti* rains dependant. Water for human consumption is collected from springs, minor rivers and seasonal pools. The production system is mixed farming on low lying plains, valleys and foothills. The main crops grown are staple Sorghum, Maize, Teff, Sesame and Flax (oil seed). Land for cultivation is generally available, but the soil is infertile and stony. Teff, a labor intensive crop, a high value cereal, is the main cash crop. Soil infertility and recurrent drought conditions are the main reasons why this zone is chronically food insecure. Smut and shoot fly pests are the biggest hazards to crop production. Smut affects Maize and Sorghum, and shoot flies attack Teff. Striga weed is a parasitic weed that also attacks Sorghum, and has the potential to reduce yields by 30%.

Cattle and goats are the main livestock types reared in the zone. Livestock are important both as a source of food and income and also for draught power. Cattle are highly valued possessions that are rarely sold. Shoats are more frequently sold and slaughtered during festive seasons in April (*Fasika*), and September (*Meskerem*). Communal grazing lands and crop residues provide feed for livestock, under the supervision of young boys. During the wet season, the sources of water for livestock are seasonal pools and minor rivers. The rainy season brings both an increase in pasture and the onset of the milk production season. Residents in this zone consume both cattle and goat milk. The main hazards to livestock ownership are shortage of pasture, bovine and ovine *pasteurellosis*, black leg and anthrax. Other important economic activities in the zone are honey sales and gum arabic sales.

The Woreda has got functional 01 primary hospital, 05 health center, 17 health posts, 12 pharmacies and one drug vendor. A total of 158 health personnel are currently working in the

Woreda. The above stipulated health facilities are staffed with 11 health officers, 58 nurses, 18 midwives, 12 pharmacist, 07 laboratory technicians, 03 environmental technician, 06 health information technicians, 05 Supervisors, 03 others (surgery, environmental health and anesthetic), 35 health extension workers. Besides, the Woreda has got 65 support staff (finance & administration) and 618 Voluntary Community Health Worker (VCHW).

At the moment, there are 19, 782 PSNP beneficiaries in the Woreda out of which 13,849 and 5933 are engaged in public work and direct support respectively. There are 13,000 beneficiaries receiving emergency relief food. Currently, there are a total of 1741 (846 children under five and 895 pregnant and lactating mothers) TSF beneficiaries in the Woreda.

2. Justification: For many years, nutrition surveys coordinated by the Federal ENCU have been focused more on determining the nutritional status of given or specific communities at a particular time and confirm reports of deteriorating food security, to serve as a baseline or monitor or evaluate the implementation of nutrition programmes at a particular point in time. Therefore, they are irregular and with limited scope. Hence, they could not serve as benchmarks or monitoring tool that determines the progression of nutrition and food security situation of the community over a long period of time. Additionally they rapidly lose relevance as majority of the data collected reflect the survey period.

Hence conducting nutrition surveys bi annually (during harvest and before the onset of hunger season) has become indispensable to carry out periodic monitoring of nutrition situation in all regional states and to establish nutrition information system or data base at national level to serve as and triangulate with other early warning indicators as well as complement the routine nutrition information collected with other sources (ie TFP, CBN and CHD) and trigger timely response accordingly. Therefore, this particular survey was conducted as one of the two biannual nutrition surveys scheduled to be conducted in October/ November and March/April.

3. Survey Objectives

3.1. General Objectives: The overarching goal of conducting this survey is to assess the nutrition, health, food security situation and contextual factors and determine determinants of the existing nutrition and food security status of the rural population. Data from the bi annual nutrition survey is also expected to provide trend analysis through time and serve as early warning tool; bench mark for monitoring purposes and to initiate timely response.

3.2. Specific Objectives: The survey has the following specific objectives

- To estimate the current prevalence of acute malnutrition in children aged 6-59 months (65-110 cm length/height when age is unknown)
- To estimate the retrospective Crude (CDR) and Under five death rates (U5DR)
- To estimate morbidity among under five children;
- To assess the food security situation of the surveyed population at the time of the survey
- To estimate Measles, BCG vaccination and Vitamin A supplementation for children 9-59 months and 6-59 months respectively
- To assess the association between contextual factors collected during the survey and nutrition situation in the survey Woreda.

- To make recommendations based on survey findings
- To serve as nutrition information systems, monitoring and early warning (surveillance tool) when conducted bi annually for long period of time

4. Methodology

4.1 Study Area: the survey was conducted in 60 rural Kushet (Villages or Gotes) of Tanqua Abergele Woreda (Please see Annex V for selected clusters using ENA SMART soft ware)

4.2 Study Period: The survey was conducted between 09 and 19 June 2015 (See the details of survey schedule in Annex IV)

4.3 Timing of the Survey: The survey was conducted in June 2015, just at the beginning of the hunger period. Compared with the harvest season, this particular month is expected to be worst in terms of food availability and access since majority of the rural communities are expected to finish food stock for consumption.

4.4 Study Population

Nutrition status: All children aged 6 - 59 months (65 - 110 cm height when age is not known) in households selected for anthropometric survey were included. Anthropometric measurements and oedema were taken from these children.

Mortality rate: All household members in all sampled households were included in the mortality component of the survey.

Contextual factors: Household specific contextual data collected from all households were included in the anthropometric and mortality survey. Additionally, community level contextual information was also collected through focus group discussion in all sampled Kushet (Villages or Gotes).

4.5 Study Design: The survey was a cross sectional in nature where data and information is collected at particular point and time. A two-stage random cluster sampling method using ENA SMART methodology was employed. The sample sizes were calculated using ENA for SMART software (November 2011 version). Kushet (Gotes or Villages), the smallest geographical unit in the region, was considered as Clusters.

4.6 Sample Size: Emergency Nutrition Assessment (ENA) for SMART software November 2011 is used for sample size calculation for malnutrition and mortality. Sample sizes for nutritional status and mortality were separately calculated as described below.

4.6.1 Sample Size for Malnutrition: To calculate the sample size for the survey, a GAM value of 8.2 conducted in May 2014 was used.

Table 1: Prevalence of past GAM results of the survey Woreda

Woreda	Global Acute Malnutrition	Date of Survey
Tanqua Abergele	10.7 % [95% CI: 8.2 – 13.8]	May 2014

The Design effect: Tanqua Abergele is entirely situated in one livelihood zones. The populations of this Woreda are more or less equally affected within the clusters but the malnutrition rate vary from cluster to cluster, hence, the design effect of 1.7 was used to determine the sample size for nutrition survey

Desired Precision: Precisions of 3% is used to obtain an accurate estimate of malnutrition prevalence in the study Woredas. This level of precision is also tolerable according to the national guideline

Table 2: Sample Size Calculation for Anthropometry

Parameters	Value
Survey Population	104,582
Total number of under five children	15,896
Proportion of Children U5	15.2%
Average Household Size	4.84
Malnutrition (GAM) Prevalence	10.7
Desired Precision	3.0
Design Effect	1.7
Non response rate	6
# of Households to be included in the Survey	1200
# of Children to be included for Anthropometry	755
Number of Clusters to be selected	60
Number of Survey Teams	6
Number of Sample Size Per Cluster /Day	17
Number of Children per Cluster per Day	13
Number of Actual Survey Days	10

4.6.2. Sample Size for Mortality: The sample size for the Mortality component was also calculated using ENA-SMART soft ware new version of November 2011 by considering the following key points. As shown in Table 3, an average of the CDR result observed from the nutrition survey conducted in May 2014 was used.

Table 3: CDR results from Past Nutrition Survey

Woreda	Date of Survey	CDR (Death/10,000/day)
Tanqua Abergele	May 2014	0.06 (0.02 – 0.19 95% CI)

Table 4: Sample Size Calculation for Mortality

Parameters	Value
Survey Population	104, 582
Estimated Crude Mortality Rate (Rate/10000/day)	0.06
Desired Precision	0.3%
Design Effect	1.7
Recall Period	90 days
Non response rate	6

# of Households to be included in the Mortality Survey	115
# of Population to be included in Mortality Survey	572
Number of Clusters to be selected	60
Number of Survey Teams	6
Number of Sample Size Per Cluster /Day	17
Number of Actual Survey Days	10

The sample size for anthropometry is much higher than the sample size for mortality. Therefore, as shown in Table 5 below, the maximum or larger sample sizes in this case anthropometry sample sizes of 1200 were used as common sample sizes in terms of households for both anthropometry and mortality.

Table 5: Summary of Sample Size & Number of Clusters

Parameters	Value
1. Anthropometry	
# Households	1200
# Children	755
2. Mortality	1115
Final Sample Size	1200
# of Clusters	60
# of survey teams per Woreda	6
Sample Size per cluster per day	17
Actual survey date (including one day of field practice)	10

4.7 Sampling Method

4.7.1 Random Selection of Cluster (First Stage Sampling): Each **Village/Gotte** locally known as **Kushet** in each Woreda were used as cluster sampling frame, and the clusters to be sampled were selected with Probability Proportional to Size (PPS). All rural Kushet of the survey Woreda with their respective population size has been entered in to the ENA software; the software then did automatically select the clusters to be sampled in each **Kebeles** locally known as **Tabias**. The lowest geographical units called **Kushet** were randomly selected from each Tabias of the survey Woredas. A total of 60 clusters were selected.

4.7.2 Random Selection of Households (Second Stage Sampling): As depicted in the Table 5 above, the 1200 sample households in the survey Woreda were selected using systematic random sampling. In each sampled cluster the total number of households was identified through the support of local administration office and/or voluntary community health workers to calculate the sampling interval and determine the number of houses to be included in the survey.

Preliminary contact with Woreda health and agriculture & rural development officers had confirmed that the population settlement of the communities in few Kushet are concentrated where as in majority (> 90%) of the selected clusters or Kushet are very thinly spread and covers

very wide area of geographic location which requires lots of travelling from one hillside to the other which makes it very difficult to exhaustively count each houses and assign a given number to employ simple random sampling. Therefore, employing systematic random sampling were an ideal or practical step that had been followed.

For random sampling, the total number of households was divided by the sample size (in our case 18) for that particular Kushet or Village to determine the sampling interval. Using Table of random number, the first sample was identified from the sampling interval. The survey team usually started the work from the first randomly selected house and then continue by adding the value of the sampling interval to the first, second, third etc and continued until the survey team reached the required sample size 17 HHs per day per cluster per team.

Children Selection: Within selected households, all children 6-59 months, or 65-110 cm when age is not known, were included in the anthropometric measurement of the survey to determine their nutritional status.

4.8. Data Collection Methods and Tools

4.8.1. Data Collection Methods: The following information were collected

- Anthropometry {sex, age (in months), weight, height/length, oedema, MUAC(in mm)} for children aged 6-59 months,
- Vaccination information (measles, BCG, and Vitamin A supplementation)
- Feeding programme information (estimated coverage of TSF and OTP)
- Morbidity: Incidences of childhood illnesses in the last 2 weeks prior to the survey
- Mortality: Crude and U5 mortality rates over the past three months
- Household Information: such as food security information at household level regarding consumption, harvests, prices, WASH etc
- Community information: rainfall status, condition of livestock, condition of forage, water availability, accessibility of health services, history of outbreak (human/livestock) and status of most recent harvest;

4.8.1.1 Anthropometric Data:

Age of the Index Child: Age of the children (in months) were estimated based on birth dates recorded in immunization cards, birth certificates or baptismal certificates when they were confirmed by the children's mothers or primary caretakers for their accuracy, if this were not possible, age of the child was estimated based on maternal recall of exact birth dates or ages in completed months; or using local seasonal event calendar developed by the community or by comparing with an index child whose exact age (months) or birth date is already known. Children date of birth was recorded in the anthropometric questionnaire.

Height or Length: Length was taken for children below the age of two years or 87 cm when age is not known, these were measured lying horizontally on the height measuring board while **height** was taken for children of two years age and above or 87 cm and above when age is not

known, their height were taken while standing. Height and length were measured using ShorrBoard® made by Weigh and Measure LLC, Maryland USA.

Before taking the height/length, subjects were requested to take off their shoes (if wearing them) and stand in a plankfort¹ position against the height board, which has been placed on a flat level surface. Trained data collectors were responsible in taking height measurements, with acceptable accuracy and precision. Height was recorded in the nearest 0.1cm. The survey teams did strictly follow the 6 and 10 steps for measuring the length and height of the child respectively recommended by DRMFSS/EWRD/ENCU emergency nutrition interim guideline and reflected in the “*Ten Steps*” survey manual developed by RENCU expert to measure length/height of the index child.

Weight: Weight of the survey subjects were measured by using a calibrated 25 kg hanging Salter scale recorded to the nearest 0.1Kg. All subjects were weighed nude to ensure accuracy of weight measurements. Weighing scales were calibrated before every weight measurement. The survey teams did strictly follow the 12 steps recommended by DRMFSS/EWRD emergency nutrition interim guideline and reflected in the “*Ten Steps*” survey manual to measure weight of an index child. Standardization test were carried out to determine precision and accuracy results of the survey teams and see if the result meets minimum criteria set by the SMART recommendation.

Nutritional Oedema was diagnosed by applying a moderate finger pressure just above the ankle on the inside of the leg where the shinbone is below the skin, or on the tops of the feet. If there is oedema, an impression remains for some time (at least three seconds, the time spent to verbally count the numbers (one hundred one, one hundred two and one hundred three) where the oedema fluid has been pressed out of the tissue. The child was only recorded as oedematous if both feet present with pitting oedema. The child was only recorded as oedematous if both feet clearly have oedema. Any suspected oedema case were reported and verified by the survey supervisors.

Mid Upper Arm Circumference (MUAC): The index child was measured using the standard MUAC tape a three color coded (red, yellow, green) flexible, non-elastic tape, graduated with 1 mm precision. MUAC was measured at the mid-point of the left mid upper arm of all children 6-59 months old. The reading of the measurement was from the window of the tape measure and recorded to the nearest 0.1cm. The survey teams were strictly follow the 10 steps recommended by DPPC emergency nutrition interim guideline and reflected in the “*Ten Steps*” survey manual to measure MUAC of the index child.

4.8.1.2 Morbidity: Retrospective morbidity data over the two weeks prior to the survey was recorded for each sampled child. For children reported as being sick during the recall period utilization of health service and reasons hindering health service utilization was collected from the caretaker. Definitions of the most common illness were provided in the manual to ensure it is defined the same throughout the survey.

4.8.1.3 Mortality: Crude death rate was assessed for sampled households. Apart from considering the number of people currently in the household, those who were present at the beginning of the recall period, birth and deaths were recorded. The method took into account the number of people who joined or left the households during the recall period. The number of

deaths during the **90** days preceding the start of the survey was recorded. Details of how to measure mortality were explained to the survey team and guidance were also provided in the survey manual that was distributed to each team leader during the survey.

4.8.1.4 Assessment of Immunization Status

BCG vaccination status – the presence of a vaccination scar on the upper arm (on either arm) of the index child was recorded as a positive result for BCG vaccination.

Measles vaccination status- each child’s mother/caretaker was asked if the child has received a measles vaccine. The team did check for the child’s vaccination card first, and where not possible the mother was asked to recall.

4.8.1.5 Household Questionnaire: Heads of sampled households were interviewed to understand about household’s food security situation. Information about source of staple food, status of most recent harvests and source of household income were gathered. Additionally data regarding food utilization, child feeding practice, household sanitation and utilization of MCHN services were collected from the selected households.

4.8.1.6 Community Questionnaire: Focus group discussions at community level were conducted in all selected clusters about the availability and price of staple food, utilization and protection of natural resources such as water availability, condition of livestock and availability of forage, and any human or cattle epidemics.

4.8.1.7 Contextual Data: Contextual data or secondary information from health, agriculture, planning and finance and water office were collected to triangulate the data and to support findings of the assessment.

4.8.2. Data Collection Tools: Survey tools that were utilized to conduct the nutrition survey such as anthropometric, mortality and contextual data for this bi-annual survey were developed by FENCUCU. All the necessary tools and equipments used to conduct the nutrition survey were also of standard quality and recommended by SMART soft ware and DPPC interim national emergency nutrition guideline. (Please refer Annex III for complete list of survey tools and equipments).

5. Survey Organization and Management

5.1. Meeting with Woreda Officials: The organization of the bi annual survey started by briefing regional bureau experts and MANTF. Then Woredas authorities were briefed of the survey in terms of objectives, methods that would employ. A team from the Regional EWRFFSS/ENCUCU visited the three survey Woredas and manage to meet Woreda officials from Administration, Health, Agriculture and Rural development and Finance and Planning Offices to brief about the survey objectives and the methodology that would employ and to seek for their support. Nutrition Survey coordination team composed of 6 technical experts (two from EWRFFSS and four from the survey Woredas (Administration, Health, Agriculture and Planning & Finance Offices) were identified and assigned to accomplish the task in an organized manner. All the ground preparation was done by the survey coordination team, the ground activities, among others, include identify duties and responsibilities of each team member, develop survey schedule, develop selection criteria and identify potential candidates for recruitment of the

survey team, collect secondary information from their respective offices, identify venue for training, list all rural Kushet in the Woreda with their respective population size.

5.2 Survey Team Recruitment: Six teams of four people each, one team leader, one interviewer and two enumerators or measurers were employed to conduct the survey. The survey teams were selected based on their academic achievement, technical skill, health status and previous work history. Twelve enumerators responsible for anthropometric measurement and mortality and four team leaders responsible to lead the overall activity and conduct community questionnaire were selected from Woreda health offices. Six interviewers responsible for administering household questionnaire and two team leaders responsible to lead the activity and conduct community questionnaire were also selected from Agriculture and Rural Development Office. It is also important to note that six trainees, those who scored high in overall performance, were selected as team leaders to lead each survey team. Three data entry clerks who were responsible for data entry and cleaning were recruited from the Woreda Agriculture, health and planning and finance offices.

One nutritionist from UNICEF was assigned and responsible to train survey teams, coordinate and closely monitor and supervise the field work and data collection, entry and analysis activities. One finance officer and one accountant from EWRFFSS were also in charge of paying outstanding bills and per diems.

5.3 Training the Survey Team: Prior to the data collection, four days training (three theoretical classes and one practical) were provided to the survey team. Regional ENCU and UNICEF nutrition experts took the responsibility of training the survey team. The training covered relevant topics such as malnutrition and its classification, nutrition assessment techniques, data collection procedures, interview and measurement techniques, standardization of anthropometric measurements and assessment of children's age. Starting from the training date until the end date of data collection, experts from Regional ENCU, UNICEF Field Office and Woreda Health and Agriculture and Rural Development Offices were actively engaged on the survey. Besides, on the fourth date of the training session, the data collection forms and questionnaires were pilot tested in Kushet (Gottes) not selected to be part of the larger survey, to ensure that the interviewers and respondents understand the questions and that interviewers follow correct protocols in the survey areas. Printed copy that contains duties and responsibilities of each survey team (team leader, interviewer, enumerator and local guide) were distributed to the survey team to help the team understand their roles very clearly.

5.4 Calibration, Standardization and Pre-test

Salter scales were used for measuring the weight of an index child. The scales were measured against a known standard weight to make sure that the equipment was properly working and displaying the correct readings. Standardization test was also carried out to see the accuracy and precision results of the survey team. The objective of a standardization test is to assess whether or not the enumerators are taking the measurements in a standard and accurate way, and to test their precision in taking measurements. For this purpose two batches of 10 children between 6 and 59 months were used.

Each measurer measured 10 children twice with rest period in between. The same children were measured by the supervisor twice. Then for each enumerator, the difference between the two measurements is calculated to assess the precision, and a mean of the measurement was calculated to assess the accuracy. ENA software was used to calculate precision and accuracy of height and weight measurements. Then the measurers scoring acceptable levels of precision and accuracy were selected to take anthropometric measurements during the actual data collection.

Team members with inadequate precision and accuracy were given one more practical training and supervision support to correct their mistakes. To balance the grouping, six best performed measurers were assigned to each team as leaders or responsible in reading the anthropometric measurement and practically train or show the steps to their counterparts. The other six who scored less points, were also assigned into the six teams as assistance and were also advised to learn from their counterparts. After finishing the standardization and field test, the six team leaders (can be from the 6 interviewers and/or 12 enumerators) were identified and assigned in each team (Team 1 – 6) to lead the work.

5.5 Conducting the Survey: The team leaders, from UNICEF Mekelle field office and RENCU, were responsible to guide the teams in the field. The team leaders had to ensure that teams' performances are quality and activities are going smooth within the teams. Additionally, the team leader was responsible in regular monitoring and providing supportive supervision on daily basis through the entire survey period.

Upon arrival into a Kushet or a village, the survey team did contact the village leaders and the team leader was responsible to brief the Kushet leader about the survey objectives; what information is going to be collected and from whom; how the study households are going to be selected and what support is needed from them before starting the actual survey. Then the survey teams would ask for cooperation to get list of eligible households; visit households; and conduct the actual survey.

It is also important to note that during the preliminary discussion with Woreda administration, it had been agreed that the Woreda would write an official letter and let the Tabia (Kebele) and Kushet (Village) leaders know about this important activity ahead of the survey date so that the community of the selected clusters would know in good time to provide the required support. Besides, the survey coordination team had already agreed the local guides would be recruited from leaders of either the selected Tabias or Kushet and these local guides would be given orientation to help them easily facilitate this particular assignment. Woreda administration office took the responsibility of identifying potential candidates. The Tabia or Kushet leaders were either be with the team during the household visit or assigned someone familiar to the villagers to guide the team. In moving from one selected household to another, the village leader or someone he/she delegates were responsible to guide the team. All interviews were done in the respective households with heads of households or their spouse.

5.6. Data Quality: To ensure the data collected from the field are of good quality, survey teams who have got the knowledge and skills, work experience and the stamina were recruited from the survey Woreda. Up on the first visit or during the preliminary activity selection criteria were developed and agreed up on by the Woreda survey coordinators to select the survey team. Four days of quality training, three in class room and one day of practice were given. Besides, the survey team were strongly advised and encouraged to thoroughly read and use the “*Ten Steps*” Survey Manual or Guide prepared by the RENCU to serve as reference materials. The nutrition specialist from UNICEF Mekelle field office was regularly and actively engaged in leading the survey team in the field and providing the required quality checkup and supportive supervision. Data entry checks and plausibility test were also conducted on daily basis to improve quality of data being collected.

Each questionnaire and data sheet was checked before the survey team leaves the cluster and each night prior to the data entry. The data was entered on daily basis and missing or flag data was identified on regular basis. Based on the assessment results, survey coordinator and information analyst were giving feedback to team leader of that particular team and advice on how to correct any missing or dubious results.

6. Ethical Considerations: All relevant stakeholders were informed of the study objectives, methods and their roles. Verbal consent was also sought from all concerned regional and Woreda authorities prior to the survey and the study subjects on the day of survey and they were requested to participate in the study. The identity of the participants was kept anonymous. Those who do not wish to participate in the survey were respected for their self-determination / decisions. In survey areas, the interviewers usually started by introducing themselves and establish rapport. All the information collected was treated as strictly confidential. All children diagnosed as severely or moderately malnourished based on MUAC or with oedema were referred to a nearby health facility. Each team was provided with referral sheets.

7. Data Entry and Analysis

7.1. Data Entry: Daily checking was conducted on each questionnaire and data sheet prior to the data entry which was done every night. The Anthropometry and mortality data entry and analysis was done using ENA for SMART software November 2011 version. SPSS data base was used for entry household and community questionnaire. The vaccination status, MUAC, illness, SFP and OPT program activities of the study children were recorded in the SMART software along with the anthropometry.

7.2. Data Analysis: The data entry and analysis for anthropometry was done using ENA-SMART and SPSS. Feedback was also given every day by the Information analyst and survey coordinator. ENA SMART software of November 2011 version was used to analyze the data. Anthropometry data analysis is automatic and results summary was generated instantly. Non-anthropometry (contextual) data was also entered, cleaned, edited, processed and analyzed by experienced staffs using SPSS software package.

8. Report Writing and Dissemination of Survey Results: Woreda Administration. Health and Agriculture offices were briefed about the anthropometric measurement results before the survey team departs from the survey area. Then preliminary results that include description of the

methodology, the prevalence of global and severe acute malnutrition, crude and under five mortality rates, vaccination coverage, morbidity prevalence and level of the nutrition situation prevailing in the survey Woreda were compiled and submitted to FENCU/UNICEF within a week time.

The anthropometric results of the survey in conjunction with the status of contextual factors were interpreted and the overall nutrition of the population in the survey Woreda were rated based on the benchmarks set in the DRMFSS/ENCU nutrition assessment interim guideline, September 2008. The final report of the survey were compiled using the reporting template recommended by the SMART methodology and the national emergency nutrition interim guideline and was submitted to the FENCU within three to four weeks after completion of field work.

The findings of the study included in the report were the prevalence of malnutrition both GAM and SAM, morbidity, crude (CDR) and under five death rates (U5DR), vaccination, food security and other relevant information.

The report of the study will be shared with other key stakeholders at Woreda, regional and federal levels once feedback from technical experts are incorporate when sharing the first draft. The reports of the survey used existing secondary data to support the findings of the assessment or triangulate survey findings.

9. Results

9.1 Demographic Characteristics: All the planned 60 clusters from 20 randomly selected Tabias or Kebeles were visited as per the schedule. The total number of households interviewed and children aged 6-59 measured for anthropometries were 1020 and 860 respectively. The number of children measured for Anthropometry, in the survey Woreda, exceeded the target by 14 per cent. The total population included for mortality survey was 5969. Average household and children aged 6-59 months size of the survey population was 5.85 and 0.84 respectively.

9.2 Age and Sex Composition of the Survey Children: Girls and Boys account around 50.2 and 49.8 percent respectively. As depicted in Table 6, the ratio of boys to girls is 1.01. The age ratio of younger children (6-29 months) to their older counter parts (30-59 months) is 0.81.

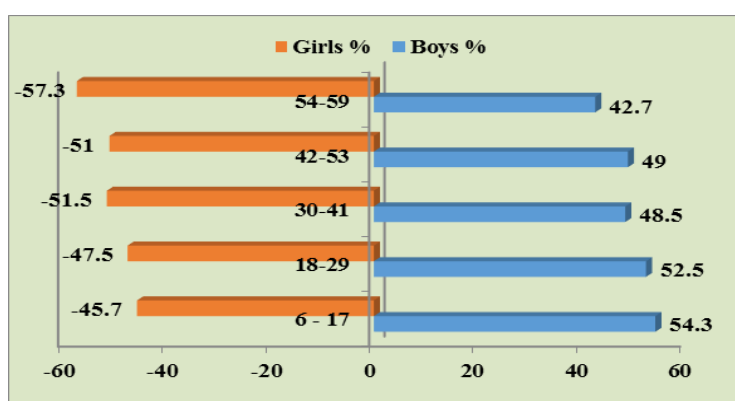


Chart 1: Population pyramid of the surveyed children aged 6-59 months

Table 6: Distribution of sample children by age groups and sex

Age group (months)	Boys		Girls		Total		Ratio Boys: Girls
	n	%	n	%	n	%	
6-17	102	54.3	86	45.7	188	21.9	1.2
18-29	104	52.5	94	47.5	198	23.0	1.1
30-41	97	48.5	103	51.5	200	23.3	0.9
42-53	94	49.0	98	51.0	192	22.3	1.0
54-59	35	42.7	47	57.3	82	9.5	0.7
Total	432	50.2	428	49.8	860	100.0	1.0

9.3 Anthropometry: (Based on the NCHS 1977 reference): A total of 860 children were measured for anthropometry and data were analyzed using ENA software 2011. Z-score values for three children were out of range using the SMART flags (exclusion of z-scores from observed mean which is in the range of: WHZ -3 to 3). The scores for distribution of the final decimal for weight and height measurements were 6 and 8 respectively. The anthropometry data also showed a moment of skewness of - 0.10 and Kurtosis, the relative peakedness or flatness

compared with the normal distribution, was 0.03. The distribution for WHZ lies to the left of the reference curve which means that more of the under-five children in the study children were malnourished than in the reference population. The design effect of the survey was 1.34. The mean and standard deviation of the weight-for-height z-score (WHZ) of the population were – 0.99 and 0.83 respectively.

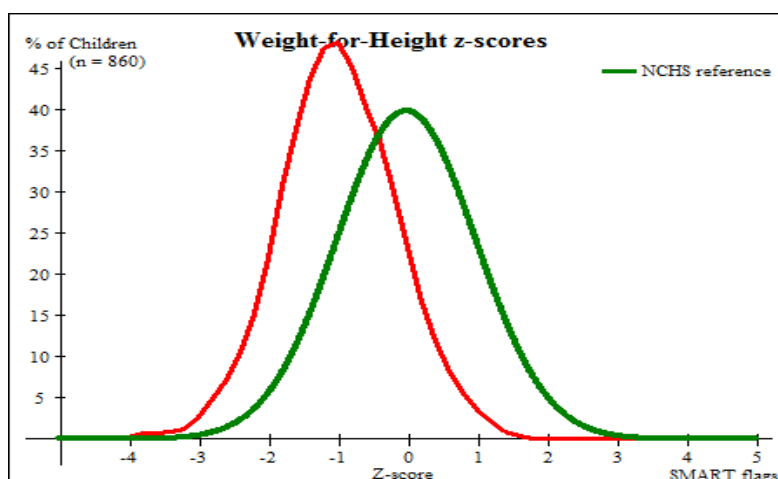


Chart 2: Summary of WHZ scores

9.3.1 Acute Malnutrition: Global Acute Malnutrition (GAM), also known as *Wasting*, is defined as < -2 z scores weight-for-height and/or oedema, and Severe Acute Malnutrition (SAM) is defined as < -3 z scores weight-for-height and/or oedema. The GAM and SAM result of the survey Woreda was **10.2** (8.1 – 12.9 95% C.I.) and **0.9** (0.5 – 1.8 95% C.I.) per cent respectively. The study identified eight children having z-score < -3 and 80 children with WHZ score between -2.0 and -3.0. The result is summarized in Table 7 and 8 below.

9.3.1.1 Weight-for-Height Percentage of Median (WHM): Global Acute Malnutrition (GAM) is defined as < 80 percentage of median and/or oedema, and Severe Acute Malnutrition (SAM) is defined as < 70 percentage of median and/or oedema). As reflected in the Table below, the GAM and SAM result of the survey Woreda was **5.8** (4.4 – 7.7 95% C.I.) and **0.5** (0.2 - 1.2 95% C.I.) percent respectively.

Table 7: Prevalence of acute malnutrition by z-score, % of the median and MUAC

Malnutrition Prevalence N= 860	WHZ Score	% of Median	MUAC % 95% C.I.	
	% 95% C.I.	% 95% C.I.	International cut-off points	National cut-off points
Global Acute Malnutrition	10.2 % (8.1 – 12.9)	5.8 % (4.4 – 7.7)	13.0 % (10.4 – 16.2)	5.0 % (3.6 – 7.0)
Moderate Acute Malnutrition	9.3 % (7.3 – 11.8)	5.3 % (3.9 – 7.3)	12.7 % (10.0 – 15.9)	4.7 % (3.2 – 6.6)
Severe Acute Malnutrition	0.9 % (0.5 – 1.8)	0.5 % (0.2 – 1.2)	0.3 % (0.1 – 1.1)	0.3 % (0.1 – 1.1)

Table 8: Prevalence of acute malnutrition based on WHZ (and/or oedema) and by sex

WHZ	All (n = 860)		Boys (n = 432)		Girls (n = 428)	
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)
Global Acute Malnutrition	88	10.2 % (8.2 – 12.9)	43	10.0% (7.0 – 14.0)	45	10.5 % (8.2 – 13.3)
Moderate Acute Malnutrition	80	9.3 % (7.3 – 11.8)	41	9.5 % (6.8 – 13.2)	39	9.1 % (7.0 – 11.8)
Severe Acute Malnutrition	8	0.9 % (0.5 - 1.8.)	2	0.5 % (0.1 – 1.9)	6	1.4 % (0.6 - 3.0)

GAM prevalence is slightly higher in girls than boys but moderate cases are higher in boys than girls. There was no oedematic cases reported. As depicted in Table 9 the prevalence of moderate wasting is higher among children aged 18-29 and the prevalence of severe wasting is higher among children aged 54-59 months. As reflected in Table 10, eight marasmic children with no sign of oedema were observed.

Table 9: Prevalence of acute malnutrition by age, based on WHZ and/or oedema

Age in Months		Severe Wasting		Moderate Wasting		Normal		Oedema	
Age	N	n.	%	n	%	n	%	n	%
6-17	188	1	0.5	22	11.7	165	87.8	0	0.0
18-29	198	1	0.5	25	12.6	172	86.9	0	0.0
30-41	200	4	2.0	11	5.5	185	92.5	0	0.0
42-53	192	1	0.5	17	8.9	174	90.6	0	0.0
54-59	82	1	1.2	5	6.1	76	92.7	0	0.0
Total	860	8	0.9	80	9.3	772	89.8	0	0.0

Table 10: Distribution of marasmus and kwashiorkor based on WHZ scores

Oedema	<-3 Z-score		≥ -3 Z-score	
	n	%	n	%
Present	Marasmic kwashiorkor No. 0 (0.0 %)		Kwashiorkor No. 0 (0.0 %)	
Absent	Marasmic No. 8 (0.9 %)		Not severely malnourished No. 852 (99.1 %)	

9.3.1.2 Mid Upper Arm Circumference (MUAC) Measurement: There are two different cut-off points for MUAC being applied at national and international level (please refer to Table 11 for cut-off points). GAM and SAM values using MUAC measurement for national level were **5.0** (3.6 – 7.0 95% C.I.) and **0.3** (0.1 – 1.1 95% C.I.) per cent but as per the international cut-off points, the result were **13.0** (10.4 – 16.2 95% C.I.) and **0.3** (0.1 – 1.1 95% C.I) per cent

respectively. The national level result is lower than the GAM level obtained by Z-scores, but the international values were higher than the result of WHZ score.

Estimated prevalence based on WHO cut off reference for wasting, stunting and underweight using z-score, percentage of median and MUAC is annexed.

Table 11: Prevalence of acute malnutrition by MUAC

MUAC	Ethiopia cut-off (N=860)			International cut-off (N= 860)		
	MUAC	n	% (95% C.I)	MUAC	n	% (95% C.I)
Global	<12.0cm	43	5.0 % (3.6 – 7.0)	<12.5 cm	112	13.0 % (10.4 – 16.2)
Moderate	<12.0cm and ≥11.0	40	4.7 % (3.2 – 6.6)	<12.5 cm and ≥11.5	109	12.7 % (10.0 – 15.9)
Severe	<11.0 cm	3	0.3 % (0.1 – 1.1)	<11.5 cm	03	0.3 % (0.1 – 1.1)

As reflected in Table 12 and 13, the survey findings has shown that the estimated number of children entitled to be admitted in Therapeutic Feeding (TFP) and Targeted Supplementary Feeding (TSF) Programs, in the survey Woreda, using WHM were 4 (0.5%) and 46 (5.3%) respectively. While the Absolute number of children in need of TFP and TSF program based on MUAC measurement were 3 (0.3%) and 40 (4.7%) children respectively.

Table 12: Number of children in need of TFP & SFP using WHM admission criteria

Weight For Height % of Median (WHM)	n	% 95% C.I
Absolute number of GAM (WHM < 80 and or oedema)	50	5.8 % (4.4 – 7.7)
Absolute number of MAM (70% =< WHM < 80%)	46	5.3 % (3.9 – 7.3)
Absolute number of SAM (WHM < 70% and/or oedema)	4	0.5 % (0.2 – 1.2)

Table 13: Number of children in need of TFP and SFP using MUAC as admission criteria

Mid Upper Arm Circumference (MUAC)	n	(%) 95% C.I.
Estimated number of children with global acute malnutrition in need of TSF and TFP programme	43	5.0 % (3.6 – 7.0)
Estimated number with moderate malnutrition in need of SFP (MUAC ≥ 110mm and <120mm)	40	4.7 % (3.2 – 6.6)
Estimated number with severe malnutrition in need of TFP (MUAC <110mm +/- oedema)	3	0.3 % (0.1 – 1.1)

9.3.2 Chronic Malnutrition: Chronic malnutrition, also known as *Stunting*, is defined as height-for-age z-score (HAZ) less than -2.0. Moderate stunting is height-for-age z-score between -2.0 and 3.0, and severe stunting is a height-for-age z score less than -3.0. The prevalence of stunting in the survey population, using NCHS 1977, was **40.5%** (36.4 – 44.6 95% C.I.) with moderate **29.8%** (26.3- 33.5 95% C.I.) and severe case **10.7%** (8.8 – 12.9 95% C.I.) respectively. As reflected in Table 14, boys are slightly more affected by stunting than girls. The number of children who are moderately stunted are three times higher than the severely stunted children.

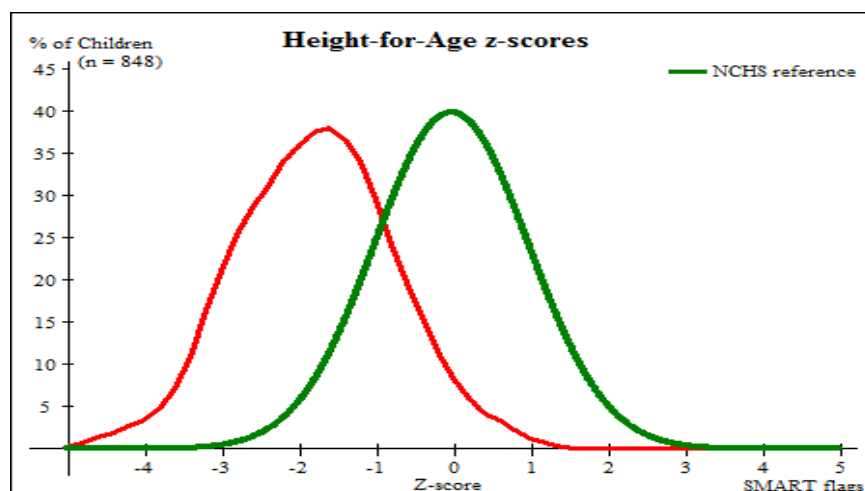


Chart 3: Summary of HAZ score

Table 14: Prevalence of stunting based on HFA z-scores and by sex (NCHS)

HAZ Stunting	All (n = 848)		Boys (n = 432)		Girls (n = 428)	
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)
Global	348	40.5 % (36.4 – 44.6)	187	43.3 % (38.3 – 48.4)	161	37.6 % (32.6 – 42.9)
Moderate	256	29.8 % (26.3 – 33.5)	145	33.6 % (29.1 - 38.4)	111	25.9 % (21.5 – 30.9)
Severe	92	10.7 % (8.8 – 12.9)	42	9.7 % (7.5 – 12.6)	50	11.7 % (9.0 – 15.0)

9.3.3 Underweight: Underweight measures the proportion of children having weight which is appropriate for their age. It is expressed using weight-for-age z-score (WAZ). Therefore severe underweight is WAZ less than -3 z-score and moderate under weight is WAZ between -2 and -3 z-score. The prevalence of underweight in the survey population, using NCHS 1977, were **43.4%** (39.4 – 47.4 95% C.I.) with **34.7%** (31.1 – 38.3 95% C.I.) moderate and **8.7%** (6.9 – 10.9 95% C.I.) severe cases respectively (please refer to Table 15). This result shows that moderate and severe cases are a bit higher in boys than girls.

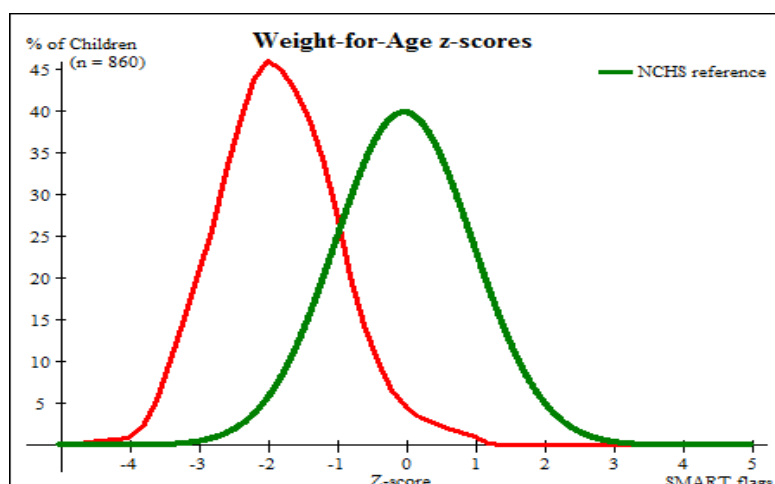


Chart 4: Summary of WAZ score

Table 15: Prevalence of underweight by sex, based on WAZ scores (NCHS)

WAZ Underweight	All (n = 860)		Boys (n = 432)		Girls (n = 428)	
	n	% (95% CI)	n	% (95% CI)	n	% (95% CI)
Global	373	43.4 % (39.4 – 47.4)	198	45.8 % (40.4 - 51.3)	175	40.9 % (36.6 – 45.3)
Moderate	298	34.7 % (31.1 – 38.3)	158	36.6 % (32.0 – 41.4)	140	32.7 % (28.3 - 37.5)
Severe	75	8.7 % (6.9 – 10.9)	40	9.3 % (6.7 - 12.7)	35	8.2 % (5.9 – 11.1)

10. Contextual Factors: All the planned 60 clusters from 20 Tabias or Kebeles were visited as per the schedule. A total of 1020 households were included in the household food security and health survey with 85% response rate. Of these 1020 households visited, 90.6% were male and 9.4% female headed households. The total population included for mortality survey was 5969. A total of 15% households were recorded as absent due to various reasons.

10.1 Education: Eighty four per cent of the mothers/guardian in the surveyed households did not have any formal education while 5.3 and 9.2 per cent attended less than primary and primary level of education. Secondary and more tertiary level of education accounts for 1.4 and 0.1 per cent respectively.

10.2 Livelihood and Food Security: The main livelihood for the surveyed community in the sample population was mixed farming with crop and livestock production. Agriculture is dependent entirely on the Kremt rains. Agro ecologically, 91.7, 5.0 and 3.3 percent of the surveyed households dwell in low land, mid highland and highland respectively.

10.2.1 Food Security: Household level food security information was assessed in all randomly sampled 60 clusters withdrawn from 20 Tabias or Kebelles. One focus group discussion in each

cluster was carried out to gather general information on agro ecology, rainfall, food security, livestock, pasture, water, and health.

10.2.2 Crop Production: The survey Woreda is 100% dependent on Meher (Azmera and Tsedia rains. Meher rains are important for cultivating crops. Five major crops cultivated in the survey Woreda are Sorghum, Maize, Teff, Sesame and Haricot bean. Summary result of the Focus Group Discussion (FGD) conducted in 60 clusters have shown that the quality of Meher rainfall (distribution and intensity) was rated from above normal (3%), normal (65%) to below normal (32%), hence the performance of the Meher harvest was rated from good (50.0%) to very good (40%). In some places, however, performance of Meher crop was low due to late onset (28%) of Azmera rains and early cessation (45%) of Tsedia rains. Other reasons such as poor soil fertility (land production potential), pest and disease and excess rain (in few places) were also contributing factors for the poor performance of Meher harvest in some pocket areas.

Meher assessment was conducted by Multi Agency Assessment team, led by Federal DRMFS, in December 2014. The assessment team found out that the production of Meher crops in this survey Woreda compared to reference year and previous year increased by 157% and 40% respectively (Table 16 outlines summary of the Meher assessment report for 2006 EC). About 67% of projected yield has been harvested this year. The main reason for decline of yield this year was due to poor performance of high yielding long cycle crops as a result of poor Azmera rains. Hence food security situation of the Woreda is classified as below normal.

Table 16: Summary of Meher Assessment Result for 2014

Description	Unit	Value
Production for reference year (2005)	Quintal	321,513
Production for last year	Quintal	632,455
Production planned for this year	Quintal	1,248,334
Production (harvest) for this year	Quintal	928,175
Production planned versus achievement	%	74
Difference from Reference Year	%	289
Difference from Last Year (yield increment/reduction)	%	47
Over all Meher rainfall performance		Below normal
Proposed number of Relief Beneficiaries for this Year	Count	13,000
Four Tabias (Kebeles) of Tanqua Abergele Woreda namely Felege Hiwot, Emba Rufael, Gera and Hadush Tekli have been affected by drought this year		

10.2.3 Livestock Production and Condition: Out of 1020 interviewed household only 6% did not own livestock at the time of survey. Ninety four per cent of the surveyed households keep animals as means of livelihood. The type of animals being owned by the household includes Ox (86%), Cattle (75%), Sheep (60%), Goats (69%), Donkey (86%) and chicken (92%). Others such as mule and camel accounted for 2.0%. The physical condition of livestock as rated by the interviewed households were good (75%), poor (16%) and very good (9%) and compared to last year, the status of livestock at the moment were rated as same (40%), better (48%) and worse (12%). The current size of the livestock, compared to last year, in the survey Woreda was also rated by FGD as increased (32%), same (20%) and decreased (48%). The three main reasons for

decreasing the herd size and productivity as identified by the survey community include drought, disease and over sale. A total of 879 livestock deaths were reported due to drought, disease and attack by predators.

Availability of water for livestock as rated by the focus group discussants was good (30%), average (42%) and below average (28%) and the availability of pasture for livestock was also rated as good (22%), average (30%) and below average (48%). Milk production of the surveyed households was rated as same (66%), better (15%) and worse (19%).

10.2.4 Income: Major sources of cash income for the one month (recent past) as reported by the households during an interview accounts for sales of crop (39%), livestock (33%), cash crop (7%) livestock, livestock product (4%) and others such as salary, remittance, PSNP, small business and handicraft accounts for 8%. During the last three months 25% of the study population did barter or sell small livestock (73%), large livestock (13%) and crop (7%) to acquire food. This indicated there were no unusual changes in the pattern of sourcing cash income for the surveyed households.

10.2.5 Food Source: The main sources of food for the household during the last three months were also assessed and results revealed that 85% households relied on own production, 11% food purchase, 4% from PSNP & relief food.

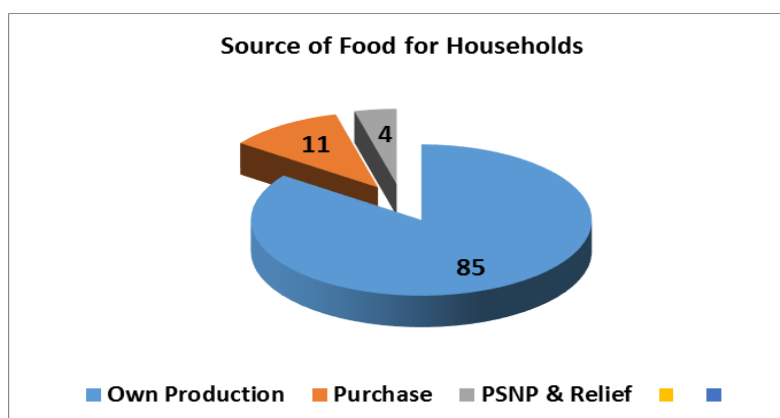


Chart 5 : Main source of food for the household during the last three months

Food stock availability of the surveyed households was also assessed and result of the assessment has indicated that 29.7 per cent of the population reported having no or little food stock at home while 19.1% reported that the food stock they have will last for one month. About 42.1 and 9.1% reported the food stock would be adequate to cater for 2-3 and 4-6 months respectively.

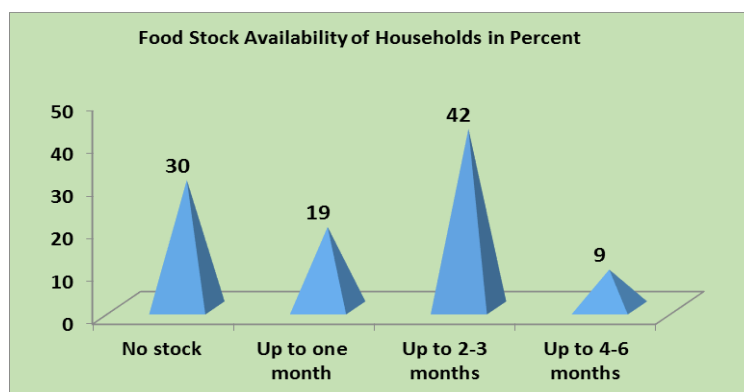


Chart 6: Availabilit of food stock in the household

As reflected in Chart 7, the main source of food for the next three months for those households who do not have food stock currently at home (30%) would be depending on own production (1.3%), purchase (77.6%), PSNP (14.9), relief (5.0%) and borrowed (1.3%).

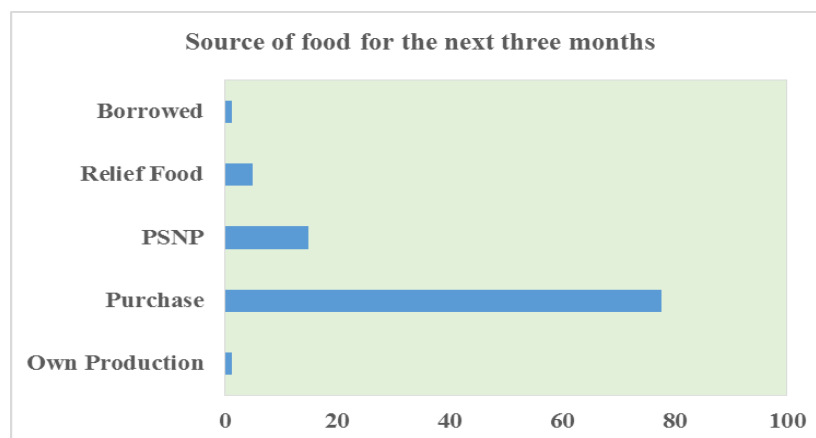


Chart 7: Source of food for the houshold for the next three months

The community most commonly consume food groups in the past seven days or a week were grains and cereals (100%), legumes/nuts (88%), and Oil (92%). Fruits/ vegetables (28%), dairy products (14%), roots and tubers (20%) and flesh foods are consumed by 8% of the households. Meal consumption frequency of the household was recorded as three times (93%), four times or more (4%) and twice (3.4%) a day. Only 10% of the household in the survey Woreda confirmed that children older than 6 months consumed milk a day before the study was conducted.

10.2.6 Coping Strategy: To assess households' food security status, the household consumption coping strategies were also analysed. At least 8% of the sureyed households have employed various forms of coping startegy in the 30 days preceeding the survvey. The most often used staregies were limt portion, reducing number of meals,rely on less expensive food, reduce adult consumption and purchase or borrow. There was no unusual migration of members reported from surveyed households.

Table 17: Coping strategy of the households (frequency)

Coping Strategy in Past Month N = 1020	Frequency in percent				
	Never	Seldom	Sometimes	Often	Daily
A. Skip Meal	99.3	0.7	0.0	0.0	0.0
B. Limit Portion	90.5	2.2	4.7	2.5	0.0
C. Reduce number of Meals	92.3	1.1	4.6	2.1	0.0
D. Borrow food	98.7	1.2	0.1	0.0	0.0
E. Rely on Less Expensive food	93.5	2.3	2.7	1.5	0.0
F. Purchase or Borrow	94.5	5.0	0.4	0.1	0.0
G. Gather Unusual Food	99.8	0.1	0.1	0.0	0.0
H. Send HH member	100.0	0.0	0.0	0.0	0.0
I. Adult consumption reduced	94.6	1.5	2.5	1.5	0.0
J. Casual Labor	99.6	0.3	0.1	0.0	0.0

11.0 Food and Nutrition Intervention

11.1 PSNP and Relief Beneficiaries: Tanqua Abergele Woreda is one of the chronically food insecure Woredas in Central Zone and has been supported by the Productive Safety Net Program (PSNP) and relief food assistance. More than 40% of the population are currently receiving food assistance in form of PSNP (19%), Relief food (12.4%) and TSF (1.7%). there are 19,782 PSNP beneficiaries in the Woreda out of which 13,849 are engaged in public work and 5,933 benefiting from direct support. There are 13,000 targeted beneficiaries receiving emergency relief food. Currently, there are a total of 1,741 (846 children under five and 895 pregnant and lactating mothers) TSF beneficiaries in the Woreda. About 78% of focus group discussants confirmed that there were extended delays of PSNP, relief and TSF food dispatch and distribution in the woreda.

In the last three months, about 17%, 4% and 2% of the surveyed households confirmed that they benefited from PSNP, Relief Food (GFD) and Targeted Supplementary Feeding programme respectively.

11.2 OTP/TSF Programmes: The Out-patient Therapeutic Program (OTP) is implementing in 19 OTP operational sites to treat severe acute malnutrition children without complications. As reflected in Table 18, admission of children under five into the TFP program in March, April and May were 16, 38 and 30 respectively, showing an increasing and then decreasing trend from March to April.

Table 18: TFP admission report of the past three months

Beneficiary Type	Total OTP Admission (2015)		
	March	April	May
Children under five	16	38	30

The absolute numbers of children in need of TFP and TSF program based on MUAC screening during the survey (for June 2015) were 3 (0.3%) and 40 (4.7%) children respectively.

12.0 Health and Health Care Services:

12.1 Health Care Providers: The Woreda has got functional 01 primary hospital, 05 health center, 17 health posts, 12 pharmacies and one drug vendor. A total of 158 health personnel are currently working in the Woreda. The above stipulated health facilities are staffed with 11 health officers, 58 nurses, 18 midwives, 12 pharmacist, 07 laboratory technicians, 03 environmental technician, 06 health information technicians, 05 Supervisors, 03 others (surgery, environmental health and anesthetic), 35 health extension workers and 618 Voluntary Community Health Worker (VCHW).

12.2 Mortality: A total of 5969 individuals were found in 1020 households for the mortality 90-days retrospective interview. There were five adults and two under five deaths reported during the mortality interview within the recall period. Therefore, crude and under five mortality rate was calculated as 0.09 and 0.24 per 10000 people per day respectively.

Key informant interview from the survey Woreda result showed the most prevalent or top five diseases for adults are malaria, ARI, and pneumonia and for children under five they are fever, diarrhea and malaria. Malaria is the biggest threat to human health in this Woreda.

Table 19: Crude and U5 Death Rates

Deaths	Deaths	Deaths/10,000/day	95 % C.I
Crude Death Rate	05	0.09	(0.04 – 0.22)
Under Five Death Rate	02	0.24	(0.06 – 0.97)

Morbidity: Out of the 860 sample children, only a total of 135 (15.7%) were reported to have been ill in the two weeks period prior to the survey date. Fever (5.9%), Diarrhea (3.8%), Acute Respiratory Infection (5.5%) and malaria (0.5%) were the predominant causes of illnesses among children aged 6-59 months (See Table below).

Table 20: Prevalence of reported illness in children 6-59 months

Reported Illness (N= 860)	n	%	EDHS 2011	
			Region	National
Prevalence of reported illness	135	15.7		
Diarrhea	33	3.8	13.4	13
Fever	51	5.9	23.9	17
Acute Respiratory Infection (ARI)	47	5.5	9.4	7
Malaria	04	0.5		

Mothers or care takers of the sick children were asked if they had taken their children to a health facility and/or traditional healers for treatment and about 37.4% and 3.1% of the interviewed

mothers reported that they had taken their children when ill to health facilities and traditional healers respectively while 59.5% of the households did not seek any form of treatment.

Table 21: Health seeking behavior of Mothers or Care takers when children are ill

Illness (N=135)	n	%
Child was sick	135	15.7
Child was taken to Health Facility (HF)	49.0	37.4
Child taken to TH	4.0	3.1
Child taken to both HF & TH	0.0	0.0
Did not take to either HF or TH	78.0	59.5

Vaccination & Vitamin A: Information on Vaccination for BCG, Measles and Vitamin A supplementation status in the survey children were assessed. The result had revealed (Please refer Table 19) that 77% of the survey children had BCG scar and 97.3% of the survey children had Measles immunization both on card and mother/guardian recall (See Table below). About 91% of the survey children had Vitamin A capsule in the last six months. Forty per cent (38.7%) of the mothers or care takers were in a position to show the vaccination card when they were requested to show during the interview.

Table 22: BCG and Measles vaccination & Vitamin A supplementation coverage

Vaccination N = 838	n	%	EDHS 2011	
			Region	National
BCG by scar (6-59 months)	663	77.1	95.9	66
Measles by card or mother recall	805	97.3	83.7	56
i. Measles by card (9-59 months)	321	38.7		
ii. Measles by mothers recall (9-59 months)	486	58.6		
Vitamin A in last 6 months (6-59 months)	778	90.5		

12.5 Bed Net: Ninety four per cent of the surveyed households have got insecticide treated bed nets. As reflected on chart 8, among the households having treated bed nets, 57% households did not use it the night before the survey date. On the other hand, about 30% of the households in the survey Woreda confirmed that all family members slept under the net during the previous night preceding the survey while mothers and children constitute 6%.

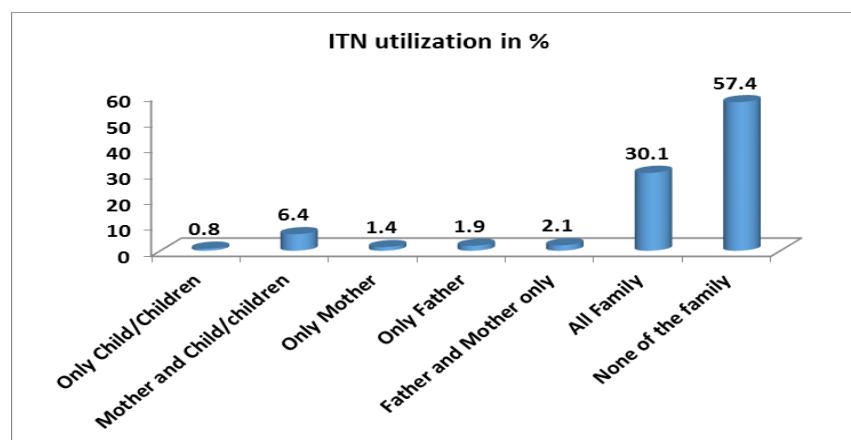


Chart 8: Use of Bed net by the household

13. Water and Sanitation: 77 per cent of the surveyed households used safe water for human consumption (this includes piped water, borehole/ tube well, protected spring and protected well) while 23% of the community used un safe water (from unprotected spring and unprotected well, river, dam and stream). About 69% of the community use unsafe and unprotected water as an alternative source when the main source is no longer in use. Currently, 93% of the study population are using water from main source.

Table 23: Source of drinking water for the households

Source of water for drinking	Main Source in %	Alternative Source in %
Piped treated	2.5	4.3
Tube Well or Borehole	73.3	21.4
Protected Well	-	0.9
Unprotected Well	1.3	4.6
Protected Spring	1.2	4.0
Unprotected Spring	9.9	27.6
Surface Water	11.8	36.9

About 42% of the surveyed households confirmed they use various means of treating of water for drinking at home. The most common forms of water treatment currently and widely practices by the community were add chemicals like wuha agar (56.3%), boil (12%), let it stand and settle (28.9%) and strain it through cloth (2.8%).

Coverage of safe excreta disposal was assessed by interviewing the households for their usual place of excretion. A bout 77% of the households during interview reported to have pit latrine and 0.3% ventilated improved pit latrine; however, up on conducting the physical observation, 60.5% of these latrines were found to be functional and clean, 18.6% functional but not clean. 14.2% of the latrines were also non-functional due to damage while 6.7% were constructed but

were not in use during the survey period. The percentage of households without any form of latrine was 22.6%. About 91% of the households asserted that they do not share the toilet with neighbours other family members residing around their residential areas.

14. Discussion: The overall quality assessment for the Z scores showed that the data is of very good quality. The plausibility score of the overall data quality is 5% rated as **excellent** (please refer to the plausibility summary report in Annex I). Summary of mean, SD, design effects and number of z scores out of range is reflected in Table 24. The number of Z score out of range for WHZ and WAZ and HAZ were zero. The number of children who did not have Z score value for WAZ and HAZ were none.

Table 24: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores \pm SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
WHZ	860	-0.99 \pm 0.83	1.34	0	0
WAZ	860	-1.84 \pm 0.86	1.40	0	0
HAZ	848	-1.75 \pm 1.09	1.50	0	0

* contains for WHZ and WAZ the children with edema.

The age ratio of younger children (6-29 months) to their older counter parts (30-59 months) is 0.81 which is closer to the plausible value of 1.0 indicating there is no significant age bias in the overall distribution of the study population. The number of children between the age of 6 and 29 months in the surveyed population were as expected. The demographic profiles were close to the typical sex and age distribution of the reference population (NCHS reference 1977).

The scores for distribution of the final decimal for weight and height measurements was 6 and 8 respectively indicating that there was no significant bias in weight and height measurements. The standard deviation of WHZ (Weight-for Height Z score, NCHS 1977 reference) was 0.83 which fell within the plausible limit of less than 1.1. The anthropometry data also showed a moment of skewness of - 0.10 which is within the acceptable range of plus or minus one, indicating that the distribution of WHZ was symmetrical as in a normal distribution. Kurtosis value was 0.03 indication of the normal distribution since it is less than ± 1 . The distribution for WHZ lies to the left of the reference curve which means that more of the under-five children in the study children were malnourished than in the reference population. The design effect of the survey was 1.34 indicating that the distribution of acute malnutrition in the surveyed Woreda was not homogenous across all clusters or Kushets. The mean and standard deviation of the weight-for-height z-score (WHZ) of the population in this survey was -0.99 and 0.83 respectively. Therefore, the GAM and SAM value are acceptable.

The global and severe acute malnutrition result of the survey Woreda is **10.2 %** (8.1 – 12.9 95 % C.I.) and **0.9 %** (0.5 – 1.8 95% C.I.) respectively and by looking at the anthropometric result of the surveyed population, the current nutritional status of the Woreda, as per the national interim guideline (2008), is classified as “**Poor**”.

The survey Woreda is chronic food insecure Woreda currently classified as hotspot priority number one. As reflected in Table 25, there has been an increasing trend in the prevalence of

malnutrition from GAM value of 8.2% in May 2013 to 10.7% in May 2014 and a decreasing trend from 10.7% in May 2014 to 10.2% in June 2014.

The prevalence of stunting (point estimate) showed a significant decreasing trend ($P = 0.039$) from 47.0% in November 2012 to 40.5% in June 2015.

The prevalence of underweight (point estimate) also showed a slight decreasing trend ($P = 0.239$) from 47.8% in November 2012 to 43.4% in June 2015 but not significant or still lies within the confidence interval limits (41.5 - 54.1).

Table 25: Malnutrition Trend Analysis of the BANS between November 2012 – June 2015

Survey Dates	Wasting	Stunting	Underweight
November 2012	12.2 % (9.2 - 16.0 95% C.I.)	47.0 % (42.6 - 51.4 95% C.I.)	47.8 % (41.5 - 54.1 95% C.I.)
May 2013	8.2 % (6.7 - 10.0) (95% C.I.)	43.2 % (39.2 - 47.4) (95% C.I.)	43.7 % (40.0 - 47.4) (95% C.I.)
December 2013	13.8 % (11.0 - 17.3) (95% C.I.)	44.1 % (38.8 - 49.7) (95% C.I.)	47.8 % (43.8 - 51.8) (95% C.I.)
May 2014	10.7 % (8.2 - 13.8) (95% C.I.)	45.3 % (40.4 - 50.3) (95% C.I.)	43.8 % (38.9 - 48.9) (95% C.I.)
December 2014	9.6 % (7.5 - 12.3) (95% C.I.)	44.3 % (40.6 - 48.1) (95% C.I.)	45.8 % (41.8 - 49.9) (95% C.I.)
June 2015	10.2 % (8.1 - 12.9 95% C.I.)	40.5 % (36.4 - 44.6 95% C.I.)	43.4 % (39.4 - 47.4 95% C.I.)

The level of stunting and underweight in the survey Woreda, as per the WHO 1995 guideline reflected in the table below, is classified as ‘**very high prevalence**’ or ‘**critical situation**’ which is un acceptably high, that needs due attention by key actors.

Table 26: Stunting & Underweight Value, Cut-off points & Level of health significance (WHO 1995)

Indicator	TAG June 2015	Prevalence cut-off values for public health significance
Stunting	40.5%	< 20%: Low prevalence 20-29%: Medium prevalence (<i>Poor situation</i>) 30-39%: High prevalence (<i>Serious situation</i>) ≥ 40%: Very high prevalence (<i>Critical situation</i>)
Underweight	43.4%	< 10%: Low prevalence 10-19%: Medium prevalence (<i>Poor situation</i>) 20-29%: High prevalence (<i>Serious situation</i>) ≥ 30%: Very high prevalence (<i>Critical situation</i>)

Result of the household interview and focus group discussion of the survey showed that the performance of the 2014 Meher rain in the survey Woreda was rated as “**normal**” as a result; the performance of Meher crop was rated as “**good**”, however; there was some irregularities like late onset of Azmera and early cessation of Tsedia rains in some areas. Besides, the low producing potential of the land, lack of inputs, attack of crops by pest and disease did significantly

contributed to the reduction of the Meher harvest. However, Meher assessment carried out by multi-agency team of experts in November 2014 confirmed that the food security of the surveyed Woreda was classified as '*below normal*'. But there had been 47% increase in yield compared to previous year (2005 EC).

Besides, the assessment had also revealed that, four pocket Tabias or Kebeles of the survey Woreda were categorized by the Woreda early warning office as drought affected areas.

Almost half of (49%) the interviewed households reported having no or little food stock that keep them for a month or less out of which about 14.9% & 5% of the interviewed households are currently relying on PSNP & relief food, for the next three months, as the main source of food for the family.

The condition of livestock in the survey Woreda at the moment, except for the above mentioned four Tabias or Kebeles, is said to be '*normal*'. The availability of water and pasture for livestock was also reported as '*good*'.

Crude and under five mortality rate of the survey Woreda was also calculated as 0.09 and 0.24 per 10000 people per day respectively, that is far below the thresholds level for emergency outlined in the Sphere Project of < 1.14 & < 2.3/10,000 per day, respectively.

A TFP admission case in the past three months has shown an increasing trend. There had been an increase of TFP admission cases of children under five from 16 cases in March to 38 and 30 cases in April and May 2015 respectively.

There had been no major human epidemic or disease outbreak reported. Prevalence of reported illness of the survey population was below the regional and national (DHS 2011) values.

The estimated coverage for measles and Vitamin A supplementation was good, above the regional and national figure. Measles and Vitamin A coverage is also above the minimum standard recommended by sphere standard (> 90%). BCG immunization result was below the regional but above the national EDHS 2011 value.

Safe water coverage in the survey Woreda is promising but still needs due attention to improve coverage and quality. Practicing water to make it safe for drinking was very low (42%). Source of drinking water for the household as main sources were considered safe (77%), but the alternative sources (69%) were unsafe. Quite significant number of people in the surveyed community had to trek long distances to fetch water for consumption.

Coverage of safe disposal of excreta was good (77%) but out of these, 60% of these latrines were found to be functional and clean, about 19% were also functional but not clean. About 14% of constructed toilets are damaged and dilapidated due to various reasons such as use of poor construction materials, heavy rain, wind etc. About 7% were also constructed but not in use at the moment of the survey. This low and improper utilization calls for key actors to implement an urgent and appropriate actions.

15. Conclusion and Recommendation

15.1 Conclusion: As per the national nutrition interim guideline (2008) with a GAM prevalence rate of **10.2 %** and the nutrition situation of the surveyed Woreda, is characterized as “**Poor**”

The prevalence of stunting and underweight, as per the WHO guideline and the cut-off points, showed a ***serious public health concern***.

15.2 Recommendations: Based on the findings from the survey, the following short term and long term action points are recommended:

Regional and Woreda level early warning in collaboration with stakeholders should closely assess, monitor and follow up the food security, health and nutrition situation of the surveyed Woreda with special attention given to the communities of the four highly drought affected pocket areas of concern: Felegehiwet, Emabrufael, Gera and Hadush Tekli.

Effective coordination, timely allocation and distribution of PSNP, Relief food and TSF supplies would be very vital at the moment since closer to 50% of surveyed households have got nothing and/or a little food reserve at household that may not go beyond one month.

Strengthen community mobilization and sensitization activities to implement and monitor preventative and promotive nutrition and health interventions.

Strengthen active case finding (through RHD and GMP services) and treatment of malnourished children under five and pregnant & lactating mothers as per the guidelines and protocols.

Build / strengthen the capacity (knowledge & skill) of front-line workers or service providers (Woreda Agriculture and Health experts, HEW, DAs, Women and Men Development Armies in nutrition specific and nutrition sensitive interventions.

Promote health & nutrition education to bring about the individual behavior and community social change (focusing on the identified gaps such as immunization, water treatment, CBN, sanitation and hygiene and proper use of ITN) by implementing evidence-based and result-based IEC / BCC nutrition and health interventions.

Improve the supply of agricultural inputs (crops and livestock - high yielding, drought /disease resistant varieties, veterinary supplies and services, encourage use of local and/or commercial fertilizer) and up-to-date agricultural technologies and tools.

Strengthen key WaSH activities (Safe water supply, water treatment) and sanitation & hygiene at household, community and institution levels.

Promote the use of small and large scale irrigation schemes to cultivate varieties of crops, vegetables and fruits to increase production and diversify foods including promotion of fruit and tree nurseries.

Promote livelihood diversification activities such as bee keeping, poultry, shoats and other income generating activities. Including strengthen linkages with credit and microfinance institutions to benefit communities in need of financial assistance.

Promote proper use and protect /maintain natural resources

Advocate for and strengthen multi-sectoral approach (make use of the already established regional to Tabia level Nutrition Coordination Body and Nutrition Technical Committee platforms) to tackle the multi-dimensional problems of the underlying causes of malnutrition by identifying the gaps, prioritize key intervention areas and incorporate nutrition programming into the existing sectors' (signatories of NNP) AWP. Planning and implementation of both nutrition specific and nutrition sensitive interventions reflected in the NNP document and the Lancet.

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17. ANNEXES

Annex I: Plausibility Check Summary Report

Plausibility check for: 10062015_TENCU_TAG.as

Standard/Reference used for z-score calculation: WHO standards 2006 (If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	Score
Missing/Flagged data (% of in-range subjects)	Incl	%	0-2.5	>2.5-5.0	>5.0-10	>10	0 (0.5 %)
Overall Sex ratio (Significant chi square)	Incl	p	>0.1	>0.05	>0.001	<0.000	0 (p=0.891)
Overall Age distrib (Significant chi square)	Incl	p	>0.1	>0.05	>0.001	<0.000	0 (p=0.611)
Dig pref score - weight	Incl	#	0-5	5-10	10-20	> 20	2 (6)
Dig pref score - height	Incl	#	0-5	5-10	10-20	> 20	2 (8)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>1.20	0 (0.95)
Skewness WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	0 (-0.10)
Kurtosis WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	0 (0.03)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<0.000	1 (p=0.024)
Timing	Excl	Not determined yet	0	1	3	5	
OVERALL SCORE WHZ =			0-5	5-10	10-15	>15	5 %

At the moment the overall score of this survey is 5 %, this is excellent.

There were no duplicate entries detected.

Annex II: Summary of Anthropometric Result (based on WHO standards)

3. Results

3.1 Anthropometric results (based on WHO standards 2006):

Definitions of acute malnutrition should be given (for example, global acute malnutrition is defined as <-2 z scores weight-for-height and/or oedema, severe acute malnutrition is defined as <-3 z scores weight-for-height and/or oedema)

Table 3.1: Distribution of age and sex of sample

	Boys		Girls		Total		Ratio
AGE (mo)	no.	%	no.	%	no.	%	Boy: girl
6-17	102	54.3	86	45.7	188	21.9	1.2
18-29	104	52.5	94	47.5	198	23.0	1.1
30-41	97	48.5	103	51.5	200	23.3	0.9
42-53	94	49.0	98	51.0	192	22.3	1.0
54-59	35	42.7	47	57.3	82	9.5	0.7
Total	432	50.2	428	49.8	860	100.0	1.0

Table 3.2: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

	All n = 860	Boys n = 432	Girls n = 428
Prevalence of global malnutrition (<-2 z-score and/or oedema)	(92) 10.7 % (8.5 - 13.4 95% C.I.)	(47) 10.9 % (7.6 - 15.4 95% C.I.)	(45) 10.5 % (8.3 - 13.3 95% C.I.)
Prevalence of moderate malnutrition (<-2 z-score and ≥ -3 z-score, no oedema)	(73) 8.5 % (6.7 - 10.7 95% C.I.)	(37) 8.6 % (6.2 - 11.8 95% C.I.)	(36) 8.4 % (6.4 - 11.0 95% C.I.)
Prevalence of severe malnutrition (<-3 z-score and/or oedema)	(19) 2.2 % (1.4 - 3.6 95% C.I.)	(10) 2.3 % (1.1 - 4.6 95% C.I.)	(9) 2.1 % (1.1 - 3.9 95% C.I.)

The prevalence of oedema is 0.0 %

Table 3.3: Prevalence of acute malnutrition by age, based on weight-for-height z-scores and/or oedema

Age (mo)	Total no.	Severe wasting (<-3 z-score)		Moderate wasting (>= -3 and <-2 z-score)		Normal (>= -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	188	4	2.1	21	11.2	163	86.7	0	0.0
18-29	198	2	1.0	20	10.1	176	88.9	0	0.0
30-41	200	7	3.5	9	4.5	184	92.0	0	0.0
42-53	192	4	2.1	18	9.4	170	88.5	0	0.0
54-59	82	2	2.4	5	6.1	75	91.5	0	0.0
Total	860	19	2.2	73	8.5	768	89.3	0	0.0

Table 3.4: Distribution of acute malnutrition and oedema based on weight-for-height z-scores

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 19 (2.2 %)	Not severely malnourished No. 841 (97.8 %)

Table 3.5: Prevalence of acute malnutrition based on MUAC cut off's (and/or oedema) and by sex

	All n = 860	Boys n = 432	Girls n = 428
Prevalence of global malnutrition (< 125 mm and/or oedema)	(112) 13.0 % (10.4 - 16.2 95% C.I.)	(58) 13.4 % (10.1 - 17.7 95% C.I.)	(54) 12.6 % (9.5 - 16.6 95% C.I.)
Prevalence of moderate malnutrition (< 125 mm and >= 115 mm, no oedema)	(101) 11.7 % (9.2 - 14.8 95% C.I.)	(54) 12.5 % (9.3 - 16.6 95% C.I.)	(47) 11.0 % (8.2 - 14.6 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or oedema)	(11) 1.3 % (0.7 - 2.3 95% C.I.)	(4) 0.9 % (0.3 - 2.4 95% C.I.)	(7) 1.6 % (0.8 - 3.3 95% C.I.)

Table 3.6: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

Age (mo)	Total no.	Severe wasting (< 115 mm)		Moderate wasting (>= 115 mm and < 125 mm)		Normal (>= 125 mm)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	188	8	4.3	61	32.4	119	63.3	0	0.0
18-29	198	1	0.5	24	12.1	173	87.4	0	0.0
30-41	200	2	1.0	6	3.0	192	96.0	0	0.0
42-53	192	0	0.0	8	4.2	184	95.8	0	0.0
54-59	82	0	0.0	2	2.4	80	97.6	0	0.0
Total	860	11	1.3	101	11.7	748	87.0	0	0.0

Table 3.7: Prevalence of underweight based on weight-for-age z-scores by sex

	All n = 860	Boys n = 432	Girls n = 428
Prevalence of underweight (<-2 z-score)	(298) 34.7 % (31.0 - 38.5 95% C.I.)	(161) 37.3 % (31.6 - 43.3 95% C.I.)	(137) 32.0 % (28.3 - 35.9 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(229) 26.6 % (23.4 - 30.2 95% C.I.)	(127) 29.4 % (24.3 - 35.0 95% C.I.)	(102) 23.8 % (20.3 - 27.8 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(69) 8.0 % (6.3 - 10.1 95% C.I.)	(34) 7.9 % (5.6 - 11.0 95% C.I.)	(35) 8.2 % (6.1 - 10.9 95% C.I.)

Table 3.8: Prevalence of underweight by age, based on weight-for-age z-scores

Age (mo)	Total no.	Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (>= -2 z score)		Oedema	
		No.	%	No.	%	No.	%	No.	%
6-17	188	13	6.9	43	22.9	132	70.2	0	0.0
18-29	198	20	10.1	58	29.3	120	60.6	0	0.0
30-41	200	16	8.0	54	27.0	130	65.0	0	0.0
42-53	192	15	7.8	51	26.6	126	65.6	0	0.0
54-59	82	5	6.1	23	28.0	54	65.9	0	0.0
Total	860	69	8.0	229	26.6	562	65.3	0	0.0

Table 3.9: Prevalence of stunting based on height-for-age z-scores and by sex

	All n = 860	Boys n = 432	Girls n = 428
Prevalence of stunting (<-2 z-score)	(409) 47.6 % (43.0 - 52.1 95% C.I.)	(224) 51.9 % (46.4 - 57.2 95% C.I.)	(185) 43.2 % (37.5 - 49.2 95% C.I.)
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	(260) 30.2 % (26.8 - 33.9 95% C.I.)	(140) 32.4 % (28.1 - 37.0 95% C.I.)	(120) 28.0 % (23.3 - 33.3 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(149) 17.3 % (14.5 - 20.5 95% C.I.)	(84) 19.4 % (15.7 - 23.8 95% C.I.)	(65) 15.2 % (11.9 - 19.1 95% C.I.)

Table 3.10: Prevalence of stunting by age based on height-for-age z-scores

Age (mo)	Total no.	Severe stunting (<-3 z-score)		Moderate stunting (>= -3 and <-2 z-score)		Normal (>= -2 z score)	
		No.	%	No.	%	No.	%
6-17	188	24	12.8	43	22.9	121	64.4
18-29	198	46	23.2	61	30.8	91	46.0
30-41	200	38	19.0	72	36.0	90	45.0
42-53	192	30	15.6	59	30.7	103	53.6
54-59	82	11	13.4	25	30.5	46	56.1
Total	860	149	17.3	260	30.2	451	52.4

Table 3.11: Mean z-scores, Design Effects and excluded subjects

Indicator	n	Mean z-scores \pm SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Weight-for-Height	860	-0.80 \pm 0.98	1.39	0	0
Weight-for-Age	860	-1.65 \pm 0.92	1.34	0	0
Height-for-Age	860	-1.94 \pm 1.14	1.79	0	0

* contains for WHZ and WAZ the children with edema.

Annex III: Survey Tools

Description	Item	Quantity Per team	Remark
Weighing	Salter scales	1	M
	Standard weight (for Calibration)	1	M
	Weighing pants (if hanging scale)	3	M
Measuring	Height board	1	M
	Height stick	1	M
MUAC	MUAC tapes	2	M
Forms or questionnaire	Schedule cluster list and dates of survey	1	M
	Anthropometry questionnaire	120	M
	Mortality questionnaire	60	M
	Household questionnaires	1020	M
	Community questionnaire	60	M
	CBN	60	M
Stationery	Folders/file box	6	M/O
	Laptop (for data entry & analysis)	2	M
	Clipboard	12	M
	Ball Pen	6	M
	Pencil	12	M
	Eraser	12	M
	Sharpener	12	M
	Notebook	6	M
	Calculator	-	
Reference documents	Bag to carry anthropometric tools	6	M
	Surveyor's manual	6	M
	Official letter of introduction	6	M
	Calendar of events	6	M
	WFH reference Tables	6	M
	Random number Table	6	M
	Referral forms	6	M
Logistics	Map of the area	-	O
	Vehicle	6	M
	Fuel	TBD	M
	Per diem	210/d/pp	M
	Sign in (attendance) sheet	TBD	M
Key: M = Mandatory O = Optional M/O = It can be either of the two			

Annex VI: Survey Schedule

I. Training of survey teams			
From	To	Woreda / Venue	Remark
04/06/2015	08/06/2015	Tanqua Abergele	
II. Actual Field Work			
From	To	Woreda / Venue	Remark
09/06/2013	19/06/2015	Tanqua Abergele	

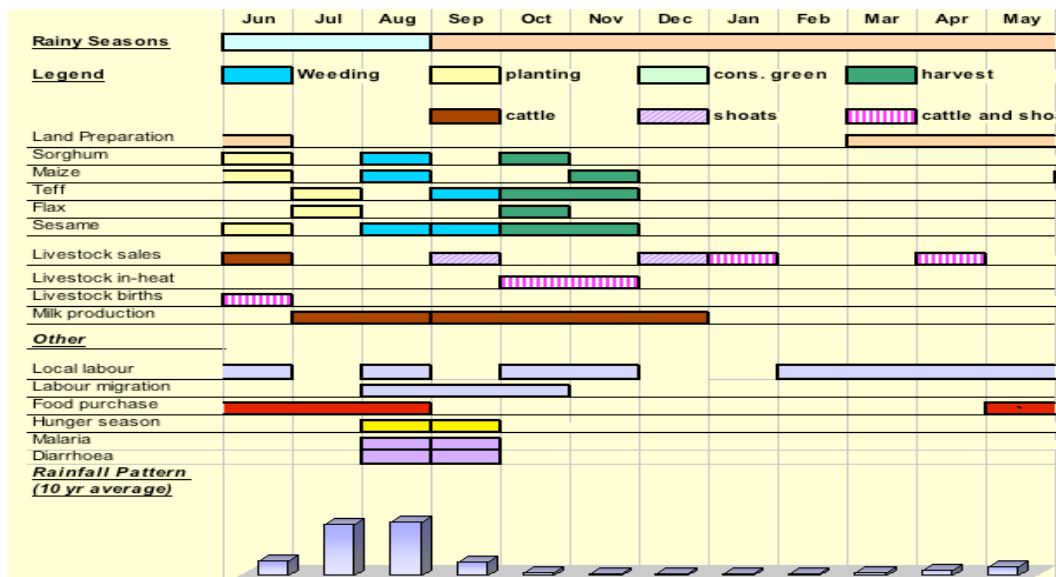
Note: Bi annual Nutrition Survey were carried out between **04 & 19 June 2015**

Annex V: Selected Clusters (Kushet) of Tanqua Abergele Woreda

SN	Geographical unit (Kushet or Village)	Population size	Selected Cluster
1	Belih	1945	1,2
2	Harana	1965	3
3	Derko	1692	4,5
4	Abaziba	760	6
5	Agora	1064	7
6	Shegalu	2765	8,9
7	Limat	1922	10,11
8	Girwure	1261	RC
9	Lemlem	699	12
10	Adi Sera	1196	49
11	Adi Nefas	765	13
12	Zemahneku	1189	14
13	Tekle Mekerna	1075	15
14	Mezina	902	16
15	Serarifa	2003	17,18
16	Zegelwa	1946	19
17	Firtata	2434	20,21
18	Tsirba	1801	22
19	Zikuli	1658	23,24
20	Agbe	1590	25
21	Akelaziba	985	RC
22	Seimteruba	2660	26,27
23	Adi Azekua	1300	28
24	Adi Tsadkan	1290	29
25	Menya	1275	30
26	Bamba	1558	31,32
27	Adi Weyane	1200	33
28	Taget	1520	34
29	Ruba Keze	1678	35
30	Tsebera	835	RC
31	Firtasige	538	36
32	Tashmane	1592	37
33	Berashewa	999	38
34	Tseikeme	1043	39
35	Terma	1686	40
36	Adi Golagul	1511	41
37	Ayni Giba	1491	42

38	Walwa	1791	RC,43
39	Gera	1788	44
40	Diwera	1415	45
41	Shewate Higum	1374	46
42	Jejeke	3200	47,48
43	Busha	2125	50
44	Fegze	905	51
45	Guftamne	1341	52
46	Misaza	2138	53,54
47	Sera Sike	987	55
48	Wegif	1092	56
49	Shewata	1186	57
50	Gomenge	2068	RC
51	Hidmo	3948	58,59
52	Adi Melale	1067	60

Annex VI: Middle Tekeze Livelihood Zone Seasonal Calendar



Annex VII: Map of Tanqua Abergele Woreda

