



**SEMI-QUANTITATIVE EVALUATION OF ACCESS AND
COVERAGE (SQUEAC)
FINAL REPORT**



AKOBO EAST COUNTY, SOUTH SUDAN, MARCH 2016

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FUNDED BY:



ACKNOWLEDGMENT

International Medical Corps, South Sudan Mission would like to appreciate all those individuals who contributed towards successful completion of the SQUEAC assessment conducted in Akobo County, Jonglei State, South Sudan.

Special appreciation goes to:

- OFDA for their financial support to undertake the assessment
- International Medical Corps, South Sudan Juba office and Akobo field office nutrition and support departments for facilitation and support more so field level planning, recruitment of survey enumerators and timely logistical support
- County administrative authorities for their support with regards to security updates and for ensuring smooth operations and for providing other relevant information for planning purposes.
- Akobo East county director of health (CHD) for his immense support from the planning stage through to the data collection.
- Survey team including other local implementing partner's staff for their endurance, professionalism and dedication to the survey exercise.
- Caretakers, local authorities and the general community for their cooperation during the survey exercise.
- Coverage Monitoring Network for remote technical support and guidance.

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ABBREVIATIONS

CI:	Confidence Interval
CHD:	County Health Department
CNV:	Community Nutrition Volunteers
CMAM:	Community Management of Acute Malnutrition
CMN:	Coverage Monitoring Network
FGD	Key Informant Interview
GAM:	Global Acute Malnutrition
SC:	Stabilization Centre
HH:	Household
IMC:	International Medical Corps
MAM:	Moderate Acute Malnutrition
MoH:	Ministry of Health
MUAC:	Mid Upper Arm Circumference
OTP:	Outpatient Therapeutic Program
OJT	On the Job training
TSFP:	Targeted Supplementary Feeding Program
IYCF:	Infant and Young Child Feeding
LOS:	Length of Stay
RRC:	Relief and Rehabilitation Commission
SAM:	Severe Acute Malnutrition
SMART:	Standardized Monitoring and Assessment in Relief and Transition
SQUEAC	Semi Quantitative Evaluation of Access and Coverage
TH:	Traditional Healers
TBA	Traditional birth attendants
SAM:	Severe Acute Malnutrition
MAM:	Moderate Acute Malnutrition
WAZ:	Weight-for-Age Z score
IYCF:	Infant and Young Child Feeding
WHZ:	Weight-for-Height Z score
U5MR:	Under-Five Mortality Rate

EXECUTIVE SUMMARY

International Medical Corps is running OTP and TSFP services in Akobo East, in 10 nutrition feeding sites; 3 are integrated at the health facility while 7 are community nutrition outreach program. IMC also support and run the Akobo county hospital, providing in-patient, out-patient services and surgical interventions. The nutrition component has infant and young child feeding (IYFC) and nutritional education is integrated into CMAM programming.

The CMAM program has Outpatient Therapeutic Program (OTP) sites, Targeted Supplementary Feeding Programs (TSFP) that run in linewith them and one Stabilization Center (SC) in Akobo hospital. Severely acutely malnourished (SAM) children without medical complications are treated in OTP. SAM cases with medical complicates are referred to the SC for stabilization and nutritional therapy and are after which transferred to the OTP site nearest their community. Children discharged as cured from OTP are enrolled in the SFP program for the treatment of moderate acute malnutrition (MAM) to prevent SAM relapse.

The Semi-quantitative Evaluation of Access and Coverage (SQUEAC) was undertaken from 27th Feb - 13th Mar 2016 where CMAM programming is provided in Akobo East County.

The SQUEAC investigation purposed to estimate the overall coverage of the OTP program and identify boosters and barriers influencing program access and coverage in Akobo East County.

The coverage assessment used Semi Quantitative Evaluation of Access & Coverage (SQUEAC) methodology which is specifically designed to evaluate the coverage of selective feeding programmes and focuses on a detailed investigation of factors influencing coverage.

The methodology applied all the three stages of SQUEAC namely.

Stage 1:Semi-quantitative investigation into factors affecting coverage. Identification of barriers to coverage and spatial pattern of coverage.

Establishment of areas of low and high coverage as well as reasons for coverage failure using routine program data, already available quantitative data and qualitative data.

Stage 2.Confirmation of areas of high and low coverage and other hypotheses relating to coverage identified in stage 1 using small studies, small surveys and small area surveys.

Stage 3.Provision of an estimate of overall program coverage using Bayesian techniques.

Three major barriers identified were: (1) Long travel time to OTP sites; (2) Insecurity/inter-clan fighting; and (3) Migrations. Three major boosters were: (1) Active case finding and referrals by community nutrition volunteers (2) Good program perception /opinion; and (3) Good understanding of malnutrition and its causes.

The results of this SQUEAC assessment reveal a final coverage estimate of: Single coverage is : 46.4% (CI 35.5% ↔ 57.4% 95%); Z-test: = -1.37, p = 0.1717¹

The final coverage estimate is slightly lower than the 50% international SPHERE standard for CMAM programming in rural contexts.

The assessment recommendations are summarized below;

- Strengthen community sensitization and mobilization on CMAM program through involvement of community opinion key leaders i.e. community chiefs, elders, religious leaders, traditional healers, traditional birth attendants, mother support group members by all the nutrition implementing partners.
- Partners should strengthen the community regular screening and referral system by ensuring that the community nutrition volunteers are trained and supported and community gate keeper's more so traditional healers and traditional birth attendants are involved in referrals.
- Follow up with CNVs to monitor arrival of new populations through community leaders and orient them on CMAM program (screen U5 & PLW and sensitization).
- Capacity building of CMAM staffs through regular on the job training (OJT) and refresher courses on IYCF (more so counseling techniques) and CMAM protocols with clear admission and discharge criteria.
- Strengthen program monitoring through regular supportive supervisions and quarterly data review meetings; that include County Health department, IMC staff, and other nutrition partners in Akobo East County..
- Nutrition partners in Akobo East to strengthen the staff's capacities by regular refresher training as well as by providing feedback on their work to ensure quality services to the target population.
- Continue regular mass screening, especially during implementation of BSFP and Child health days.
- Create Boma wise map with all nutrition sites, partners responsible for those sites, services provided in a site If possible GPS coded map is preferred.

¹ Bayesian SQUEAC Calculator 3.01

1.1 OVERVIEW OF THE AREA

The major socio-economic activities in the county include agro-pastoralism and fishing.

[illegible]

3

I.2 DESCRIPTION OF THE POPULATION

The greater part of the implementation area is rural, with populations living close to the river. It falls in the Eastern floodplain zone. Nuer is the main tribe in Akobo East, although there is a small proportion of Anyiak community residing in Akobo town, both of whom are part of the Nilotic ethnic group.

The area's population, according to 2008 former Sudan household census, was estimated to be 140,455 with children below five contributing an estimated population of 25,282. The current estimated figures of Akobo East is 79,160, however the population has increased due to internally displaced people that are estimated to be 32,733 according to UNOCHA report³.

Population displacement during the dry season is common as cattle keepers migrate in search of pasture and also due to persistent inter clan fighting between Murle and Nuer communities.

Most of the population are pastoralists, keeping cows, goats and chickens. Those located in the peri-urban bomas are sedentary and are largely restricted to government and NGO employees and IDPs. The main livelihood activity is agriculture although due to the flooding and population movement, only few are able to successfully plant crops.

At the time of the assessment there was food shortage in the main market of Akobo. Food supplies from Ethiopia was affected due to insecurity situation in Gambella and Akobo border. Food prices were very high and also fluctuates over the seasons. In the months of March to April which are the dry period are the most critical as harvested food stocks are depleted. The rainy season starts in May and ends in mid-November, crops are planted in May and harvested in August. However in 2014, flooding across Akobo East displaced communities and destroyed crops resulting in minimal food production. The majority of the population live close to the river so fish is freely available all year round. Maize, sorghum, meat and fish make up the local diet when available. OXFAM started providing general food distribution in the area at the time of the survey.

I.3 NUTRITIONAL SITUATION

The most recent SMART survey conducted in December 2015 by IMC indicated GAM prevalence of 16.9 % [95% CI: 13.7↔ 20.7] and SAM prevalence 2.6 % [95% CI: 1.4 ↔ 4.7] which is classified as critical according to the WHO classification standards for malnutrition⁴. The SAM prevalence was higher in males (3.0% (95% CI: 1.4-6.0)) than females (2.2% (95% CI: 1.1↔4.7)). No cases of oedema were found. Prevalence of stunting was 9.9% (95% CI: 6.9↔14.0) and underweight was 18.0% (95% CI: 14.3↔22.3%)

³ Nutrition SMART Survey Akobo EAST May 2015.

⁴ Nutrition SMART Survey Akobo EAST Dec-2015

I.4 HEALTH AND NUTRITION INTERVENTIONS

There are a number of humanitarian agencies who works in collaboration with the local authorities to provide health, nutrition, WASH, food security and Education interventions in Akobo East.

International medical corps provides health and nutrition interventions.

IMC runs the county hospital providing outpatient and inpatient services, surgical reproductive health and mental health services whereas Nile Hope Development Fund (NHDF), a local NGO, run eight Primary Health Care Units (PHCUs) in: Burmath, Chiban, Kony, Meer, Thokliel, Thokwath, Dilule and Old Akobo.

IMC began implementing CMAM in 2009 and have since scaled up and runs OTP, TSFP, SC and IYCF services, across 9 bomas namely Wechpout, Thokwath, Dilule, Dimma, Mer, Old Akobo, Wechjiokni, Chibhan and Burmath. Additionally IMC runs TSFPs only in Bilkey Boma, where the OTP is run by Save the Children. IMC managed Community Nutrition Volunteers (CNVs) and Mother Support Groups (MSGs) are in nine bomas, all those previously listed.

IMC established two new sites i.e. Chiban and Markath IDP last year (2015) to offer OTP services.

CMAM protocols in South Sudan consist of the following four components:

1. **Community outreach:** aim to mobilize the community and promote early presentation to CMAM services and compliance. Children under 6-59months and PLW are screened at the community and health facilities by community nutrition volunteers. Cases are then referred to OTP and TSFP sites respectively for treatment.
2. **Targeted supplementary feeding programs (TSFP)** :targets moderately acute malnourished children with no serious medical complications
3. **Outpatient therapeutic programs (OTP);** provide home-based treatment and rehabilitation using ready to use therapeutic foods (RUTF) to severely acute malnourished children without medical complications
4. **Stabilization center (SC) /Inpatient therapeutic care:** provides intensive in-patient medical and nutrition care to severely acute malnourished children with medical complications; SC link with OTP to allow early discharge and continued treatment in the community.

International Medical Corps implements Infant and Young Child Feeding through mother support groups at the community level.

2.0 GENERAL OBJECTIVE

To evaluate access and coverage of outpatient therapeutic program implemented by International Medical Corps and other partners implementing OTP services in Akobo East county South Sudan.

2.1 SPECIFIC OBJECTIVES

- To identify boosters and barriers influencing program access and coverage.
- To estimate the overall coverage of the OTP program in Akobo East County.
- To develop recommendations to improve the coverage and outcome of outpatient therapeutic program in Akobo East County.
- To build the capacity of program staffs and MoH staffs on program coverage assessment methodology

3.0 INVESTIGATION PROCESS

The coverage assessment used Semi Quantitative Evaluation of Access & Coverage (SQUEAC) methodology which is specifically designed to evaluate the coverage of selective feeding programs and focuses on a detailed investigation of factors influencing coverage.

The methodology applied all the three stages of SQUEAC namely;

Stage 1: Semi-quantitative investigation into factors affecting coverage. Identification of barriers to coverage and spatial pattern of coverage.

Establishment of areas of low and high coverage as well as reasons for coverage failure using routine program data, already available quantitative data and qualitative data.

Stage 2. Confirmation of areas of high and low coverage and other hypotheses relating to coverage identified in stage 1 using small studies, small surveys and small area surveys.

Stage 3. Provision of an estimate of overall program coverage using Bayesian techniques.

3.1 STAGE I - QUANTITATIVE & QUALITATIVE DATA ANALYSIS

3.1.1 .Quantitative data analysis

This stage involved the analysis of the existing routine program monitoring data to assess whether the program is responding to the demands of its context as well as its performance .The program data included trends analysis (admissions and defaulters), performance indicators, exits and data that is already collected on beneficiary record cards such as admission by MUAC, defaulters, length of stay etc.

Trends analysis (admissions & defaulters)

The most important element of routine program data is the number of admissions over time.

FIGURE 2 illustrates the evolution of admissions and defaulting in IMC Akobo East program over a period of the year 2015 Admissions data is presented as smoothed time-series data and compared to seasonal event calendar that was developed by the investigation team (see table 1) to determine to what degree the program was able to respond to seasonal need.

Figure 2 : Plot of OTP Admissions and Defaulting over time the year 2015 – IMC Akobo East

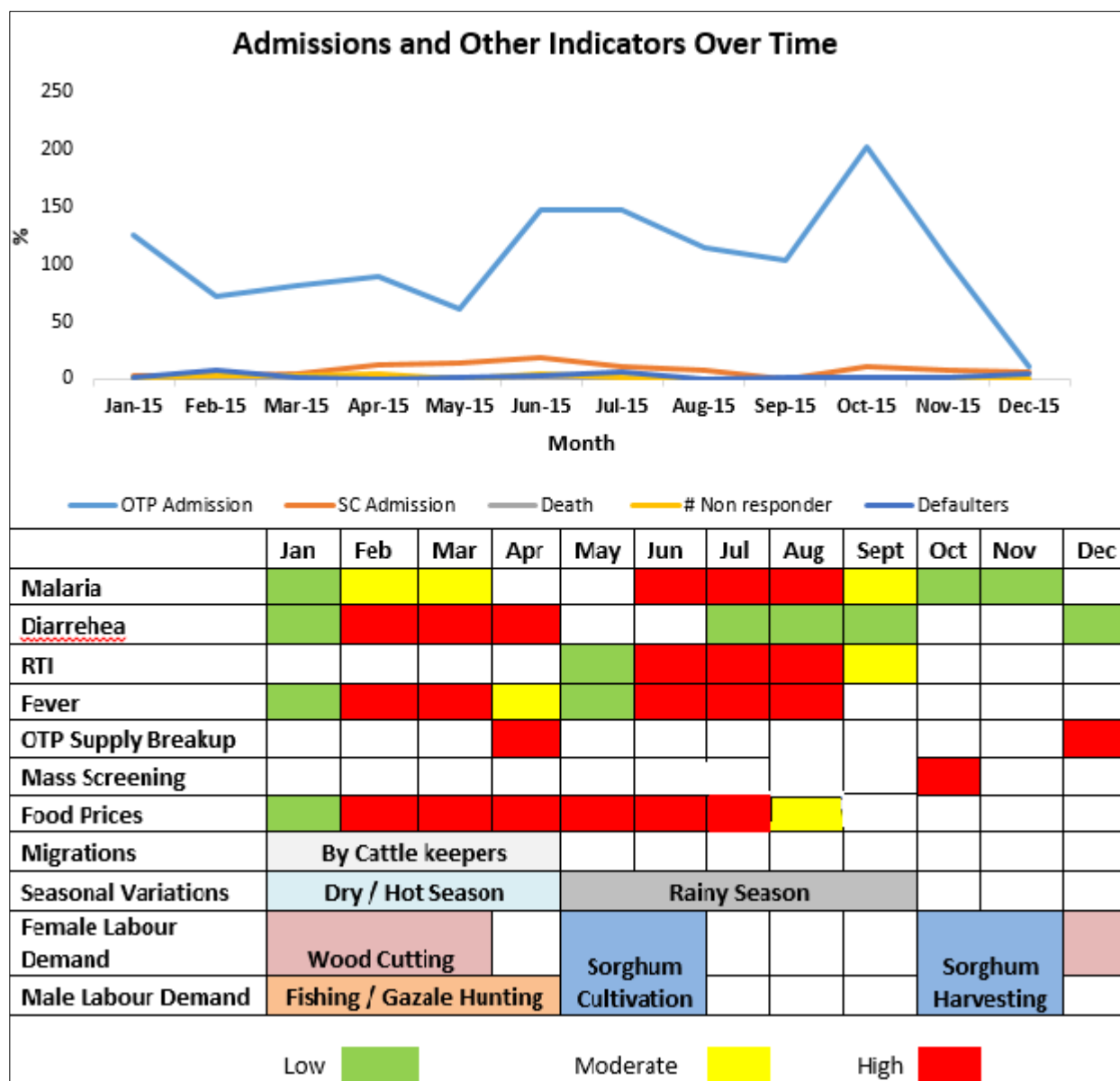
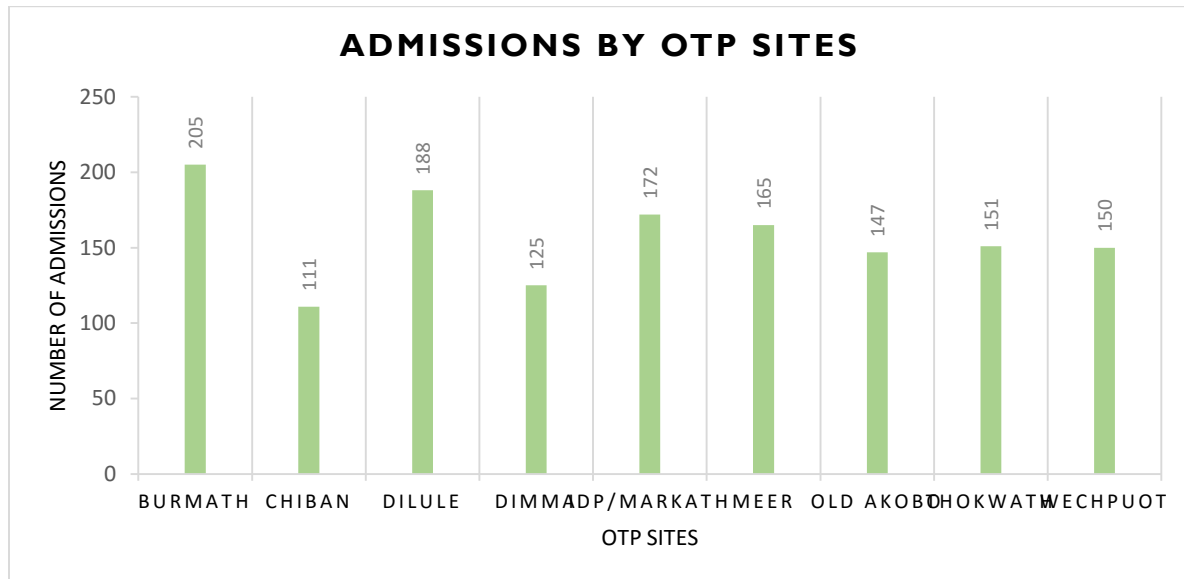


Figure 1 does not follow the typical pattern of admissions over time for CMAM program; In June and July 2015 the rate of admissions was almost 150. Program had mass screening campaigns in June and October also which also represent the high number of admissions. In December admissions dropped down due to the supply pipeline breakage. High number of admissions in January 2016 shows the new arrivals from Akobo west due to insecurity, fishing and also cattle camps around Akobo east.

OTP Admissions per OTP site

Admissions were further analyzed per OTP site to identify potential differences in admissions across the different OTP site.

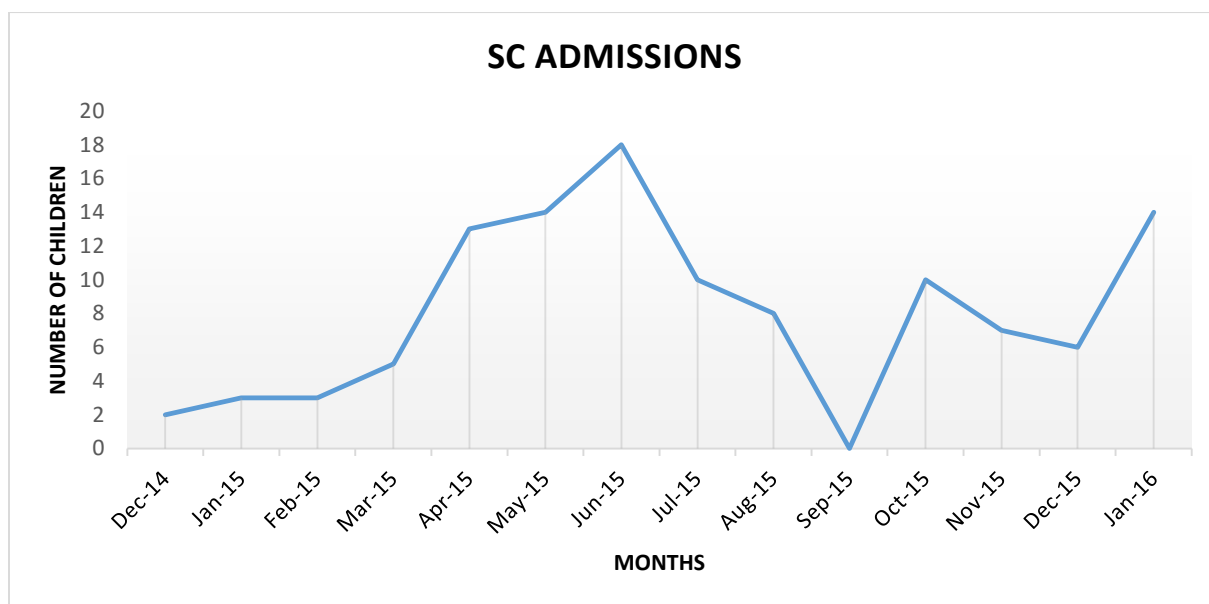
Figure 3: Total Admissions per OTP site (December 2014 – January 2016) Akobo East



From the figure above, Burmath and Dilule recorded high admissions with Chiban and Dimma recorded low admissions. The remaining OTP sites recorded relatively equal admissions. Investigations revealed that Chibhan OTP site was established in April 2015.

SC admissions

Figure 4 : SC Admissions (December 2014 – January 2016) Akobo East

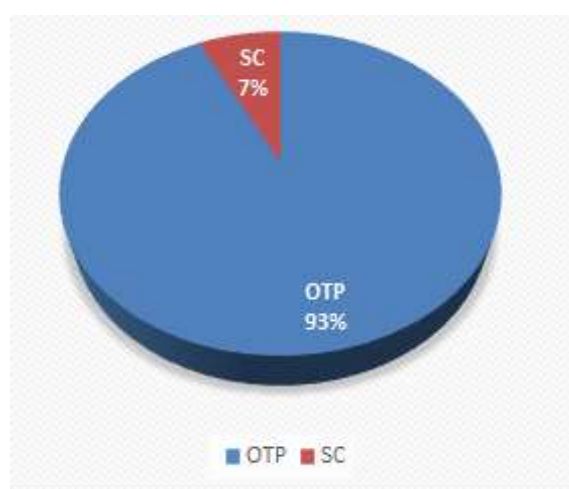


December 2014 to January 2016, 1554 SAM children were enrolled in OTP while 113 SAM children were referred to the SC inpatient care.

Percentage of OTP/SC Admissions

Figure 5 presents the total percentage of OTP / SC admissions. The proportion of SC cases (admissions and those who required admissions are above the acceptable level of <5% for an established program.

Figure 5: Percentage of Total Admissions in OTP/SC (December 2014 - January 2016) Akobo East



OTP performance indicators

The performance indicators assessed were the following:

1. Cure rate
2. Death rate
3. Default rate
4. Non-response rate

Table 1 : OTP Performance Indicators (December 2014 – January 2016) Akobo East

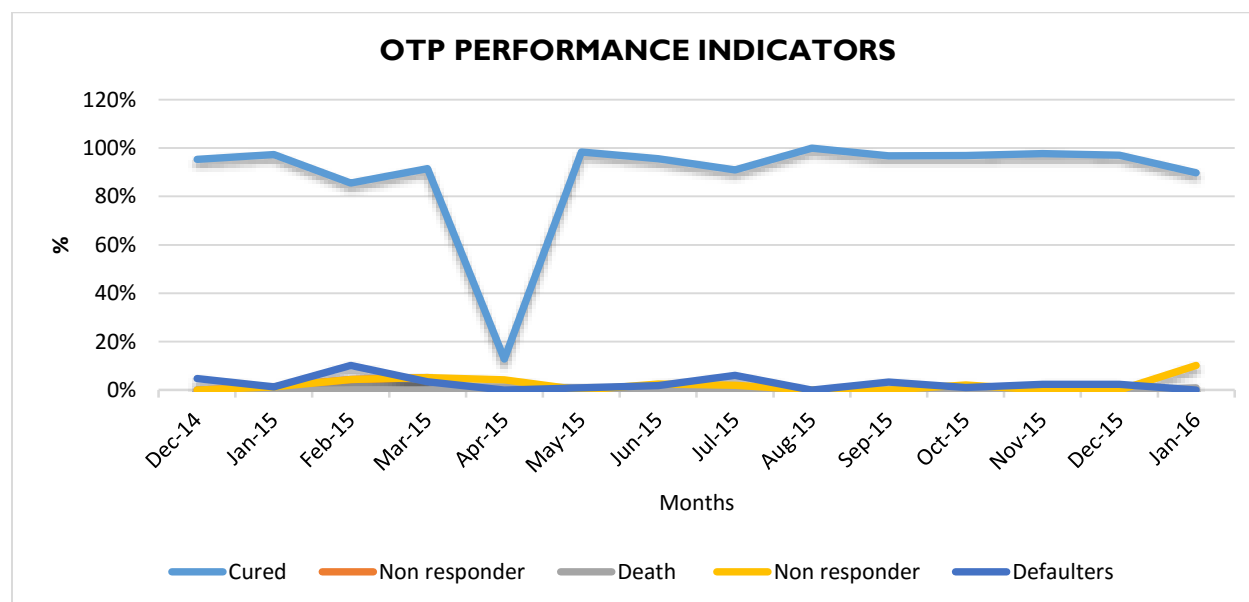
Indicators	Rates
Cure rate	89%
Death rate	0%
Default rate	3%
Non-response rate	2%

Cured and Default rates per OTP site		
Name of OTP Site	Cure rate	Default rate
Chibhan	56.3%	4.8%
Burmah	65.1%	0.4%
Thokwath	53.2%	1.4%
Dilule	68.5%	1.5%
Dimma	77.2%	0%
Meer	71.5%	0%
IDP	71.6%	3.0%
Old Akobo	76.7%	5.6%
Wechpout	52.5%	0%

Based on the available data, these OTP indicators report overall well satisfactory for Akobo East CMAM program according to SPHERE reference.

The drop in the cure rate in April was due to the supply pipeline breakage. The low death rate (only 1 death reported) is suggestive of an effective transfer system between the OTP and SC but it also could represent some deaths being classified as defaulters as some could not be traced as they are believed to have moved to Ethiopia.

Figure 6 : OTP performance indicators (December 2014 – January 2016) Akobo East



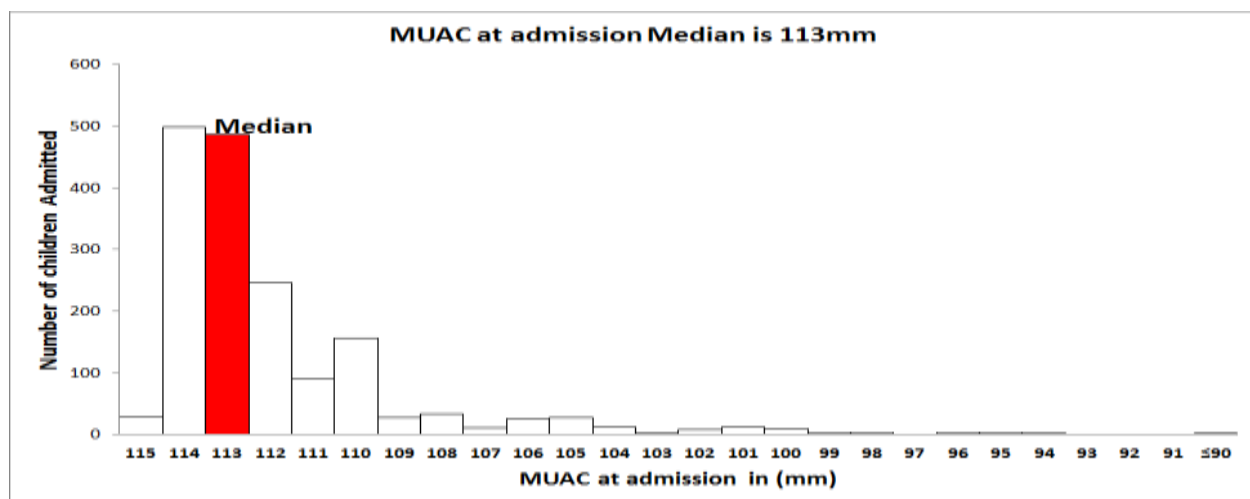
Complementary quantitative data

Admission MUAC analysis

Admission MUAC is an indicator that reports on the timeliness of case detection, presentation and admission; a low median admission MUAC can indicate late presentation, an example of direct coverage failure as SAM cases have spent a considerable amount of time non-covered before admission. Late presentation also affects coverage directly because it is often associated with the need for inpatient care, extended lengths of stay in the OTP, defaulting and overall poor treatment outcomes.

MUAC at admission data was collected from the OTP registers and analyzed from December 2014 to January 2016. Individual beneficiary treatment records were examined and verified with program registers. All OTP sites supported by IMC were included in the analysis. Data is presented in Figure 7

Figure 7: MUAC at Admission (December 2014 – January 2016) Akobo East



As illustrated in Figure 7 above, median MUAC at admission was 113cm which indicates that most MUAC measurements at admission are close to admission criteria indicating strong case finding followed by a steady decrease in lower MUACs and finally few critically low MUACs.

Discharge MUAC for cured analysis

Figure 8 presents the MUAC at discharge for cured children aged 6-59 months

Figure 8 : Discharge MUAC for cured children aged 6-59 months (December 2014 – January 2016) Akobo East.

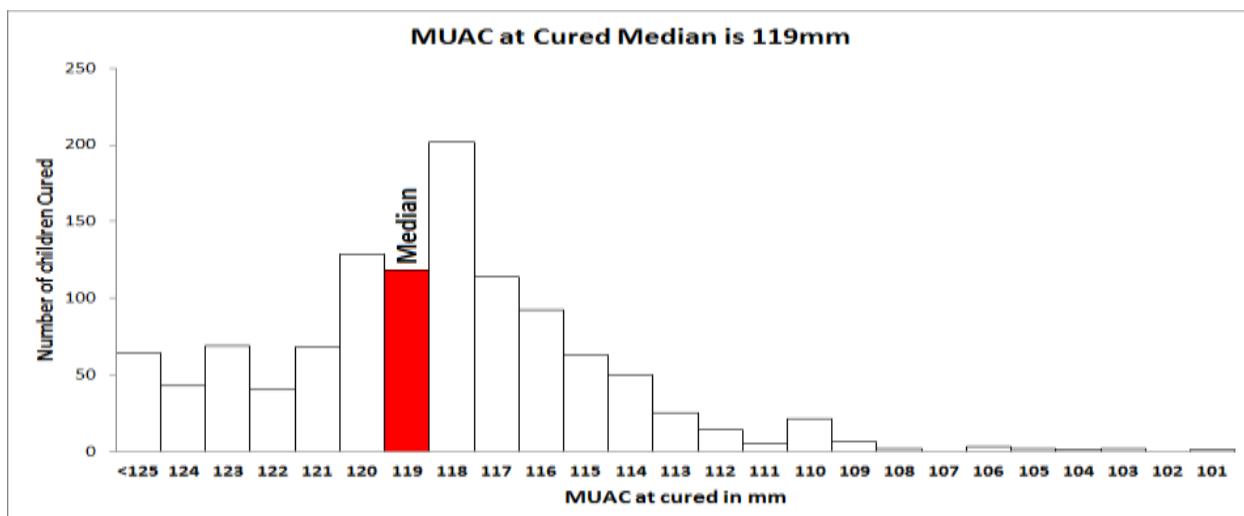
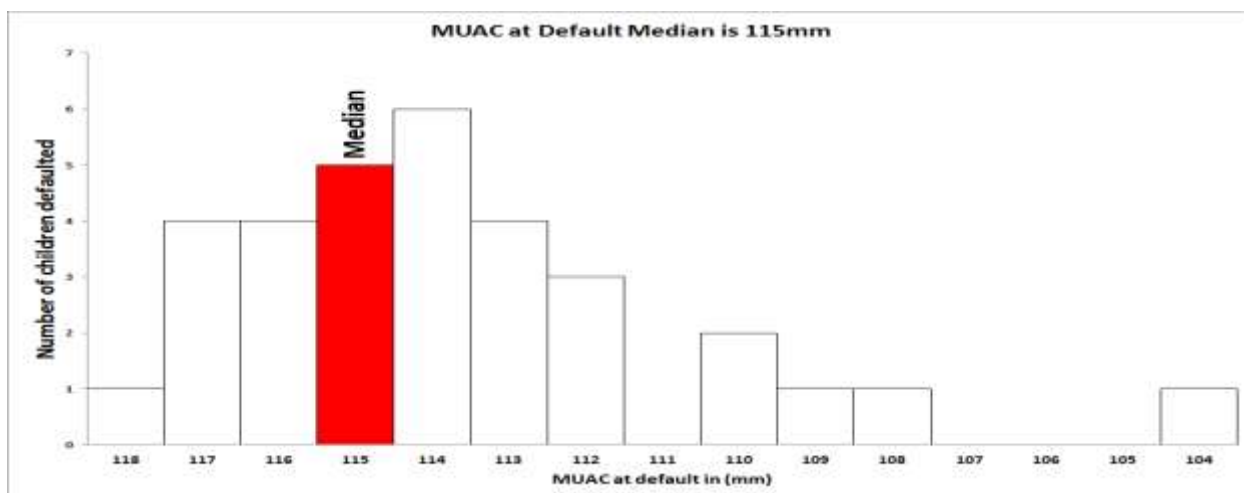


FIGURE 8 shows that 89% of children aged 6-59 months discharged from the OTP from December 2014 - January 2016 had a MUAC ≥ 115 mm. However, 11% SAM discharged as cured had a MUAC < 115 mm, or in other words were discharged prematurely. An investigation into the matter revealed that due to confusion by some nutrition nurses, a few cases were discharged at 15% weight gain; this practice was identified by the program manager and corrected.

Default MUAC analysis

Analysis of defaulter's data reveals that a total 32 cases had defaulted from the beginning of the investigation. Among these, 43% were recovering cases and 16% had critically low MUACs ($11 \text{ mm} - \leq 90 \text{ mm}$). The median MUAC for at default was 115 mm

Figure 9 : Default MUAC (December 2014 – January 2016) Akobo East.



Length of stay before default analysis

Time-to-default is a measure of how long a defaulter stays in the program before defaulting. This measure distinguishes an early defaulter (i.e. defaults within 4 weeks from admission) from a late

defaulter (i.e. defaults after 4 weeks from admission). It is important to distinguish these two classes of defaulter's particularly early defaulters because they are most likely current cases who are not covered by the program.

Figure 10: Length of Stay before Default (December 2014 – January 2016) Akobo East

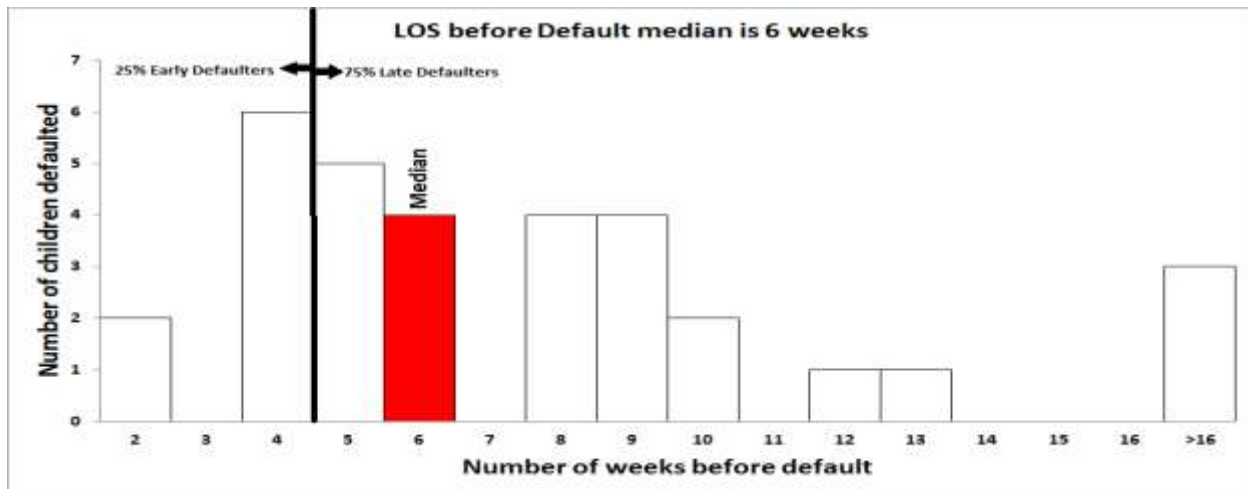


Figure 11 reports that 75% of cases were considered late defaulters, having abandoned the after 4 weeks. It was observed that some of the cases were hidden defaulters, according to the protocol they became a defaulters but not mentioned in the registers and continued in the program even after missing three consecutive visits.

Length of stay before discharge as cured analysis

The length of stay in the OTP before discharge for cured SAM cases is an indicator that reports on the duration of the treatment episode (i.e. the time between admission and discharge). Long treatment episodes are associated with advanced SAM at admission and late presentation, both of which are linked to poor treatment outcomes. According to the CMAM sphere standards mean length of stay in OTP program should be < 8 weeks.

Figure 11: Length of Stay before Discharge as Cured (December 2014 – January 2016) Akobo East.

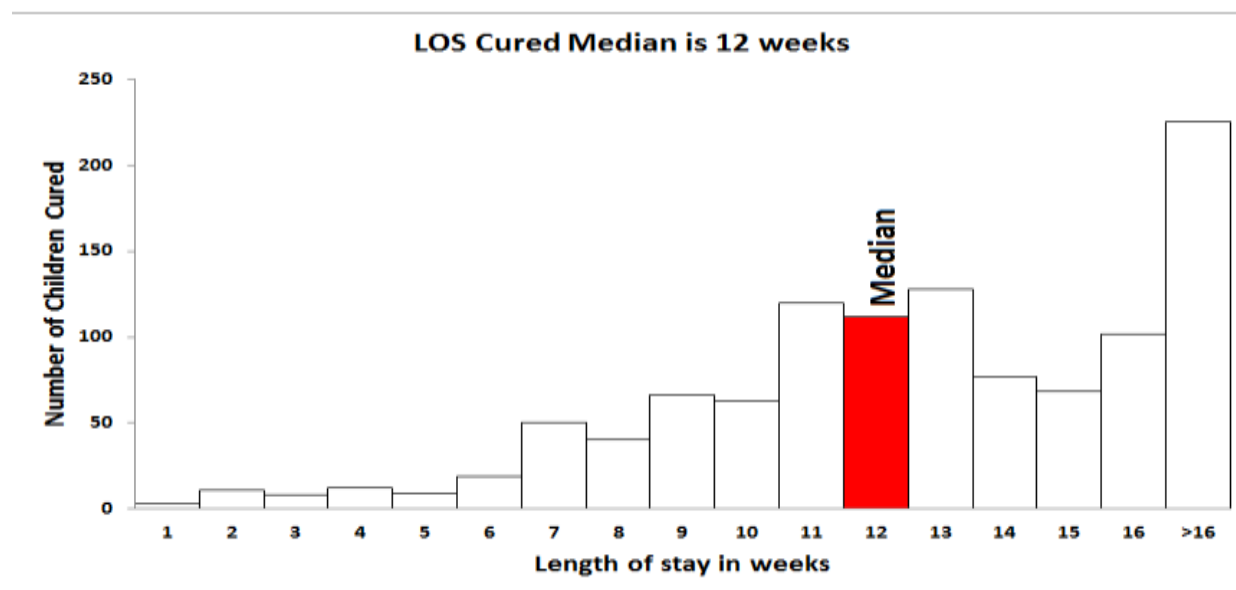


Figure 10 shows that the most of the SAM cases overstayed in the program and were discharged as cured after 12 weeks .A number of factors were found to be contributing to long lengths of stay i.e. frequent absenteeism due to migration and care givers busy schedule with other domestic duties. Stock outs in some facilities and RUTF sharing also contributed to long lengths of stay.

Time to travel: Admissions & defaulting

Distance-to-travel is one tool for assessing the impact of distance of beneficiaries and program sites on coverage. It's important to note that a limitation of time-to-travel analyses is that is does not consider factors relevant to travelling such as means of transportation, quality of roads, geographical barriers, etc.

Figure 10: Time to Travel for Villages at Defaulters (December 2014 – January 2016) Akobo East

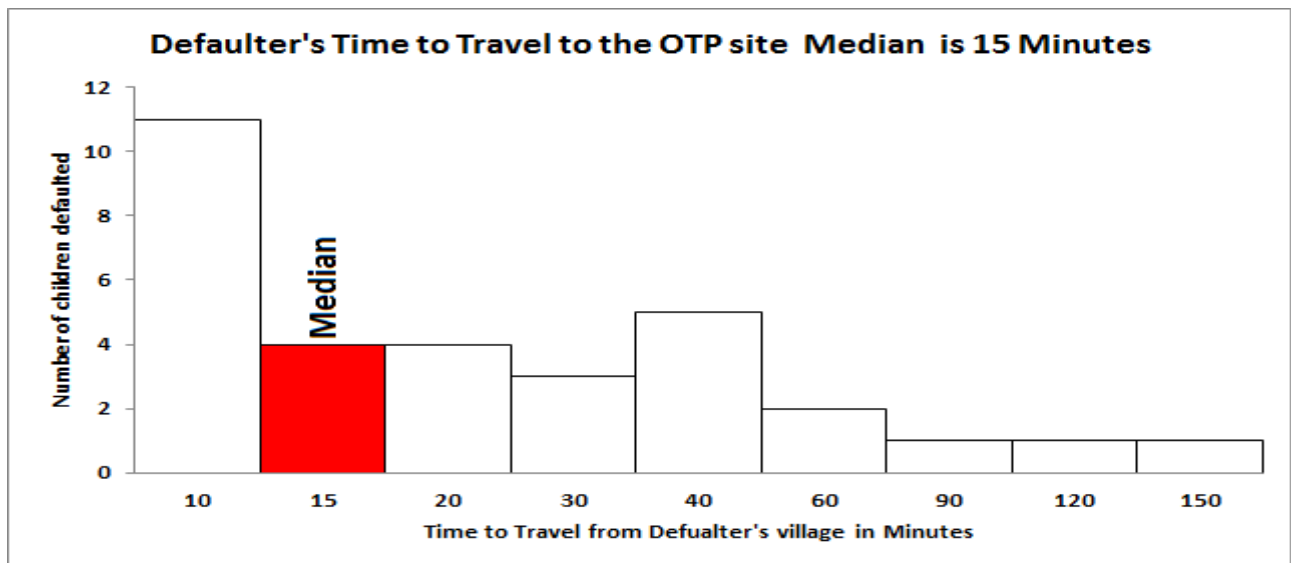
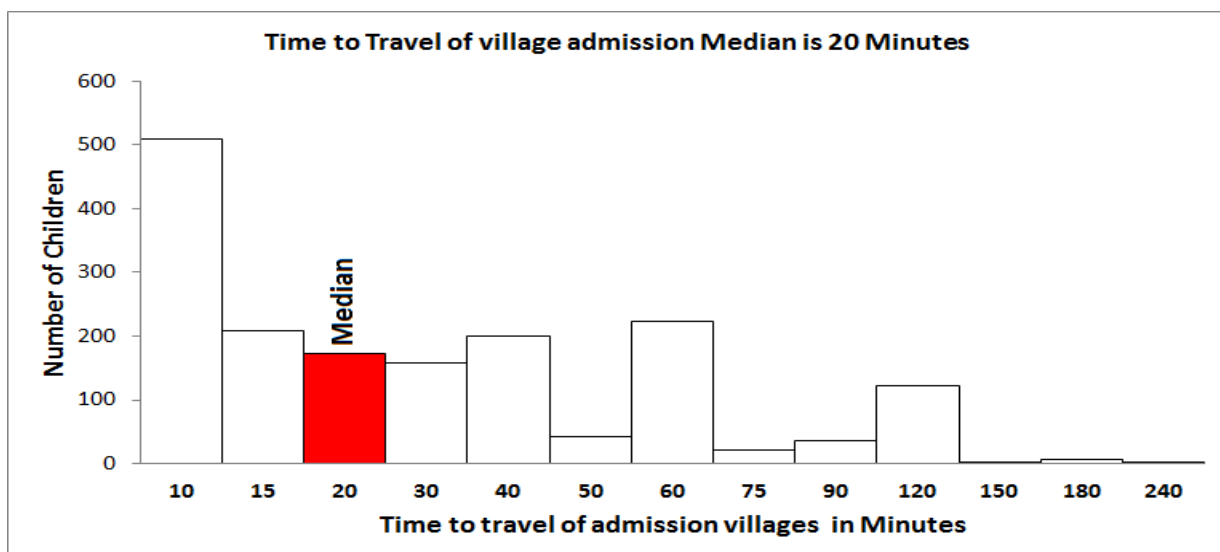


Figure 12 reports a direct relationship between defaulting and distance; yet, as OTP sites geographical coverage in Akobo is strategically organized to minimize distance when possible, the large proportion of defaulters residing in villages near to OTP sites, only few defaulters are from far villages. Investigations revealed that defaulting was mostly associated with migrations

Time to Travel: Admissions

Figure 13 reports an inverse relationship between admissions and distance; the majority of admitted SAM cases reside nearby OTP sites which promotes easy accessibility

Figure 11 : Time to Travel for Village at Admissions (December 2014 – January 2016) Akobo East



3.1.2 Qualitative data analysis

The aim of collecting qualitative data was to better inform and explain quantitative data from routine program monitoring data and allow for a more detailed development of hypotheses and identify barriers and boosters to access. Qualitative data was collected and triangulated by various sources and methods.

Sources were: Severe Acute Malnourished cases, care takers, local authorities (religious leaders, chiefs, village elders); Mother support groups; traditional healers, traditional birth attendants; OTP nurse, SC nurse; Community nutrition volunteers, community of women; community of men; program staff.

Methods used included; Focus group discussions, semi-structured interviews, simple structured interviews, key informant interviews, data analysis and observations. Interviews and discussions took place at various community and OTP sites across the intervention zone that were strategically selected to assure equal representation. Coverage monitoring interview guides were adapted and oriented to facilitate the collection of data pertinent to program coverage and barriers to access. Finally, the investigation team also developed a list of local terminology employed when referring to malnutrition as well had ready-to-use therapeutic foods (RUTF); that was used to show the caregiver, referring that the child was either in the treatment program or not.

Key areas of investigations were;

- Awareness of malnutrition and program
- Treatment seeking behavior
- Perceptions and opinions about the program
- Community outreach services
- Barriers to access /reasons for defaulting

All results were regularly categorized and organized in one of three categories in using the BBQ tool.

Table 2 below presents a legend of the different sources and methods used during the investigation.

Table 2: List of Source, Methods and number of interviews conducted during Qualitative data collection

Source	Total Number Interviews	Method	
		SSI	FGD
OTP Staff	8	7	1
Caregivers	28	28	0
Volunteers (CNVs)	14	14	0
Lead Mothers	6	5	1
Community Leaders	10	9	1
Traditional Healers	5	5	0
Religious leaders	7	6	1

Female Elders	1	0	1
Payam Chief	2	2	0
Boma Chief	9	9	0
Teacher	2	2	0

Principal positive and negative factors influencing coverage are summarized in table 3 below.

Table 3: Main Barriers and Boosters with Weightage Scores, Akobo East 2016

Boosters	Scale (1-8)	Barriers	Scale (1-8)
Case finding and referrals by CNVs	4.2	Long travel distance to OTP sites	4.6
Good program awareness	4	Insecurity/inter-clan clashes	4.6
Awareness of malnutrition and its causes	4	Lack of sensitization on admission criteria/ Rejection	3.8
Strong linkage/referral mechanism of cases from SC to OTP and vice versa	3.8	Migrations	3.8
Good program perception/ opinion	3.8	Carer busy with other domestic duties	3.4
Strong communication between staffs and CNVs	3.2	OTP Supply pipeline breakage	2.6
Strong Outreach / Follow up	3	Long waiting hours at OTP site	2.6
Familiarity with MUAC tape	3	GFD on OTP days	2.4
Community Involvement and good collaboration between nutrition workers and local leaders/TBAs in mobilization and referrals.	2.8	Lack of follow up, home visits and referrals by some CNVs	2.2
Peer Referral (caregiver to caregiver)	1.8	Lack of program awareness	2
		Seasonal variation/access challenges during the rainy season.	2
		Stigma associated with RUTF usage(parents are feeling ashamed)	1.2

Table 4 details the local terminology for malnutrition, malnourished condition and RUTF which is being used by the Akobo East communities.

Table 4 : Local terminology used for malnutrition and RUTF, Akobo East 2016

Doulchok	Malnutrition
Dout	Malnourished
Thiang	Skinny children who takes breastmilk of pregnant mother (Basically it is myth)

Pout Pout	Oedema
Boul Boul	RUTF

Based on the findings from routine data analysis and qualitative data areas with perceived low and high coverage were identified and a hypothesis was developed.

3.2 STAGE 2: HYPOTHESIS TESTING

Based on findings from routine program data analysis, and qualitative data collected during stage I, areas where coverage was believed to be low or high were identified. These data revealed information concerning potential barriers to service access. This information was used to formulate hypotheses that were then tested.

SMALL AREA SURVEY

The small-area survey is used to test hypotheses regarding the spatial distribution of coverage. A small-area survey was conducted in 5 villages strategically sampled from 5 Bomas in the intervention zone.

Qualitative data analysis during stage I revealed that the distance between beneficiaries' home villages and OTP sites played a key role in coverage.

These observations led to the following hypothesis:

Coverage is heterogeneous in Akobo East; with certain zones having good coverage while in others coverage is unsatisfactory. This heterogeneity is influenced by the distance between beneficiaries' home villages and OTP sites.

Villages were categorized as either near or far using both distance (in time to travel); villages located within one hour by walking distance from OTP sites were considered near while villages located more than one hour by walking distance from OTP sites were considered far.

Table 5: Total of villages selected to test the hypothesis.

Hypothesis	Village	Time to Travel home to OTP Site
Low Coverage Zone	Wechkeil Deng	≥ 1 Hour
	Wechlul	≥ 1 Hour
	Tongkhar	≥ 1 Hour
	Wechbout bucot	≥ 1 Hour
	Wangakni	≥ 1 Hour

High Coverage Zone	School -A	< 1 Hour
	Wechthuary	< 1 Hour
	Nyangni	< 1 Hour
	Tungdol	< 1 Hour
	Nyikan	< 1 Hour

Case finding

Active and adaptive case finding was used to find cases in the community, an approach which has shown to be effective in finding all SAM cases. It is active because the method searches for cases rather than expecting them to be found in the sample and adaptive because the case finding method is changed and improved as more information is gathered throughout the process.

Case definitions applied during the small-area survey were:

1. **SAM case in-program:** a child aged 6 - 59 months with a MUAC < 115 mm and currently enrolled in OTP.
2. **SAM case not in-program:** a child aged 6 - 59 months with a MUAC < 115 mm however but not currently enrolled in OTP.
3. **Recovering case:** a child aged 6 - 59 months with a MUAC $\geq$ 115 mm and currently enrolled in a CMAM program.
4. **Oedema:** a child aged 6 - 59 months with bilateral nutritional pitting Oedema

Table 6 summarizes the results and analysis of the small-area survey.

Table 6: Small Area Survey Results, Akobo East 2016

Results	Near(perceived high coverage)	Far(perceived low coverage)
Total number of SAM cases found	14	12
In-program	12	3
Not in-program	2	9
Recovering cases	5	4

Structured interviews were conducted with the caregivers for all current SAM cases—those cases both in-program and not in-program:

1. Interviews conducted for covered SAM cases sought to identify the mode of referral by which the child came to the OTP.
2. Interviews conducted for non-covered SAM cases sought to uncover the reason for which the child was not in the OTP.

Small-area survey results were analyzed using a simplified lot quality assurance sampling (LQAS) technique based on a coverage threshold value of 50%. The decision rule was calculated using the following formula:

$$d = \left[n = \frac{p}{100} \right]$$

d: decision rule

n= number of SAM cases found in program

p= coverage standard

High coverage areas:

14 cases found, $14/2 = 7$.

More than 7 cases need to be in the programme for coverage to be greater than 50%. 12 cases were found in the programme so coverage >50%. So this part of the hypothesis is confirmed.

Low coverage areas:

12 cases found, $12/2 = 6$.

More than 6 cases need to be in the programme for coverage to be less than 50%. 3 cases were found in the programme so coverage = <50%. So this part of the hypothesis is also confirmed.

In conclusion, the small-area survey confirms the hypotheses that coverage heterogeneity exists across the intervention zone in Akobo East. Certain zones have high coverage while others have low coverage; furthermore, with coverage heterogeneity influenced by the distance between beneficiaries' home villages and OTP sites.

3.3 STAGE 3: WIDE AREA SURVEY

The objective was to provide an estimate of overall programme coverage using Bayesian techniques and the value for the Prior probability was established first.

The results of wide area survey give probable value of coverage with the objective of likelihood being to improve and give more strength to the Prior probability value

3.3.1 Forming the Prior

The priori probability distribution, henceforth referred to as “the prior” was estimated by combining the results of stages 1 and 2 (i.e. routine program data analysis, quantitative and qualitative data analysis as well as the results of the small-area survey). Together these elements generate a probability density—the prior probability distribution or prior. The prior was calculated from the average of the three coverage estimates from the following three SQUEAC tools.

1. The simple BBQ tool: the simple BBQ tool is the most basic approach to calculate the prior. A uniform weight of 1 point was attributed to each element (either barrier or booster). The corresponding booster point-sum was added to the minimum possible coverage (0%) while the barrier point-sum was subtracted from the maximum possible coverage (100%). The average between these two values was then calculated to obtain a prior mode.

2. The weighted BBQ tool: for the weighted BBQ approach, scores or weights are attributed to each element that reflect the relative the likely effect on coverage. Scores range on a scale from 1 to 8 and denote the importance of each finding. The same method point-sum average method used for the simple BBQ tool was employed to obtain a prior mode.

3. The histogram: during a participatory working group, the investigation team produced a realist and consensual histogram that represented the hypothetical prior probability. The mode, minimum and maximum were chosen credibly. Uncertainty about the prior mode was fixed at ± 25 percentage points and was deemed consistent with prior information.

4. Concept map: the graphical data analysis technique, during a participatory working group, the investigation team also worked on concept map to analyze relationship between findings (Barriers and Boosters). The corresponding booster point-sum was added to the minimum possible coverage (0%) while the barrier point-sum was subtracted from the maximum possible coverage (100%). The average between these two values was then calculated to obtain a prior mode.

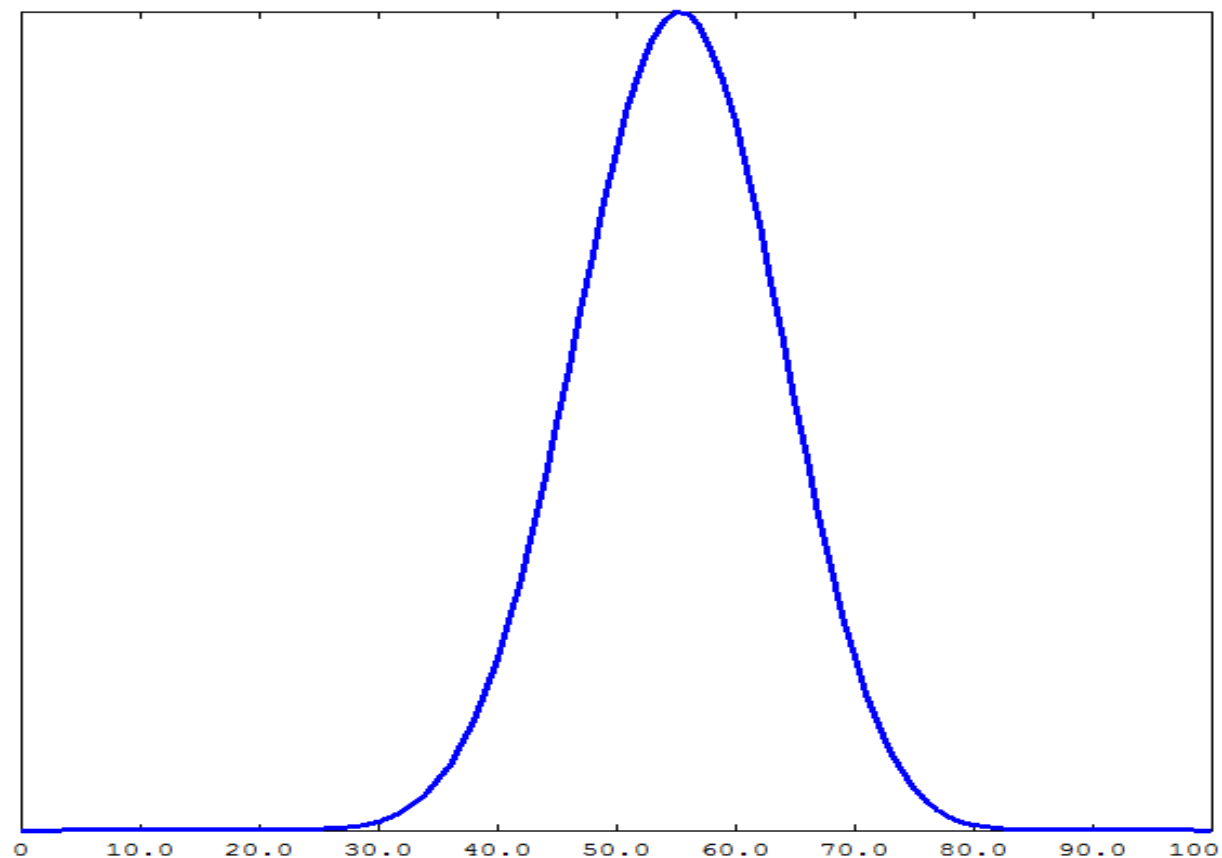
Table 7: Prior for 3rd Stage, SQUEAC Akobo East County, Jonglei Estate, South Sudan, March 2016.

Tool	Barrier	Booster	Calculation	Result
Weighted BBQ	$\sum_{Barriers} 35.2\%$	$\sum_{Boosters} 33.6\%$	$Coverage = \frac{(100\% - 35.2\%) + (0\% + 33.6\%)}{2}$	49.2%
Simple BBQ	12	10	$Coverage = \frac{[100\% - 12 = 88\%] + [0\% + (10\%)]}{2}$	49.0%

Concept Map	16	18	$\text{Coverage} = \frac{[100\% - 16 = 84] + [0\% + (18\%)]}{2}$	51.0%
Histogram prior				61.3%
Prior				52.6%

Thereafter, using the equations listed in Table 8, the shape parameters α_{prior} and β_{prior} were calculated from the prior mode of 52.6% with a degree of uncertainty oscillating between ± 25 percentage points using simulation method by the Bayesian calculator.

Figure 12 : Prior for wide area survey, Akobo East



3.3.2 Wide area survey

A wide-area survey was conducted using a two-stage sampling procedure:

1. First stage sampling method: a systematic, stratified sampling framework was applied to randomly select villages from a complete list of villages sorted by clinic catchment area.

2. Within-community sampling method: That was an active and adaptive cases finding method. This method find all, or nearly all current and recovering SAM cases in a sampled villages. Sampling was exhaustive. This means teams had stop screening only when they were sure that they have found all the cases in the community. In an effort to protect privacy and facilitate simple-structured interviews with caregivers, multiple intimate screening areas were established in each sampled village.

The sample size was calculated through Bayesian SQUEAC calculator in which mode is the prior mode, α prior and β prior are shape parameters and precision is the ideal for the posterior coverage estimate. In SQUEAC, the wide-area sample size is typically calculated to attain a precision of $\pm 10\%$ around the posterior coverage estimate. The investigation sample size was 56 SAM cases for Akobo East County.

Sample size was then used to estimate the number of villages needed to visit using formula:

$$n_{\text{villages}} = \left\lceil \frac{n}{\text{Average village pop.} \times \frac{\% \text{ of the population } 6-59 \text{ months}}{100} \times \frac{\text{SAM prevalence}}{100}} \right\rceil$$

In Akobo East County the SAM prevalence was estimated at 2.6%, the population percentage between 6 and 59 months was 21.0% and the an average village population was estimated at 620 inhabitants. Together these three elements were used to calculate minimum number of villages to be sampled, 17 villages. These villages were sampled using a random stratified sampling framework.

Note that the most recent SAM prevalence estimate for Akobo East County was used 2.6% (CI 95% = 1.4% - 4.7%)⁵. This survey was conducted in December 2015 as post-harvest survey, just after the end of the hunger gap, when food availability is expected to be high and SAM prevalence low. This SQUEAC was also conducted after two months of the SMART survey, so there were no any changes expected in the SAM prevalence.

3.3.3 Wide area survey results and Coverage estimation

A wide-area survey was conducted in 17 villages. All villages were selected by using stratified systematic sampling.

In total, 37 SAM cases were found, of which 13 were in-program and 24 were not in program. An additional 4 recovering cases were found. Table 9 presents these data:

⁵ Nutrition SMART Survey Akobo East December 2015.

Table 8: Wide Area Survey Results, Akobo East 2016

Type	Akobo
Total number of SAM cases found	37
In-program	13
Not in-program	24
Recovering cases	4

Figures 16 and 17 present:

1. The main barriers to service access uncovered during the wide-area survey.
2. The referral mechanism by which current SAM cases were admitted.

These data come from questionnaires administered with caregivers of SAM cases both in and not in-program.

Figure 13 : Most common reasons for non-attendance, Akobo East 2016

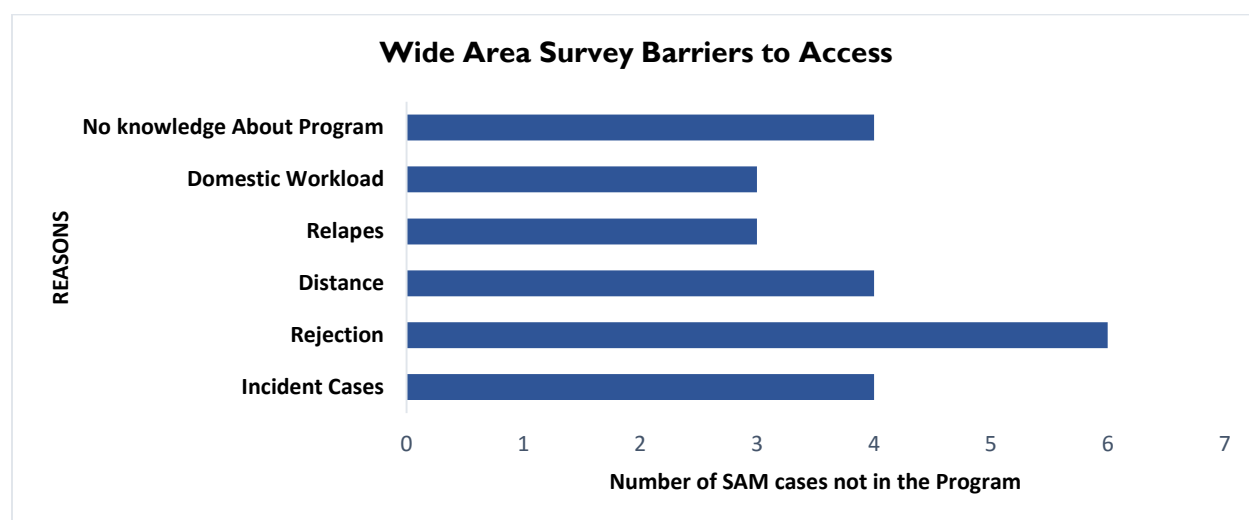
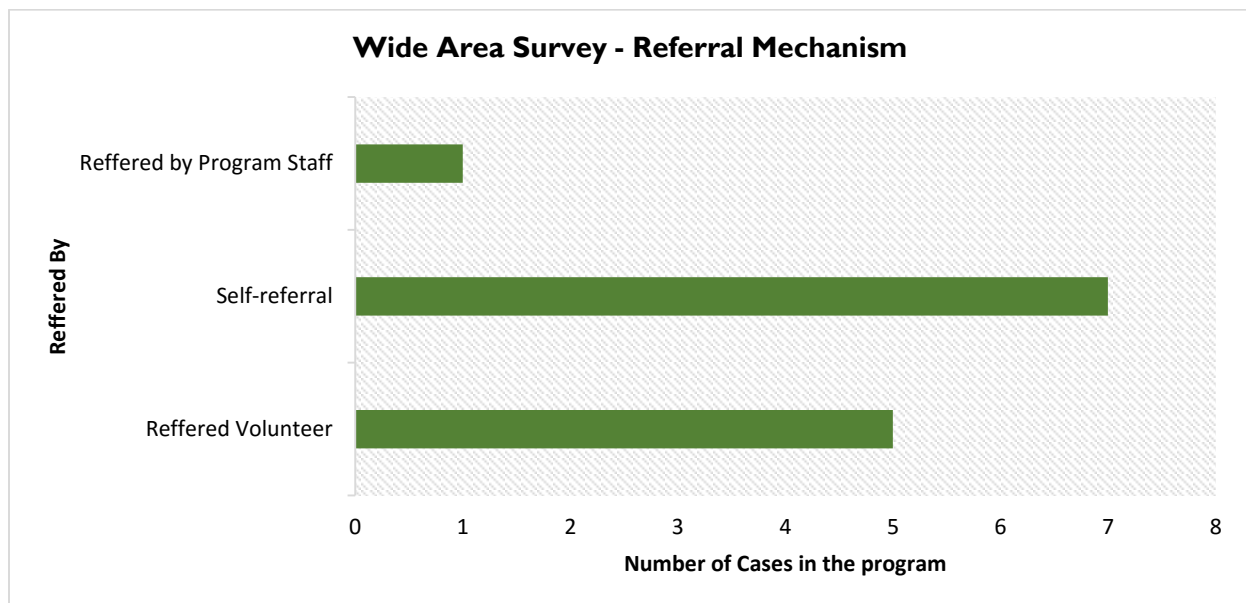


Figure 14: Wide Area Survey Referral Mechanism, Akobo East 2016



Of the 13 SAM cases in-program, 54% (7) were self-referrals, 39% (5) of them were screened in the community and referred by a volunteer and 7% (1 SAM case) of them were referred to the OTP by the IMC team.

The program coverage rate was calculated from the data of wide area survey through the pre-set *Bayesian software*.

Single Coverage:

To calculate the single coverage Single coverage calculator was used:

Using a mean length of untreated episode 7.5 and mean of length of treated episodes 2.5 the denominator 43 and numerator 17 were inserted in Bayesian SQUEAC software with α prior 19.1, β prior 15.6 and $\pm 10\%$ precision values. The “Single” coverage of the program is **46.4%** with credible value of (CI 35.5% - 57.4%) at $\pm 10\%$ precision and P-value= 0.1717.

Figure 19 and 20 shows the Single coverage calculation and Bayesian SQUEAC graph for Likelihood and Posterior.

Figure 15: Single Coverage Calculation, Akobo East 2016

Tools for SQUEAC and SLEAC

Numbers Single SLEAC Multiple SLEACs Barriers Plot Capture-Recapture

Current cases in program : 13

Current cases NOT in program : 24

Recovering cases in program : 4

Mean length of untreated episodes : 7.5 months

Mean length of treated episodes : 2.5 months

Reset

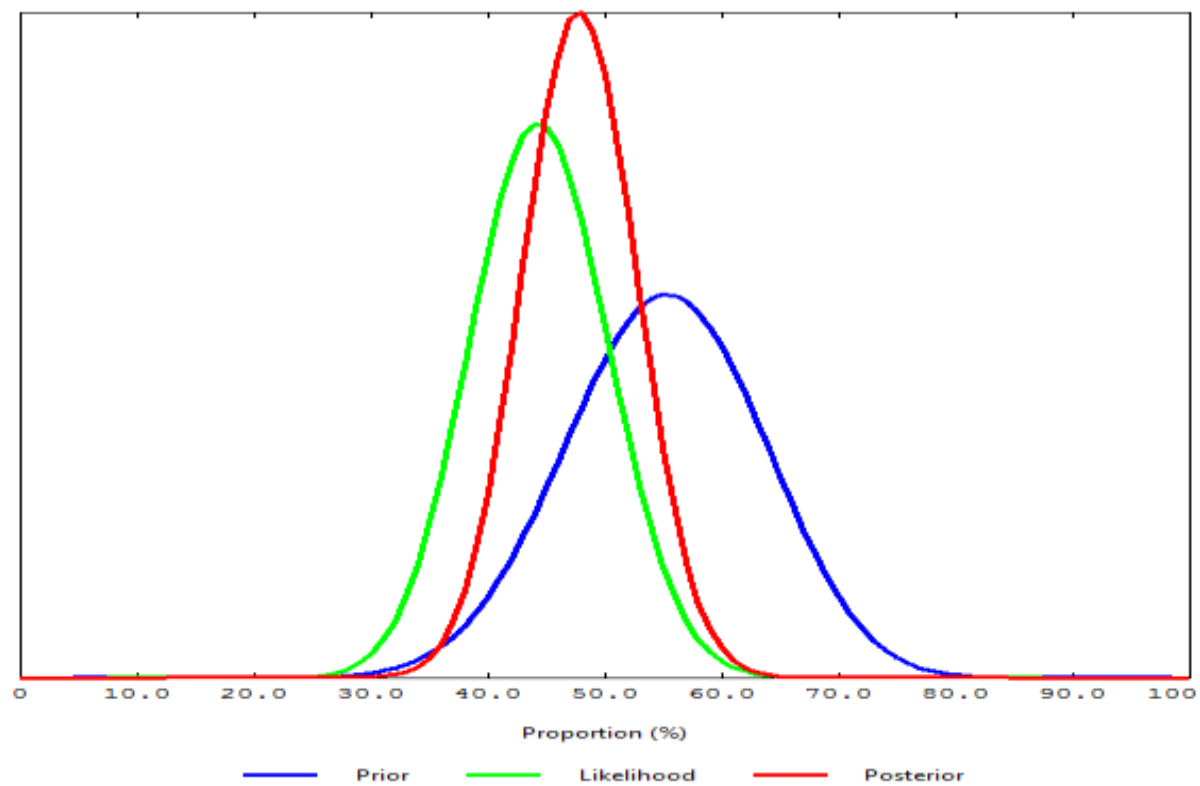
Calculate

Current cases in program : 13
 Current cases NOT in program : 24
 Recovering cases in program : 4
 Average length of untreated episodes : 7.5
 Average length of treated episodes : 2.5

Correction factor (k) : 3
 Recovering cases NOT in program : 2 (estimated)

Single Coverage (Numerator, Denominator) : 17, 43
 Point Coverage (Numerator, Denominator) : 13, 37
 Period Coverage (Numerator, Denominator) : 17, 41

Figure 16: Single Coverage Posterior Graph, Akobo East 2016



4.0 COMMUNITY BALANCED SCORECARD FOR COMMUNITY ENGAGEMENT (CBSC-CE)

The Community Balanced Scorecard for Community Engagement (CBSC-CE) is a tool designed to measure an organization's performance, technical capacity and needs in community engagement programs for Community-Based Management of Acute Malnutrition (CMAM). This tool was developed by the Coverage Monitoring Network (CMN).

This tool was developed based on the lessons learned during these coverage assessments and other field experiences globally. Engaging the community to support a CMAM program is manageable and effective when broken down into the phases of the Community Engagement Framework, a process designed to guide practitioners in better community engagement programming (see Figure 21).

Community engagement activities should be initiated and sustained during all stage of CMAM programming.

The data was collected from different actors listed in the table below, after analysis weighted score was given to each topic through by making different groups of all the survey participates.

Table 9 : Source and Topics were discussed for CBSC-CE, Akobo East 2016

SOURCE	NO OF INTERVIEWS	TOPICS DISCUSSED
Staff Perspective	4	• Job Description aspects • Overall satisfaction with Job
Care taker Perspective	15	• Outreach activities • Overall satisfaction with the services
Community Perspective	10	• Outreach activities • Overall satisfaction community participation
Nutrition Program Manager	1	• Community Assessment • Formulating Community Engagement Strategy • Capacity Building • Creating Material and Messages • Implementation and • Monitoring of Community Mobilization • Evaluating and Adjusting

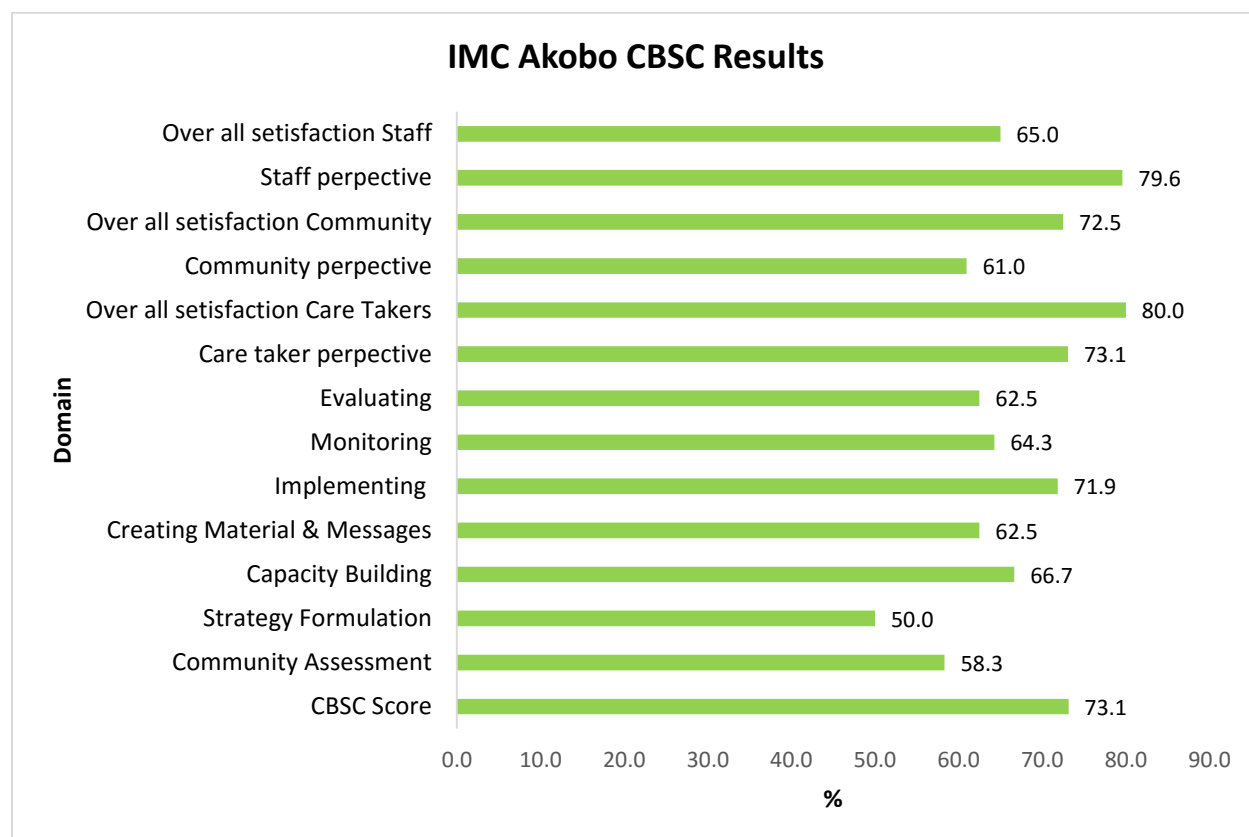
4.1 FINDINGS

Table 10 : Details of Capacity and Service perspective for CBSC-CE, Akobo East 2016

Domain	Score	Scale	%	Comments / Remarks
Capacity Building and Service Perspective				
Community Assessment	7	12	58.3	No community assessment has been done in the recent months besides the on- going SQUEAC.
Strategy Formulation	8	16	50.0	IMC uses multiple community engagement strategies i.e. traditional healers, MSGs to increase the community involvement and to improve CMAM Services.
Capacity Building	8	12	66.7	Nutrition assistant, outreach workers including CNVs are well trained for outreach activities (case finding, referrals, follow-ups) and CMAM protocols. IMC also involves the community leaders and figures on CMAM.
Creating Material & Messages	5	8	62.5	IMC has IEC material and counseling cards.
Implementing	23	32	71.9	IMC uses different budgets lines for the community engagement activities. Staff used to conduct bi-weekly and monthly meetings with community leaders and elders. Nutrition community Volunteers and lead mothers are actively participating in screening and referring children to the OTP sites. Mass MUAC screening was also done in last year and next will be conducted soon. IMC also has a plan for capacity strengthening.
Monitoring	18	28	64.3	IMC has monitoring tools used to monitor and analyze the data. volunteers activities and reporting are supervised by an outreach supervisor
Evaluating	10	16	62.5	IMC analyses M&E data and uses to assess program progress and improve. IMC conducts pre and post-harvest

				nutrition SMART surveys and coverage assessments To monitor and evaluate program performance.
Total	79	124	63.7	
Staff / Community / Care Taker Perspective				
Care Taker Perspective	38	52	73.1	Caretakers are well aware about treatment and they appreciate the overall services. However, more awareness on treatment of malnutrition needs to be created.
Overall Satisfaction	3.2	4	80.0	
Community Perspective	31.7	52	61.0	Community have an understanding of the malnutrition and CMAM activities and the benefits of the program and appreciate. Program activities however there is still need for more sensitization on admission criteria. And need to involve more community leaders and elders.
Overall Satisfaction	2.9	4	72.5	
Staff Perspective	79.6	100	79.6	Staff is well trained and they have good relation with community stakeholders, but still they need more training and capacity building regarding community engagement activities.
Overall Satisfaction	2.6	4	65.0	
Total	158	216	73	

Figure 17: Community Balanced Scorecard Community Engagement (CBSC-CE) Results, Akobo East 2016



5.0 CONCLUSION AND RECOMMENDATIONS

The results of the SQUEAC coverage assessment revealed an estimate of point coverage of 45.3% with (CI 35.6% ↔ 55.4%), and single coverage of 46.4% (CI 35.5% ↔ 57.4% 95%), in the areas supported by the program.

In this SQUEAC assessment, the team collected some primary and secondary data both qualitative and quantitative, and analyzed them to better understand the programme and dynamics associated with access and coverage. The main focus of this assessment were:

- i) If performance of the programme is up to the standard.
- ii) If the community easily access services from the program.

This assessment also aimed to improve the quality of services as well as access and coverage of the programme by developing and implementing a Joint Action Plan (JAP).

Quantitative data analysis:

The secondary data (routine programme monitoring data) that was provided by the team for analysis during the SQUEAC assessment did not reflect all the essential indicators i.e. distances, sources of referral. The OTP cards and registers were not updated. However, some program performance data are used for donor reports such as programme 'exit' data. To understand the service qualities, utilizing program data and using them as regular program monitoring tools can help to improve the quality and outcome of the program.

Akobo East program performance data suggested that the program was meeting all the SHPERE minimum standards adequately. The discharged cured rate was recorded as 89% which is >75% set by the SPHERE minimum standards. The defaulter rate is also low (3%) and within SPHERE minimum standard. Some information on defaulter was recorded to understand why care givers are defaulting. The SQUEAC team approached one of the defaulted care giver to find out the actual reason for defaulting, the caregiver reported domestic workload as the main reason. It is important to collect and monitor the program defaulters' data accurately to understand why caregivers default from the program hence to take corrective measure.

Qualitative data analysis:

This community assessment revealed that community engagement programme for CMAM programme is strong and seems positive impact on the CMAM service, mainly timely case finding and recruitment, good case retention and improved health seeking behavior. Tailoring community engagement activities to the local context that activities take full advantage of existing community systems and structures, and the availability of lead mothers groups and community nutrition volunteers to facilitate establishment of a sustainable program and providing maximum coverage of community engagement program across the intervention areas. So the community engagement program should be integrated into CHD, MSGs, Volunteers, Traditional Healers and other community leaders.

The community nutrition Volunteers should lead and support community engagement efforts. Then lead mothers, caretakers, traditional healers and other community figures would support community sensitization and case finding and referral to increase case finding and referral as well as increase their engagement in the program.

It's also equally important to carefully consider and manage the various barriers and enablers which have been identified during this SQUEAC in order to improve the access and uptake of the CMAM service. This includes improving caretaker counselling, assigning interpreters at health facilities and strengthening community nutrition volunteers and also increase their number. Program staff should continue their capacity building and technical support including communication skills. Moreover, outreach activities needs continuous monitoring to ensure the implementation of community engagement.

STAGE TWO & STAGE THREE:

The stage two, assessment focused on areas that are near and far away from both OTP service delivery points, assuming higher and lower coverage rate, respectively. The findings of the 'small

area survey' confirmed that distance is the actual barrier to coverage. However, overall coverage for OTP was found low in OTP when compare with SPHERE minimum standard $\geq 50\%$ for rural setting. However, to better understand the reason behind for the low coverage in OTP a regular data analysis and discussion with block leaders are an essential step to further increase the program coverage for OTP, including regular meeting with volunteers.

The wide area survey data estimation of overall program coverage for OTP revealed that the program did not meet the standard that was set by SPHERE at $\geq 50\%$, for rural setting.

The programme identified some important barriers such as **i)** caretakers are very busy with other household/domestic work **ii)** Migration **iii)** Seasonal variation (too hot & rainy season), **iv)** Distance, **v)** Some mother's don't know knowledge about the existence of the program, **vii)** insecurity and **vi)** Incident cases. To address the barriers of this program detailed recommendations are provided in the joint plan of action for community mobilization and to improve the CMAM services, see section below; table 13.

6.0 LIMITATIONS:

The major challenge of this assessment was insecurity, some inter-clan fighting during the assessment really disturbed the SQUEAC activities.

Population movement with most villages vacated making defaulter tracing difficult.

Joint Action Plan					
	Objectives	Responsible	Performance Indicators	Target	Timeline
I	Community Engagement				
I.1	Sensitize the community gate keepers (Community leaders, Religious leaders, Teachers, Traditional Healers, Traditional Birth Attendants, MCGs and IYCF group members) on their role in screening and sensitization on malnutrition causes especially “thiang”.	IMC, SCI and Nile Hope	Number of full package of CMAM training including IYCF education.	4 Trainings (Quarterly)	Feb-2017
I.2	Quarterly meetings with Community figures (Leaders, CNVs, MCGs, Traditional Healers, Religious leaders) to improve community participation, review the barriers and sensitization on admission criteria to avoid confusion on rejection.	IMC, SCI and Nile Hope	Number of meetings	4 Meetings (Quarterly)	Feb-2017
I.3	Strengthen community mobilization (screening referrals, defaulter tracing) and sensitize community to stop Selling/Sharing RUTF by engaging community leaders, MCGs and community nutrition volunteers. Continue sensitization in “Thiang” to reduce this myth.	IMC, SCI and Nile Hope	Strong monitoring and review of number of screening, referrals, defaulters and tracing mechanism	4 Updates of the reviewing figures (Quarterly)	Feb-2017

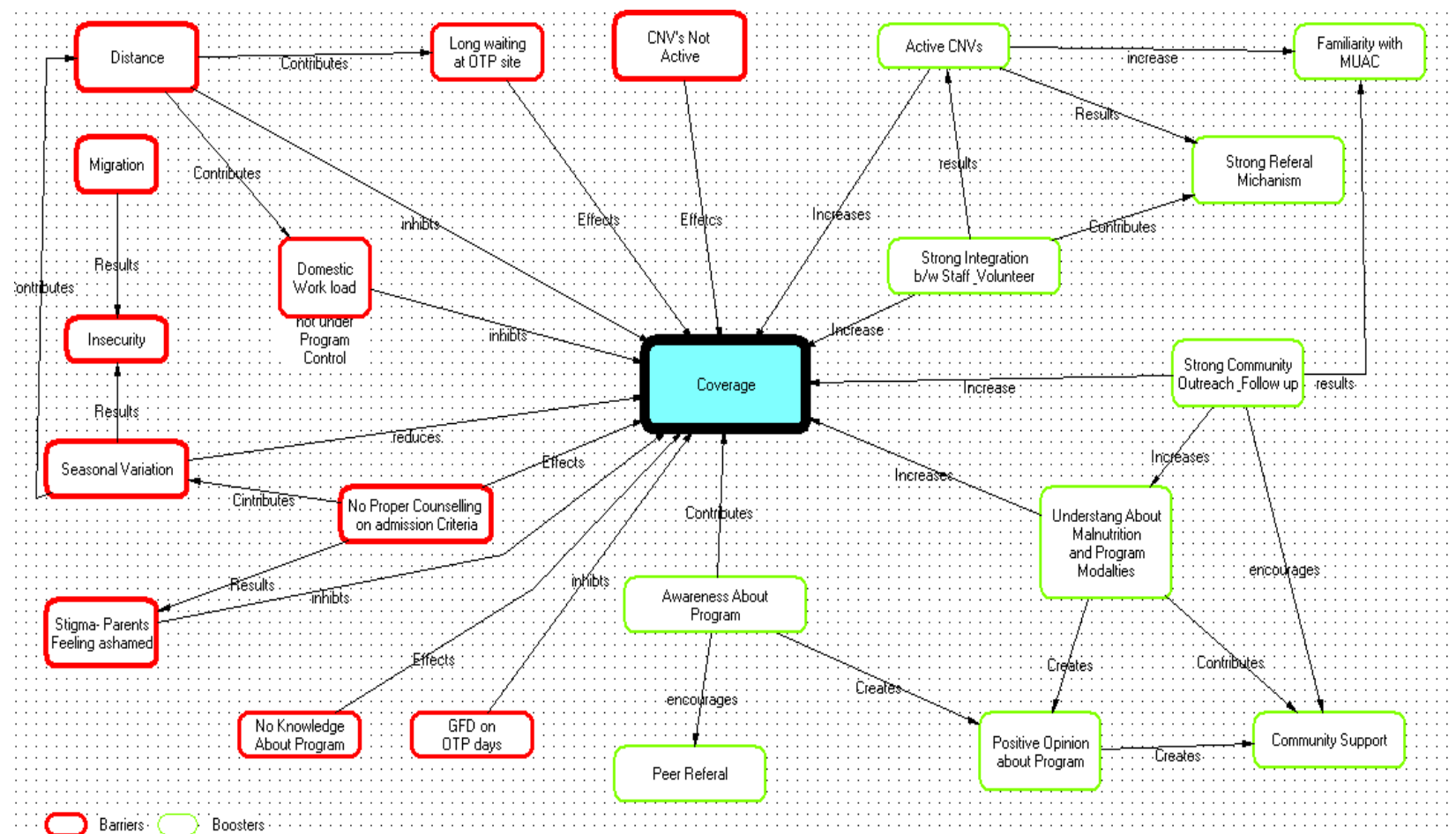
2	Outreach Activities				
2.1	Involve IMC/SCI/NH outreach staff members on screening of targeted population after every three months in all the villages, because of persistent internal displacements of the population	IMC, SCI and Nile Hope	% of villages covered at least thrice in a year	90 % of the villages in every screening campaign.	Feb-2017
2.2	Raise community awareness by disseminating key messages on correct identification of SAM, MAM, causes of malnutrition, IYCF practices and use of RUTF.	IMC, SCI and Nile Hope	Number of sessions in the community	All topics included in sessions, 12 sessions per Boma during OTP/TSFP service days	Feb-2017
2.3	Train and involve traditional healers for strengthened community outreach services including provision of MUAC tapes	IMC, SCI and Nile Hope	# of Traditional Healers train	All traditional healers	Aug-2016
2.4	Continue mass screening	IMC, SCI and Nile Hope	# of mass screening	4 Mass screenings (Quarterly)	Feb-2017
2.5	Continue assigning CNVs specific number of households	IMC, SCI and Nile Hope	# of CNVs assigned to a specific number	All CNVs cover all HHs	May-2016
2.6	Support Supervision of the CNVs and follow up with them to monitor arrival of new populations through community leaders and orient them on CMAM (screen U5 & PLW and sensitization).	IMC, SCI and Nile Hope	# meetings with community leaders to review new arrivals, # sensitization sessions held with new arrivals	12 meetings as a minimum 12 awareness raising sessions	Feb-2017
2.7	Provide user friendly IEC materials (visual aid job materials in local language)to the CNVs	IMC, SCI and Nile Hope	# IEC materials distributed	All CNVs provided with job aids	August -2016

3	Technical Support / Monitoring and Evaluation				
3.1	Monthly reports analysis and review of OTP/TSFP registers record and supportive field supervision visits.	IMC, SCI and Nile Hope	# of meetings on review / visits	12 as a minimum	Feb-2017
3.2	Data review meetings and review of the performance indicators of the action plan	IMC, SCI and Nile Hope	# of meetings held on performance	4 Meetings (Quarterly)	Feb-2017
4	OTP Services				
4.1	Train CMAM staff on counseling techniques and CMAM protocols with clear admission and discharge criteria. Including SC staff on frequent complications and feeding protocols.	IMC, SCI and Nile Hope	# of trainings	3 Trainings as a minimum	Feb-2017
4.2	Regular review and on job trainings of nutrition staffs on reporting and data management (maintenance of OTP/TSFP registers to update all the correct information of absentees, non-responders and defaulters. Record reasons for defaulting and separate readmissions from transfers, ensure OTP cards are completed & ensure accurate data collection by CNVs.	IMC, SCI and Nile Hope	# of on job trainings	3 Trainings as a minimum	Feb-2017
4.3	Follow up on purchase of Motorolas for mobile teams.	IMC, SCI and Nile Hope	# of teams with Motorolas	5 Motorolas	May-2016
4.5	Create Boma wise map with all IMC sites/ activities with all sites and villages marked. If possible GPS coded map is preferred.				

7.0 ANNEXES

7.1 Annexes I:

Figure 18 Concept Map, SQUEAC Akobo East 2016



7.2 Annexes II:

Table 11: Seasonal Calendar of Akobo EAST

	Children Morbidity											
Disease	January	February	March	April	May	June	July	August	September	October	November	December
Malaria												
Diarrhea												
RTI												
Fever												
	Foods Access											
Crop/ Produce	January	February	March	April	May	June	July	August	September	October	November	December
Food Prices												
	Female Labour Demand											
Activity	January	February	March	April	May	June	July	August	September	October	November	December
Sorghum Cultivation												
Sorghum Harvest												
Wood Cutting												
Wild Food Collection												
	Male Labour Demand											
Activity	January	February	March	April	May	June	July	August	September	October	November	December
Sorghum Cultivation												
Sorghum Harvest												
Fishing												

Hunting Gazale												
	Climate											
Climate	January	February	March	April	May	June	July	August	September	October	November	December
Dry Seaon												
Rain Fall												
Temperature												
	Migrations											
Activities	January	February	March	April	May	June	July	August	September	October	November	December
Migration for cattles												