Semi-Quantitative Evaluation of Access and Coverage (SQUEAC)
Song LGA CMAM Program
Adamawa State, Northern Nigeria
October-November 2014

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Action Against Hunger | ACF International
ACKNOWLEDGEMENTS

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Ifeanyi Maduanusi (ACF CMAM Coverage Deputy Program Manager) led the coverage assessment team in the implementation of the SQUEAC assessment and writing of this report. Chika Obinwa, Zulai Abdulmalik, Janet Adeoye and Francis Ogum (ACF CMAM Coverage Officers) supervised the enumerators in collecting information from field. Diego Macias (ACF UK) reviewed and contributed in finalizing this report.

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<th>Description</th>
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</thead>
<tbody>
<tr>
<td>ACF</td>
<td>Action Contre La Faim</td>
</tr>
<tr>
<td>ASPHCDA</td>
<td>Adamawa State Primary Health Care Development Agency</td>
</tr>
<tr>
<td>CIFF</td>
<td>Children Investment Fund Foundation</td>
</tr>
<tr>
<td>CMAM</td>
<td>Community-based Management of Acute Malnutrition</td>
</tr>
<tr>
<td>CV</td>
<td>Community Volunteer</td>
</tr>
<tr>
<td>FMOH</td>
<td>Federal Ministry of Health</td>
</tr>
<tr>
<td>HF</td>
<td>Health Facility</td>
</tr>
<tr>
<td>IYCF</td>
<td>Infant and Young Child Feeding</td>
</tr>
<tr>
<td>LGA</td>
<td>Local Government Area</td>
</tr>
<tr>
<td>NFP</td>
<td>Nutrition Focal Person</td>
</tr>
<tr>
<td>INGO</td>
<td>International Non-Governmental Organization</td>
</tr>
<tr>
<td>MUAC</td>
<td>Mid Upper Circumference</td>
</tr>
<tr>
<td>OTP</td>
<td>Outpatient Therapeutic Program</td>
</tr>
<tr>
<td>PMV</td>
<td>Patent Medicine Vendor</td>
</tr>
<tr>
<td>PHC</td>
<td>Primary Health Care</td>
</tr>
<tr>
<td>RUTF</td>
<td>Ready to Use Therapeutic Food</td>
</tr>
<tr>
<td>SAM</td>
<td>Severe Acute Malnutrition</td>
</tr>
<tr>
<td>SLEAC</td>
<td>Simplified Lot quality assurance sampling Evaluation of Access and Coverage</td>
</tr>
<tr>
<td>SNO</td>
<td>State Nutrition Officer</td>
</tr>
<tr>
<td>SMART</td>
<td>Standardized Monitoring Assessment of Relief and Transitions</td>
</tr>
<tr>
<td>SMOH</td>
<td>State Ministry of Health</td>
</tr>
<tr>
<td>SQUEAC</td>
<td>Semi Quantitative Evaluation of Access and Coverage</td>
</tr>
<tr>
<td>VI</td>
<td>Valid International</td>
</tr>
<tr>
<td>TBA</td>
<td>Traditional Birth Attendant</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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</tbody>
</table>
1. Executive summary

The Community-based Management of Acute Malnutrition (CMAM) program in Song’s Local Government Area (LGA) is implemented by the Adamawa State Primary Health Care Development Agency (ASPHCDA), Song LGA, and UNICEF D Field Office based in Bauchi. CMAM services have been integrated into Primary Health Care services in 5 Health Facilities1 since November 2011. In 2013, a Simplified Lot Quality Assurance Sampling Evaluation of Access and Coverage (SLEAC) assessment was conducted in Song LGA, along with two other LGAs in Adamawa State and, overall, 71 LGAs across the country. Then, the SLEAC assessment reported moderate coverage classification, which implies that coverage of CMAM services in Song range somewhere between 20 and 50 per cent2. Considering the results of some LGAs in Northern Nigeria which yielded low classification of coverage (i.e., below 20 per cent), Song LGA was identified for a follow-up Semi Quantitative Evaluation of Access and Coverage (SQUEAC) assessment to elucidate in detail the factors affecting the CMAM program coverage.

Quantitative data were analyzed, including the routine program data from September 2013 to September 2014 —available thanks to the diligence of LGA and state officers, and the data mined from the information contained in the beneficiary OTP cards of all exits from May 2014 to October 2014. Various charts were plotted and interpreted to get possible leads on factors affecting the CMAM program. The plots include: exit trends, admission trends, MUACs on admission, length-of-stay from admission to recovery, number of visit before default, time-to-travel from home to the CMAM HFs, etc. The trend of admission and exit was found to be impacted negatively upon by intermittent stock-out of RUTF. Though the MUAC at admission was relatively high, errors in MUAC measurements were suspected. Generally, the performance data indicated that defaulter and recovery rates were higher and lower than the SPHERE standards, respectively.

Time-to-travel was observed not to be contributing to defaulting; however, distance was suspected to be limiting accessibility in communities with time-to-travel to CMAM HFs above 60 minutes of walking time. Additional qualitative information were gathered from different stakeholders using different methods in order to augment the quantitative information analyzed. Both quantitative and qualitative information gathered were analyzed into barriers and boosters.

The barriers found include: Shortage of HWs at CMAM HFs, lack of refresher training for HWs since inception of the program, chronic stock out of RUTF, far distance, lack of routine drugs, non-existent defaulter tracing, lack of training for CVs; poor health seeking behavior in some communities, Non-adherence to CMAM guidelines, long waiting time due to shortage of HWs, sale and consumption of RUTF by adults and healthy siblings, amongst others. The boosters include: Good opinion of the program in the communities, community volunteers are used to provide services due to shortage of HWs, HWs contribute money to transport RUTF and buy routine drugs, referral from non-CMAM HFs, good collaboration between CVs and HWs, peer-to-peer referral and referrals from communities, good health seeking behavior in some communities.

A heterogeneous level of coverage was hypothesized, and further confirmed using a small survey in wards hosting CMAM HFs and wards that are not hosting CMAM HFs.

The headline coverage was estimated using point coverage estimator, the coverage yielded = 27.6% (19.2% - 37.6%.CI; 95%).

The recommendations proffered during the dissemination workshop are hinged on the following key areas;

- Advocacy visit to the LGA chairman by the LGA PHC team to commit more funds towards strengthening the supply of routine drugs and RUTF to the CMAM HFs.
- The LGA with support from ADSPHCDA to strengthen the CV activities by recruitment and training of additional CVs and retraining existing CVs ones for active case finding.

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1 Murke, Song NRC, Wurodaudo, Sigiri, and Dumne HFs
• Strengthen the community mobilization and sensitization in Song LGA by identifying relevant State and LGA forums to incorporate relevant message on CMAM program, making of relevant messages to sensitize the LGA populace.
• The ASDPHCDA to advocate to the State Government for the recruitment for additional HWs in HFs and make modalities to increase HWs in all CMAM HFS.
• Training and reorientation of HWs on CMAM National guideline.
• The Executive Secretary PHC and SNO through the ASPHCDA to support printing and delivery of data tools, in CMAM HFs in Song LGA.

2. Introduction
Adamawa, one of the largest states in Nigeria (occupies about 36,917 square kilometers), is located in the Northeast. It shares borders with the states of Borno to the northwest, Gombe to the west and Taraba to the southwest. While its eastern border forms the national eastern border with Cameroon³. Farming is the major occupation of the people. The cash crops produced in Adamawa are cotton and groundnuts, while food crops include maize, yam, cassava, guinea corn, millet and rice.

Figure 1: Map of Adamawa State indicating the LGAs⁴

Song is one of the LGAs in Adamawa State. It is located in the northern part of the state, with Song town as the administrative headquarter. Roll-out of Community-based Management of Acute Malnutrition (CMAM) in Song LGA commenced began in November

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³ http://en.wikipedia.org/wiki/adamawa_state
⁴ Sourced from http://nigeriazipcodes.com/378/Adamawa-state-zip-code/
2011 with five CMAM HFs. The program is supported by the ASPHCDA, Song LGA, and UNICEF D' Field Office, Bauchi. UNICEF provides technical support and supply of RUTF to State through the ASPHCDA. The services are provided primarily by the HWs (employees of the ASPHCDA) in the five CMAM HFs. The program is linked to the communities by community volunteers that actively seek for SAM cases to refer for enrolment into the program.

The SQUAEC investigation was a follow-up to the previous SLEAC assessment carried out in Song to determine coverage of the CMAM program in the LGA. The implementation was conducted in October/November 2014, as part of a wider effort to assess the CMAM program in Northern Nigeria. Among other crucial elements, this assessment aimed at identifying the most relevant boosters and barriers affecting access to CMAM services, as well as proposing some initial recommendations on possible ways to address such obstacles.

3. Objectives

The following objectives guided this SQUEAC investigation:

1. To identify the barriers and boosters to program access and coverage.
2. To determine the spatial pattern of program coverage in Song LGA.
3. To estimate the overall program coverage.
4. To proffer recommendations on how to improve the access and coverage.
5. Build the capacity of ASPHCDA and LGA staff to conduct a SQUEAC assessment.

4. Methodology

The SQUEAC methodology as outlined in the technical manual guided the methodology this SQUEAC investigation. Detailed explanation of the tools that were used in different stages of SQUEAC are presented below:

Stage 1 data tools and analysis

Quantitative data:

The routine program data, and data mined from information contained in the beneficiary OTP cards were analyzed into various plots/charts including admission trends, exit trends, MUACs at admission, length-of-stay from admission to recovery, number of visits before default, time-to-travel from home to CMAM HFs, amongst others. These were intelligently interpreted to point out possible factors affecting the program. The analysis of the findings were to give leads on factors to be noted for further investigation.

Qualitative data:

Qualitative data were also obtained and analyzed in order to augment the quantitative information gathered. Different methods were used to get information from different sources in the communities and HFs.

Barriers, Boosters and Questions (BBQ):


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5 Murke, Song NRC, Wurodaudo, Sigiri, and Dumne HFs
Both the quantitative and qualitative data were analyzed and interpreted into positive (booster) and negative (barrier) factors. The barrier, booster and question (BBQ) tool was used to capture the positive and negative factors affecting access and coverage. The information analyzed from different sources were triangulated to adduce evidence by both source(s) of the information and the method(s) used. Questions were raised to examine and obtain additional information on areas that were not clear enough using different sources and methods. Information is continually collected until the conducting team confirms sampling to redundancy when no new information about a theme was forthcoming.

This barriers and booster were also used to develop concept map illustrating the linkage between the various factors affecting the program coverage.

**Stage 2 data tools and analysis**

All the information collected in Stage 1 were used to imagine the spatial pattern of coverage in the LGA. This pattern of coverage is used to postulate a hypothesis around the major factor(s) affecting the coverage. The hypothesis is tested using a small area survey.

The result of the small areas survey was interpreted using Simplified Lot Quality Assurance Sampling technique. This was done by examining the number of Severe Acute Malnutrition (SAM) cases found (n) and the SAM cases covered in the program. A threshold value (d) was used to determine if the coverage was classified as satisfactory or not. Value (p) denotes a standard used as a measure of coverage\(^7\), which in this SQUEAC investigation was 50% because Song is a rural area.

The values of (p) = 50%. The formula for deriving (d) are outlined below:

\[
d = [n \times p] = \left\lfloor n \times \frac{50}{100} \right\rfloor = \frac{n}{2}
\]

If the number of covered cases exceeded the value (d), then the coverage was classified as being satisfactory. On the contrary, if the number of covered cases found did not exceed value (d) then the coverage was classified as being unsatisfactory. The combination of the (n) and (d) was used as the sampling plan.

The barriers to program access and uptake obtained from caregivers of SAM cases not-in-program was also analysed and plotted.

**Stage 3 data**

**The prior:**
An informed guess of what the program coverage would be in Song LGA was made by combining all the information obtained in Stage 1 and 2. Different tools were used to arrive at the prior mode, these include:

- Belief histogram
- *Weighted* barriers and boosters
- *Un-weighted* barriers and boosters
- Concept map
- Previous SLEAC coarse estimate

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\(^7\) The SPHERE standards has recommended minimum coverage for Therapeutic programs in rural, urban, and camp settlements. These thresholds which are 50%, 70% and 90% coverage for TFP program run in the contexts of rural, urban and camp areas respectively can be used to set the value of “p”. In this assessment two standard 3 class classifier was used to set the value of “p”. See below.
The prior mode was plotted on BayesSQUEAC calculator\textsuperscript{8} with the shape parameters. A minimum sample size of SAM cases to be found was suggested by the BayesSQUEAC calculator at 10% precision (95% Credible Interval (CI)).

**The likelihood survey**

The likelihood / wide area survey was conducted. The number of villages to be visited to identify the suggested minimum sample size was calculated. A systematic random sampling technique was employed to select the villages. The data obtained during the likelihood survey was organized into the parameters tabulated below. The likelihood results was expressed as a point coverage as shown in the table below (with reasons for choosing the point coverage given in later part of this report).

**Table 1: Parameters analyzing likelihood survey**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current cases in the program ((x))</td>
<td>(x)</td>
</tr>
<tr>
<td>Current SAM cases not in the program ((y))</td>
<td>(y)</td>
</tr>
<tr>
<td>Total current SAM cases ((n))</td>
<td></td>
</tr>
<tr>
<td>Point coverage\textsuperscript{9}, CI 95%</td>
<td>(\text{point coverage} = \frac{(x)}{(x+y)})</td>
</tr>
</tbody>
</table>

**The program coverage (Posterior).**

The headline coverage estimate was arrived at after combining the prior and the likelihood in a conjugate analysis\textsuperscript{10}. The conjugate analysis combined the beta distributed prior with a binomial distributed likelihood to produce a beta distributed posterior. The plot of the conjugate analysis of this investigation was also presented in the result Section of this report.

**Met need:** The program met need was calculated as:

\[
\text{Met need} = \text{Coverage} \times \text{Median recovery rate}
\]

**5. Results and findings**

The results obtained during the SQUEAC investigation are presented as follows:

5.1. Stage 1: Routine monitoring data and beneficiary OTP cards

As it was mentioned in the above methodology section, the SQUEAC assessments take into consideration sources of quantitative data for analyzing CMAM performance. A series of indicators, ranging from general cure and defaulting trends up to the quality of MUAC measurement and the length of stay of SAM children in the program, allow the conducting team to evaluate some elements of service delivery quality.

The team was granted with access to routine program data, which are the databases that each SNO compiles with information directly reported from health facilities by LGA authorities. Such databases provide with up to date insights on total admissions and

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\textsuperscript{8} The software can be downloaded free at: [http://www.brixtonhealth.com/bayessqueac.html](http://www.brixtonhealth.com/bayessqueac.html)

\textsuperscript{9} Point coverage gives overall accurate measure of this program

\textsuperscript{10} A conjugate analysis requires that the prior and the likelihood are expressed in similar ways.
performance rates, but their figures are usually checked against the findings of the coverage assessments. The routine program data from September 2013 to September 2014 was analyzed. The second source of data, the direct analysis performed by the conducting team of the admission cards and other beneficiary records available at the OTPs was analyzed for all exits over a six-month period ranging from May 2014 to October 2014.

The tables below show the summary of the routine data, and the extracted data from the beneficiary OTP card information.

<table>
<thead>
<tr>
<th>Type of exit</th>
<th>Number of Children</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recovered</td>
<td>764</td>
<td>74.3%</td>
</tr>
<tr>
<td>Dead</td>
<td>6</td>
<td>0.6%</td>
</tr>
<tr>
<td>Defaulters</td>
<td>246</td>
<td>23.9%</td>
</tr>
<tr>
<td>Non Recovered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transferred to SC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing Outcomes</td>
<td>12</td>
<td>1.2%</td>
</tr>
<tr>
<td>Total</td>
<td>1028</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 2  Major outcomes of data extracted from beneficiary OTP cards (May to October 2014)

<table>
<thead>
<tr>
<th>Type of exit</th>
<th>Number of Children</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recovered</td>
<td>1501</td>
<td>77.8%</td>
</tr>
<tr>
<td>Dead</td>
<td>29</td>
<td>1.5%</td>
</tr>
<tr>
<td>Defaulters</td>
<td>400</td>
<td>20.7%</td>
</tr>
<tr>
<td>Non Recovered</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Transferred to SC</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1930</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 3: Outcomes of routine monitoring data (September 2013 – September 2014)
5.1.1 Admission trends

The program admissions over time compared to the calendar of events in Song LGA are illustrated below:

![Trend of admissions - smoothed in season M3A3](image)

*Figure 2: Admission trends and the seasonal calendar of events*

There were no admissions in September 2013 due to stock-out of RUTF in the State. It is worth mentioning that this general stock-out of RUTF commenced in August 2013. As RUTF was made available in late October 2013, many of the beneficiaries returned to seek care. Thus the monthly admission increased in October and November 2013. The decline in admissions in December 2013 through January 2014 coincided with another stock-out of RUTF in CMAM HFs, as well as peak of female labor demand for harvesting and processing of crops. As RUTF became available in late February, admission was noted to be impacted by the seasons as it increased steadily to peak in July 2014. Depletion of household food reserves after the planting season (April to June) leading to peak in the hunger season (May to July), increase in episodes of malaria and diarrhea (June to August), and resultant increase in incidence of malnutrition due to combination of these factors were noted to have resulted in the steady rise in admissions. Increase rain fall, and flooding of some roads during the peak of rainy season (August and September) could be attributed to the decline in admissions in August and September 2014.
5.1.2 Program exits (discharge outcomes)

Figure 3: Exit trends for Song LGA CMAM program—September 2013 to September 2014

In 2013, no exit was witnessed in September and October, with only 11 reported in November; this was due to the effect of closure of the CMAM HFs as RUTF was unavailable in August and September (see Section 5.1.1). As admission commenced in late October, only few number of beneficiaries were discharged in November 2013. However, from December 2013 many beneficiaries were noted to exit the program. The recovery rate was noted to be above 75% SPHERE standard from February to September 2014. However, the default rate was higher than the acceptable 15% standard throughout the period, except in June 2014. Therefore, weak defaulter tracing by community volunteers was envisaged.
### 5.1.3 MUAC at admission

*Figure 4: MUAC at Admission - Song LGA CMAM program*

Figure 4 above offers an insight on the most common MUAC values of SAM cases admitted to the program. This measurement is useful to inform on the quality of screening and referral, as the closest the median value is to 115mm (the admission criteria), the likeliest it is that most SAM children have been identified on time, before the condition becomes critical and life-threatening.

For Song LGA, the Figure shows a high median of MUAC at admission at 110mm. This, however, should be analyzed carefully because of two central reasons. One, there is still an important number of admissions that took place above the admission criteria (151 cases out of 1022 for which information was available in the OTP cards). This represents 14.8%, a non-negligible proportion of admissions, and pushes the median value upwards even when 163 children entered the program with MUAC values of 100mm or below.

The second reason is that an unrealistic 29% of admissions (299 cases) were recorded with an admission vale of 110mm, which likely unveils common wrong measurements. This is confirmed by the peaks shown in the histogram for rounded values (90, 95, 100, etc.), a common feature in many CMAM programs that need be further attended through training Sections.
5.1.4 Length of stay from admission to cure

The total time elapsed between the first and the last visit of successfully treated SAM children is a good indicator for elucidating the performance of CMAM service delivery. If cases are held for too long it is probably the result of frequent absences; if the median length of stay is too short, suspicions about the compliance with discharge criteria arise. Normally, a program with a median length of stay between four and eight weeks is considered acceptable.

The SQUEAC conducted in Song found that, out of 1028 OTP cards available, 764 corresponded to children that had been successfully discharged. Among them, the median length of stay was 6 weeks (see Figure 5) with an important number of cases staying for 7 weeks. This indicates good performance: there are very few cases staying more than 9 weeks, although there is still need for addressing early discharge (196 children spent four or less weeks in the program).

Early discharge is likely to reflect either wrong admissions —so children are rapidly cured— or lack of compliance with discharge criteria. It was mentioned already that 151 cases during the assessed period had been admitted with MUAC values of 115mm or above. This cases are likely to spend less time in the program before discharge —actually, 135 of them were discharged as cured.

Yet this did not seem to be the case: for those 135 cured cases that had been wrongly admitted, the median length of stay was 5 weeks, with seven weeks actually being the single most frequent value found. In other words, cases admitted with MUAC above 115mm did not stay much longer in the program as other children\(^\text{11}\).

The second explanation (wrong discharge because of poor compliance with protocol) is not a particularly strong issue, which further confirms that, in general terms, service delivery is acceptable. Out of all recovered cases, 539 (or 71%) where discharged with a MUAC value of 125mm or more. Only 6 per cent were discharged below 115mm. There is still a challenge, since the program should aim at having 100% of recovered children with a MUAC measurement above 125mm. Figure 6 below exemplifies the situation.

\(^{11}\) This is probably explained by the fact that children admitted with values only slightly above 115mm MUAC —that is, MAM cases— will have to stay in the programme until reaching 125mm, which can take some time.
As mentioned above, 246 children were identified as defaulters after analyzing available OTP cards. Precise records on the total number of visits to the program are available for 243 default cases. For these, the median number of visits is four (see Figure 9). It is usually assumed that children in the program that default before the first four weeks are very likely to be SAM cases still. Yet the opposite is possible for children staying for more than four week and then defaulting. In this case, the median number of four visits before defaulting suggests that both outcomes are common in CMAM delivery in Song.

An analysis of the last recorded MUAC values before defaulting reveals that there is little chance that defaulting cases are actually hidden cured cases (see Figure 8 below). Out of 245 last measurements available, 138 or 56% defaulters abandoned the program before even reaching 115mm SAM; 86 (or 35%) left before reaching 125mm, and only 21 (9%) did so after 125mm, which is the criteria for cured cases. In other words, a large majority of defaulters are likely to be SAM cases still, regardless of their relatively long length.
of stay in the program. For instance, out of 95 defaulters who stayed five or more weeks in the program, only 15 left with a final MUAC measurement above 125mm.

Figure 8 Distribution of defaulting cases according to their last available MUAC measurement

5.1.6 Time-to-travel to CMAM HF

A large majority of caregivers with children admitted in the OTPs need to walk 20 minutes or more because of living in a different village (see Figure 9). Overall, 49% walk 30 minutes or less, 37% have to walk up to an hour and more than 30 minutes, and 11% (roughly 100 cases) have to walk more than 90 minutes. This last group faces a particularly harsh situation, especially considering that this amount of time needs to be duplicated to understand the real time travelled by caregivers.

Figure 9 Distribution of children in the program according to the walking time between their home and the OTP
A common hypothesis testing the performance of CMAM service is that beneficiaries living in communities away from the closest OTP will be more likely to default than others living closer. Figure 10 above suggest that most defaulters come from villages reachable through a 30 to 60min walk. Most cured cases, on the other hand, come from closer. Conversely, taking a 60 minute threshold, it was found that there is no much impact of distance on defaulting, as the share of defaulters coming from distant villages is fairly similar to the share of cured cases. The median time to travel for all beneficiaries was found to be 42 minutes (Figure 11 below).

However, a more cursory look on Figure 9 showed that the proportion of beneficiaries coming from distances above 60 minutes walking time was only 14%. CMAM HFs are located in only five out of eleven political wards, with most of the communities in the six non-host wards spanning over 60 minutes walking time from CMAM HFs (see Figure 11). This was noted to be investigated further as it could imply that beneficiaries from non-host wards with over 60 minutes walking time had limited access to the CMAM HFs.

**5.1.7 Irregular rationing of RUTF to beneficiaries**

After analyzing general data on the quantity of RUTF packages given to recently admitted children, the team concluded that this was commonly assigned under correct criteria and procedures. Some exceptions are present, but there are so few that they lose statistical significance. On a general note, RUTF was correctly distributed by the staff. For example, 96% of children that weighted between 4
and 7kg on admission received between 14 and 18 RUTF sachets, which is equivalent to technical recommendations taking weight into consideration.

5.1.8 Conclusion of the routine monitoring data analysis

The analysis and interpretation of the quantitative information led the conducting team to identify the following for further investigation.

- Defaulter tracing and case finding by community volunteers.
- Adherence to CMAM protocol by HWs
- RUTF supply and availability at the CMAM HFs.
- Erroneous MUAC measurements by CVs and HWs
- Accessibility of CMAM services from communities in wards where there are no CMAM HFs.

5.2 Stage 1: Qualitative data.

5.2.1 Qualitative sampling Framework

Further investigation was carried out using qualitative methods. Four out of the existing five CMAM HFs were visited where HWs, CVs, Caregivers and Achaba riders were interviewed. Eight villages were purposively selected and visited; four near the CMAM HFs, and four far villages in wards where there are no CMAM HFs. Different respondents including; traditional leaders, religious leaders, traditional birth attendants, traditional healers, Patent Medicine Vendors (PMV) operating in the villages, Majalisa, and teachers were interviewed. The information were collected using in-depth interviews, Informal group discussions, semi structured interviews, and observation checklist. All the information collected were summarized in themes as follows;

5.2.2 Opinion about the program in communities

There was good opinion about the program in all communities visited. Respondents said they are happy with the program that treats malnourished children. Community members see the program as a very important program that saves the lives of children. Most were able to give names of former beneficiaries from the communities who received the treatment earlier. Good opinion about the program in communities could be the reason for the strong community linkage, especially in terms of referrals from community members. Majority of the caregivers-in-program that were interviewed mentioned that they were referred by their peers who had benefited from the program.

5.2.3 Health seeking behavior in the communities

The responses obtained during the interviews indicated that the pathway to seek care for malnourished children is mixed across the communities. Most interviewees said that that malnourished children are taken to the HF for treatment. This was evidenced by the willingness of caregivers who were referred by their peers to seek treatment in CMAM HFs. On the other hand, many respondents said they seek treatment from traditional healer or patent medicine vendor first before visiting the HFs if the condition did not

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12 Commercial motorcycle
13 Majalisa refers to age-group social gathering in market places or shops discussing wide variety of issues in the community, usually partaking local drinks such as tea
14 Provision shop seller, Majalisa, TBA, Traditional healer.
improve\textsuperscript{15}. The traditional healer in Bakka community said he treats \textit{Datti}\textsuperscript{16} by bathing the children with herbs. Majalisa in same community said children with \textit{Tamowa}\textsuperscript{17} are taken to the traditional healer, and that leaves\textsuperscript{18} are boiled for the children to drink. This confirms SAM cases that were admitted late when the cases had deteriorated, despite the fact that the program having commenced in 2011 should be admitting incident cases.

In Song LGA, farming is the major occupation of the inhabitants. As such, many caregivers reported that some of their peers defaulted or refused to attend due to farm work. Some were reported not to be allowed to attend by their husbands. To investigate further the conducting team visited Bapta, Koribo communities where these were reported twice, but could not reach the caregivers identified as they went to the farm.

5.2.4 Community mobilization, and awareness about the program in communities

The investigation revealed that community mobilization and sensitization is non-existent. All community stakeholders\textsuperscript{19} reported that no one had come to the community to mobilize or sensitized them on malnutrition. Community members said they learnt about the program from caregivers who had benefited from the CMAM program. The NFP could only confirm that mobilization was conducted in the communities\textsuperscript{20} hosting the CMAM HFs during the commencement of the program in October 2011. Though it was evident that both far and near communities are aware of the program treating malnutrition (even in communities 35km away from CMAM HF), community members lack knowledge on how the program works. Many caregivers withdraw their children from the program before being declared recovered by HWs.

5.2.5 Community volunteers’ activities and training

CVs were also observed to be running some of the CMAM HFs\textsuperscript{21} due to shortage of HWs trained on CMAM and/or transfer of such trained HWs to non-CMAM HFs. This has a mixed effect on the program performance. On one hand the effect include; errors in measurements and compliance to National CMAM Guidelines in terms of admission and discharge criteria, and other issues that could arise due to use of non-professionals. While on the other hand, the use of CVs to run CMAM HFs ensured that the affected HFs were not usually closed, beneficiaries who access CMAM services in those HFs were provided services.

Active case finding by CVs was in doubt despite the fact that the community volunteers at the CMAM HFs\textsuperscript{22} said that they are involved in the monthly polio immunization campaign, which they utilize the opportunity for active case finding when they visit houses. On the other hand, interviews with the CVs indicated that defaulter tracing was hardly conducted, especially, in communities far from the CMAM HFs. The CVs owned up that they could not pay the transportation costs to access distant communities to trace defaulters. Most of the community volunteers had been working since the inception of the program in October 2011, and have been trained only once —when the program commenced in 2011.

5.2.6 Referral mechanism

During the SQUEAC investigation it was clear based on the responses given by the various community stakeholders and HWs that there were two major sources of referrals of beneficiaries into the program. Majority of beneficiaries were referred by their peers/co-wives, with few saying their husband referred them. On the other hand, a handful of the beneficiaries were referred to the CMAM program from non-CMAM health facilities by HWs when they sent to the HF to seek treatment. Although all the CVs interviewed said

\begin{footnotesize}
\begin{itemize}
\item \textsuperscript{15} Bakka, and Dadin Kowa community.
\item \textsuperscript{16} Malnutrition believed to be caused by ‘dirty breastmilk’ that flows when a breastfeeding mother has intercourse.
\item \textsuperscript{17} Meaning malnutrition in Hausa language
\item \textsuperscript{18} Paw-paw, banana, mango, lemon, and guava leaves
\item \textsuperscript{19} Traditional leader, majalisa, TBA, PMV, teacher, religious leader, traditional healer, CHEW, Achaba riders
\item \textsuperscript{20} Song, Sigire, Balamtuba, Zumbo and Dumne
\item \textsuperscript{21} Murke, song NRC
\item \textsuperscript{22} Murke, Song NRC, Dumne and Wuro Dauda
\end{itemize}
\end{footnotesize}
they conduct active case finding while on routine immunization exercise, it could not be verified from any other source except fromHWs. Most importantly, the team could not identify a caregiver in program that was referred by CVs.

5.2.7 **Health workers’ activities and training**

Shortage of HWs was observed in all the CMAM HFs visited. Some HF had only one HW; two out of the four CMAM HFs visited were totally manned by CVs. Transfer of HWs trained on CMAM to non-CMAM HF was cited as the reason for the shortage of HWs. Thus, the CVs in those HFs were heavily engaged in providing CMAM services to beneficiaries weekly (see Section 5.2.5). The use of CVs to provide CMAM services could be the source of the errors in measurements, non-adherence to admission and discharge criteria (Section 5.1.3, and Figure 8). Even where HWs were present, it was noted that they do not verify MUAC measurements taken by CVs, nor do they provide health and nutrition talks to caregivers. Generally, the validity of the weekly program data generated at the HF was in doubt. The few HWs that were seen at the CMAM centers were observed to be motivated while discharging their duties. However, they reported that the last time they recieved training on CMAM was at the inception of the program, three years ago.

5.2.8 **Stock-out of data tools and routine drugs**

There was general chronic stock-out of data tools in all the CMAM HFs visited. CMAM OTP register and admission/follow-up cards were also not available. Beneficiary information were documented on exercise books, usually, with many information missing. This makes data management and tracking of defaulters difficult. Additionally, caregivers were charged a fee for the exercise books used as admission and follow-up cards.

During the investigation, routine drugs were completely lacked in all the CMAM HFs in Song LGA as the LGA no longer supplies the drugs. Caregivers were charged a fee ranging from NGN200 to NGN450 for amoxicillin and anti-malaria, as it was observed in Murke CMAM HF. The explanation given by the HWs was that the drugs were purchased by HWs and the Director MCH of the LGA to bridge the gap due to stock-out, therefore, the drugs were sold to caregivers so that the HWs could get another supply.

5.2.9 **Stock-out of RUTF**

Stock out of RUTF resulting from poor logistics and supply chain management from the State to the LGA, and to the CMAM HFs constituted a major setback to CMAM program in Song LGA. Stock-out was reported to be a usual occurrence in 2013 and first quarter of 2014. This was noted to be contributing to the high defaulter rate (above the 15% SPHERE standard) recorded during these periods. Initially, the LGA was responsible for transporting RUTF from the State store to the LGA and CMAM HFs. However, the LGA has reneged on this responsibility. These led to HWs conveying RUTF themselves from the State. However caregivers are charged NGN 200 weekly at all CMAM HFs for the transportation of RUTF. The HWs interviewed during the investigation said the charges was to enable them pay for the transportation of RUTF.

5.2.10 **Mis-use of RUTF in CMAM HFs and Communities**

Despite the fact that RUTF is usually in short supply, it was found that it was being mis-used in many CMAM HFs and communities. It was observed that RUTF were given to community members that walked into the health facility without any SAM child once they pay NGN 200. Rations were also given to healthy children. Community members who pay NGN200 were given 30 sachets. This was noted

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23 It was observed at Murke HF, no advice to caregivers on administering RUTF to client, also no hygiene practices
24 During investigation Dumne health facility had stock out of RUTF just a week prior to SQUEAC which was for two consecutive weeks
to be done by the CVs who were manning the CMAM HF\textsuperscript{25}. Caregivers were given double (two weeks) ration once they increase the amount of money they pay. It was discovered that the caregiver issued double ration could still obtain RUTF on the next OTP day, once she is willing to pay. Though the CVs said the money was for transportation of RUTF, they could not explain why they give RUTF to adults and healthy children. RUTF was generally observed to given out without keeping record.

During the SQUEAC investigation it was also noted that healthy children and adults eat RUTF in the communities. Many interviewees in the communities reported having seen adults and healthy children eating RUTF, with some of the respondents saying that they eat RUTF. The major reason they gave for consuming RUTF was because it is tasty. More so, RUTF was sold openly in the market. A religious leader in Lala community reported that some caregivers sell RUTF at NGN 30 per sachet. This was collaborated by a provision shop owner in Tasu Hausa community who reported that children buy RUTF as low as NGN 10 per sachet in Song market on Sundays. Caregivers in Tarawo community mentioned that most of the people who sell RUTF in the market are caregivers who are in-program, or other people that come to the CMAM HF to buy RUTF on an OTP day. Additionally, the NFP and representative of the executive secretary PHC Song confirmed the sale of RUTF in Loko community in Farde Murke ward in Song LGA.

### 5.2.11 Distance, flooding and rough terrain

Only five health facilities are rendering CMAM services in Song LGA. Therefore, the host communities are located only in five out of the eleven wards in the LGA. Many communities\textsuperscript{26} in the non-host wards were noted to be far, or hard to reach due to rough terrain. Beneficiaries in those areas find it difficult to access the CMAM program. Those who managed to attend usually default after few weeks of accessing the CMAM services. These are usually caregivers that could afford to pay Achaba\textsuperscript{27} for transportation from those areas. Caregivers interviewed reported distance as a major challenge limiting their communities\textsuperscript{28} from accessing the services.

More so, flooding during the rainy season was also reported to be limiting access. Though these communities and surrounding villages are far from the CMAM HFs, rainy season brings additional difficulty to accessibility of the program from these communities. The villagers are usually cut-off due to flooding of roads, and absence of a bridge for crossing the over-flooded river; they resort to alternative route which costs about NGN 1000 to access the nearest CMAM HF.

### 5.2.12 Data triangulation

The Quantitative and qualitative information obtained were analyzed into barriers and boosters. The sources and methods used to obtain the information are presented in the table below.

\textit{Table 4: Sources and methods used to get information in a BBQ tool.}

<table>
<thead>
<tr>
<th>S/N</th>
<th>Sources</th>
<th>Method used</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Health worker</td>
<td>Semi structured interview/ in-depth interview</td>
<td>A,C</td>
</tr>
<tr>
<td>2</td>
<td>Community volunteer</td>
<td>Semi structured interview/ in-depth interview</td>
<td>A,C</td>
</tr>
<tr>
<td>3</td>
<td>Caregiver</td>
<td>Semi structured interview</td>
<td>A</td>
</tr>
<tr>
<td>4</td>
<td>Health facility</td>
<td>Observation checklist</td>
<td>B</td>
</tr>
</tbody>
</table>

\textsuperscript{25} Song NRC
\textsuperscript{26} Suktu, Pupa, Malabu, Ganta wube, Kanawa, Koribo, etc
\textsuperscript{27} Commercial motorcycle transport.
\textsuperscript{28} 3hours walk and kanawa 2hours walk, koribo an hour walk with a lake being crossed
Table 5: Barriers, boosters and sources of information

<table>
<thead>
<tr>
<th>BOOSTERS</th>
<th>SOURCES</th>
<th>BARRIERS</th>
<th>SOURCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Community Volunteers are used to run CMAM centers as there is</td>
<td>4B,1A,5C,6C</td>
<td>Shortage of HWs at CMAM site. (Murke, Song NRC (only 1HW rendering CMAM services to beneficiaries)</td>
<td>1A,4B,5C,6C</td>
</tr>
<tr>
<td>shortage of Health workers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Health workers contribute money to transport RUTF and buy routine</td>
<td>1A,2A,2C</td>
<td>No refresher training (Health workers trained only once since inception 3 years ago).</td>
<td>5C,6C,1A,4B,1C</td>
</tr>
<tr>
<td>drugs.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Referral from non-CMAM HFs</td>
<td>1A,3A,17C</td>
<td>Stock out of RUTF due to poor logistic/supply chain management system</td>
<td>1A,2A,3A,1C,9C</td>
</tr>
</tbody>
</table>

See detailed barriers boosters and questions in annex 7
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Good collaboration between CVs and Health workers</td>
<td>2A,1A</td>
<td>Lack of routine drugs</td>
<td>1A,2A,3A,1C</td>
</tr>
<tr>
<td>6</td>
<td>Peer to peer/Husband referral</td>
<td>3A,2C,13E,15A,9A,16A,15C</td>
<td>Non-existing defaulter tracing</td>
<td>1A,2C</td>
</tr>
<tr>
<td>7</td>
<td>Good health seeking behavior in some communities</td>
<td>3A,2A,8A,9A,10A,11A,12A,13E,14A,15A,16A,17A,8C,9C,11C,15C</td>
<td>Lack of training for CVs; CVs were trained once from inception 3 years ago.</td>
<td>2A,2C</td>
</tr>
<tr>
<td>8</td>
<td>Health workers friendly to Care givers</td>
<td>4B,3A</td>
<td>Poor health seeking behavior.</td>
<td>2A,3A,15A,9A,10A,11A,12A,13E,8A,14A,16A,10C</td>
</tr>
<tr>
<td>10</td>
<td>Incurred charges for drugs and cards</td>
<td>1A,2A,3A,4B,2C,9C,15C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Stock out of data tools (ration card, lack of OTP register at all CMAM site.</td>
<td>5C,2A,4B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Non adherence to CMAM protocol</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Wrong admission (MUAC&gt;114 without oedema, children &lt;6months  (Song NRC, Murke, and NRC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. No nutritional counselling (Murke)</td>
<td></td>
<td></td>
<td>3A,7D,4B</td>
</tr>
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<td></td>
<td></td>
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<td>---</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Far distance to travel to access CMAM HFs</td>
<td>3A,2A,8C,9C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Conflicting priorities due to farming activities (Bapta community –Dumne HF, and Koribo –Wurodaude HF)</td>
<td>3A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Long waiting time due to shortage of HWs</td>
<td>3A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Consumption of RUTF by adults</td>
<td>2C,4B,8A,9A,10A,11A,12A,1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Husband refusal (Wurodaudo CMAM site)</td>
<td>2C,3A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Poor knowledge about the CMAM program in many communities</td>
<td>8A,9A,10A,11A,12A,13E,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Pronounced sale of RUTF in communities by HWs, caregivers, PMVs and some community members</td>
<td>15C,9C,17C,18A,5C,6C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 5.2.13 Concept map

The relationship between the barriers and boosters within the context of Song LGA was illustrated by the conducting team using a concept map. The Team was split into two, A and B, with each drawing a concept map which are presented in the annex of this report.

### 5.3 Stage 2: Confirmation of areas of probable high and low coverage in Song LGA CMAM program.

The quantitative and the qualitative information collected in stage one was used to predict the spatial pattern of coverage in Song LGA.
The conducting team envisaged that that coverage in Song LGA was heterogeneous; caregivers from non-CMAM wards, it was predicted, were less likely to be attending the CMAM HFs due to far distance compared to caregivers in nearby villages or in wards hosting CMAM HFS. It then follows that distance was to be considered as an explanatory variable for levels of coverage in different wards.

Therefore, a hypothesis was formulated as follows:

Communities in Wards hosting the CMAM HFs are much more likely to have high coverage classification (>50%), while communities in wards without CMAM HFs have low classification of coverage (< 50%).

5.3.1 Study Type

A Small area survey was used to test the hypothesis that was formulated above. Such a study consists in identifying SAM cases among the population of selected communities, and controlling for distance to the closest OTP when analyzing the share of covered SAM cases by the programme in relation with the overall SAM cases identified in each community.

5.3.2 Sampling Methodology

The villages were selected purposively based on the characteristics used in setting the hypothesis. For a small area survey, active and adaptive case finding technique was employed to locate the SAM cases in the rural communities, while door-to-door screening was done in communities which have urban characteristics.

5.3.3 Case Definition

Severe Acute Malnutrition (SAM) is defined as Children (6-59 months), with MUAC <115mm and or bilateral pitting oedema.

SAM case covered: Refers to a SAM case (as defined above) who is currently enrolled in a CMAM HF or in hospital Stabilization Centre (SC). The status was verified when the beneficiary showed evidence of the RUTF packets and/or ration card to the SQUEAC investigator.

SAM case not covered: Refers to a SAM case who was not enrolled in a CMAM program or the hospital SC at the time of this investigation. The case was also confirmed as not in the program when the beneficiary was unable to show evidence of the RUTF packets and/or ration Card.

Recovering case: A child (6-59months) with MUAC above 115mm and without Oedema who already enrolled in a CMAM program at the time of the investigation. This case was also, verified when beneficiary showed the RUTF packets and/or ration Card.

5.3.4 Result of Small Area Survey, small studies and observational study

The results of the small area survey are presented in the table below.
Table 6: Simplified Lot Quality Assurance classification of small area survey results

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Wards</th>
<th>Community</th>
<th>Total SAM $(x)$</th>
<th>Decision rule $d = \frac{x \times 50}{100}$</th>
<th>Covered(C)</th>
<th>Not covered (NC)</th>
<th>Recovering case (RC)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hypothesis</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wards with CMAM sites</td>
<td>Sigiri</td>
<td>Gollare</td>
<td>1</td>
<td>$d =</td>
<td>2</td>
<td>= 2$</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Song Gari</td>
<td>Tsangaya</td>
<td>3</td>
<td></td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Wards without CMAM sites</td>
<td>Zumo</td>
<td>Degereji</td>
<td>6</td>
<td>$d =</td>
<td>4.5</td>
<td>= 4$</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Suktu</td>
<td>Suktu</td>
<td>3</td>
<td></td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

Interpretation of the results

The results were analyzed using the simplified LQAS classification technique.

Wards with CMAM HFs
The number of SAM cases that were covered was 3, the decision rule calculated $= 2$. 3 is greater than 2, therefore coverage in the Wards with CMAM HFs is classified as above 50%.

Wards without CMAM HFs
The number of SAM cases that were covered was 0, the decision rule calculated was 4. Since 0 is not greater than 4, the coverage in the surveyed area is classified as being below 50%.
5.3.5 **Conclusion of small area survey**

The result of the small area survey showed that the spatial pattern of coverage in Song LGA is heterogeneous, mostly due to the location and accessibility of CMAM HFs. The barriers to program access and uptake buttresses the fact that the **distance was the major reason for low classification of coverage in non-CMAM wards**. This was also noted to be in tandem with the information gathered in stage 1.

5.4 **Developing the prior.**

The information gathered from Stage 1 and 2 were used to estimate what the program coverage would be in Song LGA. Various tools were used to develop the prior mode including:

- Belief Histogram
- Un-weighted barriers and boosters
- Weighted barriers and boosters
- Previous SLEAC coarse estimate\(^3\)
- Concept Map

---

\(^3\) The preceding SLEAC assessment reported a classification of coverage in Song LGA to be moderate. From the various evidences gathered in stage 1 and 2 of this investigation, the conducting team considered that program coverage in Song still falls within this classification and has not changed significantly over the period. Therefore, and based on the information that the SLEAC provides in terms of covered cases found against total SAM cases found, the SLEAC result was used to calculate a coarse estimate of coverage in Song, which was integrated into building the mode prior. This practice is justified by the recommendations made in many technical guidelines regarding the construction of the prior: conducting teams are encouraged to build it with as much information available as possible. As long as selections are justified and explained, this practice is adequate.
5.4.1 **Histogram of Belief.**

The belief of the conducting team of what coverage in Song would be was requested. Each member of the team was asked to write on a piece of paper his/her belief of the program coverage. The figures obtained from the team was used to construct a histogram of belief, with the x-axis representing coverage, while the y-axis represented belief. The mode of the belief of the conducting team was arrived at, while the minimum and maximum probable values were also set.

The belief histogram yielded 40%, with the minimum and maximum probable values of 10% and 65%.

**Prior 1 result:** Histogram of belief = 40%

5.4.2 **Concept Map**

The SQUEAC investigation team was split into Team A and B, and each team drew a concept map based on the barriers and boosters obtained in stage1 analysis.

Team A concept map has a total of 24 barriers, and 10 boosters while team B had 20 barriers and 9 boosters. So as to determine the impact of each barrier and booster using concept maps, a score of 3 was used by each team:

*Results of prior calculated from concept map-Team A*

*Contribution of barriers = 24 x 4 = 96*

*Contribution of boosters = 10 x 4 = 40*

Prior estimated from concept map Team A = [(100 – 96) + (0 + 40)]/2 = 22

**Team ‘A’ prior estimation= 22 %**

*Results of prior calculated from concept map B:*

*Contribution of barriers = 20 x 4 = 80*

*Contribution of boosters = 9 x 4 = 36*

Prior estimated from concept map Team A = [(100 – 80) + (0 +36)]/2 = 26

**Team ‘B’ prior estimation=26%**

**Prior 2 results:** (Average prior of Team ‘A’ and Team ‘B’ concept maps) = (22 + 26)/2 =24%

**Prior of developed by use of concept map =24%**

5.4.3 **Un-weighted barriers and boosters**

The barriers and boosters were multiplied by a fixed score for each. The fixed score used was determined in such a way that neither the sum of positive scores nor the sum of the negative scores exceed 100%.
Number of barriers = 20
Number of boosters = 9
Therefore,

*Contribution of barriers* = 20 x 5 = 100

*Contribution of boosters* = 9 x 5 = 45

Prior estimated from concept map Team A = \[(100 – 100) + (0 +45)]/2 = 22.5

**Prior 3 results:** estimated from un-weighted barriers and boosters = 22%

### 5.4.4 Weighted barriers and boosters.

The barriers and boosters were weighted by team members, according to how each of the factors were perceived to affecting coverage. The weights assigned ranked from 1 to 5, with 5 being the highest possible weight. The table showing scores arrived at for barriers and boosters are shown below:

<table>
<thead>
<tr>
<th></th>
<th>BOOSTERS</th>
<th>SCORE</th>
<th>BARRIERS</th>
<th>SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Community Volunteers are used to run CMAM centers as there is shortage of Health workers</td>
<td>3</td>
<td>Shortage of HWs at CMAM site. (Murke, Song NRC (only 1HW rendering CMAM services to beneficiaries)</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Health workers contribute money to transport RUTF and buy routine drugs.</td>
<td>2</td>
<td>No refresher training (Health workers trained only once since inception 3 years ago).</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Referral from non-CMAM HFs</td>
<td>3</td>
<td>Stock out of RUTF due to poor logistic/supply chain management system</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Good opinion of the CMAM program</td>
<td>5</td>
<td>Default due to far distance to CMAM site, and stock-out of RUTF</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Good collaboration between CVs and Health workers</td>
<td>2</td>
<td>Lack of routine drugs</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>Peer to peer/Husband referral</td>
<td>4</td>
<td>Non-existing defaulter tracing</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>Good health seeking behavior in some communities</td>
<td>3</td>
<td>Lack of training for CVs; CVs were trained once from inception 3 years ago.</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>Health workers friendly to Care givers</td>
<td>2</td>
<td>Poor health seeking behavior.</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Good awareness of the CMAM program in some communities</td>
<td>3</td>
<td>CV clamoring for incentives</td>
<td>3</td>
</tr>
<tr>
<td>---</td>
<td>-------------------------------------------------------</td>
<td>---</td>
<td>----------------------------</td>
<td>---</td>
</tr>
<tr>
<td>10</td>
<td>Incurred charges for drugs and cards</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Stock out of data tools (ration card, lack of OTP register at all CMAM site.)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Non adherence to CMAM protocol</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Wrong admission (MUAC&gt;114 without oedema, children &lt;6months (Song NRC, Murke, and NRC)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. No nutritional counselling (Murke)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. No verification of MUAC measurements. (Murke, NRC, Wurodaudo, Sigiri)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>d. No appetite test (Wurodaudo)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Far distance to travel to access CMAM HF's</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Conflicting priorities due to farming activities (Bapta community – Dumne HF, and Koribo – Wurodaude HF)</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Long waiting time due to shortage of HWs</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Consumption of RUTF by adults</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Husband refusal (Wurodaudo CMAM site)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>Poor knowledge about the CMAM program in many communities</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Lack of community mobilization and sensitization</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Pronounced sale of RUTF in communities by HWs, caregivers, PMVs and some community members</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>27</strong></td>
<td><strong>CV clamoring for incentives</strong></td>
<td><strong>3</strong></td>
</tr>
</tbody>
</table>

|   | Total                                              | 27 | **Weight of barriers** | **51** |

**Table 7: summary of calculations of prior using weighted barriers and boosters**

**Prior 4 results:**

*Weight of barriers = 51*
Weight of boosters = 27

Prior estimated from concept map Team A = [(100 – 51) + (0 +27)]/2 = 38

Prior estimate from weighted barriers and boosters = 38%

5.4.5 Previous SLEAC Coarse estimate.

Prior 5: The previous SLEAC Coarse estimate = 48.5%

5.4.6 Triangulation of Prior

The Mode prior was calculated by triangulating all the prior estimates (prior 1, 2, 3, 4, & 5) obtained above.

Prior mode = (40 + 24 + 22.5 + 38 + 48.5)/5 = 34.6%

5.4.7 Bayes Prior Plot and Shape Parameters

The mode prior (34.6%), the minimum and maximum coverage (10% and 65%, respectively) were used to calculate the shape parameters. The prior probability distribution shaping parameters (αprior = 9.3; βprior = 16.9) were calculated and the plotted. The Beta prior distribution plot is illustrated in figure below:
Figure 13: BayesSQUEAC binomial distribution plot for prior mode showing the shape parameters and the suggested sample size.

5.5 **Stage 3: Wide area survey**

The likelihood/wide area survey was conducted during the investigation to add to the existing information gathered in stage 1 & 2), and therefore, arrive at headline coverage estimate of the program in Song LGA. The detail of the wide area survey are presented as follows:

5.5.1 **Calculation of Sample Size and number of villages to be visited**

The number of representative sample of SAM cases was calculated using the BayesSQUEAC calculator to be 56. The number of villages \( (n) \) that needed to be visited was calculated using the following formula:
Given that:

Table 8: Table showing parameters for number of villages to be visited to achieve desired sample size.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1          SAM cases sample size</td>
<td>56</td>
</tr>
<tr>
<td>2          N(Median population size of all ages)</td>
<td>540</td>
</tr>
<tr>
<td>3          Percentage of under-fives in the population(^{32})</td>
<td>18%</td>
</tr>
<tr>
<td>4          SAM prevalence(^{33})</td>
<td>1.1%</td>
</tr>
</tbody>
</table>

Therefore the number of villages that need to be visited:

\[
 n_{\text{villages}} = \left[ \frac{56}{540 \times 0.18 \times \frac{1.1}{100}} \right] = [52.38] = 53
\]

Systematic random sampling technique was used to select villages. The complete list of villages was obtained, this constituted the sampling frame. A sampling interval was calculated by dividing the total number of villages in Song LGA with the number of villages to be visited. Then, the first village to be visited was randomly selected by using the RAND function in Microsoft Excel to select a number between 1 and the sampling interval calculated. Subsequent villages to be visited were selected by adding the sampling interval.

5.5.2 Case finding method

Active and adaptive case-finding method was used during the wide area survey by following the steps below:

- Identifying the local terms used to define malnutrition and those used for program case definition,
- In each of the sampled villages, community leader was consulted to identify key informant,
- Explanation of the case definition to the key informant was done to enable him to lead the investigators to a SAM case\(^{34}\) (or Household-HH with SAM case);
- Measurement of MUAC, and checking for oedema was done on the identified case MUAC and questionnaire administered where relevant,
- The caregiver of the measured child gives investigators information about another case that would be similar to the one just measured\(^{35}\).
- The investigators uses this method until they are led to the HHs that they have previously visited.

The case definition used referred to a child:

- Aged 6-59 months
- With a MUAC less than 11.5 cm, and or

\(^{32}\) Source: National Bureau of Statistics

\(^{33}\) Severe Acute Malnutrition results of Mid Upper Arm Circumference (MUAC) for the SMART Nutrition survey unveiled in Adamawa State June 2013, this was also used for determining the sample size during the previous SLEAC.

\(^{34}\) See the basic case definition below

\(^{35}\) If the case just measured did not have malnutrition or MUAC of less than 115mm or Oedema, the case definition is shared with the caregiver to help her to give information that would lead to a likely case of malnutrition within her neighborhood.
• With bilateral pitting oedema

5.5.3 Qualitative data Framework

The SAM cases that were found not to be attending the CMAM program were regarded as non-covered case36. In such cases a semi structured questionnaire was administered to the caregiver to collect information on reasons for enrolling into the program. The analysis of these reasons or barriers to access and uptake are illustrated in the figure below.

![Barriers to program access and uptake - WAS](image)

*Figure 14: Barriers to program access and uptake – WAS*

The figure above showed that the most pronounced reason cited by caregivers of SAM children not covered was related to knowledge about the program. Most of the caregivers (36 out of 42) reported being aware about the program, however, they do not know that their child is malnourished (confirming lack of active case finding by CVs identified in stage 1); others cited that were busy with farming activities, or had no money to pay for RUTF and routine drugs, amongst other reasons. Far distance from HFs to caregivers was also another major reason limiting access. Most of these reasons were already identified in stage 1 as barriers to coverage, therefore, result of the wide area survey is consistent with that the findings in Stage 1 and 2. On the other hand, some caregivers (8 out of 42) reported that they do not know about the program, or health facility providing CMAM services.

5.5.4 The Likelihood result

The likelihood result is presented below.

*Table 9: Results of the Likelihood (wide area) survey*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Total SAM cases</td>
<td>64</td>
</tr>
<tr>
<td>2 SAM cases in the program</td>
<td>16</td>
</tr>
<tr>
<td>3 SAM cases not in the program</td>
<td>48</td>
</tr>
</tbody>
</table>

36 The SAM cases that could not show RUTF or ration card
Recovering cases in the program

The likelihood was calculated using the following standard formula for point coverage:

\[
Point \ coverage = \frac{SAM \ cases \ in \ the \ program}{Total \ SAM \ cases}
\]

Therefore:

\[
Likelihood = \frac{16 \times 100}{64} = 25\%
\]

Likelihood = 27%

5.5.5 Posterior/Coverage Estimate

The beta-binomial conjugate analysis was plotted using the BayesSQUEAC calculator\(^{37}\) as shown in the figure below. The posterior distribution yielded 27.6% (19.2% - 37.6%.CI; 95%). This was regarded as the headline coverage estimate of the program in Song LGA. The results of the conjugate analysis are credible and useful in this study because:

1) Prior & likelihood are not conflicting, the curves are coherent, with considerable overlap (p>0.05).
2) The likelihood survey was noted to have reduced uncertainty as posterior unveiled was narrower than the prior.
3) The probability measure of the posterior is higher than the likelihood, thus giving posterior more credence as an indication of the headline coverage.

\(^{37}\) BayesSQUEAC Coverage Estimate Calculator version 3.01 downloaded free from www.brixtonhealth.com
Figure 15: Bayes plot showing prior, likelihood and posterior

The point coverage of the program is therefore:

**Point coverage = 27.6% (19.2% - 37.6%.CI; 95%)**\(^{38}\)

Point coverage was used to express the headline coverage in Song LGA due to the following reasons:

- Though the median MUAC at admission found was relatively high, active case finding was noted to be non-existent.
- Default rate was higher than the 15% SPHERE standard.
- The recovery rate was mostly below the recommended standard. Additionally, 29% of those classified as ‘recovered’ were found to have exited with MUAC below 125 mm.

Met need = **Medium recovery rate x Coverage**

Median recovery rate = 73.1% (of which 71% were correctly discharged)

Coverage = 27.6%

Therefore, met need = \((73.1 \times 0.71) \times 0.276 = 14.32\%\)

\(^{38}\) Results are expressed with a credible interval of 95%.
6 Discussions and conclusions.

The CMAM program in Song LGA had been providing services to beneficiaries for over three years. The coverage yielded by the investigation was lower than that reported by the previous SLEAC. The investigation showed that services are affected by frequent stock-out of RUTF, prolonged stock-out of routine drugs, shortage of HWs, non-existent case-finding, lack of community mobilization and sensitization, non-adherence to CMAM guidelines amongst other barriers. Most of the caregivers of non-covered cases found during the likelihood survey were not aware that the child is malnourished, as the SAM children have not shown any clinical sign. This confirms lack of case-finding by CVs already identified in stage 1. Distance was also reported as additional reason for lack of access to the program; especially from the non-CMAM wards, and the communities with hard to reach terrain.

Farming activities was observed to be a conflicting priority to caregivers, thereby negatively affecting uptake of the program as Song LGA is predominantly inhabited by farmers. Pockets of the caregivers were also unable to access the program because they could not afford the money to pay for RUTF and routine drugs, while some do not know HFs providing CMAM services.

7 Recommendations

A dissemination workshop was held with stakeholders at the State and LGA levels. The following recommendations were proffered.

- Advocacy visit to the LGA chairman by the LGA PHC team to commit more funds towards the supply of routine drugs and RUTF to the CMAM HFs.
- Strengthening the CV activities by recruitment and training of additional CVs and retraining existing CVs ones for active case finding.
- Strengthen the community mobilization and sensitization in Song LGA by identifying relevant State and LGA forums to incorporate relevant message on CMAM program, making of relevant messages to sensitize the LGA populace.
- The SMOH to advocate to the State Government for the recruitment for additional manpower in HFs and make modalities to increase HWs in all CMAM HFS.
- The Executive Secretary PHC and SNO through the ASPHCDA to support printing and delivery of data tools, in CMAM HFs in Song LGA.

| Table 10: framework of action points to address barriers in Song LGA CMAM program\(^{39}\) |
|---------------------------------|---------------------------------|------------------|-----------------|-----------------|
| **Main area of activity**       | **Processes**                   | **Responsible**  | **Verification** | **Outcome indicators** |
| Advocacy to LGA chairman to     | Conduct Advocacy to the LGA     | PHC Coordinator/NFP | Number and dates of | Constant availability of |
| commit Strengthen Supply Chain | Chairman                        |                  | advocacy visits   | RUTF             |
| of RUTF and provision of        | Provision of funds for          | LGA Chairman     |                 |                  |
| routine drugs                   | transportation to strengthen    |                  |                 |                  |
|                                 | supply chain of RUTF by LGA    |                  |                 |                  |

\(^{39}\) This is presented as discussed and made in a Section at Song LGA SQUEAC dissemination work shop
| **Develop a purchasing plan for routine drugs** | **Executive Secretary PHC, NFP** | **Amount dedicated to supply of RUTF monthly by the LGA** | **Steady supply of routine drugs to CMAM sites.** |
| Develop a distribution plan for RUTF | Executive Secretary PHC, NFP | Quantity of routine drugs supplied to each CMAM HF | |
| | | Number of weeks with occurrence of stockout of routine drugs | |
| | | Quantity of RUTF supplied to each HF | |
| | | Number of weeks with occurrence of RUTF stock-out | |

| **Improve staff strength and quality of service delivery in health facilities** | **Advocacy to relevant authorities for recruitment of HWs to strengthen the staff capacity** | **Director CHS, Chairman ASPHCDA, Commissioner of Health Adamawa State.** | **Increased number of HWs per CMAM HF** |
| | Identify 55 HWs (5per CMAM site and/or catchment area) for training/refresher training | **SNO/NFP and PHC Cordinator** | **Improved knowledge of CMAM guidelines by HWs** |
| | Conduct Training and refresher training for health workers on CMAM | **SNO supported by UNICEF** | **Increased adherence to CMAM protocol** |
| | | | **Increase in number of trained HWs on CMAM** |
| | | | **Improved effectiveness of service delivery** |

| **Strengthening of Community Volunteers active case-finding in Song LGA** | **Identify religious leaders, community leaders, TBAs, Traditional Healers, and majalis mapped by catchment** | **NFP and District Heads** | **Increase in SAM early enrollment.** |
| | | | **Increased knowledge about CMAM program in the community.** |
| population who can work as community volunteers | Train community volunteers | potential for indoctrination in the program.  
Schedule of meeting/appointments with religious leaders  
Key messages to be used on faithful at mosque  
Number of new and existing community volunteers trained |
Concept Map by Team A
Concept map by Team B
8.1 Annex 3: Active and adaptive case finding procedure

Visit the community gathering place first and seek permission to visit the village.

Request the village leader to provide a key informant of choice.

Ask the key informant the case finding question: ‘can you show us child who is under-five years and is Tamowa, rina (swollen body), rana (wasting, skin or drying-up), ciwon kumburi (swollen body), & Ciwon yunwa (Hausa word for hunger). Bajul (Fulani word for oedema), and tuhundi- Fulani words for different types of malnutrition. Kadawu (Kanuri word for wasting), Kumberi (oedema), Kinna (hunger),

Check the child is aged between 6 and 59 months

Explain the purpose of the survey to the parents and what you will do

Measure the MUAC of the child

Does the child have bilateral Oedema or is the MUAC < 115mm?

Current SAM case

Is the child in HF?

Ask to see sachet of RUTF and health card

Not a Current SAM case

Is the child in HF?

Ask to see sachet of RUTF and health card

Current SAM case not in the program

1. Fill out the tally sheet
2. Apply questionnaire
3. Refer the child to CMAM program site
4. Thank the caregiver
5. Ask case finding question

Recovering SAM case

1. Fill out the tally sheet
2. Thank the caregiver
3. Ask case finding question

Current SAM case in the program

1. Fill out the tally sheet
2. Thank the caregiver
3. Ask case finding question

Normal child, No history of SAM

1. Not included in the study.
2. Thank the caregiver
3. Ask case finding question

Use additional sources or other key informants to inform and improve the search

Always ask parents of the SAM children identified whether they know of other cases

Local terms of malnutrition used are from Song LGA in Adamawa State, Northern Nigeria.
8.2 Annex4: List of participants in Song LGA SQUEAC assessment

8.3 Annex5: Recommended RUTF prescription\textsuperscript{41} compared to weight measurement of SAM cases

<table>
<thead>
<tr>
<th>Weight(Kg) of SAM case</th>
<th>Recommended RUTF (weekly)</th>
<th>RUTF-Daily ration</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5-3.9kg</td>
<td>11</td>
<td>1.5</td>
</tr>
<tr>
<td>4.0-5.4kg</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>5.5-6.9kg</td>
<td>18</td>
<td>2.5</td>
</tr>
<tr>
<td>7.0-8.4kg</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>8.5-9.4kg</td>
<td>25</td>
<td>3.5</td>
</tr>
<tr>
<td>9.5-10.4kg</td>
<td>28</td>
<td>4</td>
</tr>
<tr>
<td>10.5-11.9kg</td>
<td>32</td>
<td>4.5</td>
</tr>
<tr>
<td>&gt;=12kg</td>
<td>35</td>
<td>5</td>
</tr>
</tbody>
</table>

\textsuperscript{41} According to national CMAM guidelines
8.4 Annex9: Questionnaire for the carers of children (Severe cases) who are NOT in the programme

CMAM site: __________________ Under Health Facility Name: ____________________________

Village: ___________________________ Interviewer name & Team #: ______________________

Local government authority: ___________________ state: ____________________________

Date: ____/____/2014

1. Do you think your child is malnourished?
   * YES    * NO

2. If Yes: Are you aware of the existence of a programme which can help malnourished children?
   * YES    * NO (→ stop!)

3. If yes: what is the program’s name? _____________________________

4. Where is this program? _____________________________

5. Why is your child not attending or currently not enrolled in the programme? (do not prompt. Probe for “any other reason?”
   * Program site too far (How long does it take to walk? ...............hours)
   * No time / too busy. What is the parent doing instead? __________________________
   * Mother is sick
   * The mother cannot carry more than one child
   * The mother feels ashamed or shy about coming
   * Security problems
   * There is no one else who can take care of the other siblings
   * The amount of RUTF was too little to justify the journey
   * The child has been rejected by the programme already. When? _____ (approx.)
   * Other parents’ children have been rejected
   * My husband refused
   * I thought it was necessary to be enrolled at the hospital first
   * I do not think the programme can help my child (prefer traditional healer, etc.)
   * Other reasons (specify): __________________________________________________________

6. Has this child ever been to the program/ previously admitted to the programme?
   * YES    * NO (→ stop!)

7. If yes, why is he/she not enrolled anymore?
   ____________________________________________

Can be used in small area survey and in wide area survey for non-covered cases
*Previously rejected

*Defaulted (when? ..........why? .............)

* Condition improved and discharged by the programme  (when?.......)

* Discharged because he/she was not recovering  (when?........)

* Other:______________________________________________

(Thank the carer)