Semi-Quantitative Evaluation of Access & Coverage

(SQUEAC)

Fune Local Government Area (LGA)

Yobe State

NIGERIA

July-August 2011

ACF INTERNATIONAL

EUROPEAN COMMISSION

Humanitarian Aid

ACRONYMS

CMAM	Community-based Management of Acute Malnutrition
ECHO	European Commission Humanitarian Office
IYCF	Infant and Young Child Feeding
LGA	Local Government Area
MCH	Mother and Child Health
OTP	Outpatient Therapeutic Programme
PHC	Primary Health Care
SAM	Severe Acute Malnutrition
SDU	Service Deliver Unit (i.e. health facility)
SQUEAC	Semi-Quantitative Evaluation of Access and Coverage
RUTF	Ready – to – Use Therapeutic Food
YSPHCDA	Yobe State Primary Health Care Development Agency

ACKNOWLEDGEMENTS

First and foremost, ACF would like to thank the YSPHCDA, LGA authorities and PHC teams, health workers and communities for their commitment to integration of CMAM and in ensuring that timely treatment is available for the children who are severely acutely malnourished in Fune LGA. Thank you to the ACF field teams for the support and hard work throughout the SQUEAC investigation. Finally, thank you to ACF-UK headquarters Evaluation, Learning, & Accountabilities Unit, specifically Saul Guerrero, for training the team, facilitating the process and developing SQUEAC capacity within Nigeria.

EXECUTIVE SUMMARY

Between July 29th and August 10th, 2011, a Semi-Quantitative Evaluation of Access & Coverage (SQUEAC) was carried out by ACF in Fune LGA. The SQUEAC design was defined to provide an estimate of LGA wide coverage as well as identify key barriers/boosters to access affecting programme quality and coverage. The evaluation used a simplified version of the standard, 3-stage, Bayesian beta-to-binomial conjugate analysis. CMAM coverage in Fune LGA was estimated to be:

Point Coverage	33.0% (24.4% - 42.7%)
Period Coverage	52.6% (44.0% - 60.7%)

Point coverage was revealed to be relatively low throughout the LGA, with pockets of lower coverage in specific geographical areas, mainly in the east and northeast part of the LGA. Interface problems at health facility level (including waiting times, staff-beneficiary relations, etc.) were also found to be a key determinant of programme coverage. In addition, awareness about the CMAM programme also needs to be improved if coverage is to be increased.

The investigation recommended; 1) Increasing geographic coverage of CMAM availability by targeting additional health facilities to provide treatment; 2) Strengthening awareness about CMAM services available; and 3) strengthening health facility interface in terms of better working conditions for health workers which will in turn impact how caregivers are treated and waiting times. In order to evaluate the impact of these and other measures, the exercise will be repeated in the next 12 months.

CONTENTS

BACKGROUND

ACF has been supporting the Fune Local Government Area (LGA) health system in the integration of Community-based Management of Acute Malnutrition (CMAM) into routine services since mid-February 2011. The pilot approach has focused on capacity strengthening of stakeholders (health workers, leaders, etc.) on CMAM at different levels - State, LGA, health facility and community. Activities are done in partnership with the Yobe State Primary Health Care Development Agency (YSPHCDA) and LGA Primary Health Care (PHC) Departments, as well as in close collaboration with community leaders. A total of 10 health facilities are supported, providing CMAM services one time per week for follow-up (Annex 1). Admissions are done on a daily basis, according to needs. The main objective of the project is to ensure sustainable access of CMAM services for severely acutely malnourished children 6-59 months in Fune LGA, as such services become integrated as part of health and community systems, taking acute malnutrition treatment closer to homes.

The SQUEAC evaluation took place at an early stage – 6-month implementation period - with two main objectives:

1. To provide a baseline coverage for Fune LGA after 6 months and identify main factors affecting coverage.
2. To provide key recommendations for Phase 2 of the pilot approach to improve quality and coverage of CMAM services.

The SQUEAC investigation brings timely guidance towards refining the current pilot approach, ensuring that Phase 2 adopts recommendations, thus strengthening the pilot CMAM LGA model for replication, accounting for CMAM quality and coverage. The SQUEAC investigation was carried out by ACF Nigeria with the support of ACF-UK's Evaluations, Learning & Accountability Unit. Considering the dimension and scale of CMAM in Nigeria, a simplified, easy-to-use version of SQUEAC was applied, exploring an increasingly time and cost efficient model to be used for regular monitoring of coverage. This report was written based on other SQUEAC reports produced within ACF-International.

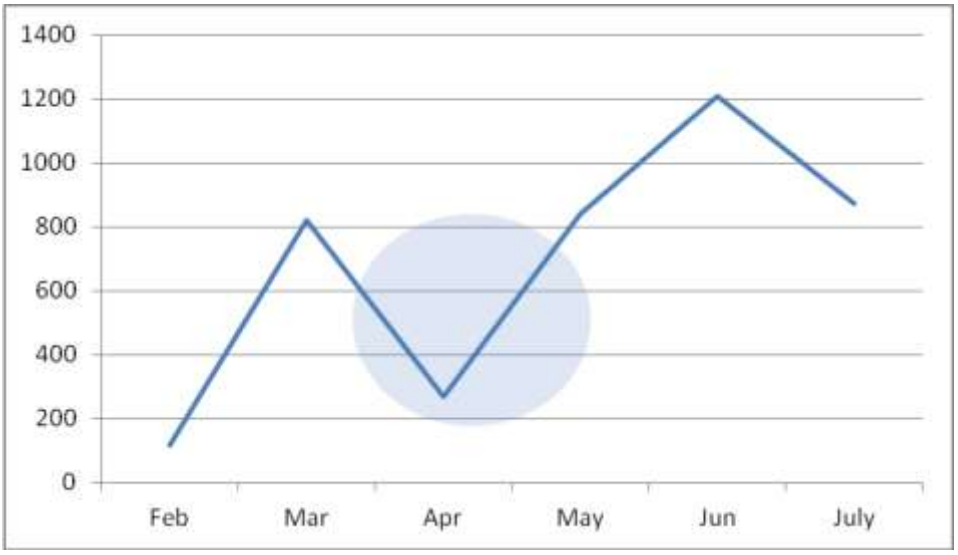
1. STAGE ONE

The objective of Stage One was to identify areas of low and high coverage and the reasons for coverage failure using routine programme data or easy-to-collect quantitative and qualitative data.

1.1. Programme Admissions (Overall Numbers)

Since support for CMAM integration started in February 2011, a total of 4,177 children have been admitted to different health facilities providing CMAM. Evolution of overall admissions is illustrated in Figure 1. A cursory glance at the trend reveals a pronounced drop in admissions in April 2011. The investigation concluded that this was due to the election period which happened throughout April. During this time, some health facilities did not open and thus treatment was not provided, leading to a decrease in attendance and in effect, admissions. The steep upward trend in June can be explained by an increase in admissions in one health facility in Fune – Damagum Maternal & Child Health (MCH) Clinic– from which at least 60% of admissions were coming from a neighbouring LGA, Potiskum, which is densely populated and accessible by road. Despite the short time frame to determine reoccurring admissions trends it was possible to identify key events affecting admissions.

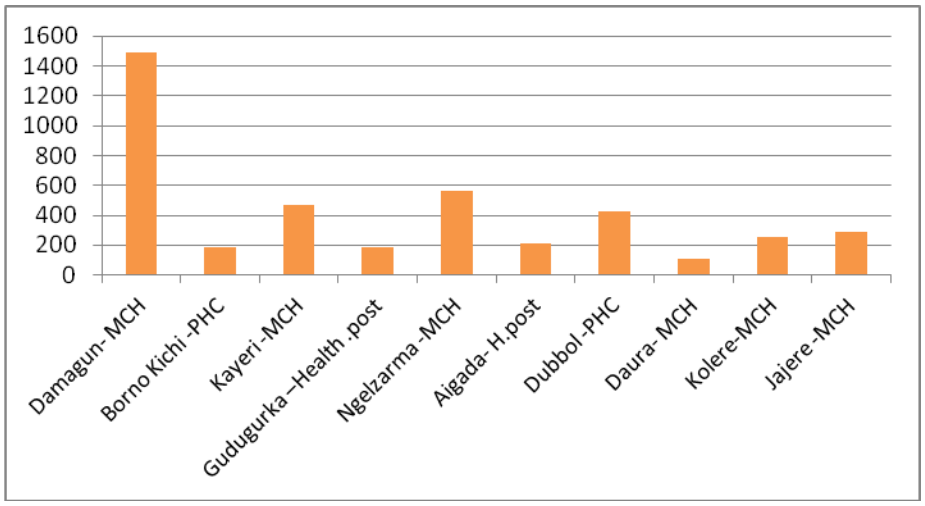
Figure 1. Programme Admissions over Time, Feb-July 2011, Fune LGA



1.2 Admission by service delivery unit

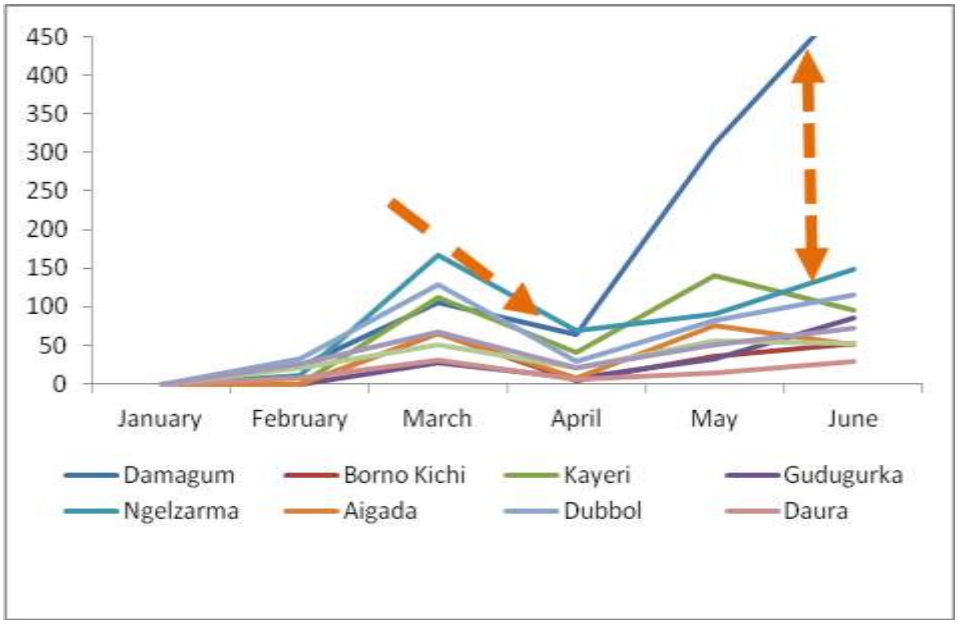
Looking at the overall admission trends, admissions were analysed by service delivery unit (i.e. health facility – Figure 2) in order to identify potential disparities in admissions across the different facilities.

Figure 2. Admissions by health facility, Fune LGA, Feb-July 2011



The analysis identified a clear difference between Damagum MCH and all other health facilities. The investigation concluded this to be the result of the location of the facility near the primary road in the region connecting different LGAs. This effectively means that the facility currently caters for children from the area as well as those from neighbouring LGAs such as Potiskum. Kayeri and Nglezerma health facilities are in densely population areas, which can be a reason for higher admissions. Overall, admissions are relatively elevated to be managed one day a week, leading to overcrowding of health facilities. This can be overwhelming for health workers as well as time consuming for caregivers, who may have to spend a full day at the health facility for their child to receive treatment. The admission trends over time per health facility are illustrated in Figure 3 below.

Figure 3. Admissions by health facility over time, Fune LGA, Feb-June 2011



The figure indicates similar trends for almost all health facilities with a decrease in April and increase between May and June. The increase in admissions is clearly more significant for Damagum, due to the high number of children coming from Potiskum.

1.3 Admissions vs. Needs

As the six month time period is very short to determine time bound trends, seasonal peaks are based on the local seasonal calendar and critical events, which highlights highest food insecurity (i.e. hunger season) and malaria peak periods to be between June and August. In linking admission trends and the seasonal calendar one can see the trends correspond to needs as in Annex 2, though largely based on assumptions as the time frame is not long enough (over years) to illustrate this adequately.

1.4 Spatial coverage of Admissions

Following the overall admission trend analysis, the home locations of admissions were to indicate the spatial coverage of CMAM activities in Fune LGA. The map in Annex 3 illustrates the actual geographical coverage of the programme admissions[1]. The analysis of this mapping exercise helped identify specific areas (where no admission has been reported) in the eastern and north-eastern part of Fune and around more rural areas (such as south of Gudgurka and Kayeri) that have reported few or no admissions[2], highlighted by the blue circled areas . Similarly, the analysis showed that admissions were higher in communities along the network of roads within the LGA and from the more densely populated areas. This was a key exercise towards guiding the investigation in the formulation of two different hypotheses on coverage for testing as part of Stage Two.

1.5 MUAC at admission

In order to further understand whether the programme is reaching SAM children early, the MUAC at admission was plotted for all recorded admissions since the start of the programme. The results are found in Annex 4. The median MUAC at admission was 9.2 cm and the mean MUAC was 10.5 cm.

---

[1] Refer to Annex 1 for locations of admissions mapped.

[2] These are the blue circled areas; there are several single admissions throughout other parts of the LGA, in smaller font which can be visible if the map is zoomed in or projected at a larger scale.

Overall, children appear to be arriving in a relatively timely manner for treatment, despite the short period for start up. Normally, at start up, the MUAC at admission distribution is flatter, and as activities progress, children are expected to arrive at an earlier stage of malnutrition (as community case finding is strengthened). It must be noted though, that there are peaks in digit preference, indicating the need to further strengthen MUAC measurement at health facility level.

1.6 Programme Exits

The following table presents cumulative programme performance indicators since Feb 2011.

Table I. Performance rates, Fune LGA, Feb-July 2011

Performance Rate	Number	Percentage
Recovered	1190	**47.7%**
Death	27	**1.1%**
Defaulter	1219	**48.9%**
Non-recovered	57	**2.3%**

Programme exits exhibit a high defaulter rate with negative implications for programme coverage in Fune LGA. The investigation decided to carry out a more in depth analysis of defaulter cases by reviewing exit card information as well as consulting the programme team.

In linking the elevated defaulter rates with other information collected, some reasons for defaulting were identified: these include distance and overcrowding of health facilities. The impact of the April elections, and the closure of health facilities over an extended period of time, was also taken into account during the investigation of defaulting in the programme.

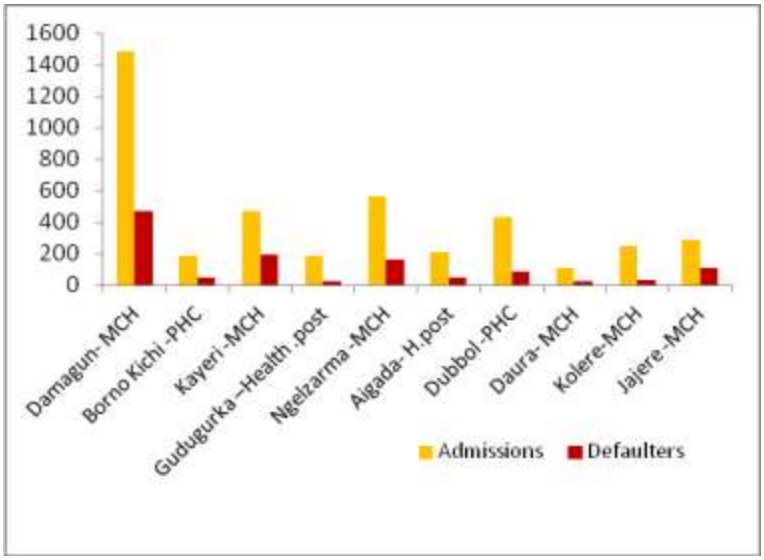
1.7 Review of Defaulter Records

To better understand the factors effecting defaulting and potentially affecting coverage, various stages of analysis were conducted specific to defaulting. This was a key exercise towards guiding the investigation in the formulation of two different hypotheses on coverage for testing as part of Stage Two.

1.7.1. Defaulter versus admission and over Time

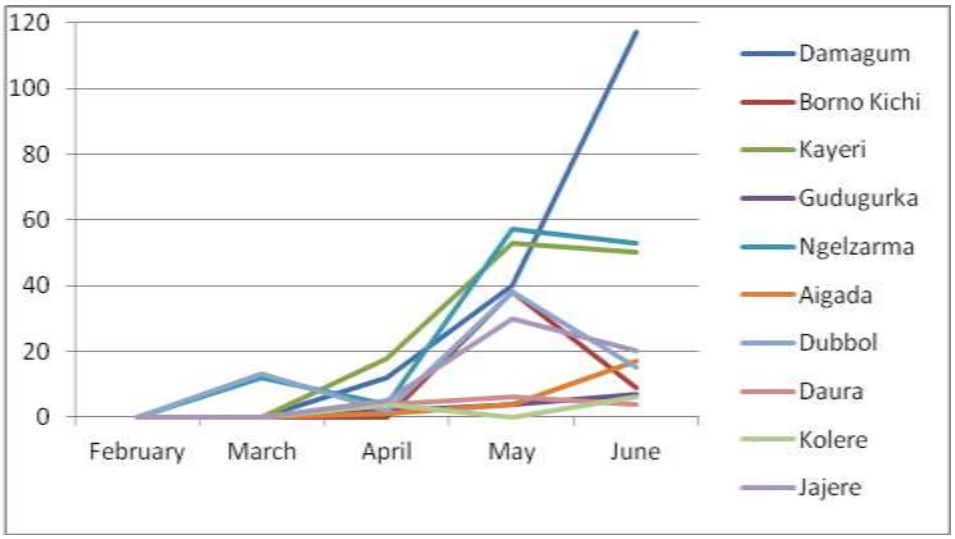
In bringing together admissions and defaulters per health facility it is possible to identify a few trends in the graph below.

Figure 4. Defaulters versus Admissions per health facility, Fune LGA, Feb-Jul 2011



Health facilities with higher number of admissions also have a higher number of defaulters, such as Damagum, Ngelzerma, and Kayeri. On the same note, health facilities with lower admissions also have lower defaulting, such as Borno Kichi, Aigada, and Daura. Such trends suggest a possible correlation between the levels of admissions and the levels of defaulting. The potential correlation seems to be corroborated by the trends in defaulting over time by health facility (Figure 6 below) which follows a similar pattern to admissions (see Figure 3). The increase in defaulting in May could also be a result of the April elections. Defaulter OTP Cards were therefore analysed in relation to this possible incidental barrier. It was found that 27% of all defaulter discharge cards may have been a result of the elections (between April & May). Whilst the elections may have had an impact on defaulting, the investigation concluded that this was minor compared to other factors and barriers.

Figure 5. Defaulter over time, Fune LGA, Feb-June 2011



1.7.2. Early versus Late Defaulter

The investigation also analysed the timing of defaulting, in an effort to determine possible reasons behind it[3]. For Nigeria, a threshold of at least 5 visits or more was set as sufficient for a child to be considered as a late defaulter (based on average length of stay in the programme observed from treatment charts), therefore to have improved his or her condition since the first visit to the health facility. Discharged defaulter cards were gathered and separated into categories according to number of visits recorded (Figure 7). The analysis concluded that most defaulting is occurring early on, with most defaulters never returning for a single follow-up visit after admission. In order to explore possible correlations between defaulting and programme numbers, the analysis was done by health facility as shown below (Figure 8).

The highest early defaulting is happening in Damagum and Ngelzerma, with the highest number of admissions and children in charge. Aigada and Gudgurka, health facilities with fewer children in charge, report a higher number of late defaulters. This indicates that a key factor linked to defaulting is the interface problem between health worker and beneficiary, which is caused by overcrowding of health facilities.

[3] Early defaulters generally suggests; 1) that the child did not recover on its own after (i.e. is affecting coverage) and; 2) it happened most likely for significant reasons. If it happened late it generally means that; 1) the child probably recovered on its own and; 2) it probably happened precisely because "sufficient" progress had been made and cost-benefit balance shifted

Figure 6. Time of defaulting, overall, Fune LGA, Feb-July 2011

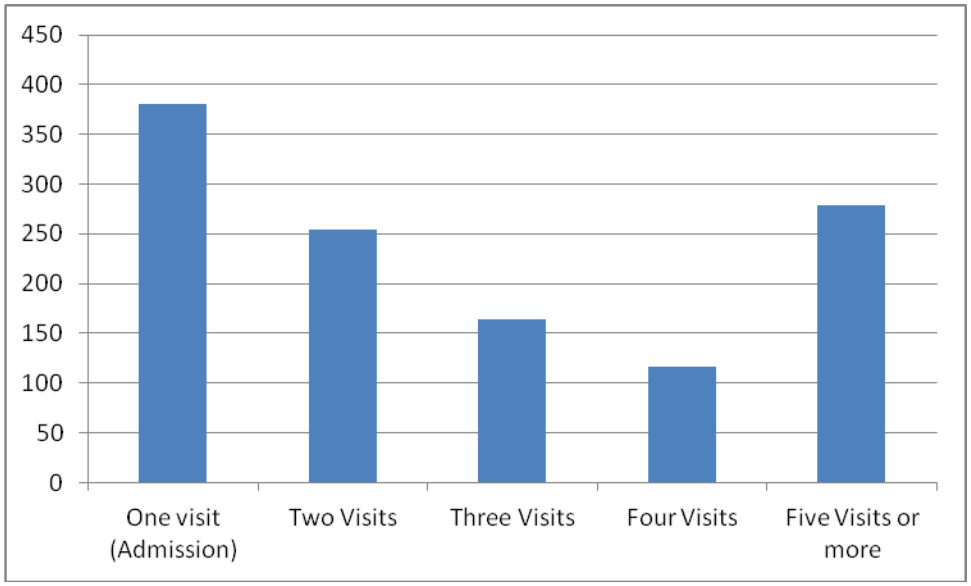
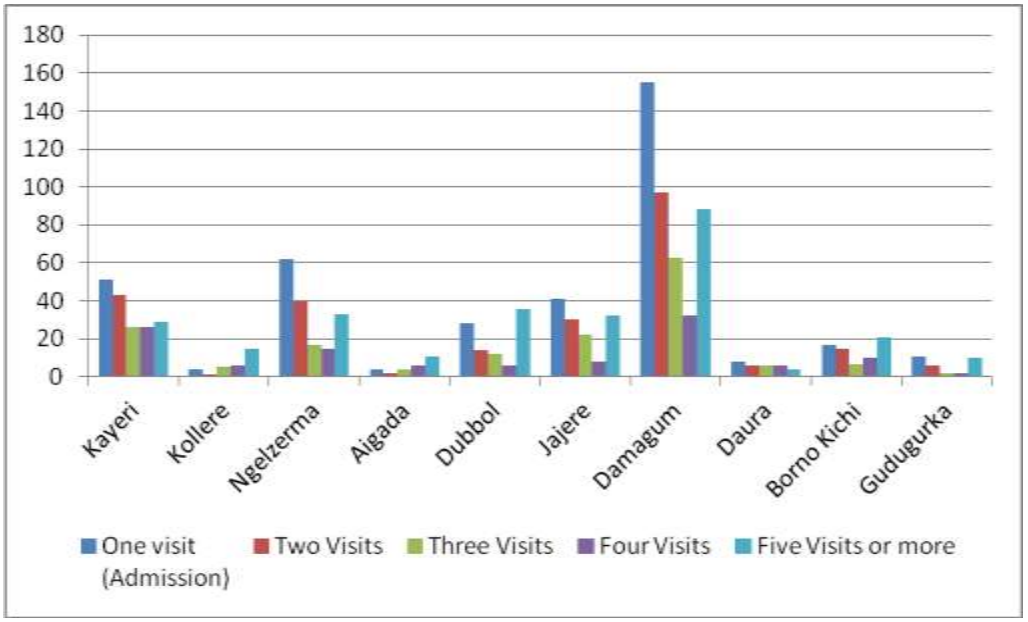


Figure 7. Time of defaulting, per health facility, Fune LGA, Feb-July 2011



1.7.3. Defaulters by Home Location

Since many of the admissions in high volume sites (Damagum and Ngelzerma) were reportedly coming from different LGAs, and defaulting was also more pronounced in these facilities, an analysis of defaulters by home location was also carried out. The aim was to establish the extent to which high defaulting was having an impact on coverage within Fune. Three types of defaulter mapping were carried out; 1) Defaulters were mapped by health facility (Figure (9.a); 2) By proportion (in %) of defaulters from outside Fune LGA (Figure 9.b; green % from outside, red from inside) and; 3) By village of origin within Fune LGA (Figure 10). The first figure presents the first two mapping exercises side by side for comparative value.

The mapping shows that facilities located on the western part of Fune LGA, and along the main roads within the LGA, have recorded higher defaulting levels that those in the north (figure 9.a). A large proportion of defaulters in health facilities in border areas originally reside outside of Fune (percentages in green, figure 9.b). This suggests that whilst overall defaulting is having an impact,

within Fune, its impact on coverage is less than originally anticipated [4]. It also suggests that distance is responsible for defaulting in many of these cases. In order to better understand the factors influencing defaulting within Fune, a mapping of defaulters within Fune was carried out (Figure 10 below).

Figure 8. Defaulter mapped per SDU and proportion from outside Fune LGA (in green, %), Feb-Jun 2011

9.a **9.b**

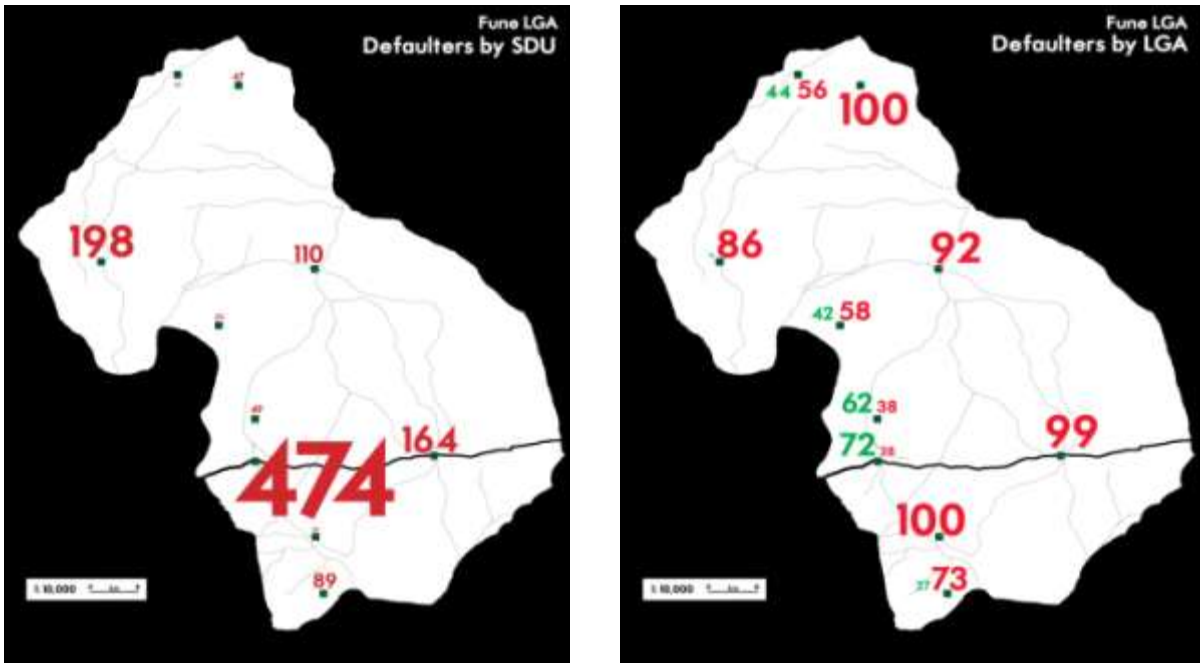
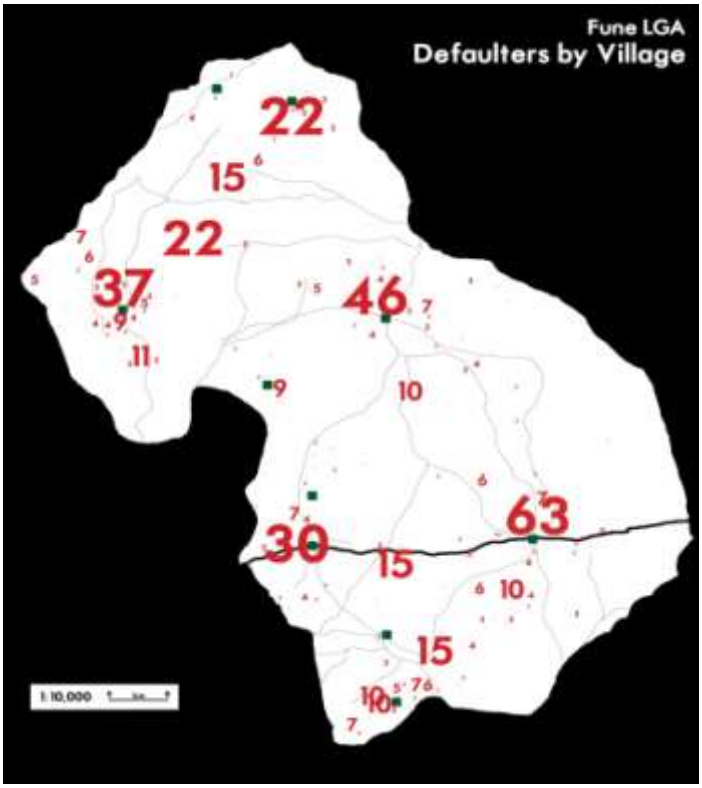


Figure 9. Defaulters mapped by village of origin, Fune LGA, Feb-Jun 2011



[4] This means that defaulting does not affect coverage within Fune LGA because a large proportion of children admitted who default are coming from outside the LGA, and thus would be removed from the numerator/denominator in the equation

The map reveals that a core number of defaulters are coming from within the towns where health facilities are located and providing treatment, suggesting that physical access is not the only barrier.

1.8 Qualitative Data[5]

1.8.1. Causes of Malnutrition

Malnutrition is not recognized in Fune communities as a distinct and easily recognisable condition, which can affect early detection. The belief in the community is that malnutrition is not a disease that can be treated at health centres with modern medication, which is natural, considering that previous to CMAM activities, there was not Ready-to-Use-Therapeutic-Food (RUTF) or other type of medical treatment available. Only traditional healers and the messages from the Quran were seen as a cure. The causes of malnutrition identified from the community members include: poverty (hunger - *yunwa*); *shanciki* (witchcraft); lack of awareness (i.e. giving an unbalanced diet and not feeding the child frequently or at the right time); evil spirits; *kunika* or when a mother breastfeeds while pregnant (i.e. the milk is believed to be bad for the child and causes malnutrition)[6].

High coverage is dependant on sensitisation strategies that can successfully consider and adapt to traditional beliefs – here realtively negative –linked to malnutrition. Moreover there is no specific term in communities for malnutrition, as it is mainly associated to causes and identified through symptoms. Sensitisation strategies must therefore focus on consistent key terms to ensure early detection and referral by communities for better coverage.

1.8.2. Health Seeking Behaviour

The most commonly used treatment given by caregivers are herbal medicines from traditional healers. Herbs are put in water used to bath the child or the medicine is burnt and the child inhales the smoke. Other traditional remedies include slaughtering animals and rubbing the animal stomach contents on the child's body and using a heated need to withdraw fluids – malnutrition- form a child's body. Caregivers will testify that most traditional remedies do not work if the child's mother does not expose evil she committed, indicating the strong link between traditional beliefs and malnutrition. When a child is sick with malnutrition, food with oil will not be given as it is believed to cause death. When the situation becomes very serious, the child will then be taken to the hospital, where they receive nutritional advice and medication for other identified illnesses. Some of the cases are brought to the health facility too late even after the start of CMAM activities.

1.8.3. Barriers to Access

In order to understand health seeking behaviours in Fune LGA, a series of cultural and programmatic factors linked to malnutrition were reviewed. The table below summarizes key findings on possible reasons for defaulting and non-attendance.

[5] This section is a combination of information collected during the SQUEAC as well as previously, as part of the Rapid Socio Cultural Assessment (RSCA) conducted prior to the investigation.

[6] Other belief on causes of malnutrition include: a mother being adulterous during pregnancy, kwashiorkor comes to a child born from a mother who was swollen during pregnancy, pregnant mothers who eat sand will give birth to malnourished children, a pregnant woman is not allowed to walk by a dead donkey's body as the child she gives birth to will be malnourished, mothers with too many young children will have their hands full all day and care for the young ones is limited, diseases such as malaria and yellow fever will cause wasting and swelling; most mothers complain that they do not have sufficient breast milk; poor access to treatment (health facilities not adequately equipped).

Table II. Reasons for Defaulting & Non-Attendance

Awareness on malnutrition & treatment available	Malnutrition is not recognized as a distinct disease by communites. Thus, when a child presents malnutrition signs and symptoms, caregivers go to traditional healers. This was also the case before CMAM service became available close to some communities in Fune LGA. With the start of CMAM, caregivers bring children for treatment for a few times, and tend to stop once they see the child's condition is improving.
Beliefs linked to malnutrition / Stigma	Malnutrition is believed to result from socially unacceptable behavior or action. Therefore it can sometimes be difficult for the family, especially men, to accept treatment. They will prefer to go to traditional healers unknown to the community and get treatment for the children.
Health Facility service provision	Caregivers complain of health staff attitude towards them at health facility level. Caregivers say they are judged and provided with limited information, leading them to feel intimidated or uninformed on the continuation of treatment. In additon, the number of CMAM beneficiaries in charge in many health facilities is too high jeopardizing quality of services/information provided to caregivers. Waiting times are long, sometimes leading caregivers to return home without receiving treament for their child.
Health Facility Coverage	A common barrier to accessing health care services is distance. Since the settlement structures in Fune are clustered they tend to be spread far from one another. Some villages are very far from a health faciltiies with almost two to three walking hours to reach the facility where CMAM services are provided. An alternative means is the use of an ox/donkey cart, vehicles and motor bike, though costs are an additonal barrier. From about 30 functional health facilties, only 10 are providing CMAM services.
Physical Barrier	During the rainy season, seasonal rivers become a main barrier to access. In addition, road networks also become worse, limiting access during the rainy season.
Rejection	Many caregivers come on a regular basis to health facilities for screening as they hear about the programme from other caregivers. As some of the children do not fit the criteria, they are not admitted and this is relayed back to communities. Therefore, sometimes, even if a community volunteer or caregiver may notice symptoms, they may be told by other women in the community not to attend the health facility as they will not be admitted anyway.
RUTF Perceptions / Acceptance	Some health facilities refer to RUTF as food, which can have implication in that caregivers will attend the health facility without understanding the admission criteria/malnutrition treatment, be rejected and relay this information back to communities. Some causes of defaulting have also been as a result of children not liking RUTF.

1.9 Areas of High and Low Coverage

Based on the information collected and analyzed in Stage One, the investigation concluded that coverage is likely to be relatively low throughout Fune LGA. Two primary factors affecting coverage were identified:

1. Spatial distribution (low admissions in East & North East of the LGA)
2. Interface problems at Health Centres (high defaulting in towns)

The hypothesis was therefore that:

- **Coverage is low** in areas that do not have a health facility providing CMAM services and removed from main road network within Fune.
- **Coverage is low** in catchment area of health facilities with high admissions and long waiting times.

To test this hypothesis, two areas were selected, based on the investigation, as the most representative of the two hypotheses:

- **Rural East Fune LGA**: The admissions mapping exercise (see section 1.4) showed there are no admissions coming from this area. The main objective was to investigate whether; 1) the area has no communities as road access limited/non-existent or; 2) if existing communities are aware and/or have access to CMAM services.
- **Ngelzerma Town**: The defaulter analysis (see section 1.7) showed that Ngelzerma has had a high number of admissions and the highest defaulting from within the town itself. The investigation focused on main barriers to accessing the health facility providing CMAM located within the town.

In both cases, the investigation hypothesis classified coverage as being low to identify barriers to access on why it was low.

2. STAGE TWO

The objective of Stage Two was to confirm the locations of areas of high and low coverage as well as the reasons for coverage failure identified in Stage One (above) using small area surveys.

Two teams were formed for the small area surveys. Both identified locations were sampled in one day. One team of 3 people went to the eastern part of Fune LGA. The other team of 4 people split into 2 teams of 2 people to cover Ngelzerma Town. The case definition used was for both marasmus and kwashiorkor cases - terms used included: children who are not eating, have lost weight, are being weaned or swollen (kwashiorkor) with use of photos, as well as for children in the programme but no longer with severe acute malnutrition (recovering cases). Combined active & adaptive with house to house case finding methodology was used to ensure exhaustive coverage of targeted areas. The main findings of the small area surveys are summarized in Table III below.

Table III. Stage Two – Small Area Survey (Findings)

Low Coverage Areas for Stage 2	Rural Eastern Fune LGA	Total SAM Found	7	
		SAM Cases in the Programme	1	
		SAM Cases not in the Programme	6	Defaulter
				Awareness
				Awareness
				Awareness
				Awareness
				No condition
	Ngelzerma Town	Total SAM Found	10	
		SAM Cases in the Programme	3	
		SAM Cases not in the Programme	7	Rejection
				Rejection
				Awareness
				Awareness
				Defaulter - Interface
				No Reason
				Awareness

Based on the information collected, coverage was classified against a threshold of 50%[7]. A decision rule (d) was calculated using the following formula:

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

n = total number of cases found

p = coverage standard set for the area

The results of coverage classification are presented in Table IV.

Table IV. Small Area Survey (Coverage Classification)

Low Coverage Areas	Rural Eastern Fune LGA	Coverage standard (p)	50%	Number of cases covered (1) is < decision rule (3) **Coverage is <50%**
		Decision Rule (d)	[n x 50/100]	
			[7 x 0.5]	
			3.5	
		d	3	
		Cases covered	1	
	Ngelzerma Town	Coverage standard (p)	50%	Number of cases covered (3) is < decision rule (5) **Coverage is <50%**
		Decision Rule (d)	[n x 50/100]	
			[10 x 0.5]	
			5	
		d	5	
		Cases covered	3	

The small area survey finding confirmed the hypothesis that distance and interface problems at health facility level are primary factors affecting programme coverage. In addition, it revealed that low awareness about malnutrition symptoms and treatment available in both areas visited. Moreover, it indicated that the problems with interface are various, including waiting times, rejection (a caregiver who returned to the health facility after not attending for 2 weeks was turned away and became a defaulter) and communication with caregivers who children do not fit the admission criteria.

3. STAGE THREE

The objective of Stage 3 was to provide an estimate of overall programme coverage using Bayesian techniques. To do this, the evaluation relied on the standards Bayesian beta to binomial conjugate analysis.

3.1. Developing a Prior

The information collected was separated between factors that reflect positively about CMAM coverage and factors that reflect poorly. Each factor was ranked using a simple weighed (3-5-7) point system. All positive factors were added to the minimum possible coverage (0%) while all the negative factors were subtracted from the highest possible coverage (100%).

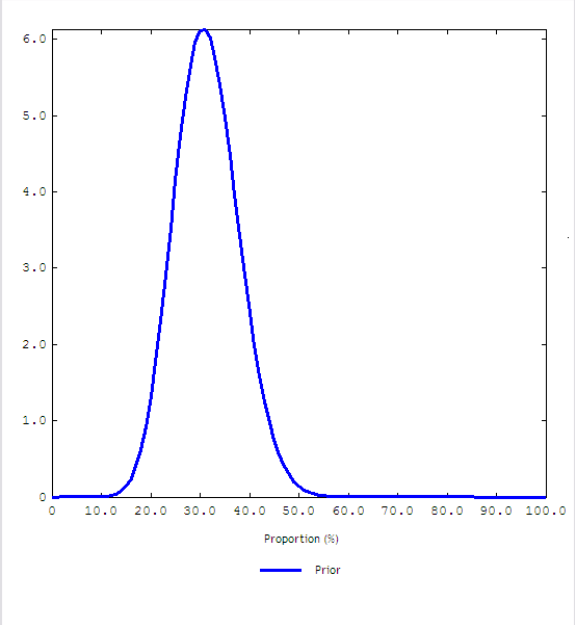
[7] Threshold was set at 50% based on the SPHERE minimum for rural areas and as was included as an indicator of the project.

Table V. Measuring Contributing Factors (Prior)

Positive Factors	Value		Negative Factors
Total Programme Admissions	7	7	Total number of defaulters
MUAC on admission	5	5	Impact of elections
Number of Volunteers	7	7	Heterogeneous coverage distribution
Involvement of key community figures	5	7	Awareness about the programme
		7	Interface at health facilities
		7	Physical access (seasonal variations)
		3	Husband's refusal
		5	Stigma
	24	48	
Added to Minimum Coverage (0%)	24	52	Subtracted from Maximum Coverage (100%)
Median	38		
α value	16	21	**β value**

An average was calculated and used as the median for a trial distribution curve (Prior) plotted using the BayesSQUEAC Calculator. In observing the first version of the prior with the overall estimate of 38% coverage, and re-evaluating all programme factors possibly affecting coverage, 38% with +/- 10% confidence interval seemed high. The mode was therefore readjusted to 30% with the alpha value remaining at 16 and the beta value changing from 21 to 35. The final curve used for a prior is present in Figure 11.

Figure 10. Prior (Programme Coverage)



3.2. Sampling Methodology

3.2.1. Minimum Sample Size

To estimate the minimum number of cases (children) needed in the small area survey (n), the following formula is used:

$$n = \left| \frac{\text{mode} \times (1-\text{mode})}{(\textit{precision} / 1.96)^2} - (\alpha + \beta - 2) \right|$$

Using the α (16) and β (35) values and a mode of 30% (*see section 3.1),* the following minimum sample is as follows:

$$n = [(0.3 \times (1-0.3) / (0.1/1.96)^2 - (16 + 35 - 2)]$$
$$n = [(0.21/0026) - 49]$$
$$n = 80.769 - 49$$
$$n = 31.769$$
$$\mathbf{n=32}$$

In order to achieve a confidence of +/- of 10%, a minimum of 32 cases needs to be identified.

3.2.2. Minimum number of villages

The minimum number of villages to be sampled was then calculated with the use of the following values.

Target Sample Size:	**32**
Average village population:	**633**
Prevalence of SAM[8]:	**2.8%**
% Children aged 6-59 months[9]:	**17.5%**

Values were used in the following formula

$$n_{villages} = \frac{n}{\text{average village population}_{\text{all ages}} \times \frac{\text{percent of population}_{\text{6-59 months}}}{100} \times \frac{\text{prevalence}}{100}}$$

$$n_{villages} = 32/ (633 \times 0.175 \times 0.028)$$
$$n_{villages} = 32/3.1$$
$$n_{villages} = 10.32$$
$$\mathbf{n_{villages} = 11}$$

As a result, a minimum of 11 villages has to be sampled in order to reach the minimum sample size of children.

3.2.3. Spatial Representation

In order to achieve spatial representation, the Stage Three survey involved a two-stage sampling:

1) Village selection: First, a 20 km x 20 km grid was plotted over the map of Fune LGA (Figure 12). The map was obtained from the State Lands & Survey Department. In total, 14 quadrats were selected to cover all the areas in Fune LGA, excluding quadrats that we made up of less than 50% land mass. The centre of the quadrat was then identified, and the closest village to the centre of each quadrat selected in the sampling process. The list of villages selected for the wide area survey is in Annex 5. Two selected villages no longer existed at the time of the survey and these were replaced by the next village closest to the centre of the specific quadrats.

2) Within-community sampling method: a combined active & adaptive case-finding & mass screening approach was used in Stage Three to ensure selected communities were sampled exhaustively. The wide area survey was carried out over four days (Aug 6th – 10th) by five teams of two people, each composed by a supervisor and an enumerator, and was overseen by the Senior Community Officer and Technical Coordinator. Case definition used in Stage Two was reviewed with field teams and replicated in this stage of the process.

[8] Based on prevalence for MUAC SAM cases from SMART surveys, July 2010
[9] Based on Nigeria Demographic Health Survey, 2008

Figure 11. Sampling Areas

3.3. Wide Area Survey Results

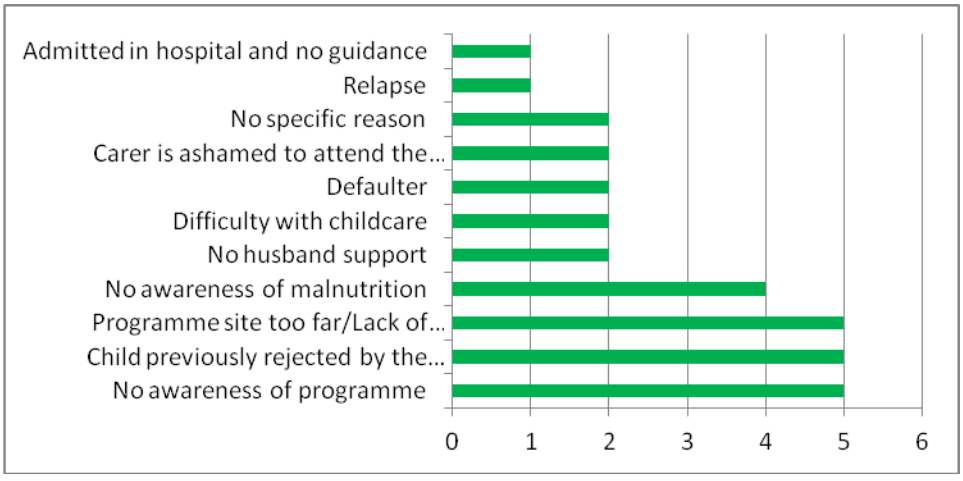
Main results for the wide area survey are summarised in Table VI.

Table VI. Stage Three (wide area survey) Main Findings

Types of Cases	Number of cases
Number of current (SAM) cases	**48**
Number of current (SAM) cases attending the programme	**17**
Number of current (SAM) cases not attending the programme	**31**
Number of recovering cases attending the programme.	**40**

The main reasons for not attending CMAM services available are summarised in Figure 13.

Figure 12. Main reasons for Non-Attendance



3.4. Overall Coverage Estimation

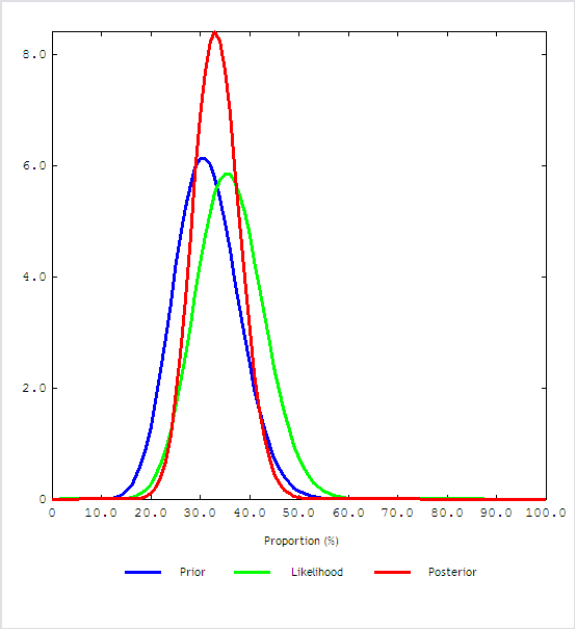
Both point and period coverage are presented in this section. However, focus is set on period coverage as it provides a more accurate picture of the actual coverage of SAM cases at the time the investigation was conducted.

3.4.1. Point Coverage

Point coverage provides a snapshot of programme performance and places strong emphasis on the coverage and timeliness of case-finding and recruitment. To calculate point coverage, the numerator and the denominator were selected from the results for the wide area survey using the formula

$$\frac{\text{No. of current (SAM) cases attending the programme}}{\text{No. of current (SAM) cases}}$$

Selected data was used as a denominator (48) and numerator (17) when inputted into the BayesSQUEAC Calculator.



Based on the existing prior and wide area survey (likelihood) **point coverage** was estimated to be **33.0% (24.4% - 42.7%)**[10]

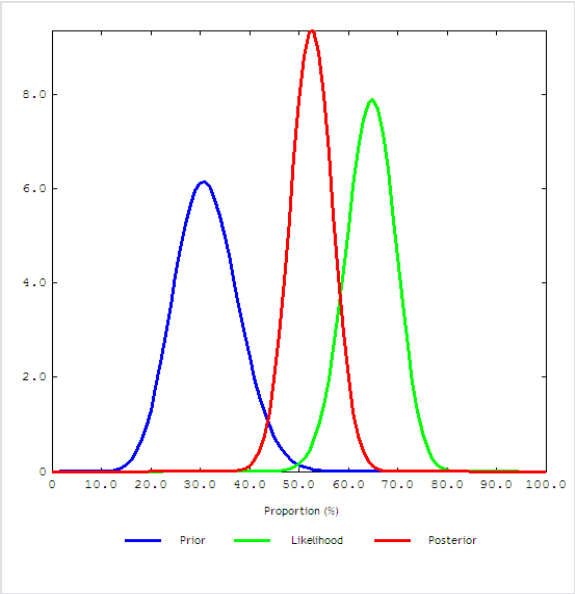
3.4.2. Period Coverage

Period coverage includes recovering cases; case that should be in the programme because they have not yet met the discharge criteria. To calculate period coverage, the numerator and denominator were selected from the results of the wide area survey using the formula

$$\frac{\text{No. of current (SMA) cases and recovering cases attending the programme}}{\begin{array}{c}\text{No. of current (SAM) and recovering cases attending the programme} \\ + \text{No. of current (SAM) cases not attending the programme}\end{array}}$$

Selected data was used as numerator (17+40 = 57) and denominator (57+31 = 88) when inputted into the BayesSQUEAC calculator,

[10] All values were calculated using the BayesSQUEAC calculator.

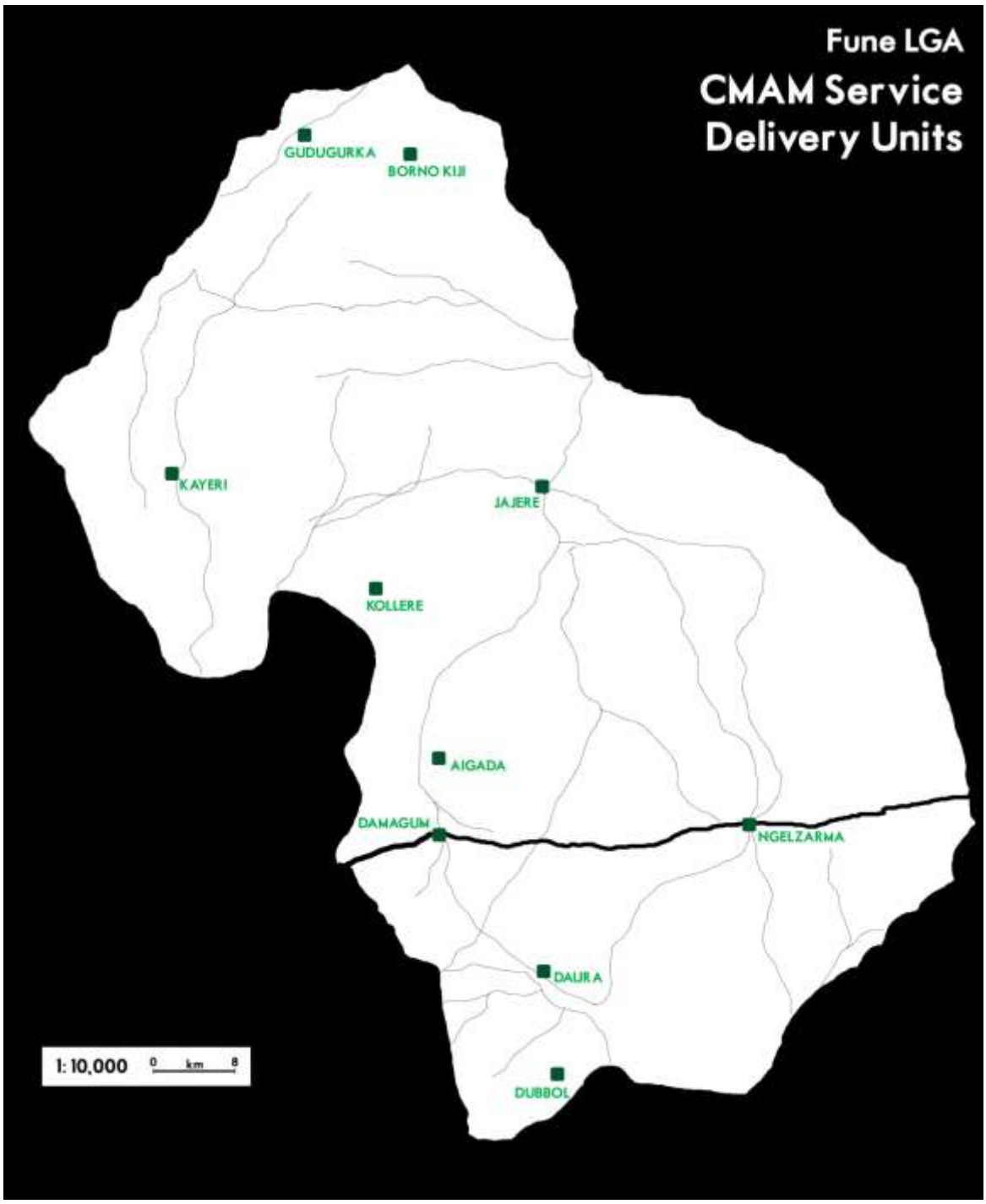


Based on existing prior and small area survey (likelihood) a period coverage was estimated to be 52.6% (44.0% - 60.7%). The very minimal overlap between the prior and the likelihood, the period coverage can be said to be less representative of the present situation of the programme coverage, potentially indicating better coverage earlier in the programme period, prior to the rise in admissions and the accompanying rise in defaulters as a result of overcrowding and other interface problems.

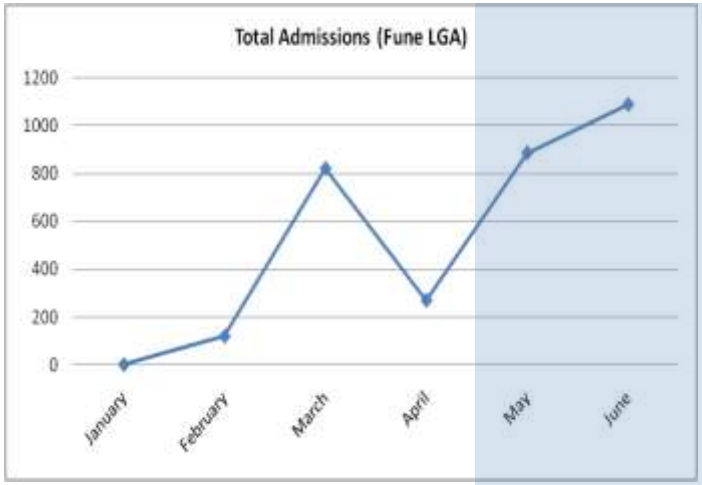
4. CONCLUSIONS & RECOMMENDATIONS

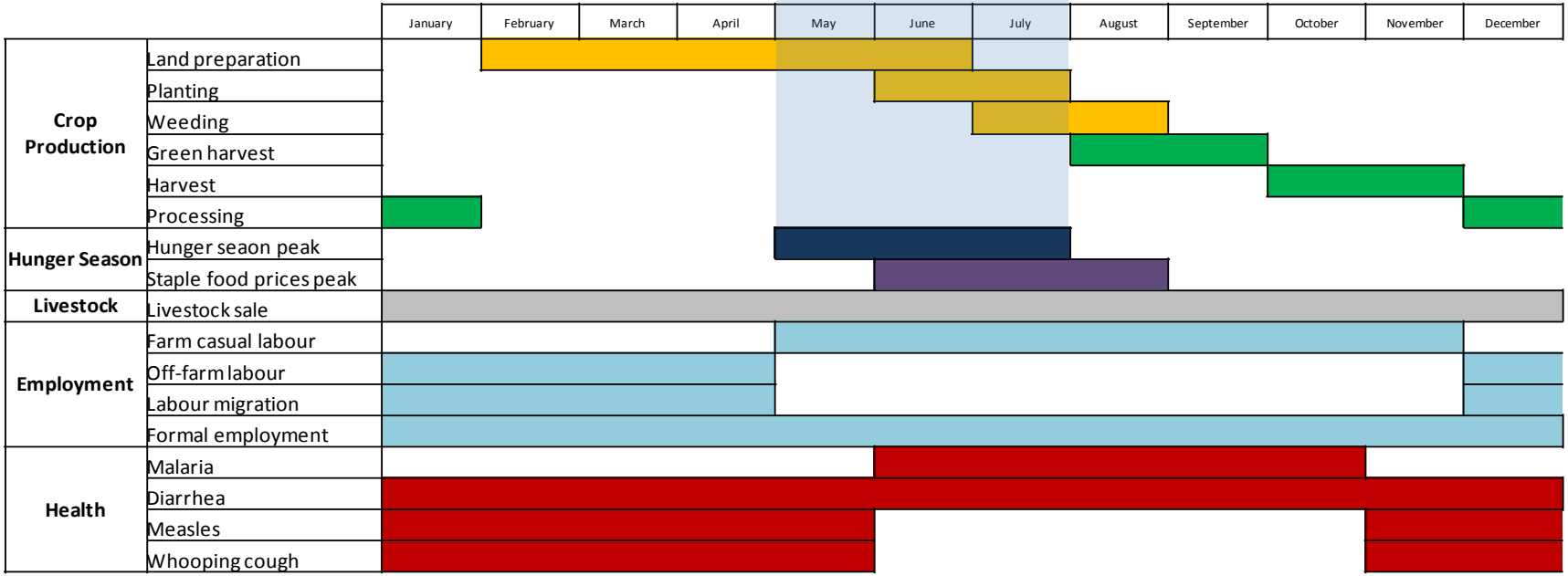
- A large number of children have been admitted and treated in a short 6-month period of CMAM services having been integrated to the health system in Fune LGA. Nonetheless, the number of health facilities must be augmented in order to ensure that the population has adequate access to treatment. The impact may be two-fold: first, access is improved and second, further decentralization can make caseload more manageable for overcrowded health facilities.
- Defaulting rates are more than triple the target set by SPHERE standards. A main cause identified has been health facility interfaces, due to large volume of children to be seen in one day by health workers which can be stressful for the personnel and lead to long waiting hours for caregivers. It will therefore be vital to work with health facility teams to improve service delivery. This may involve provision of double rations, organizing more that one day a week for follow-up or other modifications as may be provided by the health workers themselves. It is important that the planning and implementation in improving interface is done jointly, in close partnership with health facility teams, to ensure ownership of the adaptations they identify.
- Awareness about malnutrition and treatment availability is still a significant barrier to access. Thus, the community mobilisation and awareness strategy must be further elaborated beyond community volunteer training and leader sensitisation meetings, to include creative and unforgettable events, such as theatre, jingles, as well as stronger sensitisation of alternative key stakeholders, such as traditional healers.
- The difference in point and period coverage also indicates that case-finding is weak. The overall low point coverage has highlighted the importance to also strengthen timely malnutrition detection mechanism in communities via a complementary and concerted awareness strategy.
- A SQUEAC investigation is recommended to be conducted in 6 months to evaluate the impact of the implementation of recommendations.
- Results will be shared with State and Local Government Area authorities as well as with health facility workers to show the benefits of the exercise and plan additional joint SQUEAC evaluations.

Annex 1. Map of health facilities (Service Delivery Units) integrating CMAM

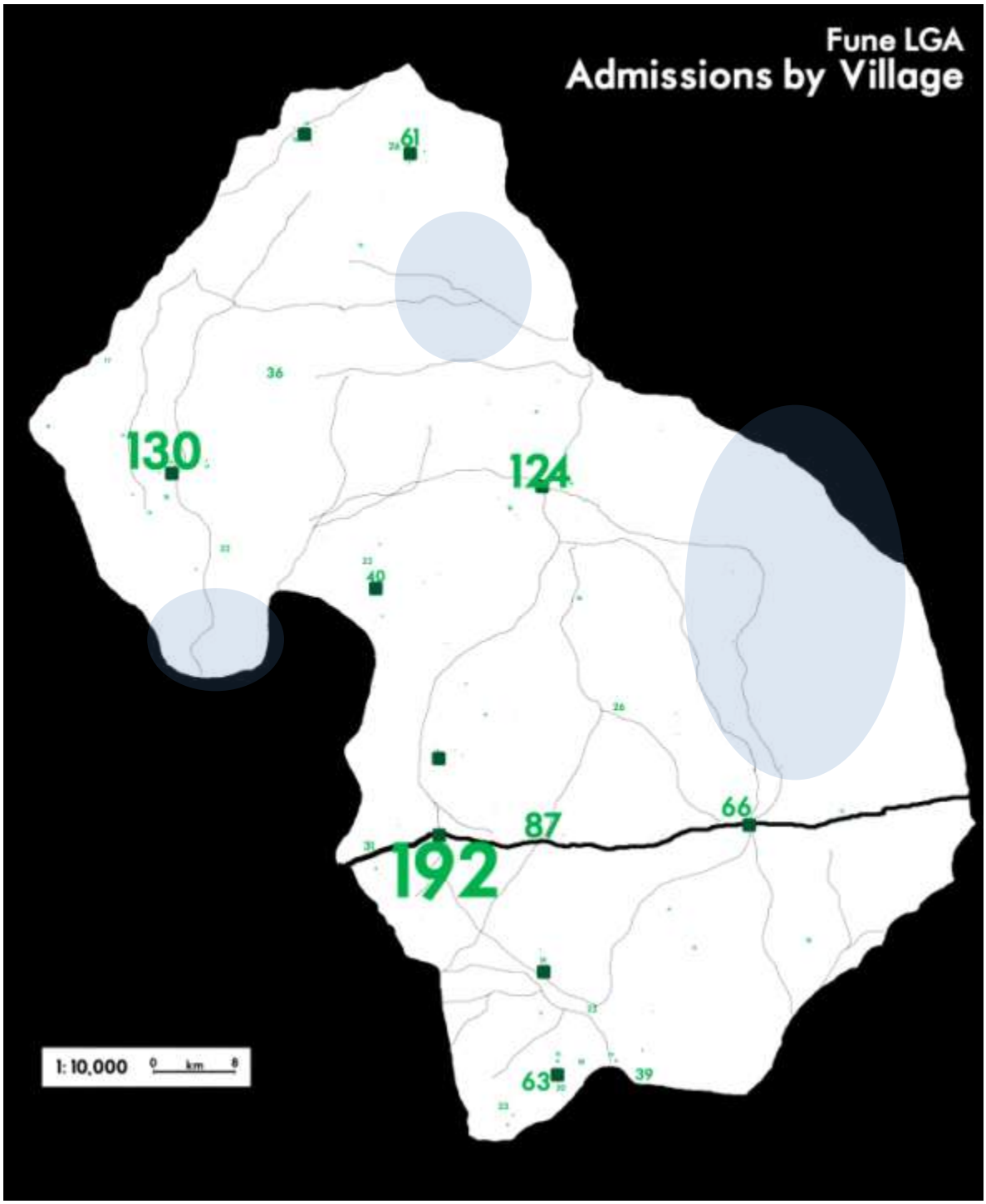


Annex 2. Admissions versus Seasonal & main events calendar, Fune LGA

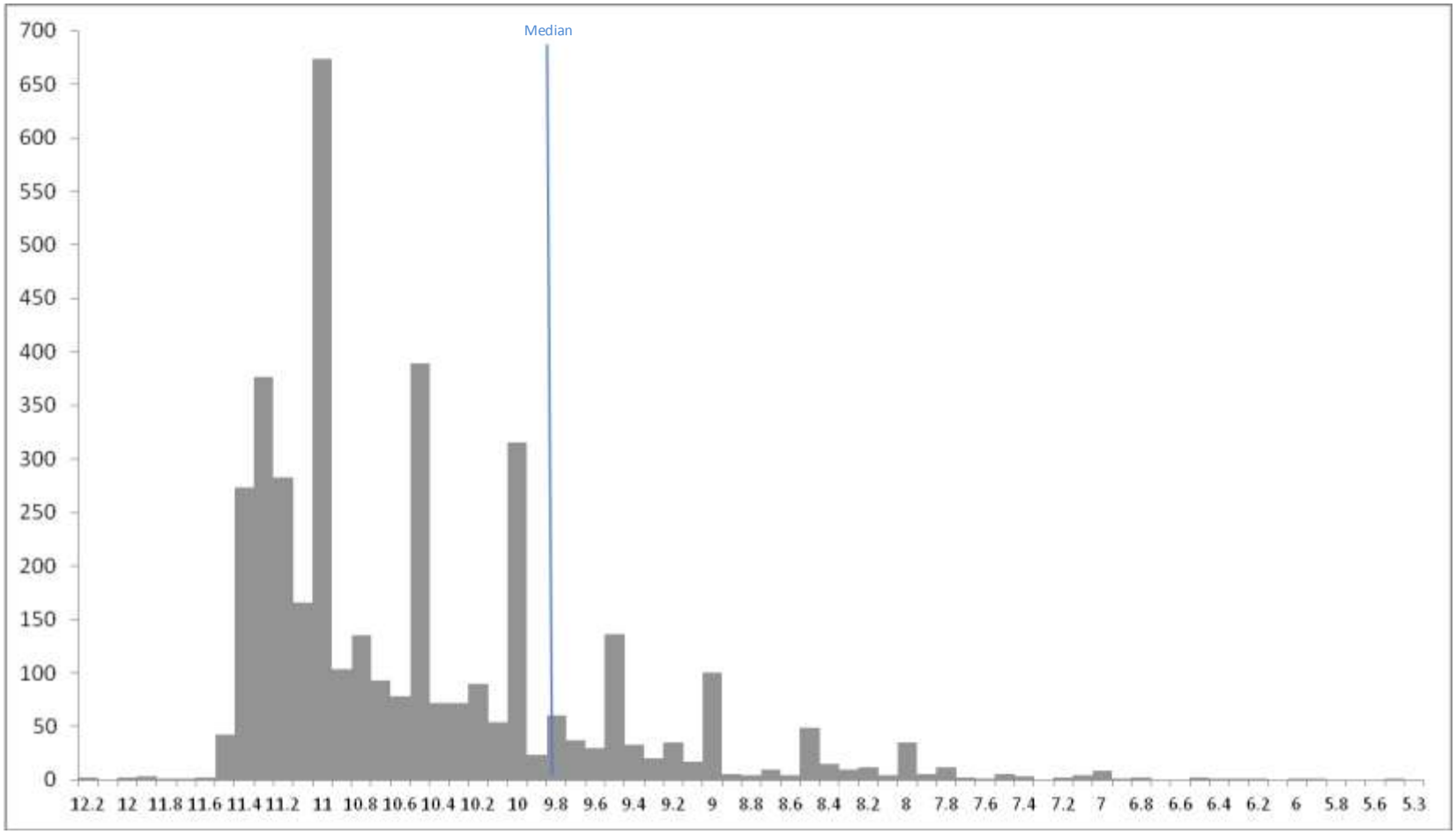




Annex 3. Spatial distribution of Admission



Annex 4. MUAC at admission, Fune LGA, Feb – July 2011



Annex5. List of villages sampled for the wide area survey

Quadrat	Village
1	Shilowa (Dubbol NE area)
2	Bulamariguwa (Daura area)
3	Dogo Kuka (Ngelzerma area)
4	Dawadawa(Ngelzerma area)
5	Kujeyel iso (Ngelzerma area)
6	Garin Dole (near Aigada)
7	Sudade (north Dogo kuka)
8	Mboloya (no people for 2 years, changed to Mashio)
9	Dibala
10	Bebbade Dala
11	Ngelmakama (near Jajere)
12	Dungele
13	Genkel
14	Kutekumo(no people, shifted to Rokoroko)