



National CMAM Scale-Up Costing Report, 2013–2017

November 2013





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Abbreviations and Acronyms

ABC	Activity-Based Costing
ART	antiretroviral therapy
CMAM	Community-Based Management of Acute Malnutrition
CMV	combined mineral and vitamin mix
DHIMS	district health information management system
F-75	Formula 75 therapeutic milk
F-100	Formula 100 therapeutic milk
FANTA	Food and Nutrition Technical Assistance III Project
FANTA-2	Food and Nutrition Technical Assistance II Project
FTE	full-time equivalent
GHS	Ghana Health Service
GOG	Government of Ghana
HIV	human immunodeficiency virus
HSS	health systems strengthening
IPC	inpatient care
MICS	Multiple Indicator Cluster Survey
MOH	Ministry of Health
MUAC	mid-upper arm circumference
OPC	outpatient care
ReSoMal	Rehydration Solution for Malnutrition
RUTF	ready-to-use therapeutic food
SAM	severe acute malnutrition
SLEAC	Simplified Lot Quality Assurance Sampling Evaluation of Access and Coverage
SQUEAC	Semi-Quantitative Evaluation of Access and Coverage
USAID	U.S. Agency for International Development
WHO	World Health Organization

1 Background

Community-Based Management of Acute Malnutrition (CMAM) was introduced in Ghana in June 2007, at a workshop organized by the Ministry of Health (MOH)/Ghana Health Service (GHS), UNICEF/Ghana, World Health Organization (WHO)/Ghana, and U.S. Agency for International Development (USAID)/Ghana. Following the workshop, CMAM learning sites were established in two districts of Central and Greater Accra regions in 2008.

In 2009, a two-phase national CMAM scale-up was designed; regions and districts were prioritized for inclusion in the phased scale-up based on the prevalence of severe acute malnutrition (SAM) and the availability of financial resources to procure CMAM supplies and to support the rollout of CMAM activities. The first phase of scale-up—which included Central, Greater Accra, Northern, Upper East, and Upper West regions—began in 2010. The second phase—which targeted Ghana’s other five regions (Ashanti, Brong-Ahafo, Eastern, Volta, and Western)—started in 2012.

As of December 2012, 65 districts, 756 health facilities, and 8,750 communities had gained access to CMAM services. Along with the scale-up of CMAM in various health service delivery units, a number of activities were implemented at the national level to support both the sustainable integration of CMAM into the health system and the quality of CMAM service delivery. These activities included:

- Development of national guidelines for community-based management of SAM
- Development of CMAM inpatient, outpatient, and community outreach training materials and job aids
- Training of about 100 trainers in CMAM inpatient care (IPC), outpatient care (OPC), and community outreach
- Strengthening of competencies of MOH/GHS national, regional, and district technical coordination/managerial teams to oversee national CMAM scale-up
- Integration of CMAM into the national nutrition and child health policy, strategies, and strategic planning

Based on this experience, the MOH/GHS, in collaboration with stakeholders, is currently developing a national CMAM scale-up strategy for 2013–2017. This CMAM strategy outlines activities that will be undertaken over the next 5 years to ensure that CMAM is institutionalized within the Ghanaian health system. The strategy uses a health systems strengthening (HSS) approach and aims to provide guidance on how to integrate CMAM with other health services. The HSS approach also ensures that CMAM scale-up is instrumental in addressing gaps and weaknesses in the health system.

The objectives of the 2013–2017 national CMAM scale-up strategy are organized in the following domains:

1. Strengthening leadership and governance of CMAM
2. Promoting the development of a competent and responsive workforce for CMAM
3. Ensuring sustained financing of CMAM services
4. Ensuring equitable and sustained access to CMAM supplies and equipment
5. Delivering high-quality and safe CMAM services at facility and community levels
6. Guiding the collection, analysis, and use of relevant information on CMAM performance

This report presents an analysis of the costs associated with scaling up CMAM within the Ghanaian health system over the next 5 years (2013–2017), as per the MOH/GHS scale-up strategy.

2 Method

2.1 The CMAM Costing Tool

The CMAM costing tool, developed by the Food and Nutrition Technical Assistance II Project (FANTA-2) in February 2012, was used to generate the cost information presented in this report.¹ The costing tool is a set of Excel spreadsheets that allow users to determine the cost of implementing CMAM at the national or sub-national level. The tool is based on the Activity-Based Costing (ABC) method—combining the “ingredients” and “adaptation” approaches² for cost calculations—which provides a more comprehensive picture of the direct and indirect costs associated with an activity. CMAM activities are grouped thematically in the costing tool in six categories:

1. Treatment of children with SAM
2. Community outreach
3. Supply logistics
4. Training of health care providers and health managers
5. Supervision of health care providers and health managers
6. Management of services

The MOH/GHS determined which activities went into which category in its national CMAM scale-up strategy.

2.2 Assumptions and Data Used in the CMAM Costing Tool

Several assumptions must be made before the CMAM costing tool can be used. These assumptions are divided among scale-up assumptions (number of facilities and communities to be considered for scale-up); epidemiological assumptions (estimated annual SAM caseloads); and programmatic assumptions (number of years CMAM will be implemented, geographical regions for implementation; distances between facilities and district, regional, and national health headquarters; prices of various commodities required for CMAM; and roles and responsibilities at the national, regional, district, facility, and community levels of the health system).

Additional assumptions affecting the costing exercise relate to the type and features of CMAM services to be implemented. CMAM encompasses prevention, detection, and treatment of acute malnutrition for several types of individuals (moderately malnourished children, severely malnourished children, and malnourished pregnant and lactating women). The MOH/GHS strategy itself provided assumptions about which groups would be targeted by the CMAM program, but not about the detailed activities that must be implemented for effective delivery of CMAM services, such as the basics of SAM case management (e.g., frequency of visits in OPC), the methods used in community outreach, the training system for service providers, the number and types of people to be trained per type of training, the principles of monitoring and supervision, overall management and coordination, and the time spent by each type of service provider on each type of activity. Information about these assumptions was obtained through interviews with stakeholders. A detailed list of assumptions used for this costing exercise appears in Annex 1.

¹ The CMAM costing tool is available at <http://www.fantaproject.org/tools/cmam-costing-tool>.

² The “ingredients” approach consists of detailing each input that activities are composed of and computing the quantities and unit costs for each input. The “adaptation” approach consists of using existing costs similar to the ones to be computed for the new or scaled-up activities (e.g., staff costs).

The assumptions discussed above were defined and agreed upon by stakeholders during a workshop conducted on April 1–4, 2013. These assumptions were based on the national CMAM scale-up strategy and on stakeholders' practical experience implementing CMAM in Ghana.

Once all the data related to the above-mentioned assumptions are identified and entered, the tool automatically generates costs according to the six categories listed above. The following sections describe the data that were entered into the costing tool based on the specific situation in Ghana.

2.2.1 CMAM Scale-Up Strategy Assumptions and Data

- The MOH/GHS will mobilize the necessary resources from the health sector and/or from external sources to scale up CMAM to all 10 regions of Ghana by 2017. Moreover, within each region, the expectation is that by 2017 all districts will provide CMAM services throughout the existing health system via the comprehensive network of health facilities and community outreach activities. This expectation reflects national, regional, and district health authorities' recognition of the need to mobilize existing human and non-human resources to scale up CMAM.

2.2.2 Epidemiological and Population Assumptions and Data

- The 2010 national population census was used to estimate the number of children under 5 years of age, which was 13.3 percent of the total population.³
- The 2011 Multiple Indicator Cluster Survey (MICS) was used to determine regional SAM prevalence and expected regional caseloads. It was assumed that SAM prevalence will not vary significantly over the next 5 years.
- In each region, the SAM caseload was calculated with the assumption that during the first year of implementation, coverage in each region would not exceed 25 percent of the total estimated caseload. For the subsequent years, it was estimated that coverage would reach but not exceed 50 percent due to the health system's limited capacity to implement and sustain an expanded community outreach program.

2.2.3 Programmatic Assumptions and Data

Ghana-specific program data were used to define assumptions on admissions and duration of SAM treatment in outpatient and inpatient care as outlined below.

- Approximately 15 percent of SAM cases will require IPC, while 85 percent of cases will be treated in OPC.
- On average, children 6–59 months with SAM will require 60 days to fully recover from an episode; severe cases presenting with medical complications will require 7 days to stabilize in IPC.
- Severely malnourished infants under 6 months will require about 21 days of treatment in IPC to successfully re-lactate.
- To successfully treat a child with SAM in inpatient and outpatient care, facilities require a team of doctors/medical assistants, nurses, dietitians/nutritionists, and auxiliary staff. For community outreach to be effective, community health nurses/officers and health promotion assistants team up with community volunteers to conduct active case searches, referrals, and follow-up of SAM cases. The time each cadre of staff spends at the community and facility levels was estimated

³ Ghana Demographic Health Survey. 2008.

based the average amount of time reported by facility and district health care providers currently implementing CMAM activities.

2.2.4 Other Assumptions

- The 2012 market value of various commodities was used to determine the costs of CMAM inputs. It was assumed that these values will remain unchanged during the 5 years covered by the costing exercise.
- Average salaries for each cadre of staff included in the costing exercise were used. It was also assumed that the salary values will remain the same over the 5 years.

2.3 CMAM Scale-Up Targets, 2013–2017

Table 1 summarizes CMAM scale-up targets for 2013–2017. Numbers of districts and health facilities implementing CMAM, expected SAM caseloads, and number of required communities are presented per region and per year. Totals for each region represent the 50 percent coverage target described in the costing exercise assumptions. The increase of estimated SAM cases for each year is influenced by the number of new facilities implementing CMAM. For new facilities, coverage is estimated at 25 percent for the first year of CMAM implementation and then increased to 50 percent for the following years. The reference year for the pre-costing indicators was 2012. This table also shows that CMAM implementation has already begun in most regions.

Table 1. Regional CMAM Scale-Up Targets, 2013–2017

Region	Indicator	2012*	2013	2014	2015	2016	2017	Total
Ashanti	Districts	0	5	5	5	6	6	27
	Health facilities	1	51	101	151	201	241	–
	SAM cases	0	1,377	4,132	6,887	9,642	12,396	34,434
	Communities	0	500	1,000	1,500	2,000	2,400	–
Brong-Ahafo	Districts	0	5	5	5	5	5	25
	Health facilities	0	50	100	150	200	250	–
	SAM cases	0	156	461	765	1,069	1,450	3,901
	Communities	0	500	1,000	1,500	2,000	2,500	–
Central	Districts	10	5	5	0	0	0	20
	Health Facilities	131	175	208	208	208	208	–
	SAM cases	1,933	4,240	5,135	5,135	5,135	5,135	26,713
	Communities	1,000	1,400	1,700	1,700	1,700	1,700	–
Greater Accra	Districts	14	5	2	0	0	0	21
	Health facilities	140	190	210	210	210	210	–
	SAM cases	836	1,554	2,338	2,338	2,338	2,338	11,742
	Communities	1,400	1,900	2,100	2,100	2,100	2,100	–
Eastern	Districts	3	5	5	5	5	3	26
	Health facilities	54	180	270	360	450	468	–
	SAM cases	0	404	1,057	1,552	2,048	2,453	7,514
	Communities	300	1,000	1,500	2,000	2,500	2,600	–
Northern	Districts	15	6	5	0	0	0	26
	Health facilities	165	231	286	286	286	286	–
	SAM cases	4,649	4,935	6,110	6,110	6,110	6,110	34,024
	Communities	2,250	3,150	4,650	4,650	4,650	4,650	–

Region	Indicator	2012*	2013	2014	2015	2016	2017	Total
Upper East	Districts	10	3	0	0	0	0	13
	Health facilities	111	143	143	143	143	143	–
	SAM cases	1,976	1,731	1,731	1,731	1,731	1,731	10,631
	Communities	1,950	1,950	1,950	1,950	1,950	1,950	–
Upper West	Districts	11	0	0	0	0	0	11
	Health facilities	132	132	132	132	132	132	–
	SAM cases	2,224	1,778	1,778	1,778	1,778	1,778	11,114
	Communities	1,650	1,650	1,650	1,650	1,650	1,650	–
Volta	Districts	0	5	5	5	5	5	25
	Health facilities	0	60	120	180	240	300	–
	SAM cases	0	576	1,729	2,882	4,035	5,188	14,410
	Communities	0	500	1,000	1,500	2,000	2,500	–
Western	Districts	2	5	5	5	5	0	22
	Health facilities	22	77	132	187	242	242	–
	SAM cases	0	966	2,626	3,984	5,342	6,036	18,954
	Communities	200	700	1,200	1,700	2,200	2,200	–

* Reference year is 2012.

3 Results

This report presents the costs of implementing CMAM activities in Ghana. While some aspects of these costs may be covered through shared health system resources, the activities may not be entirely budgeted for under other nutrition or health activities. The costed activities have been organized to fit into five of the six CMAM domains (listed on page 1). Because the entire process is a finance exercise, the costs of activities that fit into the financing domain are not presented separately, but rather are incorporated into the costs of the other five domains:

- Strengthening leadership and governance of CMAM
- Promoting the development of a competent and responsive workforce for CMAM
- Ensuring equitable and sustained access to CMAM supplies and equipment
- Delivering high-quality and safe CMAM services at facility and community levels
- Guiding the collection, analysis, and use of relevant information on CMAM performance

3.1 Interpreting the Results

The costing tool calculates the amount and types of resources required to deliver CMAM services, including finances, human resources, space, equipment, and supplies. When interpreting the results, the following aspects were considered.

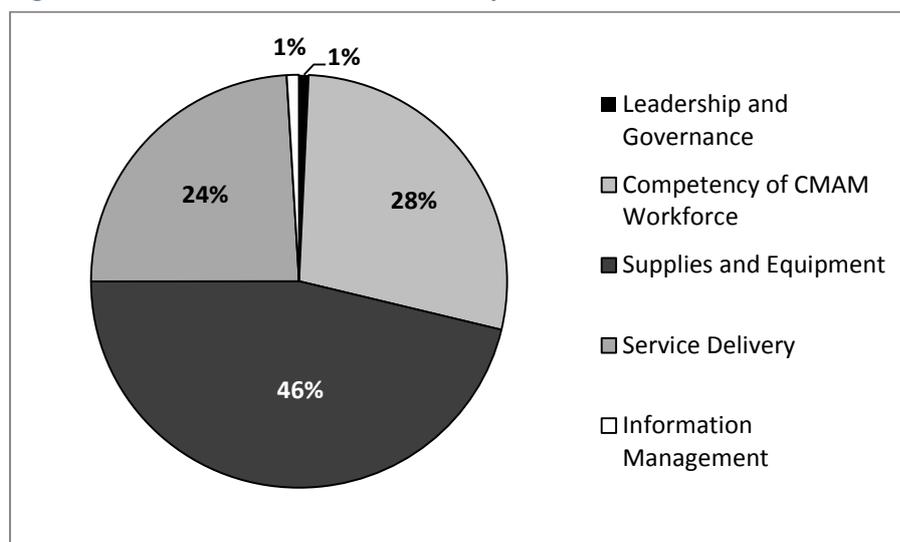
- The accuracy of results generated was assessed for each of the five domains. This involved reviewing each results table generated by the tool and comparing the results to the actual resources spent in past years on implementing similar activities. When the results appeared unrealistic, the assumptions or data used in the tool were adjusted to generate a more realistic output. An example of an adjustment was the cost of transporting CMAM commodities. Currently, districts use small trucks to collect ready-to-use therapeutic food (RUTF) from regional warehouses. However, using small trucks is realistic for only the first 2 years of implementation, when caseloads are lower. As admissions and the number of facilities increase, district teams would need to make substantially more delivery rounds, which would be impractical. The costing tool tables were adjusted slightly to account for using larger trucks, which reduces the number of delivery rounds.
- Because CMAM activities are implemented as part of routine health services, many of their costs are already supported by existing health services. However, while inputs such as human resources, storage space, and transport are already provided for within the health system, it was still necessary to generate costs for each type of expense to provide a comparison of what is already available through the health system and what additional financial resources will be required to support increased CMAM services.
- The current version of the costing tool does not allow for calculating the costs of developing technical reference materials or conducting program assessments and evaluations, such as CMAM coverage surveys. These costs were calculated separately using the ABC approach and added to the costing tool's results.

Unless otherwise noted, all costs in this report are in the local currency, the Ghana cedi.

Table 2 summarizes the overall costs of scaling up CMAM in Ghana over the next 5 years, and Figure 1 shows the distribution of those costs during that period.

Table 2. Summary of Costs of the 5-Year CMAM Scale-Up

Year	Leadership and Governance	Competency of CMAM Workforce	Supplies and Equipment	Service Delivery	Information Management	Total Cost
2013	143,955	4,561,213	3,559,926	2,191,913	250,000	10,707,007
2014	98,527	5,029,910	5,979,357	3,393,116	200,000	14,700,910
2015	105,702	4,383,956	7,657,934	3,923,114	175,000	16,245,706
2016	114,760	4,424,106	8,986,931	4,542,063	100,000	18,167,860
2017	118,071	3,538,468	10,012,569	4,772,737	25,000	18,466,845
Total	581,015	21,937,653	36,196,717	18,822,943	750,000	78,288,328

Figure 1. Distribution of CMAM Scale-Up Costs, 2013–2017

As shown in Table 2 and Figure 1, CMAM supplies and equipment account for the largest proportion of CMAM scale-up costs, almost 50 percent. (After scale-up is completed, supplies will represent most of the total costs of CMAM services.) The lowest cost (< 1 percent) is that of leadership and governance, which is made up predominantly of personnel time required to manage and advocate for CMAM activities at the national and regional levels.

Strengthening competencies of the CMAM health workforce includes the cost of training and supportive supervision and also accounts for a relatively large proportion of CMAM scale-up costs, about 30 percent.

3.2 Leadership and Governance of CMAM

Leadership and governance costs are associated with the overall management of CMAM services at the national and sub-national levels (region and district). These costs include:

- **Personnel time** spent by MOH/GHS employees on managing (i.e., co-ordinating, advocating, planning, budgeting, reporting) CMAM within new and established regions
- Provision of national-level CMAM **trainings of trainers**
- Review and development of **technical tools and materials**
- Management of **procurement and distribution of supplies** at the national level

Table 3 summarizes costs associated with strengthening leadership and governance for CMAM services.

Table 3. Summary of Costs of Leadership and Governance of CMAM

Year	National-Level Management	Regional-Level Management	Training of Trainers	Technical Tools and Materials	Logistics Management	Total Cost
2013	12,836	61,341	13,960	50,000	5,818	143,955
2014	12,836	65,913	13,960	0	5,818	98,527
2015	12,836	73,088	13,960	0	5,818	105,702
2016	12,836	82,146	13,960	0	5,818	114,760
2017	12,836	85,457	13,960	0	5,818	118,071
Total	64,180	367,945	69,800	50,000	29,090	581,015

The costs of national-level trainings of trainers and the review and development of technical tools require funding from the Government of Ghana (GOG) and/or other sources. An update of technical tools and materials is under way and will be completed at the end of the 5-year scale-up period.

Management costs presented in Table 3 are personnel time costs and are already paid for at the national level by the MOH/GHS, as a full-time MOH/GHS national-level position already exists to provide technical and managerial leadership for scaling up and running CMAM services.

At the regional level, CMAM implementation is co-ordinated and managed by the existing regional health management teams, which include a regional nutrition officer, a public health nurse, a health promotion officer, a disease control officer, and clinical care officers. These positions contribute to managing and providing technical support to CMAM activities along with other health and nutrition interventions.

Approximately 100 national and regional-level trainers have been trained, and technical tools, such as guidelines, training materials, and monitoring and evaluation tools, have been developed. The technical tools and materials costs in Table 3 integrate the costs of providing refresher trainings and any required update of technical tools over the next 5 years.

3.3 Developing and Sustaining a Competent CMAM Workforce

Costs presented under the CMAM workforce section relate to:

- **In-service training** of service providers setting up CMAM services in new facilities and communities, as well as refresher trainings for established facilities and communities
- **Supervision of service providers** at regional, district, facility, and community levels

Pre-service training is the most effective way to ensure that new health system personnel have adequate CMAM knowledge and skills when they join the health workforce. It also mitigates the challenges associated with high staff attrition rates commonly seen in the GHS. However, because CMAM pre-service courses are integrated with other nutrition components, they were not included in this costing report, but will be included in the broader national nutrition scale-up plans.

Table 4. Summary of CMAM Workforce Costs

Year	In-Service Training Cost	Supervision Cost	Total Cost
2013	2,435,208	2,126,005	4,561,213
2014	2,486,353	2,543,557	5,029,910
2015	1,951,543	2,432,413	4,383,956
2016	1,874,577	2,549,529	4,424,106
2017	1,165,780	2,372,688	3,538,468
Total	9,913,461	12,024,192	21,937,653

Detailed analysis of the in-service training and supervision costs is presented in Sections 3.2.1 and 3.2.2.

3.3.1 In-Service Training

Three main types of CMAM in-service trainings are conducted: OPC, IPC, and community outreach. In-service training costs are divided into two main sections, personnel time and other expenses associated with training (e.g., per diem, venue rental, transport, meals, and refreshments). These costs depend on the number of facilities and communities targeted for scale-up within each region for each year.

Table 5 provides the number of districts, facilities, and communities that will require trained service providers and the associated training costs.

Table 5. Annual Cost of In-Service Training

Year	In-Service Training Requirements			Associated Costs		
	Districts	Facilities	Communities	Personnel Time Cost	Training Cost	Total Cost (Personnel and Training)
2013	109	1,289	13,250	463,064	1,972,144	2,435,208
2014	146	1,702	17,750	498,356	1,987,997	2,486,353
2015	171	2,007	20,250	373,865	1,577,678	1,951,543
2016	197	2,312	22,750	364,288	1,510,289	1,874,577
2017	216	2,480	24,250	247,177	918,603	1,165,780
Total				1,946,750	7,966,711	9,913,461

A breakdown of training costs by the type of training, year, and region appears in Annex 2.

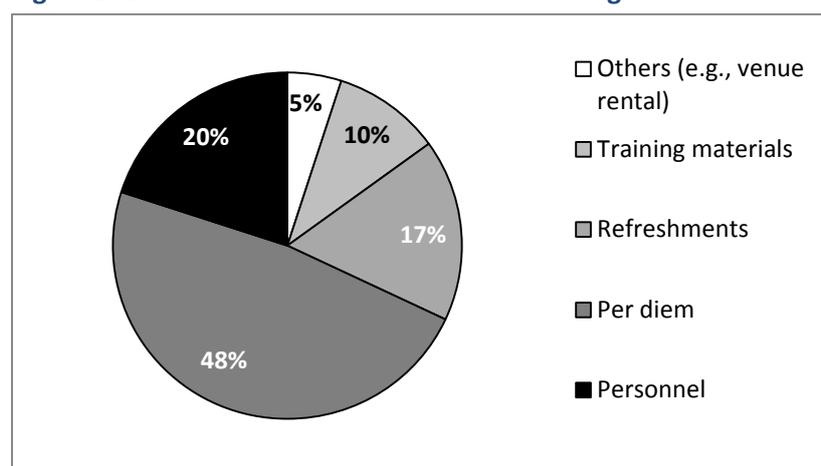
Table 6 provides a breakdown of the unit cost of conducting OPC, IPC, and community outreach trainings and the training cost per service provider. The costs include personnel time, per diem, refreshments, venue rental, and training materials. Inpatient training is, as expected, the most expensive as it requires providing several categories of health personnel with intensive care skills. Outpatient training, in comparison, targets only senior and junior health facility staff and takes only 3 days. Outreach training takes 1 day and targets community outreach volunteers.

Table 6. Training Cost per Unit and Service Provider

Type of Unit	Cost of Training per Unit	Cost of Training per Service Provider
OPC	2,390	598
IPC	12,073	1,500
Community outreach	164	164

These cost estimates assume that at least four service providers will be trained per OPC facility, about eight health care providers per IPC facility, and one person per community on community outreach activities.

Figure 2 shows how the costs of an in-service training are distributed.

Figure 2. Breakdown of CMAM In-Service Training Costs

3.3.2 Supervision

Costs in this section include the levels and types of supervision associated with CMAM scale-up:

- Supervision by the regional and district teams to each facility providing CMAM services
- Internal supervision by health facility management personnel
- Supervision of community activities by OPC staff

Regional or district personnel's supervision of facilities involves intensive support to each facility in the 3–4 months after CMAM services are set up. This is followed by quarterly supervision visits, which are normally integrated into routine district health management team supervisory visits. See Annex 3 for a detailed breakdown of supervision costs by level of supervision and year.

Supervision costs in Table 7 include personnel time, transport, and materials used during the supervisory visits.

Table 7. Supervision Costs by Region

Region	2013	2014	2015	2016	2017	Total
Ashanti	76,463	85,086	106,619	115,576	105,767	489,511
Brong-Ahafo	75,542	85,042	106,960	115,371	110,846	493,761
Central	310,962	362,623	344,547	344,547	344,547	1,707,226
Eastern	127,991	118,921	157,128	194,592	136,884	735,516
Greater Accra	136,272	143,969	139,004	139,004	139,004	697,253
Northern	625,775	945,600	759,089	759,089	759,089	3,848,642
Upper East	316,866	319,461	319,461	319,461	319,461	1,594,710
Upper West	283,752	283,752	283,752	283,752	283,752	1,418,760
Volta	82,143	99,871	102,506	136,063	131,367	551,950
Western	90,239	99,232	113,347	142,074	41,971	486,863
Total	2,126,005	2,543,557	2,432,413	2,549,529	2,372,688	12,024,192

As shown in Table 7, supervision costs are considerably higher in Northern Region, which is large; has a higher number of facilities and communities implementing CMAM; and has longer distances between districts, facilities, and communities. Each region shows a peak in supervision costs

associated with the implementation of new sites, followed by a decline in costs as the region goes back to routine supervision only. The Upper East and Upper West regions were fully scaled up in 2013, so their supervision costs remain constant.

Table 8 summarizes supervision costs disaggregated by personnel time and transport and materials. Personnel time, which accounts for the largest portion of the costs, is already covered by the MOH/GHS. The costs of transport and materials require additional funding from the GOG or other sources.

Table 8. Supervision Costs by Personnel Time and Transport/Materials

Year	Personnel Time	Transport/Materials	Total Supervision Cost
2013	1,923,813	202,194	2,126,007
2014	2,309,761	233,795	2,543,556
2015	2,202,673	229,741	2,432,414
2016	2,303,981	245,550	2,549,531
2017	2,145,972	226,716	2,372,688
Total	10,886,200	1,137,996	12,024,196

3.4 CMAM Supplies and Equipment

Costs in this section include:

- **CMAM supplies and equipment**
- **Transport and storage** of CMAM supplies

Table 9 summarizes the costs of CMAM supplies, equipment, transport, and storage required during the 5 years. A detailed analysis of these costs is presented in Sections 3.3.1 and 3.3.2.

Table 9. Summary of Costs of CMAM Supplies, Equipment, Transport, and Storage

Year	Therapeutic Foods	Medicines and Medical Supplies	Other Equipment and Supplies	Transport	Storage	Total Cost
2013	1,041,842	48,717	620,905	134,953	1,713,509	3,559,926
2014	2,395,713	113,969	792,790	327,270	2,349,615	5,979,357
2015	3,310,751	160,745	871,153	504,425	2,810,860	7,657,934
2016	3,983,299	197,677	953,401	646,081	3,206,473	8,986,931
2017	4,570,078	235,339	946,570	797,916	3,462,666	10,012,569
Total	15,301,683	756,447	4,184,819	2,410,645	13,543,123	36,196,717

3.4.1 Supplies and Equipment

The following supplies are required for the management of SAM:

- Therapeutic foods such as RUTF, F-75, F-100, combined mineral and vitamin mix (CMV), and ReSoMal
- Routine medicines and supplies, including but not limited to antibiotics, antimalarial drugs, vitamin A capsules, dewormers, measles vaccines, malaria test kits, gloves, syringes, and HIV test kits

- Other equipment and supplies, such as job aids, counselling cards, Veronica buckets,⁴ mid-upper arm circumference (MUAC) tapes, weighing scales, measuring jars, cups, and food scales.

Every child suffering from SAM requires therapeutic food and medical supplies during treatment; therefore, such costs are recurrent and based on the annual SAM caseload. Other equipment and supplies are required during setup and may be replaced occasionally if damaged during the 5-year period. See Annex 4 for a detailed breakdown of supply costs, Annex 5 for therapeutic supply requirements, and Annex 6 for medical supply requirements over the 5 years.

Most of the CMAM supply and equipment costs require annual funding from the GOG and/or other sources.

Table 10. Costs of Supplies and Equipment

Region	Therapeutic Food	Medicines and Medical Supplies	Other Equipment and Supplies	Total
Ashanti	3,750,723	160,589	361,992	4,273,304
Brong-Ahafo	424,916	22,058	305,807	752,781
Central	1,960,278	95,313	540,920	2,596,511
Eastern	818,462	34,594	599,109	1,452,165
Greater Accra	946,286	50,780	421,410	1,418,476
Northern	2,421,657	116,176	706,037	3,243,870
Upper East	663,519	31,831	276,151	971,501
Upper West	681,668	49,539	251,524	982,731
Volta	1,569,609	66,344	373,537	2,009,490
Western	2,064,564	129,225	348,331	2,542,120
Total	15,301,682	756,449	4,184,818	20,242,949

As presented in Table 10, therapeutic food represents the highest proportion (76 percent) of the total cost of supplies and equipment, while medical supplies represent the lowest proportion (4 percent). Table 10 also shows that regions with a high SAM caseload, such as Ashanti, Central, Northern, Volta, and Western, have higher therapeutic food supply requirements. Therapeutic food such as RUTF will continue to be the biggest expense for CMAM services. So far, all funds dedicated to the purchase of these products are provided by external sources. Including RUTF on the essential medicines list would help reduce the customs costs associated with importing supplies. The GOG should also consider allocating specific funds for the purchase of RUTF, as is increasingly being done for other essential treatments, such as antiretroviral therapy (ART) drugs.

The standard treatment protocol for the management of SAM recommends that every child with SAM receives a broad spectrum antibiotic—such as amoxicillin or, for HIV-positive children, cotrimoxazole—together with therapeutic food. However, because the majority of children with SAM are not covered by medical insurance, most children receive only the therapeutic food; routine medicines are not administered unless the caregiver can afford to buy them.⁵ Recent evidence shows

⁴ Veronica buckets are small hand-washing stations composed of a bucket with tap and a basin on top of a wooden stand. They are placed at the entrance of health facilities.

⁵ Some health facilities can use internally generated funds to cover the cost of providing routine medication to children with SAM. But as the number of SAM cases increases, the costs increase, making it difficult for the facility to bear the costs.

that routine medicines, specifically antibiotics, increase the rate of recovery and decrease mortality in children with SAM.⁶ Therefore, it is crucial that the routine medicines are made available to all children with SAM regardless of whether they are covered by medical insurance.

3.4.2 Transport and Storage

Table 11 presents the combined costs of transport and storage of CMAM supplies and equipment. The costs of transport and storage of commodities are currently covered by the MOH/GHS.

Table 11. Cost of Transport and Storage of CMAM Supplies

Region	2013	2014	2015	2016	2017	Total
Ashanti	76,956	173,628	294,144	431,449	556,926	1,533,103
Brong-Ahafo	73,272	147,654	222,103	296,270	376,981	1,116,280
Central	261,199	349,628	376,043	376,043	376,043	1,738,956
Eastern	236,739	373,830	510,921	652,474	704,583	2,478,547
Greater Accra	271,221	332,919	376,043	332,919	332,919	1,646,021
Northern	354,239	530,450	530,603	530,603	530,603	2,476,498
Upper East	200,293	200,293	209,299	209,299	209,299	1,028,483
Upper West	184,429	184,429	192,743	192,743	192,743	947,087
Volta	82,734	176,897	285,616	399,222	534,737	1,479,206
Western	107,380	207,157	317,770	431,532	445,748	1,509,587
Total	1,848,462	2,676,885	3,315,285	3,852,554	4,260,582	15,953,768

Table 12 presents the cost of transporting CMAM supplies from the central medical stores in Accra to the facilities across the country. A comparison of Tables 11 and 12 shows that storage represents a much more significant cost than transport. This is mainly due to the costs of warehouse maintenance and warehouse personnel.

Table 12. Cost of Transporting Commodities from the Central Medical Stores to the Facilities

Region	2013	2014	2015	2016	2017	Total
Ashanti	4,367	24,146	61,428	111,024	167,862	368,827
Brong-Ahafo	3,792	7,488	11,244	19,740	36,600	78,864
Central	28,610	63,480	84,475	84,475	84,475	345,515
Eastern	9,900	24,696	39,492	61,500	85,140	220,728
Greater Accra	3,792	7,488	42,435	42,435	42,435	138,585
Northern	47,050	130,670	130,755	130,755	130,755	569,985
Upper East	14,656	14,656	21,806	21,806	21,806	94,730
Upper West	13,536	13,536	20,136	20,136	20,136	87,480
Volta	3,478	16,775	41,362	65,988	109,495	237,098
Western	5,772	24,335	51,292	88,222	99,212	268,833
Total	134,953	327,270	504,425	646,081	797,916	2,410,645

⁶ Manary, Mark J.; Maleta, Kenneth; and Trehan, Indi. 2012. "Randomized, Double-Blind, Placebo-Controlled Trial Evaluating the Need for Routine Antibiotics as Part of the Outpatient Management of Severe Acute Malnutrition." <http://www.fantaproject.org/sites/default/files/resources/FANTA-CMAM-Antibiotic-Study-Mar2012.pdf>.

The cost of transport is determined by the number of children with SAM to be treated annually; the volume of storage space; the size of transport vehicles; and the distances between the national, regional, and district medical stores and the facilities. As the SAM caseload increases annually due to the anticipated increase in coverage, the cost of transport also increases. Ashanti, Central, Northern, and Western regions have the highest costs due to higher caseloads and longer distances.

CMAM commodities are currently distributed through existing MOH/GHS logistics systems. The region collects commodities from the central medical stores; districts and hospitals collect commodities from the regional medical stores and, if possible, distribute commodities to health centres, or health centres collect commodities from the district stores.

Table 13 presents storage costs, which are mainly composed of personnel time costs, especially for guards. MOH/GHS national, regional, district, and facility storage units are used at no direct cost to CMAM services. These storage facilities also already have guards. Regions with a large number of facilities providing CMAM services have higher storage costs.

Table 13. Cost of Storing Commodities

Region	2013	2014	2015	2016	2017	Total
Ashanti	72,589	149,482	232,716	320,425	389,064	1,164,276
Brong-Ahafo	69,480	140,166	210,859	276,530	340,381	1,037,416
Central	232,589	286,148	291,568	291,568	291,568	1,393,441
Eastern	226,839	349,134	471,429	590,974	619,443	2,257,819
Greater Accra	267,429	325,431	333,608	290,484	290,484	1,507,436
Northern	307,189	399,780	399,848	399,848	399,848	1,906,513
Upper East	185,637	185,637	187,493	187,493	187,493	933,753
Upper West	170,893	170,893	172,607	172,607	172,607	859,607
Volta	79,256	160,122	244,254	333,234	425,242	1,242,108
Western	101,608	182,822	266,478	343,310	346,536	1,240,754
Total	1,713,509	2,349,615	2,810,860	3,206,473	3,462,666	13,543,123

3.5 CMAM Service Delivery

The cost of delivering CMAM services includes the time service providers spend managing SAM cases and establishing OPC, IPC, and community outreach services. The costs of personnel time spent on training and supervision, supplies, and equipment were covered in Sections 3.2 and 3.3. Costs in this section are related to:

- **Community outreach**, which includes setting up and running community outreach activities
- **SAM treatment** costs, which include personnel requirements and the personnel time required to manage SAM cases
- The **cost of treatment per beneficiary**, which includes all costs attributed to the management of SAM: in-service training, monitoring and supervision, supplies, transport, storage, and personnel time spent on SAM treatment and community outreach

Community outreach activities are conducted by unpaid community volunteers with the support and under the supervision of MOH/GHS service providers. SAM cases are managed by existing MOH/GHS employees. In addition to personnel time, transport costs must also be considered; they require annual funding from the GOG and/or other sources.

Table 14. Summary of Costs of CMAM Service Delivery

Year	Community Outreach Costs	SAM Treatment Cost	Total Cost
2013	107,501	2,084,412	2,191,913
2014	106,261	3,286,855	3,393,116
2015	61,833	3,861,281	3,923,114
2016	61,833	4,480,230	4,542,063
2017	35,855	4,736,882	4,772,737
Total	373,283	18,449,660	18,822,943

Detailed analysis of community outreach and cost of personnel providing SAM treatment are presented in Sections 3.4.1 and 3.4.2.

3.5.1 Community Outreach

Community outreach costs include transport cost and personnel time of facility-based community outreach workers, such as community health nurses, health promotion assistants, and extension workers who provide support to community activities.

Table 15 shows community outreach setup costs, which are primarily transport costs for facility-based community outreach workers. All community outreach setup costs require annual funding from the GOG and/or other sources. Setup costs reflect community mobilization and sensitization activities in the initial years of implementation only, which is why some regions in Table 15 have costs only for the first years.

Continuous community outreach is a critical component of CMAM service delivery. It is expected that intense community outreach activities will be conducted during the CMAM setup period; thereafter, CMAM-related community outreach is integrated into routine health service community outreach and mobilization and community-level child health and nutrition campaigns and initiatives.

Table 15. Community Outreach Setup Costs

Region	2013	2014	2015	2016	2017	Total
Ashanti	11,695	11,695	11,695	11,695	9,356	56,136
Brong-Ahafo	11,735	11,735	11,735	11,735	11,735	58,675
Central	9,548	7,161	0	0	0	16,709
Eastern	13,293	13,293	13,293	13,293	2,659	55,831
Greater Accra	14,677	5,871	0	0	0	20,548
Northern	20,160	31,397	0	0	0	51,557
Upper East	1,282	0	0	0	0	1,282
Upper West	0	0	0	0	0	0
Volta	12,105	12,105	12,105	12,105	12,105	60,525
Western	13,005	13,005	13,005	13,005	0	52,020
Total	107,501	106,261	61,833	61,833	35,855	373,283

3.5.2 Cost of Personnel for SAM Treatment

To estimate the cost of personnel involved in SAM treatment, the time each cadre of staff spends conducting CMAM activities was estimated in detail. First, the tool generates an estimate of the

number of personnel required for implementing and running CMAM services at the various levels and then estimates the costs associated with that number of personnel.

3.5.2.1 Full-Time Equivalent of Personnel

Table 16 summarizes annual CMAM personnel requirements for the community, facility, district, regional, and national levels. The information is provided in terms of full-time equivalents (FTEs) of personnel required.⁷

Table 16. Personnel Requirements for CMAM Service Delivery at the Various Levels

Year	Community Outreach Volunteers	Senior Staff in OPC	Junior Staff in OPC	Senior Staff in IPC	Junior Staff in IPC	Senior Staff at Region/District Level	Mid-Level Staff at Region/District Level	Junior Staff at Region/District Level	Regional Drivers	Mid-Level Staff at National Level	Drivers at National Level
2013	2,217	174	157	16	247	1.0	22	4	22	1.2	1
2014	2,968	221	211	31	432	0.5	24	6	54	1.2	1
2015	3,380	206	253	39	539	0.5	25	7	77	1.2	1
2016	3,797	216	303	44	624	0.5	28	8	102	1.2	1
2017	4,045	218	315	48	666	0.5	26	8	128	1.2	1

It should be noted that the FTE in Table 16 is only an indication of the number of personnel required and should not be taken as an absolute value, as each staff member is responsible for several activities within the health system. For instance, community health nurses and public health nurses managing SAM cases in OPC are also responsible for various reproductive and child health services at the facility.

Table 17 provides the personnel time requirement per facility, community, district, and region.

Table 17. Personnel Requirements (in FTEs) per Facility, Community, District, or Region

Year	Community Outreach Volunteers	Senior Staff in OPC	Junior Staff in OPC	Senior Staff in IPC	Junior Staff in IPC	Senior Staff at Region/District Level	Mid-Level Staff at Region/District Level	Junior Staff at Region/District Level	Regional Drivers	Mid-Level Staff at National Level	Drivers at National Level
2013	0.2	0.1	0.1	0.2	3	0.10	2	0.4	2	1.2	1
2014	0.2	0.1	0.1	0.2	3	0.05	2	0.6	5	1.2	1
2015	0.2	0.1	0.1	0.2	3	0.05	3	0.7	8	1.2	1
2016	0.2	0.1	0.1	0.2	3	0.05	3	0.8	10	1.2	1
2017	0.2	0.1	0.1	0.2	3	0.05	3	0.8	13	1.2	1

Generally, personnel requirements are consistent across the various levels. The exception is the higher number of junior health care providers needed to provide inpatient care services in hospitals. These facilities will normally have a larger number of health care providers and will manage a relatively small proportion of SAM cases at any point in time. Some regional personnel requirements will increase from year to year (Table 16) as the number of districts and facilities requiring supervision increases (Table 17 shows that most personnel requirements per facility remain constant). It may not

⁷ An FTE is a unit that indicates the workload of an employed person (or student) in a way that makes workloads comparable across various contexts. FTE is often used to measure a worker's involvement in a project or to track cost reductions in an organization. An FTE of 1.0 means that the worker is equivalent to a full-time employee, while an FTE of 0.5 indicates that the worker is equivalent to a half-time employee.

be necessary to recruit additional personnel in each region to manage CMAM activities. Instead, it should be ensured that CMAM management is fully integrated into regional and district-level activities as CMAM scales up.

3.5.2.2 Associated Cost of Personnel for Managing CMAM

Table 18 provides cost estimates of personnel for the management of SAM. The costs are based on an average MOH/GHS salary rate and time spent by the particular service provider delivering CMAM services. The costs integrate all CMAM activities, including the previously costed in-service training and supervision requirements.

Table 18. Estimated Cost of Personnel Time Spent in Management of SAM

Region	2013	2014	2015	2016	2017	Total
Ashanti	179,069	408,158	621,517	846,298	942,504	2,997,546
Brong-Ahafo	53,356	114,751	160,353	217,253	269,210	814,923
Central	339,299	475,606	477,637	479,821	467,395	2,239,757
Eastern	178,971	268,253	321,296	400,243	437,714	1,606,478
Greater Accra	249,227	400,343	396,736	411,595	387,317	1,845,217
Northern	428,219	599,830	581,017	578,201	561,115	2,748,382
Upper East	198,976	218,814	226,143	224,735	216,192	1,084,860
Upper West	193,651	206,281	208,313	207,014	199,128	1,014,387
Volta	107,019	244,210	351,946	528,578	661,390	1,893,143
Western	156,625	350,609	516,324	586,493	594,916	2,204,967
Total	2,084,412	3,286,855	3,861,281	4,480,230	4,736,882	18,449,660

It should be noted that the regions with high caseloads also have high personnel costs because more time will be required to manage the higher number of SAM cases.

3.5.3 Cost of Treatment and Cost per Beneficiary

Table 19 summarizes all costs associated with the scale-up of CMAM services as per the MOH/GHS national CMAM scale-up strategy.

Table 19. Costs of CMAM Scale-Up per Region and per Year

Region	2013	2014	2015	2016	2017	Total
Ashanti	734,978	1,505,605	2,150,365	2,882,748	3,263,905	10,537,601
Brong-Ahafo	503,294	752,496	1,009,449	1,087,485	1,251,961	4,604,685
Central	1,476,138	1,943,127	1,898,580	1,890,595	1,878,500	9,086,941
Eastern	1,151,474	1,454,481	1,740,947	2,080,886	1,827,787	8,255,575
Greater Accra	1,123,552	1,349,895	1,276,079	1,223,755	1,199,808	6,173,089
Northern	2,210,495	3,276,974	2,804,792	2,777,881	2,761,126	13,831,268
Upper East	1,081,474	973,391	1,078,006	1,052,503	1,044,292	5,229,665
Upper West	909,045	906,263	1,008,812	983,537	975,982	4,783,639
Volta	657,160	1,115,163	1,430,989	2,005,036	2,357,686	7,566,034
Western	776,783	1,390,901	1,815,076	2,150,824	1,873,184	8,006,767
National-level costs	82,614	32,614	32,614	32,614	32,614	213,070
Total	10,707,007	14,700,910	16,245,708	18,167,863	18,466,845	78,288,334

The annual cost per region was divided by the expected number of children with SAM to determine the cost of treatment per beneficiary. This information is presented in Table 20.

Table 20. Average Cost of Treatment per Beneficiary

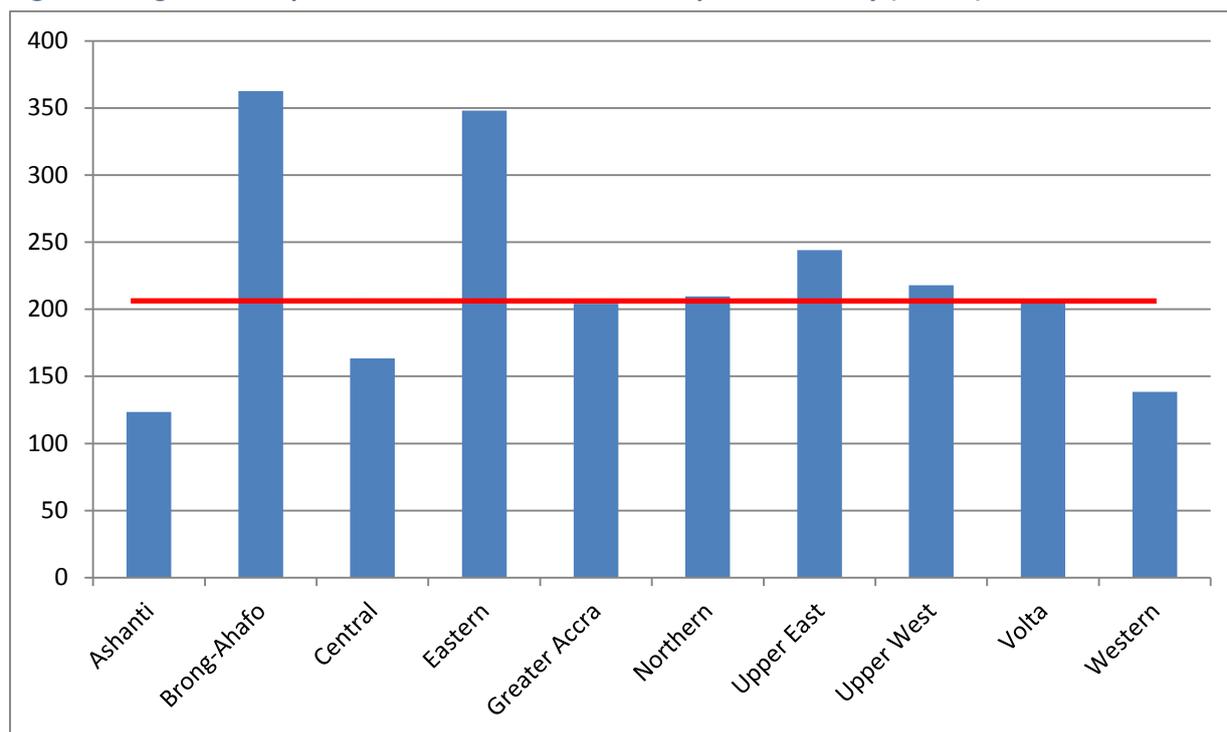
Region	2013	2014	2015	2016	2017	Average	Potential Costs after Scale-Up
Ashanti	534	364	312	299	263	355	247
Brong-Ahafo	3,226	1,632	1,320	1,017	863	1,612	725
Central	348	378	370	368	366	366	327
Eastern	741	622	745	890	782	756	696
Greater Accra	2,781	1,277	822	598	489	1,193	408
Northern	448	536	459	455	452	470	419
Upper East	625	562	623	608	603	604	488
Upper West	511	510	567	553	549	538	436
Volta	1,141	645	497	497	454	647	416
Western	804	530	456	403	310	500	277
Average	1,116	706	617	569	513		

Regions with higher expected caseloads, such as Ashanti, Central, Northern, and Western, have the lowest cost of treatment per beneficiary, while such costs are relatively high in regions with lower expected caseloads, such as Brong-Ahafo and Eastern. Cost per beneficiary is influenced by several factors, including caseload, number of facilities, and distances between facilities. The number of facilities and distance between facilities influence fixed costs for operating a CMAM program (increased distance increases the cost of transportation of therapeutic food and the cost of fuel for supervision of facilities by district/region personnel); fixed costs per case decline as the number of cases being treated at the facilities increases. This means an overall lower cost per beneficiary. These regional variations in cost per beneficiary are important to consider, particularly if funds for scale-up are limited. Prioritization of regions with lower costs per beneficiary represents the most efficient use of resources.

The last column indicates the potential average cost of CMAM services per beneficiary in each region after scale-up funding has been spent and the program is fully operational. Variations still remain high between high- and low-caseload regions.

The World Bank estimates the cost of treating SAM based on the CMAM treatment protocol to be approximately US\$200 per episode.⁸ Figure 3 presents the cost of SAM treatment per beneficiary per episode by region, with a red line representing the World Bank estimate. Only the regions with low caseloads, such as Brong-Ahafo and Eastern, exceed the World Bank estimate.

⁸ Horton, S. et al. 2010. *Scaling up Nutrition: What Will It Cost?* Washington, DC: World Bank.

Figure 3. Regional Comparison of the Cost of Treatment per Beneficiary (in US\$)

Note: Red line represents the World Bank average estimate; costs are from Table 20 and were converted into U.S. dollars.

Table 21 shows the distribution of expected annual SAM cases per facility and per region. The cost of CMAM services per beneficiary in Figure 3 is directly related to the number of cases per facility, as shown in Table 21; facilities with higher caseloads have lower costs per beneficiary.

Table 21. Number of Expected SAM Cases per Facility per Year

Region	2013	2014	2015	2016	2017
Ashanti	27	41	46	48	51
Brong-Ahafo	3	5	5	5	6
Central	24	25	25	25	25
Eastern	8	11	11	11	11
Greater Accra	2	4	4	5	5
Northern	21	21	21	21	21
Upper East	12	12	12	12	12
Upper West	13	13	13	13	13
Volta	10	14	16	17	17
Western	13	20	21	22	25

Taken together, Tables 20 and 21 and Figure 3 indicate that the cost per beneficiary declines as CMAM scales up within the region and, as a result, as more communities gain access to CMAM services and more inpatient and outpatient facilities develop the capacity to manage SAM cases. Moreover, after an initial higher setup cost at community and facility levels, which includes training and equipment, subsequent annual costs will mainly include personnel, transport, and therapeutic supplies. For regions that are already fully scaled up, such as Upper East and Upper West, the cost per beneficiary remains almost stable throughout the period.

3.6 CMAM Information Management

CMAM information management requires the collection, analysis, dissemination, and use of reliable and timely information to inform decision making and ensure quality of service delivery.

A large portion of CMAM information management involving data collection, reporting, analysis, and dissemination is integrated into routine management costs at national, regional, district, facility, and community levels. CMAM information management is also integrated within the district health information management system (DHIMS). Separating personnel time requirements and costs specific to these tasks is impractical; however, they are included in previously mentioned personnel costs.

The costs presented in this section are specific to CMAM coverage monitoring using the Simplified Lot Quality Assurance Sampling Evaluation of Access and Coverage (SLEAC) and Semi-Quantitative Evaluation of Access and Coverage (SQUEAC) methods.

3.6.1 CMAM Coverage Monitoring

Monitoring the coverage of CMAM services is essential to estimating the proportion of SAM cases being reached and to understanding the barriers to accessing SAM treatment. It is estimated that at least one SLEAC survey and SQUEAC analysis will be conducted per region within the first 2 years of implementing CMAM; thereafter, one SQUEAC analysis will be conducted after 1 year of conducting the initial SLEAC survey and SQUEAC analysis to assess progress toward addressing barriers affecting coverage of CMAM services. It is estimated that a SLEAC survey and a SQUEAC analysis will cost 25,000 Ghana cedi each.

Table 22. Costs of Monitoring CMAM Coverage

Region	2013	2014	2015	2016	2017	Total
Ashanti	0	50,000	0	25,000	0	75,000
Brong-Ahafo	0	0	50,000	0	25,000	75,000
Central	50,000	0	25,000	0	0	75,000
Eastern	0	50,000	0	25,000	0	75,000
Greater Accra	50,000	0	25,000	0	0	75,000
Northern	50,000	0	25,000	0	0	75,000
Upper East	50,000	0	25,000	0	0	75,000
Upper West	50,000	0	25,000	0	0	75,000
Volta	0	50,000	0	25,000	0	75,000
Western	0	50,000	0	25,000	0	75,000
Total	250,000	200,000	175,000	100,000	25,000	750,000

Costs incurred while conducting the SLEAC survey and SQUEAC analyses include per diem and transport costs for data collectors and supervisors.

4 Conclusions

The high rate of mortality among severely malnourished children and the relatively high prevalence of SAM in Ghana justify the investment of resources toward the goal of providing treatment for all SAM cases in the country. Investing in the scale-up of CMAM within the Ghanaian health system over the next 5 years is a vital step toward that goal. As presented in this report, much of this investment is already being supported by the GOG through existing health system mechanisms and functions.

The scale-up process has been progressing as expected since 2012, but the main challenge is providing equitable access to treatment for all who need it. Equitable access will require that CMAM clients be enrolled in the national health insurance schemes and not have to pay for drugs at the health facilities.

The second biggest challenge will be mobilizing adequate funding to ensure sustained access to CMAM supplies (RUTF, F-75, CMV, and ReSoMal). These supplies represent the biggest cost of CMAM services and currently are funded 100 percent by external sources.

The third main challenge will be ensuring high quality and coverage. Recent coverage surveys conducted in Agona West and Ashaiman districts—in Central and Greater Accra regions, respectively—showed low rates of coverage (lower than 30 percent) and high rates of defaulting. The surveys indicated that the outreach system was the main barrier to high coverage. The current national CMAM scale-up strategy may prove to be insufficient in ensuring high coverage, and additional funding for targeted and time-bound community sensitization campaigns may be necessary.

Scaling up CMAM services requires a significant financial commitment from the GOG. If funding for all of the costs presented in this report is not available during the scale-up period, it will be necessary to prioritize activities and actions. Attempting to scale up services at the rate presented in this report with only part of the required funds will be detrimental to service delivery and to health services as a whole.

Meanwhile, the MOH/GHS acknowledges the support of development partners during the initiation and scaling up of CMAM to date. This support will remain necessary until CMAM is fully scaled up and integrated into the GHS and funded through the GOG.

Annex 1. CMAM Programmatic Assumptions

Table 23. Personnel Time Spent in SAM Treatment

OPC	Unit	# of hours spent
Senior staff (public health nurse, midwife, or medical assistant) hours per OPC session to conduct medical and nutrition assessment of the child with SAM	Hours	0.2
Senior staff (public health nurse, midwife, or medical assistant) hours per OPC session for review of recordkeeping	Hours	0.5
Senior staff (public health nurse, midwife or medical assistant) hours per month per OPC site for review of reports	Hours	0.5
Junior staff (community health nurse/officer) hours per OPC session to conduct medical and nutrition assessment of child with SAM	Hours	0.25
Junior staff (community health nurse/officer) hours per OPC session conducting appetite test, counselling, and distributing RUTF	Hours	1
Junior staff (community health nurse/officer) hours per month per OPC site preparing reports	Hours	0.5
IPC	Unit	# of hours spent
Clinical assessment (hours per child)		
Senior staff (nurse, doctor, dietician)	Hours	1
Junior staff (enrolled nurse)	Hours	1
Clinical assessment (per IPC day per child)		
Senior staff (nurse, doctor, dietician)	Hours	0.5
Junior staff (enrolled nurse)	Hours	0.5
Food preparation—Junior staff (hours/day/IPC site)	Hours	0.5
Supervision of feeding first 3 days—Junior staff (hours/child/day)	Hours	1
Supervision of feeding after first 3 days—Junior staff (hours/child/day)	Hours	0.5
Recordkeeping—Senior staff (dietician/nutritionist) (hours/week/IPC site)	Hours	2
Community Outreach	Unit	# of days spent
Mid-level district-level manager (technical officers)		
Time to assist staff in a new OPC site, design community outreach materials, prepare guidance on strategies, do community mapping, and select communities (per new OPC site)	Days	0.5
Senior OPC health care provider		
Time in a new OPC site to design community outreach materials, prepare guidance on strategies, do community mapping, and select communities (per new OPC site)	Days	0.5
Time in a new community outreach activity site to conduct community sensitization meetings (and select volunteers, if relevant)	Days	0
Junior (community health nurse/officer) OPC health care provider		
Time in a new OPC site to design community outreach materials, prepare guidance on strategies, do community mapping, and select communities (per new OPC site)	Days	1
Time in a new community outreach activity site to conduct community sensitization meetings (and select volunteers, if relevant)	Days	1
Community outreach worker		
Time in the community for home visits for problem cases, identification of new cases and referral to CMAM, community mobilization, liaison with community leaders, and community assessment (per year per community outreach activity site)	Days	37
Time at OPC for data and reporting (per year per community outreach activity site)	Days	6

Annex 2. In-Service Training Cost by Region and Year

Table 24. Breakdown Cost of In-Service Training by Region

Region	# of health care providers to be trained	# of community outreach workers to be trained	Costs
Year 1: 2013			
Ashanti	232	500	192,418
Brong-Ahafo	232	500	232,340
Central	200	650	229,260
Eastern	536	1,000	452,076
Greater Accra	248	1,200	212,820
Northern	296	1,463	375,035
Upper East	152	488	165,906
Upper West	–	413	61,776
Volta	272	500	262,359
Western	252	700	251,218
Total	2,420	7,414	2,435,208
Year 2: 2014			
Ashanti	264	500	244,384
Brong-Ahafo	264	500	284,466
Central	164	650	229,573
Eastern	424	500	399,179
Greater Accra	136	1,150	152,918
Northern	252	2,288	470,985
Upper East	–	488	67,782
Upper West	–	413	61,776
Volta	272	500	272,792
Western	284	500	302,498
Total	2,060	7,489	2,486,353
Year 3: 2015			
Ashanti	264	500	251,475
Brong-Ahafo	264	500	299,589
Central	–	425	72,384
Eastern	424	500	426,401
Greater Accra	–	1,050	22,680
Northern	–	1,163	168,168
Upper East	–	488	67,782
Upper West	–	413	61,776
Volta	272	500	270,779
Western	284	500	310,509
Total	1,508	6,039	1,951,543

Region	# of health care providers to be trained	# of community outreach workers to be trained	Costs
Year 4: 2016			
Ashanti	264	500	255,366
Brong-Ahafo	224	500	241,967
Central	-	425	72,384
Eastern	392	500	405,420
Greater Accra	-	1,050	22,680
Northern	-	1,163	168,168
Upper East	-	488	67,782
Upper West	-	413	61,776
Volta	304	500	343,844
Western	220	500	235,190
Total	1,404	6,039	1,874,577
Year 5: 2017			
Ashanti	160	400	132,563
Brong-Ahafo	200	500	198,108
Central	-	425	72,384
Eastern	72	100	132,167
Greater Accra	-	1,050	22,680
Northern	-	1,163	168,168
Upper East	-	488	67,782
Upper West	-	413	61,776
Volta	288	500	310,152
Western	-	-	-
Total	720	5,039	1,165,780

Annex 3. Supervision Cost by Region, Type, and Year

Table 25. Supervision of OPC and IPC by the District Teams

Region	2013	2014	2015	2016	2017	Total
Ashanti	5,146	7,438	9,560	11,682	12,291	46,117
Brong-Ahafo	5,742	8,281	10,662	12,714	14,766	52,165
Central	11,151	12,063	9,678	9,678	9,678	52,248
Eastern	15,042	16,850	20,659	24,204	20,448	97,203
Greater Accra	12,355	11,497	9,871	9,871	9,871	53,465
Northern	15,108	16,922	13,109	13,109	13,109	71,357
Upper East	8,753	6,507	6,507	6,507	6,507	34,781
Upper West	5,991	5,991	5,991	5,991	5,991	29,955
Volta	6,254	8,756	11,257	14,016	16,492	56,775
Western	12,414	15,230	17,634	19,010	10,215	74,503
Total	97,956	109,535	114,928	126,782	119,368	568,569

Table 26. Internal Supervision of OPC and IPC by Senior Health Care Providers

Region	2013	2014	2015	2016	2017	Total
Ashanti	6,960	13,920	20,880	27,840	32,640	102,240
Brong-Ahafo	6,720	13,680	20,640	27,000	33,000	101,040
Central	47,430	56,865	56,865	56,865	56,865	274,890
Eastern	22,200	33,960	45,720	57,000	59,160	218,040
Greater Accra	52,020	58,905	58,905	58,905	58,905	287,640
Northern	62,220	77,265	77,265	77,265	77,265	371,280
Upper East	38,250	38,250	38,250	38,250	38,250	191,250
Upper West	35,190	35,190	35,190	35,190	35,190	175,950
Volta	7,680	15,360	23,040	31,200	39,120	116,400
Western	9,840	17,400	24,960	31,560	31,560	115,320
Total	288,510	360,795	401,715	441,075	461,955	1,954,050

Table 27. Supervision of Community Outreach Workers by OPC Providers

Region	2013	2014	2015	2016	2017	Total
Ashanti	64,142	63,513	75,965	75,839	60,621	340,080
Brong-Ahafo	62,885	62,885	75,462	75,462	62,885	339,577
Central	252,137	293,451	277,760	277,760	277,760	1,378,868
Eastern	90,554	67,915	90,554	113,192	57,080	419,295
Greater Accra	71,777	73,446	70,108	70,108	70,108	355,546
Northern	548,092	851,057	668,360	668,360	668,360	3,404,229
Upper East	269,664	274,505	274,505	274,505	274,505	1,367,684
Upper West	242,372	242,372	242,372	242,372	242,372	1,211,862
Volta	67,915	75,462	67,915	90,554	75,462	377,308
Western	67,790	66,406	70,557	91,308	–	296,061
Total	1,737,328	2,071,013	1,913,557	1,979,460	1,789,152	9,490,510

Table 28. Internal Supervision of District Teams

Region	2013	2014	2015	2016	2017	Total
Ashanti	215	215	215	215	215	1,075
Brong-Ahafo	196	196	196	196	196	980
Central	244	244	244	244	244	1,220
Eastern	196	196	196	196	196	980
Greater Accra	120	120	120	120	120	600
Northern	356	356	356	356	356	1,780
Upper East	199	199	199	199	199	995
Upper West	199	199	199	199	199	995
Volta	294	294	294	294	294	1,470
Western	196	196	196	196	196	980
Total	2,215	2,215	2,215	2,215	2,215	11,075

Annex 4. Supply Costs by Region and Year

Table 29. Cost of Therapeutic Food Supplies by Region

Region	2013	2014	2015	2016	2017	Total
Ashanti	149,990	450,078	750,166	1,050,255	1,350,234	3,750,723
Brong-Ahafo	16,992	50,214	83,328	116,441	157,941	424,916
Central	177,134	377,885	460,547	472,356	472,356	1,960,278
Eastern	44,006	115,134	169,052	223,078	267,193	818,463
Greater Accra	96,779	204,312	215,065	215,065	215,065	946,286
Northern	227,557	508,492	561,869	561,869	561,869	2,421,656
Upper East	79,622	106,163	159,244	159,244	159,244	663,517
Upper West	81,800	109,067	163,600	163,600	163,600	681,667
Volta	62,741	188,331	313,922	439,512	565,103	1,569,609
Western	105,222	286,037	433,957	581,877	657,471	2,064,564
Total	1,041,843	2,395,713	3,310,750	3,983,297	4,570,076	15,301,679

Table 30. Cost of Routine Medicines and Medical Supplies by Region

Region	2013	2014	2015	2016	2017	Total
Ashanti	6,422	19,270	32,119	44,967	57,811	160,589
Brong-Ahafo	743	2,341	4,127	6,106	8,741	22,058
Central	8,613	18,374	22,393	22,393	22,967	94,740
Eastern	1,860	4,866	7,145	9,429	11,294	34,594
Greater Accra	4,876	10,850	11,662	11,697	11,697	50,782
Northern	10,917	24,394	26,955	26,955	26,955	116,176
Upper East	3,820	5,093	7,640	7,640	7,640	31,833
Upper West	4,323	7,625	12,452	12,570	12,570	49,540
Volta	2,652	7,960	13,269	18,577	23,886	66,344
Western	4,493	13,196	22,984	36,770	51,781	129,224
Total	48,719	113,969	160,746	197,104	235,342	755,880

Table 31. Cost of Other CMAM Supplies and Equipment by Region

Region	2013	2014	2015	2016	2017	Total
Ashanti	35,831	56,714	75,321	75,321	100,199	343,386
Brong-Ahafo	33,180	49,702	63,946	74,127	84,853	305,808
Central	83,990	115,687	112,719	114,262	114,262	540,920
Eastern	90,404	104,414	128,402	149,142	126,748	599,110
Greater Accra	81,545	115,687	112,719	114,262	114,262	538,475
Northern	112,459	159,235	144,781	144,781	144,781	706,037
Upper East	58,575	49,193	56,128	56,128	56,128	276,152
Upper West	43,181	46,743	53,867	53,867	53,867	251,525
Volta	39,273	56,405	73,538	93,920	110,401	373,537
Western	42,467	62,576	79,871	90,667	72,751	348,332
Total	620,905	816,356	901,292	966,477	978,252	4,283,282

Annex 5. Annual Priority Therapeutic Supply Requirements

Table 32. Annual RUTF Requirements (in kg)

Region	2013	2014	2015	2016	2017	Total
Ashanti	18,278	54,849	91,419	127,989	164,546	457,081
Brong-Ahafo	2,071	6,119	10,155	14,190	19,247	51,782
Central	25,561	54,530	66,458	68,162	68,162	282,873
Eastern	5,363	14,031	20,601	27,185	32,561	99,741
Greater Accra	13,965	29,483	31,034	31,034	31,034	136,550
Northern	32,837	73,377	81,079	81,079	81,079	349,451
Upper East	11,490	15,320	22,979	22,979	22,979	95,747
Upper West	11,804	15,739	23,608	23,608	23,608	98,367
Volta	7,646	22,951	38,256	53,561	68,866	191,280
Western	12,823	34,858	52,884	70,910	80,123	251,598
Total	141,838	321,257	438,473	520,697	592,205	2,014,470

Table 33. Annual F-75 Requirements (in kg)

Region	2013	2014	2015	2016	2017	Total
Ashanti	583	1,750	2,917	4,083	5,250	14,583
Brong-Ahafo	66	195	324	453	614	1,652
Central	815	1,740	2,120	2,175	2,175	9,025
Eastern	171	448	657	867	1,039	3,182
Greater Accra	446	941	990	990	990	4,357
Northern	1,048	2,341	2,587	2,587	2,587	11,150
Upper East	367	489	733	733	733	3,055
Upper West	377	502	753	753	753	3,138
Volta	244	732	1,221	1,709	2,197	6,103
Western	409	1,112	1,687	2,262	2,556	8,026
Total	4,526	10,250	13,989	16,612	18,894	64,271

Table 34. Annual F-100 Requirements (in kg)

Region	2013	2014	2015	2016	2017	Total
Ashanti	175	525	875	1,225	1,575	4,375
Brong-Ahafo	20	59	97	136	184	496
Central	245	522	636	652	652	2,707
Eastern	51	134	197	260	312	954
Greater Accra	134	282	297	297	297	1,307
Northern	314	702	776	776	776	3,344
Upper East	110	147	220	220	220	917
Upper West	113	151	226	226	226	942
Volta	73	220	366	513	659	1,831
Western	123	334	506	679	767	2,409
Total	1,358	3,076	4,196	4,984	5,668	19,282

Annex 6. Annual Priority Medical Supply Requirements

Table 35. Annual ReSoMal Requirements (in packets)

Region	2013	2014	2015	2016	2017	Total
Ashanti	186	557	928	1,299	1,670	4,640
Brong-Ahafo	21	62	103	144	195	525
Central	259	554	675	692	692	2,872
Eastern	54	142	209	276	331	1,012
Greater Accra	142	299	315	315	315	1,386
Northern	333	745	823	823	823	3,547
Upper East	117	156	233	233	233	972
Upper West	120	160	240	240	240	1,000
Volta	78	233	388	544	699	1,942
Western	130	354	537	720	813	2,554
Total	1,440	3,262	4,451	5,286	6,011	20,450

Table 36. Annual Antibiotic Drug Requirements (amoxicillin, in grams)

Region	2013	2014	2015	2016	2017	Total
Ashanti	4,131	12,396	20,661	28,926	37,188	103,302
Brong-Ahafo	468	1,383	2,295	3,207	4,350	11,703
Central	5,777	12,324	15,020	15,405	15,405	63,931
Eastern	1,212	3,171	4,656	6,144	7,359	22,542
Greater Accra	3,156	6,663	7,014	7,014	7,014	30,861
Northern	7,421	16,583	18,324	18,324	18,324	78,976
Upper East	2,597	3,462	5,193	5,193	5,193	21,638
Upper West	2,668	3,557	5,335	5,335	5,335	22,230
Volta	1,728	5,187	8,646	12,105	15,564	43,230
Western	2,898	7,878	11,952	16,026	18,108	56,862
Total	32,056	72,604	99,096	117,679	133,840	455,275

Table 37. Annual Antimalarial Drug Requirements (in number of complete treatment sets)

Region	2013	2014	2015	2016	2017	Total
Ashanti	386	1,157	1,928	2,700	3,471	9,642
Brong-Ahafo	44	129	214	299	406	1,092
Central	770	1,643	2,003	2,054	2,054	8,524
Eastern	113	296	435	573	687	2,104
Greater Accra	421	888	935	935	935	4,114
Northern	990	2,211	2,443	2,443	2,443	10,530
Upper East	346	462	692	692	692	2,884
Upper West	356	474	711	711	711	2,963
Volta	161	484	807	1,130	1,453	4,035
Western	270	735	1,116	1,496	1,690	5,307
Total	3,857	8,479	11,284	13,033	14,542	51,195