



Save the Children Ethiopia Country office

LQAS, ENGINE Project mid - Term survey Report

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Country Office, Ethiopia

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Acronyms

DHS - Demographic and Health Survey

ENGINE - Empowering New Generations to Improve Nutrition and Economic opportunities

HHs – House Holds

HSDP – Health Sector Development Plan

IYCF - Infant and Young Child Feeding

LQAS – Lot Quality Assurance Sampling

M and E – Monitoring and Evaluation

MDDS - Mother's dietary diversity score

PMP - Performance Monitoring Plan

SA – Supervision Area

SNNPR – Southern Nation Nationalities peoples Region

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Summary

Introduction

USAID's Empowering New Generations to Improve Nutrition and Economic opportunities (ENGINE) project was inaugurated in November 2011 under prime contractor Save the Children Federation, Inc. (SC), ENGINE will assist the Government of Ethiopia (GoE) to implement a five-year integrated nutrition program to decrease maternal, neonatal and child mortality through a comprehensive program addressing the Ethiopian nutrition policy environment, the improvement of nutrition services, and the introduction and reinforcement of evidence-based preventive nutrition and care practices.

The aim of this assessment was to monitor the status of selected health and nutrition related indicators at half life of the project time.

Method

ENGINE LQAS survey designated the overall ENGINE project area as a coverage area and the supervision areas were the five regional sub offices; 19 study subjects were selected from each lot (sub office) with a total of 95 study subjects for the overall project area.

Result and Conclusion

Overall, the performance of most indicators in the LQAS survey showed improvements from the baseline findings. In particular, Iron/folate supplementation, and early initiation of breast feeding showed significant increases.

Special attention should also be made and careful planning will be necessary to tailor interventions to improve de worming supplementation in children, very low dietary diversity and mean number of food consumption by both the mother and child in all program areas. Tailored agriculture production programs and health and nutrition interventions should be designed to address specific issues.

Introduction

Ethiopia's key nutrition indicators show continuous improvement over the past decade, but malnutrition in its various forms remains a pervasive problem. Preliminary analysis of 2011 Demographic and Health Survey (DHS) data indicates that 44% of all children under age 5 years are stunted – 21% of them severely – reflecting a significant problem of chronic under nutrition. Acute malnutrition is also prevalent, with levels of wasting in the under-five years age group of 10% with 2.8% suffering from the severe form of wasting. Sub-optimal care and feeding practices are clearly a contributing factor. The 2011 data show that nearly half of infants under 6 months are not exclusively breastfed. Among the 6 – 9 months age group, nearly half receive no complementary foods (1). With malnutrition thought to contribute to 53% of child mortality in Ethiopia, efforts to prevent and to treat malnutrition in its various forms remain an urgent priority to address Millennium Development Goals (MDGs).

USAID's Empowering New Generations to Improve Nutrition and Economic opportunities (ENGINE) project undertakes to address this need. Inaugurated in November 2011 under prime contractor Save the Children Federation, Inc. (SC), ENGINE will assist the Government of Ethiopia (GoE) to implement a five-year integrated nutrition program to decrease maternal, neonatal and child mortality through a comprehensive program addressing the Ethiopian nutrition policy environment, the improvement of nutrition services, and the introduction and reinforcement of evidence-based preventive nutrition and care practices. The aim of this assessment was to monitor the status of selected health and nutrition related indicators at half life of the project time.

Methodology

LQAS is a relatively rapid and inexpensive approach to data collection, and is primarily used for M&E purposes. Used to empower program managers to evaluate program performance, the LQAS method enables these managers to assess whether program targets have been achieved within a specific unit of interest (a geographical area, a facility, an organization, or any other catchment area) (2).

A global review (covering a total of 805 LQAS surveys) of the use of LQAS surveys to assess aspects of health care including service delivery, health behavior and disease burden was carried out by the World Health Organization (WHO) in 2006. LQAS surveys were found to be a practical field method increasingly applied in the assessment of preventative and curative health services and for measuring variation in behavior change when collected recurrently at multiple points in time. Most LQAS surveys have been used to assess risk factors for HIV/AIDS and sexually transmitted infections, although substantial numbers have also been conducted to assess immunization coverage, growth and nutrition, and post-disaster health status of communities.

LQAS data collection method provides a viable alternative to traditional surveys. The method allows for smaller sample sizes than standard probability surveys, and the lower associated costs allow for more frequent sampling. In the LQAS application, the entire program area, or catchment area, is divided into meaningful sub-divisions, or “lots”. Typically, the lot is defined as a program supervisory area, and the measure is binary (e.g., yes/no, or acceptable/not acceptable) for each indicator included in the study. Information from each lot can then be agglomerated to provide a coverage estimate for the entire catchment area.(2) A sample of 19 provides an acceptable level of error (less than 10%) for making management decisions and 90% confidence level (3, Page PM-28).

Defining Catchment Area and Supervision areas

LQAS methodology requires well defined, programmatically meaningful “lots” (also known as “supervision areas”) for the collection, analysis and interpretation of data. In ENGINE LQAS survey, the overall ENGINE project area was considered as a coverage area and the designated supervision areas were the five regional sub offices; 19 study subjects were selected from each lot (sub office) with a total of 95 study subjects for the overall project area.

Selecting at least one supervisory areas per sub office has ensured a minimum aggregate sample size meets at least 95 (5 × 19) completed interviews per aggregate performance area.

Table 1. - Year I ENGINE operating Woredas.

S.no	Amhara Woredas	East Shewa woredas	West shewa woredas	SNNPR woredas	Tigray woredas
1	Jabi tenagne	Horo (Jima)	Dendi	Chena	Alamata
2	Wenberma	Shirka	Ambo*	Decha	Emdemahoni*
3	Debub Achefer	Limu Bilbilo	Toke Kutaye	Enemore ena Ener	Wolqayit
4	Semen Achefer	Digelu Tijo	Baco (Tulu Bolo)	Endegegne*	Quafta humera
5	Baherdar Zuriya	Dodola	Weliso	Bule	
6	Dejene	Kofele	Gutu Gida	Gedebo	
7	Enemay	Sinana	Wayu tuqa	West Azernet	
8	Ankesha	Agarfa	Gudruu	Gorche	
9	Dangila*	Wolmera*	Horo	Melga	
10	Taqusa				
11	Alefa				
Total no of Woreda	11	8	9	9	4

* Randomly selected woreda from each sub offices.

Table 2. Randomly Selected kebeles and localities from list of kebele and list of limat buden.

S.no	Sub office	Woreda	Kebele	* First Limat buden/Gery selected

1.	Tigray	Endamehoni	Nikah	Sindayo Hagos	
2.	Amhara	Dangila	Guilt	Serdo gedel	
3.	East Oromia	Wolmera	Barafta tokoffa	Mehal Sefer 3	
4.	West Ormia	Ambo	Sankale Faris	Burka Cheffe	
5.	SNNPR	Endagegn	Esemat	Bekecho	

* N.B. The team has visited up to four localities to complete indicators with narrow age range.

Indicators selected and Target Population

ENGINE LQAS survey collected data using semi-structured survey questionnaires adapted from ENGINE base line survey from May 1-2, 2014 on (1) Folate supplementation during pregnancy, (2) De-worming for children 24 -36 months (3) Vitamin A supplementation for children 6-36 months (4) Early initiation of Breast feeding for children 6-36 months and (5) Maternal dietary diversity and (6) child dietary diversity (7) percentage of mothers and children 6-36 months who consume animal source food resulted in the tabulation of indicators for each sub office.

The presence of children of a specific age group in the household directed the use of the survey instrument to collect information on certain indicators. The age groups and specific indicators for both mother and children are presented in table 3 below.

Table 3. Indicators assessed for both mother and child.

Category 1 .Indicators on children aged between 6 to 36	
Mother	% of women 15-49 years with children 6 to 18 months who took iron/folate supplementation during their last pregnancy (last 18 months)
	Mean number of food groups consumed by women of reproductive age
	% of womens 6-36 months who consume animal source food

Category 2 .Indicators based on mothers with children aged between 6 to 36	
Child	%of children 6-36 months who received vitamin A from ENGINE supported programs in the previous six months
	% of children 24-36 months de-wormed in the previous 6 months
	Early initiation of Breast feeding for children 6-36 months
	Prevalence of children 6-23 months receiving minimum dietary diversity
	Mean number of food group consumed by children
	% of children 6-23 months who consume animal source food
	% of children 6-23 months who consume iron rich food

Folate / iron supplement coverage

Folate / iron supplement coverage is the proportion of women aged 15 to 49 years with children 6 to 18 months who took folate / iron supplements during their last pregnancy as shown in the following formula:

$$\frac{\text{Women aged 15 to 49 years with children 6 to 18 months who took folate / iron supplements during their last pregnancy}}{\text{Total number of women aged 15 to 49 years with children 6 to 18 months}}$$

Mother's dietary diversity indicators were analysed as follows:

Indicators

Mean mother's dietary diversity score

$$\frac{\sum (\text{Dietary diversity score of mothers with children 6 to 36 months})}{\text{Total number of mothers with children 6 to 36 months}}$$

Coverage of enhanced outreach strategy indicators were analysed as follows:

Indicators	Analysis
Vitamin A supplementation coverage	$\frac{\text{Children 6 to 36 months receiving Vitamin A supplement in the past 6 months}}{\text{Total number of children 6 to 36 months}}$
Deworming coverage	$\frac{\text{Children 24 to 36 months receiving deworming pill in the past 6 months}}{\text{Total number of children 24 to 36 months}}$

Ever breastfed

Ever breastfed	$\frac{\text{Children 6 to 24 months who have ever breastfed}}{\text{Total number of children 6 to 24 months}}$
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Dietary diversity Scores

Minimum dietary diversity	$\frac{\text{Children 6 to 24 months who consume at least 4 food groups}}{\text{Total number of children 6 to 24 months}}$
Consumption of iron-rich foods	$\frac{\text{Children 6 to 24 months consuming iron-rich foods}}{\text{Total number of children 6 to 24 months}}$

Sample size

A total 95 sample households was chosen from all the supervisory area as shown in the following table.

Sub office	# of Supervisory	# of Interviews per	Total Interviews per
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	areas	SA	SA
SNNPR	1	19	19
East Oromia	1	19	19
West Oromia	1	19	19
Amhara	1	19	19
Tigray	1	19	19
Total	5	95	95

Table 4 .Total Sample size selected from each supervision areas.

The preceding table shows each sub office was considered as a different lot. For each sub office, all indicators included in the study have the same sample size (i.e., within a supervision area, each indicator has a denominator of 19 which is enough observation to provide the acceptable/unacceptable determination for that indicator).Valadez’s Decision-Rule rule was used to determine whether a supervisory area’s performance was acceptable or unacceptable based on the indicator’s average for the county.(3, Annex III) By combining the five supervisory areas for a county, the total denominator was 95 (5×19), and this sample size made it possible to calculate a coverage estimate at the country level.

Sampling Stages

Sampling districts (First stage)

In the first stage we randomly selected one woreda per supervision area from the list of year I woreda (table 1), and subsequently we also selected one kebele randomly from the list of kebeles in the selected woreda.

Sampling smallest locality (second stage)

In the second stage, we have listed all Gery/Limat buden¹ in the kebele, and then sampled one Gery/limat buden randomly, and a second Gery /Limat buden nearest to the last house hold in the first Gery /Limat buden was selected when we couldn’t find enough eligible households in

the first locality.
HHs.

1 Gery/Limat buden is the smallest structure in a kebele and contains an average of 25-30

Sampling households (Third stage)

In the third stage of sampling, a house hold was selected in the cluster. A total of 19 households were chosen within each supervisory area using the spin bottle method. In the selected household, surveyors administered the instrument on eligible individuals.

The interviewer then proceeded to the household directly to the left (or to the nearest household) to continue completing of the questionnaire.

Expected LQAS Results

From the LQAS Survey information is reported for each indicator on the county-level estimate or “Coverage”. For the analysis of these indicators pre-existing targets from the ENGINE PMP document and HSDP IV was used (Annex II). Targets were calculated based on the average number of correct responses for each lot within a sub office and then rounded up, which is reflected, along with the corresponding percentage, in the “Decision Rule” column of the reported results.

A “yes” or “no” answer was used whether the supervisory area is within an acceptable range of the specified performance benchmarks (i.e. targets) in each of the selected supervisory areas within ENGINE catchment area. We used the same benchmark value for all supervision areas for each indicator from the five year target of ENGINE Performance Monitoring Plan (PMP), and HSDP IV to serve as a coverage benchmark. Midline target of the project and baseline results have been assigned as upper and lower thresholds respectively to establish the decision rules. Lower threshold is a baseline result below which a lot was considered to have ‘unacceptable’ coverage and an upper threshold is a midline target above which a lot was considered to have ‘acceptable’ coverage. All decision rules were based on Valadez’s Decision-Rule table. (Annex II and III)

Data entry and Analysis

Data was entered using excel sheet for binary responses and SPSS V. 16 for composite measure indicator for computation and recoding of dietary diversity scores. Nine experienced surveyors, who have participated in the ENGINE baseline survey, collected the data in all the five sub offices at the time.

Quality Assurance

For keeping the quality of the survey, we used experienced surveyors who worked in ENGINE baseline survey more than a year and one day training was given to them on the basics of LQAS methodology and on data collection instrument. Role play exercise was done to practice the instrument. Households were selected randomly based on the spin bottle method. Data gathered was cross checked for consistency, completeness at field level by a supervisor and, where applicable, other members of the survey team. The questionnaire took a maximum of 15 minutes for interviewing a single household. A teams of two individuals was assigned together to complete the assessment of a sub office in maximum of 7 days considering 2 days one way travel to a remote Woreda.

Ethical Consideration

Permission was sought from the woreda authorities and respective kebele and village leaders in the study area to conduct the study. In addition, each individual interview was begun with an oral consenting process in which the interviewer explained the details of the study, including the participant's right to refuse to participate in all or part of the survey and assuring the confidentiality of the responses given. Participants verbally consented to participating in the survey.

Basic LQAS terminologies

- **Supervision area:** The catchment area that a supervisor wants to assess.
- **Coverage benchmark/Target coverage:** is a predetermined level of coverage that a project aims to reach at a specified time period.

- **Average coverage:** is the percentage of people in a catchment area who know of and/or practice a recommended health behavior or receive a particular service..
- **Coverage:** the proportion of respondents in the SA that show desired effect-the actual outcome.
- **Decision rule (DR):** tells us whether an individual supervision area reaches the average coverage/benchmark or is below the average coverage.
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Result

Iron/folate supplementation

Provision of iron / folate supplements to pregnant women is one of the component services of antenatal care (Villar et al. 2001; Langer et al. 2002; World Health Organization 2002). A lower threshold of 25 % and an upper threshold of 60% were used to establish a decision rule of eight (8) to analyze fefol coverage in each supervision area. In this study, the proportion of iron/folate supplementation was 80% in the overall program area. The percentage of women who were supplemented with iron folate during their last pregnancy in this study is higher than the decision rule for all supervision areas. (Annex I)

Vitamin A Supplementation

During Community health days children of age 6-59 months receive vitamin A supplements every six months, and those between two and five years receive de worming pills. Vitamin A coverage from all surveyed Woreda was higher than the de worming coverage. Vitamin A supplements are usually delivered through national campaigns, health extension program, and some non-governmental organizations (NGOs) or charity's program.

A lower threshold of 55% and an upper threshold of 75% have been used to establish a decision rule of 13 to analyze Vitamin A coverage in each supervision area. The proportion of children who received vitamin A supplementation in the preceding 6 months was 80% in the overall

program area. All supervision areas have achieved a coverage result higher than the decision rule. (Annex I)

De worming coverage

During Community health day's children between two and five years receive de worming pills. Children tended to receive de worming pills only through national campaigns or when they visit the health clinics / health posts. A lower threshold of 30% and an upper threshold of 60% were used to establish a decision rule of nine (9) to analyze de worming coverage in each supervision area. The proportion of children who received de worming supplementation in the preceding 6 months was 40% in the overall program area. The percentage of children who were supplemented with de worming in this study was below the decision rule in all supervision areas except Amhara sub office. (Annex I)

Infant young Child Feeding

WHO recommends a specific set of eight core and seven optional indicators to assess IYCF practices (6). For the LQAS survey, indicators on early initiation of breastfeeding and dietary diversity were selected.

A lower threshold of 40% and an upper threshold of 60% were used to establish a decision rule of nine (9) to analyze the coverage of early initiation of breast feeding. In all surveyed woredas, all mothers had ever breastfed their children, the proportion of mother's breastfeeding their children within 1 hour of birth was 60% in the overall program area. The percentage of woman who was breast fed their child with in 1 hour of birth was higher than the decision rule in all supervision areas except Amhara regional office. (Annex I)

Mother's Dietary Diversity Score (MDDS)

Mother's dietary diversity is a qualitative measure to reflect their access to a variety of foods. It also serves as a proxy for nutrition adequacy (7). Diet information collected from the questionnaire was aggregated into nine food groups: 1) starchy staples; 2) dark green leafy vegetables; 3) other vitamin A-rich fruits and vegetables; 4) other fruits and vegetables; 5) organ meat, meat and fish; 6) eggs; 7) legumes; 8) nuts and seeds; and, 9) milk and milk products.

Mother's dietary diversity score (MDDS), therefore, ranged from 0 to 9. Low dietary diversity was defined as consuming less than or equal to three food groups, medium dietary diversity was defined as consuming four to five food groups and high dietary diversity was defined as consuming six or more food groups.

Findings from the surveyed Woreda revealed that out of the nine food groups, the mean dietary diversity score for reproductive age women (15-49) in this study was 2.8. The midline project target for mean number of food group is 3.4. It is, however, accepted that women need to consume at least four of the nine food groups in order to meet the minimum dietary diversity. In this study proportion of mothers with low dietary diversity in the overall programme area was 80% nearly the same as which the baseline result. (Annex I)

Child Dietary Diversity Score (MDDS)

Minimum dietary diversity for breastfed children is defined as four or more food groups out of the following 7 food groups (8) that include: 1. Grains, roots and tubers, 2. Legumes and nuts, 3. Dairy products (milk, yogurt, cheese), 4. Flesh foods (meat, fish, poultry and liver/organ meats), 5. Eggs, 6. Vitamin-A rich fruits and vegetables, and 7. Other fruits and vegetables. In this study only 15.7% of children have got minimum dietary diversity with marked difference among supervision areas (Annex I). The mean number of food group consumed by children in the overall program area is 2.4 with the highest score in Amhara 3.2 and lowest score of 1.7 in East Oromia. The baseline survey coverage for mean number of food group consumed by children was 2.5. (Annex I)

Percentage of individuals consuming animal source foods

Survey questions were also administered regarding consumption of animal source foods. The percentage of women who consume animal source foods was 35% in the overall program area. Amhara and Tigray sub offices have scored coverage higher than the average coverage and lower in other supervision areas. On the other hand the percentage of children who consumed animal source foods is 50% in the overall program area. Amhara and SNNPR sub office have scored coverage higher than the average coverage for the entire programmatic area, where as Tigray and East oromia sub offices scored below the average coverage. (Annex I).

Percentage of children consuming iron rich foods

The percentage of children who consumed iron rich animal source foods was 13.6% in the overall program area. Amhara and Tigray sub offices have scored coverage higher than average coverage and lower in other supervision areas.

Limitations

As with all cross-sectional surveys, the LQAS survey had some limitations.

The use of small sample size of 19 for an entire region could affect the generalization of the result to the other ENGINE Woredas in the region.

Since respondents were asked to report on information from their past, such as Iron/ folate supplement or Vitamin A supplementation, de worming and 24 dietary recall , it is also possible that their responses did not accurately reflect their experiences due to recall bias.

Response bias may also have been of concern in this survey, as respondents might have intentionally reported on their own behavior or experiences incorrectly based on a perceived desirability of responses rather than the real practices.

Recommendations and Conclusions

Overall, the performance of most indicators in the LQAS survey showed improvements from the baseline findings. In particular, Iron/folate supplementation, Vitamin A supplementation and early initiation of breast feeding showed significant increases.

Nevertheless, the pattern was not uniform across the whole program area. The differences across districts should be taken into account by program officials in order to identify those areas that were found to be below average.

Special attention should also be made and careful planning will be necessary to tailor interventions to improve de worming supplementation in children, very low dietary diversity and mean number of food consumption by both the mother and child in all program areas. Health, nutrition and agricultural production programs should be designed to address specific issues.

Ultimately, the LQAS approach proved to be helpful and effective in providing information to be used at local level. Its ultimate goal was to inform decision makers and to offer an updated picture for planning purposes. If consistently repeated, it also provides with trend data that can assist in effectively monitoring the allocation of resources and evaluating the accomplishments and contributions of specific projects to the overall.

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Annexes

I. LQAS Summary tabulation table

ENGINE project Mid-term Survey																
Indicator	Total Correct in Each SA/Decision Rule				Total Correct in Program		Sample Size				Total Sample Size in Program		Average Coverage = $\frac{\text{Total Correct}}{\text{Sample Size}}$	Midline Targets		
	1	2	3	4	5		1	2	3	4	5					
Average coverage (rounded up)		80%				Upper threshold - 60%, Lower threshold - 25%										
1	% of women 15-49 years with children 6 to 18 months who took iron/folate supplementation during their last pregnancy (last 18 month	18	13	8	16	16	72	19	19	19	19	19	95	75.7%	40%	
	(Decision rule)	8	8	8	8	8										
Average coverage (rounded up)		80%				Upper threshold - 75%, Lower threshold - 55 %.										
2	% of children 6-36 months who received vitamin A from ENGINE supported programs in the previous six months	19	17	14	13	13	76	19	19	19	19	19	95	80%	75%	
	(Decision rule)	13	13	13	13	13										

Average coverage (rounded up)		40%					Upper threshold - 60 %, Lower threshold – 30%											
3	% of children 24-36 months de-wormed in the previous 6 months	5	10	5	8	8	36	19	19	19	19	19	95	37.8 %	60%			
	(Decision rule)	9	9	9	9	9												
Average coverage (rounded up)		20%						No target										
4	Prevalence of children 6-23 months Minimum dietary diversity	5	7	1	3	1	17	19	19	19	19	19	95	17.8 %				
	(Decision rule)	1	1	1	1	1												
							Average score = 2.8											
5	Mean number of food groups consumed by women													3.4	4			
Average coverage (rounded up)		60%					Upper threshold - 60%, Lower threshold – 40 %											
6	% of children 6-36 months with breastfeeding initiated in the first hour	14	7	13	11	11	56								50%			
	(Decision rule)	9	9	9	9	9		19	19	19	19	19	95	58.9 %				

7	Average coverage (rounded up)	35%						No target						NO	
	Percentage of mothers who consume animal source foods	8	13	4	4	4	33	19	19	19	19	19	95	34.7%	
	(Decision rule)	4	4	4	4	4									
8	Average coverage (rounded up)	50%						No target						No	
	Percentage of children who consume animal source foods	6	17	5	7	10	34	19	19	19	19	19	95	47.3%	
	(Decision rule)	7	7	7	7	7									
9	Average coverage (rounded up)	15%						No target							
	Percentage of children who consume iron rich foods	4	4	1	3	1	13	19	19	19	19	19	95	13.6%	
	(Decision rule)														

Key SA 1 = Tigray, SA 2 = Amhara, SA 3 = East oromia, SA 4 = West oromia SA 5 = SNNPR

N.B.

- **Upper threshold values are either midline targets/average coverage and lower threshold are baseline targets.**
- **Those numbers highlighted in red are supervision areas coverage's which scored below the minimum threshold coverage value/ average coverage.**
- **Target for Vitamin A and de worming was taken from other national document like HSDP IV, because the target in the ENGINE PMP is a service count.**

Annex II . Baseline, Mid- line and End line target used for LQAS survey and their respective data sources.

Indicators	Baseline (Data source)	End line target(Data source)	Midline target (calculated)	Remark
Iron/ folate	21% (PMP)	60% (PMP)	40%	
Vitamin A	54% (PMP)	94 % (HSDP IV)	75%	The ENGINE PMP target is a service count for both services.
De worming	29% (PMP)	90% (HSDP IV)	60%	
Early B.feeding	40% (PMP)	60% (PMP)	50%	
Dietary diversity score	2.9(PMP)	4(PMP)	3.4	

- **Midline target** – is a target computed from PMP of ENGINE five year base line, end line targets and national documents.
- **Baseline target** – is a target which was taken from the ENGINE PMP Aug 2013 version

Annex III

Table LQAS Table from Valadez et al for sample size of 19

Appendix 3: Decision rules for an LQAS sample of 19. Upper thresholds are average coverage/coverage targets range from 20-95%. Lower thresholds range from 0-75%. Corresponding producer and consumer risks (alpha and beta errors) are included. Optimal decision rules are highlighted.

		AVERAGE COVERAGE (Baselines, Monitoring and Evaluation) / ANNUAL COVERAGE TARGET (Monitoring and Evaluation)																					
		20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%						
LOWER THRESHOLD	0%	1 0.014 0.000	2 0.031 0.000	3 0.046 0.000	3 0.017 0.000																		
	5%		3 0.111 0.067	3 0.046 0.067	4 0.059 0.013	4 0.023 0.013																	
	10%				4 0.059 0.115	5 0.070 0.035	5 0.028 0.035	6 0.032 0.009															
	15%					5 0.070 0.144	6 0.078 0.054	6 0.032 0.054	7 0.034 0.016														
	20%						7 0.173 0.068	7 0.084 0.068	7 0.034 0.068	8 0.035 0.023													
	25%							8 0.180 0.077	8 0.087 0.077	8 0.035 0.077	9 0.035 0.029												
	30%							8 0.180 0.182	9 0.184 0.084	9 0.088 0.084	9 0.035 0.084	10 0.033 0.033											
	35%								9 0.184 0.185	10 0.186 0.087	10 0.087 0.087	10 0.033 0.087	11 0.029 0.035										
	40%									10 0.186 0.186	11 0.185 0.088	11 0.084 0.088	12 0.077 0.035	12 0.023 0.035									
	45%										11 0.185 0.184	11 0.084 0.184	12 0.077 0.087	13 0.068 0.034	13 0.016 0.034								
	50%											12 0.182 0.180	12 0.077 0.180	13 0.068 0.084	14 0.054 0.032	14 0.009 0.032							
	55%												13 0.176 0.173	14 0.163 0.078	14 0.054 0.078	15 0.035 0.028	16 0.013 0.008						
	60%													14 0.163 0.163	15 0.144 0.070	15 0.035 0.070	16 0.013 0.023						
	65%														15 0.144 0.150	16 0.115 0.059	16 0.013 0.059						
	70%																16 0.115 0.133	17 0.067 0.048					
	75%																		17 0.067 0.111				

Appendix 3: LQAS Table with Alpha and Beta Errors A-13

LQAS Table from Valadez et al

LQAS Table: Decision Rules for Sample Sizes of 12-30 and Coverage Targets/Average of 10%-95%																		
Sample Size*	Average Coverage (Baselines) / Annual Coverage Target (Monitoring and Evaluation)																	
	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%
12	N/A	N/A	1	1	2	2	3	4	5	5	6	7	7	8	8	9	10	11
13	N/A	N/A	1	1	2	3	3	4	5	6	6	7	8	8	9	10	11	11
14	N/A	N/A	1	1	2	3	4	4	5	6	7	8	8	9	10	11	11	12
15	N/A	N/A	1	2	2	3	4	5	6	6	7	8	9	10	10	11	12	13
16	N/A	N/A	1	2	2	3	4	5	6	7	8	9	9	10	11	12	13	14
17	N/A	N/A	1	2	2	3	4	5	6	7	8	9	10	11	12	13	14	15
18	N/A	N/A	1	2	2	3	5	6	7	8	9	10	11	11	12	13	14	16
19	N/A	N/A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
20	N/A	N/A	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16	17
21	N/A	N/A	1	2	3	4	5	6	8	9	10	11	12	13	14	16	17	18
22	N/A	N/A	1	2	3	4	5	7	8	9	10	12	13	14	15	16	18	19
23	N/A	N/A	1	2	3	4	6	7	8	10	11	12	13	14	16	17	18	20
24	N/A	N/A	1	2	3	4	6	7	9	10	11	13	14	15	16	18	19	21
25	N/A	1	2	2	4	5	6	8	9	10	12	13	14	16	17	18	20	21
26	N/A	1	2	3	4	5	6	8	9	11	12	14	15	16	18	19	21	22
27	N/A	1	2	3	4	5	7	8	10	11	13	14	15	17	18	20	21	23
28	N/A	1	2	3	4	5	7	8	10	12	13	15	16	18	19	21	22	24
29	N/A	1	2	3	4	5	7	9	10	12	13	15	17	18	20	21	23	25
30	N/A	1	2	3	4	5	7	9	11	12	14	16	17	19	20	22	24	26

N/A: *not applicable*, meaning LQAS cannot be used in this assessment because the coverage is either too low or too High to assess an SA.

: Shaded cells indicate where *alpha* or *beta* errors are $\geq 10\%$.

: hashed cells indicate where *alpha* or *beta* errors are $> 15\%$.

II. CONSENT TO PARTICIPATE IN RESEARCH STUDY

STUDY TITLE: Empowering New Generations to Improve Nutrition and Economic Opportunities (ENGINE) in Ethiopia: LQAS Mother and Children's Survey

BACKGROUND AND PURPOSE:

You are being asked to take part in a study carried out by Save the Children International as part of the ENGINE program being carried out by Save the Children. The goal of the ENGINE program is to improve the health and diet of women and children in Ethiopia in order for them to lead healthy and productive lives. By diet, we mean not just the type of food being eaten, but that the right types of food are being eaten in order to grow properly and be healthy. The reason for this study is to find out if the ENGINE program results in better health and diet of women and children.

We hope that this study will help the Government of Ethiopia to improve projects that prevent and treat hunger and poor diets in women and children. As a community member in one of the program *woredas*, we think that you will be able to provide valuable information to help us with our study. We would be grateful if you would let us interview you to find out more about the health and nutrition status of you and your children. We would like to take weight and height measurements of you and your children.

PROCEDURES: The interview should not take more than 15 minutes and we will be asking questions about what kind of care has been provided for you during your pregnancy. We will also be asking about the health and diet of your children under three years of age. Some of the questions will be about the types of food that are eaten in your household and some will be about your children's diet. While the results of this research will be published, the names of the people who have taken part in the study will not be shared with anyone else.

CONFIDENTIALITY AND RISK: The information we hope to collect will be limited to your child's health, growth and diet. We will also be asking about what health services and programs

are available in the area, and if your children have participated or benefited from these. The questions we will ask and the measurements we would like to take should not present any risk or discomfort to you or your child. Any information you provide will not be linked to either you or your child.

WITHDRAWAL OF PARTICIPATION: Should you decide at any time during the interview that you no longer wish to take part you may stop the interview and if you decide to do this we will not be upset. If you do not feel comfortable answering any of the questions you do not have to and you are free to stop the interview at any time.

COSTS BENEFITS TO YOU: We do not think that there is anything bad about taking part in this study although it will take a few minutes of your time. There are also no direct benefits to you. However, we are hopeful that the Government and organizations like Save the Children will use the information collected to provide better health projects and services in Ethiopia.

REQUEST FOR MORE INFORMATION: Before you join the study, we will answer any questions you have. If you join the study, you can ask questions at any time and we will be happy to answer them for you.

SIGNATURE: I confirm that the purpose of the research, the study procedures, the possible risks and discomforts as well as benefits have been explained to the participant. All questions have been answered. The participant has agreed to participate in the study.

Signature of Person Obtaining Consent

Date

III. Survey Questionnaire

Mother and Child Survey Questionnaire for LQAS survey

Date of the survey: / /

D D M M Y Y Y Y

Lot name _____

Village Name: _____

Mother ID:

Name: _____

Household ID: / /

woreda village mother id

Age (years):

Household size: people

Note: before proceeding check how many children the mother has and what are their ages (in months) to confirm their eligibility!

I. Ante-natal care

Note: The ante-natal questions should be asked of the mother with regard to the time that she was pregnant with her youngest child.

1. During your pregnancy for [NAME OF CHILD], did you take any tablets that was round and of brown colour given to you by the person you went to see?

YES NO

II. Child health

Child Identifying Data			
	NAME: _____	NAME: _____	NAME: _____
Child ID	<input type="text"/>	<input type="text"/>	<input type="text"/>
Age (months) OR	<input type="text"/>	<input type="text"/>	<input type="text"/>

Date of Birth	<input type="text"/> / <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> D D M M Y Y Y Y	<input type="text"/> / <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> D D M M Y Y Y Y	<input type="text"/> / <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/> D D M M Y Y Y Y
Sex	<input type="checkbox"/> Male <input type="checkbox"/> Female	<input type="checkbox"/> Male <input type="checkbox"/> Female	<input type="checkbox"/> Male <input type="checkbox"/> Female

Note: The next set of questions should be asked of the mother with regard to all her children aged 6 – 36 months old (Anti-helminthes for > 2 years)

2. In the previous six months, did the child take...?

	Name	Name	Name
Vitamin A?	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO
Anti-helminth?	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO	<input type="checkbox"/> YES <input type="checkbox"/> NO

	NAME: _____	NAME: _____
3. Have you ever breastfed [NAME OF CHILD]?	<input type="checkbox"/> NO → go to (22) <input type="checkbox"/> YES	<input type="checkbox"/> NO → go to (22) <input type="checkbox"/> YES
(3a) If YES, how long after birth did you first put [NAME OF CHILD] to the breast?	<input type="checkbox"/> immediately (<1 hour) <input type="checkbox"/> hours (<24 hours) <input type="checkbox"/> days (24 hours +)	<input type="checkbox"/> immediately (<1 hour) <input type="checkbox"/> hours (<24 hours) <input type="checkbox"/> days (24 hours +)

III. Mother Dietary Diversity and Child's Food Group Diversity

Note: Ask mother about her and her children 6-23 months: Since this time yesterday how many times have you eaten / taken any of the following things to eat or drink?

	Mother	NAME: _____ _____	NAME: _____ _____	NAME: _____ _____
(5) Plain water?	_____ times	_____ times	_____ times	_____ times
(6) Tinned, powdered, infant formula such as [INSERT LOCAL EXAMPLES], or milk (excluding breast milk)	_____ times	_____ times	_____ times	_____ times
(7) Sweetened or flavoured water, 'soda' drink, tea or infusion, soup, coffee, broth or homemade beer	_____ times	_____ times	_____ times	_____ times
(8) Any food made from grain such as millet, wheat, barley, sorghum, rice, teff, maize	_____ times	_____ times	_____ times	_____ times
(9) Any food made from fruits or vegetables that have yellow or orange flesh such as carrots, pumpkin, squash, red sweet potatoes, ripe mangoes, and papaya	_____ times	_____ times	_____ times	_____ times
(10) Any dark green leafy vegetables (golmmen, spinach, lettuce, merengue leaves, sama, kale, aleko, shifra)	_____ times	_____ times	_____ times	_____ times
(11) Any food made from roots or tubers such as white potatoes, white yams, cassava, onions, beets, false banana, kocho	_____ times	_____ times	_____ times	_____ times
(12) Any food made from lentils, beans, guaya, peas, nuts (lewz), or seeds (peas, sesame, selyit, chickpea)	_____ times	_____ times	_____ times	_____ times
(13) Any other fruits or vegetables (eggplant, tomatoes, peppers, zucchini, fosoliya, avocado, lemon, green mango, banana)	_____ times	_____ times	_____ times	_____ times
(14) Liver, kidney, heart, or other organ meats.				

	<input type="text"/> <input type="text"/> <input type="text"/> times			
(15) Any meat such as beef, pork, goat, chicken, or duck.	<input type="text"/> <input type="text"/> <input type="text"/> times			
(16) Fresh or dried fish, shellfish, or seafood.	<input type="text"/> <input type="text"/> <input type="text"/> times			
(17) Cheese, yoghurt, or other milk products.	<input type="text"/> <input type="text"/> <input type="text"/> times			
(18) Eggs.	<input type="text"/> <input type="text"/> <input type="text"/> times			
(19) Sugary foods such as sweets, candies, chocolate, cakes, and biscuits.	<input type="text"/> <input type="text"/> <input type="text"/> times			
(20) Any food made with oil, fat, butter, or ghee.	<input type="text"/> <input type="text"/> <input type="text"/> times			

