



BASELINE ASSESSMENT: NUTRITION AT THE CENTER

(Final)

December 2014

CARE BENIN/TOGO
&
NATIONAL INSTITUTE OF STATISTICS AND ECONOMIC ANALYSIS
REPUBLIC OF BENIN

For further information concerning the baseline assessment, or to obtain a copy of the questionnaire, kindly contact:

The National Institute of Statistics and Economic Analysis (INSAE),
01 BP 323, Cotonou, Benin
Phone (+229) 21 30 74 48 /21 30 82 44
Fax (+229) 21 30 82 46
E-mail : insae@insae-bj.org Website: www.insae-bj.org

CARE Benin/Togo
06 BP 1153, Cotonou, Benin
Phone (+229) 21304400
E-mail : reception.benin@co.care.org
Website: www.care.org or www.care-international.org

CONTENTS

CONTENTS.....	3
LIST OF TABLES AND FIGURES.....	5
LIST OF ACRONYMS AND ABBREVIATIONS	6
EXECUTIVE SUMMARY	9
1. STUDY AREA.....	11
2. METHODOLOGY.....	12
2.1. Survey Design.....	12
2.2. Sampling.....	12
2.3. Data Collection Tools	12
2.4. Enumerators	13
2.5. Ethics Considerations.....	13
2.6. Collection of Anthropometric Measurements.....	13
2.7. Data Management and Analysis.....	13
3. BASELINE FINDINGS	14
3.1. Demographic Characteristics of Households and Women.....	14
3.1.1. Women's Age and Martial/Household Status	14
3.1.2. Women's Attendance in School, Level of Education and Literacy.....	15
3.1.3. Household living standards.....	16
3.2. Agriculture and Fisheries Production	17
3.3. Food Preservation and Storage.....	18
3.4. Agricultural extension	19
3.5. Food security	19
3.5.1. Household Hunger Scale	19
3.5.2 Household Coping Strategies	20
3.5.3. Women's Dietary Diversity.....	20
3.6. Maternal health	21
3.6.1. Prevalence of Anemia in Mothers.....	21
3.6.2. Body Mass Index among Mothers	21
3.6.3. Prenatal Care.....	22
3.6.4. Type of staff consulted for prenatal care.....	23
3.6.5. Place of delivery.....	23
3.6.6. Attendance during delivery.....	23
3.6.7. Intake of iron tablets	23
3.6.8. Post-partum care	24
3.7. Infant and young child feeding practices	25
3.7.1. Early introduction to breastfeeding.....	25
3.7.2. Exclusive breastfeeding	25
3.7.3 Timely complementary feeding.....	27
3.7.4. Continued breastfeeding after one year.....	28
3.7.5. Introduction of solid, semi-solid or soft foods	28
3.7.6. Minimum feeding diversity.....	29
3.7.7. Complementary foods consumed the previous day by children 6- 23 months	29
3.7.8. Minimum number of meals.....	30
3.7.9 Bottle feeding	31

3.7.10. Person in charge of child feeding	31
3.7.11 Infant and young child feeding (IYCF) practices	32
3.8.1. Wasting.....	33
3.8.2. Underweight	33
3.8.3. Stunting	33
3.8.4. Children’s anemia.....	35
3.10. Child illness.....	35
3.10.1. Acute respiratory infections.....	35
3.10.2. Fever.....	36
3.10.3. Diarrhea.....	38
3.10.4. Other diseases.....	38
3.11. Water and sanitation	38
3.11.1. Access to water by households	38
3.11.2. Sanitation in the households.....	40
3.12 Women’s Empowerment	42
3.12.1 Women’s Mobility.....	42
3.12.2. Women’s participation in household decision making	44
3.12.3. Decision making concerning husband/partner and child diet.....	46
3.13. Community and social capital	47
3.14. Gender attitudes and beliefs: tolerance towards domestic violence	48
3.15. Participation in community groups or government social security programs	49
3.15.1. Existence of active programs or community groups in the village	49
3.15.2. Existence of government social security programs.....	50
3.15.3. Direct aid or assistance to women or members of their households	52
4. SUMMARY OF FINDINGS	55
5. RECOMMENDATIONS	57
6. BIBLIOGRAPHIC REFERENCES	58
7. Notes.....	59
Appendix 1: Distribution of children aged 6-23 months	59
Appendix 2: Nutrition at the Centre, definitions and thresholds for tests and measurements	59
Appendix 3: Nutrition at the Center; Results Framework.....	61
Appendix 4: Baseline Schedule Matrix (work study).....	62

LIST OF TABLES, FIGURES, AND BOXES

	Page	
Table 1	Sample Sizes: Mother and Children	12
Table 2	Distribution of women 15-19 years by marital status	14
Table 3	Distribution of women surveyed by sex of household head and relationship with household head	15
Table 4	Distribution of women by age group at first marriage	15
Table 5	Distribution of women by school attendance, level of education and literacy	15
Table 6	Percentage of Households based on sources of food consumed	17
Table 7	Producer of food consumed by household	17
Table 8	Percentage of households that preserved fruits and vegetables and stored crops planted within the past 12 months for future use	18
Table 9	Percentage of households visited by an agriculture advisor or an animal breeding technician within the past 12 months	19
Table 10	Percentage and frequency of households by Hunger Scale classification	19
Table 11	Coping Strategies	20
Table 12	Percentage of women who consumed each type of food group and total number of food groups consumed	20
Table 13	Percentage of mothers of children under three suffering from anemia, classified according to type of anemia	21
Table 14	Women's body mass index (BMI)	22
Table 15	Nutritional status of women using arm measurement indicator (MUAC)	22
Table 16	Percentage of women receiving prenatal care	22
Table 17	Iron tablet intake during pregnancy	24
Table 18	Percentage of women based on post-partum consultations after their last delivery	24
Table 19	Percentage of women based on the timely initiation of breastfeeding of children 0-23 months	25
Table 20	Percentage of mothers who report giving their children a food or fluid other than breast milk during the first three days after birth	25
Table 21	Exclusive breastfeeding and early feeding practices (0-5 months)	26
Table 22	Feeding practices for 0-5 month olds (within the preceding 24 hours)	27
Table 23	Continued breastfeeding 12-15 months and 16-23 months	28
Table 24	Percentage of children (6-8 months) who received solid, semi-solid, or soft foods the previous day	29
Table 25	Percentage of children 6-23 months consuming foods from different food groups	29
Table 26	Percentage of children 6-23 months who consumed foods rich in iron	30
Table 27	Average and median meal frequency by age group, based on current breastfeeding status	30
Table 28	Percentage of children 0-23 months bottle fed, by age group	31
Table 29	Percentage of children, according to person responsible for providing the main meal	31
Table 30	Percentage of children who are given an incentive to eat	32
Table 31	Infant and Young Child Feeding Practices	32
Table 32	Malnutrition status in children: Wasting, Stunting, Underweight	34
Table 33	Percentage of children suffering from State 1 and State 2 Anemia	35
Table 34	Percentage of children 6-23 months based on the type of malnutrition and anemia state	35
Table 35	Percentage of children under 3 years based on the type of illness contracted within the two weeks before the survey	36
Table 36	Percentage of children under 3 years who have suffered from illness within the past two weeks based on socio-demographic characteristics	37
Table 37	Primary and secondary sources of drinking water, by percentage of households	38
Table 38	Primary water sources used, by percentage of households	38
Table 39	Months per year that secondary water sources are used, by percentage	39
Table 40	Percentage of women based on time spent to fetch water from primary source	39
Table 41	Percentage of households who treat water and the type of water treatment they use to obtain safe drinking water	40
Table 42	Percentage of the population who has a water conservation system	40
Table 43	Percentage of women who wash their hands at key moments	40

Table 44	Percentage of households who have detergents for washing hands	41
Table 45	What kind of toilet do family members usually use?	41
Table 46	Improved and unimproved toilet facilities, by percentage of households	42
Table 47	Percentage of women who are able to go alone to some places, accompanied to some places, or not go at all	43
Table 48	Percentage of women who habitually make decisions along or with their husband (1)	44
Table 49	Percentage of women who habitually make decisions along or with their husband (2)	46
Table 50	Percentage of women based on the type of support she can get from her community	47
Table 51	Women's responses to situations when a man is justified in hitting his wife, by percentage	48
Table 52	Gender Attitude Index, by percentage	49
Table 53	Percentage of women based on the presence of and participation in community groups/programs	49
Table 54	Percentage of women based on social security participation in the village	51
Table 55	Percentage of women who were given direct support	52
Figure 1	Proportion of Respondent Women Based on Age Group and Study Area	14
Figure 2	Distribution (in %) of households based on quintile wealth	16
Figure 3	Percentage of households with a kitchen gardens for food production and/or a water territory for fishing	18
Figure 4	Percentage of women based on health worker who attended the delivery of the last pregnancy	23
Figure 5	Percentage of infants exclusively breastfed and percentage of infants receiving solid, semi-solid or soft foods, based on the infant's age in months	27
Box 1	Determination of the non-monetary poverty index	16
Box 2	Definition of minimum meal frequency	31

LIST OF ACRONYMS AND ABBREVIATIONS

BMI	Body Mass Index
CNERS	National Ethics Committee for Research on Health
CNS	National Statistics Council
CPEET	Commission for Study, Survey and Data Processing Program
CSPRO	Census and Survey Processing System, a software package
EDSB	Benin Demographic and Health Survey
EMICoV	Integrated Modular Survey on Households Living Standards
HAZ	Height-for-age Z-score
HDDS	Household Dietary Diversity Score
INSAE	National Institute for Statistics and Economic Analysis
IRA	Acute Respiratory Infection
OMD	Millennium Development Goals
ONG	Non-Governmental Organization
OMS	World Health Organization
PTF	Technical and Financial Partner
USAID	United States Agency for International Development
WASH	Water, Sanitation and Hygiene
WAZ	Weight-for-age Z-score
WHZ	Weight- for-height Z-score
WHO	World Health Organization
IYCF	Infant, Young and Child Feeding

ACKNOWLEDGEMENTS

The technical and administrative coordination team of the baseline study of "Nutrition at the Centre" is composed of:

INSAE	CARE Benin/Togo
Alexandre BIAOU, Managing Director	Rotimy DJOSSAYA, Director
Djabar ADECHIAN, Director of Social Statistics	Bonaventure NZAVUGAMBONYIMANA, Programs Director
Awaou BACO BABA-MOUSSA, Chief Financial Officer	Daniel DJODJOUHOUIN, Responsible of Impact measurement and learning

The coordination team sincerely thanks all those who contributed to the success of this study: the staff of INSAE and CARE Benin/Togo, those involved in data collection and computing process, the health agents of the health zone of Adjohoun-Bonou-Dangbo, and lastly, the communal and local authorities of the communes of Dangbo and Bonou. The team received the technical support of CARE/USA in designing the main documents and the training of the field agents.

Revision and translation of the technical documents for the study were conducted by:

From INSAE	From CARE Benin/Togo
Djabar ADECHIAN	Huguette SEKPE
Raïmi A. ESSESSINO	Estelle CODO
Rémy HOUNGUEVOU	Pierre POUILLAIN
Mouchitaba LAWANI	Evelyne EZIN
Armelle AHAMIDE	
Eudes HOUNKPODOTE	

Training of enumerators and supervisory data collection team was conducted by:

From INSAE	From CARE Benin/Togo and CARE USA
Djabar ADECHIAN	Daniel DJODJOUHOUIN
Raïmi A. ESSESSINO	Estelle CODO
Rémy HOUNGUEVOU	Evelyne EZIN
Mouchitaba LAWANI	Pierre POUILLAIN
Armelle AHAMIDE	Imee CAMBRONERO ¹
Eudes HOUNKPODOTE	

Data processing, analysis, and reporting were conducted by:

Djabar ADECHIAN	Raïmi A. ESSESSINO
Mouchitaba LAWANI	Armelle AHAMIDE
Rémy HOUNGUEVOU	Eudes HOUNKPODOTE

The report was reviewed by:

¹ CARE USA

From INSAE	From CARE Benin/Togo and CARE USA
Alexandre BIAOU	Bonaventure NZAVUGAMBONYIMANA
Djabar ADECHIAN	Daniel DJODJOUHOUI
Raïmi A. ESSESSINO	Estelle CODO
Armelle AHAMIDE	Huguette SEKPE
Mouchitaba LAWANI	Evelyne EZIN
Rémy HOUNGUEVOU	Pierre POUILLAIN
	Ghislaine GLITHO ALINSATO

This report presents the main results of the baseline survey related to the initiative of the program “Nutrition at the Centre” of CARE Benin/Togo, conducted in Benin from February 3 to 20, 2014 by the National Institute of Statistics and Economic Analysis (*INSAE*) in partnership with CARE Benin/Togo. The survey was commissioned and financed by CARE Benin/Togo.

EXECUTIVE SUMMARY

Introduction

Nutrition at the Center is a comprehensive CARE program that seeks to improve nutrition outcomes for children under two and their mothers in the district of Ouémé, Benin, West Africa. The specific programmatic goals of N@C are to decrease stunting in children and decrease both mother and child anemia. The integrated program approach includes elements of food and nutrition security, sanitation and hygiene, and gender equality. Nutrition at the Center is currently being implemented in four countries: Benin, Bangladesh, Ethiopia, and Zambia

The Beninese National Institute for Statistics and Economic Analysis (*INSAE*) conducted the baseline survey to provide comprehensive data for both activity development and future program evaluation. The survey was implemented in two control sites: Athiéme and Grand Popo, both in the department of Mono, and two intervention sites: Dangbo and Bonou, both in the department of Ouémé. The survey was conducted from February 3 to February 20, 2014.

Methodology

The baseline study used a cross-sectional observational model that included questions administered by an interviewer, anthropometric measurements, hemoglobin level testing, and on-site observation. The target group included two specific demographic groups. The first group consisted of women 15-49 years who gave birth within the last 36 months, whose child was alive, and who had lived in the given community for at least the past six months. The second group contained children 6-35 months; these children were identified for anthropometric and hemoglobin level measurements.

Results

2,149 women participated in the survey. 1277 were located in the intervention areas and 872 were located in the control areas. The following key findings were identified as the most relevant characteristics for understanding the baseline status of the intervention and control areas.

- ✓ Nearly six out of every ten women surveyed (58.4%) had not received a formal education. This proportion represents 62.5% for the women in the project intervention area and 52.5% for those in the control area.
- ✓ On average, 15.22% of the sampled households are very poor. The proportion of very poor households is 16.86% in the intervention area and 14.09% in the control area.
- ✓ The diet of about half of the households (48.0%) is not diversified, meaning that daily food consumption comes from fewer than five food groups. The percentage of households with an undiversified diet is 50.2% in the intervention area and 44.7% in the control area.
- ✓ More than half of the women surveyed in the intervention and control areas are suffering from either mild or moderate anemia. The mild and moderate rates are demonstrated at 31.8% and 28.4% in the intervention area and 26.1% and 27.8% in the control area.
- ✓ Less than the half of the mothers in the intervention area (41.3%) went to a health facility for post-partum care. In the control area, less than 2/3 of mothers (64.7%) did the same.
- ✓ Less than half of the children under two years of age were put to the breast immediately after birth: 43.8% in the intervention area and 36.8% in the control area. 18.5% of the children in the intervention area and 25.5% of those in the control area were put to the breast within one hour after birth.
- ✓ The proportion of children 0-5 months who were fed other foods in addition to breast milk is significant: 15.5% in the intervention area and 20% in the control area.

- ✓ The proportion of children 6-23 months who received minimum meal frequency in the preceding 24 hours was 31.3% in the control area and 40.1% in the intervention area.
- ✓ In the intervention area, 17.4% of children from 6 to 35 months are underweight (3.4% are severe cases). In the control area, 14.4% of children are underweight. The proportion of underweight children is lower among girls than boys: 14% versus 20.8% in the intervention area and 12.4% versus 16.2% in the control area.
- ✓ Of the 33.8% of stunted children 6- 35 months in the intervention area, 22.8% are moderately and 11% are severely stunted. Of the 26.9% of stunted children 6-35 months in the control area, 19.3% are moderately and 7.6% are severely stunted.
- ✓ The height-for-age index shows that in the intervention area, about two out of every five children aged 6 to 35 months (33.8%) are stunted. The stunting is comprised of 22.8% moderate cases and 11% acute cases. In the control area, these rates are 19.3% and 7.6%, respectively.
- ✓ 32.5% of children under three years of age suffered from fever during the two weeks preceding the interview. This proportion was 27.9% for children in the intervention area and 39.4% for those in the control area. The prevalence of malaria was higher among girls (33.8%) than boys (30.5%).
- ✓ 25.7% of children under 3 years of age have suffered from cough in the past two weeks. Children aged 6-11 months saw the highest frequency of respiratory infections (28.3%).
- ✓ 19.2% of children in the study areas suffered from diarrhea within the last two weeks before the survey. This proportion was almost the same in the intervention area (19.6%) as the control area (18.6%).
- ✓ More than half of the households in the study have access to protected drinking water from a household or public source (78.4% in the intervention area and 61.2% in the control area).
- ✓ A large proportion of women fail to wash their hands before feeding their children (55.8% in the control area and 65.6% in the intervention area), after using the toilet (65.6% in the control area and 67.1% in the intervention area) and after changing a baby's diaper (32.9% in the control area and 48.3% in the intervention area).

Recommendations

Key findings from the baseline survey demonstrate significant gaps in household and nutrition practices that effect health outcomes for mothers and children; the objective of intervention activities should be to minimize these gaps.

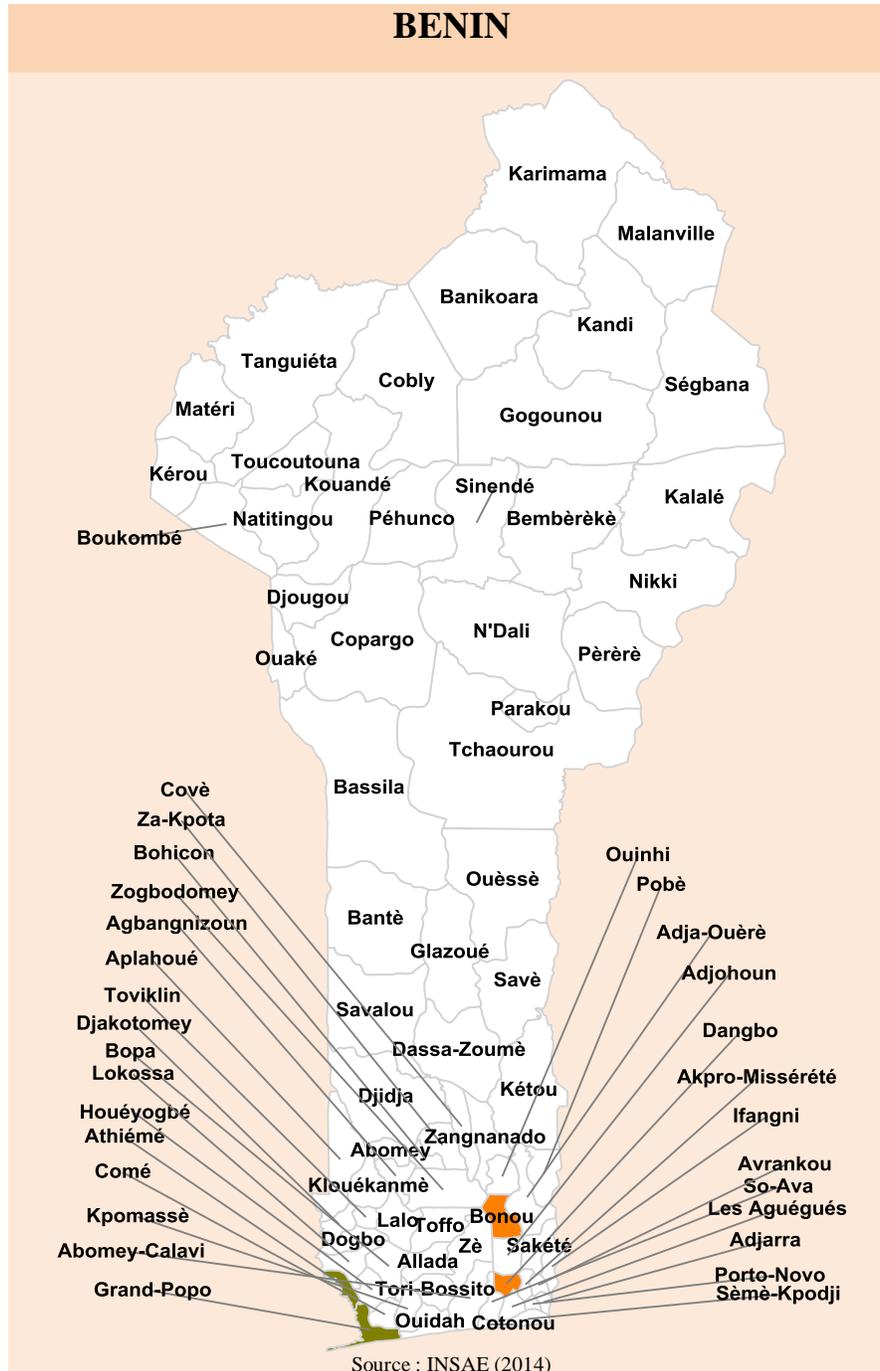
Increased yields of foodstuffs from kitchen gardens, combined with preservation of fruits and vegetables, directly target the issues of nutritional diversification within the household. The production and consumption of iron-rich foods that are currently cultivated, such as carrots, sweet potatoes, and palm nuts should be promoted for the benefit of both mothers and children, especially those suffering from anemia.

Education of appropriate breastfeeding practices, including timely introduction, exclusivity (specifically from water) and longevity, should be initiated. Supplemental activities regarding proper child nutrition, including frequency of feeding and the importance of multiple food groups, would complement the transition from exclusive to complementary breastfeeding. The promotion of post-natal consultations could be coupled with education regarding proper child dietary practices.

Construction of and education regarding basic toilet facilities would seek to reduce the amount of households practicing open defecation. Hand washing education and access to hand washing stations would further sanitation practices within the household and target childhood illness derived from inappropriate waste management. Activities for both men and women that promote the integration of women into community development groups would serve to disseminate information on the aforementioned nutrition and health practices. Further anticipated benefits from outreach towards women would include group solidarity and empowerment towards reducing domestic violence.

1. STUDY AREA

The baseline survey for Nutrition at the Center (N@C) was conducted in two control sites: Athiémé and Grand-Popo, both in the department of Mono, and two intervention sites: Dangbo and Bonou, both in the department of Ouémé. All four communities are located in the southern Benin; Grand-Popo is a coastal community. While not ethnically homogenous, communities in Southern Benin share common languages, cultural traditions, and social structures.



Intervention Areas: Bonou and Dangbo
Control Areas: Athiémé and Grand-Popo

2. METHODOLOGY

2.1. Survey Design

The technical documents and standardized questionnaire designed by CARE/USA were reviewed and adapted to the Beninese context. These adaptations were implemented during a framing working ship in Cotonou in November 2013. The survey was conducted in each target village after contacting the local authorities.

2.2. Sampling

The sample size was determined by using available demographic data for the villages in the intervention and control communities. This data was collected from population estimates by *INSAE* according to the 2002 general population and habitation census. The sampling frame is composed of 32 villages in the intervention communities and 32 villages in the control communities. The sampling strategy chosen was “random walk.” This method allowed for the calculation of inclusion probabilities. This method assumes that there is no mapping of the villages and that both a starting point and a continued path must be chosen by the enumerators. The sampling distribution is presented in Table 1.

Table 1: Sample Sizes: Mothers and Children

Department	Commune	Number of villages	Number of women aged 15-49 years	Number of children			Total
				0-5 months	6-17 months	18-35 months	
OUEME	BONOU	16	602	98	115	389	602
	DANGBO	16	675	114	103	458	675
	TOTAL	32	1277	212	218	847	1277
MONO	ATHIEME	16	516	142	100	274	516
	GRAND POPO	16	356	68	115	173	356
	TOTAL	32	872	210	215	447	872
ALL AREAS		64	2149	422	443	1294	2149

2.3. Data Collection Tools

The following modules were included in the household questionnaire:

- A. Identification of household
- B. Information on the child
- C. Information on the mother
- D. Basic information on the household
- E. Agricultural production and fisheries
- F. Food Preservation and storage
- G. Agriculture extension
- H. Adaptation strategies
- I. Level of hunger in households
- J. Women’s dietary diversity
- K. Women’s health/pregnancy
- L. Infant and young child feeding practices
- M. Responsive feeding
- N. Child illness
- O. Drinking Water
- P. Hand washing, sanitation and removal of children’s feces
- Q. Women’s empowerment
- R. Community groups and participation in government social security programs

- S. Woman's anthropometry and hemoglobin
- T. Child's anthropometry and hemoglobin

2.4. Enumerators

75 Enumerators were trained to conduct the baseline survey. 15 teams of five people per team were created (1 team leader, 2 investigating agents, 1 agent for the anthropometric measurement, and 1 agent for anemia testing). The team leader was responsible for compliance with the methodology, for choosing the sample, and the quality of data collected. The leader was also responsible for comprehensiveness, compliance with intervals, accuracy of anthropometric measures and compliance with the procedures for anemia testing. Two investigating agents were responsible for administering the questionnaire. The two agents in charge of measuring were responsible for the anthropometric measurements among women and children aged 6-23 months as well as anemia screening.

2.5. Ethics Considerations

The household questionnaire and documents explaining N@C were first submitted to the National Council for Statistics (CNS) for technical approval, and afterwards, to the National Committee for Program Study and Scientific Research for ethical compliance. The Commission in charge of Study programs, Surveys and Data Processing, reviewed the documents on February 14, 2014 and, with the commissioner recommendation, CNS authorized the questionnaire. Following this procedure, the household questionnaire and accompanying documents were sent to the National Ethics Committee for Research on Health (CNEERS) for approval. Permission for anemia sampling required assurance of confidentiality, deontology and ethics. CNEERS studied the technical documents to ensure confidentiality and protection of individual information, ultimately granting permission for the anemia testing.

2.6. Collection of Anthropometric Measurements

Hemoglobin testing was included to estimate the prevalence of anemia among children aged 6-23 months and their mothers aged 15-49 years. Consent from the parent/adult responsible for the child was requested. Consent was obtained after reading an information letter to the eligible person explaining the objective of the test, the risks of participating, the voluntary character of participating, and finally the procedural care, if necessary. Before taking the sample of blood, the finger was cleaned with alcohol wipes and air dried. Then, the fingertip (or the sole of the foot of very thin children under 1 year) was pricked using a retractable, sterile and non-reusable lancet. A drop of blood was put in a micro cell then placed in the HemoCue photometer which indicated the level of hemoglobin. These results were recorded in the household questionnaire and communicated to the person tested or to the parent/ responsible adult upon request. When the rate of hemoglobin was below the critical threshold (11 g/dl for children and 9 g/dl for women), the subject was referred to a local health facility. Anthropometric data was collected from children 6-23 months and their mothers. It was measured using height gauges (in a vertical position for women and children of two years old or above, and in horizontal position for children under two years) and weight using electronic scales. Arm circumferences were the primary measure used for pregnant women.

2.7. Data Management and Analysis

Following the data collection, the enumerators met to verify village and enumerator codes. Data entry was then performed by 19 agents who had previously completed four-day data entry training. One data entry agent had resigned after the training and did not complete any data entry. Data entry followed a specific format designed by CARE/USA. The data entry form was designed using *CSPRO* software based on the dictionary of variables. The option of double data entry was chosen in order to guarantee the best quality of data entry. The data entry was done under the coordination and the supervision of the division in charge of computer processing and publishing and the division responsible for social statistics. At the end of the data entry, the data bases were compiled and converted into *SPSS* format.

3. BASELINE FINDINGS

3.1. Demographic Characteristics of Households and Women

3.1.1. Women’s Age and Martial/Household Status

The age of mothers with who participated in the survey follows a distribution common to developing countries, peaking between 25 and 29 years for both the intervention and control areas. The average age of the women who took part in the survey was 28.7 years (29 years for the women in the intervention area and 28.2 years for those in the control area).

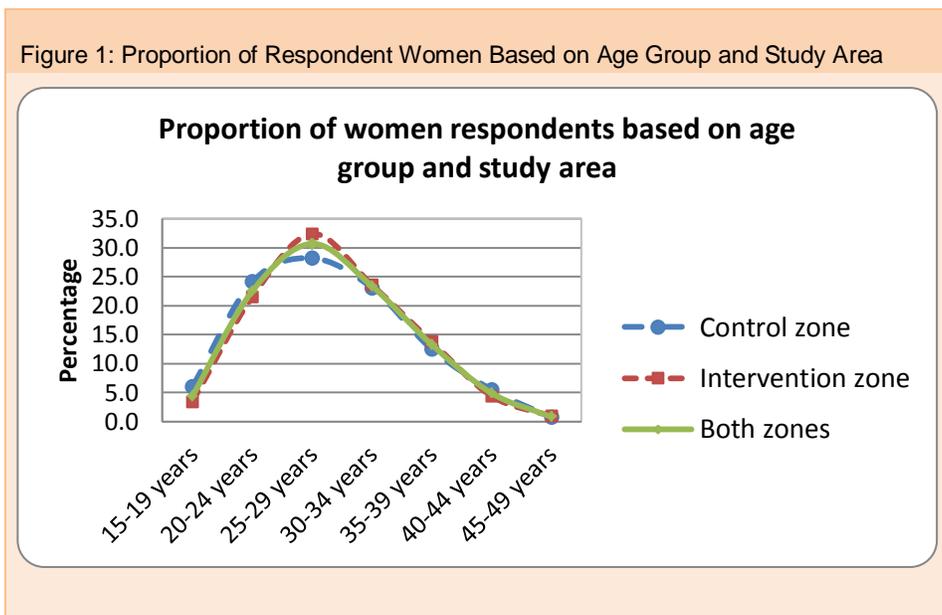


Table 2 provides information on the marital status of the women surveyed. 84.5% of the women were married: 56.0% in monogamy and 28.5% in polygamy. 13.7% of the women in the survey area lived in with a partner. There were very few single women (0.2%) and very few are separated, divorced or widowed women (1.5%). In Benin, as in many other countries in sub-Saharan Africa, the low number of widows/widowers and divorced persons is attributed to the rapid and frequent remarriage of women and to levirate practices (the inheritance of a wife by another male family member).

	Control area n=872	Intervention area n=1277	The whole study area
Marital status			
Married (monogamy)	54.5	57.1	56.0
Married (polygamy)	26.1	30.2	28.5
Divorced or separated	1.1	0.9	1.0
Widow	0.2	0.6	0.5
Single women (never married)	0.1	0.3	0.2
Cohabitation with a partner (monogamy)	12.8	7.8	9.9
Cohabitation with a partner (polygamy)	5.0	3.1	3.9
Total	100.0	100.0	100.0

Table 3 presents proportions of households based on the sex of the head of household. The majority of household heads are male. The proportion of households led by a woman is slightly higher in the control area than in the intervention area (10.4% versus 8.1%).

Table 3: Distribution of the women surveyed by study area based on the sex of the household's head and relationship with the household's head

	Control area n=872	Intervention area n=1277	The whole study area n=2149
Sex of the household head			
Men	88.9	91.5	90.4
Women	10.4	8.1	9.0
Joint (men and women)	0.7	0.4	0.5
Total	100.0	100.0	100.0

The women in the study area had their first marriage, on average, at the age of 20.7 years. This age was 21.5 years in the intervention area and 19.3 years in the control area. It is worth specifying that in Benin, Act N°2002-07, dated August 24, 2004 and establishing the Individuals and Family Code in article 123, states that the minimum age for marriage is 18 years.

Table 4: Distribution of women by age group at first marriage

Age at first marriage	Control area n=872	Intervention area n=1277	Whole study area n=2149
Below 15 years	3.8	1.5	2.4
15-19 years	59.5	43.1	49.5
20-24 years	29.7	46.6	40.0
25-29 years	6.2	7.7	7.1
30-40 years	0.8	1.0	0.9
Total	100.0	100.0	100.0

3.1.2. Women's Attendance in School, Level of Education and Literacy

Table 5 presents, by study area, the distribution of the women surveyed according to school attendance, level of education and literacy reached. To obtain information on the literacy level of those surveyed, those had never been to school and those had only primary level education were asked to read a sentence either French or a local language. This helped to classify them into three levels: can read an entire sentence, can read a few words of a sentence, and cannot read at all. Table 5 also shows that among the women surveyed, 71.8 % are unable to read in any dialect. The literacy rate of women is 76.6% in the intervention area and 64.8% in the control area.

Table 5: Distribution of women by school attendance, level of education and literacy

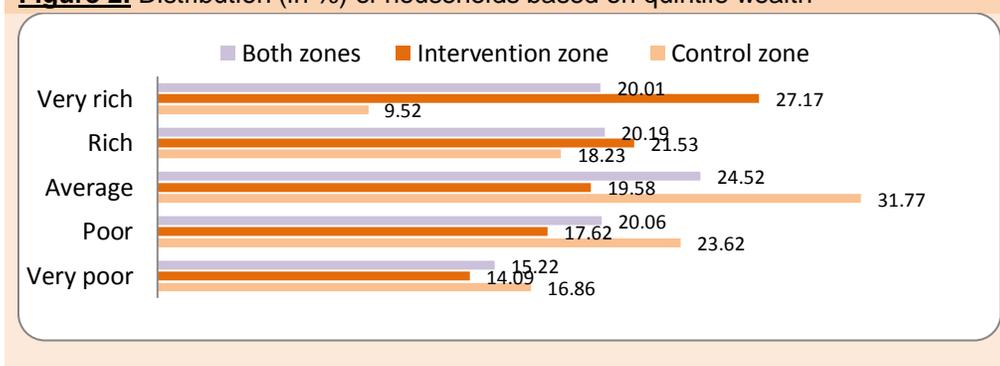
	Control area n=872	Intervention area n=1277	Whole study area n=2149
Did the woman receive a formal education?			
Yes	47.5	37.5	41.6
No	52.5	62.5	58.4

Table 5: Distribution of women by school attendance, level of education and literacy

	Control area n=872	Intervention area n=1277	Whole study area n=2149
Total	100	100	100
Highest level of education:			
Primary school incomplete	62.0	63.8	63
Primary school completed	8.0	3.8	5.7
Secondary school incomplete	29.5	31.0	30.3
Secondary school completed	0.5	0.6	0.6
Higher education incomplete	0.0	0.6	0.3
Higher education completed	0.0	0.2	0.1
Total	100	100	100
Literacy of the woman			
Unable to read	64.8	76.6	71.8
Can read a few words in a sentence	16.5	9.7	12.5
Can read a whole sentence	18.5	13.6	15.6
The sentence is not available in the local language	0.0	0.2	0.1
Blind /partially sighted	0.1	0.0	0.0
Total	100	100	100

3.1.3. Household living standards

Wealth quintile status was calculated for each household using a non-monetary poverty index, described in Box 1. Figure 2 demonstrates the relative wealth of households in the study.

Figure 2: Distribution (in %) of households based on quintile wealth

Box 1: Determination of the non-monetary poverty index

The non-monetary poverty dimension used in this study is “Living Conditions.” “Education” and “Health” were not taken into account because they are very low in the given communities. This index is therefore based on information related to household assets (car, radio, television, fridge, etc.) and other characteristics of the house (flooring materials, waste disposal system etc.). A factor analysis

method was used to score each household based on its properties and characteristics; analysis was done using *SPSS* software. The poverty threshold specific to each layer corresponds to the composite index of living conditions in a reference household under that same category.

3.2. Agriculture and Fisheries Production

The following table shows that almost all of the households in the intervention area as well as in the control area purchase food. Almost no households receive government food support. 73.5% of the households in the control area consume foods that they produce. This proportion is 54.7% in the intervention area.

Table 6: Percentage of households based on sources of foods consumed

Main sources of foods consumed by the household	Control area (n=872)	Intervention area (n=1277)
Foods produced	73.5	54.7
Foods bought	97.7	98.7
Foods in exchange for work	7.0	0.9
Government food support	0.2	0.0
Food support from NGOs	0.1	0.1
Foods on credit/borrowed	29.1	11.8
Charity/begging	0.1	0.1

In households who consume homegrown food, women stated that the husband is the main producer of these foods. This response was given by 62.3% of households in the control area and 45.7% by those in the intervention area.

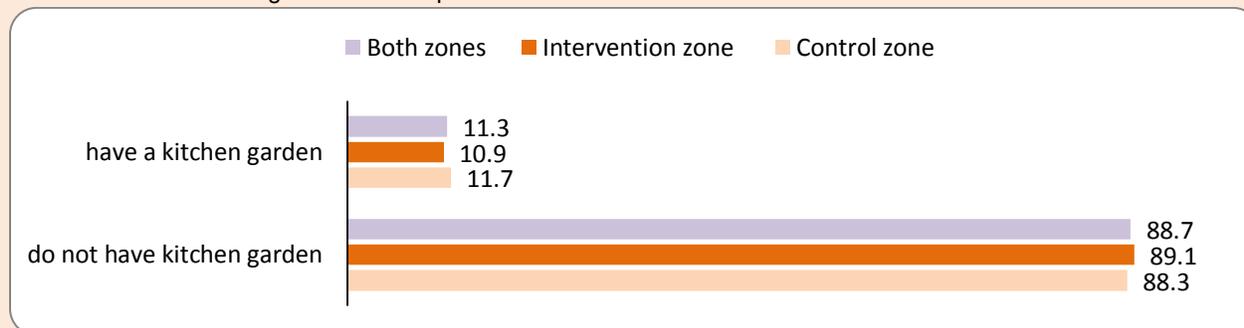
Table 7 : Producer of foods consumed by household

Who produces the food that you eat?	Control area (n=872)	Intervention area (n=1277)
You (the respondent)	47.1	22.3
Your husband	62.3	45.7
Other women in the family	4.3	4.3
Other men in the family	4.0	4.3
Neighbors	4.8	6.1
Collective farm	1.2	0.3

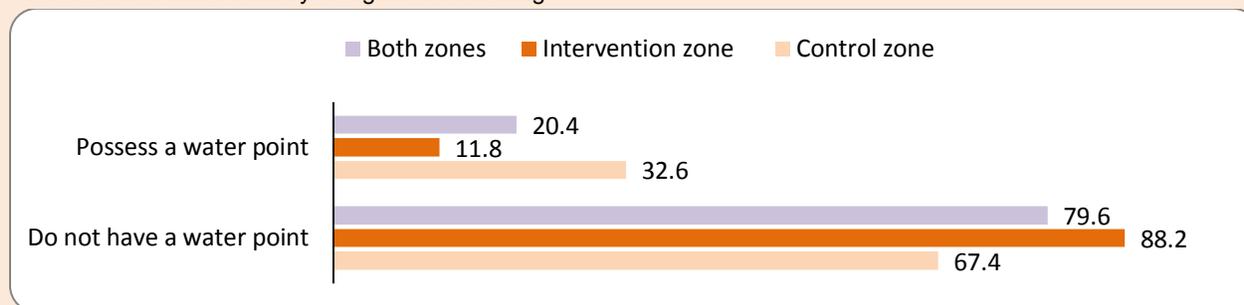
In both study areas, few households have kitchen gardens or for personal consumption. Water territories for fishing are slightly more common than kitchen gardens in the intervention area and significantly more common than kitchen gardens in the control area. These data are demonstrated in Figure 3.

Figure 3: Percentage of households with a kitchen gardens for food production and/or a water territory for fishing

Possession of a kitchen garden for food production



Possession of water territory designated for fishing



3.3. Food Preservation and Storage

In the project intervention area, only 7.6% of the households surveyed preserved fruits and vegetables for future use within the past 12 months. This percentage was 17.4% in the control area. Storage of crops (i.e. grains) was more common, as demonstrated in Table 8.

Table 8: Percentage of households that preserved fruits and vegetables and stored crops planted within the past 12 months for future use

		Control area (n=872)	Intervention area (n=1277)
Preservation of fruits and vegetables planted within the past 12 months	Yes	17.4	7.6
	No	82.6	92.4
Storage of crops planted within the past 12 months	Yes	30.0	23.3
	No	69.8	76.7

3.4. Agricultural extension

As previously mentioned, households are more likely to buy food than to produce it themselves. As such, within the past 12 months, only 12% of the households in the intervention area and 11% of those in the control area received a visit from an agricultural advisor, and even fewer consulted with an animal breeding specialist.

Table 9: Percentage of households visited by an agricultural advisor or an animal breeding technician within the past 12 months

	Control area (n=872)	Intervention area (n=1277)
Met or were visited by an agricultural advisor within the past 12 months		
Yes	11.1	11.9
No	88.9	88.1
Met or were visited by a breeding technician within the past 12 months		
Yes	2.9	7.1
No	96.9	92.8

3.5. Food security

3.5.1. Household Hunger Scale

The Household Hunger Scale (HHS) measures the proportion of households in the sample that are deprived of food, placing each household into one of three categories: Food Secure (little or no hunger), Food Insecure (moderate hunger), or Food Insecure (severe hunger). Classification of households was conducted by assessing the responses to the following questions in the survey, and is presented in Table 10.

- i. During the past 30 days, was there ever nothing to eat in your house because of a lack of resources to get food?
- ii. During the past 30 days, was there a time that a member of your household (including children) went to sleep hungry because there was not sufficient food?
- iii. In the past 30 days, did any member of your household (including children) spend an entire day and night without eating anything because there was not enough food?

Table 10: Percentage and Frequency of Households by Hunger Scale Classification

Classification	Control Area	Intervention Area
Food Secure (Little or No Hunger)	42.1% (n=367)	65.3% (n=834)
Food Insecure (Moderate Hunger)	47.7% (n=416)	29.2% (n=373)
Food Insecure (Severe Hunger)	10.2% (n=89)	5.5% (n=70)
Total	100% (n=872)	100% (n=1277)

5.5.2 Household Coping Strategies

When a household does not have sufficient food, coping strategies are utilized. The average number of days per week that a particular strategy was used in surveyed households is demonstrated in table 11.

Table 11: Coping Strategies	Intervention Area Mean No. of days used (\bar{X})	Control Area Mean No. of days used (\bar{X})
1. Eat less food or cheaper food	3.02	2.85
2. Borrow food, or rely on the help of a friend or relative	0.61	1.41
3. Buy food on credit	2.62	2.82
4. Gather or hunt food	0.18	0.47
5. Consume seeds	0.17	0.37
6. Send household members to eat with family or friends	0.56	0.49
7. Send household members to ask for charity	0.05	0.13
8. Eat less	2.26	2.15
9. Give adults less food so that young children may eat	1.61	1.32
10. Feed the family members who work at the expense of members who do not work	0.11	0.39
11. Reduce the number of meals eaten in a day	2.07	2.05
12. Spend days without eating	0.24	0.62
	n = 898	n = 555

As demonstrated, coping strategies that were most frequently used in both the intervention and control areas were (1) to eat less or to eat cheaper food (2) to purchase food on credit and (3) to eat less. Additionally, In both areas, during approximately two days per week, households limited the number of meals they consumed in order to cope with insufficient food.

3.5.3. Women's Dietary Diversity

Women's Dietary Diversity is assessed through determining, of nine specified food groups, the number of food groups that were consumed by the woman the previous day. A diversified dietary score is defined as the consumption of five or more food groups(stratified by the percentage of women consuming each food group, as well as total food groups consumed, is demonstrated in the table below.

Table 12: Percentage of women who consumed each type of food group and total number of food groups consumed	Intervention Area	Control Area
Food groups /WDDS		
1. Cereals/grains and tubers	98.5%	99.0%
2. Vitamin A rich fruits and vegetables	26.6%	31.0%
3. Other fruits and vegetables	70.6%	64.3%
4. Dark green leafy vegetables	43.1%	66.2%
5. Organ meat	0.4%	0.6%

6. Flesh foods	77.3%	71.7%
7. Eggs	4.9%	6.4%
8. Legumes, nuts and seeds	27.2%	22.0%
9. Milk and milk products	5.0%	2.4%
WDDS 5 or more food groups, during normal days	20.5%	26.6%
WDDS 4 or more food groups, during normal days	49.7%	54.8%
WDD: % of women who ate from 1 food group	3.8%	5.4%
WDD: % of women who ate from 2 food groups	15.7%	12.3%
WDD: % of women who ate from 3 food groups	30.5%	26.7%
WDD: % of women who ate from 4 food groups	29.2%	28.2%
Total	n = 1277	n = 872

The percentage of women consuming five or more food groups per day were reported at 20.5% and 26.6% in the intervention and control areas, respectively. This threshold differs significantly from those who consumed four or more food groups per day (48.7% in the intervention area and 54.8% in the control area). The data suggests approximately one quarter of women in each study area could achieve a diversified diet with the introduction of one additional food group into her daily diet.

3.6. Maternal health

3.6.1. Prevalence of Anemia in Mothers

Anemia is a disease characterized by a decreased number of red blood cells weakening the concentration of hemoglobin in the blood. Anemia is usually due to lack of dietary iron, vitamin B12 or other nutrients.

Women born between 1964 and 1998 living in the households chosen were given a hemoglobin test. According to the classifications (WHO, DeMaeyer, 1989), anemia is considered severe when the hemoglobin level is below 8.0 g/dl, moderate when this value is between 8.0 and 10.99 g/dl and mild when the value is between 11 and 11.99g/dl.

The results indicate that there are no women suffering from severe anemia in the intervention or control areas. However, more than half of the women surveyed are suffering from moderate and mild forms of anemia. Table 3: Mothers' anemia (women are not pregnant)

Table 13: Percentage of mothers of children under three suffering from anemia, classified according to type of anemia

Areas	Anemia-mother				Total	Total number
	No anemia case	Mild (11-11.99g/dl)	Moderate (8-10.99g/dl)	Severe (< 8g/dl)		
Control area	46.1	26.1	27.8	0.0	100.0	241
Intervention area	39.8	31.8	28.4	0.0	100.0	201

3.6.2. Body Mass Index among Mothers

During the survey, women had their weight and height measured. Pregnant women were excluded from these measurements. These weight and height measurements enabled the enumerators to determine the woman's Body Mass Index (BMI). BMI is an indicator which helps to demonstrate the lack or excess of weight as compared to height and is an indirect indicator of the socioeconomic status of the mother. To indicate chronic energy deficiency,

the threshold value 18.5 kg/m² is generally used. To indicate that the mother is overweight, the threshold is 25 kg/m² or more.

The results of the BMI calculation in the table below show that in the control area, over ten percent of women are suffering from chronic energy deficiency (BMI inferior to 18.5 kg/m²), versus 8.0% in the intervention area. 14.8 % of mothers in the intervention area and 12.5% of the mothers in the control area are overweight (BMI superior or equal to 25). 5,3 % of women in the intervention area and 4.3% of women in the control area are classified as obese (BMI above 30 or more).

Table 14: Women’s Body Mass Index (BMI)

Study area	Women’s BMI				Total	Number	Mean
	<18.5	18.5-24.9	25.0-29.9	>=30			
Control area	11.8	71.4	12.5	4.3	100.0	697	22.87
Intervention area	8.0	71.9	14.8	5.3	100.0	1070	23.65

A secondary approach to determine acute malnutrition among women, especially those who are pregnant, involves using the arm measurement. During the survey, the arm measurement was taken on the left² arm using a PB ribbon (Shakir’s strip), between the shoulder and the elbow. Based on the results in the following table, the proportion of women in the intervention area whose arm measurement was below the critical threshold (180 mm) was estimated at 0.2%. In in the control area, this proportion was 0.3%. The prevalence of acute moderate malnutrition among women represents 5.7% in the control area and 3.5% in the intervention area.

Table 15: Nutritional status of women using arm measurement indicator (MUAC)

Study area	Severe case (< 180 mm)	Moderated case (180 mm- 230 mm)	Normal status (>= 230)
Control area	0.3	5.7	94.0
Intervention area	0.2	3.5	96.3
The whole area	0.3	4.3	95.4

3.6.3. Prenatal Care

Medical supervision during pregnancy has an important influence on the mother and child’s health. WHO recommends at least four prenatal visits before delivery. The table below shows the distribution of mothers who had a live birth during the three years preceding the survey by the number of pre-natal visits they attended.

Table 16: Percentage of women receiving prenatal care

	1 Visit	2 Visits	3 Visits	4 or more Visits	Total
Intervention Area(n=1277)	3.0%	4.1%	9.2%	83.7%	100%
Control Area (n=872)	3.4%	5.6%	21.7%	69.3%	100%

² The arm should be hanging and relaxed during the reading of the measurement

3.6.4. Type of staff consulted for prenatal care

When the woman was consulted by many types of staff, only the most qualified provider was registered in the questionnaire. More than nine women out of ten (98.8%) met with a trained health personnel for prenatal consultations (doctor, nurse/mid-wife, nursing auxiliary, community agent). Most mothers visited nurses and mid-wives (91.1% in the intervention area and 89.9% in the control area).

3.6.5. Place of delivery

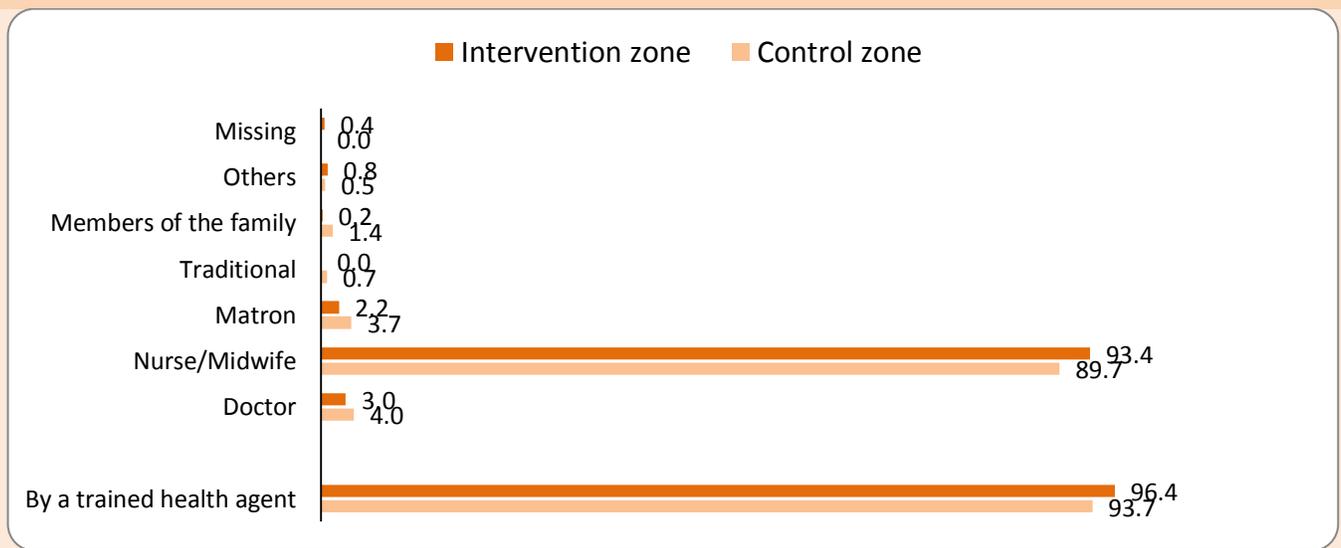
The quasi-totality of the births in the study area (97.7 %) occurred in a health center, mostly in the public sector (88.3 %). In 1.5 % of the cases, women delivered at home. In the intervention area, the percentage of women who have given birth in a health center is higher (98.6%) than in the project control area (96.3%).

It should, however, be noted that the proportion of women who gave birth in a public health center is higher in the control area than in the intervention area (95.1% versus 83.7%).

3.6.6. Attendance during delivery

The attendance of a trained health care worker during the delivery of the last child (under 3 years of age) was evaluated during the survey. The results of the data collection shown in Figure 4 demonstrate that most women had a trained health worker present at last delivery (93.7% in the control area and 96.4% in the intervention area).

Figure 4: Percentage of women based on health worker who attended the delivery of the last pregnancy



3.6.7. Intake of iron tablets

The intake of iron tablets by the mother during pregnancy helps avoid iron deficiency in the pregnant woman's body. It generally starts at the end of the first term of the pregnancy and continues until delivery. Thus, if the pregnancy is well monitored, a pregnant woman would have taken at least 90 iron tablets (one tablet daily from the first term to

the third term of pregnancy) before delivery. The percentage of women who took iron tablets during their last pregnancy, as well as the number of days during pregnancy that the tablets were taken, is shown below.

Table 17: Iron tablet intake during pregnancy		
	Control Area (n=872)	Intervention Area (n=1277)
Women who took any iron tablets during pregnancy	96.0%	96.6%
Of those who took iron tablets, the number of days during pregnancy the tablets were taken		
<30 days	13.6%	7.6%
30-59 days	16.1%	5.6%
60-89 days	18.9%	10.0%
90+ days	51.4%	76.8%

While the vast majority of women take some iron pills during pregnancy, only about half of those in the control area and three-quarters of those in the intervention are report doing so for the minimum recommended 90 days.

3.6.8. Post-partum care

The post-partum consultation is important for every woman who has recently given birth. It can be done by a doctor, or if the delivery and the post-partum period are normal, the midwife. The post-partum visit helps, especially the mother, to be sure of the good psycho-motor development of the child, to express her concerns, improve her knowledge, and benefit from advice for her wellbeing and that of her child. During the survey, the women who had live deliveries within the three years before the survey were asked if after delivery they had a post-partum check-up and if so, how long after delivery this check-up was done.

Table 18: Percentage of woman based on post-partum consultations after their last delivery					
Areas	Received any post-partum care after last delivery			Average number of days before post-partum visits	Total number
	Yes	No	Missing		
Control area (n=872)	64.7	34.4	0.9	12.0	872
Intervention area (n=1277)	41.3	58.5	0.2	16.4	1275
Whole of the study area (n=2149)	50.8	48.7	0.5	14.1	2147

The above table shows that in the intervention area, less than half of women (41.3%) went to a health center for post-partum check-up, versus two thirds in the control area (64.7%). Women in the intervention area had, on average, spent more days (16.4 days) before going to a post-partum check-up after the last delivery, compared with the women in the control area (12.0 days).

3.7. Infant and young child feeding practices

3.7.1. Early introduction to breastfeeding

Breast milk is safe, transmits antibodies from the mother and provides nutritional elements necessary for the child during the first months of life. Moreover, breast milk helps to avoid nutritional deficiency and prevents diarrhea and other diseases. As such, women were questioned about the breastfeeding of their children. The data from their responses is presented in the following table.

Table 19: Percentage of women on the timely initiation to breastfeeding of children aged 0 -23 months

Time spent before first breastfeeding	Control area	Intervention area
Immediately	36.8	43.8
Less than one hour	25.5	18.5
From one to 24 hours	23.1	26.3
One day or more	14.4	11.4
Don't know/ Can't remember	0.2	0.0
Total	100.0	100.0

The data shows that less than half of the children under two years old were put to the breast immediately after birth (43.8% in the intervention area and 36.8% in the control area). 18.5% of the children in the intervention area were put to the breast one hour after birth versus 25.5% in the control area. In addition, 26.3% and 23.1% of the children in the intervention and control area were put to the breast between 1 hour and 24 hours after birth, respectively. During these first breast feedings (within the 24 hours after birth), the child receives the colostrum containing the mother's antibodies which are fundamental to the child's ability to resist many diseases; 11.4% of the children in the intervention area and 14.4% in the control area were not put to the breast within 24 hours after their birth.

3.7.2. Exclusive breastfeeding

According to UNICEF and WHO recommendations, all children should exclusively be breastfed from birth until six months of age. The early introduction of other liquids is not recommended because it may expose the children to pathogen agents and increase the risk of diseases, especially diarrhea. In addition, it reduces the intake of milk by the child, and therefore the suckling, which reduces milk production. Among economically poor populations, other liquids or foods may not be nutritious. After six months, breastfeeding must be complemented by other appropriate foods to satisfy the nutritional needs of the child and enable him/her to have the best growth possible.

Table 20: Percentage of mothers who report giving their child a food or fluid other than breast milk during the first three days after birth

Infants early feeding practices	Control area	Intervention area
Mothers who report giving their child a food or fluid other than breast milk during the first three days after birth	20.1	15.5
Mothers who report not giving their child a food or fluid other than breast milk during the first three days after birth	79.9	84.5
Total	840	1257

During the survey, information collected about the premature introduction of foods was obtained by asking the mother if in the three first days of life her child had been given another food or fluid in addition to breast milk. The data collection results show that 15.5% of the children in the intervention areas and 20.1% of those in the control were given another food or fluid in addition to breast milk.

Table 21: Exclusive breastfeed and early feeding practices (0-5 months)

	Control area	Intervention area
Percentage of Children (0-5) who were given only breast milk in the past 24 hours.	31.4	39.2
Percentage of children (0-5 months) who received another liquid/drink in addition to breast milk within the first 3 days after birth	52.0	53.4
Percentage of children (0-5 months) who received plain water within the first three days of life	37.6	40.7
Percentage of children (0-5 months) who received a solution against abdominal pain within the first three days of life	17.6	13.7
Percentage of children (0-5 months) who received a sugar and salt solution within the first three days of life	6.0	3.2
Percentage of children (0-5 months) who received fruit juices within the first three days of life	1.4	0.0
Percentage of children (0-5 months) who received infant formula within the first three days of life	3.7	1.4

37.6% of the children in the control area were given plain water within the first three days of life versus 40.7% in the intervention area. On average, 17.6% of the children in the control area received medicine for stomach ache within the first three days of life versus 13.7% in the intervention area. Concerning the children who received sugary and salty drinks within the first three days of life, an average of 6% are from the control area and 3.2% are from the intervention area.

The results of table 22 show that a relatively small number of infants from 0 to 5 months were given oral rehydration salts/*ORS* within the 24 preceding hours. It was the same case for those who had been given fruit juices or derivatives, or were given porridge.

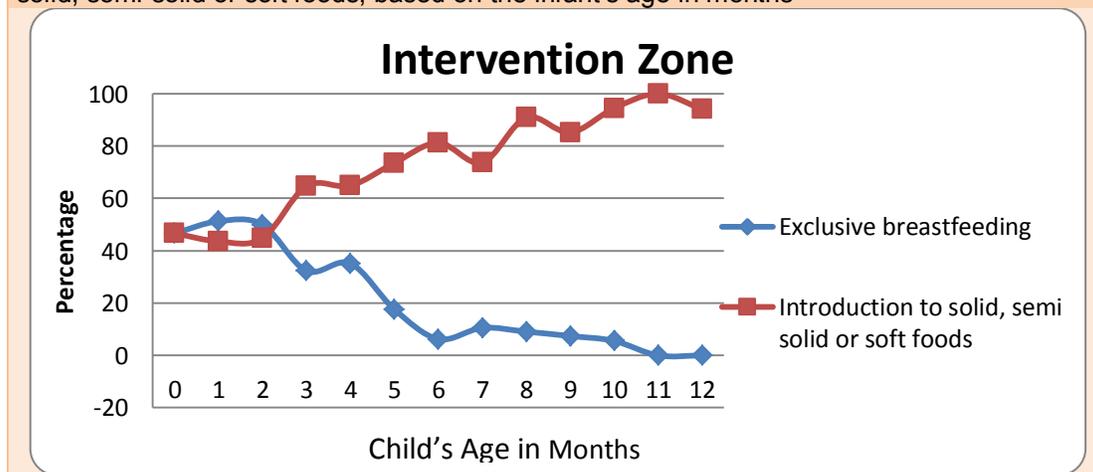
Table 22: Feeding practices for 0-5 month olds (within the 24 preceding hours)

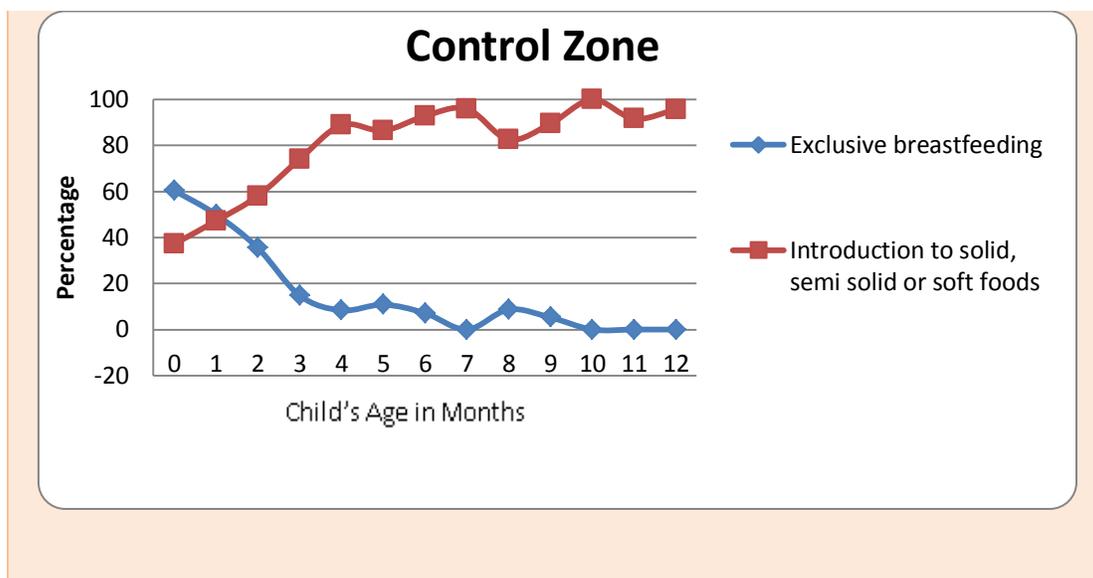
	Control area	Intervention area
Percentage of infants (0-5months) breastfed (yesterday)	100.0	100.0
Percentage of infants (0-5 months) who were given vitamin syrup/ syrup against cough/ any other medicine	6.7	9.5
Percentage of infants (0-5months) who received oral rehydration salts / ORS	0.0	0.5
Percentage of infants (0-5 months) who received plain water	59.0	53.1
Percentage of infants (0-5 months) who received infant formula	12.4	11.4
Percentage of infants (0-5 months) who received milk (fresh, canned, powder)	2.4	0.9
Percentage of infants (0-5 months) who received juices or derivatives	1.0	0.0
Percentage of infants (0-5 months) who received light stock	30.5	5.2
Percentage of infants (0-5 months) who received other water derivative liquids	0.0	0.0
Percentage of infants (0-5 months) who received milk or yogurt	1.0	0.5
Percentage of infants (0-5 months) who received porridge	1.0	0.5
Percentage of infants (0-5 months) who received tea or coffee	1.4	1.4
Percentage of infants (0-5 months) who received other liquids	3.8	5.7

3.7.3 Timely complementary feeding

Figure 5 demonstrates the point at which solid, semi-solid or soft food were introduced into the child's diet.

Figure 5: Percentage of infants exclusively breastfed and percentage of infants receiving solid, semi-solid or soft foods, based on the infant's age in months





Infants under 6 months who have been given milk (fresh, canned, powder) represent 2.4% in the control area and 0.9% in the intervention area. 30.5% of the infants in the control area and 5.2% in the intervention area were given light stock. The same proportion of infants (1.4%) in the control area as well as in the intervention area was given tea or coffee. Finally, 3.8% of infants in the control area and 5.7% in the intervention area had been given other liquids other than milk.

3.7.4. Continued breastfeeding after one year

On average, 94.6% of children 12-15 months were breastfed within the past 24 hours in the control area (92.5% in the intervention area). 70.7% of children 16-23 months were breastfed in the control area within the past 24 hours versus 47.4% in the intervention area.

Table 23: Continued breastfeeding 12-15 months and 16 - 23 months

	Children 12-15 months		Children 16-23 months	
	Percentage of children breastfed within the past 24 hours	Total number	Percentage breastfed within the past 24 hours	Total number
Control area	94.6	74	70.7	184
Intervention area	92.5	67	47.4	312
Entire study area	93.6	141	56	496

3.7.5. Introduction of solid, semi-solid or soft foods

The results in table 24 show that in the both study areas, two thirds of the infants 6-8 months were given solid, semi-solid or soft foods the previous day. The proportion of these children is estimated at 49.1% for the intervention area and 80.6% in the control area. In the analysis of the current infants' breastfeeding status, less of the non-breastfed infants (6 -8 months) were given solid, semi-solid or soft foods the previous day. For the infants who breastfed, the proportion aged 6-8 months who were given solid, semi-solid or soft foods the previous day was estimated at 47.2%

in the intervention area and 80.0% in the control area.

Table 24: Percentage of children (6-8 months) who received solid, semi-solid or soft foods the previous day

		Percentage	Total number
Children non-breastfed	Control area	100.0	2
	Intervention area	75.0	4
	Whole study area	83.3	6
Children breastfed	Control area	80.0	60
	Intervention area	47.2	53
	Whole study area	64.6	113
All children	Control area	80.6	62
	Intervention area	49.1	57
	Whole study area	65.5	119

3.7.6. Minimum feeding diversity³

It is recommended that a baby be breastfed until at least six months before the adoption of feeding diversity. The analysis of the results of the following figure shows that on average, 23.1% of the children aged 6 to 23 months received minimum feeding diversity in the control area versus 27.7% of the children of the same age in the intervention area. For the children who were breastfed, the proportion of those who received the minimum feeding diversity was estimated at 21.1% for the control area and 21.6% for the intervention area. In non-breastfed children, these proportions were 32.8% for the control area and 38.5% for the intervention area.

3.7.7. Complementary foods consumed the previous day by children 6- 23 months

The analysis of the results in tables 25 and 26 reveals that in the past 24 hours, 49.0% of children 6- 23 months consumed dark green leafy vegetables in the control area versus 24.4% in the intervention area. 39.7% ate other vegetables in the control area versus 51.3% in the intervention area. Children ate more fruits rich in vitamin A in the control area (3.6% of the children) than in the intervention area (10.0% of the children). The proportions of children who consumed milk and dairy products and those of the children who consumed oil, fats or butter or derivatives are higher in the intervention area (3.8% and 35.1%) than in the control area (1.4% and 30.1%).

Table 25: Percentage of children 6-23 months consuming foods from different food groups

	Control area	Intervention area
Percentage of children who ate vitamin A-rich dark green leafy vegetables	49.0	24.4
Percentage of children ate other vegetables	39.7	51.3
Percentage of children who ate vitamin-A rich fruits	3.6	2.0
Percentage of children who ate other fruits	8.8	10.0
Percentage of children who ate organ meat	0.0	0.0

³ Minimum feeding diversity is measured in relation to people who have at least 4 groups of food the day before the survey.

Table 25: Percentage of children 6-23 months consuming foods from different food groups

	Control area	Intervention area
Percentage of children who ate flesh foods	1.6	0.8
Percentage of children ate eggs	5.8	3.0
Percentage of children who ate legumes and nuts	18.6	20.6
Percentage of children who ate milk and dairy products	1.4	3.8
Percentage of children who ate oil, fats or butter or derivatives	30.1	35.1
Percentage of children who ate enriched foods	2.8	4.8
Percentage of children who ate condiments	62.0	66.0
Percentage of children who ate sugary foods like biscuits, candies, chocolates and pastries	15,1	20,7
Percentage of children who ate other foods	5,2	3,3

Table 26: Percentage of children aged 6 to 23 months who consumed foods rich in iron

	Control area	Intervention area
Percentage of children from 6 - 23 months who consumed iron-rich foods	41.3	59.8
Percentage of children from 6 - 23 months who were given meat	1.6	0.8
Percentage of children from 6 - 23 months who were given an iron-fortified foods	93.2	91.8

3.7.8. Minimum number of meals

The percentage of children who received at least the minimum number of meals for his/her age is demonstrated in table 24. Box 2 explains the definition of minimum meals frequency.

Table 27: Average and median meal frequency by age group, based on current breastfeeding status

	Control area		Intervention area	
	Average	Median	Average	Median
Non-breastfed children				
6-8 months	2.0	2.0	3.7	4.0
9-11 months	1.5	1.5	3.0	3.0
12-23 months	3.4	3.0	3.5	3.0
Breastfed children				
6-8 months	2.5	2.0	2.2	2.0
9-11 months	2.6	2.0	2.4	2.0
12-23 months	3.1	3.0	3.2	3.0

Box 2: Definition of minimum meal frequency

The minimum frequency of meals, consumed by the child within the previous 24 hours, is a proxy indicator for energy intake from foods other than breast milk. The definitions of minimum feeding frequency are:

- 2 times for infants 6 - 8 months who are breastfed
- 3 time for infants 9 - 23 months who are breastfed
- 4 times for infants 6-23 months who are not breastfed

"Meals" are comprised of meals or snacks in the last 24 hours.

Among the breastfed children in the intervention area, children aged 6 to 8 months eat more frequently (3.7 times daily on the average) compared with the children in the other age groups. Also, 50% of the children aged 6 to 8 months eat less than 4 times daily. For the breastfed children, the frequency of meals is higher for the age group of 12-23 months (3.2 times, on average) compared with the other age groups. Furthermore, 50% of children aged 12 to 23 months eat at least 3 times daily. In the control area, the average frequency of meals is higher for breastfed children than non-breastfed children regardless of age group. For breastfed children, the frequency of meals is higher for the age group of 12-23 months (3.1 times on average) compared to the other age groups. 50% of children aged 12 to 23 months eat less than three meals daily.

3.7.9 Bottle feeding

Table 25 shows the percentage of children 0- 23 months bottle-fed by age and area of study. The table indicates that more children are bottle fed in the control area than in the intervention area, regardless of age group.

Table 28: Percentage of children 0 to 23 months bottle fed, by age group

	Control area	Intervention area
0-5 months	76.7	54.7
6-11 months	73.8	59.8
12-23 months	58.6	28.2

3.7.10. Person in charge of child feeding

The survey was also interested in the identifying the person responsible for feeding children older than 6 months for the main meal. In the following table, the data reveals that in the intervention as well as in the control area, the person in charge of feeding the child the main meal was the child's mother (95.7% and 94.1%, respectively).

Table 29: Percentage of children, according to the person responsible for providing the main meal

Person in charge of the infant's feeding for the main meal	Control area	Intervention area
The mother	94.1	95.7
The father	1.1	0.2
The grand-mother	0.9	1.6
The aunt (mother's sister)	0.2	0.2
Child's sister or brother	0.8	0.3
Others	3.0	2.1
Total number of children	665	1061

In almost half of all cases, the person responsible for the infant's feeding encourages the child to eat: 43.3% of the infants of six months or above in the intervention area and 49.8% of those in the control area are regularly encouraged to eat.

Table 30: Percentage of children who are given an incentive to eat

	Control area	Intervention area
Action is taken to encourage the child to eat	49.8	43.3
No action is taken to encourage the child	50.2	56.7
Total number of children	665	1059

3.7.11 Infant and young child feeding (IYCF) practices

The follow table presents a summary of key IYCF indicators in the intervention and control areas. IYCF Indicator 4, continued breastfeeding at 12-15 months, presents the strongest percentages of all indicators in both the intervention and control areas. IYCF Indicator 7 (Minimum acceptable diet 6-23 months) is of particular concern, with very low percentages in both study areas.

Table 31: IYCF Practices: Sample Size, Percentage, and Confidence Intervals

Indicators	Intervention Area				Control Area			
	N*	n*	%	CI*	N	n	%	CI
IYCF1: Timely Initiation of Breast Feeding (0-23) months	714	442	61.9	58.3% - 65.4%	578	359	62.1	58.1% - 66.0%
IYCF2: Exclusive Breast Feeding (0-5 months)	214	92	43.0	36.5% - 49.7%	204	72	35.3	29.1% - 42.1%
IYCF3: Introduction of Solid/Semi-solid or soft food (6-8 months)	53	19	35.8	24.3% - 49.3%	64	47	73.4	61.5% - 82.7%
IYCF4: Continued Breast feeding at (12-15 months)	64	59	92.2	83.0% - 96.6%	72	67	93.1	84.8% - 97.0%
IYCF5: Minimum Dietary Diversity (6-23 months)	500	144	28.8	25.0% - 32.9%	374	86	23.0	19.0% - 27.5%
IYCF6: Minimum Meal Frequency (6-23 months)	500	224	44.8	40.5% - 49.2%	374	200	53.5	48.4% - 58.5%
IYCF7: Minimum Acceptable Diet (6-23 months)	500	53	10.6	8.2% - 13.6%	374	50	13.4	10.3% - 17.2%
IYCF8: Iron Rich or fortified Solid/Semi-solid Foods (6-23 months)	500	326	65.2	60.9% - 69.2%	374	169	45.2	40.2% - 50.3%
IYCF9: Bottle Feeding (0-23 months)	714	293	41.0	37.5% - 44.7%	578	393	68.0	64.1% - 71.7%

N= sample size within the age range; n= number of events within the sample frame; CI= Intervals calculated at 95% confidence

3.8. Infant and young child nutritional status and health

Classically, there are two types of malnutrition: (1) Malnutrition through nutrient deficiencies occurs in two forms: general malnutrition deficiency and specific malnutrition deficiency (deficiency in iron, vitamin A, zinc, folic acid, calcium, vitamin D, vitamin C, Iodine, etc.) and (2) Malnutrition due to overfeeding leading to being overweight,

obesity or specific metabolic problems (type 2 diabetes, high cholesterol, etc.). In this report, we are interested in micronutrient malnutrition, especially *general deficiency*. This type of malnutrition is expressed in three ways among children under five years old: chronic malnutrition (stunting), acute malnutrition (wasting) and being underweight. For each child, anthropometric indexes height-for-age, weight-for-height and weight-for-age are calculated in Z-scores based on age, height and weight, by referring to WHO's multiracial reference population (WHO, 2006).

The children whose indexes are below two standard deviations of WHO's median norms are considered to be suffering from malnutrition and those below less than three standard deviations are considered to be suffering from the acute type of malnutrition. **Wasting, Underweight, and Stunting are shown in Table 29.**

3.8.1. Wasting

Acute malnutrition or wasting is the result of a recent rapid weight loss or a lack of weight gain. It gives the best reflection of the current nutritional situation of the child (at the moment of the measuring or in a recent past) and is highly influenced by the recent events in the life of the child (diseases, severe epidemic, etc.) or nutritional deficiency (drought, hunger periods, sudden or repeated change of diet, conflict, shocks or emergency situations). This type of malnutrition is diagnosed through the weight-for-height index.

The results show that general acute malnutrition is 5.4% (Z-score weight/height < -2) in the intervention area versus 6% in the control area. The two areas both fall between 5 and 10%, which represents bad nutritional situations based on the WHO threshold. Boys are more affected by acute malnutrition in the intervention area: the prevalence of acute malnutrition is 6.9% among boys against 4% among girls.

It must be highlighted that the prevalence of acute malnutrition varies according to age. Table 32 shows that the youngest age group that was measured (6 to 11 months) are the most affected by wasting, regardless of the study area.

3.8.2. Underweight

Underweight is diagnosed through the weight-for-age index. In the control area, the percentage of underweight children is highest in the 12-23 month age range, with an estimated 16.5% of children who are underweight, including 2.7% who are severely underweight (below -3 standard deviations). In the intervention area, the percentage of underweight children is also highest in the 12-23 month age range, with an estimated 18.9% of children who are underweight, including 4.9% who are considered to be severely underweight. . It is also noted that the proportion of underweight girls is consistently lower than that of the boys (14% versus 20.8% in the intervention area and 12.4% versus 16.2% in the control area). These percentages are shown in Table 32.

3.8.3. Stunting

Chronic malnutrition is characterized by low height for age, resulting in stunting. This indicator shows the cumulative effects of a long period of inadequate feeding practices or chronic pathology, or repeated episodes of morbidity early in the life of the child. Based on the results of the table concerning the height-for-age index, the age group most affected by stunting is 24-35 months. 40.3% of children in the intervention area in this age group are stunted, with 13.1% qualifying as severely stunted (below -3 standard deviations). In the control area, stunting among 24-35 month olds is shown at 35.7%, with 8.8% of cases qualifying as severely stunted. Again, stunting is more prevalent among boys than girls in both the intervention and control areas: 29.6% versus 38.1% in the intervention area and 26.1% versus 27.6% in the control area. The hypothesis that the girl is usually closer to the mother's side, thus

nibbling on foods more than the young boy, who is off playing games, may be suggested to explain the disparity between boys and girls.

Table 32: Malnutrition Status in Children: Wasting, Stunting, Underweight

Areas	Characteristics of the children	Height-for-age		Weight-for-height			Weight-for-age			N	
		Below -3 Z	Below -2 Z	Below -3 Z	Below -2 Z	Below +2 Z	Below -3 Z	Below -2 Z	Below +2 Z		
Intervention area	Age group										
	6 - 35 months	11.0	33.8	1.3	5.4	0.0	3.4	17.4	0.5	1062	
	6 - 11 months	1.8	7.2	0.9	7.3	0.0	1.8	12.6	1.8	112	
	12 - 23 months	10.6	32.1	1.0	7.3	0.0	4.9	18.9	0.5	390	
	24 - 35 months	13.1	40.3	1.6	3.8	0.0	2.7	17.4	0.2	560	
	Gender of the child										
	Girl	8.3	29.6	1.1	4.0	0.0	2.3	14.0	0.2	529	
Boy	13.6	38.1	1.5	6.9	0.0	4.5	20.8	0.8	533		
Control area	Age group										
	6 - 35 months	7.6	26.9	1.1	6.0	0.0	3.2	14.4	0.2	662	
	6 - 11 months	3.7	6.5	1.9	8.4	0.0	2.8	7.5	0.9	107	
	12 - 23 months	7.7	25.3	1.1	8.0	0.0	2.7	16.5	0.0	261	
	24 - 35 months	8.8	35.7	0.7	3.4	0.0	3.7	15.0	0.0	294	
	Gender of the child										
	Girl	6.2	26.1	1.2	5.9	0.0	4.0	12.4	0.0	322	
Boy	8.8	27.6	0.9	6.2	0.0	2.4	16.2	0.3	340		

3.8.4. Children's anemia

As illustrated by De Maeyer (1989), two levels of children's anemia are considered: (1) State 1 anemia concerns children whose concentration of hemoglobin in the blood is inferior to 10.5g/dl and (2) State 2 anemia concerns children whose concentration in hemoglobin in the blood is inferior to 11g/dl .

Table 33: Percentage of children suffering from State 1 anemia (cut-off <105g /l or 10.5g/dl) and State 2 anemia (cut-off <110g /l or 11.0g/dl)

Area	Anemia (cut-off <10.5g/dl)		Total	Total number
	Yes	No		
Control area	43.6	56.4	100.0	374
Intervention area	30.2	69.8	100.0	500

Area	Anemia (cut-off <11.0g/dl)		Total	Total number
	Yes	No		
Control area	54.5	45.5	100.0	374
Intervention area	37.6	62.4	100.0	500

The following table presents the distribution of children from 6 - 23 months according to the type of malnutrition and their status of anemia. The results of this table indicate that in the intervention area, the proportion of the children suffering from severe stunting is higher among children suffering from anemia (9.8%) than among children who are not suffering from anemia (8.1%). Concerning wasting and underweight children, these proportions are lower among children suffering from anemia than among those who are not.

Table 34: Percentage of children 6 – 23 months based on the type of malnutrition and their anemia state

		Height-for-age		Weight-for-height			Weight-for-age		
		< -3 Z	< -2 Z	< -3 Z	< -2 Z	> +2 Z	<-3 Z	< -2Z	> +2Z
		Intervention area	No anemia	8.1	27.9	1.2	8.1	0.0	4.6
	Anemia	9.8	23.5	0.7	5.3	0.0	3.3	19.6	0.0
	All Children	8.7	26.6	1.0	7.3	0.0	4.2	17.5	0.8
Control area	No anemia	6.4	20.6	2.5	10.3	0.0	2.0	13.7	0.0
	Anemia	6.7	18.9	0.0	5.5	0.0	3.7	14.0	0.6
	All Children	6.5	19.8	1.4	8.2	0.0	2.7	13.9	0.3

3.10. Child illness

During the survey, illness information was collected for all of children 0-3 years to estimate the prevalence of the leading child diseases (acute respiratory infections, fever and diarrhea).

3.10.1. Acute respiratory infections

Based on the official statistics from the Ministry of Health of Benin, in 2012 acute respiratory infections were the second cause of consultation and hospitalization among children 0-5 years. To assess the prevalence of these infections among the children, mothers were asked if their children suffered from cough within the two weeks before

the survey and if the cough was followed by short and fast breathing. Among these children under three years, it was demonstrated that 59.6 % suffered from a cough with a runny nose within the past two weeks before the survey.

Concerning cough with short and fast breathing, there is not a great difference between the intervention and the control area (59.1% and 60.3%, respectively). It is among children from 6-11 months (28.3%) that these respiratory infections are most frequent. There is a slight difference between boys and girls (26.2% and 25.0%). In addition, children whose mothers did not receive any formal education are more at risk (26.3%) than those whose mothers received a formal education (24.9%).

Table 35 : Percentage of children under 3 years based on the type of illness contracted within the two weeks before the survey

	Control area	Intervention area	Whole area of study
Children who have suffered from runny nose and cough	60.3	59.1	59.6
Children who have suffered from acute respiratory infections	23.8	27	25.7
Children who have suffered from fever	49.7	51.2	50.6
Children who have suffered from malaria confirmed by a health agent among those who had a fever	39.4	27.9	32.5
Children who suffered from diarrhea	18.6	19.6	19.2
Children whose feces contained blood	3.4	3.1	3.2
Children who were diagnosed with intestinal worms	8.5	12.4	10.8
Total number of children	871	1274	2145

3.10.2. Fever

Fever generally results from a bacterial or viral infection like flu, but it can also be the sign of a more serious issue such as malaria in malaria risk areas. The results in the above table show that in the survey area 50.6% of children suffered from fever within the two weeks preceding the interview. The prevalence of fever was 51.2% among children in the intervention area versus 49.7% for those in the control area. When the prevalence is considered, it is noted that fever was more frequent among children aged 6-11 months and 12-17 months (61.2 % and 59.8 %) than among younger children (36.5% for those between 0 and 5 months) and older children 24-35 months and 18-23 months (52.2% and 50.8%). There was not significant overall gender discrimination: 50.9% of boys are versus 50.2% of girls.

Table 36: Percentage of children under 3 years who have suffered from illness within the past two weeks based on socio-demographic characteristics

Socio-demographic characteristics	Children under 3 years				Children under 3 months who have suffered from fever	
	Cough with runny nose	Fast or difficult breathing	Fever	N	Percentage who suffered from malaria confirmed by a health worker	N
<u>Age of children (in months)</u>						
[0-5]	44.5	19.4	36.5	422	25.0	156
[6-11]	70.3	28.3	61.2	219	29.9	134
[12-17]	65.4	26.6	59.8	214	41.4	128
[18-23]	62.0	27.2	50.8	437	32.0	222
[24-35]	61.2	26.9	52.2	854	32.7	446
<u>Sex</u>						
Male	58.5	26.2	50.9	1077	30.5	548
Female	60.5	25.0	50.2	1070	33.8	539
<u>Mother's education</u>						
Formal education	59.1	24.9	50.7	889	37.2	452
No formal education	59.9	26.3	50.5	1249	28.5	632
<u>Mother's education level</u>						
Incomplete primary	60.4	23.7	53.8	561	39.3	303
Completed primary	68.6	21.6	43.1	51	22.7	22
Incomplete secondary school	53.7	26.3	44.4	270	33.3	120
Completed secondary school	80.0	20.0	80.0	5	25.0	4
Incomplete higher education	66.7	66.7	100.0	3	100.0	3
Completed higher education	0.0	0.0	0.0	1	--	--
<u>Area</u>						
Control area	60.2	23.6	49.7	872	38.9	434
Intervention area	59.0	27.0	51.1	1275	27.6	653
Whole study area	58.9	24.7	50.6	898	37.1	455

Additionally, during the survey, mothers whose children suffered from fever were asked if these children also suffered from malaria confirmed by a health agent within the two weeks before the interview. The results showed that 32.5% of the children under three years of age had suffered from malaria within the two weeks preceding the interview. This proportion is 27.9% for the children in the intervention area against 39.4% for those in the control area. The prevalence of malaria is higher among girls (33.8%) than boys (30.5%).

3.10.3. Diarrhea

Diarrheal diseases, due to their consequences (dehydration and malnutrition), present, directly or indirectly, a main cause of death of young children in developing countries. The results of the study show that 19.2% of the children in the whole study area had diarrhea within the two weeks preceding the survey. The proportion of the children who suffered from diarrhea was slightly higher in the intervention area (19.6%) than in the control area (18.6%).

3.10.4. Other diseases

Other questions were also asked about presence of blood in the children’s feces as well as on the diagnosis of intestinal worms within the two weeks preceding the survey. The results of the analysis show that 3.2% of the children 0-3 years of age had blood in their feces. This proportion varies by study area as in the intervention area, it was 3.1%, versus 3.4% in the control area. 10.8% of the children of the sample had intestinal worms. This proportion varies from 8.5% in the control area to 12.4% in the intervention area.

3.11. Water and sanitation

3.11.1. Access to water by households

Households were asked about their primary and secondary sources of drinking water. Sources were identified as either protected or unprotected*.

Table 37: Primary and secondary sources of drinking water, by percentage of households

		Control Area (n=872)	Intervention Area (n=1277)
Primary Source of Drinking Water	Protected	61.2	78.4
	Unprotected	38.8	21.6
Secondary Source of Drinking Water	Protected	3.4	21.5
	Unprotected	19.7	26.9
	No Secondary Source	76.9	51.6

The following table demonstrates the percentage of each type of primary water source that is used.

Table 38: Primary water sources used, by percentage of households

Primary Water Source	Control Area (n=872)	Intervention Area (n=1277)
Piped Water into Dwelling	0.3	2.0
Piped Water into Yard	4.9	3.8
Public Tap	42.8	44.6
Tubewell Borehole	6.2	24.3
Protected Dug Well	6.9	3.5
Unprotected Dug Well	27.3	8.1
Protected Spring	0.1	0.2
Unprotected Spring	3.1	0.4
Rainwater Collection	0.1	0.0
Cart With Small Tank	0.1	0.1
Surface Water	6.9	12.7
Other	1.2	0.4

Data in the preceding tables demonstrate that the majority of households in both study areas utilize protected sources as their primary water sources. A substantial proportion of households in both the control and intervention

***Protected Sources:** piped water into yard or dwelling, public tap, tubewell borehole, protected dug well, protected spring
Unprotected Sources: unprotected dug well, rainwater collection, surface water, unprotected spring,

lection is primarily

conducted outside of the dwelling. Half of households in the intervention area and three-quarters of households in the control area did not identify a secondary water source.

To understand the frequency at which households use secondary water sources, those who identified a secondary water source were asked how many months out of the year they typically used the secondary source.

Table 39: Months per year that secondary water sources are used, by percentage		
	Control Area (n=202)	Intervention Area (n=617)
<2 Months	18.3	26.3
2-3 Months	26.2	14.4
3-4 Months	20.8	20.4
4-6 Months	34.7	38.9

To address issues of access, women were asked how much time it took to fetch water from the primary source for drinking water. The majority responded that drinking water could be fetched in twenty minutes or less, as demonstrated in the responses below.

Table 40: Percentage of women based on time spent to fetch water from primary source							
Area	<10min	11 – 20min	21 – 30min	31 – 40min	41 – 50min	More than 51min	
Control area	36.2	26.0	14.8	5.9	3.6	13.4	
Intervention area	54.3	26.1	10.7	1.7	0.7	6.5	

A low proportion of the population treats the water regardless of the area. The analysis of the results in the following table reveals that, whatever the study area, more than 3/4 of the population do not use a water treatment method (78.0% in the control area and 90.0% in the intervention area), that is, only 10.0% of the population treats their water in the intervention area versus 22.0% in the control area.

The results from the following table show that 0.8 % of the households boil water in order to make it safer for drinking in the control area versus 0.2% in the intervention. It is also noted that 10.8% of the households add some drops of bleach to the water in the control area versus 6.3% in the intervention area. The proportion of households who filter using linen is 4.1% in the control area. No one uses this method in the intervention area. None of the households use a filter method or a solar disinfection method. In the control area. 3.4% of the households let the water stand for a while then separate it from the sediment afterwards, while only 1.3% of the households in the intervention area use this method. Concerning water treatment with purification tablets, 12.2% of the population in the control area uses purification tablets versus 5.8% in the intervention area.

Table 41: Percentage of households who treat water and the type of water treatment they use to obtain safe drinking water

Area	Percent of households that treat water		Percent of households that do not treat water					
Control (n=872)	22.0		78.0					
Intervention (n=1277)	10.0		90.0					
Area	Boil water	the Add bleach	Filter using linen	Use water filter	Solar disinfection	Let stand separate	and Purification tablets	
Control area								
Yes	0.8	10.8	4.1	0.1	0.0	3.4	12.2	
No	99.2	89.2	95.9	99.9	100.0	96.6	87.8	
Intervention area								
Yes	0.2	6.3	0.0	0.1	0.1	1.3	5.8	
No	99.8	93.7	100	99.9	99.9	98.7	94.2	

The following table shows the percentage of population who have a water conservation system, by study area. Regardless of study area, more than 95% of the population has a water conservation system (97.36% in the control area and 98.35% in the intervention area).

Table 42: Percentage of the population who has a water conservation system

Study area	Yes	No
Control area	97.36	2.64
Intervention area	98.35	1.65

3.11.2. Sanitation in the households

Women were questioned about the moments when they washed their hands. The results from the data collected were that regardless of the study area, most (95.2% in the control area and 93.7% in the intervention area) of the women always washed their hands before eating. The number of women who wash their hands before cooking was low in both areas (39.3% for the control area and 63.4% for the intervention area). Almost the same tendencies are observed concerning hand washing before feeding their child (55.8% in the control area and 65.6% in the intervention area), after using latrines (65.6% in the control area and 67.1% in the intervention area) and after changing babies diapers (32.9% in the control area and 48.3% in the intervention area).

Table 43: Percentage of women who wash their hands at key moments

	Before eating	Before cooking	Before feeding the child	After latrines	using After changing the babies diapers	Other
Control area (n=872)						
Never	1.4	25.0	17.4	5.3	27.2	99.0
Always	95.2	39.3	55.8	65.6	32.9	0.5
Sometimes	3.4	35.7	26.7	29.1	39.9	0.6
Intervention area (n=1277)						

Table 43: Percentage of women who wash their hands at key moments

	Before eating	Before cooking	Before feeding the child	After latrines	using After changing the babies diapers	Other
Never	1.6	13.3	16.1	12.9	26.1	96.2
Always	93.7	63.4	65.6	67.1	48.3	2.9
Sometimes	4.7	23.3	18.3	20.0	25.6	0.9

Regardless of the study area, a small proportion of the households surveyed use or have detergents (12.5% in the control area and 12.3% in the intervention area), or local detergents (17.1% in the control area and 19.2% in the intervention area) for hand washing.

Table 44: Percentage of households who have detergents for hand washing, by study area

	Hand washing	Detergents			Local detergents	
		Soap	Powder/ liquid/ paste	Liquid soap	Ash	Mud
Control area (n=872)						
Yes	12.5	11.1	1.9	0.3	3.4	1.0
No	87.5	88.9	98.1	99.7	96.6	99.0
Intervention area (n=1277)						
Yes	12.3	11.4	1.0	0.2	0.4	0.0
No	87.7	88.6	99.0	99.8	99.6	100.0

Households were categorized on the type of toilet facility usually used by household members. The following table demonstrates the distribution of different toilet facilities in the study areas.

Table 45: What kind of toilet facility do members of your household usually use?

Facility Type	Control Area (n=872)	Intervention Area (n=1277)
Flush or pour to piped sewer	0.0	0.2
Flush or pour to septic tank	0.0	0.4
Flush or pour to pit latrine	1.1	7.9
Fush or pour to elsewhere	0.7	0.1
Ventilated improved pit latrine	3.4	5.2
Pit latrine with slab	6.5	15.4
Pit latrine without slab	5.0	5.1
Composting toilet	0.2	0.1
Bucket	0.0	0.5
Hanging toilet	0.8	0.6
No facilities/bush or field	82.3	64.5
Total	100	100

As demonstrated in table 42, the majority of households in both study areas are without toilet facilities of any kind. Among those household who do have toilet facilities, pit latrines (ventilated, with slab, and without slab) make up the largest percentage of facilities.

Improved toilet facilities include the following: flush toilets connected to a piped sewer system, septic system, or pit latrine, improved ventilated pit latrines, pit latrines with slab, and composting toilets. Unimproved toilet facilities include: flushing or pouring to ‘elsewhere’, pit latrines without slabs, bucket and hanging toilets, and no facilities/bush or field.

Table 46: Improved and unimproved toilet facilities, by percentage of households			
	Improved	Unimproved	Total
Control (n=872)	11.2	88.8	100
Intervention n=1277)	29.2	70.8	100

3.12 Women’s Empowerment

The study of gender enables us to highlight and understand the disparities identified in the relationships between men and women. During the survey, a certain number of questions were asked in order to help evaluate the level of the indicators related to the women’s status. These questions were, among others, on the mobility of women, and their decision making power in the household and in the relationships with the husband/spouse.

3.12.1 Women’s Mobility

To study women’s mobility, questions were asked in order to understand if the woman could go to some places alone, if she may be accompanied, or not at all. These outings were: going to the market, searching for a water source, attending training sessions or adult classes, going to a health center, participating in community meetings, visiting close friends, going to the church or mosque, and going outside the village. The results in the following table show that regardless of the study area, nine out of ten women believed themselves capable of going out alone.

For particular mobility reasons, such as participation in trainings including adult classes, participation to community meetings, and visiting friends, the proportion of women who claimed not to be able to go alone at all was higher (4.6%, 3.1% and 2.3%, respectively). These proportions were 4.3%, 3.8% and 3.9% for the control area versus 4.8%, 2.7% and 1.3% for the intervention area.

Furthermore, some women answered that they can go to different places accompanied with somebody else, like a health center (4.9% of women in the whole area: 8.0% for the control area versus 2.7% for the intervention area). This was also the case or a training or adult classes (3.1% for the whole area: 5.6% for the control area versus 1.4% in the intervention area), community meetings (2.3% for the whole area: 3.5% for the control area versus 1.6% for the intervention area) and going outside the village (2.8% in the whole area: 3.2% for the control area versus 2.5% for the intervention area).

Table 47: Percentage of women who are able to go alone to some places, accompanied to some places, or not to go at all

Women mobility indicators	Control area (n=872)	Intervention area (n=1277)	The whole study area (n=2149)
Can you go alone, accompanied to the market to buy or sell things, or can you not go at all?			
Not at all	0.8	0.4	0.6
If someone accompanies me	1.1	0.6	0.8
Alone	98.1	99.0	98.6
Can you go fetch water?			
Not at all	0.5	0.1	0.2
If someone accompanies me	0.6	0.4	0.5
Alone	99.0	99.5	99.3
Can you go for training, including adult classes?			
Not at all	4.3	4.8	4.6
If someone accompanies me	5.6	1.4	3.1
Alone	90.1	93.8	92.3
Can you go to the health center (when you are sick)?			
Not at all	1.0	0.3	0.6
If someone accompanies me	8.0	2.7	4.9
Alone	90.9	97.0	94.5
Can you go to a community meeting?			
Not at all	3.8	2.7	3.1
If someone accompanies me	3.5	1.6	2.3
Alone	92.7	95.7	94.5
Can you visit some friends near your house?			
Not at all	3.9	1.3	2.3
If someone accompanies me	1.6	0.9	1.2
Alone	94.5	97.8	96.4
Can you go outside the village?			
Not at all	1.8	1.8	1.8
If someone accompanies me	3.2	2.5	2.8
Alone	94.9	95.6	95.4
Can you go to church or mosque?			
Not at all	5.3	0.2	2.2
If someone accompanies me	1.7	0.7	1.1
Alone	93.0	99.1	96.6

3.12.2. Women's participation in household decision making

The following table shows the proportions of women who habitually take part in the decisions listed, either alone or together with their husband/partner. It is noted that the proportion of decision making in relation to how money is made by the woman is more than 50% in both areas. Fewer women, however, make this decision alone. Concerning purchases for daily use in the household, women's participation is significant (slightly more than 50% in both areas). However, the woman is more likely to make this decision with her partner than alone. For the important purchases in the household (large expenditures), the decision is usually made by the husband.

A little over half of the women in the intervention and control areas are involved in the decision to engage in income generating activities. Very few women, however, are involved in the decision of how money made by the husband will be used. When it comes to the decision of selling an important household asset, only around 30% of women in each area take part in the decision making. It is noted that even during decision making concerning the woman's health, she is not always present. Indeed, about two women out of ten are allowed to make decisions related to their own health alone.

Table 48: Percentage of women who habitually make decisions alone or with their husband (1)		
Indicators of participation in decision making in the household	Control area n=872	Intervention area n=1277
In your household, who makes the decisions concerning your own health?		
You (the respondent)	29.5	20.1
Your husband	59.9	57.9
You and your husband	7.0	18.1
Other members	3.6	3.9
In your household, who habitually makes decisions concerning the health of your child		
You (the respondent)	21.4	15.1
Your husband	63.4	54.1
You and your husband	11.6	26.6
Other members	3.5	4.2
In your household, who habitually makes decisions concerning important purchases in the household		
You (the respondent)	7.5	7.7
Your husband	72.7	67.8
You and your husband	17.1	22.2
Other members	2.7	2.2
In your household, who habitually makes decisions concerning purchases of the daily needs		
You (the respondent)	45.6	25.1
Your husband	37.8	44.0
You and your husband	13.9	28.8
Other members	2.7	2.1
In your household, who generally decides when you visit family, extended family or friends		

Table 48: Percentage of women who habitually make decisions alone or with their husband (1)

Indicators of participation in decision making in the household	Control area n=872	Intervention area n=1277
You (the respondent)	13.9	10.2
Your husband	54.1	53.8
You and your husband	28.7	34.0
Other members	3.3	2.1
In your household, who generally decides when your household will visit family/extended family		
You (the respondent)	10.8	8.5
Your husband	55.7	53.2
You and your husband	30.2	36.3
Other members	3.3	2.0
In your household, who generally decides how the money you earn is used		
You (the respondent)	56.2	41.0
Your husband	34.3	31.0
You and your husband	7.9	26.4
Other members	1.6	1.7
In your household, who generally decides how to use the money earned by your husband		
You (the respondent)	5.6	4.2
Your husband	85.9	74.9
You and your husband	7.0	18.7
Other members	1.5	2.2
In your household, who generally decides when your family sells an important asset (like a cow)		
You (the respondent)	10.2	5.9
Your husband	66.9	67.2
You and your husband	19.4	24.2
Other members	3.5	2.8
In your household, who generally decides when your family sells a small asset (like chicken)		
You (the respondent)	34.3	21.1
Your husband	45.9	48.2
You and your husband	16.6	27.9
Other members	3.2	2.7
In your household, who generally decides if you can work to earn money		
You (the respondent)	36.8	26.5
Your husband	46.0	40.0
You and your husband	15.6	31.9
Other members	1.6	1.6

3.12.3. Decision making concerning husband/partner and child diet

From the results in the following table, it is shown that the woman, more than any other person, is likely to make decisions concerning children's diet. As a matter of fact, for the whole study area, more than eight women out of ten habitually participate in decision making in relation to what to give the babies in addition to breast milk during the first three days of life. The same situation applies to the ideal moment to introduce soft or solid foods in the child's diet for the first time. The proportions are almost the same in both areas.

It is important to specifically note that concerning what to feed the baby in addition to breast milk during the first three days of life, over two-thirds of women makes the decision alone. This proportion is very similar when concerning the ideal moment to introduce a soft of solid food for the first time.

Women participate less in decisions related to the when they have sexual relations with their husband. As a matter of fact, 3.1% of the women in the whole study area take this decision alone versus 27.7% who make it together with their husband or the partner. Usually, it is the husband/partner alone who makes this decision.

Table 49: Percentage of women who habitually make decisions alone or with their husband (2)

Indicators of decision making on some relations with husband	Control area (n=872)	Intervention area (n=1277)	Whole study area (n=2149)
In your household, who decides when to have sexual relations with your husband			
You (the respondent)	4.1	2.4	3.1
Your husband	71.0	70.2	70.6
You and your husband	23.1	25.7	24.6
Other members	1.7	1.7	1.6
In your household, who generally decides if you should use family planning method			
You (the respondent)	11.0	13.7	12.7
Your husband	39.4	44.6	42.7
You and your husband	41.2	33.4	36.9
Other members	1.3	1.1	1.2
Don't know	7.1	7.2	6.5
In your household, who habitually decides to feed the baby something else in addition to breast milk during the first three days of life			
You (the respondent)	68.9	62.2	64.9
Your husband	17.2	14.8	15.8
You and your husband	11.1	17.2	14.7
Other members	2.8	5.9	4.6
In your household, who generally decides when to introduce soft or solid foods into the baby's feeding for the first time?			
You (the respondent)	71.8	66.0	68.4
Your husband	16.5	12.9	14.4
You and your husband	8.4	16.1	13.0
Other members	3.3	5.0	4.2

Table 49: Percentage of women who habitually make decisions alone or with their husband (2)

Indicators of decision making on some relations with husband	Control area (n=872)	Intervention area (n=1277)	Whole study area (n=2149)
If there is not enough food in the household, who decides the way the food will be shared among the members of the household?			
You (the respondent)	61.6	46.1	52.5
Your husband	22.9	20.3	21.4
You and your husband	13.2	31.1	23.9
Other members	2.3	2.5	2.4

3.13. Community and social capital

This section outlines the importance of the community in the life of individuals. Solidarity amongst individuals is common in Beninese society and is considered to be essential during trying times. The study therefore wanted to understand the social capital on which women can count during difficult periods.

Less than 50% of the women surveyed think the community will support them if they are going through difficulties in feeding their babies (both in the control area and in the intervention area). The support of the community is more important, according to women surveyed, in case they have difficulties offering enough food to their children. Community solidarity is stronger in the intervention area than in the control area: 58.4% in the control area versus 62.7% in the intervention area.

74.9% of the women surveyed in the intervention area versus 63.4% in the control area think that they can count on people in the community to take care of their children/ household if they need to go to hospital. 61.5% of the women in the intervention area against 51.4% in the control area agree that they can count on the people in the community to take care of their children/household if they must go out to work. Generally, more women surveyed in the intervention area think that community solidarity is strong as compared to women in the control area.

Table 50: Percentage of women based on the type of support she can get from her community

		Control area (n=872)	Intervention area (n=1277)
You can count on the help of the people in your community if you are facing difficulties breastfeeding your baby	Totally disagree	20.5	21.3
	Disagree	29.6	30.3
	Neither agree nor disagree	4.9	4.4
	Agree	33.5	38.2
	Totally agree	11.5	5.8
You can count on the help of the people in your community if you don't have enough safe food for your child	Totally disagree	15.4	6.0
	Disagree	19.9	21.3
	Neither agree nor disagree	6.3	10.0
	Agree	45.8	54.0
	Totally agree	12.6	8.7
You can count on the people in your community to take care of your children/household in case you need to go to hospital	Totally disagree	13.7	5.2
	Disagree	15.6	16.2
	Neither agree nor disagree	7.2	3.7
	Agree	50.6	62.8

Table 50: Percentage of women based on the type of support she can get from her community

		Control area (n=872)	Intervention area (n=1277)	
		Totally agree	12.9	12.1
You can count on the people of your community to help you in case a person in your family is violent or difficult	Totally disagree	11.2	4.1	
	Disagree	15.6	11.4	
	Neither agree nor disagree	9.6	8.4	
	Agree	46.8	60.7	
	Totally agree	16.7	15.4	
You can count on the people in your community to help take care of your children/household if you should go to work	Totally disagree	11.1	4.8	
	Disagree	15.2	16.8	
	Neither agree nor disagree	5.5	3.1	
	Agree	51.4	61.5	
	Totally agree	16.8	13.7	

3.14. Gender attitudes and beliefs: tolerance towards domestic violence

Gender equality is an integrated part of human rights. To assess the level of tolerance to domestic violence, women were asked if they think it is justified, that in certain situations, for a man to hit his wife.

Table 51: Women's responses to situations when a man is justified in hitting his wife, by percentage

Is a husband justified in hitting his wife if...	Intervention (n=1277)	Control (n=872)
If she goes out without telling him?		
No	70.7	79.5
Yes	29.3	20.5
If she neglects their children?		
No	69.3	78.3
Yes	30.7	21.7
If she argues with him?		
No	75.2	84.2
Yes	24.8	15.8
If she refuses to have sex with him?		
No	87.7	88.0
Yes	12.3	12.0
If she did not cook the food properly?		
No	83.4	87.0
Yes	16.6	13.0

Generally, a relatively significant proportion of women surveyed tolerate domestic violence. Indeed, in the intervention area, the proportion of women who tolerate domestic violence varies from 12.3% to 30.8% while in the control area this proportion varies between 12.1% and 21.7%. The results based on the different reasons show that in the event that the woman neglects the children or goes out without informing her husband, an important proportion think it is justified for a man to beat his wife: 30.8% in the intervention area and 21.7% in the control area in the first case and 29.3% in the intervention area against 20.6% in the control area in the second case.

Based on the results in shown in the previous table, a gender attitude index was developed for each study area.

Table 52: Gender Attitude Index, by percentage

	Intervention Area (n=1277)	Control Area (n=872)
Doesn't Accept Hitting	62.6	69.2
Accepts Hitting	37.4	30.8

3.15. Participation in community groups or government social security programs

3.15.1. Existence of active programs or community groups in the village

The results in the following table show that 80% of the women in the whole study area declare that there are no community programs or they are not aware of the existence of any such programs in their village.

Table 53: Percentage of women based on the presence of and participation in community groups/programs

		Control area (n=872)	Intervention area (n=1277)	Whole study area (n=2149)
Agriculture	Yes there is a program but I am not a member	9.90	9.20	9.50
	No, there is not a program or I am not aware if there is	86.50	89.30	88.20
	Yes there is a program and I am an active member	3.20	1.10	2.00
	Missing	0.50	0.40	0.40
	Total number of women	872	1275	2147
WASH	Yes there is a program but I am not a member	14.80	4.00	8.40
	No, there is not a program or I am not aware if there is	82.50	94.90	89.80
	Yes there is a program and I am an active member	2.60	0.50	1.40
	Missing	0.10	0.50	0.40
	Total number of women	872	1275	2147
Nutrition	Yes there is a program but I am not a member	8.10	7.10	7.50
	No, there is not a program or I am not aware if there is	88.20	90.40	89.50
	Yes there is a program and I am an active member	3.60	2.20	2.70
	Missing	0.10	0.30	0.20
	Total number of women	872	1275	2147
Maternal health	Yes there is a program but I am not a member	8.60	8.20	8.30
	No, there is not a program or I am not aware if there is	87.80	89.30	88.70
	Yes there is a program and I am an active member	3.40	2.00	2.60
	Missing	0.10	0.50	0.30
	Total number of women	872	1275	2147

	Total number of women	872	1275	2147
Child's health	Yes there is a program but I am not a member	8.50	8.50	8.50
	No, there is not a program or I am not aware if there is	88.30	89.20	88.80
	Yes there is a program and I am an active member	3.10	1.80	2.30
	Missing	0.10	0.50	0.30
	Total number of women	872	1275	2147
Education	Yes there is a program but I am not a member	8.50	6.70	7.40
	No, there is not a program or I am not aware if there is	89.80	91.80	91.00
	Yes there is a program and I am an active member	1.50	0.90	1.20
	Missing	0.20	0.60	0.50
	Total number of women	872	1275	2147
Economic development	Yes there is a program but I am not a member	7.20	8.50	8.00
	No, there is not a program or I am not aware if there is	90.40	86.90	88.30
	Yes there is a program and I am an active member	2.30	4.00	3.30
	Missing	0.10	0.50	0.40
	Total number of women	872	1275	2147
Women empowerment	Yes there is a program but I am not a member	2.50	6.90	5.10
	No, there is not a program or I am not aware if there is	94.80	91.00	92.50
	Yes there is a program and I am an active member	2.50	1.70	2.00
	Missing	0.10	0.40	0.30
	Total number of women	872	1275	2147
Climate change	Yes there is a program but I am not a member	0.50	2.40	1.60
	No, there is not a program or I am not aware if there is	97.00	96.90	97.00
	Yes there is a program and I am an active member	2.40	0.20	1.10
	Missing	0.10	0.50	0.30
	Total number of women	872	1275	2147
Other	Yes there is a program but I am not a member	0.50	2.10	1.40
	No, there is not a program or I am not aware if there is	95.00	93.00	93.80
	Yes there is a program and I am an active member	2.40	0.00	1.00
	Missing	2.20	4.90	3.80
	Total number of women	872	1275	2147

3.15.2. Existence of government social security programs

The results in the following table reveal that few women know about development programs in their villages. Very few of the women who know of the existence of such programs are members. In the intervention area, there are

women in the government programs for social security in agriculture (0.6%), in WASH (0.5%), in economic development (1.4%) and in maternal health (1.4%). The figures obtained in the control area are also low for active members who are women in these programs. However, the results obtained in the control area are less critical.

Table 54: Percentage of women based on social security participation in the village

		Control area (n=872)	Intervention area (n=1277)	Whole study area (n=2149)
Agriculture	Yes there is a program but I am not a member	7.70	4,70	5,90
	No. there is not a program or I am not aware if there is	90.70	94,10	92,70
	Yes there is a program and I am an active member	1.10	0,60	0,80
	Missing	0.50	0,50	0,50
	Total number of women	872	1275	2147
WASH	Yes there is a program but I am not a member	9.90	2,00	5,20
	No. there is not a program or I am not aware if there is	89.20	97,00	93,90
	Yes there is a program and I am an active member	0.60	0,50	0,50
	Missing	0.30	0,50	0,50
	Total number of women	872	1275	2147
Nutrition	Yes there is a program but I am not a member	3.00	3,00	3,00
	No. there is not a program or I am not aware if there is	96.00	95,10	95,50
	Yes there is a program and I am an active member	0.60	1,50	1,10
	Missing	0.50	0,40	0,40
	Total number of women	872	1275	2147
Maternal health	Yes there is a program but I am not a member	7.20	3,10	4,80
	No. there is not a program or I am not aware if there is	91.90	95,10	93,80
	Yes there is a program and I am an active member	0.60	1,40	1,10
	Missing	0.30	0,40	0,40
	Total number of women	872	1275	2147
Child's health	Yes there is a program but I am not a member	7.00	3,10	4,70
	No. there is not a program or I am not aware if there is	91.70	95,00	93,70
	Yes there is a program and I am an active member	0.90	1,50	1,30
	Missing	0.30	0,40	0,40
	Total number of women	872	1275	2147
Education	Yes there is a program but I am not a member	10.00	2,70	5,70
	No. there is not a program or I am not aware if there is	88.30	96,00	92,90

	Yes there is a program and I am an active member	1.10	0,70	0,90
	Missing	0.60	0,50	0,60
	Total number of women	872	1275	2147
Economic development	Yes there is a program but I am not a member	6.40	4,60	5,40
	No. there is not a program or I am not aware if there is	92.50	93,50	93,10
	Yes there is a program and I am an active member	0.70	1,40	1,10
	Missing	0.30	0,50	0,40
	Total number of women	872	1275	2147
Women empowerment	Yes there is a program but I am not a member	2.20	3,30	2,80
	No. there is not a program or I am not aware if there is	96.90	95,70	96,20
	Yes there is a program and I am an active member	0.60	0,50	0,60
	Missing	0.30	0,50	0,40
	Total number of women	872	1275	2147
Climate change	Yes there is a program but I am not a member	0.30	1,50	1,00
	No. there is not a program or I am not aware if there is	98.60	97,70	98,10
	Yes there is a program and I am an active member	0.70	0,40	0,50
	Missing	0.30	0,40	0,40
	Total number of women	872	1275	2147
Other	Yes there is a program but I am not a member	0.30	1,20	0,80
	No. there is not a program or I am not aware if there is	96.60	93,30	94,60
	Yes there is a program and I am an active member	0.70	0,40	0,50
	Missing	2.40	5,20	4,10
	Total number of women	872	1275	2147

3.15.3. Direct aid or assistance to women or members of their households

The analysis of the results of the following table shows that women, in general, did not benefit from different direct aid/assistance. The proportion of women beneficiaries of direct assistance is lower in the intervention area (less than 4.0%) compared to the control area.

Table 55: Percentage of women who were given direct support by study area

		Control area (n=872)	Intervention area (n=1277)	Whole study area (n=2149)
Food in exchange for work	Yes	13.40	1.60	6.40
	No	86.40	98.10	93.30
	Missing	0.20	0.20	0.20
	Total	872	1275	2147
School feeding program	Yes	2.30	3.90	3.30
	No	97.50	95.80	96.50

	Missing	0.20	0.20	0.20
	Total	872	1275	2147
Plot or land for household consumption	Yes	4.90	0.90	2.50
	No	94.80	99.00	97.30
	Missing	0.20	0.20	0.20
	Total	872	1275	2147
Seeds	Yes	5.80	1.40	3.20
	No	93.80	98.40	96.60
	Missing	0.30	0.20	0.20
	Total	872	1275	2147
Agricultural machines	Yes	0.30	0.20	0.20
	No	99.30	99.70	99.50
	Missing	0.30	0.20	0.20
	Total	872	1275	2147
Cattle	Yes	0.30	0.30	0.30
	No	99.40	99.50	99.50
	Missing	0.20	0.20	0.20
	Total	872	1275	2147
Poultry	Yes	1.30	1.10	1.20
	No	98.50	98.70	98.60
	Missing	0.20	0.20	0.20
	Total	872	1275	2147
Fishery products	Yes	0.90	0.70	0.80
	No	98.90	99.10	99.00
	Missing	0.20	0.20	0.20
	Total	872	1275	2147
Car	Yes	0.00	0.10	0.00
	No	99.80	99.80	99.80
	Missing	0.20	0.20	0.20
	Total	872	1275	2147
Sewing-machine	Yes	0.10	0.20	0.20
	No	99.50	99.60	99.60
	Missing	0.30	0.20	0.20
	Total	872	1275	2147
Latrines	Yes	0.50	0.50	0.50
	No	99.30	99.40	99.30
	Missing	0.20	0.20	0.20
	Total	872	1275	2147

Water pump	Yes	0.80	0.70	0.70
	No	99.00	99.10	99.00
	Missing	0.20	0.20	0.20
	Total	872	1275	2147
Agricultural tools	Yes	1.30	0.60	0.90
	No	98.50	99.00	98.80
	Missing	0.20	0.40	0.30
	Total	872	1275	2147
Other	Yes	0.30	0.20	0.20
	No	84.90	78.30	81.00
	Missing	14.80	21.60	18.80
	Total	872	1275	2147

4. SUMMARY OF FINDINGS

Household Socio-Economic Status

Wealth amongst households varied significantly within the sample, demonstrating heterogeneity in the study area. Poor to very poor households made up 32% of the sample, average wealth households made up 20% and rich to very rich households made up 48%. Marital structure, however, was similar across wealth strata: nearly all women surveyed were either married or cohabitating with a monogamous or polygamous partner and women generally identified their male partners as the head of household. Women's ages ranged from 15-48, and while the median age of those surveyed was 29, over three-quarters of the women were unable to read.

Agriculture and Food Preservation and Storage

An analysis of where households obtain their food showed that only about half produced food for family consumption; nearly all households purchased foodstuffs that were produced elsewhere. Less than one quarter of households reported storing cultivated crops (i.e. grains), and even fewer preserved fruits or vegetables. A limited number (<13%) of households used kitchen gardens and designated fishing territories to supplement household foodstuffs, and even fewer households had consulted with agriculture or animal husbandry specialists in the past year.

Dietary Diversity and Survival Strategies

Mother's dietary diversity was determined through analysis of food group consumption; half of women surveyed were identified as eating items from fewer than five food groups per day, thus qualifying as having an undiversified diet. Women identified particular coping strategies that were utilized in their households when the amount of food present was not sufficient (i.e. buy food on credit, reduce the daily number of means, reduce the number of daily meals). Strategies were weighted based on severity, and demonstrated that households in the very poor quintile were most likely to utilize the 'heaviest' strategies.

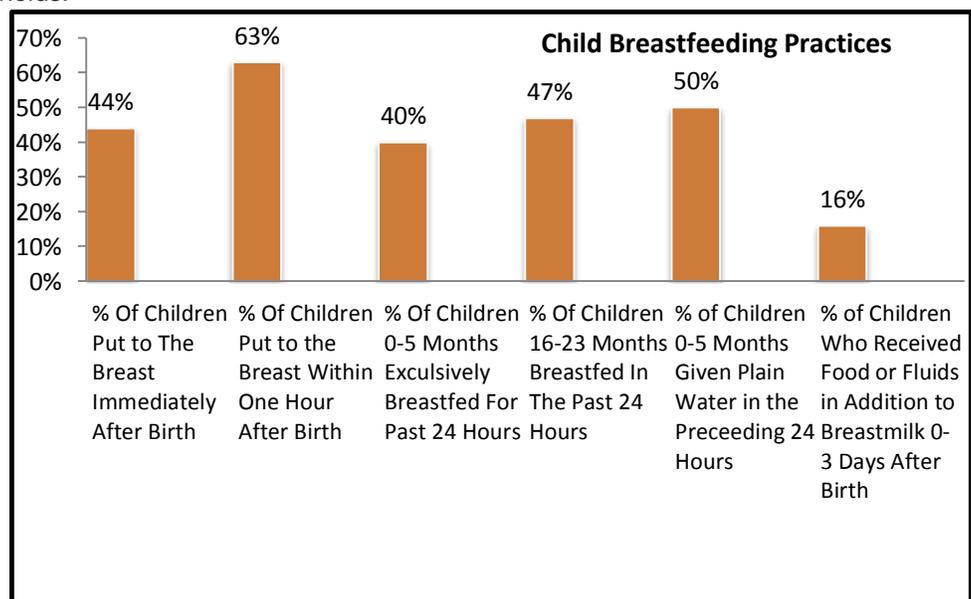
Water, Sanitation, and Hygiene

Most households in the area (80%) have access to protected water sources and those responsible for gathering water can do so in less than 20 minutes. There is still a portion of the community, however, that uses unprotected water for drinking, and gathers it from a source such as a water truck or river. Toilet and sanitation conditions are a significant concern in the community: less than a quarter of households had modern toilet facilities (either dry or water-flushing) and most respondents stated that there were no toilet facilities present. Further sanitation concerns were demonstrated through hand washing practices. While the vast majority of women reported washing hands before eating, only two-thirds reported washing hands after using the toilet or before cooking, and half washed hands after changing the baby's diaper. Modern hand washing detergent (liquid, powder, paste, or bar soap) was not commonly available in households.

Child Feeding Practices

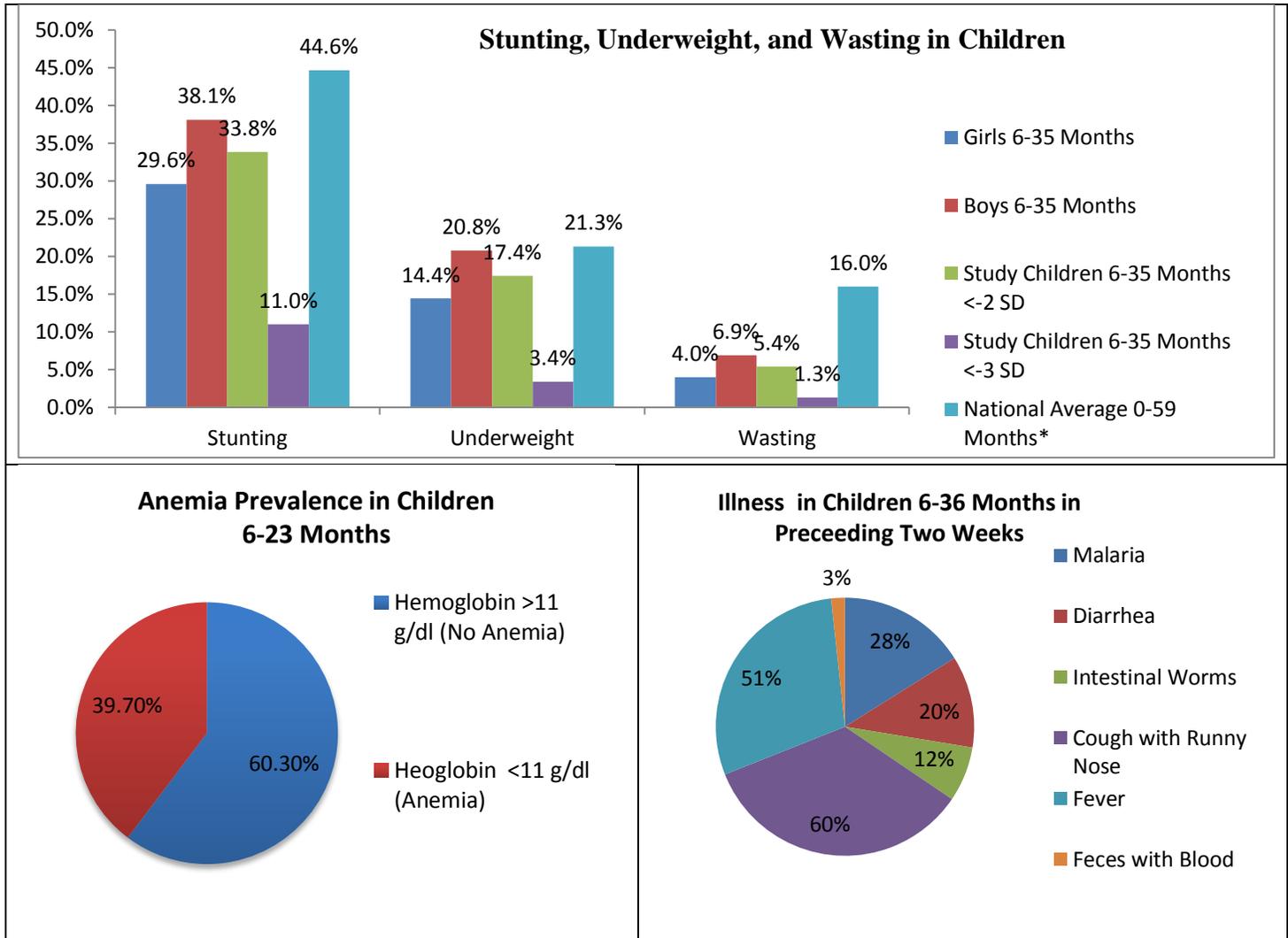
Mothers were asked to list what their children consumed in the past 24 hours as to demonstrate typical feeding practices in the study areas.

In addition to the information on breastfeeding practices shown in the chart, responses demonstrated that fewer than ten percent of children were receiving the appropriate amount of meals for their age, and the vast majority of children were eating from less than four food groups each day. While more than half of children ate an iron-rich food, meat was almost never consumed.



Child Health

Stunting, underweight, wasting, anemia, and illness status were determined in children. For all three nutritional indicators, prevalence is higher among boys than girls.

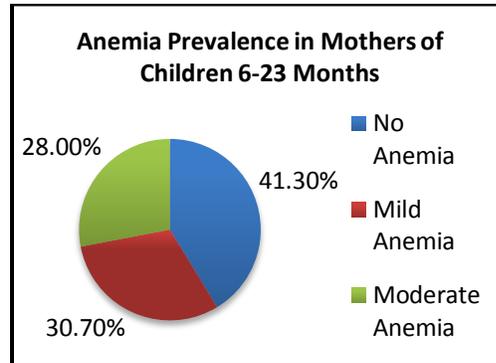
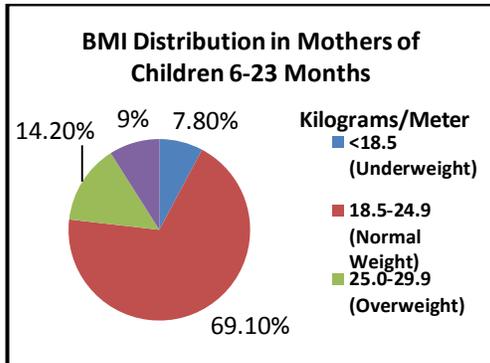


*Demographic Health Survey: Benin, 2012

Maternal Health and Antenatal Care

While most women in the study area were shown to have a normal weight, there was a significant prevalence of moderate and mild anemia; no cases of severe anemia were identified.

Nearly all women in the study area received pre-natal care and gave birth at health center under the supervision of a trained healthcare worker. Post-natal care, however, was not nearly as common, with less than two-thirds of mothers ever receiving a post-natal checkup. Those who did attend a post-natal checkup usually did so 16 days after delivery.



Women's Empowerment

Mobility indicators demonstrate that in the study area, most women were able to go out of the house alone for daily activities, such as fetching water, going to church/mosque or shopping at the market. Despite this, women's awareness of and participation in community groups was very limited. Less than 4% of women participated in groups geared towards education, health, agriculture, nutrition, or economic development. In fact, fewer 10% of women were aware that these groups existed at all. Despite limited involvement in community groups, however, the majority of women reported that they could on members of their communities in times of need, such as during a time of illness, lack of sufficient food, or family violence.

Within the household unit, the husband usually makes decisions, including when a woman can visit her birth family and how finances are allocated. Nearly a third of women responded that a husband as the right to beat his wife if she has erred, most notably if she has fought with him or if she has neglected the children.

5. RECOMMENDATIONS

Key findings from the baseline survey demonstrate significant gaps in household and nutrition practices that effect health outcomes for mothers and children; the objective of intervention activities should be to minimize these gaps.

Increased yields of foodstuffs from kitchen gardens, combined with preservation of fruits and vegetables, directly target the issues of nutritional diversification within the household. The production and consumption of iron-rich foods that are currently cultivated, such as carrots, sweet potatoes, and palm nuts should be promoted for the benefit of both mothers and children, especially those suffering from anemia.

Education of appropriate breastfeeding practices, including timely introduction, exclusivity (specifically from water) and longevity, should be initiated. Supplemental activities regarding proper child nutrition, including frequency of feeding and the importance of multiple food groups, would complement the transition from exclusive to complementary breastfeeding. The promotion of post-natal consultations could be coupled with education regarding proper child dietary practices.

Construction of and education regarding basic toilet facilities would seek to reduce the amount of households practicing open defecation. Hand washing education and access to hand washing stations would further sanitation practices within the household and target childhood illness derived from inappropriate waste management.

Activities for both men and women that promote the integration of women into community development groups would serve to disseminate information on the aforementioned nutrition and health practices. Further anticipated benefits from outreach towards women would include group solidarity and empowerment towards reducing domestic violence.

6. BIBLIOGRAPHIC REFERENCES

- Cogill, B. 2003:** *Anthropometric Indicators Measurement Guide; Academy of Educational Development;program Managers. Geneva.*
- DeMaeyer, E.M. et al. 1989.** Preventing and controlling iron deficiency anemia through primary health care: A guide for health administrators and program managers. Geneva: World Health Organization
- Demellof M, D. K.. 2002.** *The diagnostic criteria for iron deficiency in infants should be reevaluated. Journal of Nutrition, 132:3680-3686.*
- Emond AM, H. N. 1996:** *Haemoglobin and ferritin concentrations in infants at 8 months of age. Archives of Disease in Childhood, 74:36-39.*
- National Institute of Statistics and Economic Analysis (INSAE) [Benin]; 2013:** *General Census of the Population and Habitation (RGPH-4): provisional report -Benin 2013.*
- National Institute of Statistics and Economic Analysis (INSAE) [Benin] and Macro International Inc. 2013:** *Demographic and Health Survey (DHS-IV) – Benin 2011-2012. Calverton, Maryland, USA: National Institute of Statistics and Economic Analysis (INSAE) [Benin] and Macro International Inc.*
- National Institute of Statistics and Economic Analysis (INSAE) [Benin]; 2012:** *Integrated Modular Survey on Households Living Conditions (EMICoV-II)-Benin 2011.*
- National Institute of Statistics and Economic Analysis (INSAE) [Benin]; 2012:** *Integrated Modular Survey on Households Living Conditions (EMICoV-II): indicators document -Benin 2011.*
- National Institute of Statistics and Economic Analysis (INSAE) [Benin]; 2003:** *General Census of the Population and Habitation (RGPH-3): villages and town section books, department of Mono -Benin 2002.*
- National Institute of Statistics and Economic Analysis (INSAE) [Benin]; 2003:** *General Census of the Population and Habitation (RGPH-3): villages and town section books, department of Ouémé -Benin 2002.*
- Razafindrako, M et Roubaud, F (2005):**
- USAID, AED, UCDAVIS, IFPRI, UNICEF and WHO; 2007:** *Indicators for assessing infant and young child feeding practices. First part: definition. Washington, D.C., United States of America.*
- USAID, AED, FANTA, UCDAVIS, IFPRI, UNICEF and WHO; 2007:** *Indicators for assessing infant and young child feeding practices. Part 2: 2011calculation*
- USAID, AED, FANTA, UCDAVIS, IFPRI, UNICEF et OMS. 2007:** *Indicators for assessing infant and young child feeding practices. Part 3: country profiles. 2010.*
- WHO.1997:** *WHO Global Database on Child Growth and Malnutrition. Geneva.*
- WHO. 2001:** *Iron Deficiency Anemia: Assessment, Prevention and Control. A guide for*
- WHO. 2006:** *BMI classification, Global Database on Body Mass Index. Geneva.*
- Yip, R. 1994:** *Changes in iron metabolism with age. Iron metabolism in health and disease, ed. J.H. Brock, J. Halliday and L. Powell. London: W.B. Sanders, 427-448.*

7. Notes

Appendix 1: Distribution of children aged 6-23 months

Distribution of children ages 6-23 months per study area				
	6-8 months	9-11 months	12-23 months	Effective children ages 6-23 months
Commune				
Bonou	33	26	169	228
Dangbo	24	29	221	274
Athiémé	30	18	149	197
Grand Popo	32	27	112	171
Study Area				
Control Area	62	45	261	368
Intervention Area	57	55	390	502
Entire Study Area	119	100	651	870

Appendix 2: Nutrition at the Centre, definitions and thresholds for tests and measurements

1. Definition of anthropometric measurements (weight for height, HAZ and WAZ)

a) WHZ: measures Z-scores weight-for-height bodies. It is normally used to indicate current nutritional status. Low WHZ identifies "waste" in children, an indicator of moderate to severe malnutrition resulting from actual weight loss or failure to gain weight. WHZ is also useful for ages that are difficult to determine.

b) HAZ: height-for-age Z-score measures height relative to age. ZAT low compared to a child of the same sex and age in the reference population is called "stunting"¹.

c) WAZ: weight-for-age Z-scores measures body weight in relation to age. It is commonly used to control the growth and evaluation of the amplitude variation of malnutrition in time. A low WAZ compared to a child of the same sex and age in the reference population is called "underweight"¹.

2. Z-score

We used the software ANTHRO WHO to calculate Z-score for each individual. Calculated Z-scores express anthropometric value as a number of standard deviations (SD) below or above the reference median (see below² formula).

$$Z - score(or SD - score) = \frac{\text{observed value} - \text{median value of the reference population}}{\text{value of standard deviation of reference population}}$$

3. Break Points

To evaluate the anthropometric characteristics of the population, we need to define the cut-off points for the reported Z-scores. In 2006, the standard WHO Z-score cut-off points provided Z-score <-2SD and was used to classify low weight-for-height (P / Z), low height-for-age (H / A), and low weight-for-age (W / A) and moderate to severe under nutrition. Similarly, the point <-3SD cutoff is used to classify severe or chronic malnutrition.

Status	Breaking Point
Decline	<-2sd WHZ
Stunting	<-2sd HAZ
Underweight	<-2sd WAZ

4. Hemoglobin

According to WHO, the cut-off value of anemia in pregnant women is 110 g / l (11.0 g / dl). In non-pregnant women over 15 years of age, the cut-off value is 120 g / l (12.0 g / dl).

	Average	Moderate	Severe
Pregnant	10-10.9	7-9.9	< 7.0
Not Pregnant	11-11.9	8-10.9	< 8.0

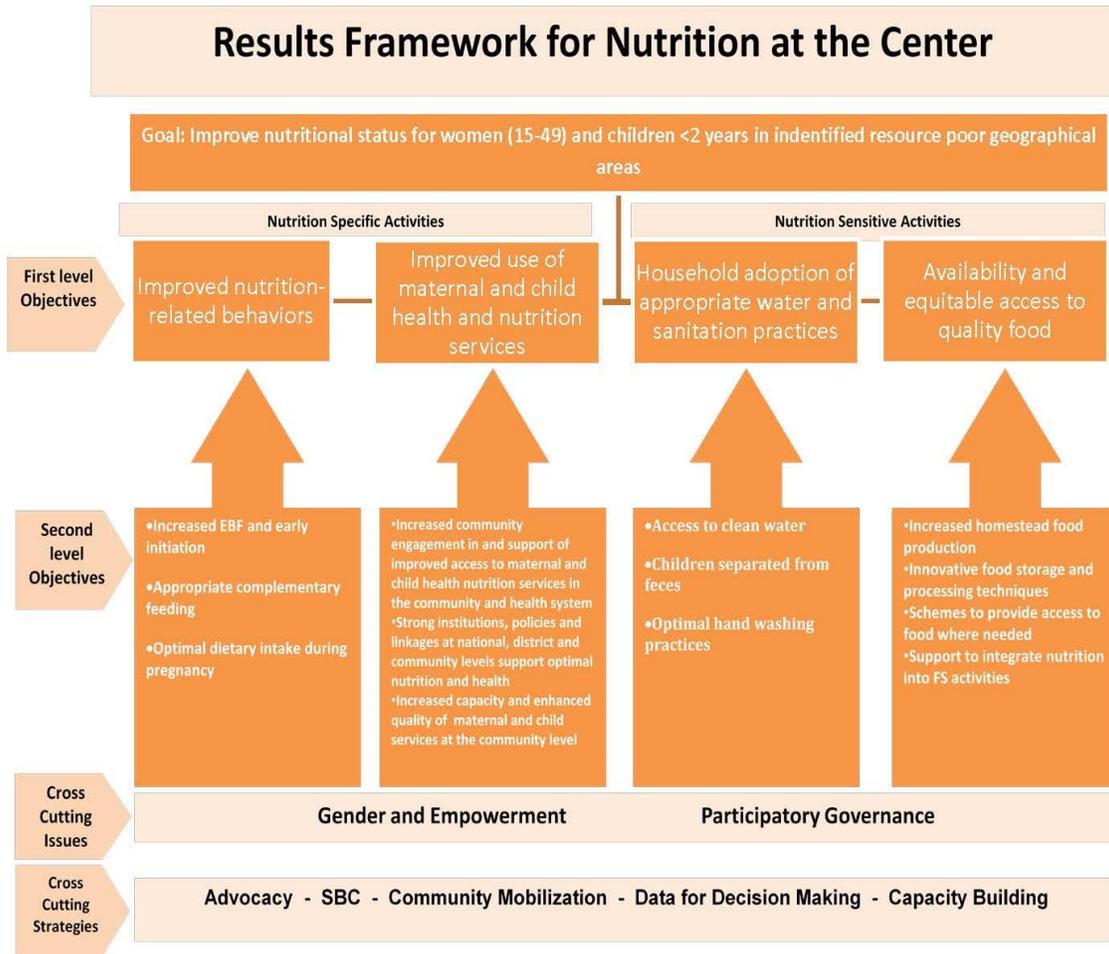
*The level of “mild” anemia is still considered to be a serious condition as the iron deficiency is already well advanced when anemia is detected. A deficiency has functional consequences, even when the anemia is not clinically apparent (WHO 2000).

There is no cut WHO value for anemia in children under 6 months of age. For children between 6 and 59 months, children with hemoglobin levels below 110g/l or (11.0 g/dl) are considered anemic. This value is based on data from children and therefore may not accurately reflect the appropriate hemoglobin levels in infants. Threshold values of <105g/l or (10.5g/dl) at 4 and 6 months of age were used in a study of iron filled infants who were breastfed.

5. Body Mass Index (BMI)

BMI is a number which is calculated by weight-for-height, and is often used to classify someone who is underweight, normal and overweight. The BMI is calculated by dividing the body weight (in kilograms) by the height (in meters) squared (BMI = weight/height²). To be underweight is defined as a BMI of <18.50; A normal BMI is defined as 18.50 to 24.99. A BMI of 25 to 29.99 or more is considered overweight, while a BMI of 30 or higher is defined as obese.

Appendix 3: Nutrition at the Center; Results Framework



Appendix 4: Baseline Schedule Matrix (work study)

Activities	Nov 2013	Dec 2013	Jan 2014	Feb. 2014	Mar 2014	Apr. 2014	May 2014	June 2014	July 2014	Aug 2014	Sept 2014	Oct 2014	Nov 2014	Dec 2014	Jan 2015	Feb 2015	...	Aug 2018
Preparation of the baseline survey	█	█																
Training for the baseline survey			█															
Data collection for the baseline survey				█														
Data entry, analysis					█													
Written report						█	█	█	█									
Planning and program design							█	█	█									
Control and Evaluation of Program						█	█	█	█	█	█	█	█	█	█	█	█	█