FINAL REPORT

NUTRITION SURVEY HOST COMMUNITY-2023

COX'S BAZAR DISTRICT, BANGLADESH

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IMPLEMENTED BY:

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FUNDED BY:

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ACKNOWLEDGEMENT:

The 2023 Nutrition Survey across 8 Upazilas in Cox's Bazar was expertly designed and led by **Dr. Md Abul Hasan**, Head of the Department of Health, Nutrition & Surveillance at ACF Bangladesh, with critical remote technical support from ACF Canada, including **Hailu Wondim**, Senior Project Manager (SMART), **Muhammad Ali**, Regional SMART Advisor, and **Clémence Malet**, Regional Health and Nutrition Advisor at ACF-France. The hands-on, daily management of the survey process was meticulously handled by **Md. Saiful Islam Talukder** and **G.M. Mosharaf Hossain**, Surveillance Supervisors, ensuring seamless coordination, comprehensive training, and rigorous data validation.

Our profound gratitude is extended to the **Government of Bangladesh**, whose essential support enabled the successful implementation of the Integrated Nutrition Survey. We also recognize the **National Nutrition Services (NNS)** and the **Institute of Public Health Nutrition (IPHN)** for their instrumental roles in providing vital resources and expertise.

The **Civil Surgeon Office-Cox's Bazar** and the **Nutrition Sector-Cox's Bazar** offered unwavering support, exemplifying a steadfast commitment to the survey's success. Special thanks go to the **Upazila Health and Family Planning Officers** in Ukhiya, Teknaf, Cox's Bazar Sadar, Ramu, Moheshkhali, Pekua, Chokoria, and Kutubdia, whose dedication was pivotal to the smooth execution of activities at the community level. We further acknowledge **WFP** and its partners, **SHED** and **SARPV**, for their assistance in household mapping and listing, critical to the success of the survey.

We are deeply grateful to **UNICEF**, whose funding made the entire host community survey possible. Special recognition is extended to **Jecinter Akinyi Oketch**, UNICEF Nutrition Manager, **Md. Lalan Miah**, UNICEF Information Management Officer, and the **Assessment Information Management Technical Working Group (AIMTWG)** of the Nutrition Sector for their technical support.

Our heartfelt appreciation also goes to the **ACF survey teams**—field supervisors, team leaders, and enumerators—who, despite the many challenges faced in the field, displayed exceptional commitment and professionalism in collecting data.

Moreover, we extend our sincere thanks to the **children and families** who participated in the survey. Their willingness to give their time and share information made this endeavor possible, and we are deeply grateful for their contribution.

ACRONYMS:

ACF	Action Contre la Faim | Action Against Hunger
AIMTWG	Assessment Information Management Technical Working Group
BSU	Basic Sampling Unit
BMI	Body Mass Index
CDR	Crude Death Rate
cGAM	Combined Global Acute Malnutrition
CI	Confidence Interval
cSAM	Combined Severe Acute Malnutrition
DEFF	Design Effect
ENA	Emergency Nutrition Assessment
GAM	Global Acute Malnutrition
GoB	Government of Bangladesh
HAZ	Height-for-Age z-score
HH	Household
IPHN	Institute of Public Health Nutrition
IYCF	Infant and Young Child Feeding
MAM	Moderate Acute Malnutrition
MoHFW	Ministry of Health and Family Welfare
MUAC	Mid-Upper Arm Circumference
NNS	National Nutrition Service
NRR	Non-Responder Rate
NS	Nutrition Sector
OTP	Outpatient Therapeutic Programme
PLW	Pregnant and Lactating Women
PPS	Population Proportional to Size
PSU	Primary Sampling Unit
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SMART	Standardized Monitoring and Assessment of Relief and Transitions
SRS	Simple Random Sampling
TSFP	Targeted Supplementary Feeding Programme
U5DR	Under 5 Death Rate
UNICEF	United Nation Children's Fund
WASH	Water, Sanitation and Hygiene
WAZ	Weight-for-Age Z-score
WFP	World Food Programme
WHO	World Health Organization
WHZ	Weight-for-Height Z-score

EXECUTIVE SUMMARY

In collaboration with Action Contre la Faim, UNICEF successfully conducted a comprehensive SMART survey across the host community of Cox's Bazar from October to December 2023. This large-scale effort encompassed eight SMART surveys across eight upazilas, meticulously weighted to provide a unified district-level analysis. A cross-sectional two-stage cluster sampling approach following SMART methodology is adopted. The first stage will involve selection of the clusters. The villages will be considered as the smallest geographical unit (clusters). Household will be considered as the basic sampling unit. The second stage will involve selection of households.

The SMART Survey aimed to assess the nutritional, WASH, and food security conditions across eight Upazilas in Cox's Bazar, focusing on vulnerable groups: children (6-59 months), pregnant and lactating women (15-49 years), and adolescent girls (10-19 years).

The specific objectives of the survey were:

Nutritional Status:

- To estimate prevalence of wasting, stunting, underweight among children aged 6-59 months.
- To assess nutrition status of Pregnant and Lactating Women and adolescent girls.

Morbidity:

- To estimate Morbidity (Diarrhea, Acute Respiratory Infection, Fever) among children 6-59 months.

Coverage:

- To assess coverage of Measles vaccination , vitamin A supplementation among children 6-59 months and deworming status 24-59 months

Infant Young Child Feeding:

- To assess Infant and Young Child Feeding Practices among children 0-23 months

Iron Folic Acid consumption:

- To assess Iron Folic Acid consumption among pregnant women and adolescent girls aged 10-19 years

Mortality:

- To estimate Retrospective crude mortality and under five mortality rates

Food Security and Livelihood

- To assess minimum dietary diversity for women of reproductive age (15-49 years).
- To asses household Food Consumption Score (FCS), reduced coping mechanism (rCSI) and Livelihood status

Water Sanitation and Hygiene practices

- To assess household Drinking Water Sources
- To assess household sanitation facility
- To assess household Water Sanitation and hygiene practices

Table 1: Summary of results integrated nutrition Cox's Bazar (Host Community)

Survey Area	Ukhiya	Teknaf	Cox's Bazar Sadar	Ramu	Moheshkhali	Kutubdia	Chokoria	Pekua	District
DEMOGRAPHY %									
Average household size	5.1	5.3	5	5.1	4.9	5.1	5	5	5.1
% of children 6-59 months	11.1%	11.8%	12.5%	10.7%	11.3%	13.2%	10.5%	12.1%	11.7%
% of Children under 5	12.1%	12.9%	13.3%	11.8%	12.3%	16.0%	12.0%	13.1%	12.7%
% of pregnant women	1.5%	1.3%	1.6%	1.6%	1.2%	1.8%	1.4%	1.5%	1.5%
% % of Lactating women with infant < 6 months	1.2%	1.5%	1.4%	1.3%	1.3%	1.3%	1.4%	1.2%	1.4%
CHILDREN 6-59 months % [95% CI]	N=504	N=414	N=451	N=548	N=384	N=459	N=546	N=376	
Global Acute Malnutrition (GAM)	11.1% (8.3-14.7)	12.8% (9.4-17.1)	11.8% (8.8-15.6)	9.9% (7.8-12.4)	10.9% (8.1-14.6)	7.4% (5.5-10.0)	8.6% (6.6-11.2)	10.6% (7.814.4)	10.6% (9.5-11.7)
Moderate Acute Malnutrition (MAM)	10.3% (7.8-13.5)	10.9% (7.7-15.1)	10.6% (7.9-14.1)	8.8% (6.8-11.3)	9.9% (7.2-13.4)	7.2% (5.5-10.0)	7.7% (5.8-10.1)	9.0% (6.6-12.3)	9.4% (8.4-10.4)
Severe Acute Malnutrition (SAM)	0.8% (0.2-2.6)	1.9% (0.9-4.0)	1.1% (0.5-2.6)	1.1% (0.5-2.3)	1.0% (0.4-2.8)	0.2% (0.0-1.6)	0.9% (0.4-2.1)	1.6% (0.7 - 3.5)	1.2% (0.8-1.6)
Oedema	0%	0%	0%	0%	0%	0%	0%	0%	0%
Mid Upper Arm Circumference (MUAC)	N=508	N=417	N=452	N=548	N=386	N=459	N=546	N=378	
MUAC <125 mm and/or oedema	1.2% (0.5-2.6)	2.2% (1.2-4.0)	0.9% (0.3-2.3)	2.9% (1.5 -5.7)	1.3% (0.5 -3.0)	1.3% (0.6 -2.8)	0.5% (0.2-1.7)	3.2% (1.8-5.5)	1.5% (1.1-2.0)
MUAC 115-124 mm	0.8% (0.3-2.1)	1.9% (1.0-3.7)	0.9% (0.3-2.3)	2.7% (1.3-5.6)	1.3% (0.5 -3.0)	1.3% (0.6 -2.8)	0.5% (0.2- 1.7)	3.2% (1.8 - 5.5)	1.4% (1.1-1.9)
MUAC <115 mm and/or oedema	0.4% (0.1-1.6)	0.2% (0.0-1.8)	0% (0.0-0.0)	0.2% (0.0-1.3)	0% (0.0-0.0)	0% (0.0-0.0)	0% (0.0-0.0)	0% (0.0- 0.0)	0.1% (0.0-0.2)
Combined Wasting (WHZ and MUAC)	N=508	N=417	N=452	N=548	N=386	N=459	N=546	N=378	
cGAM	11% (8.2-14.6)	12.9% (9.6-17.2)	11.7% (8.7-15.5)	10.0% (8.1-13.2)	11.1% (8.2-14.9)	8.1% (6.0-10.7)	8.6% (6.6-11.2)	11.6% (8.7-15.5)	10.8% (9.6-11.9)
cSAM	1% (0.4-2.7)	2.2% (1.0-4.5)	1.1% (0.5-2.6)	1.1% (0.5-2.3)	1.0% (0.4-2.7)	0.2% (0.0 -1.6)	0.9% (0.4-2.1)	1.6% (0.7-3.4)	1.2% (0.9-1.6)
Underweight (WHO 2006 Growth Standards)	N=505	N=416	N=452	N=546	N=385	N=459	N=546	N=378	
Total Underweight	26.1% (22.2-30.6)	24.8% (20.7-29.3)	26.8% (22.8-31.1)	29.5% (25.7-33.5)	29.4% (25.1-33.9)	29.4% (24.9-34.4)	28.8% (24.6-33.3)	31% (26.3-36.0)	28.0% (26.4-29.6)
Severe Underweight	2.2% (1.2-3.9)	6.5% (4.4-9.4)	4.6% (2.9-7.3)	7.0% (5.2-9.3)	6.5% (4.5-9.3)	3.5% (2.3-5.3)	5.3% (3.8 -7.5)	4.5% (2.9-6.9)	5.3% (4.5-6.0)
Stunting (WHO 2006 Growth Standards)	N=506	N=412	N=447	N=540	N=386	N=459	N=453	N=377	N=506
Total Stunting	23.3% (19.8-27.2)	22.3% (18.0-27.4)	27.5% (23.1-32.4)	32.0% (27.9-36.4)	30.8% (26.1-36.0)	31.4% (26.8-36.3)	33.7% (30.1-37.5)	35.3% (30.0-40.9)	29.9% (28.1-31.4)
Severe Stunting	3.2% (2.0-5.0)	4.9% (2.9-8.0)	4.3% (2.8-6.5)	7.6% (5.6-10.2)	7.5% (5.2-10.6)	6.1% (4.3-8.7)	6.8% (4.8-9.6)	7.7% (5.2-11.3)	3.2% (2.0-5.0)
Programme coverage									
Measles vaccination with card or recall (9-59 months)-1st Dose	97.0% (91.6-99.0)	96.3% (90.5-99.1)	97.5% (92.8-99.0)	97.2% (91.8-99.0)	97.1%(93.2 -99.0)	96.2% (90.3-99.0)	98.0% (92.7 -99.1)	96.5% (89.2-98.1)	97.3% (96.6-97.9)
Measles vaccination with card or recall (9-59 months)-2nd Dose	97.3% (90.1-99.3)	81.5% (75.9-86.7)	97.3% (92.0-99.7)	97.3% (92.0-99.8)	94.7% (90.2-97.0)	90.9% (83.0-97.1)	96.3% (88.5-99.0)	94.8% (82.8-97.2)	95.6% (94.7-96.6)
Vitamin A supplementation within past the 6 months with card or recall	80.0% (76.4%-83.2)	85.2% (79.8-89.4)	90.7% (87.3-93.3)	90.7%(87.3 -93.3)	92.5% (87.5-95.6)	82.0% (71.9-89.0)	93.6% (89.4-96.2)	79.7% (75.4-83.4)	85.8% (84.4-87.3)
Deworming Among children aged 24-59m	76.8% (72.1-81.0)	90.2% (86.3-93.0)	88.2% (83.0-92.0)	88.2% (83.0-92.0)	93.3% (83.7-97.4)	70.1% (64.7-74.9)	76.9% (72.3-81.0)	66.4% (60.4-71.9)	82.2% (79.7-84.7)
Key Disease Prevalence									
Diarrhoea in the last 2 weeks	11.7% (7.4-17.9)	15.9% (12.3-20.3)	12.3% (8.3-17.7)	14.4% (12.3-17.6)	15.6% (10.6-22.8)	17.6% (14.0- 21.7)	10.9% (8.3-14.2)	17.5% (12.8-23.5)	13.8% (12.5-15.1)
Acute Respiratory Infection (ARI) in the last 2 weeks	23.8% (17.0-32.2)	3.9% (2.4-6.3)	5.0% (2.7-8.8)	14.8% (12.3-17.6)	5.8% (4.2-7.8)	7.0% (4.4-10.9)	6.6% (4.4-9.8)	10.0% (7.8-12.8)	8.7% (7.5-9.9)
IYCF indicators -CHILDREN 0-23 months % [95% CI]									
Timely initiation of breastfeeding/Early Initiation of Breastfeeding (EBF)	80.0% (74.4-84.9)	71.9% (65.2-78.0)	70.9% (64.2-77.1)	71.8% (66.3-76.8)	72.6% (65.6-78.9)	75% (68.7-80.6)	71.7% (66.2-76.7)	71.5% (64.1-78)	71.5% (68.8-74.2)

Exclusive breastfeeding under 6 months (EBF)	77.4% (59.3-88.9)	72.7% (62.4-81.1)	79.6% (62.7-90.4)	73.6% (58.5-84.7)	83.7% (63.7-93.8)	87.5% (73.8-94.6)	79.4% (67.0-88.0)	84.6% (73.1 - 91.7)	75.0% (70.3-79.7)
Continued breastfeeding 12-23 months	92.0% (82.6-96.6)	89.0% (82.5-93.3)	79.8% (69.5-87.3)	88.7% (81.2-93.4)	90.6% (79.0-95.9)	93.5% (75.6-98.6)	93.3% (88.6-96.2)	93.6% (85.5 - 97.3)	92.0% (82.6-96.6)
Bottle feeding 0-23 months	20.7% (10.9-35.8)	9.9% (3.30-5.9)	12.3% (7.5-19.7)	19.9 % (13.9-27.7)	10.1% (5.3-18.2)	18.9% (12.6-27.3)	10.1% (5.6-17.5)	16.2% (9.3 - 26.8)	20.7% (10.9-35.7)
Minimum dietary diversity (MDD)	22.3% (17.6-27.7)	31.1% (21.7-42.3)	26.7% (19.2-35.8)	21.4% (14.6-30.2)	23.5% (13.2-38.1)	16.7% [8.9-29.0)	27.7% (20.3-36.7)	27.1% (17.5 - 39.4)	27.2% (24.5-29.9)
Minimum acceptable diet (MAD)	15.8% (9.4-25.3)	21.0% (14.7-30.4)	21.3% (14.1-30.9)	15.7% (8.3-27.7)	22.1% (12.4-36.1)	16.1% (8.8-27.4)	24.8% (18.5-32.6)	18.8% (11.3 - 29.6)	22.2% (19.6-24.8)
WOMEN 15-49 years % [95% CI]									
Nutritional Status among Pregnant and Lactating (PLW) with children <6 months [MUAC < 210 mm]	2.5% (0.0-7.1)	0% (0.0-0.0)	0.9% (0.2-5.2)	3.5% (1.5-7.9)	1.2% (0.2-6.6)	3.5% (1.5-7.9)	1.6% (0.3-8.5)	3.9% (1.3-10.9)	1.7% (0.8-2.5)
Daily IFA Consumption status of Pregnant Women	60.3% (48.4-71.1)	41.2% (28.8-54.8)	56.9% (44.1-68.8)	47.4% (36.5-58.4)	63.4% (45.7-74.3)	53.6% (40.7-66.0)	55.2% (43.4-66.5)	48.7% (32.-59.8)	58.2% (53.7-62.7)
Minimum Dietary Diversity for Women Reproductive Age (15-49 years)									
Poor (0 to 4)	48.7% (43.4-54.7)	49.1% (43.4-54.8)	56.4% (50.7-61.9)	60.9% (50.7-61.9)	60.8% (55.6-65.8)	26.3% (22.0-31.1)	58.9% (54.4-63.3)	54.7% (47.9 - 61.3)	55.0 (53.1-56.9)
Nutritional status-Adolescent Girl by Using BMI WHO range [95% CI]									
10-19 years	N=340	N=266	N=259	N=351	N=233	N=301	N=359	N=244	
Severe Malnutrition (BMI <16.0)	23.2% (17.1-29.9)	19.2% (14.0-25.7)]	21.2% (15.6-28.2)	28.5% (23.5-34.1)	25.8% (19.8-32.7)	23.9% (18.9-29.8)	21.7% (16.9-27.4)	21.7% (17.2-27.0)	22.5% (20.5-24.4)
Moderate Malnutrition (BMI ≥ 16.0 to <17.0)	10.9% (7.4-15.7)	7.1% (3.2-15.2)	8.9% (4.95-15.4)	10% (6.2-15.6)	7.3% (3.5-14.5)	10.3% (6.1-16.7)	11.4% (8.0-16.0)	10.7% (6.50-16.96)	9.3% (7.9-10.7)
Over weight (BMI ≥ 25.0 to <30.0)	7.1% (5.6-8.9)	9.8% (5.1-17.8)	6.2% (3.01-12.2)	3.4% (2.2-5.3)	4.3% (2.2-8.2)	3.7% (1.8-7.3)	5.0% (3.2-7.7)	2.8% (1.5-5.4)	7.1% (5.6-8.9)
Obesity (BMI ≥ 30.0)	1.2% (0.4-0.8)	1.5% (0.35-3.8)]	1.9% (0.8-4.4)	0.6% (0.12-2.6)	0.43% (0.0-3.6)	0.3% (0.02-4.4)	0.6% (0.1 - 2.1)	1.23% (0.44-3.32)	1.2% (0.35-3.79)
IFA Consumption at least once in a week-Adolescent	11.6%	23.4%	18.9%	16.9%	28.1%	14.6%	11.3%	7.7%	10.7%
FOOD SECURITY % [95% CI]	N=944	N=695	N=739	N=1015	N=704	N=678	N=1028	N625	
Reduce Coping Strategy Index (rCSI)-High Coping ≥10	16.4% (13.0-20.6)	6.6% (5.2-8.5)	5.7% (4.0-8.0)	8.7% (7.1-10.5)	5.7% (3.7-8.5)	8.4% (5.7-12.3)	3.5% (2.6-6.7)	8.6% (5.8-12.8)	7.0% (6.2-7.8)
Food Consumption Score (FCS)									
Acceptable/>42	89.6% (87.5-91.4)	86.9% (84.2-89.2)	96.1% (94.4-97.3)	92.8% (91.1-94.2)	97.3% (95.8-98.3)	96.2% (94.4-97.4)	91.1% (89.1-92.6)	93% (90.7-94.7)	92.9% (92.0-93.3)
Borderline/28.5-42	9.3% (76-11.3)	12.4% (10.0-15.0)	3.8% (2.6-5.4)	6.7% (5.3-8.4)	2.6% (1.6-4.0)	3.1% (2.0-4.7)	8.5% (6.9-10.3)	6.6% (4.9-8.8)	6.6% (5.8-7.0)
Poor/0–28	1.1% (0.6-1.9)	0.7% (0.3-1.7)	0.1% (0.0-0.8)	0.5% (0.2-1.1)	0.1% (0.0-0.8)	0.7% (0.3-1.7)	0.5% (0.2-1.1)	0.5% (0.2-1.4)	0.5% (0.4-0.8)
WASH %									
Water Sources									
Protected Sources of Drinking Water	63.2%	55.6%	66.5%	54.1%	55.0%	55.6%	55.0%	63.2%	58.5%
Unprotected Sources of Drinking Water	36.8%	44.4%	33.5%	45.9%	45.0%	44.4%	45.0%	36.8%	41.5%
Toilet/Latrine use									
Improved Latrine	69.5%	54.7%	59.1%	58.4%	52.6%	61.2%	64.2%	59.5%	59.9%
Unimproved Latrine	30.5%	45.3%	40.8%	41.7%	47.4%	38.8%	35.8%	40.5%	40.1%

KEY HIGHLIGHTS

- The prevalence of Global Acute Malnutrition (GAM) among children aged 6-59 months in Cox's Bazar District is 10.6%, which is classified as "High" according to WHO/UNICEF thresholds. This finding is close to the national GAM rate of 11% reported in the 2022 BDHS survey.
- Between the 2021 and 2023 SMART surveys, GAM rates increased notably in Teknaf (from 8.9% to 12.8%), Ukhiya (from 9.9% to 11.1%), and Cox's Bazar Sadar (from 10.0% to 11.8%), with all areas now classified as "High" by WHO/UNICEF threshold. Conversely, Moheshkhali (from 14.7% to 10.9%), Pekua (from 11.7% to 10.6%), and Kutubdia (from 14.8% to 7.8%) showed improvements with reduced GAM rates.
- The prevalence of underweight has risen between 2021 and 2023 in Teknaf (from 21.9% to 24.8%), Ukhiya (from 25.8% to 26.1%), and Cox's Bazar Sadar (from 24.4% to 26.8%), all now categorised as "Serious" by WHO/UNICEF threshold. In Pekua, underweight rates spiked from 26.8% to 31.0%, reaching the "Critical" threshold.
- Approximately 35,753 children in the district are suffering from wasting, indicating a high level nutritional crisis, while 94,441 are underweight and 100,850 are stunted.
- The district prevalence of Acute Respiratory Infection 8.7%, diarrhea (13.8%) and fever (43.8%) among children aged 6-59 months is notably high compared to the national averages of 1.4%, 4.8% and 30.5%, respectively (BDHS 2024).
- Exclusive breastfeeding rates are at a promising 75%, surpassing the national rate of 55% (BDHS 2022) and the 2022 IYCF assessment district rate of 62.1%.
- The Minimum Acceptable Diet (MAD) rate of the district is critically low at 27.2%, indicating inadequate acceptable diet and below the national rate of 39% (BDHS) and the district rate of 28.3% (2022 IYCF assessment).
- The Minimum Dietary Diversity (MDD) rate of the district is also alarming low at 22.2%, indicating insufficient variety in diets and falling below the national rate of 29% (BDHS) and the district prevalence of 23.3% from the 2022 IYCF assessment.
- The Vitamin A supplementation coverage among children aged 6-59 months of the district is 85.8%. Measles vaccination coverage for children aged 9-59 months is 89.3% for the first dose (MR1) and 95.6% for the second dose (MR2), both of which are 82.2% higher than the national averages (MR1: 89.4%, MR2: 87.7%).
- Deworming coverage for children aged 24-59 months was 82.2%.
- Severe Malnutrition (Body Mass Index < 16) among adolescent girls in Cox's Bazar District is alarmingly high at 22.5%, indicating approximately 1 in 4 adolescent girls are suffering of severe under nutrition, with Ramu Upazila reporting the highest rate at 28.5% and Teknaf Upazila the lowest at 19.2%.
- The intake of iron and folic acid (IFA) among adolescent girls is strikingly low, 93.4% do not meet the recommended weekly consumption dosage.
- Less than half of the women in Cox's Bazar District meet the minimum recommended dietary diversity, with only 45.0% achieving this standard.
- Only two-thirds of pregnant women in the district are taking the recommended daily dose of iron and folic acid (IFA) tablets, with a rate of 58.3%. The highest adherence is in Moheskhali at 63.4%, while Teknaf reports the lowest at 41.2%.
- In the district, 41.5% of households depend on unprotected drinking water sources, and sanitation facilities are equally concerning, with more than one-third of households (41%) lacking access to improved latrines. This situation may greatly increases the risk of environmental contamination from waterborne diseases.

Specific recommendations:

1 Implement WHO's 2023 wasting management and prevention guidelines in Bangladesh, tailored to the local context. This includes adapting and endorsing the guidelines to ensure effective implementation and addressing the specific needs of the population.

2 Scale up severe wasting treatment and comprehensive care for moderate wasting using a child health-centered approach, along with a mother/caregiver-infant pair care approach, as outlined in WHO's 2023 guiding principles. This approach ensures holistic care for both the child and their caregiver, promoting better health outcomes and sustainable interventions.

3 Tailor and implement specific Adolescent health Programs aiming at engaging with them in order to address the significant malnutrition burden among adolescents in the district.

4 Strengthen the delivery of basic health services to address identified morbidity levels, especially in high burden areas. Mobilize community outreach services and capacity building of to local health facilities staff to enhance quality services.

5 Ensure continued and effective coverage of essential health interventions such as micronutrient supplementation, deworming, and measles vaccination, particularly in low coverage areas and hard-to-reach areas. Utilize community sensitization efforts and biannual maternal and child health week campaigns to increase uptake.

6 Supporting a point-of-care approach in delivering high-quality Infant and Young Child Feeding (IYCF) counseling through health service providers, including community workers, is crucial.

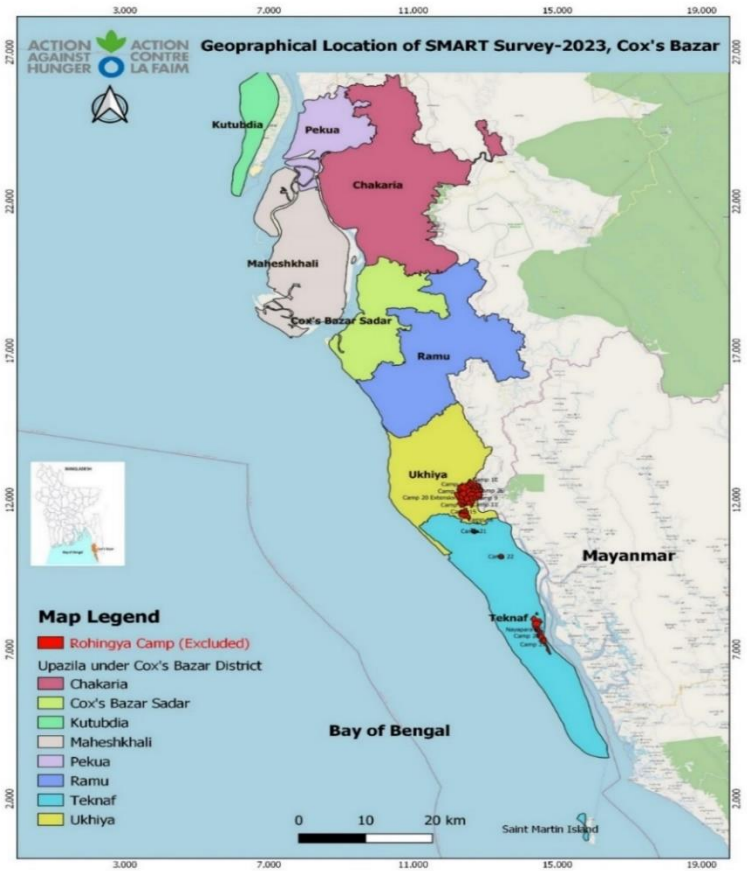
7 Support local health facilities to maintain adequate IFAS supplies and strengthen screening for acute malnutrition among women of reproductive age, with timely referrals for nutritional support.

8 Integrate food fortification, income generation activities, and nutrition garden initiatives to improve dietary diversity, household food security, and overall nutrition security comprehensively.

9 Improve access to improved water sources, sanitation, and hygiene facilities by increasing infrastructure such as boreholes, wells, and rainwater harvesting systems. Strengthen community health education on proper toilet usage and promote handwashing practices, complemented by soap distribution and handwashing campaigns

1. Introduction and Survey Objectives

1.1. Geographic and Demographic Information



Bangladesh is divided into 8 Divisions (Dhaka, Chattagram, Khulna, Sylhet, Rajshahi, Barisal, Rangpur, and Mymensingh) which are then divided into 64 Districts comprising 495 Sub districts/Upazilas.[1] Cox's Bazar District, located in the Chittagong division, is one of Bangladesh's coastal districts prone to disasters, identified as one of the country's 20 "lagging districts" (BBS, 2017)It covers 2,491.85 sq. km, surrounded by Chattagram district to the north, Bay of Bengal to the south and on the west, Bandarban district, Arakan (Myanmar) and the Naf River to the east[2]. The district is a coastal area and often falls victim to sea storms, tidal waves, hurricanes, cyclones and flooding. Cox's Bazar District has a population of 3011536 nationals[3] an average household size of 4.81, and 587,127 households[4]and hosts the largest refugee camp in the world with 965,467[5] Rohingya resides in 33 makeshift camps. It is one of Bangladesh's most vulnerable districts, with a 16.6%[6] estimated poverty rate based on head-count ratio and using upper poverty lines. Furthermore, the primary livelihood source in Cox's Bazar is tourism, resulting in the proliferation of hotels, guesthouses, and motels, especially in the city and coastal regions. The touristic industry has become a major employer, while fishing, coastal activities, handicrafts, and cottage industries contribute as well significantly to the local economy. Occupations in the area include agriculture 25.64%, and agricultural labourer 21.2% along with forestry 1.85%, fishing 4.01%, wage labourer 7.64%, service 4.68%, commerce 15.14%, transport 1.86% and others 17.98%[7].The district has a literacy rate of 71.45%.

Rice is the staple food, grown in three annual cycles. Other crops and fruits, such as wheat, potatoes, pulses, vegetables, spices, bananas, pineapples, guavas, jackfruits, and coconuts, vary based on land type. Coastal activities include prawn farming, aquaculture, sea fishing, and salt production. Households typically have three daily meals centered around rice, often supplemented with pulses, fish, and vegetables. However, from June to October households face significant food security challenges due to minimal food stocks.

[1] https://bangladesh.gov.bd/site/page/812d94a8-0376-4579-a8f1-a1f66fa5df5d/Know--Bangladesh

[2] More details in Map of Cox's Bazar

[3] Estimated based on census 2011 community series-projected population of 2022

[4] Preliminary report - Population and Housing Census 2022

[5] Joint Government of Bangladesh – UNHCR as of 30 September 2023

[6] Household Income Expenditure Survey (HIES) 2022

[7] BBS-Census 2011

The health system in Cox's Bazar aligns with the national structure, with district hospitals, Upazila health complexes, community clinic and union health and family welfare centers providing healthcare services. Additionally, community clinics at ward and village levels offer primary healthcare. In addition, there is a medical college hospital in the district.

Global Acute Malnutrition is at 9.7%, with 29.4% of children underweight and 34.6% stunted. Moreover, 11.5% of children under 5 experienced recent diarrhoea, and 32.3% had fever episodes in the last 2 weeks, emphasizing the need for focused interventions to address these issues,[8] (MICS 2019). Exclusive breastfeeding for infants aged 0-5 months is at 71.8%. However, there's limited dietary diversity among children aged 6-23 months, with only 31.3% meeting the recommended food group intake (5 out of the recommended 8). Minimum acceptable diet for this age group is at 26%, indicating poor complementary feeding practices. Additionally, 67.3% of children consume unhealthy food, influenced by social beliefs, knowledge gaps, and traditional practices[9].

Furthermore, in August 2023, Cox's Bazar district faced a humanitarian crisis due to flash floods and monsoon rains, leaving thousands without access to necessities. Particularly affected were Chakaria and Pekua Upazilas, with 210,000 and 85,000 people impacted in 18 and 7 unions, respectively.[10] It is against this background that UNICEF in collaboration with ACF intends to carry out an overall nutritional assessment in the district in order to ascertain the nutritional status of children and adolescent girls and status of WASH and food security situation

1.2. Current activities in Cox's Bazar

In Cox's Bazar, UNICEF, in partnership with the Government of Bangladesh and organizations like SHED, SARPV, and CARE, implements nutrition-specific programs across all eight upazilas. Additionally, nutrition-sensitive initiatives are underway in Moheskhali, and Cox's Bazar Sadar Upazilas, aimed at enhancing the healthof children, adolescent girls, and pregnant/lactating women. Activities include growth monitoring, severe wasting treatment, IYCF counseling, and community mobilization. Moreover, UNICEF collaboprevalences with the Ministry of Agriculture to integprevalence nutritional considerations into agricultural extension services, empowering marginalized farmers to combat challenges induced by climate change.

In Teknaf, Ukhiya, Kutubdia, Moheskhali, and Pekua Upazilas, World Food Programme (WFP) partners with local NGOs SHED and SARPV to implement Targeted Supplementary Feeding Programs (TSFP) to prevent moderate wasting among children and pregnant/lactating women. Additionally, ACF supports the government in Teknaf and Ukhiya Upazilas, focusing on severe wasting treatment, Infant and Young Child Feeding (IYCF), and micro-nutrient supplementation. ACF's nutrition-sensitive initiatives include livelihood grants, agricultural inputs, Village Saving Loan Association (VSLA), youth engagement, and revolving funds for women.

1.3. Survey Justification

In 2021, a SMART surveys conducted in Cox's Bazar district covered six upazilas (Ukhiya, Teknaf, Cox's Bazar Sadar, Moheshkhali, Pekua and Kutubdia) revealeding notable significant variations in malnutrition rates, ranging from medium to high levels based on WHO/UNICEF thresholds. The prevalence of wasting ranged from a low of 8.9% in Teknaf to a high of 14.8% in Kutubdia. The prevalence of wasting varied, with Teknaf showing the lowest rate at 8.9%, while Kutubdia recorded the highest at 14.8%. Stunting was lowest in Ukhiya at 20.7% and highest in Moheshkhali at 29.8%, placing all upazilas in the "high" stunting category according to WHO/UNICEF standards. Similarly, the underweight prevalence ranged from 21.9% in Teknaf to 32.1% in Moheshkhali, falling within the serious to critical levels. Building on these findings, the 2023 survey aimed to

[8] Multiple Indicator Cluster Survey-2019 Bangladesh; District Summary Findings Report
[9] Infant And Young Child Feeding Survey Host Community, Cox's Bazar, Bangladesh 2022
[10] CHT Flash Flood-August 2023-Needs Assessment Working Group (NAWG)

monitor progress in the six previously surveyed upazilas while expanding to cover the remaining two upazilas (Ramu and Chokoria). This comprehensive assessment was essential for supporting data-driven decision-making and implementing targeted interventions. Furthermore, the survey explored a broader set of indicators, including WASH (Water, Sanitation, and Hygiene), food security, morbidity, Infant Young Child Feeding Practice, Maternal nutritional status, Adolescent nutritional status and mortality, to better understand the underlying factors contributing to malnutrition. These additional metrics offer crucial insights into the social and environmental determinants of nutritional status within the population.
In response to these challenges, UNICEF, with technical support from ACF, initiated an integrated nutrition survey covering all eight upazilas of Cox's Bazar. This approach, recommended by the Nutrition Sector-Cox's Bazar, reflects a proactive effort to address the complex nutritional issues faced by the host communities. The goal is to enhance evidence-based programming and advocacy, ensuring interventions are tailored to the evolving needs and dynamics of the population.

1.4. Survey Objectives

The main objective of the SMART Survey was to conduct an integrated assessment of the nutritional situation, covering the eight Upazilas in Cox's Bazar district. The survey targeted the following key populations: children aged 6 to 59 months, pregnant women, and lactating women (PLW) and adolescent girls. By focusing on these vulnerable groups, the study aims to gain insights into their nutritional status and identify potential risk factors contributing to malnutrition in the surveyed regions.

Specific Objectivities:

- To estimate the prevalence of Acute Malnutrition among children aged 6-59 months.
- To estimate the prevalence of stunting, underweight and overweight in children aged 6-59 months.
- To estimate retrospective crude mortality and under five mortality prevalences.
- To assess the key IYCF practices among children 0-23 months e.g. EBF, EIBF, MMF, MDD, MAD etc.)
- To assess the prevalence of diarrhea, Acute Respiratory Infection, and Fever among children 6-59 months based on two weeks recall period and their health seeking behaviours.
- To estimate the measles immunization coverage in children aged 9-59 months. .
- To estimate the coverage of vitamin A supplementation in children aged 6-59 months.
- To estimate the nutrition status of Pregnant and Lactating Women (PLW – 15-49 years) based on MUAC (<210mm) and adolescent girls (10-19 years) based on Body Mass Index (BMI).
- To assess Iron Folic Acid consumption among pregnant women and adolescent girls aged 10-19 years.
- To assess the minimum dietary diversity for women of reproductive age (15-49 years)
- To determine the extent to which negative coping strategies are used by households and to assess household food consumption (quantity and quality); (Food Consumption Score (FCS), Food Consumption Score-Nutrition (FCS-N), reduced coping strategy index (rCSI).
- To explore the livelihood options of households (Income, Income source, food source and Expenditure).
- To determine the access to water (Water sources, purification) and sanitation facilities (Improved /non improved) and evaluate the hygiene practices (Hand washing practices, child fecal management) at the household level.

2. Methodology

2.1. Study Design:

A cross-sectional two-stage cluster sampling approach following SMART methodology was adopted. The first stage involved selection of the clusters. The villages were considered as the smallest geographical unit (clusters). The second stage involved selection of households**.**
Household were considered as the basic sampling unit.

2.2. Sample Size:

The sample sizes were designed to achieve reasonable precision for estimates of GAM as well as crude mortality separately for the entire district covering all Upazila. All calculations were made using ENA for SMART software (version January 11th, 2020). The purpose of the sample calculation was to get a sample having the optimal units so that results are reliable; with reasonable precision. The following assumptions (based on the given context) were used to calculate the sample size in the number of children, which were then converted into the number of households to survey (corresponding to the sample unit).

The point prevalence of GAM was used based on the 2021 SMART survey, as no other trusted recent data was available. However, due to the absence of recent data for two Upazilas, the MICS 2019 results were utilized to estimate the required sample size. A desired precision used based on SMART guideline considering the point prevalence and a design effect from the previous survey findings used in calculating the sample size. It was determined that a sample size of 3585 children would be statistically representative for anthropometric measurements in the district.

Taking into account factors such as household size, a 5% allowance for non-response, and population parameters for children under 5, the study's design dictates the need to include a minimum of 6651households. This substantial sample size was essential to ensure the successful collection of data from the targeted 3585 sample children. The objective is to deliver a comprehensive and representative assessment of the nutritional situation in the area.

Table 2: Sample Size Parameters-Anthropometry

Parameters for Anthropometry	Ukhiya	Teknaf	Cox's Bazar Sadar	Ramu	Moheshkhali	Kutubdia	Chokoria	Pekua
Estimated Prevalence of GAM (%)	9.9%	8.9%	10.0%	9.7%	20.2%	19.9%	9.7%	11.7%
± Desired precision	3%	3%	3.5%	3%	5%	5%	3%	3.5%
Design Effect	1.21	1.2	1.2	1.2	1.57	1.65	1.2	1.2
Children to be included	**502**	**452**	**369**	**488**	**423**	**440**	**488**	**423**
Average HH Size	5.0	5.2	5.1	4.81	5.0	5.3	4.81	5.2
% Children under-5	11.9%	14.0%	11.2%	11.2 %	13.9%	13.8%	11.2%	14.7%
% Non-response Households	5%	5%	5%	5%	5%	5%	5%	5%
Households to be included	**986**	**726**	**755**	**1060**	**712**	**704**	**1060**	**648**

Table 3: Assumption based on Context of Parameters for Anthropometry

Parameters for Anthropometry	Assumptions based on context
Estimated Prevalence of GAM (%)	In Ukhiya and Teknaf, we had utilized point prevalence rates of 9.9% and 8.9%, respectively, for estimating the Global Acute Malnutrition (GAM) prevalence based on the Jan-Feb 2021 Ukhiya-Teknaf SMART Survey. This choice was made considering the consistent static GAM rates observed from 2016 to 2021 (10.7%, 11.3%, 11.4%, and 9.3%).
	We had considered a point prevalence of 10.0% based on the August 2021 Cox's Bazar Sadar SMART Survey results, under the assumption that the situation had not significantly changed since 2021. This assumption is made to maintain consistency in determining the current state of malnutrition in the area.
	We had considered the District Global Acute Malnutrition (GAM) point prevalence data from MICS 2019 as a proxy for Ramu and Chokoria Upazila, as no specific SMART survey had been conducted for Ramu and Chokoria Upazilas to date.
	We had considered a point prevalence of 11.7% for Pekua, based on the June 2021 Pekua SMART Survey results. This decision was supported by the observation that the last two SMART surveys in 2019 and 2021 (12.4% and 11.7%) indicated nearly static malnutrition rates in this area.
	We had adopted the upper confidence limit for Moheshkhali (20.2%) and Kutubdia (19.9%) because recent data indicates variations in GAM prevalence. For Kutubdia, the rates had fluctuated (2017-7.6%, 2020-11%, and 2021-14.8%), and for Moheshkhali, they had also shown changes (2018-10.6%, 2020-11%, and 2021-14.7%). Using the upper confidence limit accounts for these fluctuations is estimated malnutrition prevalence.
± Desired precision	Based on the SMART guideline
Design Effect	As per the 2021 SMART survey findings, calculated design effect for Z scores (WHZ) for Unkiya - 1.21, Teknaf -1.0, Cox's Bazar Sadar-1.1, Moheshkhali-1.57, Kutubdia-1.65 and Pekua-1.0. However, we used same for Ukhiya, Moheshkhali,Kubdia and thinking cluster sampling we increased slightly upward 1.2 of remaining Teknaf, Cox's Bazar Sadar and Pekua. As there was no previous information about the design effect in Ramu. However, considering the Upazila adjacent to Cox's Bazar Sadar, which was found quite similar, we used a design effect of 1.2, slightly higher to avoid making overly optimistic assumptions.
Average HH Size	We had used 2021 SMART survey findings for Ukhiya, Teknaf, Cox's Bazar Sadar, Moheshkhali, Kutubdia, and Pekua. Additionally, we relied on Census 2022 data for Ramu and Chokoria, based on district-level household size, due to the absence of upazila-level data for these two.
% Children under-5	We had used 2021 SMART survey findings for Ukhiya, Teknaf, Cox's Bazar Sadar, Moheshkhali, Kutubdia, and Pekua. Additionally, we had chosen 11.2% for Ramu and Chokoria as the minimum upazila-wise proportion as per SMART 2021 avoiding over estimation because no other recent data is accessible for these two Upazila.
% Non-response Households	Based on ACF experienced of previous different surveys at regions

Table 4: Sample Size Parameters: Mortality

Parameters for Mortality	Ukhiya	Teknaf	Cox's Bazar Sadar	Ramu	Mohesh khali	Kutubdia	Chokoria	Pekua
Estimated Death Prevalence /10,000/day	0.15	0.15	0.03	0.5	0.08	0.10	0.5	0.14
± Desired precision /10,000/day	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.2
Design Effect	1.21	1.2	1. 2	1.2	1.57	1.65	1.2	1.2
Recall Period in days	106	105	108	116	121	147	136	131
Population to be included	**1790**	**1792**	**322**	**2363**	**1051**	**1198**	**2020**	**1321**
Average HH Size	5.0	5.2	5.1	4.81	5.0	5.3	4.81	5.2
% Non-response Households	5%	5%	5%	5%	5%	5%	5%	5%
Households to be included	**377**	**363**	**66**	**517**	**222**	**238**	**442**	**272**

Table 5: Assumption based on context of parameters for Mortality

Parameters for Mortality	Assumptions based on context
Estimated Death Rate /10,000/day	Based on SMART 2021 survey findings
	No available data for Ramu and Chokoria , we considered default value of 0.5 deaths/10,000/day as per SMART guideline
± Desired precision /10,000/day	As per SMART guideline
Design Effect	As per the 2021 SMART survey findings, calculated design effect for Z scores (WHZ) for Unkiya -1.21, Teknaf -1.0, Cox's Bazar Sadar-1.1, Moheshkhali-1.57, Kutubdia-1.65 and Pekua-1.0. However, we used same for Ukhiya, Moheshkhali,Kubdia and thinking cluster sampling we increase slightly upward 1.2 of remaining Teknaf, Cox's Bazar Sadar and Pekua.As there is no previous information about the design effect in Ramu. However, considering the Upazila adjacent to Cox's Bazar Sadar, which was quite similar, we used a design effect of 1.2, slightly higher to avoid making overly optimistic assumptions.
Recall Period in days	Maharram Ashura, which falls on the 29th of July 2023, had served as the starting point for the recall period, as it represents the most recent and memorable religious festival for Muslims.
	Data collection was started at Ukhiya on 8th November and ended on 20th November, mid-point was 14th November, hence the recall period was 106.

Parameters for Mortality	Assumptions based on context
	Data collection was started at Teknaf on 8th November and ended on 19th November, mid-point was 13th November, hence the recall period was105
	Data collection was started at Cox's Bazar Sadar on 20th November and ended on 29th November, the mid-point was 25th November, hence the recall period was 117.
	Data collection was started at Ramu on 21st November and ended on 4th December, mid-point was 27th November, hence the recall period was 118.
	Data collection was started at Moheshkhali 30th November and ended on 6th December, mid-point was 4th December, hence the recall period was 125.
	Data collection was started at Pekua 5th December and ended on 16th December, mid-point was 11th December, hence the recall period iwas133.
	Data collection was started at Chokoria on 7th December and ended on 26th December mid-point was 17th, hence the recall period was 138
	Data collection was started at Kutubdia on 17th December and ended on 29th December mid-point was 23rd, hence the recall period was144.
Average HH Size	We used 2021 SMART survey findings for Ukhiya, Teknaf, Cox's Bazar Sadar, Moheshkhali, Kutubdia, and Pekua. Additionally, we relied on Census 2022 data for Ramu and Chokoria, based on district-level household size, due to the absence of upazila-level data for these two.
% Non-response Households	Based on ACF experience of previous different surveys at regions

Sample size for additional indicators:

The SMART survey used anthropometry or mortality as the primary estimation of sampling for all the other additional indicators in an integrated cross-sectional survey and therefore no additional sampling calculation was required for other indicators. The household questionnaire was administered within the same household sample. It is crucial to acknowledge that the Infant and Young Child Feeding (IYCF) many indicators may not provide adequate sample due to their smaller sample size as determined by SMART methodology, making them less suitable for this purpose.
Since anthropometry has the highest estimated sample, therefore 6651 households were considered to be the final sample size (BSU) for this survey:

2.3. Cluster Sampling Strategy:

The SMART survey was conducted with the use of a two-stage cluster sampling procedure to select the targeted population. Villages were considered the Primary Sampling Unit (PSU) while household was Basic Sampling Unit (BSU). The first stage involved the selectionclusters/villages from a total list of villages of entire Upazila using the Probability Proportion to Size (PPS) method. The population estimate has been derived from the 2011 census, which had been projected for the year 2022. While a 2022 census had taken place, unfortunately, there was no available data at the upazila or community level to accurately represent the population in lowest unit of villages. This has been applied prior to the sampling. The second stage involved the random selection of households from a complete and updated list of households. This has been executed at the field level.

- **First Stage Sampling – Selection of Clusters:**

At the first stage, the required number of clusters were assigned randomly using probability proportion to size (PPS) sampling where the clusters are defined as villages. A list of all updated villages were uploaded into the ENA for SMART (Jan 11th, 2020, version) software where PPS was applied. The number of clusterswere determined by the number of households a team could complete in a day. The number of clusters were selected to allow for one team to complete one cluster per day.
In many cases, villages selected randomly to contain a cluster might be very large or households very dispersed and sample selection c became very tedious; teams had to walk for long distances and not enough time to complete one cluster per day. In those scenarios (approximately more than 250 households in the village), segmentation into smaller parts (max 150-250 HH each) was used in order to reduce the areas that were covered by the survey teams. The objective of this procedure is to divide the village into smaller segments and choose one segment randomly to include the cluster.

This division was based on existing administrative units (neighborhoods, etc.), natural landmarks (river, road, mountains, etc.) or public places (market, schools, churches, mosques, temples, etc.) Segmentation has been done into equal or unequal parts.

Segmentation into equal parts: The village can be divided into 2 or more approximately equal parts each, the survey team leader wrote the name of those parts on pieces of paper that he folds and put into a bag or hat and had the village leader or his representative choose one part randomly. Therefore, the team had to go to that part of the village to conduct the survey for that cluster.
Segmentation into unequal parts: In some cases, it was not impossible to divide the village into equal parts, as shown on. Therefore, the survey team tried to find some natural landmarks that helped to divide the village into separate clearly defined segments. Once those segments were defined with an approximate population size, one segment was selected randomly using PPS.

Table 6: Segmentation procedure

Segments	Number of HHs	Cumulative number of HHs	Intervals
A	70	70	1-70
B	100	170	71-170
C	30	200	171-200
D	190	390	201-390

Then the team used a random number table (here considering three digits numbers) to select a number between 001 and the cumulative total number of households (390) of all the segments. The segment containing this number was the one to be surveyed. In this example, a 3-digit number must be picked from 001- 390. E.g., we picked **167**. This number is within segment B. Therefore, the survey has been conducted in segment B.

For the selection of more than one cluster in each village, the villages have been segmented and then simple random technique using the PPS method applied for the assigned number of clusters.
Selection of the number of households to be interviewed / per day

A calculation was done for each team to estimate the number of households to be surveyed per cluster per day at each Upazilla. Based on the estimated time to travel to the survey area, select and survey the households, 15 households were feasible to visit and complete the questionnaire by each team in each day.

Based on issues that impact on the total number of households that can be done in a day i.e. travel hours, introduction and household listing, lunch breaks, and time taken to administer a questionnaire in a household, it was estimated that 15 households could be visited by one team per day.

Table 7: Calculation of HH per cluster

Calculation of HH coverage/day/team		
Event	Time to dedicate	Total time remaining a
Time per day for field work	7:00 am until 5:30 pm = 630 min	630 min
Travel time (including travel time, round trip)	40 min X 2 trip = 80 min	630-80=550 min
Time for household listing and selection of households		
One breaks of 10 min plus 20 min lunch break	10 min + 20 min = 30 min	550-30= 520 min
Time allocated for households' interview (Interview + Travel time between HH+ consent)	30 min+ 3 min+2 min= 35 min	Interview – 30 min Travel time between HH-3 min Consent-2 min
Total number of HH's to be covered by each team per day	520/35 ≈ 15 HH	

Clusters and reserve clusters (Annex 2) were assigned using ENA software. Reserve clusters were not used as the survey achieved minimum number of clusters (>=90%) and children (>=80%) as recommended by SMART methodology to get representative results (see Annex).

Sampling frame of Cox's Bazar district:

Table 8: Sample size by ENA

Name of Upazila	Estimated Population of the areas	Estimated Number of children Under 5 years	Sample size (Children 6-59 months) size	HHs need to be covered size	Number of Clusters (Assuming 15 HHs per cluster per day) size
Ukhiya	284008	31809	502	986	65.8≈66
Teknaf	356703	39951	452	726	48.43≈49
Cox Sadar	619379	69370	369	755	50.3≈51
Ramu	358968	40204	488	1060	70.7≈71
Moheshkhali	392092	43914	423	712	47.5≈48
Kutubdia	148214	16600	440	704	46.9≈47

Chokoria	625891	70100	488	1060	70.7≈71
Pekua	226281	25343	423	648	43.2≈44
Cox's Bazar District	3011536	337291	3585	6651	447

Therefore 447 clusters (rounded up to achieve sufficient sample) for Cox's Bazar district. Clusters and reserve clusters were be assigned using ENA software (Annex 2).

 Second Stage Sampling – Household Selection:

Households were selected using simple random sampling. An updated household list was developed by survey teams 1-2 weeks prior to the data collection with the help of local community leaders or community nutrition volunteers. Once the list was updated, the team used a random number generator to select the required number of households from the list.

A community nutrition volunteer or leaders were appointed to guide the survey teams to the selected households on the day of the interview. In this case, the team also used a random number generator to select the required number of households from the list. All children 6-59 months within selected households were eligible for measurement. This approach of tracing each child and the corresponding household as well as revisiting other absent households minimized the non-response rate.

2.4. Overview of Indicators, Case Definition and Threshold:

Table 9: Survey Indicator

SL	Indicator	Target Population
	Anthropometry and Morbidity	
1.	Acute Malnutrition by WHZ and/or Oedema	Children 6-59 months
2.	Chronic Malnutrition by HAZ	
3.	Underweight by WAZ	
4.	Overweight or obesity by WHZ	
5.	Acute Malnutrition by MUAC and/or Oedema	
6.	Nutritional status of PLWs based on MUAC (<210 mm)	Pregnant and Lactating Women (PLW)
7.	Body Mass Index (BMI)	Adolescent girl 10-19 years
	Mortality	
8.	Crude Mortality Rate (CDR)	Entire population
9.	Under 5 Children Death Rate (U5DR)	Children under 5 years
	Additional indicators for Morbidity, Food security & WASH	
10.	Prevalence of common childhood illness (Diarrhoea, ARI, Fever)	Children 6-59 months
11.	Measles Vaccination Coverage (1st dose)	Children 9-59 months
12.	Measles Vaccination Coverage (2^{nd})	Children 15-59 months
13.	Early Initiation of Breastfeeding	0-23 months
14.	Exclusive Breast feeding	Less than 6 months
15.	Minimum acceptable diet	6-23 month children
16.	IFA consumption	PLW and adolescent girl based on WHO recommendation
17.	Minimum Dietary Diversity for Women [MDD-W]	Reproductive Age: 15-49 years
18.	Food Consumption Score (FCS), Food Consumption Score- Nutrition (FCS-N) coping mechanism (rCSI), livelihood, household income and expenditure	Household level
19.	Water Sanitation and hygiene practices	Household level

Table 10: Cut-offs for the indices of WHZ, HAZ, WAZ, and MUAC

Malnutrition Status	MALNUTRITION STATUS CLASSIFICATION			
	Acute Malnutrition (WHZ)		Chronic malnutrition (HA	Underweight (WAZ)
	Weight-for-/ Height [WHZ]	MUAC (MM)	Height-for-/Age [HAZ]	Weight/Age [WAZ]
Global Acute Malnutrition (GAM)	WHZ< -2 SD and/or Oedema	MUAC< 125 mm and /or Oedema	HAZ< -2 SD	WAZ< -2 SD
Moderate Acute Malnutrition (MAM)	WHZ <- 2SD to ≥ -3 SD	115 mm≤ MUAC< 125 mm	HAZ <- 2SD to ≥ -3 SD	WAZ <- 2SD to ≥ -3 SD
Severe Acute Malnutrition (SAM)	WHZ < -3 SD and/or Oedema	MUAC< 115 mm and /or Oedema	HAZ < -3 SD	WAZ < -3 SD

Table 11: WHO and/ UNICEF Classification for the Severity of Malnutrition by Prevalence among Children under Five

Indicator	PREVALENCE THRESHOLDS LEVEL [%]				
	Very high	High	Medium	Low	Very low
Wasting [WHZ]	≥ 15	10 – <15	5 - <10	2.5- <5	<2.5
Overweight [WHZ]	≥ 15	10 – <15	5 -<10	2.5- <5	<2.5
Stunting [HAZ]	≥ 30	20 - <30	10 -<20	2.5- <10	<2.5

Table 12: Nutritional Status among Adolescent Girl by Using BMI WHO range

Indictor	PREVALENCE THRESHOLDS LEVEL (BMI)					
	Severe Malnutrition	Moderate Malnutrition	Mild Malnutrition	Normal Nutritional Status	Over weight	Obesity
Body Mass Index (BMI)	<16.0	≥ 16.0 to <17.0	≥ 17.0 to <18.5	≥ 18.5 to <25.0	≥ 25.0 to <30.0	≥ 30.0

Indicator Definition:

Households (HH): A household is defined as a group of people who normally live together and eat from the same pot and resources.

Acute Malnutrition: Acute malnutrition in children aged 6-59 months can be assessed using three indicators: Weight for Height (WHZ), Mid Upper Arm Circumference (MUAC), and nutritional edema, which is a severe acute malnutrition indicator.

Weight-for-height index (W/H): A child's nutritional status is determined by comparing their measurements to the weight-for-height distribution curves from the 2006 WHO growth standards reference population. The weight-for-height index is expressed as a Z-score (WHZ), which calculates how the child's observed weight (OW) compares to the mean weight (MW) of the reference population for a child of the same height. The Z-score signifies the number of standard deviations (SD) that separate the child's observed weight from the mean weight of the reference population: WHZ = (OW - MW) / SD. During data collection, the weight-for-height index in Z-score was computed in the field for each child 6-59 month children. This calculation allowed us to identify malnourished cases and refer them to appropriate centers if necessary. Furthermore, the results are presented in Z-scores using WHO references in this report.

Mid Upper Arm Circumference (MUAC): Mid Upper Arm Circumference is an independent anthropometric measurement that doesn't require a comparison to other measurements. It serves as a reliable indicator of a child's muscular status and is primarily used to identify children at risk of mortality. MUAC is an indicator of malnutrition for children aged six months and older. Table 10 provides the MUAC cutoff criteria for classifying cases of acute malnutrition.

Nutritional bilateral "pitting" oedema: Nutritional bilateral "pitting" edema is a characteristic sign of Kwashiorkor, which is one of the major clinical forms of severe acute malnutrition. When this condition coexists with Marasmus (severe wasting), it is referred to as Marasmic-Kwashiorkor. Children presenting with bilateral edema are automatically classified as severely malnourished, regardless of their weight-for-height index. Table 5 below provides definitions of acute malnutrition based on the W/H index, MUAC, and the presence of edema.

Global Acute Malnutrition based on combined criteria (cGAM): The Combined Global Acute Malnutrition (cGAM) was calculated by considering W/H <-2SD and/or MUAC <125mm, and/or the presence of bilateral pitting edema. cGAM offers us a comprehensive estimate of acute malnutrition or wasting, as it combines children who are experiencing wasting based on WHZ or MUAC, or the presence of edema.

Overweight or Obesity among children: The prevalence of overweight or obesity among children aged 6-59 months was determined by evaluating the Weight-for-Height Z-Score (WHZ) for those exceeding 2 Standard Deviations (SD).

Underweight: The Weight-for-age index (W/A) Underweight is characterized by a low weight for a child's age compared to the World Health Organization reference median. In this survey, the latter reference was utilized. Children whose weight-for-age falls below -2 Standard Deviations (SD) in relation to a reference child are classified as underweight.

Chronic Malnutrition: The height-for-age index (H/A) The height-for-age measure assesses whether a child of a specific age is stunted, also known as chronically malnourished. This index provides insights into the child's nutritional history rather than their current nutritional status and is primarily employed to identify chronic malnutrition. Similar to the principle used for weight-for-height, the child's chronic nutritional status is evaluated by comparing their height with the WHO standard height-for-age curves, as opposed to weight-for-height curves. The child's height-for-age index within the studied population is expressed as a Z-score (HAZ). Children whose weight-for-age falls below -2 Standard Deviations (SD) in relation to a reference child are classified as Stunting.

2.5. Indicator Measurement:

Age: Children 0-59 months from the selected households were considered eligible for the survey. Age was obtained from official written documents such as vaccination or birth registration cards. If documentation was unavailable, a local calendar of events was used to estimate age.

Sex: This was recorded as either 'f' for female or 'm' for male.

Weight: Standardized SECA scales were used for weight measurement of children between 0 to 59 months. The weight was recorded to the nearest 100g (0.1 kg). Direct weighing option was used for older children who could easily stand while the double weighing option was applied for younger children or children who could not stand.

Height: Standard, height boards were used for taking length and height of children. Children less than 24 months were measured lying down, and children greater than or equal to 24 months were measured standing. The precision of the measurement is 0.1 cm

Mid Upper Arm Circumference (MUAC): Was measured using a flexible non-elastic tape, midway between the tip of the acromion process and the tip of the olecranon process of the left arm with the arm hanging freely by the child's/PLW side. MUAC measurements was recorded to the nearest 0.1 cm or 1.0 mm.

Bilateral Oedema: Was assessed by applying a moderate thumb pressure on both feet for three seconds. If oedema was present, a shallow pit remained after releasing pressure from the feet. Only children with bilateral oedema (oedema on both feet) were diagnosed positive for nutritional oedema. The team leader confirmed all cases of oedema and referred the cases for immediate inpatient care.

Crude and under 5 death rates:
The survey questionnaire included questions on deaths and demographic information during the recall period of approximately three months. Specifically, the survey collected the following data:

- Total number of people in the household
- Number of children under five years
- Number of people who left the household within the recall period (total and children under five years)
- Number of people who joined the household within the recall period (total and children under five years)
- Number of births in the household within the recall period
- Number of deaths in the household within the recall period (total and children under five years)
- Cause of deaths

Crude mortality rate [CDR]: It was defined as the number of deaths from all causes per 10,000 people per day over a specified period. It is calculated from the following formula:

* **CDR =** Number of deaths / [mid-interval population / 10,000] x time interval

= deaths / 10,000 / day

Under five death rate [U5DR]: U5DR was defined as the number of deaths among children under five from all causes per 10,000 people per day over a specific period of time. It is calculated from the following formula:

* **U5DR** = Number of under 5 deaths / [mid-interval population / 10,000] x time interval
= under 5 deaths / 10,000 / day

Morbidity:

Retrospective morbidity: Mothers or caregivers were asked about illnesses that affected their children (6-59 months) in the past two weeks prior to the survey date.

Diarrhea: This was assessed among children 6-59 months by a two-week recall. Diarrhea is defined as the passage of three or more loose or liquid stools in a day.

Cough (with fast, short, rapid or difficulty breathing): This was assessed among children 6-59 months by a two-week recall. This indicator was used as a proxy for suspected ARI or pneumonia.

Fever (without cough and rash): This was assessed among children 6-59 months by a two-week recall, defined as fever in the absence of respiratory symptoms (cough).

Vitamin A supplementation, deworming, and measles vaccination

Measles vaccination: This was assessed among children 9-59 months by checking for the measles vaccine on the EPI card if available or by asking the caregiver to recall if no EPI card was available.

Vitamin A supplementation: This was assessed among children 6-59 months by checking the EPI card or health card if available or by asking the caregiver to recall if no card is available. A vitamin A capsule image was shown to the caregiver when asked to recall.

Deworming: This was assessed among children 24-59 months by asking the caregiver to recall. A deworming tablet was shown to the caregiver when asked to recall.

Infant and Young Child Feeding

Infant and young child feeding practices were assessed based on the standard WHO guidelines of 2021 as follows:

1. Key Breastfeeding indicators

Early initiation of breastfeeding: Percentage of children born in the last 24 months who were put to the breast within one hour of birth.

$$\frac{\text{Children 0-23 months who were put to the breast within one hour of birth}}{\text{Children 0-23 months}}$$

Exclusively breastfeeding under six months: Percentage of infants 0-5 months who were fed exclusively with breast milk during the previous day

$$\frac{\text{Children 0-5 months who were fed exclusively with breastmilk during the previous day}}{\text{Children 0-23 months}}$$

Continued breastfeeding 12-23 months: Percentage of children 12-23 months who were fed breastmilk during the previous day.

$$\frac{\text{Children 12-23 months who were fed breastmilk during the previous day}}{\text{Children 12-23}}$$

Bottle feeding 0-23 months: Percentage of children 0-23 months who were fed from a bottle with a nipple during the previous day

$$\frac{\text{Children 0-23 months who were fed from a bottle with a nipple during the previous day}}{\text{Children 0-23 months}}$$

2. Key Complementary feeding indicators

Minimum dietary diversity 6-23 months: Percentage of children 6–23 months who consumed foods and beverages from at least five out of eight food groups during the previous day.

$$\frac{\text{Children 6–23 months who consumed foods and beverages from} \geq 5 \text{ food groups during the previous day}}{\text{Children 6–23 months of age}}$$

Minimum meal frequency 6-23 months: Percentage of children 6–23 months who consumed solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the mini-mum number of times or more during the previous day.

$$\frac{\text{Children 6–23 months who consumed solid, semi-solid, or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more during the previous day}}{\text{Children 6-23 months of age}}$$

Minimum milk feeding frequency for non-breastfed children 6-23 months: Percentage of non-breastfed children 6–23 months who consumed at least two milk feeds during the previous day

$$\frac{\text{Non-breastfed children 6–23 months who consumed at least two milk feeds during the previous day}}{\text{Children 6–23 months of age}}$$

Minimum acceptable diet: Percentage of children 6–23 months who consumed a minimum acceptable diet during the previous day.

$$\frac{\text{Children 6–23 months who consumed a minimum acceptable diet during the previous day}}{\text{Children 6-23 months}}$$

Egg and/or flesh food consumption 6-23 months: Percentage of children 6–23 months who consumed egg and/or flesh foods during the previous day.

$$\frac{\text{Children 6–23 months who consumed egg and/or flesh food during the previous day}}{\text{Children 6-23 months}}$$

Sweet beverage consumption 6-23 months: Percentage of children 6–23 months who consumed a sweet beverage during the previous day.

$$\frac{\text{Children 6–23 months who consumed a sweet beverage during the previous day}}{\text{Children 6-23 months}}$$

Unhealthy food consumption 6-23 months: Percentage of children 6–23 months who consumed selected sentinel unhealthy foods during the previous day.

$$\frac{\text{Children 6–23 months who consumed selected sentinel unhealthy foods during the previous day}}{\text{Children 6-23 months}}$$

Zero vegetable or fruit consumption 6-23 months: Percentage of children 6–23 months who did not consume any vegetables or fruits during the previous day.

$$\frac{\text{Children 6–23 months who did not consume any vegetables or fruits during the previous day}}{\text{Children 6-23 months}}$$

Maternal Nutrition: The nutritional status of women of reproductive age was assessed using MUAC measurements. The MUAC measurements were recorded to the nearest 0.1 cm or 1.0 mm.

IFA consumption of pregnant women: This was passed by asking pregnant women on last one week IFA consumption.

Women minimum dietary diversity: This was asked 24 hours recall period to one woman in reproductive age group 1 family member (randomly selected 1 woman if in this age group family member more than one through lottery by putting name in piece of paper.

Adolescent Girl Malnutrition:

The nutritional status of adolescent girl 10-19 years was using Weight and Height Measurement measurements. The weight measured through SECA scale and recorded to the nearest 100g (0.1 kg). The Height measured by UNICEF adult height scale and the precision of the measurement is 0.1 cm. Adolescent Malnutrition Categorized as Severe Malnutrition (BMI <16.0), Moderate Malnutrition (BMI ≥ 16.0 to <17.0), Mild Malnutrition (BMI ≥ 17.0 to <18.5), Normal Nutritional Status (BMI ≥ 18.5 to <25), Over weight (BMI ≥ 25.0 to <30.0) and Obesity (BMI ≥ 30.0).

IFA consumption of pregnant women: This was passed by asking pregnant women on last 1-week IFA consumption.

Food Security and Livelihood:

Monthly Income: This was measured by asking the various sources of income and summing the earnings of all household members in cash or kind over the course of one year, and then considering the average monthly amount.

Household Expenditure: This included household consumption and certain other outlays of the household during the reference period and monthly expenditure based on all HHs members.

Food Consumption Score: The "Food consumption score" (FCS) was calculated using the frequency of consumption of different food groups consumed by a household during the 7 days before the survey. Food items are grouped into 8 standard food groups with a maximum value of 7 days/week. Due to high consumption of oil and sugar in our context, we have adjusted the cutoff points according to FAO standards:

Acceptable: (>42), Borderline: (28.5-42), Poor: (0-28)

Reduced Coping Strategies Index: The reduced Coping Strategies Index (rCSI) used to compare the hardship faced by households due to a shortage of food. This was measured based on the frequency and severity of the food consumption behaviors that households had to adopt due to food shortages in the 7 days leading up to the survey.

Water Sanitation and Hygiene Practices:

Hand washing at critical by the household: This was assessed by asking the respondents and also observing to see the kind of hand washing materials that was reported.

Availability of drinking water at the household: This was assessed by asking the respondents

Purification of drinking water: This was assessed by asking the respondents the process they follow.

Availability of water at the hand washing place: This was assessed through observations.

2.6. Survey Equipment:

Weight had been measured by using SECA electronic scales, which enable double measurements. These weight scales were calibrated daily using a 2 Kg standard weight. Height had been measured using UNICEF standard height boards. For measuring the Mid-Upper Arm Circumference (MUAC) of both children and women, UNICEF MUAC tapes were employed. MUAC tapes were replaced every two days or more for frequently if they showed signs of stretching or folding.

2.7. Team Composition:

The survey was implemented by 12 teams, each consisting of 3 members: one team leader cum lead measurer, one measurer assistant and one interviewer. Each team member has the following designated roles:

- Team leader: Introduced the team in the surveyed area with several key responsibilities. These included mapping the clusters, segmenting clusters when necessary, engaging with the village chief and local authorities, ensuring the listing of households (the basic sampling unit), overseeing the correct randomization of household selection during the second stage of cluster sampling, ensuring the proper selection of households according to the randomization technique, lead anthropometric measurements, supervising and monitoring anthropometric measurements and interviews conducted with questionnaires, and maintaining both the supervision checklist and cluster control form.
- Interviewer: Interviewers secured consent, conducted verbal interviews, inquired about mortality-related issues, and input additional indicators into the tablet. Considering the social and cultural sensitivity of gathering information from caregivers or female members, it was advisable to recruit female interviewers.
- Measurer assistant: Assisted in taking anthropometric measurements and confirm household listing of family members by interviewer.

Additional survey 2 enumerators (1 male & 1 female) were kept as reserve. As individual team member absence due to urgent personal issues he/she was replaced on those days However, one additional volunteers/staff from nutrition sectors partner was added for assisting household listing at 4 upazila Ukhiya, Teknaf, Moheshkhali and Kutubdia..

Training: All team members and reserve team (42 persons) participated in the training. The survey team received a 5 days training (29th October -2nd November 2023) which includes classroom training and field test during the training, the field enumerators were trained on survey objectives, household selection techniques, and demonstration of anthropometric measurements, mortality questionnaire and use of mobile data collection and also standardization test was taken during training. A field test was conducted a day before the actual survey in the nearest village. The questionnaire was translated into Bengali and administered in the local language uploaded in kobo platform.Determination of the team composition was based on performance on a written evaluation (pre and post-test), standardization test and field test.

2.8. Data Collection:

The data collection for the nutrition survey was commenced in the specified district covering all upazila between November and December 2023. Approximately 7-8 weeks were allocated for the completion of field data collection..

2.9. Quality Assurance:

The survey's commitment to data quality was assured through careful oversight at every stage of the process. The protocol outlined various measures taken to ensure quality assurance during recruitment, sampling (such as maintaining an updated sampling frame), training (including field tests, standardization tests, and written exams), and fieldwork (including equipment calibration and a multi-agency supervision team). Standard SMART questionnaire in ODK collect were used in tablets to collect data in 8 upazila.

Furthermore, a daily data check was conducted by the Head of Department and Deputy Head of department. Weekly SMART regional advisor assessed the completeness and consistency of entered data. To evaluate data quality, the ENA plausibility check for anthropometric data was employed, and additional variables reviewed in Excel/SPSS. Teams, supervisors, and the HoD/DHoD-Health, Nutrition & Surveillance held nightly meetings throughout the data collection process to address any issues observed in the field and those identified during data review. Furthermore, UNICEF supervised the standardization test, field testing, random field monitoring of data collection, and daily plausibility checks in close cooperation with ACF.

2.10. Data Management, Analysis and Report:

All anthropometric and mortality data were analysed using the ENA for SMART tool (version dated January 11, 2020). SMART flags were utilized to exclude values that fell outside the range of +/- 3 standard deviations from the observed WHZ mean. Weighted analysis of Upazila were conducted to reach district wise result. Preliminary results were validated by ACF Canada SMART Team and ACF FRANCE. A consolidated Power Point presentation of results, along with datasets in ENA file format, was shared with the AIMTWG within 1 month of completing data collection and in country validation by the AIMTWG working group of Nutrition Sector Cox's Bazar.

2.11. Ethical Consultation:

All participants were verbally asked for informed consent, and no one was compelled to provide information for the study; participation was entirely voluntary. Before collecting data, the survey objectives were clearly explained to all participants. Enumerators were refrained from collecting data from individuals who declined or show any disinterest in participating. Enumerators were committed to maintaining the privacy of survey participants' information and data sources. They made every effort to collect data without bias. Personally, identifiable information were not retained in the dataset.

Survey approval obtained from the National Nutrition Service (NNS) and the Cox's Bazar Civil Surgeon's office by sharing a detailed protocol, outlining health safety measures, and addressing other operational aspects of the survey.

2.12. Exclusion Criteria:

- Rohingya children/households were not be included.
- Severely ill children, adolescent or caregivers were excluded from anthropometric data; however, other additional household level information were added.

2.13. Referral:

In the host community, the programming is focused solely on Mid-Upper Arm Circumference (MUAC) measurement. As a result, all children identified as meeting the case definition for severe acute malnutrition (MUAC < 115 mm) and moderate acute malnutrition (MUAC $\geq$ 115 mm and < 125 mm) were referred to the nearest Outpatient Therapeutic Feeding Program (OTP), with the option of Supplementary Care (SC) if inpatient care is required.

Additionally, pregnant and lactating women with MUAC measurements less than 210 mm were referred to the nearest Targeted Supplementary Feeding Program (TSFP), provided they have not already been admitted to such a program.

2.14. Limitation:

This is a cross-sectional survey, which means that we examined a snapshot in time, and therefore, we won't have the capability to establish causal relationships. Our primary objective is to assess the prevalence of malnutrition and to identify potential contributing factors based on the information gathered through the questionnaire. While additional indicators like IYCF, care practices etc should be considered at using of this findings in the future if less number of representative sample size and limited indicators. The same sample size as the anthropometric indicators were used for IYCF. It should be noted that IYCF indicators require a larger sample size, and therefore the results of the IYCF indicators in the Integrated SMART survey are only an indication and NOT a representative for the whole population. For women dietary diversity, one women of reproductive age (15-49 years) was randomly selected (if more than one) from each household for assessing minimum dietary diversity for women (MDD-W). Moreover, the study's design inherently limits our ability to draw conclusions about causation.

3. Survey Results:

3.1. Anthropometric results (based on WHO standards 2006)

3.1.1. Survey Data Quality

Overall Anthropometry data quality ranged from excellent to a good in all 8 upazila This is an indication of good quality data across the stratums (see Annex). The mean Z-scores, standard deviations, design effects, and missing or flagged values were thoroughly assessed and found to be reliable, ensuring the integrity and quality of the data. This rigorous validation process confirms that the dataset is robust and fit for accurate analysis (see Annex).

3.1.2. Demography

In Cox's Bazar District, the estimated percentage of infants aged 0-5 months is 1.4%, while children aged 6-23 months make up 4.1% of the population. Children aged 24-59 months represent 7.4%. Pregnant Women (PW) account for 1.5% of the population, and Lactating Women (LW) with infants under 6 months make up 1.3%, while those with infants aged 6 months and older account for 3.6%. Adolescents (10-19 years) comprise 20.5% of the population, with adolescent girls specifically representing 9.4% (below Table 13).

Table 13: Demography Profile (Special Group)

Upazila	0-5 m	6-23 m	24-59 m	PW	LW with infant < 6 m	LW with infant ≥ 6 m	Adolescent Girl (10-19)yrs	Adolescent (10-19)yrs
Ukhiya	1.3%	3.9%	7.2%	1.5%	1.2%	2.8%	10.3%	22.1%
Teknaf	1.7%	4.0%	7.8%	1.3%	1.5%	3.3%	9.6%	22.0%
Cox's Bazar Sadar	1.7%	4.1%	8.5%	1.6%	1.4%	3.3%	8.9%	19.0%
Ramu	1.4%	4.4%	6.3%	1.6%	1.3%	4.4%	10.3%	21.1%
Moheshkhali	1.3%	4.2%	7.0%	1.2%	1.3%	3.7%	9.1%	20.5%
Kutubdia	1.4%	4.6%	8.5%	1.8%	1.3%	4.4%	9.5%	20.5%
Chokoria	1.3%	3.9%	6.6%	1.4%	1.4%	3.8%	8.7%	19.6%
Pekua	1.3%	4.2%	7.9%	1.5%	1.2%	3.3%	10.4%	21.7%
Cox's Bazar District	1.5%	4.1%	7.4%	1.5%	1.4%	3.6%	9.4%	20.5%

Furthermore, in Cox's Bazar District, demographic profiles vary across upazilas. Ukhiya and Teknaf exhibit higher percentages of individuals aged 18-49, with significant numbers of children aged 5-11. Conversely, Kutubdia shows lower proportions of the 18-49 age group, with more balanced distributions across other ages, notably higher representation of older adults. Chokoria and Pekua align with other upazilas in 18-49 dominance but have slightly fewer elderly (see Annex).

3.1.3. Retrospective crude and under 5 death rates

The findings reveal varying mortality rates across the eight Upazilas in Cox's Bazar, Bangladesh. However across the upazilas the crude and under 5 death rates were below the WHO emergency threshold of 1/10,000/day and 2/10,000/day respectively (See Annex)

3.1.4. Prevalence of acute malnutrition based on weight-for-height z scores and/or oedema[11]

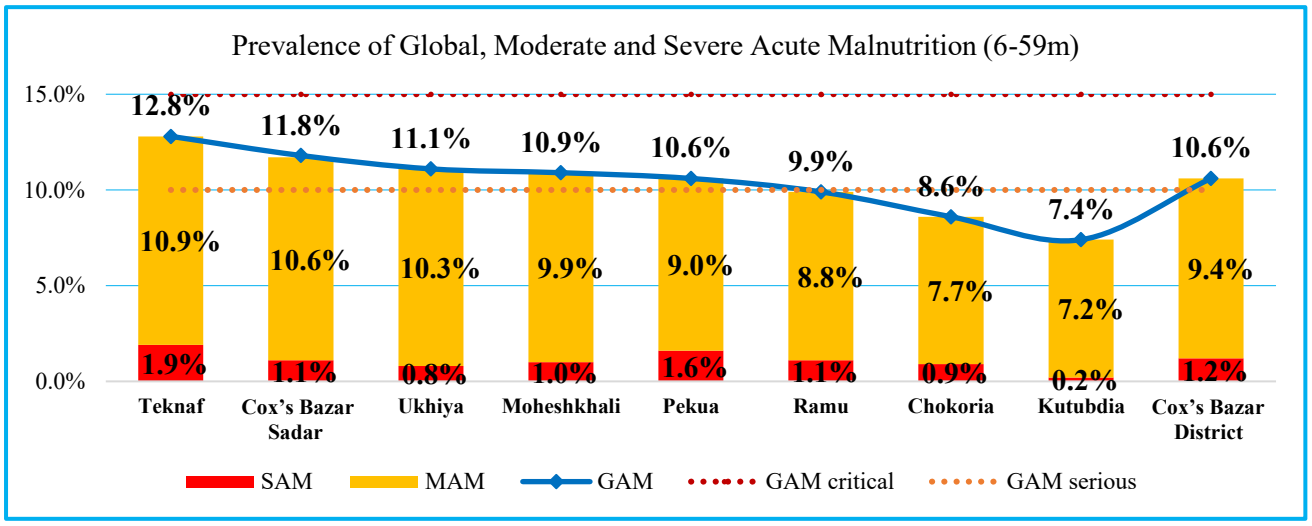


Figure 1: Prevalence of acute malnutrition based on weight-for-height z scores

The highest prevalence was found in Teknaf at 12.8% (95% C.I 9.4-17.1), while the lowest was observed in Kutubdia 7.4 % (95% C.I 5.5 -10.0) (Figure 2, above). Overall, the district's status was categorized as high according to the WHO/UNICEF emergency threshold, with a prevalence of 10.6% (95% C.I 5.5-10.0) while severe acute malnutrition was weighted at 1.2% (95% C.I 0.8-1.6). These findings underscores the critical need for urgent interventions to address malnutrition and improve child health outcomes across the region.

3.1.5. Prevalence of Wasting Based on MUAC:

The prevalence of wasting 6-59 months based MUAC found to be low across the upazila. Overall district global 1.5% (1.1-2.0) (see Annex).

3.1.6. Prevalence of combined Wasting (WHZ and MUAC):

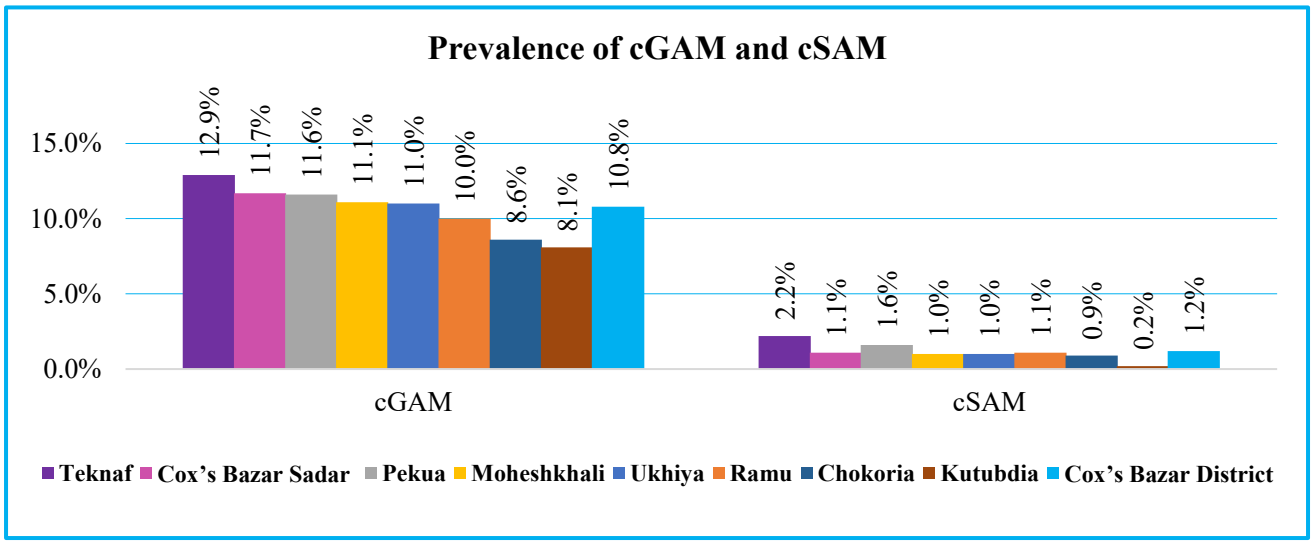


Figure 2: Prevalence of combined Wasting (WHZ and MUAC)

[11] No oedma cases identified

Overall, the district's weighted combined Global Acute Malnutrition (cGAM) based on WHZ and MUAC prevalence is 10.8% (95% C.I 9.6-11.9), indicating a high level of wasting prevalence as per WHO/UNICEF classification (Figure 3, above). Teknaf , Ukhiya , Cox's Bazar Sadar , Ramu, Moheshkhali, and Pekua fall under the high level indicating the acute wasting are high concern of these upazila. Chokoria and Kutubdia fall under medium level of threshold.

3.1.7. Prevalence of Underweight based on Weight-for-Age Z-scores (WAZ):

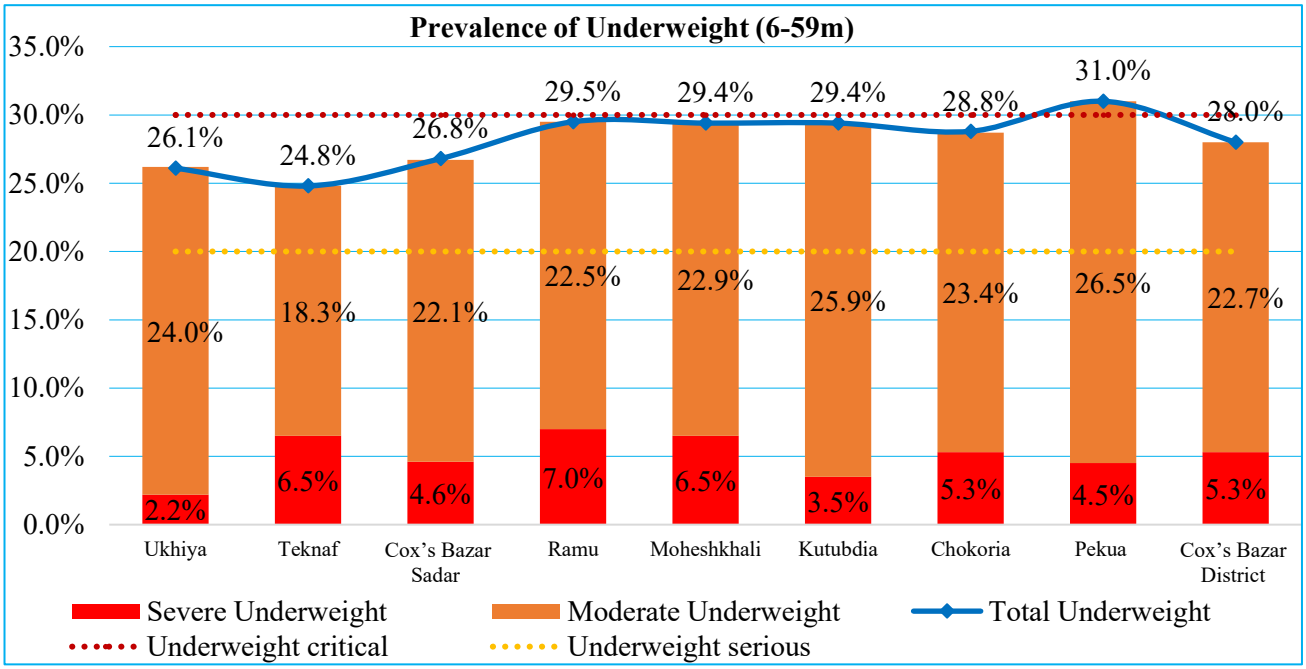


Figure 3: Prevalence of underweight (WAZ)

The prevalence of underweight across the upazilas was found to be at a serious level in seven upazilas, with one Upazila (Pekua) within the critical emergency threshold (Figure 4, above). Overall, the district prevalence of underweight was observed at 28.0% (95% C.I 26.4-29.6), classified as a serious level by WHO/UNICEF threshold. These findings emphasize the urgent need for intensified nutrition interventions to address the widespread undernutrition and prevent further deterioration of child health in the district.

3.1.8. Prevalence of Stunting based on Height for Age Z-scores (HAZ):

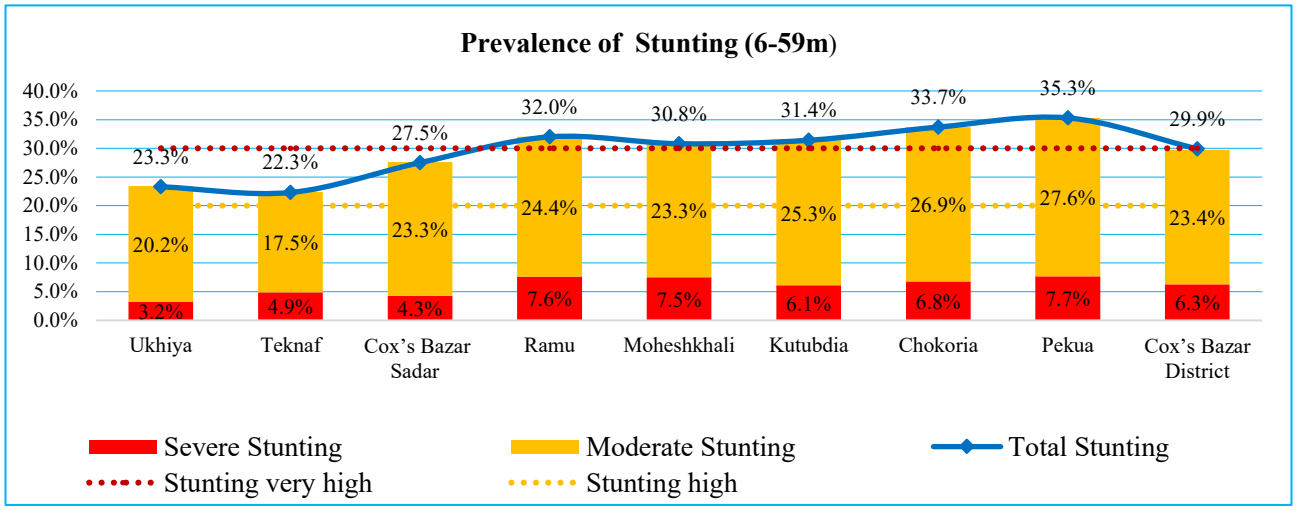


Figure 4: Prevalence of stunting based on height-for-age z-scores

Stunting prevalence was notably very high across the five upazilas; Ramu, Moheshkhali, Kutubdia, Chokoria, and Pekua exceeding the ≥30% WHO/UNICEF threshold (Figure 5, above). In Ukhiya, Teknaf, and Cox's Bazar Sadar, stunting prevalence was classified as high. The highest prevalence was observed at Pekua upazial 35.3% and less found in Tekna 22.3%.

3.1.9. Acute Malnutrition 2021vs 2023 SMART Survey:

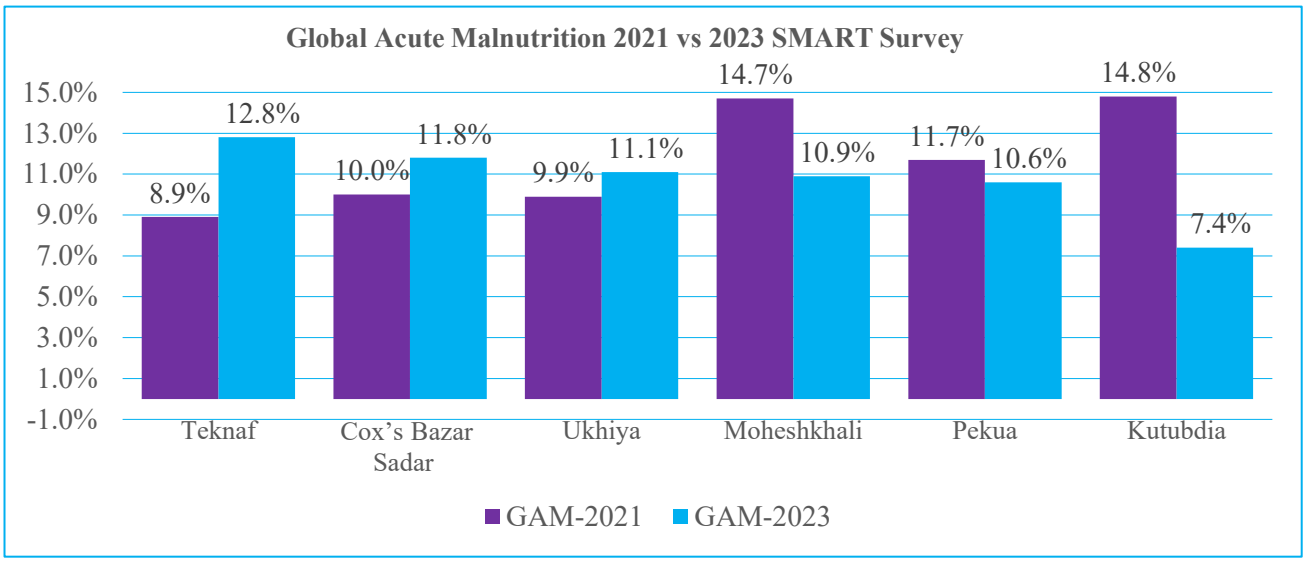


Figure 5: Acute Malnutrition 2021 vs 2023

In Teknaf, Cox's Sadar, and Ukhiya, there has been an increase in acute malnutrition at 2023 compare to 2021. Conversely, in Moheshkhali, Pekua, and Kutubdia, there has been a decrease in acute wasting, the decrease in Kutubdia is statistically significant compared to 2021 (p-value < 0.05). All Others upazila found no statistically significant either increase or decrease (Figure 6, above). These trends underscore the need for targeted interventions in areas experiencing worsening malnutrition, while maintaining progress in regions showing improvement.

3.1.10. Underweight and Stunting 2021 vs 2023 SMART Survey:

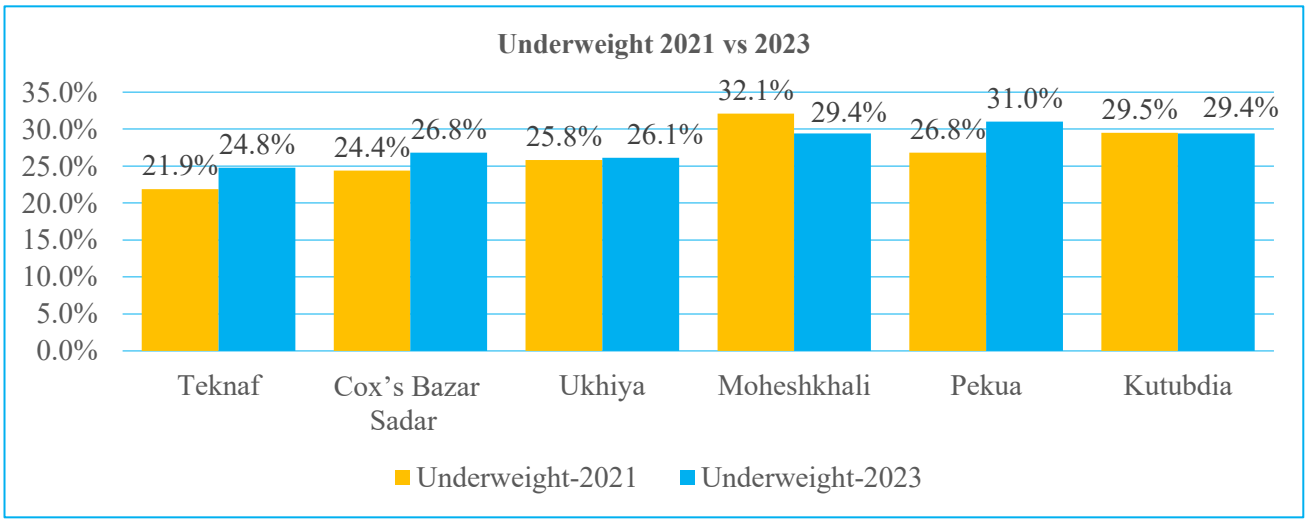


Figure 6: Underweight 2021 vs 2023 SMART Survey

Underweight prevalence has increased in 2023 all Upazilas except for Moheshkhali and Kutubdia (Figure 7, above). However, these changes in trends are not statistically significant comparing to 2021, indicating a need for further investigation into the underlying factors contributing to these fluctuations and the effectiveness of existing interventions in addressing undernutrition in the district.

3.1.11. Stunting 2021 vs 2023 SMART Survey:

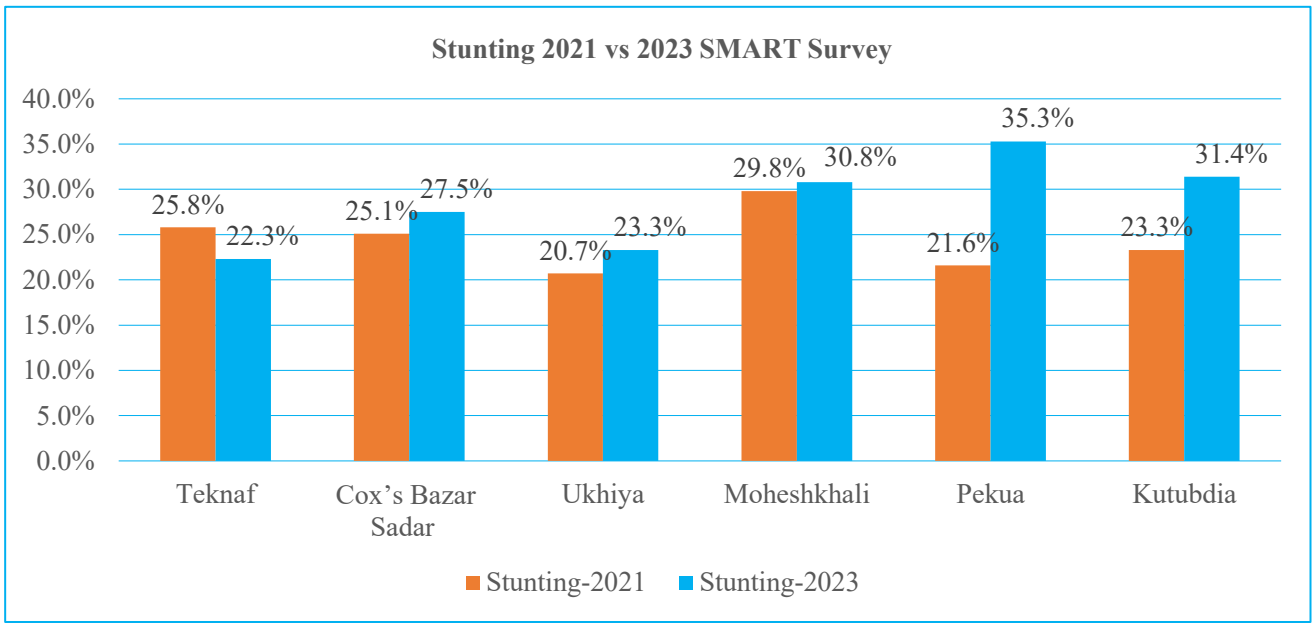


Figure 7: Stunting 2021 vs 2023 SMART Survey

The prevalence of stunting has increased in 2023 across all Upazila compared to 2021, except for Teknaf (Figure 8, above). Notably, there is a significant increase in the prevalence of stunting in Kutubdia and Pekua in 2023 ($p<0.05$), raising urgent concerns about child growth and nutrition.

3.1.12. Prevalence of wasting (WHZ), underweight (WAZ) and stunting (HAZ) by Sex and Age

The wasting prevalence was found to be significantly higher among boys compared to girls in Teknaf and Moheshkhali ($p<0.05$). In contrast, no significant differences in wasting were observed between boys and girls in the other upazilas. Additionally, no significant variations in underweight or stunting between boys and girls were detected across the eight upazilas (See Annex).

Furthermore, Underweight was found to be significantly higher among older children (24-59 months) compared to younger children (6-24 months) in Ukhia, Cox's Bazar Sadar, and Chokoria ($p<0.05$). Additionally, stunting prevalence was significantly higher in the older age group in Ukhiya, Teknaf, Cox's Bazar Sadar, Ramu, and Chokoria, highlighting the increased vulnerability of older children in these regions (see Annex).

3.2. Infant and Young Child Feeding Practices:

3.2.1. Key Breastfeeding Practices:

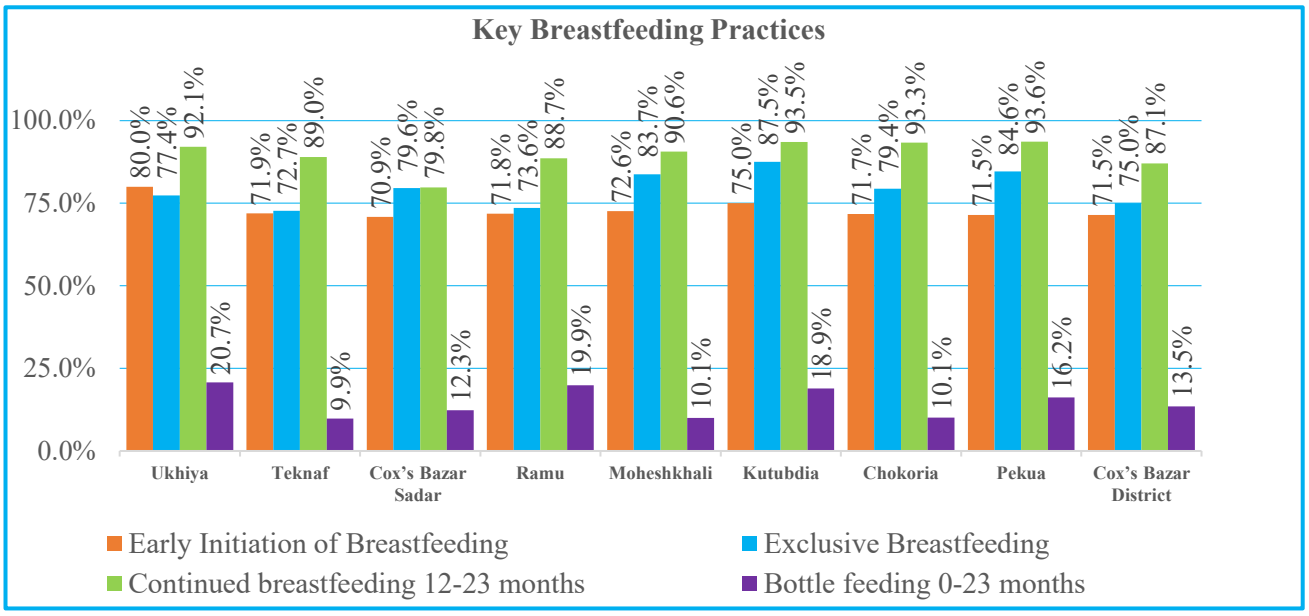


Figure 8: Key Breastfeeding practices among infant and young children 0-23 months

In Cox's Bazar District, early initiation of breastfeeding (EIBF) stands at 71.5%, exclusive breastfeeding (EBF) at 75%, and continued breastfeeding at 87.1%. Ukhiya leads with the highest EIBF, while Kutubdia achieves optimal EBF at 75%. However, all other upazilas fall below the desired EBF threshold of 75%. Notably, Ukhiya struggles with a high rate of bottle feeding. Despite these challenges, all upazilas demonstrate commendable continued breastfeeding rates reflecting while continued breastfeeding is consistently strong, there is a need to address exclusive breastfeeding, reduce bottle feeding, and improve early initiation rates across upazilas (Figure 9, above).

3.2.2. Complementary feeding practices:

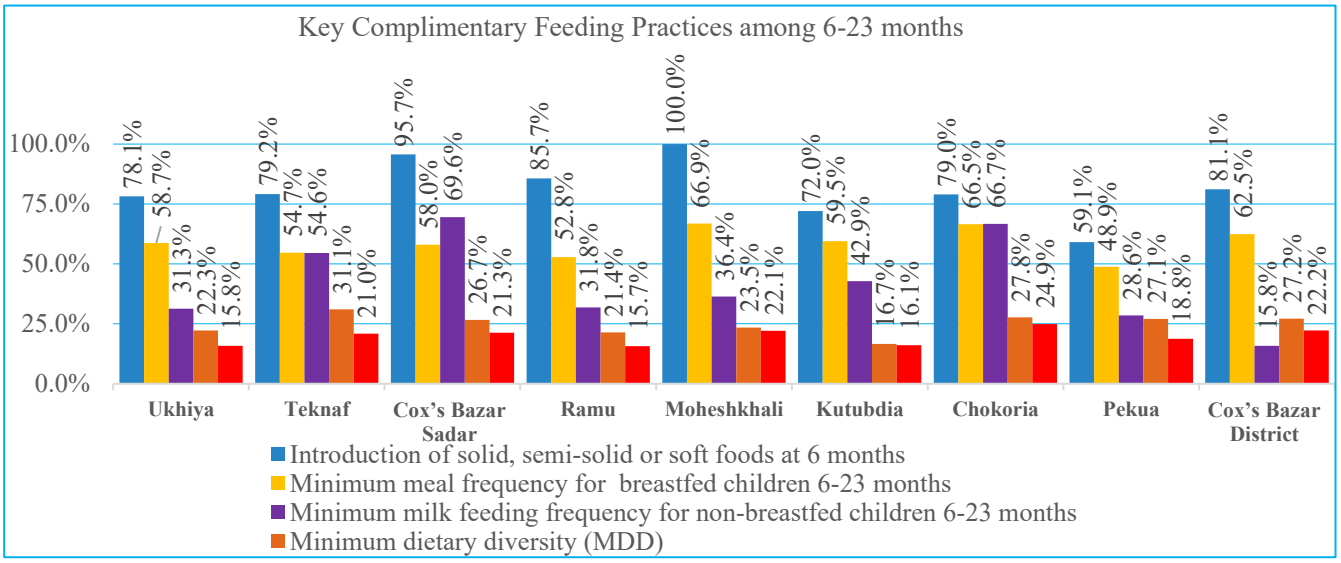


Figure 9: Key Complementary feeding practices among children 6-23 month

In Cox's Bazar District, while 81.1% of children aged 6-8 months are introduced to solid, semi-solid, or soft foods—an optimal rate—key feeding practices remain suboptimal. Minimum meal frequency for breastfed

children (62.5%) and minimum milk feeding frequency for non-breastfed children (45.9%) are below acceptable levels. Furthermore, Minimum Dietary Diversity (MDD) is alarmingly low at 27.2%, and Minimum Acceptable Diet (MAD) is critically low at 22.2% (Figure 10, above).

Across the upazilas, consumption of Grains, Roots, and Tubers is the only food group at an acceptable level, while Milk and Milk products, as well as Vitamin A-rich fruits and vegetables, are significantly lacking. Minimum Dietary Diversity (MDD) is severely low in Ukhiya, Ramu, Moheshkhali, and Kutubdia, and moderately low in the remaining upazilas. The Minimum Acceptable Diet (MAD) is critically low across all upazilas. These findings highlight an urgent need for targeted interventions, including nutrition-sensitive programs and educational efforts, to improve dietary diversity and overall nutritional intake in the region (see Annex).

3.3. Morbidity and health seeking:

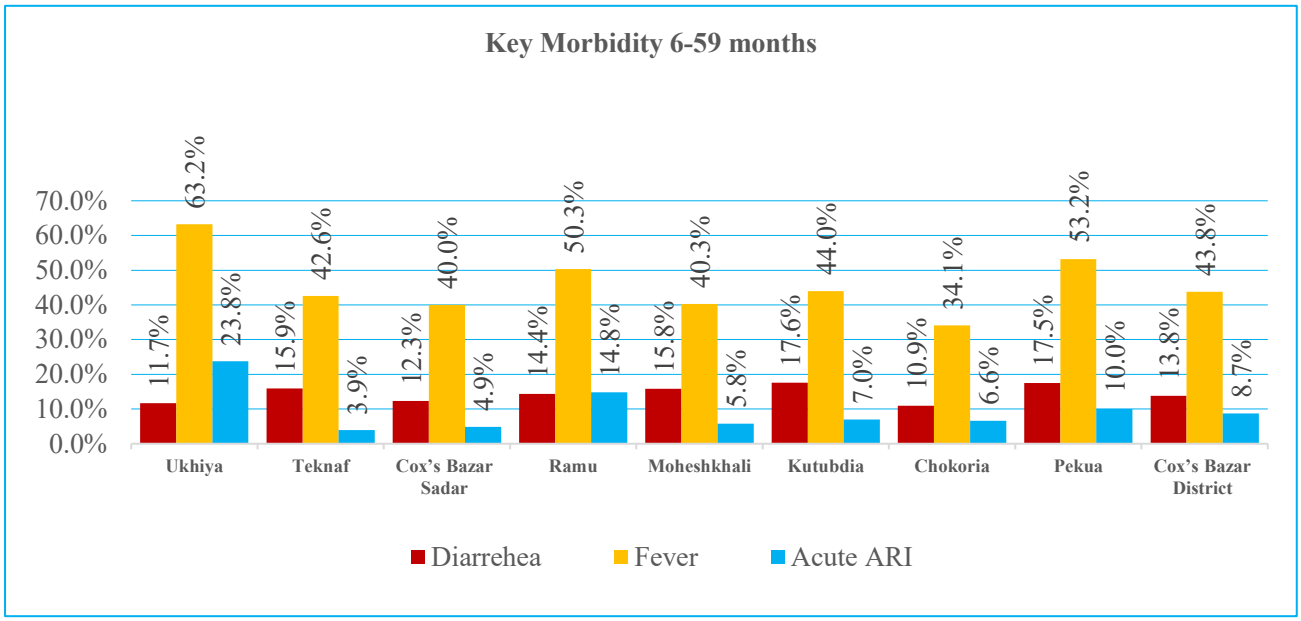


Figure 10: Morbidity status among 6-59 month following last 2 weeks

The overall prevalence of diarrhea (Figure 11, above) is 13.8%, fever 43.8%, and acute respiratory infections (ARI) 8.7%. Significant variation is seen across upazilas, with the highest diarrhea prevalence in Pekua (17.5%), fever in Ukhiya (63.2%), and ARI also highest in Ukhiya (23.8%). This variation points to the need for targeted interventions to address the specific health challenges faced by children 6-59 months in these high-prevalence areas.

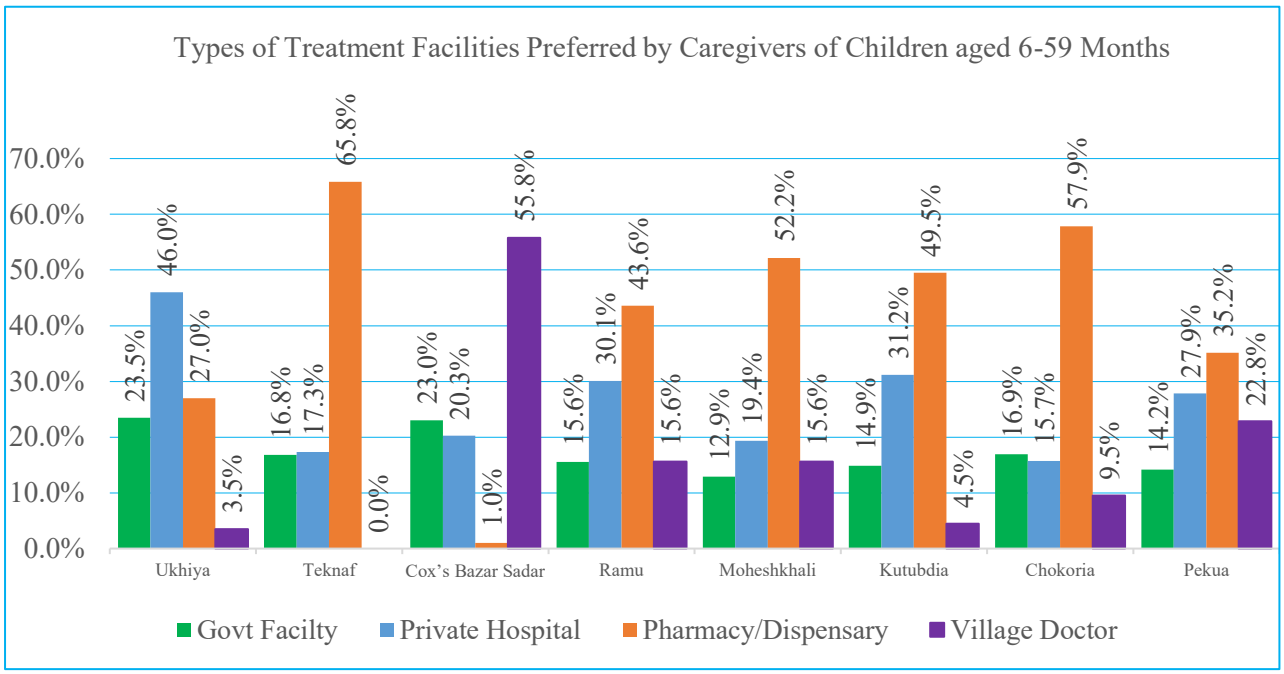


Figure 11: Treatment Seeking Behavior of caregiver among 6-59 months by Upazila

In Cox's Bazar, only 14.2% of caregivers utilize government health facilities, such as Community Clinics, Union Health and Family Welfare Centers, Upazila Health Complexes, and District Hospitals. Alarmingly, a significant portion of caregivers seek treatment from non-medical sources, with 27.9% relying on village doctors and 35.2% on pharmacies/dispensaries, exposing them to a high risk of inappropriate medical care. Additionally, 22.8% of caregivers prefer private hospitals for medical services (Figure 12, above). These practices vary widely across the district, underscoring the urgent need for improved access to and positive health seeking behaviors.

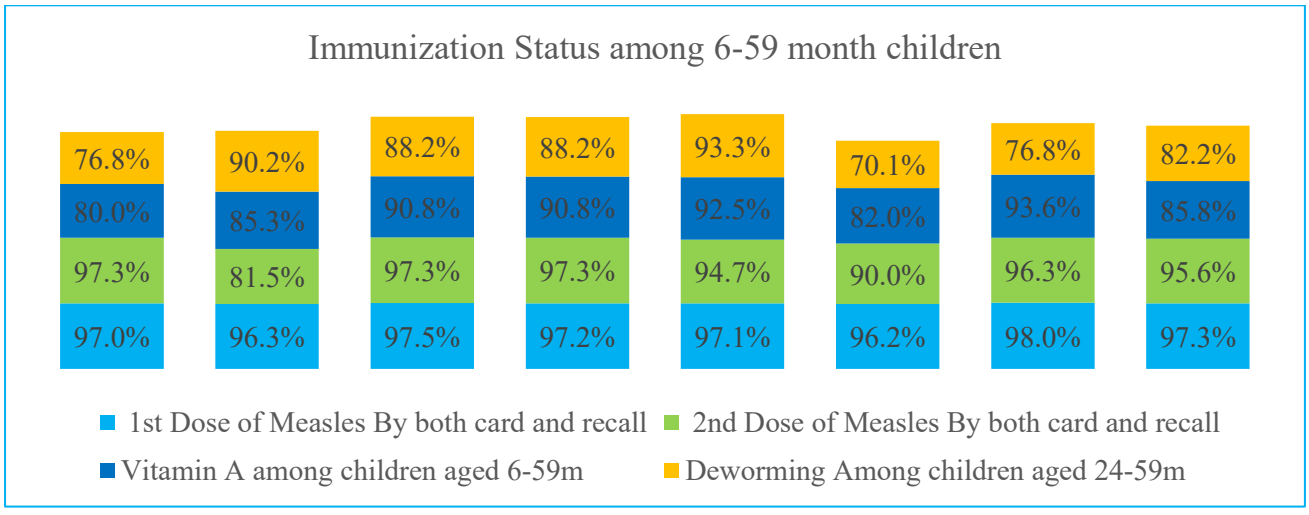


Figure 12: Vaccination (MEASLES), Vitamin A and deworming status 6-59 months

In Cox's Bazar District, measles vaccination coverage is high, with the 1st dose ranging from 97.3% to 98.0% and the 2nd dose from 90.9% to 97.3%. Vitamin A supplementation varies between 79.7% and 93.6%, while deworming coverage ranges from 66.4% to 93.3% (Figure 13, above)

3.4. Nutritional Status among Pregnant and Lactating women (PLW) with children <6 months [MUAC < 210 mm]:

3.4.1. Nutritional Status of PLW:

The district-weighted prevalence of acute malnutrition among pregnant and lactating women in Cox's Bazar is 1.7% (95% CI: 0.8-2.5) and height prevalence found in Pekua 3.9%(1.3-10.9) (see Annex)

3.4.2. Minimum Dietary Diversity for Women (MDD-W)

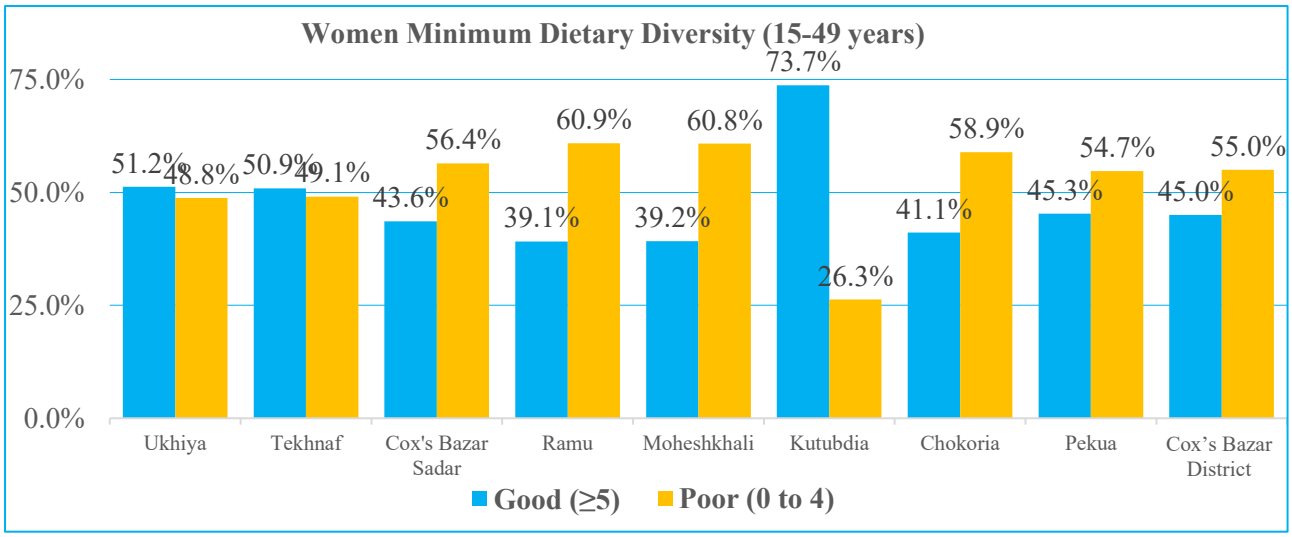


Figure 13: Minimum dietary diversity for women of reproductive age (15-49 years).

On average, only 45% of women in the reproductive age 15-49 years consume adequately diversified diets, meeting the minimum intake of five out of eight essential food groups daily. Alarmingly, the remaining 55% experience poor dietary diversity (Figure 14, above), highlighting a significant gap in nutritional intake that urgently needs to be addressed.

3.5. Nutritional status- Adolescent Girl by Using BMI WHO range:

3.5.1. Under nutritional status of Adolescent Girl (10-19 years):

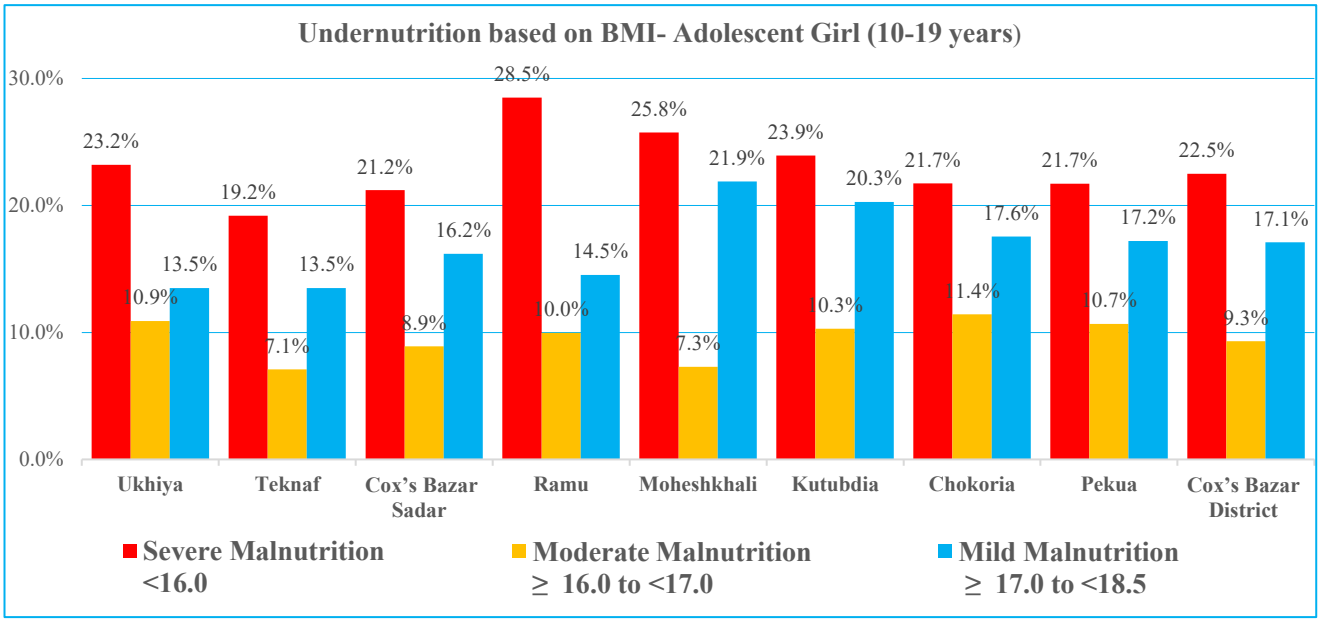


Figure 14: Under nutritional status- Adolescent Girl by Using BMI WHO range

The survey reveals alarming rates of adolescent undernutrition across Cox's Bazar district (Figure 15, above). A staggering 22.5% of adolescents suffer from severe malnutrition (BMI < 16.0), 9.3% experience moderate malnutrition (BMI 16.0-17.0), and 17.1% are classified with mild malnutrition (BMI 17.0-18.5). These figures underscore the urgent need for targeted interventions to combat the widespread malnutrition affecting adolescents across the district.

3.5.2. Over nutritional status of Adolescent Girl (10-19 years):

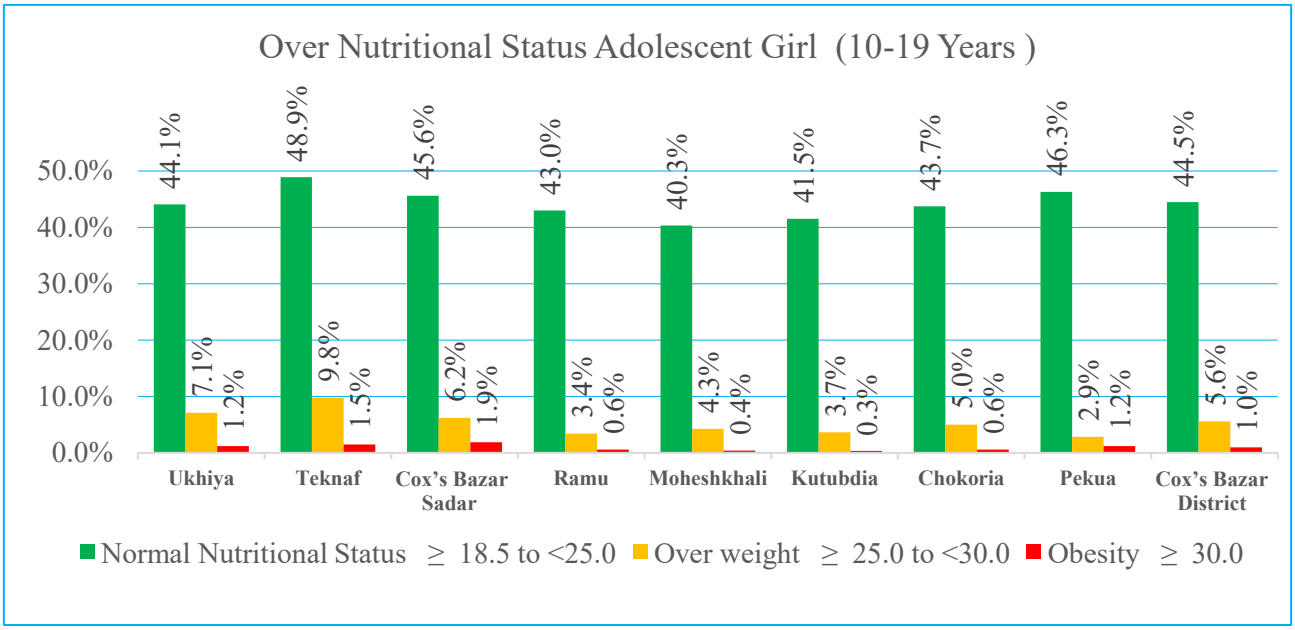


Figure 15: Over Nutritional Status among Adolescent Girl by Using BMI WHO range

The prevalence of overweight among adolescent girls stands at 5.6%, while 1.0% of them are classified as severely underweight, highlighting the dual burden of malnutrition in this population.

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3.5.3. Iron and Folic Acid (IFA) Consumption Status by Pregnant:

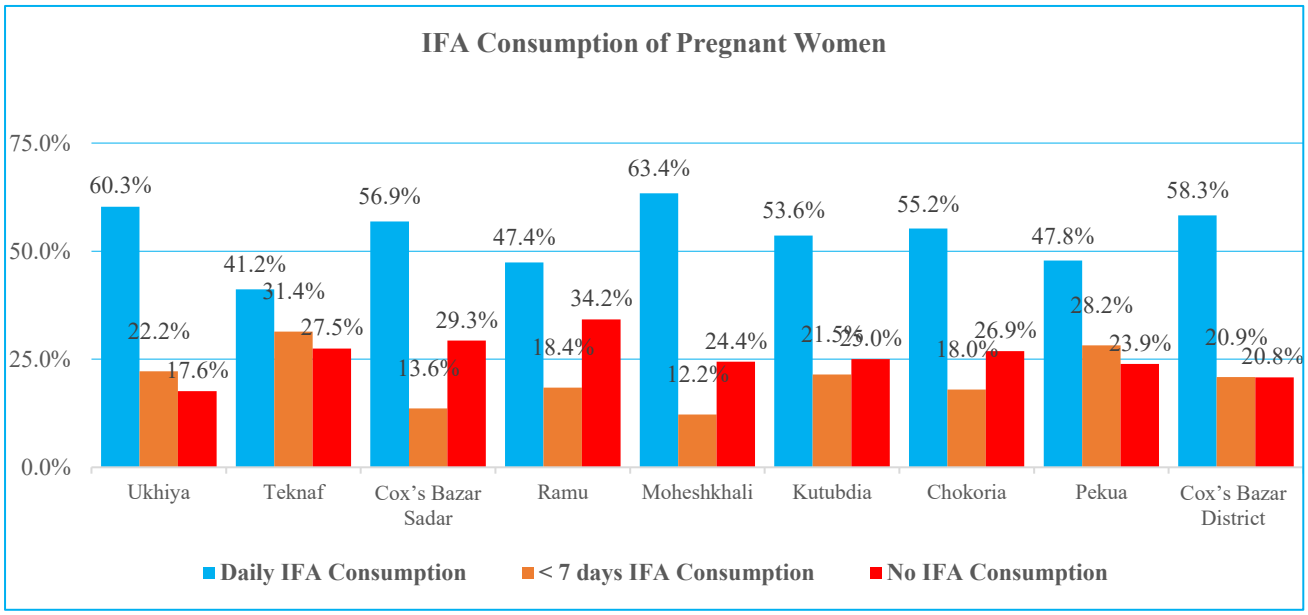

Figure 16: IFA consumption by Pregnant Women

Across the district, only 58.3% of pregnant women consume iron-folic acid (IFA) supplements daily, while a concerning 20.8% do not take them at all (Figure 17, above). This gap in IFA supplementation highlights a critical need for enhanced nutrition programs to ensure pregnant women receive recommend micronutrients supplementation for their health and the well-being of their babies.

3.5.4. Iron and Folic Acid (IFA) Consumption Status by Adolescent Girls (10-19 years):

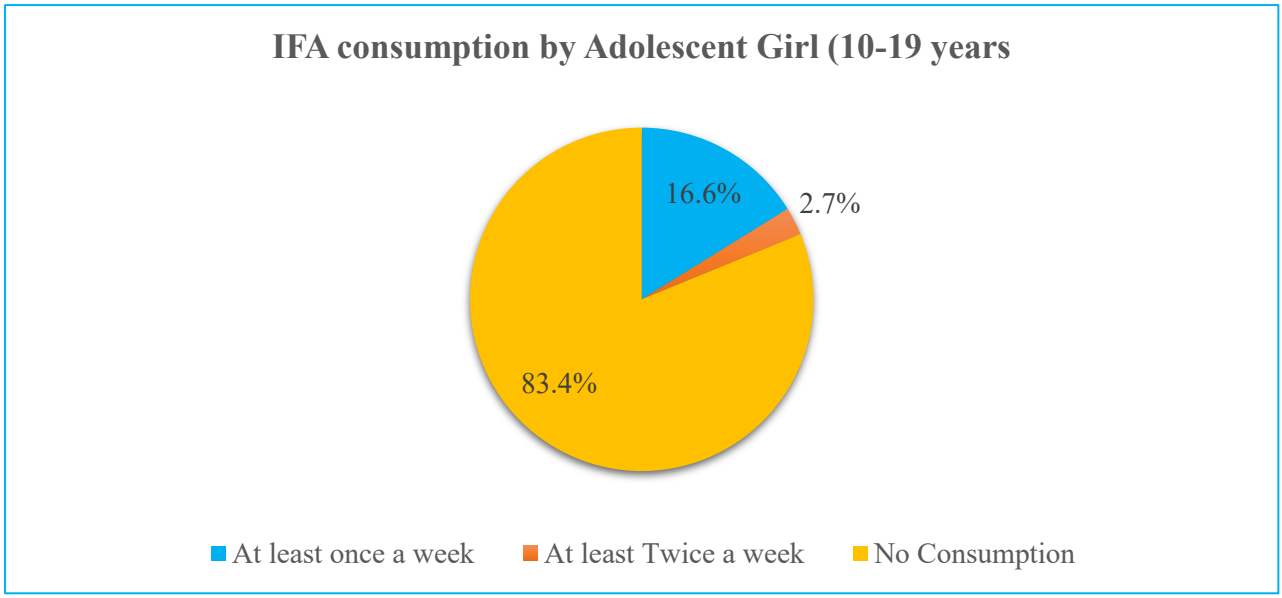

Figure 17: IFA consumption by Adolescent Girl

The findings reveal a deeply concerning situation regarding iron and folic acid (IFA) consumption among adolescent girls in Cox's Bazar district, with a staggering 89.3% not consuming any IFA supplements where only 16.6% at least once a daily and only 2.7% twice a week (Figure 17, above). This critical gap in nutrition poses serious concern across the Upazila (see Annex) to the health and development of adolescent girls, underscoring the urgent need for targeted interventions to improve IFA supplementation and combat potential long-term health consequences.

3.6. Food Security and Livelihood Status:

3.6.1. Main Sources of Income:

The district's primary income sources are unskilled labor (22.7%), skilled labor (14.9%), commercial activities and sales (12.9%), remittances (10.5%), and various other occupations (see annex).

3.6.2. Main Food Sources:

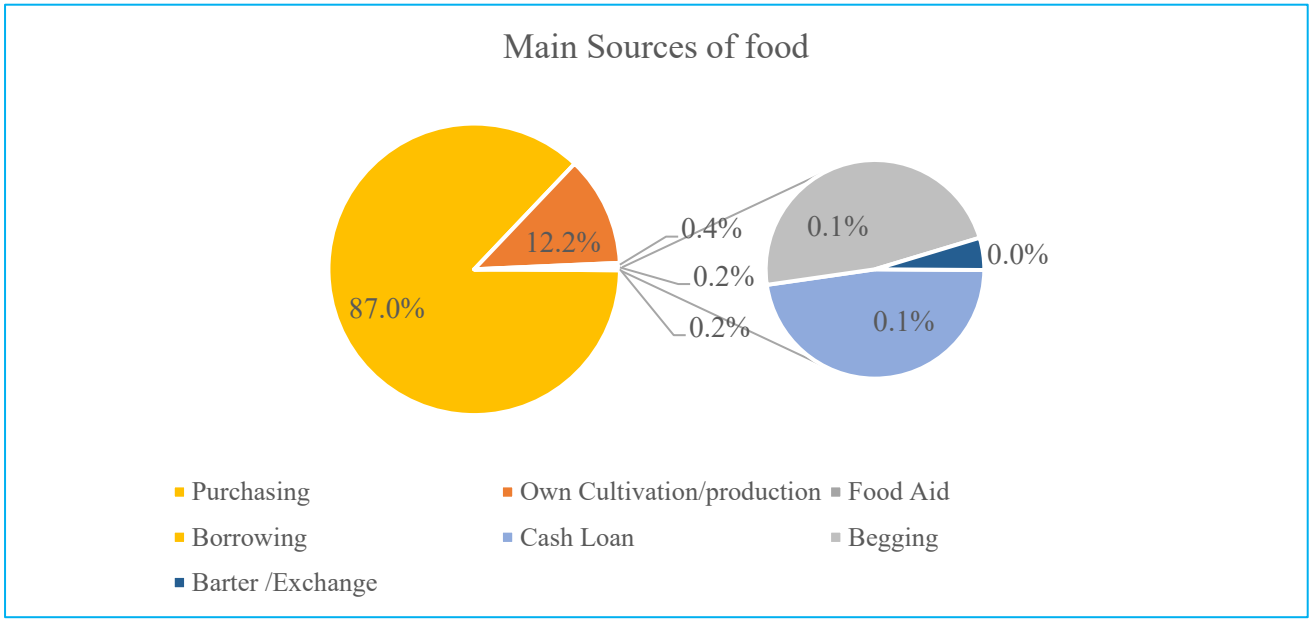

Figure 18: Household main food sources

The district the exhibits a strong reliance on market-based food procurement, with 87.0% of households purchasing their food. Only 12.2% of households supplement their food needs through self-cultivation or production (Figure 18, above). This reliance on market purchases, despite efforts at self-sufficiency, is notable given the relatively modest average monthly household income of BDT 23,052. These figures highlight potential vulnerabilities in food security, particularly for households with limited income and access to resources for self-production

3.6.3. Negative Coping Strategy:

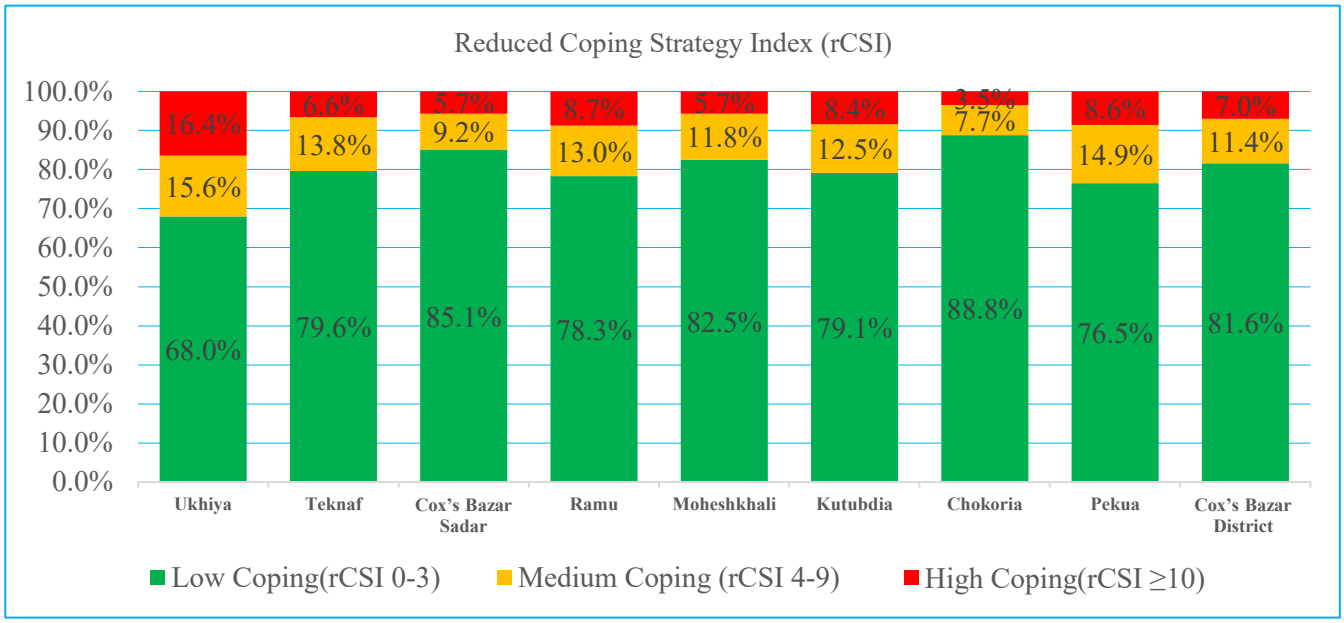

Figure 19: Reduced Coping Strategy Index (rCSI)

The rCSI highlights widely variation in household coping mechanisms across upazilas, with some areas demonstrating stronger resilience to food security. District-wide, 81.6% of households are in the no or low coping category, indicating relative stability. However, 11.4% of households are in the medium coping category, and 7.0% are in the high coping category, revealing that a notable portion of the population faces medium to severe stress and relies on more extreme measures to meet basic needs (Figure 19, above). Urgent support is needed for these vulnerable households to reduce reliance on negative coping strategies.

3.6.4. Food Consumption Score:

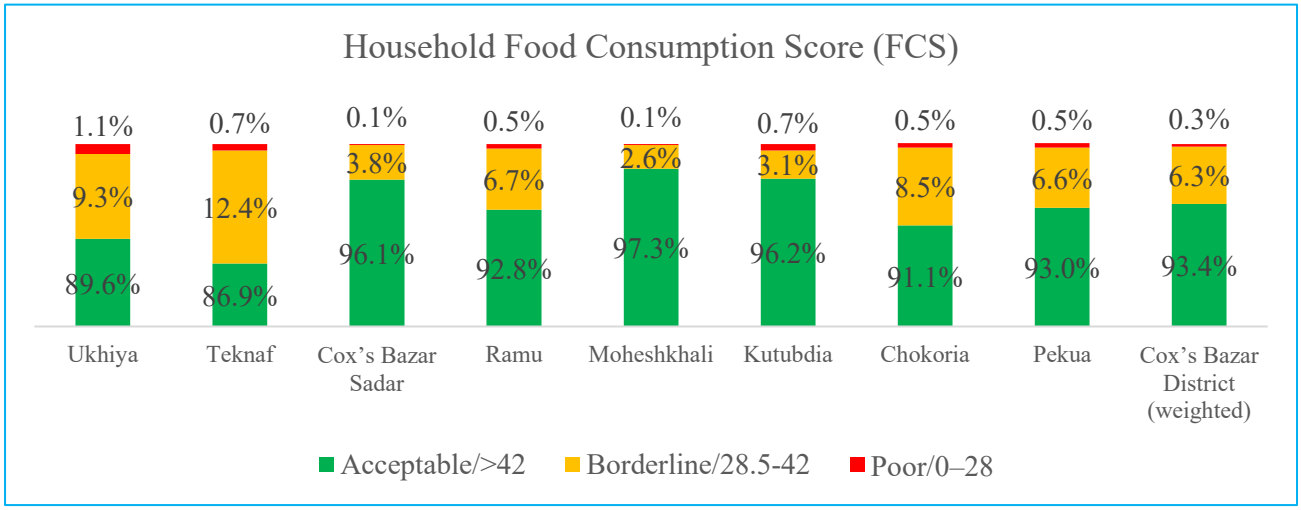

Figure 20: Food Consumption Score (FCS)

The majority of households in Cox's Bazar district exhibit satisfactory food consumption scores. These findings may be inflated due to data collection occurring during the harvesting time, when consumption tends to be higher given the increased food availability during this period. Across the district, the weighted values reveal

that 93.40% of households have acceptable food consumption scores, with 6.30% categorized as borderline and only 0.30% as poor (Figure 20, above).

3.7. Water Sanitation and Hygiene Situation:

3.7.1. Main Sources of Drinking Water:

The findings highlights the water sources across different Upazilas in Cox's Bazar district: deep tube wells account for 31.9%, piped networks for 0.4%, protected wells for 0.3%, rainwater harvesting for 0.4%, shallow tube wells for 66.5%, unprotected wells for 0.1%, and other sources (Chara) for 0.4% at the district level.

3.7.2. Type of Drinking Water Sources

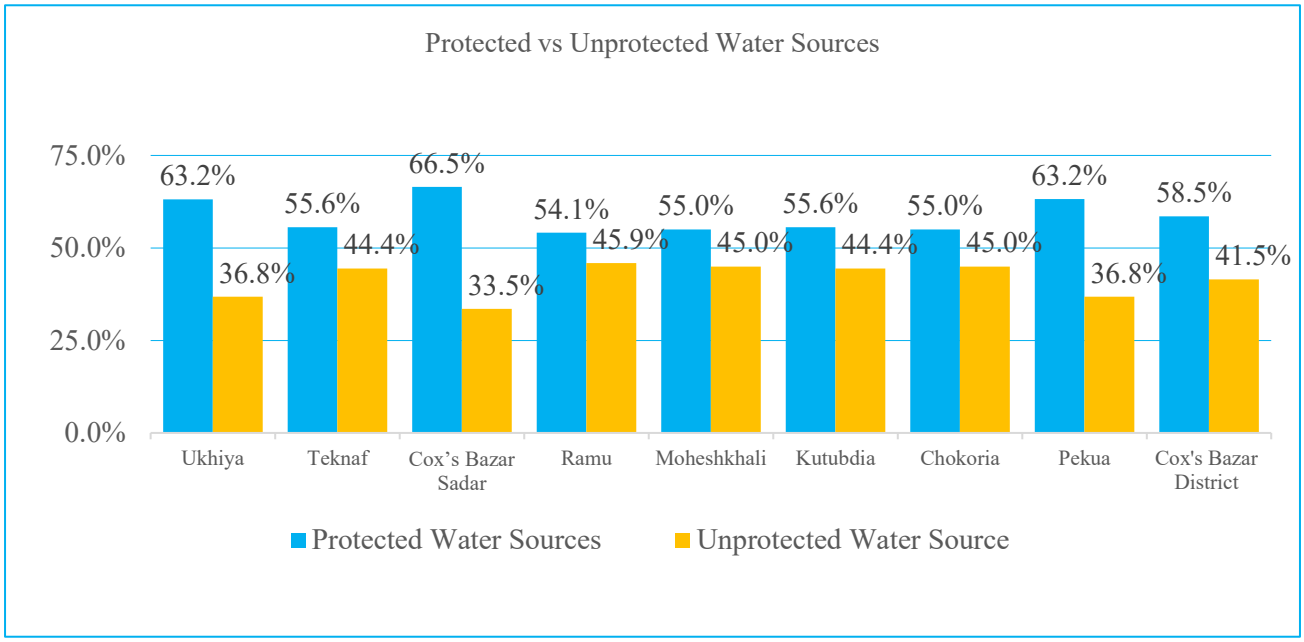

Figure 21: Type of Drinking Water Sources

The availability of protected water sources across Cox's Bazar district is concerning, with only 58.5% of drinking water sources being protected[12]. Cox's Bazar Sadar, Ukhiya, and Pekua show relatively higher rates of protected sources at 66.5% and 63.2%, respectively, but nearly half of the district's households still rely on unprotected[13] water sources (Figure 21, above). These households are at significantly higher risk of waterborne diseases such as cholera, dysentery, and gastrointestinal illnesses due to exposure to pathogens, chemicals, and pollutants from inadequate infrastructure and poor drainage. Immediate interventions are needed to improve water protection and reduce health risks.

[12] Protected water sources include deep or shallow tubewells with platforms and proper drainage, protected wells, piped water systems, and rainwater collection systems.
[13] Unprotected water sources consist of deep or shallow tubewells without platforms and proper drainage, unprotected wells, and open sources.

3.7.3. Purification Status of Drinking Water:

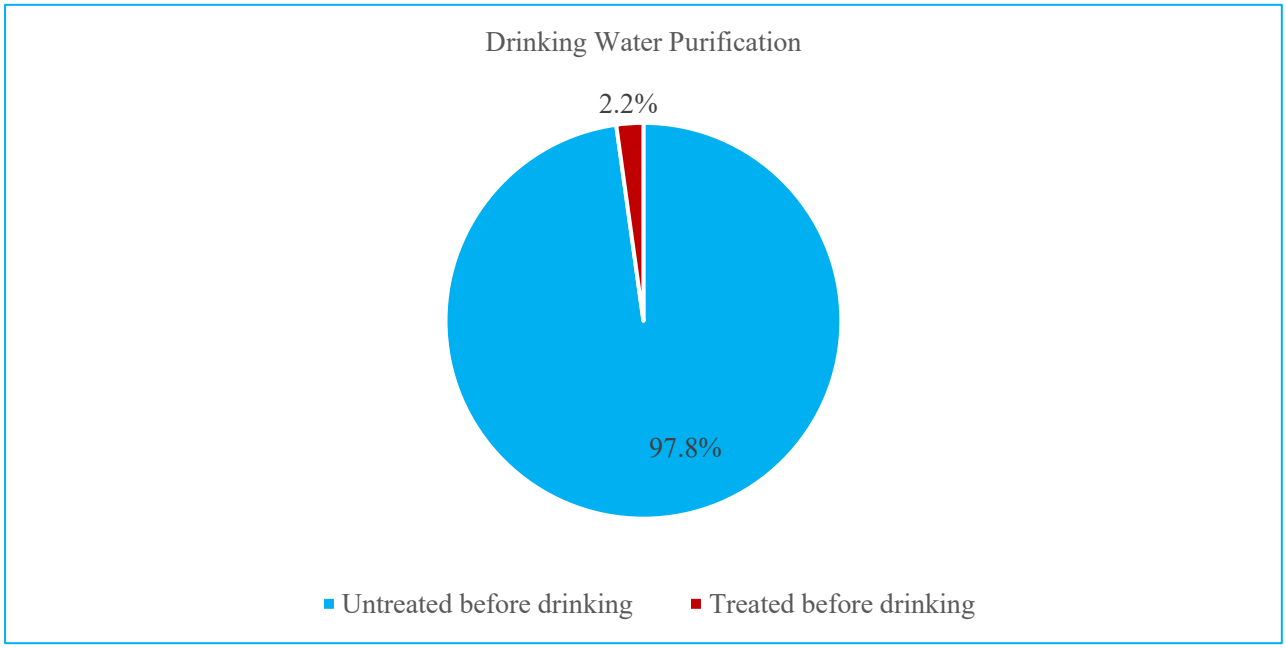

Figure 22: Water Treatment before Drinking

Despite of high unprotected sources of drinking water consumption, across the eight Upazilas, most households (97.8%) do not purify or further treat water before drinking indicating a high risk of waterborne diseases due to potential contamination (Figure 22, above).

3.7.4. Drinking Water Availability:

Regardless of the safe/unsafe water sources, the majority of households, ranging from 86.9% to 97.0%, report consistent access to water throughout the year. Teknaf emerges with the highest percentage at 97.0%, indicating widespread and reliable water availability. Similarly, Cox's Bazar Sadar, Chokoria, and Moheshkhali also boast high percentages, ranging from 92.6% to 95.9%

3.7.5. Household Sanitation Status:

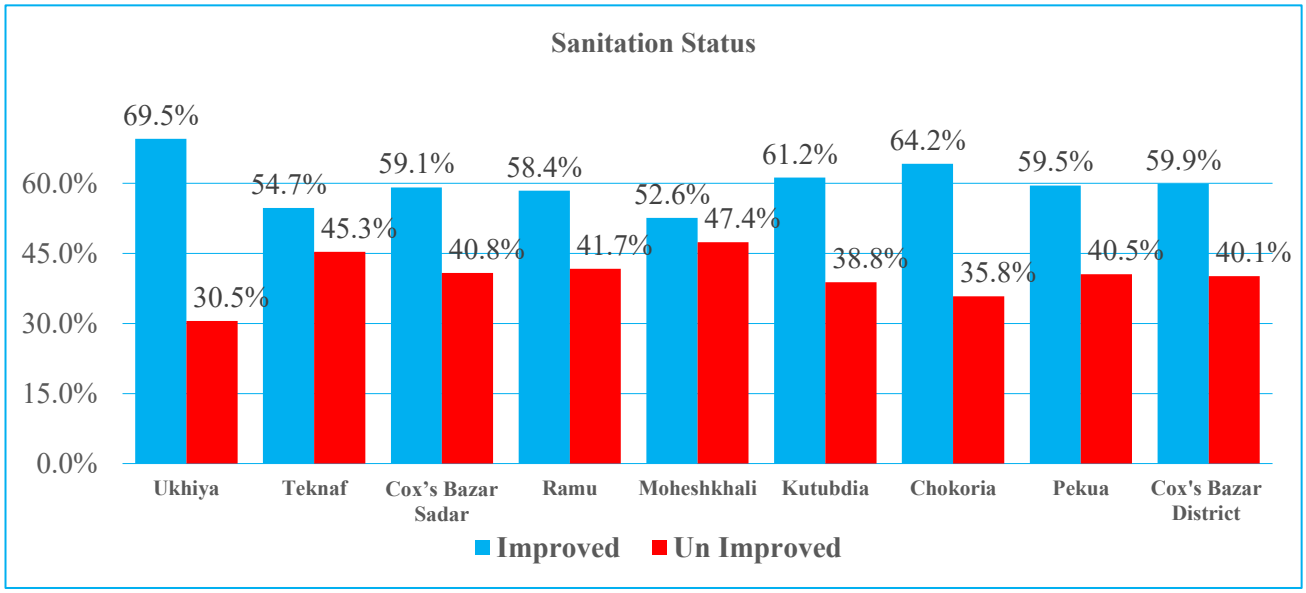

Figure 23: Sanitation Status

The data reveals a stark disparity in sanitation across different upazilas in Cox's Bazar district, distinguishing between improved[14] and un[15] improved facilities, with nearly two-thirds (40.1%) of sanitation facilities classified as unimproved (Figure 23, above) . This highlights a significant and ongoing challenge in ensuring adequate sanitary conditions. Addressing these deficiencies is crucial for improving public health outcomes and reducing the prevalence of waterborne diseases in the district. Urgent action is needed to enhance sanitation infrastructure and protect vulnerable populations from preventable health risks.

3.7.6. Hand Washing Practices at Critical Times:

Handwashing practices across critical times in different upazilas of Cox's Bazar district are generally suboptimal. The 5 critical times include Before cooking or serving food, After defecation, Before eating food, After disposing of child's feces/cleaning child and Before feeding a child and these are presented in Figure 27.

These findings raise concerns, particularly regarding the low rates of handwashing before serving food and before feeding a child and after disposing of child feces which are critical moments for preventing the spread of diseases. Additionally, the significant variation in handwashing practices across different upazilas suggests a need for targeted interventions to improve hygiene behaviors consistently across the district.

[14] Improved sanitation facilities include Bio Fill Latrine, Latrine with water seal, Latrine with Septic Tank, and Others such as public toilets or shared options

[15] Un improved sanitation facilities consist of Hanging Latrine, Latrine with broken or unmanaged pits mixed with nearby water bodies, Latrine without water seal, and Open defecation.

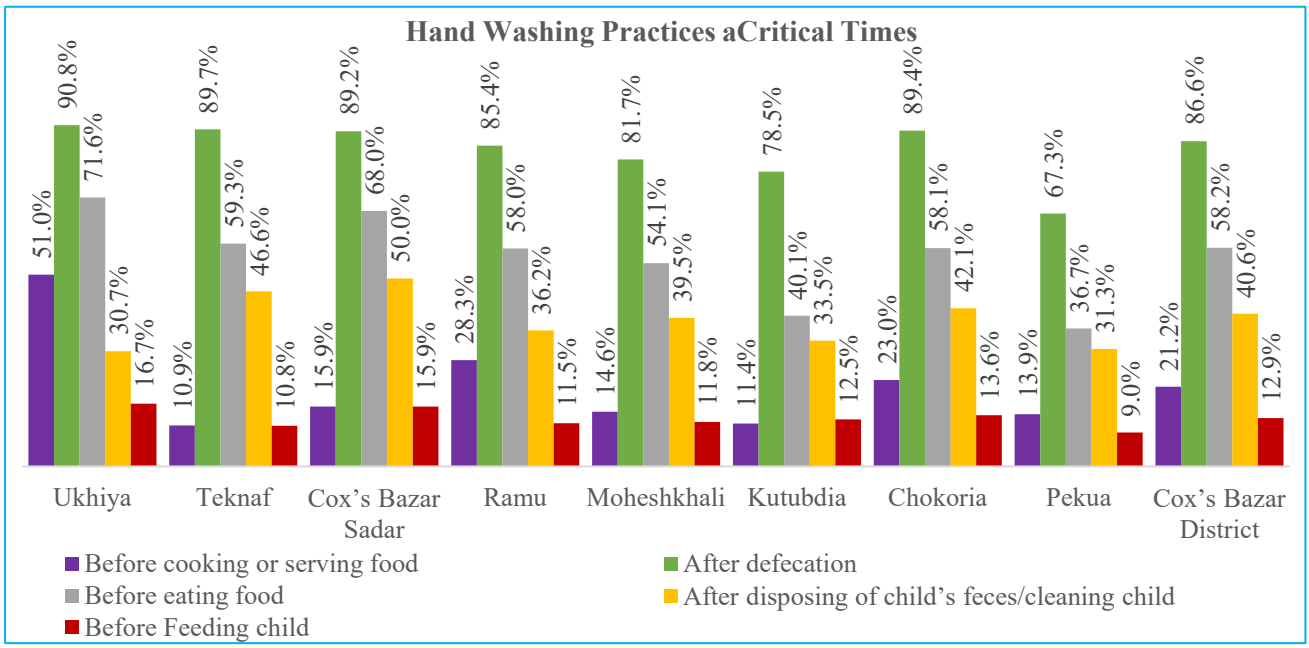

Figure 24: Hand Washing Practices at 5 Critical Times

4. Discussion

Cox's Bazar District is facing a severe nutrition crisis, with the Global Acute Malnutrition (GAM) rate at 10.6%, classified as "High" by WHO/UNICEF and close to the national average of 11% (BDHS 2022). While some areas have shown improvement, rising GAM rates in Teknaf, Ukhiya, and Cox's Bazar Sadar have worsened the situation. Underweight and stunting remain critical issues.

Although exclusive breastfeeding rates are encouraging at 75%, well above the national average of 55% (BDHS 2022) and the district's 2022 IYCF assessment rate of 62.1%, the quality of children's diets is a major concern. The Minimum Acceptable Diet (MAD) and Minimum Dietary Diversity (MDD) are alarmingly low at 27.2% and 22.2%, below national averages of 39% and 29% (BDHS 2022), and the district's previous IYCF assessments in 2022. Morbidity rates are also high, with 43.8% of children under five suffering from fever, 13.8% from diarrhea, and 8.7% from acute respiratory infections (ARI), all significantly above national averages (BDHS 2024). Severe undernutrition among adolescent girls, inadequate iron and folic acid intake, and poor access to safe water and sanitation further fuel the crisis, highlighting the complex interplay between nutrition and health challenges in the district..

4.1. Acute Wasting:

The prevalence of acute wasting in the district varies significantly, with Teknaf having the highest rate at 12.8% (95% CI 9.4-17.1) and Kutubdia the lowest at 7.4% (95% CI 5.5-10.0). Overall, the district's acute malnutrition rate is 10.6% (95% CI 9.5-11.7), categorizing it as high according to WHO /UNICEF standards. Analysis using both weight-for-height (WHZ) and mid-upper arm circumference (MUAC) shows that Global Acute Malnutrition (GAM) isin the high level in six upazilas, requiring immediate community-based management of acute malnutrition. Chokoria and Kutubdia have medium levels of wasting, with Kutubdia showing a notable

decrease in prevalence, indicating progress in nutritional efforts. While WHZ indicates a 10.6% prevalence of acute malnutrition, MUAC criteria show a much lower rate of 1.5% (95% CI 1.1-2.0). To tackle malnutrition effectively, targeted interventions are crucial. These should include nutritional support and addressing root causes like poverty, limited healthcare access, poor sanitation, lack of dietary diversity, and education. Community programs focusing on maternal and child health, promoting breastfeeding, providing micronutrient supplements, and improving access to nutritious foods are vital. Additionally, enhancing livelihoods, water and sanitation infrastructure, and healthcare services are essential for a comprehensive approach to combat malnutrition in Cox's Bazar District.

4.2. Underweight:

The prevalence of underweight remains a serious concern across seven Upazilas, with Pekua reaching critical levels, demanding urgent intervention. With the district-wide underweight prevalence at 28.0% (95% C.I 26.4-29.6), it's evident that comprehensive nutrition strategies are imperative. These strategies should include robust initiatives like promoting exclusive breastfeeding, improving access to diverse and nutritious foods, and providing micronutrient supplementation to vulnerable populations. Despite ongoing efforts, the lack of significant changes in underweight prevalence between surveys highlights the stubborn persistence of undernutrition in the region. This underscores the need for sustained and intensified interventions, coupled with broader socio-economic development initiatives, to effectively address the root causes of undernutrition and improve the nutritional status of the population.

4.3. Stunting:

The prevalence of stunting presents a critically concern across various Upazilas, notably exceeding the WHO threshold in several areas. Regions like Ramu, Moheshkhali, Kutubdia, Chokoria, and Pekua showcase particularly elevated rates, indicating a widespread issue. Even in Ukhiya, Teknaf, and Cox’s Bazar Sadar, stunting prevalence remains notably high. Pekua stands out with the highest prevalence at 35.3% (95% C.I 30.0 - 40.9), underlining the severity of the situation. Conversely, Teknaf reports the lowest prevalence at 22.3% (95% C.I 19.4 - 25.5), though still concerning. The observed increases in stunting prevalence in Kutubdia and Pekua signify dynamic nutritional challenges evolving within these communities. These findings emphasize the urgency of adopting a comprehensive, multi-sectoral approach to tackle the underlying factors contributing to stunting. Such an approach should integrate nutrition-specific interventions with broader development initiatives, addressing issues related to healthcare, education, sanitation, and livelihoods to effectively combat stunting and improve the overall health and well-being of the population over the long term.

4.4. Trend Analysis of Malnutrition:

The trend analysis of malnutrition in Cox's Bazar District highlights widely variations across different Upazilas.

While Kutubdia experienced a notable decrease in wasting prevalence, other areas showed no significant changes in underweight rates, indicating persistent challenges in addressing undernutrition. Concerning increases in stunting prevalence were observed in Kutubia and Pekua. However the overall nutritional status likely to be stagnant and still in a level of high to critical. Addressing the multifaceted nature of malnutrition requires comprehensive interventions targeting root causes. An integrated approach involving nutrition causal analyses and evidence-based interventions, along with multi-sectoral collaboration, is essential for effectively combating malnutrition in the district

4.5. Infant and Young Child Feeding Practices (0-23 months):

In Cox's Bazar District, breastfeeding practices vary across Upazilas, with some meeting recommended thresholds for early initiation and continued breastfeeding, while others fall short. Exclusive breastfeeding rates remain suboptimal district-wide. The prevalence of Minimum Dietary Diversity (MDD) and Minimum Acceptable Diet (MAD) is notably low, indicating a significant gap in ensuring infants and young children receive a diverse and nutritionally adequate diet. Overall, there is a pressing need for comprehensive interventions to improve infant and young child feeding practices district-wide.

4.6. Morbidity Status 6-59 month's children:

The morbidity status of children aged 6-59 months in Cox's Bazar District displays significant variation across Upazilas. Diarrhea, fever, and acute respiratory infections continue to be prevalent concerns, with rates ranging from 10.92% to 17.48% for diarrhea, 34.14% to 63.21% for fever, and 3.92% to 14.78% for acute respiratory infections. Treatment-seeking behavior among caregivers also varies, reflecting diverse healthcare access and utilization patterns across Upazilas. While a limited percentage (12.9% to 23.5%) opt for government health facilities, a considerable proportion prefers village doctors and pharmacies which is really a concern of appropriate treatment receiving. Despite these challenges, there is widespread coverage of preventive healthcare interventions such as measles vaccination, vitamin A supplementation, and deworming district-wide, indicating effective implementation of preventive healthcare programs. Nonetheless, addressing the variability in morbidity prevalence and treatment-seeking behavior across Upazilas remains a crucial priority to enhance child health outcomes in the district.

4.7. Nutritional Status among Pregnant and Lactating Women (PLW):

The nutritional status among pregnant and lactating women (PLW) in Cox's Bazar District varies, with an overall district-weighted prevalence of malnutrition at 1.7%. Malnutrition rates range from 0% in Tekhnaf to 3.9% in Pekua, indicating regional disparities. Minimum dietary diversity among women of reproductive age is low, with only 45% practicing good dietary diversity. Additionally, the uptake of iron and folic acid (IFA) supplements among pregnant women is inadequate, with only 58.3% consuming them regularly for all seven days in a week. Improving dietary diversity and ensuring quality health sevices are crucial for promoting maternal health in the district.

4.8. Nutritional Status among Adolescent Girl 10-19 years):

The survey conducted in Cox's Bazar district highlights concerning levels of undernutrition among adolescent girls, with almost half categorized as undernourished. Severity levels vary, with a significant proportion experiencing severe malnutrition. Additionally, a notable percentage of girls are overweight or obese. Alarmingly, the vast majority do not consume iron and folic acid (IFA) supplements regularly, despite national recommendations. Addressing these challenges requires comprehensive interventions to improve dietary diversity, promote healthy eating habits, and increase access to essential supplements for adolescent girls in the district.

4.9. Food Security and Livelihood:

In Cox's Bazar District, livelihoods primarily depend on unskilled wage labor, followed by wages from employment and skilled wage labor. Monthly income averages BDT 23,052, with variations across Upazilas. Food acquisition mainly relies on purchasing, supplemented very low by own cultivation or production, with minimal reliance on food aid. The majority of households exhibit low coping mechanisms, indicating relative stability despite economic challenges. Food consumption scores are generally satisfactory, with a small proportion categorized as borderline or poor. Overall, addressing food security and livelihood challenges requires a multifaceted approach to income diversification, livelihood support, and resilience-building measures.

4.10. Water, Sanitation, and Hygiene (WASH) Situation:

The data on water, sanitation, and hygiene (WASH) situation in Cox's Bazar district reveals disparities in access to protected water sources, with some areas relying more heavily on unprotected water sources. Despite variations, the majority of households report consistent access to water throughout the year. However the purification practices are very poor. Similarly improved sanitation facilities are prevalent across the district, but not improved facilities still remain concern, emphasizing the need for continued efforts to promote proper sanitation. Hygiene practices related to child feces disposal and before feeding children vary across upazilas, highlighting the importance of targeted hygiene education. Overall, addressing WASH challenges requires a comprehensive approach focusing on infrastructure development, behavior change interventions, and community engagement to ensure universal access to safe water and proper sanitation practices

5.0. Conclusion

Nutrition surveys across eight Upazilas in Cox's Bazar District expose severe challenges in addressing malnutrition and others determinants. Despite some localized improvement, such as reduced wasting in Kutubdia, Moheshkhali, and Pekua, the situation in Teknaf, Ukhiya, and Cox's Bazar Sadar has worsened, with rising wasting rates. Overall, the district faces a critical situation, with Global Acute Malnutrition (GAM) remains high. Chronic malnutrition (stunting) remains close to WHO/UNICEF's emergency threshold, while underweight levels have reached a serious to critical stage, underscoring the urgent need for targeted interventions.

Boys and older children are disproportionately affected, and widespread diarrhea and fever among children may exacerbating the malnutrition crisis. Although breastfeeding practices are strong, the rates of minimum acceptable diet and dietary diversity among children aged 6-23 months remain critically low. Similarly, women of reproductive age face poor dietary diversity, and severe undernutrition among adolescents is an escalating concern, especially for adolescent girls, and pregnant women.

The district's poor access to safe drinking water, inadequate sanitation, and suboptimal hygiene practices are driving high rates of diarrhea and malnutrition, highlighting the critical link between health and environmental factors. These findings call for urgent, comprehensive interventions that not only address immediate nutritional needs but also target underlying causes such as poor WASH conditions and gender inequalities.

A robust, multi-sectoral nutrition approach—integrating healthcare, WASH, agriculture, and social protection—is essential to tackle malnutrition head-on and improve health outcomes across Cox's Bazar District.

5. Recommendation

The findings of this survey were presented to the Nutrition Sector partners and key government officials on May 15, 2024. Based on the negative factors identified, the partners have developed the following recommendations to improve nutritional status and address the issues highlighted by the assessment.

Key Recommendation:

1. Implement WHO's 2023 wasting management and prevention guidelines in Bangladesh, tailored to the local context. This includes adapting and endorsing the guidelines to ensure effective implementation and addressing the specific needs of the population.

2. Scale up severe wasting treatment and comprehensive care for moderate wasting using a child health-centered approach, along with a mother/caregiver-infant pair care approach, as outlined in WHO's 2023 guiding principles. This approach ensures holistic care for both the child and their caregiver, promoting better health outcomes and sustainable interventions.

3. Tailor and implement specific Adolescent health Programs aiming at engaging with them in order to address the significant malnutrition burden among adolescents in the district.

4. Strengthen the delivery of basic health services to address identified morbidity levels, especially in high burden areas. Mobilize community outreach services and capacity building of to local health facilities staff to enhance quality services.

5. Ensure continued and effective coverage of essential health interventions such as micronutrient supplementation, deworming, and measles vaccination, particularly in low coverage areas and hard-to-reach areas. Utilize community sensitization efforts and biannual maternal and child health week campaigns during Vitamin A plus campaign to increase uptake.

6. Supporting a point-of-care approach in delivering high-quality Infant and Young Child Feeding (IYCF) counseling through health service providers, including community workers, is crucial.

7. Support local health facilities to maintain adequate IFAS supplies and strengthen screening for acute malnutrition among women of reproductive age, with timely referrals for nutritional support.

8. Integrate nutrition program with food fortification, income generation activities, and nutrition garden initiatives to improve dietary diversity, household food security, and overall nutrition security comprehensively.

9. Improve access to improved water sources, sanitation, and hygiene facilities by increasing infrastructure such as boreholes, wells, and rainwater harvesting systems. Strengthen community health education on proper toilet usage and promote handwashing practices, complemented by soap distribution and handwashing campaigns.

Table 14: Key Sector wise recommendation

Sector	Recommendations	Responsible Department/Agency	Partners
NUTRITION	• Strengthening Community based Management of Acute Malnutrition through the districts • Implement IYCF counseling protocols for pregnant women and caregivers of children aged 0-23 months. • Enhance community mobilization strategies, including cooking demonstrations and male forums, to bolster nutrition awareness. • Maximize coverage of GMP activities to address malnutrition effectively. • Integrate nutritionally vulnerable beneficiaries with Food Security and Livelihoods (FSL) programs. • Ensure seamless coordination between nutrition and health sectors to optimize resource allocation. • Strengthen multi-sectoral approaches, leveraging platforms like UNCC and UDCC, to address underlying causes of malnutrition. • Establish robust monitoring and evaluation mechanisms to track the effectiveness of nutrition programs. • Distribute micronutrient supplements (MNP, vitamin A, iron, and zinc) to prevent deficiencies.	• MOHFW-IPHN, NNS, DGHS, DGFP • MOLGRD&C-DPH • MOFood-DC FOOD • MoA-DAE • MOWCA-DWCA • MOSW-DSW • MOI • MOLabor	• UNs • INGO • NGO • Civil Society
HEALTH	• Integrate nutritional counseling into routine health services to address deficiencies identified in coverage of Vitamin A, measles, and deworming. • Strengthen logistical support and preparation procedures for Vitamin A and deworming campaigns to minimize dropouts. • Ensure adequate planning, distribution, and consumption of iron and folic acid (IFA) and Multiple Micro Nutrient supplements among pregnant women including • Collaborate with education and women's welfare departments to improve IFA consumption among adolescent girls. • Conduct comprehensive data analysis to identify factors contributing to high ARI rates among children under 5. • Enhance awareness campaigns on healthcare-seeking behavior to reduce morbidity rates among children under five	• MOHFW-DGHS,DGFP • MOWCA-DWCA • MOSW-DSW • MoA-DAE • MOI	• UNs • INGO • NGO Civil Society
FOOD SECURITY AND LIVELIHOODS	• Incorporate agricultural activities into malnutrition alleviation and diversify livelihood opportunities. • Improve knowledge transfer during community sessions through the use of pictorial presentations and food cards.	• MOFood-DoF • MoA-DAE • MOFL-DLS • MOSW-DSW	• UNs • INGO • NGO Civil Society

	• Enhance food fortification and diversify food production to ensure availability and accessibility.	• MOWCA-DWCA • MODMR-DRRO	
WASH	• Promote awareness about safe drinking water practices and prioritize the installation and maintenance of handwashing blocks and improved latrines. • Advocate for policies that enforce the protection of water sources. • Invest in infrastructure to increase the availability of protected water sources, such as deep tube wells with platforms and proper drainage and piped water systems. • Invest in building and upgrading sanitation facilities, such as latrines and septic systems, particularly in areas where current sanitation infrastructure is lacking.	• MOLGRD&C-DPH • MOHFW-IPHN, NNS, DGHS, DGFP	
CROSS-CUTTING	• Implement policies and programs aimed at promoting women's empowerment, • Ensure that social safety net programs are designed and implemented with a focus on inclusivity, targeting the most vulnerable groups, such as the pregnant women, under 5 children, persons with disabilities, and marginalized community. • Foster community-based initiatives for crop diversification and resilience-building, encouraging the adoption of resilient crop varieties and conservation agriculture techniques.	• MOWCA-DWCA • MOSW-DSW • MoA-DAE	• UNs • INGO • NGO Civil Society

See Annex

Table-A 1: Target vs Achieved -Sample

Upazila	Target Cluster	# of Cluster surveyed*	# of HHs planned*	# of HHs surveyed	# of children 6-59 m planned	# of children 6-59 m surveyed	# of children 6-59 m measured*	% surveyed
Ukhiya	66	66	990	944	502	530	508	>100%
Teknaf	49	48	735	695	452	434	415	91.80%
Cox's Bazar Sadar	51	51	765	739	369	465	452	>100%
Ramu	71	71	1065	1017	488	565	548	>100%
Moheshkhali	48	48	720	704	423	400	386	91%
Kutubdia	47	47	705	678	440	473	459	>100%
Chokoria	71	71	1065	1028	488	577	546	>100%
Pekua	44	44	660	625	423	419	378	89%
Cox's Bazar District	447	446	6705	6430	3585	3863	3692	>100%

Table-A 2: Mean z-scores, Flagged, Sex-ratio, Age-ratio and Digit Pref. Weight

Upazila	Criteria	SD WHZ	Flagged	Sex-ratio	Age-ratio	Digit Pref. Weight
Ukhiya	Observed	0.94	0.8%	p=0.478	p=0.817	5
Teknaf	Observed	0.94	0.2%	p=0.524	p=0.355	4
Cox's Bazar Sadar	Observed	0.88	0.2%	p=0.452	p=0.729	5
Ramu	Observed	0.86	0.0%	P=0.146	P=0.006	5
Moheshkhali	Observed	0.88	0.5%	P=0.476	P=0.135	4
Kutubdia	Observed	0.83	0.0%	P=0.544	P=0.700	2
Chokoria	Observed	0.90	0.0%	P=0.072	P=0.259	5
Pekua	Observed	0.85	0.5%	P=0.355	P=0.973	5
	Desired	0.8-1.2	< 5%	(p>0.05)	(p>0.05)	< 13

Excellent	Good	Acceptable	Problematic

Table-A 3: Digit Pref. Height, Digit Pref. MUAC, Skewness, Kurtosis, Poisson Distribution & Overall Score

Upazila	Criteria	Digit Pref. Height	Digit Pref. MUAC	Skewness	Kurtosis	Poisson Distribution	Overall Score*
Ukhiya	Observed	6	4	0.30	0.08	p=0.065	1%
Teknaf	Observed	7	6	-0.06	0.30	p=0.017	2%
Cox's Bazar Sadar	Observed	6	4	0.17	0.35	P=0.127	6%
Ramu	Observed	5	6	0.00	0.16	p=0.750	9%
Moheshkhali	Observed	6	5	-0.23	-0.09	p=0.467	6%
Kutubdia	Observed	4	2	0.18	-0.12	p=0.695	10%
Chokoria	Observed	4	6	0.07	0.15	p=0.603	7%
Pekua	Observed	5	4	-0.09	0.60	p=0.637	10%
	Desired	< 13	< 13	< ± 0.6	< ± 0.6	(p>0.01)	< 15%

Excellent	Good	Acceptable	Problematic

Table-A 4: Mean z-scores, Standard Deviation, Design Effects, Missing and Flagged Values for Z-scores, SMART survey

	Indicator	(n1)	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Ukhiya	Weight-for-Height	504	-0.91±0.94	1.29	0	4
	Weight-for-Age	505	-1.35±0.96	1.16	0	3
	Height-for-Age	506	-1.26±0.99	1	0	2
Teknaf	Weight-for-Height	414	-0.96±0.94	1.35	2*	1
	Weight-for-Age	416	-1.40±0.97	1.03	0	1
	Height-for-Age	412	-1.30±0.98	1.29	2	3
Cox's Bazar Sadar	Weight-for-Height	451	-0.95±0.88	1.23	0	1
	Weight-for-Age	452	-1.40±0.95	1	0	0
	Height-for-Age	447	-1.32±1.00	1.21	0	5
Ramu	Weight-for-Height	548	-0.91±0.86	1	0	0
	Weight-for-Age	546	-1.50±0.96	1.01	0	2
	Height-for-Age	540	-1.56±0.99	1.13	0	8
Moheshkhali	Weight-for-Height	384	-0.95±0.88	1	0	2
	Weight-for-Age	385	-1.55±0.89	1	0	1
	Height-for-Age	386	-1.60±0.96	1.09	0	0
Kutubdia	Weight-for-Height	459	-0.89±0.83	1	0	0
	Weight-for-Age	459	-1.48±0.87	1.23	0	0
	Height-for-Age	459	-1.55±0.94	1.19	0	0

	Indicator	(n1)	Mean z-scores ± SD	Design Effect (z-score < -2)	z-scores not available*	z-scores out of range
Chokoria	Weight-for-Height	546	-0.86±0.90	1	0	0
	Weight-for-Age	546	-1.47±0.92	1.27	0	0
	Height-for-Age	543	-1.58±0.99	1	0	3
Pekua	Weight-for-Height	376	-0.97±0.85	1.03	0	2
	Weight-for-Age	378	-1.57±0.89	1.02	0	0
	Height-for-Age	377	-1.62±0.95	1.22	0	1

*Height was not taken due to child disability that led the missing of height based Z-scores [WHZ and HAZ]

Table-A 5: Demography of overall population

Upazila	0-4 Years	5-11 Years	12-17 Years	18-49 Years	50-64 Years	>65 Years
Ukhiya	12.1%	15.7%	13.0%	47.1%	8.3%	3.9%
Teknaf	12.9%	17.4%	13.6%	45.1%	7.5%	3.5%
Cox's Bazar Sadar	13.3%	14.7%	12.0%	48.1%	8.7%	3.2%
Ramu	11.8%	14.9%	13.3%	47.2%	8.6%	4.1%
Moheshkhali	12.3%	16.8%	12.7%	45.9%	8.7%	3.7%
Kutubdia	16.0%	14.3%	18.2%	16.9%	17.2%	17.1%
Chokoria	12.0%	13.9%	12.2%	48.4%	9.6%	3.9%
Pekua	13.1%	16.1%	13.8%	45.5%	7.8%	3.7%
Cox's Bazar District	12.7%	15.8%	13.4%	46.9%	8.7%	2.6%

Table-A 6: Retrospective crude and under 5 death rates

Upazila	Mid-interval population	Crude death rate Deaths/10,000/day	Mid-interval under 5 population	Under 5 death rate Deaths/10,000/day
Ukhiya	4771	0.11 (0.05-0.26)	577	0.17 (0.07-0.46)
Teknaf	3671	0.17 (0.07-0.43)	474	0.22 (0.03-1.66)
Cox's Bazar Sadar	3678	0.15 (0.06-0.38)	489	0.19 (0.01-2.56)
Ramu	5177	0.12 (0.04-0.34)	612	0.14 (0.01-1.89)
Moheshkhali	3398	0.07 (0.02-0.23)	419	0.20 (0.03-1.48)
Kutubdia	3469	0.02 (0.00-0.24)	505	0.00 (0.00-0.00)
Chokoria	5161	0.06 (0.02-0.15)	621	0.24 (0.06-0.96)
Pekua	3106	0.15 (0.06-0.37)	408	0.56 (0.18-1.73)
Cox's Bazar District		0.10 (0.07-0.15)		0.22 (0.11-0.41)

Table-A 7: Prevalence based on MUAC

	Ukhiya	Teknaf	Cox's Bazar Sadar	Ramu	Moheshkhali	Kutubdia	Chokoria	Pekua	Cox's Bazar District
Mid Upper Arm Circumference (MUAC)	N=508	N=417	N=452	N=548	N=386	N=459	N=546	N=378	
GAM MUAC <125 mm and/or oedema	1.2 % (0.5-2.6)	2.2 % (1.2-4.0)	0.9 % (0.3 -2.3)	2.9 % (1.5-5.7)	1.3 % (0.5-3.0)	1.3 % (0.6-2.8)	0.5 % (0.2-1.7)	3.2 % (1.8-5.5)	1.5% (1.1-2.0)
MAM MUAC 115-124 mm	0.8 % (0.3-2.1)	1.9 % (1.0-3.7)	0.9 % (0.3-2.3)	2.7 % (1.3-5.6)	1.3 % (0.5-3.0)	1.3 % (0.6-2.8)	0.5% (0.2-1.7)	3.2 % (1.8-5.5)	1.4% (1.1-1.9)
SAM MUAC <115 mm and/or oedema	0.4 % (0.1-1.6)	0.2 % (0.0-1.8)	0.0 % (0.0-0.0)	0.2 % (0.0-1.3)	0.0 % (0.0-0.0)	0.0 % (0.0-0.0)	0.0 % (0.0-0.0)	0.0 % (0.0-0.0)	0.1% (0.0-0.2)

Table-A 8: Prevalence of wasting (WHZ), underweight (WAZ) and stunting (HAZ) by Sex

Upazila	Wasting (WHZ)			Underweight (WAZ)			Stunting (HAZ)		
	Boys	Girls	p Value	Boys	Girls	p Value	Boys	Girls	p Value
Ukhiya	12.3%	10.0%	0.462	26.0%	26.2%	0.980	22.4%	24.1%	0.610
Tekhnaf	17.0%	8.9%	0.050	27.4%	22.3%	0.203	25.0%	19.8%	0.233
Cox's Bazar Sadar	12.9%	10.6%	0.462	29.1%	24.3%	0.287	29.7%	25.1%	0.287
Ramu	11.0%	8.6%	0.339	30.3%	28.5%	0.675	31.5%	32.7%	0.780
Moheshkhali	14.6%	7.5%	**0.024**	28.5%	30.2%	0.711	31.2%	30.5%	0.890
Kutubdia	7.2%	7.6%	0.861	28.0%	30.9%	0.492	31.8%	30.9%	0.820
Chokoria	10.2%	6.7%	0.129	30.3%	27.0%	0.412	34.1%	33.2%	0.821
Pekua	11.2%	10.1%	0.734	32.8%	28.9%	0.410	37.1%	33.3%	0.456
Cox's Bazar District	12.4%	8.7%	p<0.05	29.2%	26.7%	p>0.05	30.8%	28.6%	p>0.05

Table-A 9: Prevalence of wasting, stunting and underweight by Age

Upazila	Wasting (WHZ)			Underweight (WAZ)			Stunting (HAZ)		
	Younger [6-23m]	Older [24-59m]	P value	Younger [6-23m]	Older [24-59m]	P value	Younger [6-23m]	Older [24-59m]	P value
Ukhiya	11.7%	10.8%	0.784	19.4%	29.30%	0.001	16.3%	26.9%	0.004
Tekhnaf	9.8%	14.4%	0.175	18.9%	27.60%	0.045	14.8%	26.2%	0.007
Cox's Bazar Sadar	6.8%	14.2%	0.675	14.9%	32.60%	0.001	16.4%	33.2%	0.001
Ramu	11.8%	8.5%	0.194	24.7%	32.70%	0.174	26.6%	35.3%	0.013
Moheshkhali	11.8%	10.8%	0.763	25.7%	31.50%	0.241	26.2%	33.6%	0.115
Kutubdia	6.2%	8.1%	0.459	26.5%	31.0%	0.342	30.9%	31.6%	0.879
Chokoria	5.9%	10.2%	0.056	22.4%	32.3%	0.016	25.9%	38.2%	0.004
Pekua	11.6%	10.1%	0.63	24.6%	34.3%	0.066	30.0%	38.1%	0.137
Cox's Bazar District	9.2%	11.4%	p>0.05	21.6%	31.5%	p<0.05	23.1%	33.4%	p<0.05

Table-A 10 Dietary Diversity and Consumption of various food group by 6-23 months children

Upazila	Grains, Roots, Tubers	Pulse, legumes and nuts	Milk & Milk product	Flesh Foods	Eggs	Vit A rich fruits & vegetables	Other fruits & Vegetables	MDD	MAD
Ukhiya	89.7%	41.3%	14.7%	50.0%	32.1%	27.2%	33.2%	22.3%	15.8%
Teknaf	91.2%	39.2%	14.2%	58.1%	33.8%	33.1%	24.3%	31.1%	21.0%
Cox's Bazar Sadar	94.0%	46.0%	6.0%	55.3%	31.3%	19.3%	25.3%	26.7%	21.3%
Ramu	89.5%	26.2%	14.8%	45.9%	25.8%	21.0%	30.1%	21.4%	15.7%
Moheshkhali	94.5%	35.9%	11.7%	43.4%	33.8%	29.0%	31.0%	23.5%	22.1%
Kutubdia	90.5%	31.0%	6.5%	39.3%	25.0%	24.4%	24.4%	16.7%	16.1%
Chokoria	90.0%	33.5%	9.6%	48.3%	42.6%	16.7%	33.0%	27.8%	24.9%
Pekua	82.7%	24.8%	14.3%	51.1%	27.8%	15.0%	29.3%	27.1%	18.8%
Cox's Bazar	89.9%	34.7%	11.5%	48.9%	32.8%	23.3%	28.8%	27.2%	22.2%

Severe low	Moderately low	Mild low	Acceptable
0 - <25%	25 - <50%	50- <75%	≥75%

Table-A 11: Nutritional Status among Pregnant and Lactating with children <6 months based on MUAC < 210 mm

Upazila	N	(95% C.I) MUAC < 210 mm-PLW
Ukhiya	119	2.5% (0.0-7.1)
Teknaf	105	0% (0.0-0.0)
Cox's Bazar Sadar	106	0.9% (0.2-5.2)
Ramu	144	3.5% (1.5-7.9)
Moheshkhali	82	1.2%(0.2-6.6)
Kutubdia	144	3.5%(1.5-7.9)
Chokoria	63	1.6%(0.3-8.5)
Pekua	77	3.9%(1.3-10.9)
Cox's Bazar District		1.7%(0.8-2.5)

Table-A 12: IFA consumption by Adolescent Girl (10-19 years

Upazila	Once a week	At least Twice a week	No Consumption
Ukhiya	11.6%	3.5%	88.4%
Teknaf	23.3%	5.6%	76.7%
Cox's Bazar Sadar	18.9%	1.2%	81.1%
Ramu	16.9%	2.0%	83.1%
Moheshkhali	28.2%	4.2%	71.8%
Kutubdia	14.6%	1.6%	85.4%
Chokoria	11.4%	1.1%	88.6%
Pekua	7.7%	2.0%	92.3%
Cox's Bazar District	16.6%	0.0%	83.4%

Table-A 13: Monthly income /Expenditure

	Average monthly income BDT	Average monthly expenditure BDT
Ukhiya	18810	17876
Teknaf	20221	15848
Cox's Bazar Sadar	25536	20078
Ramu	21867	19200
Moheshkhali	21627	17034
Kutubdia	17982	16090
Chokoria	27786	19630
Pekua	19954	17157
Cox's Bazar District	23052	18196

Table-A 14: Main Income Sources

	Agriculture and sales of crops	Salaries wages employees	Seller commercial activity	Skilled wage labour	Unskilled wage labour [including agro]	Petty trading -less than 15000 monthly income	Remittance	Fishing [open /common water	Livestock and sales of animals	others
Ukhiya	10.2%	13.9%	9.4%	16.9%	26.9%	6.9%	5.6%	2.4%	2.3%	5.5%
Teknaf	6.0%	10.6%	11.5%	12.5%	21.4%	7.5%	7.8%	16.7%	0.7%	5.3%
Cox's Bazar Sadar	1.4%	20.6%	15.8%	17.3%	18.4%	5.0%	13.7%	3.0%	0.1%	4.7%
Ramu	17.8%	14.3%	9.1%	14.8%	21.4%	6.0%	11.5%	0.7%	0.9%	3.5%
Moheshkhali	8.6%	11.3%	12.6%	10.2%	29.8%	3.7%	7.1%	11.7%	0.3%	4.7%
Kutubdia	10.0%	10.6%	12.7%	10.5%	24.0%	5.9%	2.8%	20.2%	0.9%	2.4%
Chokoria	10.2%	16.2%	15.7%	15.6%	21.2%	3.5%	14.0%	0.5%	0.1%	3.0%
Pekua	14.6%	10.6%	9.4%	19.4%	21.9%	5.3%	12.6%	1.9%	1.1%	3.2%
Cox's Bazar District	9.0%	14.7%	12.9%	14.9%	22.7%	5.1%	10.5%	5.8%	0.6%	3.8%

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