AFGHANISTAN

Integrated Nutrition, Mortality Health, WASH and FSL SMART Survey

Final Report

Badakhshan Province, Afghanistan

30th July to 15th August 2018

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Abbreviation

AAH/ACF	Action Against Hunger/Action Contre La Faim
AfDHS	Afghanistan Demographic and Health Survey
AHDS	Afghan Health and Development Services
AIM-WG	Assessment Information Management Working Group
AKF	Aga Khan Foundation
AKHS	Aga Khan Health Services
ANC	Antenatal Care
AOG	Armed Opposition Group
ARI	Acute Respiratory Infection
BARAN	Bu Ali Rehabilitation and Aid Network
BCG	Bacillus Calmette Guerin
BHC	Basic Health Center
BPHS	Basic Package of Health Services
CAF	Care of Afghan Familles
CDR	Crude Death Rate
CHW	Community Health Worker
CSO	Central Statistics Organization
DH	District Hospital
ENA	Emergency Nutrition Assessment
EPHS	Essential Package of Health Services
EPI	Expanded Program on Immunization
ERM	Emergency Response Mechanism
FCS	Food consumption Score
FSL	Food Security and Livelihoods

GAM	Global Acute Malnutrition
HH	Household
HSC	Health Sub Center
IMAM	Integrated Management of Acute Malnutrition
IP	Implementing Partner
IPD	Inpatient Department
IYCF	Infant and Young Child Feeding
MHT	Mobile Health Team
MoPH	Ministry of Public Health
MUAC	Mid Upper Arm Circumference
MW	Mean Weight
NNS	National Nutrition Survey
OPD	Outpatient Department
PENTA	Pertussis, Diphtheria, Tetanus, Hepatitis B and Hemophilia's Influenza Type B
PH	Provincial Hospital
PLW	Pregnant and Lactating Women
PNC	Prenatal Care
PND	Public Nutrition Department
PNO	Provincial Nutrition Officer
PPHD	Provincial Public Health Directorate
PPS	Population Proportional to Size
RC	Reserve Cluster
rCSI	reduced Coping Strategy Index
SAM	Severe Acute Malnutrition
SBA	Skilled Birth Attendants
SD	Standard Deviation

SMART	Standardized Monitoring and Assessment of Relief and Transition
SM	Starting Mechanism
TBA	Traditional Birth Attendant
U5	Under five
U5DR	Under five Death Rates
UNICEF	United Nation Children's Fund
WASH	Water, Sanitation and Hygiene
WFP	World Food Program
W/H	Weight for Height
WHO	World Health Organization
WHZ	Weight for Height Z score

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1. EXECUTIVE SUMMARY

Badakhshan Province is one of the 34 provinces of Afghanistan, located in the northeastern part of the country between Tajikistan and north Pakistan. It shares around 56.5 mile (91 km) border with China too. It is part of a broader historical Badakhshan region. The province has 28 districts, such as Arghan Khwa, Argo, Baharak, Daryim, Ishkashim, Jurm, Khas, Kihsim, Kuf ab, Kohistan, Keran Wa Menjan, Miamy, Nusay, Raghistan, Shari Buzang, Sheghanan, Shekay, Shuhada, Tagab, Tishkan, Wakhan, Warduj, Yaftali Sufla, Yamgan, Yawan, Zebak and Faizabad. Faizabad is the capital of Badakhshan province.

A nutrition and mortality survey was conducted in the province of Badakhshan from the 30th July to the 15th August, 2018 during the summer season. It was a cross sectional survey following two-stage cluster sampling method, based on standardized Monitoring and Assessment of Relief and Transition (SMART) methodology. The final report shows the analysis of under-five children's nutritional status, morbidity, mortality, immunization, the nutrition status of pregnant and lactating women (PLW), water, sanitation and hygiene (WASH) and food security and livelihoods (FSL) indicators. The summary of the key findings is shown in the table below.

1.1. Summary Findings

Child Nutritional Status	
Indicator	**Result**
GAM rate among children 6-59 months old children based on WHZ <-2SD	**12.6%** (10.3-15.5 95% CI)
SAM rate among children 6-59 months old children based on WHZ <-3SD	**3.0%** (2.0-4.4 95% CI)
GAM rate among 0-59 months old children based on WHZ <-2 SD	**13.3 % (10.9-16.2 95%CI)**
SAM rate among children 0-59 months old children based on WHZ <-3SD	**3.1% (2.1-4.6 95%CI)**
GAM rate among children 6-59 months old children based on MUAC <125mm	**16.9%** (14.0-20.2 95% CI)
SAM rate among children 6-59 months old children based on MUAC <115 mm	**5.1%** (3.7-7.195% CI)
GAM rate among children 6-59 months old children based on combined criteria (MUAC <125mm and/or WHZ <-2SD and/or Oedema)	**20.7%** (17.6-24.1 95% CI)
SAM rate among children 6-59 months old children based on combined criteria (MUAC <115mm and/or WHZ <-3SD and/or Oedema)	**6.1%** (4.5-8.2 95% CI)
Stunting among 6-59 months old children based on HAZ <-2SD	**45.5%** (41.2-49.8 95%CI)
Severe Stunting among 6-59 months old children based on HAZ <-3SD	**14.8 %**

	(12.2-17.9 95% CI)
Underweight among children 6-59 months based on WAZ <-2SD	**24.5%** (21.3-28.0 95% CI)
Severe Underweight among children 6-59 months based on WAZ <-3SD	**6.6%** (4.7-9.0 95% CI)

Child Health and Immunization	
Indicator	**Result**
Children aged 0-59 months that reported of being sick during the past 14 days of the survey	69.7%
Children aged 0-59 months that reported of having Fever during the past 14 days of the survey	47.1%
Children aged 0-59 months that reported of having ARI during the past 14 days of the survey	22.4%
Children aged 0-59 months that reported of having Diarrhea during the past 14 days of the survey	51.1%
Measles vaccination status of the children aged 9-59 months based on both recall and vaccination cards confirmation	82.8%
BCG vaccination status based on scar confirmation for children aged 0-59 months	85.8%
Polio vaccination status based on both recall and vaccination card confirmation for children aged 0-59 months	89.2%
PENTA 3 vaccination status based on both recall and vaccination card confirmation for children aged 3.5–59 months	84.0%
Deworming of children aged 24-59 months received in the last six months based on recall	67.9%
Vitamin A received in the last six months for children 6-59 months based on recall	83.4%

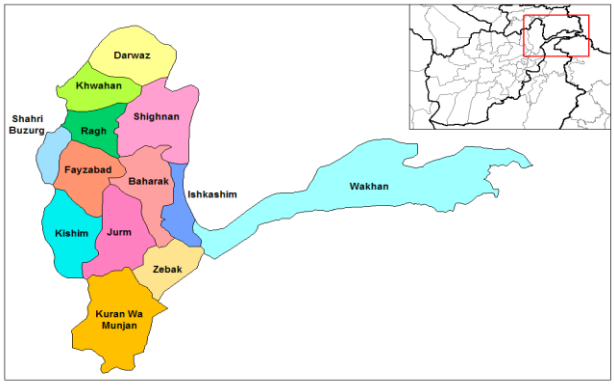
Nutritional status among Pregnant and Lactating Women (PLW)	
Indicator	**Result**
Undernutrition among pregnant women based on MUAC <230 mm	**23.8%** (14.4-33.1 95% CI)
Undernutrition among lactating women based on MUAC <230 mm	**19.0%** (15.5-22.5 95 CI)
Undernutrition among pregnant and lactating women (PLWs) based on MUAC <230mm	**19.7%** (16.4-23.0 95% CI)

Infant and Young Children Feeding (IYCF) Practices	
Indicator	**Result**
Children ever breastfed (children 0-23 months)	98.8%
Initiation of breastfeeding within 1 hour of birth (children 0-23 months)	94.9%
Exclusive breastfeeding (EBF) of children less than 6 months	62.2%
Provision of colostrum in the first 3 days of birth (children 0-23 months)	95.4%
Continued breastfeeding at 1 year of age (children 12-15 months)	94.4%
Continued breastfeeding at 2 year of age (children 20-23 months)	81.8%
Introduction of solid, semi-solid or soft foods (children 6-8 months)	41.3%

Crude and U5 Death Rate (Death/10,000/Day)	
Indicator	**Result**
Crude Death Rate (CDR)	0.65 (0.29-1.47 95%CI
Under five Death Rate (U5DR)	0.27 (0.06-1.17 95%CI)

2. INTRODUCTION

Badakhshan Province is one of the 34 provinces of Afghanistan, located in the northeastern part of the country between Tajikistan and northern Pakistan. It shares a 56.5 mile (91 km) border with China too. It is part of a broader historical Badakhshan region. The province has 28 districts, such as Arghan Khwa, Argo, Baharak, Daryim, Ishkashim, Jurm, Khas, Kihsim, Kuf ab, Kohistan, Keran Wa Menjan, Miamy, Nusay, Raghistan, Shari Buzang, Sheghanan, Shekay, Shuhada, Tagab, Tishkan, Wakhan, Warduj, Yaftali Sufla, Yamgan, Yawan, Zebak and Faizabad. Faizabad is the capital of Badakhshan province.



Map of Badakhshan province with districts

Badakhshan is primarily bordered by Gorno-Badakhsan autonomous province and Khatlon province in Tajikistan to the north and east. In the east of the province a long spur called the Wakhan Corridor, extend above northern Pakistan Chitral and Northern Areas to border with China. The province has total area of 44,059 square kilometers, most of which is occupied by the Hindu Kush and Pamir mountain ranges.

Economy and Demography

Despite massive mineral reserves, Badakhshan is one of the most destitute areas in the world. Opium poppy growing is the only real source of income in the province and Badakhshan has one of the highest rates of maternal mortality[1] in the world, due to the complete lack of health infrastructure, inaccessible locations, and bitter winters of the province. BORNA Institute of Higher Education being the first private university located on the bank of Kokcha River.

Recent geological surveys have indicated the location of other gemstone deposits, in particular rubies and emeralds. It is estimated that the mines at Kuran wa Munjan District hold up to 1,290 tons of azure (lapis lazuli). Exploitation of this mineral wealth could be key to the region's prosperity.

[1] World Health Organization Retrieved 17, 2016 http://www.who.int/healthinfo/statistics/indmaternalmortality/en/.

The population of the province is about 982,835 (Central Statistics Organization (CSO) 1396) which is a multi-ethnic rural society. Dari and Tajiks make up the majority followed by Uzbek, Hazaras, Pushtun, Kyrgyz, Qazalbash and others. There are also group of populations speaking Pamiri languages: Shughani, Munji, Ishakshimi and Wakhi. The inhabitants of the province are mostly Sunni Muslims, although there are also some Ismaili Shias.The SMART nutrition survey was conducted in summer (August 2018 and Asad 1397 according to solar calendar) by CAF with the technical support of ACF. The survey was conducted in the province by excluding Sheghanan, Miamy, Nusay, Sheky, Khahan districts (five districts out of total 28) which are on the other side of the mountain and require traveling through Tajikistan.

Six national and international organizations for health and nutrition programmers Strengthen Mechanism (SM), CAF, Bu Ali Rehabilitation and Aid Network (BARAN), Aga Khan Health Services (AKHS), Aga Khan Foundation (AKF) and the United Nation Children's Fund (UNICEF) are providing health services in the province. It is to be noted that, a total of 114 health facilities (2 district hospitals (DHs), 5 comprehensive health centers+ (CHC+), 9 comprehensive health centers (CHCs), 31 basic health centers (BHCs), and 66 health sub centers (HSCs) are operating in the province. Among these, one provincial hospital is providing an essential package of health services (EPHS), which is implemented by SM under the MoPH. The basic package of health services (BPHS) is implemented by CAF/BARAN and AKHS. Out of 114 health facilities, 54 are providing nutrition services (47 outpatient departments (OPDs) for the treatment of severe acute malnutrition (SAM) and 7 inpatient departments (IPDs) for the treatment of SAM. However, OPDs for the treatment of moderate acute malnutrition (MAM) are not present in the province.

The survey covered the 23 districts out of 28. Five districts were not accessible due to geographic remoteness and partially insecure villages, ACF technically supported CAF to implement this survey during the summer season (August 2018) to investigate the health and nutritional status of children under-five.

3. SURVEY OBJECTIVES

3.1. Broad objective

- To determine the nutritional status of the vulnerable population; mainly children under five and pregnant and lactating women living in the province.

3.2. Specific objective

- To estimate Crude Death Rate (CDR) and Under five Death Rate (U5DR).
- To determine prevalence of under nutrition among children aged 6-59 months.

- To determine the nutritional status of pregnant and lactating women (PLW) based on mid upper arm circumference (MUAC) assessment.
- To determine the core Infant and Young Child Feeding (IYCF) practices among children aged 0-23 months.
- To assess pregnant women delivered by Skilled Birth Attendants (SBA) in the province.
- To assess Water, Sanitation and Hygiene (WASH) proxy indicators: household water storage, water use and caregiver hand washing practices.
- To assess morbidity among children 0-59 months based on a two weeks recall period.
- To assess food access and consumption per seven day recall period at the household level.
- To determine the immunization coverage (Measles, PENTA 3, Polio and BCG) among children 0-59 months.

3.3. Justification

- Since more than 5 years, there has been no nutrition assessment in Badakhshan. The most recent provincial level representative nutrition data available from Badakhshan are from the 2013 National Nutrition Survey with a GAM rate of 9.3% (6.8 - 12.8; 95% CI) and SAM rate of 3.2% (2.0 - 5.1; 95% CI). Therefore, the Assessment Information Management Working Group (AIM-WG) and the Nutrition Cluster prioritized this province to conduct a SMART survey.
- Badakhshan is also one of the most seriously affected provinces by the recent drought as per the drought map shared by OCHA.
- There is a need to investigate the current prevalence of undernutrition in the province. The survey findings will be used to inform future programming in the province.
- It will also be a good opportunity of building the capacity of CAF,a BPHS implementing partner (IP),as well as AKHS (another EPHS IP) and other stakeholders.

4. METHODOLOGY

4.1. Sample Size

The sample size of households to be surveyed was determined using ENA for SMART software version 2011 (up dated 9th July 2015). A **two-stage cluster methodology** was applied. In the first stage, it involves the random selection of clusters/villages (51 clusters) from total list of villages using the probability proportion to size (PPS) method. This was done before starting the data collection at the field office. The village was the primary sampling unit for the proposed survey. The second stage of the methodology involved the random

selection of households from a complete and updated list of households. This was conducted at the field level. The household was the basic sampling unit for the proposed survey. Tables 1 and 2 highlights the sample size calculation for anthropometric and mortality surveys.

Table 1: Parameters for sample size calculation of anthropometric indicators

Parameters for Anthropometry	Value	Assumptions based on context
Estimated prevalence of GAM (%)	9.3%	Based on the NNS-2013 result for GAM 9.3% (6.78-12.76, 95% CI).
Desired precision	±3%	Based on SMART methodology recommendations and consistent with survey objectives in order to estimate prevalence..
Design effect	2.0	The population living in the province were quite diverse and expected to be heterogeneous considering the geography, livelihood, urban vs rural etc. characteristics. Hence, a DEFF of 2.0 was considered for this assessment.
Children to be included	*784*	Minimum sample size of children aged 6-59 months. (However to avoid possible bias of selection for younger age group, all children from 0 to 59 months old found in the selected households were surveyed.)
Average household (HH) size	8.0	Based on AfDHS survey 2015, the mostly frequent average HH size was 8.0.
% Children 6–59 months	17.2%	Based on CSO updated population for Afghanistan 1396 (2017-2018)
% Non-response rate	3%	Based on the results of the most recent SMART surveys in the nearby provinces.
Households to be included	**653**	Minimum sample size of households to be surveyed. Households were the basic sampling unit for the SMART survey.

Table 2: Sample size calculation for mortality surveys

Parameters for Mortality	Value	Assumptions based on context
Estimated death rate /10,000/day	0.5/10,000/day	There were no updated mortality data available; therefore, the 0.5 CDR baseline was used per the SMART methodology recommendation for the planning stage.
Desired precision /10,000/day	±0.3	Based on SMART methodology recommendations and consistent with survey objectives in order to estimate death rate.
Design effect	2.0	The population living in the province were quite diverse and expected to be heterogeneous considering the geography, livelihood, urban vs rural etc. characteristics. Hence, a DEFF of 2.0 was considered for this assessment.
Recall period in days	107	Starting point of recall period beginning on the Mujahidin Victory Day from Russia (8th Sawar1397 solar date) that is equivalent to 28th April 2018 as per Gregorian calendar.
Population to be included	4,343	Population
Average HH size	8.0	Based on AfDHS survey 2015, the mostly frequent average HH size was 8.0.
% Non-response rate	3%	Based on the results of the most recent SMART surveys in the nearby provinces.
Households to be included	560	minimum simple size households to be surveyed household will be the basic sampling unit(BSU) for the SMART survey.

Note: All additional variables (IYCF, Mortality, FSL, PLW nutritional status, HH water usages, WASH, health and immunization) were collected based on anthropometric sample size.

4.2. Sampling Methodology

A two-stage cluster sampling methodology was implemented. based on above planned table , actually we surveyed 993 children, in 634 households in the province.

Stage 1: Random selection of clusters/villages were chosen by applying PPS using ENA for SMART software version 2011 (Updated 9thJuly, 2015). A complete and updated list of Faizabad city and districts villages was added into the ENA for SMART software where PPS was applied. The villages with a large population had a higher chance of being selected than the villages with a small population and vice versa. Reserve Clusters (RCs) were also selected by ENA software version 2011 (updated 9th July 2015). Estimating 13 HHs could be visited per team per day, 653/13=50.23 rounded up to 51 clusters to be surveyed.. Finally, 49 Clusters were surveyed out of 51 clusters: two clusters (3.9%) were not surveyed due to ongoing fighting in the area. As the number of inaccessible clusters was less than 10%, we did not used the RCs as they are intended to be used if 10% or more clusters would have been impossible to reach during the survey as per SMART methodology. The selected clusters are highlighted in Annex-2.

In each selected village, one or more community member(s) was asked to help the survey teams to conduct their work by providing information about the village with regard to the geographical organization or the number of households. In cases where there are large villages or semi-urban zones/small city in a cluster, the village/zones was divided into smaller segments and a segment was selected randomly to represent the cluster. This division was done based on existing administrative units e.g. neighborhoods, zone, Guzar or streets or natural landmarks like river, road, or public places like market, schools, and mosques

Stage 2: Households were chosen randomly within each cluster/village using systematic random sampling (SRS). Based on the estimated time to travel to the survey area, select and survey the households, each team could effectively survey 13 households in a day. In this assessment, 7 teams were engaged during the assessments, while data collection was conducted over 9 days. All households were listed and numbered by the survey team. The 13 households were chosen randomly from this enumerated household list using systematic random sampling. The teams were trained on both methods of sampling (simple and systematic random sampling) and carried materials to assist in selecting the households during data collection. For the small semi urban/city in Faizabad district, the team took into account multistoried buildings as multiple HHs depending on the HHs definition. In case a multistoried building was counted as one HH during the initial listing but actually there were multiple HHs living in the same building then the enumerator did another round of randomization to select one HH in the building.

All the children living in the selected house aged 0 to 59 months old were included for anthropometric measurements. Children aged 0-23 months were included for IYCF assessment. To ensure that every child would have the same chance of being surveyed, if more than one eligible child were found in a household,

both were included, even if there were twins. Eligible orphans living in the selected Households were also surveyed. All of the selected HHs were included in the mortality survey as well as responded to questions concerning the HH as a whole (e.g. water storage and FSL).

Any empty households, or households with missing or absent children were revisited at the end of the sampling day in each cluster; any missing or absent child that was not be subsequently found was not included in the survey. A cluster control form was used to record all missed and absent households, however, abandoned HHs were ideally excluded from the total HHs list before surveying began. Village elders often provided this information to the teams.

The household was the basic sampling unit. The term household was defined as all people eating from the same pot and living together (World Food Programme (WFP) definition). In Afghanistan, the term household is often defined and/or used synonymously with a compound – which potentially represents more than one household. Hence, a strategy was followed together with the village elders/community leaders to identify compounds from the households list in advance and asking if there were multiple cooking areas to determine the number of households.

4.3. Training, team composition and supervision

Seven teams of four members each conducted the field data collection. Each team was composed of one supervisor, one team leader and two data collectors. Each team had one female data collector to ensure acceptance of the team amongst the surveyed households, particularly for IYCF questions. Each female member of the survey team was

Class and standardization test pictures

accompanied with a mahram[2] to facilitate the work of the female data collectors at the community level. The teams were supervised by ACF, CAF and the PNO of the province.

The entire survey team received a 7-day training in local language of Dari on the SMART survey methodology and all its practical aspects. Two ACF technical staff facilitated the training. A standardization test was conducted over the course of one day, measuring 10 children in order to evaluate the accuracy and the precision of the team members in taking the anthropometric measurements. The teams also conducted a one-day field test in order to evaluate their work in real field conditions.

Feedback was provided to the team in regards to the results of the field test; particularly in relation to digit preferences and data collection. Refresher training on the anthropometric measurement and on the filling out of the questionnaires and household selection was organized the last day of the training by ACF to ensure overall comprehension before data collection began.

Each team member was provided with two documents: one field guidelines document with instructions and another household definition plus selection document. All documents, such as the local events calendar, questionnaires or consent forms were translated in Dari (local language) for better understanding and to avoid direct translation during the field data collection. The questionnaires were back translated using a different translator and pre-tested during the field test. Alterations were made as necessary.

Daily data entry and analysis was done using ENA software for anthropometric data, plausibility check, and feedback was provided to the data collection teams. All anthropometric data were directly inserted into ENA while IYCF and other data were analyzed using an excel spreadsheet.

4.4. Data analysis

The anthropometric and mortality data were analyzed by ENA for SMART software 2011 version (9thJuly 2015). Survey results were interpreted in reference to WHO standards, analysis of other indicators to include IYCF, WASH, demographic and food security were done using Microsoft excel version 2016. Information generated from these indicators was used to explain the outcome indicators to include; nutritional status of

[2] Women are not allowed to go outside without being accompanied by one male relative locally called a 'Mahram'.

children under five and mortality (CDR and U5DR). Contextual information generated from routine monitoring complemented survey findings.

4.5. INDICATORS: DEFINITION, CALCULATION and INTERPRETATION

4.5.1. Anthropometric Indicators: Definition of nutritional status of children 0-59 months

Acute Malnutrition

Acute malnutrition in children 6-59 months can be identified using 3 indicators; Weight for Height Index (W/H), Mid Upper Arm Circumference (MUAC), or Bilateral Pitting Oedema as described below.

Weight-for-Height Index (W/H)

A child's nutritional status is estimated by comparing it to the weight-for-height curves of a reference population (WHO standards data[3]). These curves have a normal shape and are characterized by the median weight (value separating the population into two groups of the same size) and its standard deviation (SD). The expression of the weight-for-height index as a Z-score (WHZ) compares the observed weight (OW) of the surveyed child to the mean weight (MW) of the reference population, for a child of the same height. The Z-score represents the number of standard deviations (SD) separating the observed weight from the mean weight of the reference population: WHZ = (OW - MW) / SD.

During data collection, the WHZ was calculated in the field for each child in order to refer malnourished cases to appropriate center if needed. The classification of acute malnutrition based on WHZ is illustrated in table 4.

Mid Upper Arm Circumference (MUAC)

The mid upper arm circumference does not need to be related to any other anthropometric measurement. It is a reliable indicator of the muscular status of the child and is mainly used to identify children with a risk of mortality. The MUAC is an indicator of malnutrition only for children greater or equal to 6 months. Table 3 provides the cut-off criteria for categorizing acute malnutrition cases.

Table 3: MUAC cut-offs points for children aged 6-59 months

Target group	MUAC (mm)	Nutritional status
	>= 125	**No malnutrition**

[3] WHO standard 2006

Children 6-59 months	< 125 and >= 115	**Moderate Acute Malnutrition (MAM)**
	< 115	**Severe Acute Malnutrition (SAM)**

Nutritional Bilateral "Pitting" Oedema

Nutritional bilateral pitting oedema is a sign of Kwashiorkor, one of the major clinical forms of severe acute malnutrition. When associated with Marasmus (severe wasting), it is called Marasmic-Kwashiorkor. Children with bilateral oedema are automatically categorised as being severely malnourished, regardless of their weight-for-height index. The table below defines the acute malnutrition according to W/H index, MUAC criterion and oedema.

Table 4: Definition of acute malnutrition according to weight-for-height index (W/H) expressed as a Z-score based on WHO standards and considering the presence of oedema

Severe Acute Malnutrition (SAM)
W/H <-3 z-score and/or bilateral oedema
Moderate Acute Malnutrition (MAM)
W/H <-2 z-score and >= -3 z-score and absence of bilateral oedema
Global Acute Malnutrition (GAM)
W/H <-2 z-score and/or bilateral oedema

Chronic Malnutrition

The Height-for-Age Index (H/A Z-score)

The Height-for-Age measure indicates if a child of a given age is stunted. This index reflects the nutritional history of a child rather than his/her current nutritional status and is mainly used to identify chronic malnutrition. The same principle is used as for Weight-for-Height; except that a child's chronic nutritional status is estimated by comparing its height with WHO standards height-for-age curves, as opposed to weight-for-height curves. The Height-for-Age Index of a child from the studied population is expressed in Z-score (HAZ). The HAZ cut-off points are presented in Table 5.

Table 5: Cut offs points of the Height for Age index expressed in Z-score, WHO standards

Not stunted	≥ -2 z-score
Moderate stunting	-3 z-score ≤ H/A < -2 z-score
Severe stunting	< -3 z-score

Mortality Indicator Calculation

The mortality indicators were collected in all households, regardless of the presence of children. All members of the household were counted, using the household definition.

Crude death rate (CDR):

It refers to the number of persons in the total population that died over specified period (107 days) – see the Table 2 above for Sample size calculation for mortality surveys:

$$\text{CDR} = \frac{\text{Nb of deaths x 10000 persons}}{\text{population at mid} - \text{interval x time interval in days}}$$

Under-5 death rate (U5DR):

It refers to the number of children aged (0-5) years that die over specified period of time – see the Table 2 above for Sample size calculation for mortality surveys, calculated as:

$$\text{U5DR} = \frac{\text{Nb of deaths of U5s x 10000 U5s}}{\text{population of U5s at mid} - \text{interval x time interval in days}}$$

4.6. Health

In addition to anthropometric data, the following health information was collected as follows:

Immunization Status, Deworming and Vitamin A Supplementation

Caregivers of children were asked if the children received all the necessary vaccinations (Measles, BCG, PENTA3 and Polio), which was subsequently verified by reviewing the vaccination card, when available. In the case of PENTA 3 although this vaccination should be given on 14 weeks (3.5months), consistent with SMART methodology age data without documentation of exact birth date, age is rounded down to the nearest month, therefore, PENTA3 was assessed from 4-59 months. If the vaccination card was not available, then the recall of the caregiver was considered. The deworming and the Vitamin A supplementation of children were also verified using samples.

Morbidity

Caregivers of children were asked if the children had experienced an illness in the past 2 weeks. Data on acute respiratory infection, fever and diarrhoea were recorded when symptoms according to the case definition were described by the caretaker.

4.7 WASH

Water Storage and Usage

Household heads were asked what type of container they used for storing drinking water and how much water they used in the HH in the last 24 hours to assess the water use per person per day.

Hand Washing Practices

Caregivers were asked on what occasions they washed their hands and what they used to wash their hands to determine the hand washing practices in the surveyed area.

4.8 Infant and Young Child Feeding (IYCF) Practices Indicators

The IYCF questionnaire was asked to the caregivers of children aged <24 months to assess the IYCF practices as described below:

Child Ever Breastfed

The indicator refers to the proportion of children who have ever received breast milk. It was calculated by dividing the number of children born in the last 24 months who were ever breastfed by all Children born in the last 24 months. The indicator was based on historical recall, and the caregiver was asked to provide information of all children living or dead who were born in the last 24 months. This indicator looked at the number of mothers who ever breastfed their children.

Timely Initiation of Breastfeeding

Proportion of children born in the last 24 months who were put to the breast within one hour of birth. The indicator was calculated by dividing the number of children born in the last 24 months who were put to the breast within one hour of birth by the total of children born in the last 24 months. The denominator and numerator included living and deceased children who were born within the past 24 months.

Provision of Colostrum in the First 3 Days of Life

Proportion of children who received colostrum (yellowish liquid) within the first 3 days after birth. This indicator looked at the number of mothers with children <24 months who fed their children with colostrum within the first 3 days after birth.

Exclusive Breastfeeding under 6 Months

Proportion of infants 0-5 months of age who are fed exclusively with breast milk. It was calculated by dividing the number of all Infants aged 0–5 months who received only breast milk during the previous day by the total infants aged 0-5 months.

Continued Breastfeeding at 1 Year

Proportion of children 12–15 months of age who were fed with breast milk. It was calculated by dividing the total number of children aged 12–15 months who received breast milk during the previous day by the total children aged 12–15 months

Introduction of Solid, Semi-solid or Soft Foods:

Proportion of infants 6-8 months of age who received solid, semi-solid or soft foods. It was calculated from the number of infants aged 6-8 months who received solid, semi-solid or soft foods during the previous day by the total number of infants 6–8 months of age

Continued Breastfeeding at 2 Years

Proportion of children 20–23 months of age who were breastfed. It was calculated by dividing the number of children aged 20–23 months who received breast milk during the previous day by total children aged 20–23 months.

4.9. Maternal Health and Nutrition

1. Pregnant and lactating women were assessed for their nutritional status based on MUAC measurements. The nutritional status of pregnant and lactating mothers was assessed by using the MUAC cut-off of 230 mm. The indicator for iron-folate supplementation derived from dividing the total number of pregnant women supplemented with iron-folate in the last 90 days by total number of pregnant women.

2. Antenatal care: Caregivers between the ages of 15-49 years at household level will be asked on whether they sought at least one antenatal care during their last pregnancy. In this case, the last pregnancy will be considered of the last child who is still between 0-59 months for the purpose of having a more precise recall period.

3. Delivery assisted by a Skilled Birth Attendant (SBA): caregiver who confirms receiving assistance from a skilled birth attendants (i.e. mid-wives, nurse, doctor who are certified by MoPH) during the last delivery.

5. LIMITATION OF THE SURVEY

- Insecurity was one of the major limitations of the assessment in the province. Due to this issue, two clusters could not been accessed and surveyed. Insecurity also limited the ACF Deputy Programme Manager's ability to provide regular direct supervision and on job training activities in the field to some extent.
- Some areas to be surveyed were situated very far from the city of Badakhshan province and the team could not come to the office to perform daily database supervision and data quality check.

6. SURVEY FINDINGS

6.1. Demography

The mortality questionnaire in SMART methodology is designed in a way that some additional useful demography data are gathered. Data was collected from 49 clusters, 634 households, 4,896 individuals (2,445 male and 2,451 female) living in the household, with 615 households having under five children. The summary is highlighted in table 6 below.

Table 6: Demographic Summary

Indicator	Values
Total number of HHs with children under five	615
Average household size	7.6
Percentage of children under five	22.8%
Birth Rate	0.89/10,000/day
In-migration Rate (Joined)	0.84/10,000/day
Out-migration Rate (Left)	0.08/10,000/day
Number of clusters surveyed	49

Note: * observed in immigration may have been influenced by most of the Afghan people return from Iran due to lack of the jobs and labors.

6.1.1 Residential

The assessed households were either residents (95.3%) or internally displaced (4.7%). No returnee households were present in the surveyed sample size.

Table7: The information collected from households regarding returnees and IDPs is presented in table below.

Residential status of households N= 634	Permanent residential	604	95.3%
	Internal displacement	30	4.7%

	Returnees	0	0.0%

6.2 Description of sample

Among the 51 clusters that were planned to be surveyed, two clusters were missed due to ongoing conflict between government and AOGs in Wadoj and Khahan districts. Data were collected from 49 clusters, 634 households, 4,896 individuals, 993 children aged 6-59 months (although 12 children WHZ were out of range), 1,067 children aged 0-59 months, 431 children aged 0-23 months and 697 women of reproductive age (15-49 years).

Although 653 HHs were planned (ENA), with two clusters were inaccessible the teams ultimately attempted to survey 637 (13x49) households. Of these, 634 HHs were successfully surveyed in this case our non-response rate was 0.5% (3/637).. The average household size was 7.6 and 615 households had children under five years.

Table 7: Distribution of age and sex of children 6-59 months

	Boys		Girls		Total		Ratio
AGE (mo)	no.	%	no.	%	no.	%	Boy:Girl
6-17	134	52.1	123	47.9	257	25.9	1.1
18-29	118	50.9	114	49.1	232	23.4	1.0
30-41	114	49.6	116	50.4	230	23.2	1.0
42-53	84	48.6	89	51.4	173	17.4	0.9
54-59	52	51.5	49	48.5	101	10.2	1.1
Total	502	50.6	491	49.4	993	100.0	1.0

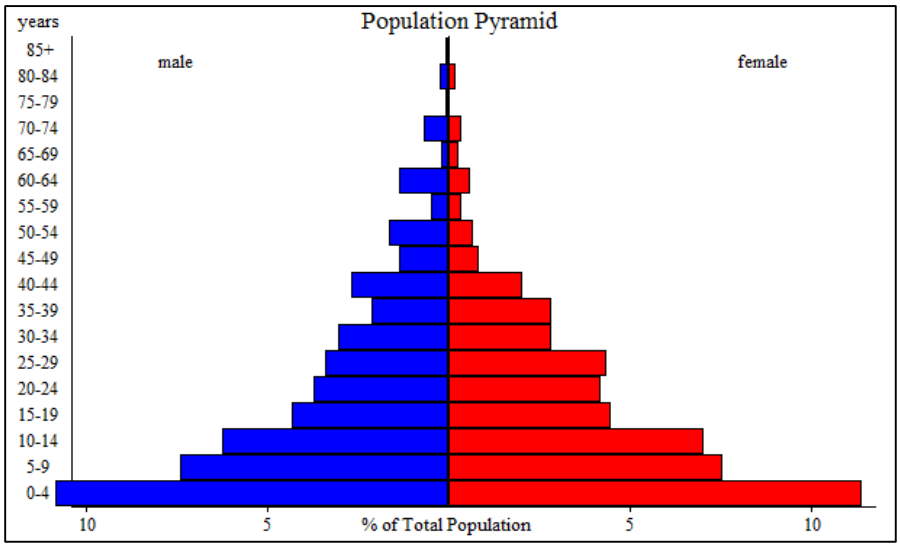


Figure 1 : Distribution of age and sex pyramid

The number of planned and surveyed households and the number of planned and surveyed children from 6-59 months are shown in Table 8.

Table 8: Details of proposed and actual sample size achieved

Number of households logistically planned	Number of households surveyed	% of surveyed	Number of children 6-59 months planned	Number of children 6-59 months surveyed	% of surveyed
664	634	95.6%	784	993	126.7%

In the planning stage it was estimated 663 HHs (51 clusters*13HHs=663 HHs) would be surveyed, however, two clusters were inaccessible due to insecurity. Finally, the teams attempted to survey 637 HHs. Even though 100% households were not reached, 126.7% of planned children were surveyed during the assessment.

In this survey, most of the children did not have the exact birth date (85%) only 15% of the children were found to have the exact birth date.

6.3 Data quality

The plausibility check indicated the anthropometric measurements were of good quality with an overall score of 11%. For more details refer to Annex 3. The percentages of values flagged with SMART flags were: 1.2% for WHZ, 0.3% for HAZ and 0.2% for WAZ.

The overall sex ratio was found equally representative with a P-value of 0.727, suggesting equal representation of boys and girls. However, the age ratio of 6-29 months to 30-59 months shows a significant difference (P-value=0.037), indicating there were **more children aged 6-29 months surveyed than children 30-59 months. This may be influenced by 85 % of children with no exact birth date and or some older children being absent with school when the teams surveyed the HHs**.

Standard deviation for the distribution of WHZ (1.13) was classified as good, the and WAZ (1.02) was classified as excellent, and the HAZ (0.89) was classified as excellent.

6.4 Undernutrition

The nutritional status of children was analyzed in reference to the 2006 WHO Child Growth Standards. Table 9 shows the Z-scores, design effect, and the number of children with flag signs and number of samples excluded in the analysis.

Table 9: Mean z-scores, design effects, missing and out of range data

Indicator	N	Mean z-scores ± SD	Design effect (z-score < -2)	Z-scores not available*	Z-scores out of range
Weight-for-Height	981	-0.62±1.13	1.48	0	12
Weight-for-Age	991	-1.47±0.89	1.49	0	2
Height-for-Age	990	-1.88±1.02	1.83	0	3

*WHZ and WAZ unavailable z-scores include cases of oedema.

6.4.1 Prevalence of Global Acute Malnutrition (GAM)

Acute malnutrition is the condition represented by measures of wasted body muscles and thinness or bilateral pitting oedema and acts as a proxy for the current nutritional status of the population. It represents child's failure to receive adequate nutrition and may be the result of inadequate food intake or a recent episode of illness causing loss of weight.

The analysis of GAM rate was generated on children aged 6-59 months (table 10).

Table 10: Prevalence of acute malnutrition based on WHZ (and/or edema) and by sex among children 6-59 months

Indicators	All n = 981	Boys n = 494	Girls n = 487
Prevalence of global acute malnutrition (<-2 z-score and/or oedema)	(124) 12.6 % (10.3 - 15.5 95% C.I.)	(64) 13.0 % (9.9 - 16.7 95% C.I.)	(60) 12.3 % (9.4 - 16.0 95% C.I.)
Prevalence of moderate acute malnutrition (<-2 z-score to ≥-3 z-score, no oedema)	(95) 9.7 % (7.7 - 12.1 95% C.I.)	(44) 8.9 % (6.5 - 12.1 95% C.I.)	(51) 10.5 % (7.6 - 14.3 95% C.I.)
Prevalence of severe acute malnutrition (<-3 z-score and/or oedema)	(29) 3.0 % (2.0 - 4.4 95% C.I.)	(20) 4.0 % (2.7 - 6.1 95% C.I.)	(9) 1.8 % (1.0 - 3.4 95% C.I.)

The prevalence of oedema was 0.0 %

Table 11: Prevalence of acute malnutrition by age, based on WHZ and/or oedema

		Severe wasting (<-3 z-score)		Moderate wasting (≥-3 to <-2 z-score)		Normal (≥-2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	250	23	9.2	57	22.8	170	68.0	0	0.0
18-29	228	4	1.8	26	11.4	198	86.8	0	0.0
30-41	229	0	0.0	3	1.3	226	98.7	0	0.0
42-53	173	1	0.6	5	2.9	167	96.5	0	0.0
54-59	101	1	1.0	4	4.0	96	95.0	0	0.0
Total	981	29	3.0	95	9.7	857	87.4	0	0.0

A further analysis of the GAM rate based on weight for height Z score was done between children 6-23 months (29.5%) and children aged 24-59 months (3.8%) and showed that these rates were significantly different; indicating that children less than 24 months were more effected than older children. For more details, refer to table 12.

Table 12: Prevalence of acute malnutrition based on WHZ (and/or oedema) disaggregated by sex and age

6-23 months aged	All n = 352	Boys n = 183	Girls n = 169

Prevalence of global acute malnutrition (GAM) (<-2 z-score and/or Oedema)	(104) 29.5 % (24.1 - 35.6 95% C.I.)	(53) 29.0 % (22.6 - 36.3 95% C.I.)	(51) 30.2 % (23.4 - 38.0 95% C.I.)
Prevalence of Severe acute malnutrition (SAM) (<-3 z-score and/or Oedema)	(31) 8.8 % (6.1 - 12.6 95% C.I.)	(22) 12.0 % (8.0 - 17.7 95% C.I.)	(9) 5.3 % (3.0 - 9.4 95% C.I.)
24-59 months aged	**All** **n = 634**	**Boys** **n = 315**	**Girls** **n = 319**
Prevalence of global acute malnutrition (GAM) (<-2 z-score and/or Oedema)	(24) 3.8 % (2.6 - 5.5 95% C.I.)	(14) 4.4 % (2.7 - 7.3 95% C.I.)	(10) 3.1 % (1.6 - 5.9 95% C.I.)
Prevalence of severe acute malnutrition (SAM) (<-3 z-score and/or Oedema)	(2) 0.3 % (0.1 - 1.3 95% C.I.)	(1) 0.3 % (0.0 - 2.2 95% C.I.)	(1) 0.3 % (0.0 - 2.3 95% C.I.)

***There were no cases of Oedema**

Table 13: Distribution of severe acute malnutrition based on Oedema among children 6-59 months

	<-3 z-score	>=-3 z-score
Oedema present	Marasmic Kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Oedema absent	Marasmic No. 37 (3.7 %)	Not severely malnourished No. 956 (96.3 %)

There were no cases of Oedema found.

Table 14: Prevalence of acute malnutrition based on MUAC cut off (and/or oedema) disaggregated by sex among children 6-59 months

Indicators	All n = 993	Boys n = 502	Girls n = 491
Prevalence of global malnutrition (<125 mm and/or Oedema)	(168) 16.9 % (14.0 - 20.2 95% C.I.)	(70) 13.9 % (10.5 - 18.2 95% C.I.)	(98) 20.0 % (16.0 - 24.6 95% C.I.)

Prevalence of moderate malnutrition (< 125 mm to ≥115 mm, no Oedema)	(117) 11.8 % (9.8 - 14.1 95% C.I.)	(53) 10.6 % (8.0 - 13.8 95% C.I.)	(64) 13.0 % (10.2 - 16.5 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or Oedema)	(51) 5.1 % (3.7 - 7.1 95% C.I.)	(17) 3.4 % (2.1 - 5.4 95% C.I.)	(34) 6.9 % (4.7 - 10.1 95% C.I.)

Table 15: Prevalence of acute malnutrition by age, based on MUAC cut off's and/or oedema

		Severe wasting (<115 mm)		Moderate wasting (≥115 mm and <125 mm)		Normal (≥125 mm)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	257	41	16.0	64	24.9	152	59.1	0	0.0
18-29	232	8	3.4	48	20.7	176	75.9	0	0.0
30-41	230	2	0.9	4	1.7	224	97.4	0	0.0
42-53	173	0	0.0	0	0.0	173	100.0	0	0.0
54-59	101	0	0.0	1	1.0	100	99.0	0	0.0
Total	993	51	5.1	117	11.8	825	83.1	0	0.0

Weight for Height Z-score is considered a key indicator for acute malnutrition, but it should be noted that there is no gold standard measure for acute malnutrition. Based on the 2008 WHO and UNICEF Joint Statement on Child Growth Standards and the Identification of SAM in Infants and Children, a MUAC measurement of less than 115mm among children 6 to 59 months old also indicates acute malnutrition. Further, MUAC less than 115mm indicates a higher-elevated risk of mortality and morbidity than weight for height. Hence, it is important to use both criteria (MUAC+WHZ) of malnutrition for Integrated Management of Acute Malnutrition (IMAM) case loading. Table 16 shows the GAM and SAM based on both criteria.

Table 16: Prevalence of acute malnutrition based on combined criteria (WHZ+ MUAC+ Oedema) among children 6-59 months

GAM and SAM based on combined criteria*	**All** **n = 981**	**Boys** **n = 494**	**Girls** **n = 487**
Prevalence of Global Acute Malnutrition (MUAC<125 mm and/or WHZ <-2 SD and/or Oedema)	(203) 20.7 % (17.6 - 24.1 95% C.I.)	(91) 18.4 % (14.7 - 22.8 95% C.I.)	(112) 23.0 % (18.6 - 28.0 95% C.I.)

Prevalence of Severe Acute Malnutrition (MUAC <115 mm and/or WHZ <-3SD and/or Oedema)	(60) 6.1 % (4.5 - 8.2 95% C.I.)	(25) 5.1 % (3.5 - 7.2 95% C.I.)	(35) 7.2 % (4.9 - 10.4 95% C.I.)

*There were no identified cases of oedema

6.4.2 Prevalence of chronic malnutrition (stunting)

Stunting indicates a failure to achieve one's genetic potential for height. It usually reflects the persistent, cumulative effects of long term poor micro and macronutrient intake and other deficits that often persist across several generations. It is caused by the failure to receive adequate nutrition over a long period and is affected by recurrent and chronic illness. It is not sensitive to recent/short-term changes in dietary intake and multi sectoral approach is needed to contribute to the prevention of stunting. The table 17 shows stunting rate based on height for age and by sex among children 6-59 months old.

Table 17: Prevalence of stunting based on height-for-age z-scores (HAZ) disaggregated by sex

	All n = 990	Boys n = 501	Girls n = 489
Prevalence of stunting (<-2 z-score)	(450) 45.5 % (41.2 - 49.8 95% C.I.)	(255) 50.9 % (45.6 - 56.2 95% C.I.)	(195) 39.9 % (34.9 - 45.1 95% C.I.)
Prevalence of moderate stunting (<-2 z-score to ≥-3 z-score)	(303) 30.6 % (27.5 - 33.9 95% C.I.)	(160) 31.9 % (28.0 - 36.2 95% C.I.)	(143) 29.2 % (24.8 - 34.2 95% C.I.)
Prevalence of severe stunting (<-3 z-score)	(147) 14.8 % (12.2 - 17.9 95% C.I.)	(95) 19.0 % (15.3 - 23.3 95% C.I.)	(52) 10.6 % (7.7 - 14.5 95% C.I.)

The distribution of HAZ of the observed population (SMART flags excluded) compared to WHO Reference curve shows that it was strongly shifted to the left, suggesting restricted linear growth of the observed population. Further analysis suggests that linear growth retardation is at its highest in the group of children aged 18-29 months (n=231) to then decrease with the older age groups.Although boys are more stunted than girls and we need to interpreted the stunting rate with caution.

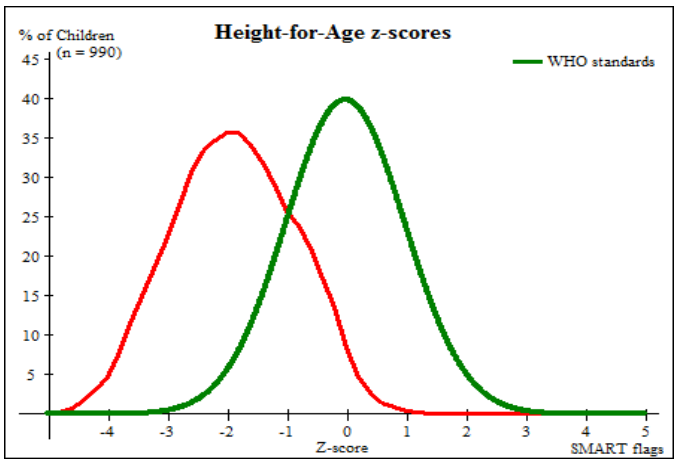


Figure 3: Gaussian distributed curves HAZ

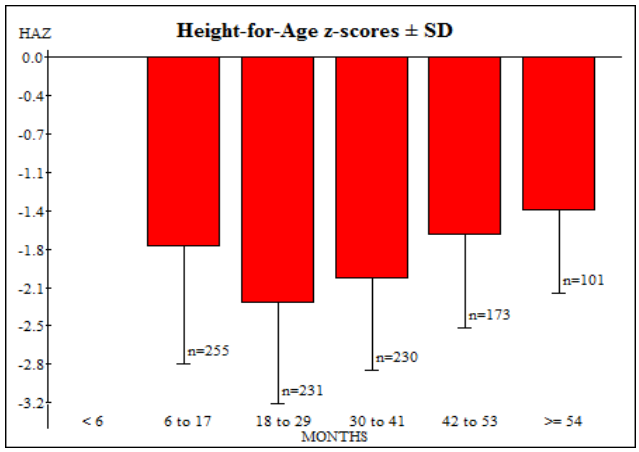


Figure 2: Trend of stunting over the age distribution

Table 18: Prevalence of stunting disaggregated by age based on height-for-age z-scores

		Severe stunting (<-3 z-score)		Moderate stunting (>= -3 to <-2 z-score)		Normal (> = -2 z score)	
Age (mo)	Total no.	No.	%	No.	%	No.	%
6-17	255	34	13.3	80	31.4	141	55.3
18-29	231	61	26.4	82	35.5	88	38.1
30-41	230	34	14.8	84	36.5	112	48.7
42-53	173	16	9.2	35	20.2	122	70.5
54-59	101	2	2.0	22	21.8	77	76.2
Total	990	147	14.8	303	30.6	540	54.5

6.4.3 Prevalence of underweight

Underweight is a compound index of height-for-age and weight-for-height. It takes into account both acute and chronic forms of malnutrition. While underweight or weight-for-age was used for monitoring the previous Millennium Development Goals, it is no longer use for monitoring individual children, as it cannot detect children who are stunted. Furthermore, it does not detect life-threatening acute malnutrition among children. The underweight results are presented in **table 19** for more details.

Table 19: Prevalence of underweight based on weight-for-age z-scores (WAZ) among children 6-59 months

	All	Boys	Girls
	n = 991	n = 500	n = 491

Prevalence of underweight (<-2 z-score)	(243) 24.5 % (21.3 - 28.0 95% C.I.)	(139) 27.8 % (23.3 - 32.8 95% C.I.)	(104) 21.2 % (17.1 - 25.9 95% C.I.)
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	(178) 18.0 % (15.3 - 21.0 95% C.I.)	(99) 19.8 % (16.4 - 23.7 95% C.I.)	(79) 16.1 % (12.5 - 20.5 95% C.I.)
Prevalence of severe underweight (<-3 z-score)	(65) 6.6 % (4.7 - 9.0 95% C.I.)	(40) 8.0 % (5.5 - 11.6 95% C.I.)	(25) 5.1 % (3.5 - 7.4 95% C.I.)

Table 20: Prevalence of underweight disaggregated by age, based on weight-for-age z-scores

		Severe underweight (<-3 z-score)		Moderate underweight (>= -3 and <-2 z-score)		Normal (> = -2 z score)		Oedema	
Age (mo)	**Total no.**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
6-17	255	38	14.9	73	28.6	144	56.5	0	0.0
18-29	232	24	10.3	53	22.8	155	66.8	0	0.0
30-41	230	3	1.3	18	7.8	209	90.9	0	0.0
42-53	173	0	0.0	19	11.0	154	89.0	0	0.0
54-59	101	0	0.0	15	14.9	86	85.1	0	0.0
Total	991	65	6.6	178	18.0	748	75.5	0	0.0

6.4.4 Women health and nutrition status

All women of child-bearing age (15-49 years) were included in this survey. A total of 697 women was assessed for nutrition status, antenatal care (ANC) and prenatal care (PNC) services and iron folate supplementation. The analysis focused on pregnant and lactating women, iron folate supplementation only from pregnant women, while last child delivery status was asked of all the women. Adequate nutrition is critical for women especially during pregnancy and lactation because inadequate nutrition causes damage not only to women's own health but also to their children and the development of the next generation. The results for PLWs are presented in tables 21 and 22.

Table 21: Prevalence of malnutrition among PLWs based on MUAC cut-off

Physiological Status	Frequency (MUAC <230 mm)	Results 95% CI
Malnutrition among Pregnant women (N=80)	19	**23.8%** (14.4-33.1 95% CI)
Malnutrition among Lactating women (N=474)	90	**19.0%** (15.5-22.5 95% CI)
Malnutrition among PLWs (N=554)	109	**19.7%** (16.4-23.0 95% CI)

Table 22: Iron folate supplementation for pregnant women based on available answers

Iron- folate for Pregnant women (N=80)	Frequency	Results
Yes	36	45.0%
No	44	55.0%
Don't Know	0	0.0%

Table 23: Status of ANC visits in the last pregnancy

ANC Visits in the last pregnancy (N= 697)	Frequency	Result
Yes	507	72.7%
No	190	27.3%
ANC visits by Whom? (N=507)		
Health professional	422	83.2%
Traditional birth attendant (TBA)	16	3.2%
Community health worker (CHW)	68	13.4%
Relative/ Friends	1	0.2%

*ANC visited by whom" response came from those women who actually had ANC checkup.

Table 24: Skill Births Attendance (SBA) status for the last baby

Status of Skill Birth Attendance during last delivery (N=697)	Frequency	Result (%)
Last delivery at the health facilities	313	44.9%

Last Delivery at home	Professionals (nurses, midwifes, doctors and community midwifes)	21	3.0%
	Non-Professionals (CHWs, TBA and relatives)	363	52.1%

6.5 Crude and Under 5 Death Rate

The mortality data was also included in the survey to calculate the CDR and U5DR. It was planned to survey 4343 individuals in 560 households, however, relying on the anthropometric sample size, ultimately, 634 households with 4,896 individuals were assessed. The CDR and U5DR were lower than WHO emergency threshold[4] as shown in the table below.

Table 25: Death rates by age and sex category with design effect

Population	Death Rate (/10,000/Day)	Design Effect
Overall	0.65 (0.29-1.47)	5.58
By Sex		
Male	0.87 (0.42-1.83)	3.14
Female	0.43 (0.15-1.24)	3.01
By Age		
0-4	0.27 (0.06-1.17)	1.64
5-11	0.00 (0.00-0.00)	1.00
12-17	0.00 (0.00-0.00)	1.00
18-49	0.49 (0.22-1.06)	1.45
50-64	2.30 (0.87-5.98)	1.43
65-120	13.94 (4.62-34.84)	4.51

6.6 Child Health and Immunization

6.6.1 Morbidity

The survey found that, among 1,067 children under five, 69.7% reported symptoms of illness (cough, fever, diarrhea, fever, rash, infection, headache, nausea, vomiting, etc.) in the 14 days prior to the survey. The major illnesses reported were diarrhea, Acute Respiratory Infection (ARI) and fever as highlighted in the table below.

Table 26: Morbidity status among under-five year's children

Parameter (N=1,067)	Frequency	Results (%)

[4] WHO's emergency thresholds of CDR 1/10,000/day and U5DR 2/10,000/day respectively

Children 0-59 months reporting symptoms of illness based on 2 weeks recall	744	69.7%
Children 0-59 months reporting symptoms of Acute Respiratory Infection (ARI) based on 2 week recall	239	22.4%
Children 0-59 months reporting symptoms of fever based on 2 week recall	503	47.1%
Children 0-59 months reporting symptoms of diarrhea based on 2 week recall	545	51.1%

6.6.2 Child Health and Immunization

Immunization is an important public health intervention that protects children from illness and disability. As part of the Expanded Program on Immunization (EPI), measles vaccination is given to infants aged between 9 to 18 months, Bacillus Callmette Guerin (BCG) is given to infants at birth and Pertussis, Diphtheria, Tetanus, Hepatitis B and Hemophilia's Influenza Type B (PENTA 3) is given to infant at 14 weeks of age. 1,067 under five children were assessed for their immunization history. These results are presented in the table 27 below

Table 27: Immunization coverages for BCG, Measles, PENTA 3 and Polio vaccines among children under five

Indicator	Class	Frequency	Results
Measles (children aged 9-59 months) (N= 930)	Yes by card	110	11.8%
	Yes by recall	660	71.0%
	Both by card and recall	**770**	**82.8%**
	No	157	16.9%
	Don't know	3	0.3%
Polio (children aged 0-59 months) (N= 1,067)	Yes by cards	121	11.3%
	Yes by recall	831	77.9%
	Both by card and recall	**852**	**89.2%**
	No	113	10.6%
	Don't know	2	0.2%
PENTA 3 (children aged 4-59 months) (N=1,027)	Yes by cards	130	12.7%
	Yes by recall	733	71.4%
	Both by card and recall	**863**	**84.0%**
	No	161	15.7%
	Don't know	3	0.3%
BCG scar (children aged 0-59 months) (N=1,067)	Yes by scar	915	85.8%
	No	152	14.2%

6.6.3 Vitamin A Supplementation for children

Provision of Vitamin A supplementation among children 6-59 months every 6 months can help protect a child from mortality and morbidity associated with Vitamin A deficiency and is documented as being one of

the most cost-effective approaches to improve child health. The coverage of Vitamin A supplementation in the last 6 months is presented in the table below.

Table 28: Vitamin A supplementation among children 6-59 months

Indicator	Class	Frequency	Results
Vitamin A supplementation 6-59 months (N= 993)	**Yes**	828	83.4%
	No	162	16.3%
	Don't know	3	0.3%

6.6.4 Deworming of children aged 24-59 months

Helminths or intestinal worms represent a serious public health problem in areas where climate is tropical, sanitation inadequate and unhygienic. Helminths cause significant malabsorption of vitamin A and aggravate malnutrition and anemia, which eventually contributes to retarded growth and poor cognitive development. Children under five years old are extremely vulnerable to the deficiencies induced by parasitic infections. This means deworming is critical for the reduction of child morbidity and mortality. The proportion of children who received deworming the past 6 months is presented in table 29.

Table 29: Deworming among children 24-59 months

Indicator	Class	Frequency	Results
Deworming (24-59 months children) (N=636)	**Yes**	432	67.9%
	No	203	31.9%
	Don't know	1	0.2%

6.7 Infant and Young Child Feeding (IYCF) Practices

Indicators for infant and young child feeding (IYCF) practices were also included in the survey for all children 0-23 months old. A total of 431 children under two years were included in the sample. The results are presented in percentage of the total answers available.

Table 30: Infant and Young Child Feeding (IYCF) Practices (children 0-23 months)

IYCF indicators	Definition	Frequency	Results
Children ever breastfed (N=431)	Proportion of children 0-23 months who have ever received breast milk.	426	98.8%

Timely initiation of breastfeeding (N=431)	Proportion of children 0-23 months who were put to the breast within one hour of birth.	409	94.9%
Provision of colostrum within first 3 days of delivery (N=431)	Proportion of children 0-23 months who received colostrum (yellowish liquid milk) within the first 3 days after birth.	411	95.4%
Continued breastfeeding at one year (N=89)	Proportion of children 12–15 months of age who fed breast milk.	84	94.4%
Continued breastfeeding at two years (N=33)	Proportional of children 20-23 months of age who fed breast milk.	27	81.8%
Exclusive breastfeeding for children <6 months (N=74)	Proportion of infants 0–5 months of age who fed exclusively with breast milk.	46	62.2%
Introduction of solid, semi solid or soft foods (N=63)	Proportion of infants 6–8 months of age who receive solid, semi-solid or soft foods.	26	41.3%

6.8 WASH

6.8.1 Water Availability and Consumption

634 households and 4,896 individuals (2,451 male and 2,445 female) were surveyed on water consumption practices. Figure 4 and 5 shows the total amount of water consumption in liters per households and per individual.

Analysis excluded the water used by animals. Data were displayed according to the proportion of liters used. The results were then divided in quantity of water in liters available to each household's member per day and liters to each person per day.

According to national standards, an average consumption of 25L water/person/day is recommended.

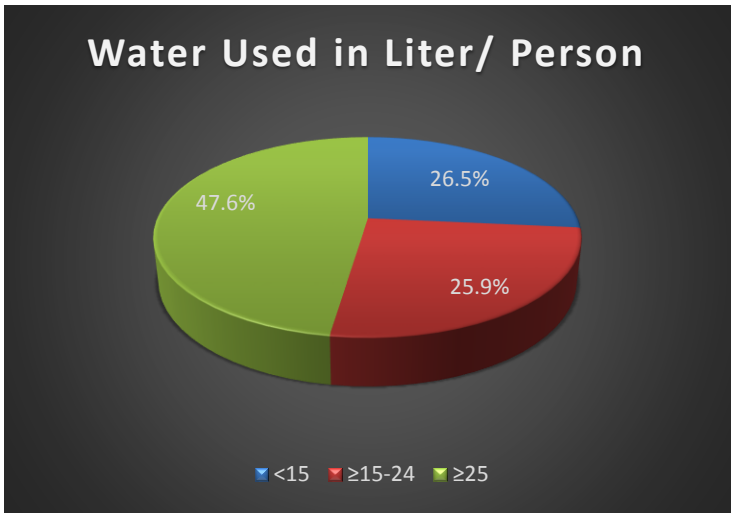


Figure 1: Percentage of water usage in liter/ person/day

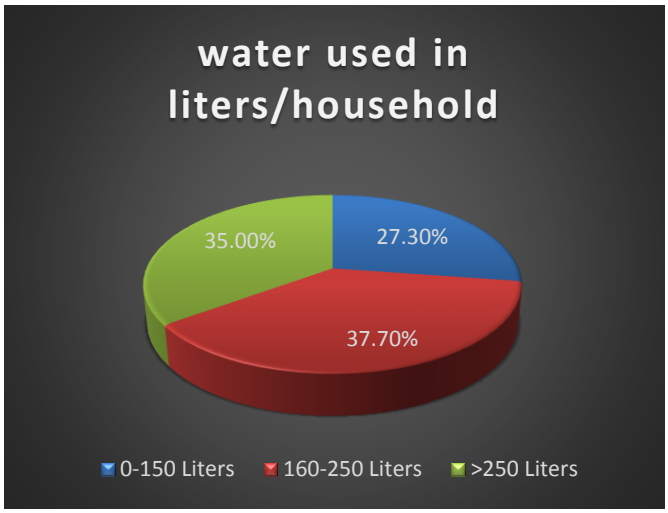
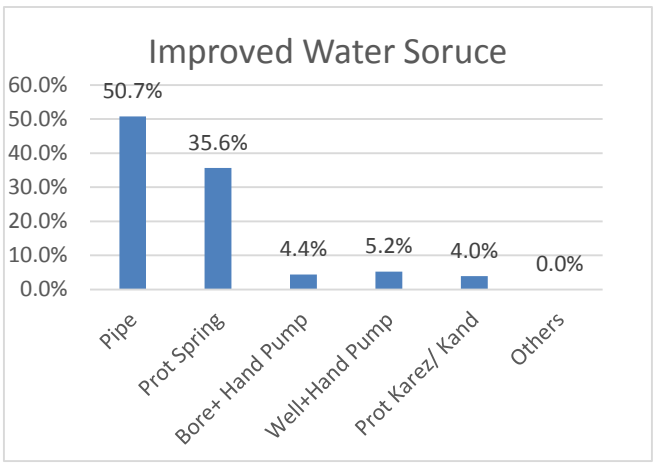


Figure 1: Percentage of HH water usage in liter/day



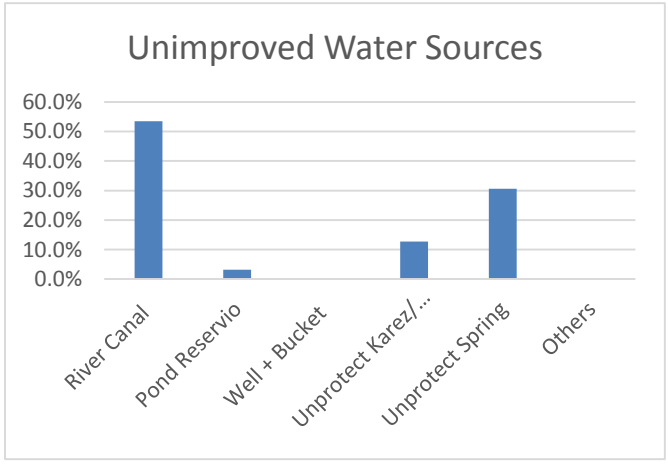


Figure 4: HH level daily improved and unimproved water sources

Among HHs surveyed 236 (37.2%) used a water treatment methods to improve the quality of their drinking water. The most common method of water treatment was boiling. The remaining 398 (62.8%) households relied on a simple stand and settle method, which allowed the sedimentation in the water to settle the bottom of the container. See table 31 below.

Table 30: Percentage of households with practice of different water treatment methods

Water treatment methods (N=634)	Frequency	Result (%)

Boiling	225	35.5%
Chlorine	6	0.9%
Straining through a cloth	3	0.5%
Water filter	2	0.3%

6.8.3 Caregiver's Hand washing practice

Hand washing practices were also included in the survey. This information was largely knowledge/recall based, there is no practical verification process to know if caregivers actually practiced hand washing at all critical points. Appropriate hand washing is a general measure that contributes to the prevention and control of communicable diseases. 64.3% of caregivers reported washing their hands at the five critical points (see table 31).

Table 31: Hand-washing practices by the caregivers

Hand washing practices by mothers/caretakers (N=697)	Frequency	Results (%)
Only clean with water	214	30.7%
Soap/ash with clean water	481	69.0%
Washes both hands	532	76.3%
Rubs hands together at least 3 times	241	34.6%
Dries hands hygienically by air-drying or using a clean cloth	230	33.0%

Table 32: Hand washing practice by mothers/caretakers at critical time

Response (n=697)	Frequency	Results
Washes hands at all 5 critical moments	448	64.3%
After defecation	660	94.7%
After cleaning baby's bottom	600	86.1%
Before food preparation	614	88.1%
Before eating	639	91.7%
Before feeding children (including breastfeeding)	499	71.6%

6.9 Household Food Security and Livelihoods (FSL)

6.9.1 Food Consumption Scores and Food Based Coping Strategies

Food security exists when all people, at all times have physical, social and economic access to sufficient, safe and nutritious food for a healthy and active life. In this survey, the *Food Consumption Score* (FCS)[5] was used to describe the current short-term household food security situation. The score was triangulated with the food-based or *reduced Coping Strategy Index* (rCSI)[6] to provide an indication of the food security status of the household. The triangulation of these two food security proxy indicators allows for capturing the interaction between household food consumption and coping strategies adopted, and hence, more properly reflects the food security situation in Badakhshan province.

Classification for food security: households having poor food consumption with high or medium coping strategies and those with borderline food consumption but with high coping are considered as ***severely food insecure (in red in the table below)***. Households having poor food consumption with low coping strategies, households having borderline food consumption with medium coping strategies and those having acceptable consumption but with high coping strategies are considered as ***moderately food insecure (in yellow in the table below).*** Households having borderline or acceptable food consumption with low or medium coping are considered as Food Security ***(in green in the Tabl*** 6.9.2 ***)***[7]**.**

Food consumption groups (based on FCS)	Coping group (based on CSI)		
	High coping	Medium coping	No or low coping
Poor	Severely food insecure	Severely food insecure	Moderately food insecure
Border line	Severely food insecure	Moderately food insecure	Food secure

[5] The Food Consumption Score (FCS) is an acceptable proxy indicator to measure caloric intake and diet quality at household level, giving an indication of food security status of the household if combined with other household access indicators. It is a composite score based on dietary diversity, food frequency, and relative nutritional importance of different food groups. The FCS is calculated based on the past 7-day food consumption recall for the household and classified into three categories: poor consumption (FCS = 1.0 to 28); borderline (FCS = 28.1 to 42); and acceptable consumption (FCS = >42.0). The FCS is a weighted sum of food groups. The score for each food group is calculated by multiplying the number of days the commodity was consumed and its relative weight.

[6] The reduced Coping Strategy Index (rCSI) is often used as a proxy indicator of household food insecurity. Households were asked about how often they used a set of five short-term food based coping strategies in situations in which they did not have enough food, or money to buy food, during the one-week period prior to interview. The information is combined into the rCSI which is a score assigned to a household that represents the frequency and severity of coping strategies employed. First, each of the five strategies is assigned a standard weight based on its severity. These weights are: Relying on less preferred and less expensive foods (=1.0); Limiting portion size at meal times (=1.0); Reducing the number of meals eaten in a day (=1.0); Borrow food or rely on help from relatives or friends (=2.0); Restricting consumption by adults for small children to eat (=3.0). Household CSI scores are then determined by multiplying the number of days in the past week each strategy was employed by its corresponding severity weight, and then summing together the totals. The total rCSI score is the basis to determine and classify the level of coping: into three categories: No or low coping (rCSI= 0-9), medium coping (rCSI = 10-17), high coping (r ≥18).

[7] Adopted from WFP (Kabul Informal Settlement (KIS) Winter Needs Assessment FINAL REPORT ON FOOD SECURITY, December 8th, 2015)

Acceptable	Moderately food insecure	Food secure	Food secure

6.9.2 Food security situation

Based on triangulation of the FSC with the food-based rCSI, the survey findings shows that 21.6% households had moderate and severe food insecurity for more details see figure 7.

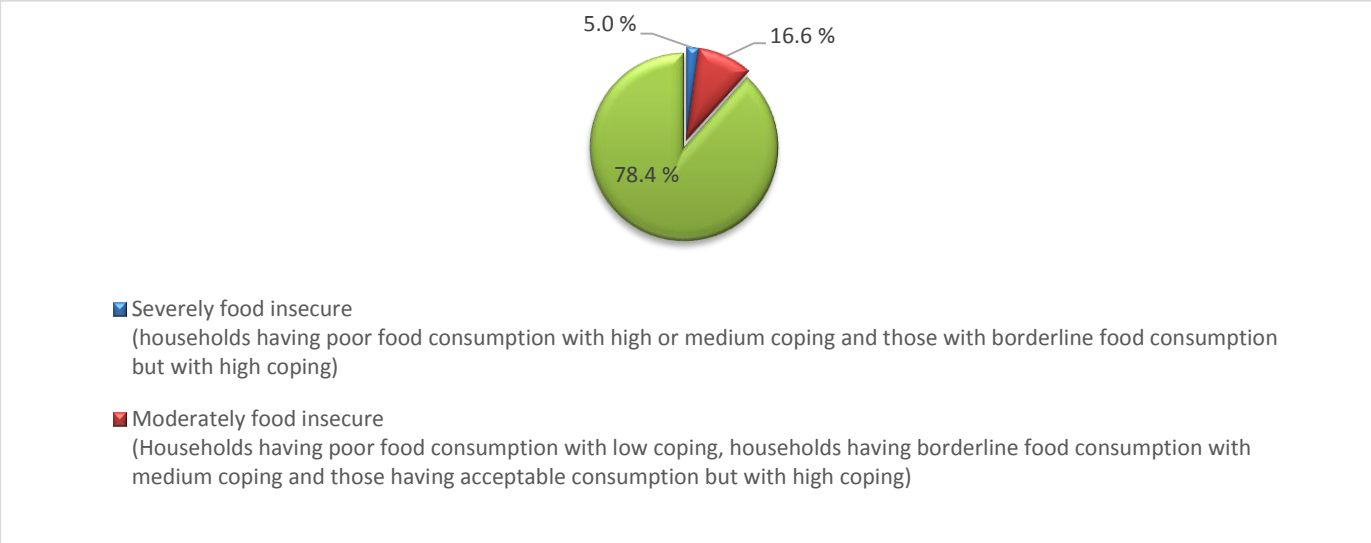
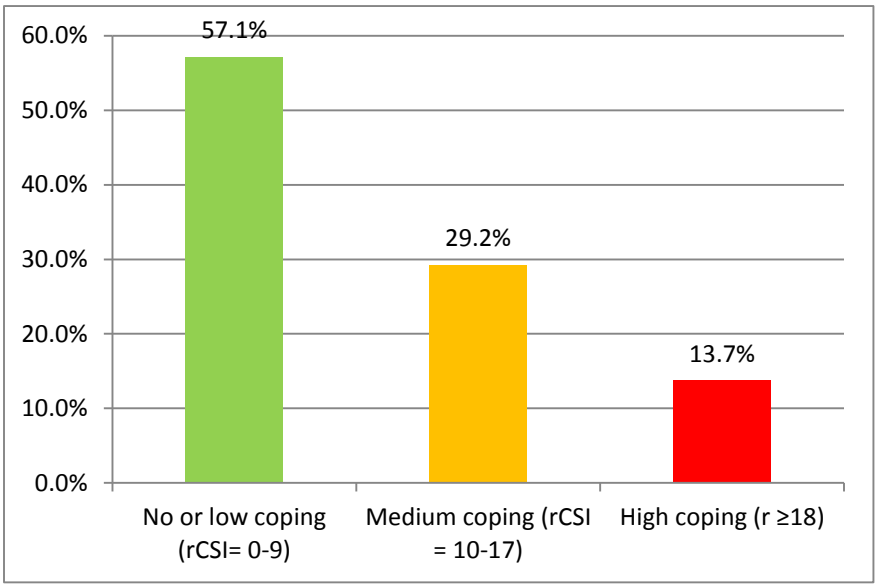


Figure 5: Food security situation (Based on FCS & rSCI)

6.9.3 Reduced Coping Strategy Index[8]

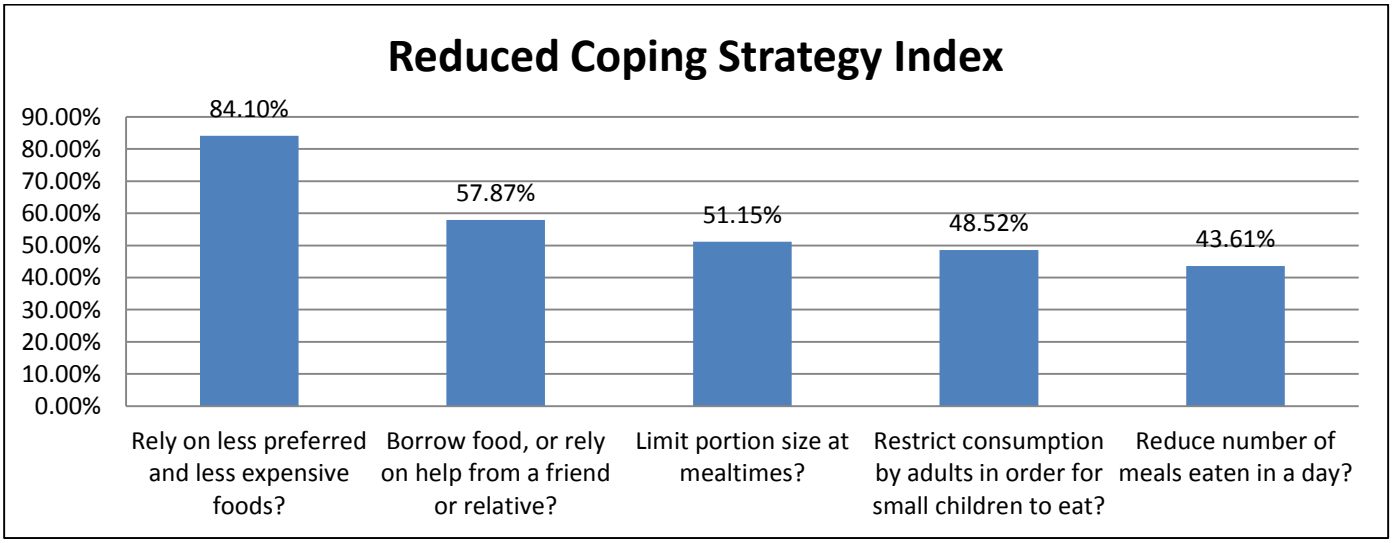
The Food Based Coping Strategy Index is based on measures of the frequency of use of food deprivation, such as the recourse to cheaper food, reductions of the quantity of meals, the act of borrowing food, as well as alterations in food distribution within the household to favor children. Each strategy is weighted as per its severity with borrowing food and altering the distribution of food within the household regarded as the most severe strategies. Categories are then defined based upon these scores varying from low coping (0-9) to medium coping (10-17) and high coping (>18).



13.7% of HHs with a high level of coping (rCSI ≥18 score).

29.2% of HHs with a medium level of coping (rCSI= 10-17 score).

57.1 % of HHs with No or Low-level coping (rCSI=0-9 score).



[8] Adopted from WFP *(Kabul Informal Settlement (KIS) Winter Needs Assessment FINAL REPORT ON FOOD SECURITY, December 8th, 2015)*

6.9.4 Food Consumption Score:

Food Consumption Scores are the sum of the frequency of consumption (in the 7 days prior to the interview) of each type of food item (cereal, pulses, vegetables, meat fish and eggs, dairies, oil and sugar) weighted by their nutritional value (proteins are weighted 4, cereals 2, pulses 3, and vegetables and fruits 1, while sugar is weighted 0.5). Households are then grouped into "Poor" food consumption (1.0-28), "Borderline" (28.01–42) and acceptable (>42). Food consumption groups are a proxy of food consumption and reflect both the frequency and quality of food consumption.

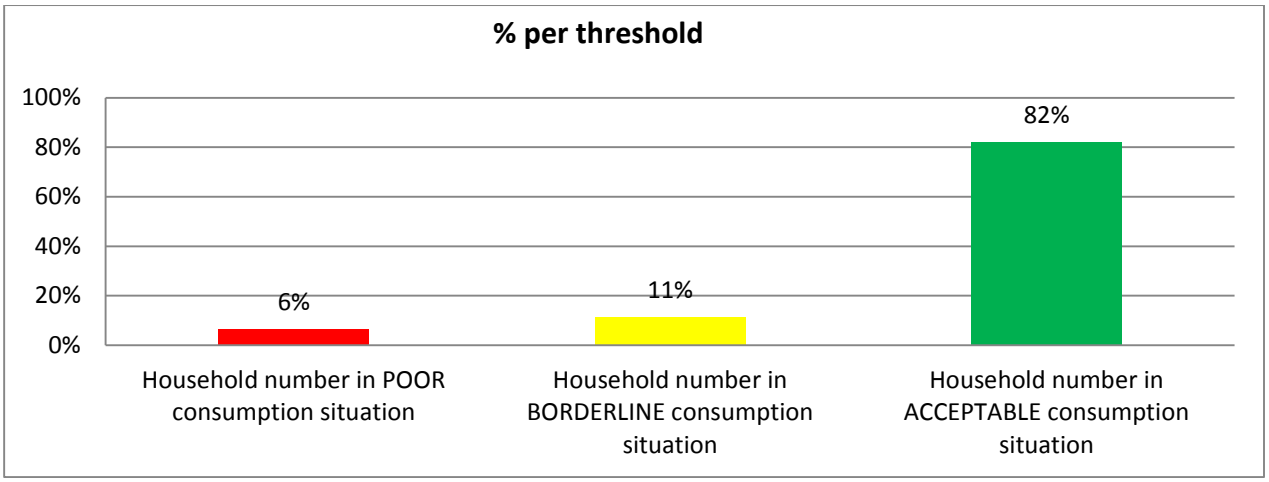


Figure 6: Food Consumption score per HH

6% households surveyed have Poor consumption scores (FCS = 1.0 to 28).

11% households surveyed have Borderline consumption scores (FCS = 28.1 to 42).

82% households surveyed have acceptable food consumption scores (FCS >42.0).

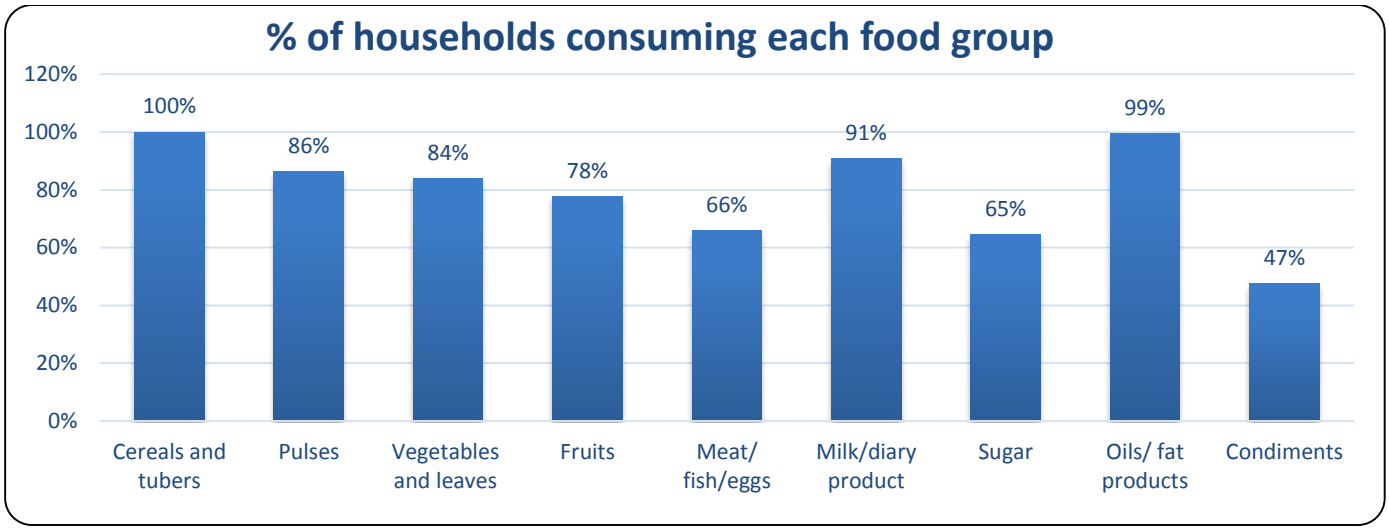


Figure 7: Households consuming different food items/group

6.9.5 Food stock

The table below shows the HHs percentages with duration of food stock in HHs where a staggering 19.2% households responded that there is no food stock in the house.

Table 33: Status of food stock in the household

Status, N=634 Respondents	N	Results (%)
No food stock in the households	122	19.2%
Less than a week food stock in household	91	14.4%
Food stock in household from 1-3 weeks	207	32.6%
Stock food in household up to 3 months	86	13.6%
Stock food in household for more than 3 months	128	20.2%

6.9.6 Food main sources

The survey finding shows that most of the food that households used in the last 7 days prior to the survey was obtained using cash, see table 35 for more details.

Table 34: Food main sources that the households consumed

	Own production	Cash	Credit	Battering	Gift/ charity	Wild food	Food Aid	Total
Cereals and tubers	374	234	15	5	4	2	0	**634**
Pulses/ Nuts	169	346	14	9	8	1	0	**547**
Vegetables and leaves	309	200	10	2	7	0	2	**530**
Fruits	219	265	6	1	2	0	0	**493**
Meat/ fish/eggs	42	361	11	3	2	0	0	**419**
Milk/diary product	428	104	16	11	7	3	5	**574**
Sugar / Honey	27	349	12	2	4	12	2	**408**
Oils/ fat products	69	507	31	2	8	5	9	**631**
Condiments	152	127	6	4	1	3	6	**299**

7. CONCLUSION

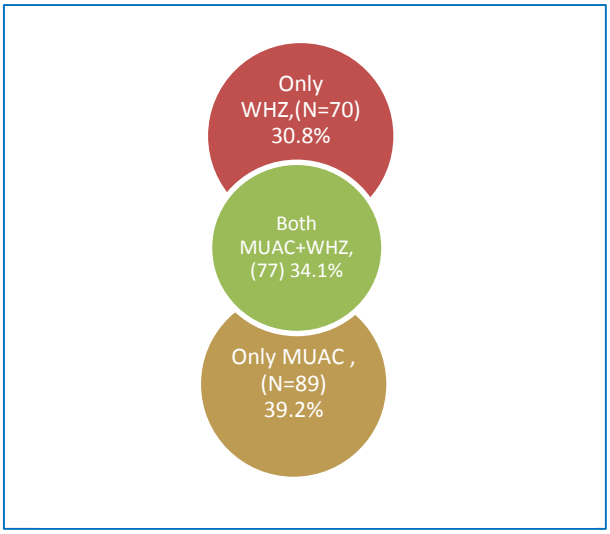
7.1. Undernutrition

Results of this survey are not a reflection of national nutrition situation but are representative of only for the Province of Badakhshan. The results of the survey shows a prevalence of GAM of **12.6% (10.3-15.5 95% CI)** and for severe acute malnutrition (SAM) of **3.0% (2.0- 4.4 95% CI)** based on WHZ. This level of severity per WHZ was classified as a 'serious' nutrition situation in the province according to the WHO severity classification[9]. The 3.0% SAM prevalence by WHZ cut off has been established by MoPH, nutrtion cluster and AIM-WG as the threshold after which a response should be prioritized for the Afghanistan context.. According to the 2013 NNS survey, the GAM and SAM prevalence were **9.3% (6.78-12.76 95 % CI)**, and **3.2 % (2.02- 5.06 95%CI)** respectively, in the province based on WHZ. It is also important to note that this SMART survey was conducted by CAF with technical support from ACF in August 2018 (covering 23 districts out of 28) the results may therefore not be representative of the entire province.

The GAM prevalence based on MUAC was **16.9% (14.0-20.2 95% CI)** and SAM is **5.1% (3.7- 7.1 95% CI)**, which was slightly higher than WHZ based GAM.

[9] WHO acute malnutrition classification : <5% acceptable, 5-9% poor, 10-14% serious, >15% critical (without aggravating factors)

The combined MUAC and WHZ prevalence revealed GAM and SAM prevalence was **20.7% (17.6-24.1 95 % CI)** and **6.1% (4.5- 8.2 95% CI)** respectively. According to this combined GAM and SAM prevalence, the nutritional situation is very critical in the province. The combined rate informs the estimated SAM and MAM caseload in the province for better programming. All the children in the sample detected as acutely malnourished (either by MUAC or WHZ or Oedema) are reflected in this calculation according to combined criteria. To detect all acutely malnourished children eligible for treatment, the MUAC only detection is not enough according to Afghanistan IMAM Guidelines.



This should be further investigated. See figure 11 in the actual acute malnutrition comparing WHZ <-2 Z-score with MUAC <125 mm and there is slightly difference respectively.

Children under two years age had a higher prevalence of GAM as indicated by WHZ as well as MUAC, **[WHZ based 29.5%** (24.1-35.6, 95% CI) and **MUAC based 37.5%** (31.2-44.3 95% CI)] compared to children over 2 years **[WHZ based: 3.8% (2.6-5.5** 95% CI) and **MUAC based 5.3%** (3.9-7.2 95% CI)]. This suggests higher vulnerability of wasting among younger children.

Chronic malnutrition in the province continues to be worrying. The results of the present survey clearly showed that, based on WHO classification of severity of Malnutrition, the overall prevalence of stunting is very high **45.5% (41.2-49.8 95% CI) it means out of 9906**-59 months children 450 children were stunted, **o**ne in every two children. For further analysis the figure below has shown **24.4 %** children suffering from wasting by both criteria are **also stunted** in the province.
One in every three children was underweight **24.5% (21.3-28.0 95% CI)**

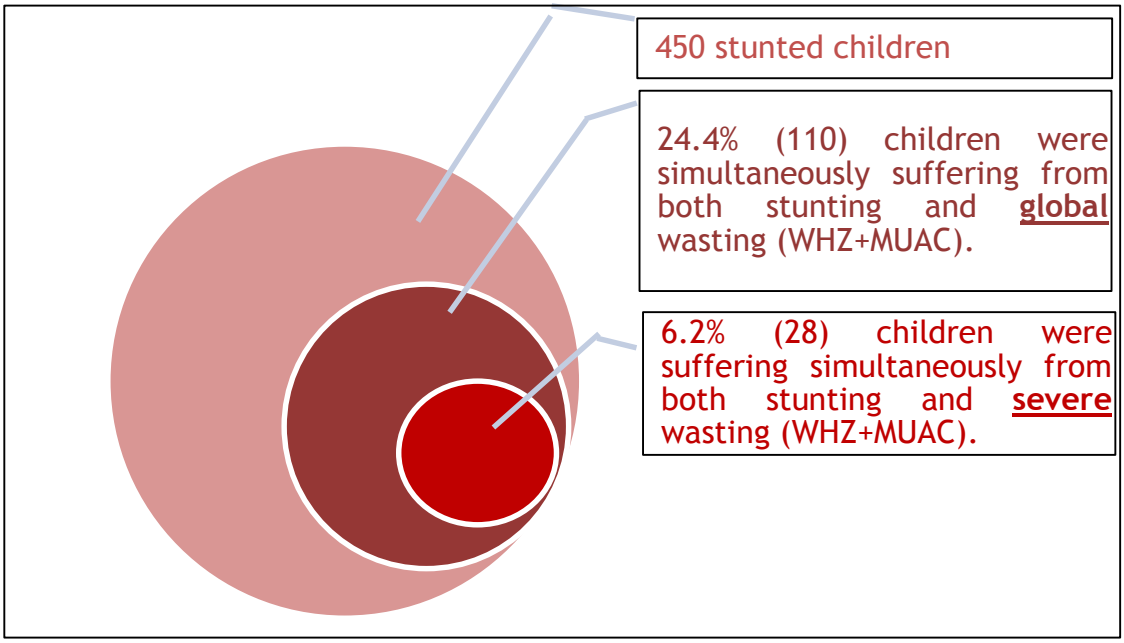


Figure 9: shows global and severe wasting among stunted children

7.2 Mortality rates

The CDR and U5DR were below the WHO emergency threshold[10]. However, Badakhshan province has been found to have a quite high CDR (0.65 death/10,000/Day) and U5DR (0.27 death/10,000/Day). Even though it is under the WHO defined emergency thresholds for mortality, this requires some close monitoring and follow-up.

7.3 Maternal nutritional status

There are no commonly accepted standards for maternal malnutrition status based on MUAC cut-offs. For this survey, the MUAC cutoff of 230 mm is used to approximately identify their status. This survey shows that **23.8%** (14.4-33.1 95% CI) of PLWs suffered from malnutrition based on MUAC<230mm.

The main concern was iron supplementation among pregnant women, which the survey found to be low **(45.0%)**. Institutional delivery was also found to be low (44.9%). This is of concern because iron supplementation prevents anemia during pregnancy and eventual life-threatening complications during pregnancy and delivery. Therefore, it decreases maternal mortality, prenatal and perinatal infant loss and prematurity. This can also be directly related to child stunting in the first two years of life.

[10] emergency threshold

7.4 Child Health and Immunization

The UNICEF conceptual framework of malnutrition can be used to explain the probable causes of under-nutrition in this area. Diseases weaken the individual immune system, increase nutritional needs and in the same time may be a reason of reduced food intake and absorption (diarrhea), engaging the body in a vicious cycle of malnutrition. In the Badakhshan province, more than half of the sampled children **(69.7 %)** had suffered from one or another form of illness symptoms such as diarrhea **(51.1%)**, fever (**47.1%)** or acute respiratory **(22.4%)** in the 2 weeks prior the survey, suggesting quite a high disease burden of basic treatable diseases.

It is important to note that a child's developing immune system also contributes increased malnutrition, morbidity and mortality. The survey results showed a BCG vaccination coverage of **85.8%**, a measles vaccination coverage both by recall and by card confirmation of **82.8%, and a** polio vaccination coverage of **89.2%.** Overall this coverage was quite good. The only concern was for **PENTA 3** vaccination coverage (78.7**%)** which fell below the national target 90% and can be considered low. Low immunization coverages contribute to increase morbidity and mortality, particularly among children under five.

Parasitic infection among children causes malabsorption, which can aggravate malnutrition and anemia rates and contribute to retarded growth, child morbidity and mortality. Deworming is recommended for children from 24- 59 months of age as children in this age group are considered as a potential risk of acquiring helminths. Deworming also helps to enhance the iron status of children, which eventually helps children exercise to the best their intellectual ability. The proportion of all children aged 24-59 months who had received deworming in the last 6 month prior to the survey was low (**67.9 %),**

8. RECOMMENDATIONS

Undernutrition

- AIM-WG, PND and the Nutrition Cluster should immediately organize a meeting with CAF, Unicef, MoPH, WFP and other actors responsible for the nutrition programmes in Badakhshan province to develop a timely plan/intervention to tackle the very high rates of undernutrition.
- Provide sensitization sessions about prevention, malnutrition treatments as well as consequences of malnutrition to Health Shura as they were found to be very influential in the community.
- Motivate and effectively mobilize CHWs to strengthen active case findings through regular monthly planning in the community level.
- Support relevant aspects of availability, access as well as the utilization of nutritious and diverse foods through integrated programming.
- Integrate multi-sectorial health, nutrition, WASH and FSL intervention in the province to fight both acute and chronic malnutrition.
- Ensure regular supervision and monitoring of the current IMAM program by the PNO and other provincial level nutrition managers to closely observe the situation and provide necessary support to the field team.
- Conduct a SMART survey one year later (Aug 2019) to continue closely monitoring of the nutrition situation.

Child health and immunization

- Expand nutrition services along with IMCI and MCH services by using mobile health teams in the uncovered areas for SAM and MAM children and PLWs.
- Support women and their families to practice optimal breastfeeding and ensure timely and adequate complementary feeding through provision of IYCF programs at facility and community levels.
- Advocate for an integrated approach within the health system to ensure monitoring of chronic malnutrition, growth monitoring and promotion, at the health facility and primarily community level.
- Sensitize the community on the importance of micronutrient supplementation and immunization for children and pregnant women.

- To Scale up soft and hard WASH interventions, strengthening awareness on water treatment. In additional, rehabilitation or constructions of protected water sources and provision of water filters to affected community for safe drinking water.
- Establish water source management committees.
- Increase hygiene awareness in the community level to improve handwashing practices. The awareness needs to include personal, environmental and menstrual hygiene messages.
- Improve awareness among EPI and other health workers to correctly write the day of births on the vaccination cards or any other document used by surveys.

9. ANNEXES

Annex 1: Badakhshan province Map

Annex 2: selected Clusters in the Badakhshan province

Province_Name	Distract Name	Geographical unit	Population size	Cluster
Badakhshan	Yawan	بریاوان	560	1
Badakhshan	Yawan	ساری	1155	2
Badakhshan	Yawan	دشت سنگ سبز	644	3
Badakhshan	Yawan	شلمند اشول	532	4
Badakhshan	Raghistan	کولعل رباط	840	5
Badakhshan	Teshkan	نواباد غلاوک	392	6
Badakhshan	Teshkan	المچ	910	7
Badakhshan	Faizabad	دو آبه	539	8
Badakhshan	Faizabad	میر شکاران	560	RC
Badakhshan	Faizabad	مسجید فیض آباد	770	9

Badakhshan	Shahr e Buzorg	دیگریز ها	1260	10
Badakhshan	Shahr e Buzorg	کره علیا	1330	RC
Badakhshan	Shahr e Buzorg	لاغیر	1050	11
Badakhshan	Shahr e Buzorg	گردنی ریگ	665	12
Badakhshan	Shahr e Buzorg	شخ آب پر	945	13
Badakhshan	Shahr e Buzorg	اسپخوا	1911	14
Badakhshan	Argo	کاکان بالا	1134	15
Badakhshan	Argo	نوآباد حا فیظ معل	385	16
Badakhshan	Argo	آب باریک	2016	17
Badakhshan	Argo	بخت شا ه	1120	18
Badakhshan	Argo	پشگاه	119	19
Badakhshan	Argo	ارغند	5670	20
Badakhshan	Argo	حوضی	1260	21
Badakhshan	Yaftali Payean	سرون ها	1715	22
Badakhshan	Yaftali Payean	قرچه بالا و پابن	602	23
Badakhshan	Yaftali Payean	شیر کش	595	24
Badakhshan	Yaftali Payean	کشگاه	1680	25
Badakhshan	Khahan	باریکی	224	26
Badakhshan	Arghanjkah	دهن آب	350	27
Badakhshan	Tagab	زک آب	210	28
Badakhshan	Tagab	عا چل بالا	630	29
Badakhshan	Tagab	کرستی	4200	30
Badakhshan	Kesheem	پشت ده	490	RC
Badakhshan	Kesheem	میان شهر	2450	31
Badakhshan	Kesheem	تیغه مابین	280	32
Badakhshan	Kesheem	چهل کزی	595	33
Badakhshan	Kesheem	سیا ه قشلاق	3521	RC
Badakhshan	Kesheem	فرجعانی های غربی	1574	34
Badakhshan	Kesheem	نوآباد وخشی	1491	35
Badakhshan	Kesheem	نماز گاه	4634	36
Badakhshan	Darim	قوت علـــی	350	37
Badakhshan	Darim	نوآباد قرلق	840	38
Badakhshan	Darim	حاجی پهلوان	1393	39
Badakhshan	Darim	ترگنی پاین	686	40
Badakhshan	Juram	سنگلاخ	1183	41
Badakhshan	Shuhada	سراسک	420	42
Badakhshan	Shuhada	دشت محمدرازق	98	43
Badakhshan	Khash	شهران	5915	RC
Badakhshan	Khash	بقلک	1309	44
Badakhshan	Baharak	بینی جر	385	45
Badakhshan	Baharak	گل باغ	595	46
Badakhshan	Baharak	مسجد شمس الد ین	186	47

Badakhshan	Baharak	اهل مغل	731	48
Badakhshan	Wardooj	ایستین	251	49
Badakhshan	Ishkashem	صیاد	421	50
Badakhshan	Ishkashem	قاضده	98	RC
Badakhshan	Wakhan	کیبکوت	713	51

Annex 3: Plausibility check for Badakhshan_SMART_Assessment_August_2018.as

Standard/Reference used for z-score calculation: WHO standards 2006

(If it is not mentioned, flagged data is included in the evaluation. Some parts of this plausibility report are more for advanced users and can be skipped for a standard evaluation)

Overall data quality

Criteria	Flags*	Unit	Excel.	Good	Accept	Problematic	**Score**
Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-7.5	>7.5	
(% of out of range subjects)			0	5	10	20	**0** (1.2 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**0** (p=0.727)
Age ratio(6-29 vs 30-59)	Incl	p	>0.1	>0.05	>0.001	<=0.001	
(Significant chi square)			0	2	4	10	**4** (p=0.037)
Dig pref score - weight	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (3)
Dig pref score - height	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (5)
Dig pref score - MUAC	Incl	#	0-7	8-12	13-20	> 20	
			0	2	4	10	**0** (3)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>=1.20	
.			and	and	and	or	
.	Excl	SD	>0.9	>0.85	>0.80	<=0.80	
			0	5	10	20	**5** (1.13)
Skewness WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**1** (-0.26)
Kurtosis WHZ	Excl	#	<±0.2	<±0.4	<±0.6	>=±0.6	
			0	1	3	5	**1** (-0.29)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<=0.001	
			0	1	3	5	**0** (p=0.068)
OVERALL SCORE WHZ =			0-9	10-14	15-24	>25	**11** %

The overall score of this survey is 11 %, this is good.

There were no duplicate entries detected.

Percentage of children with no exact birthday: 85 %

Anthropometric Indices likely to be in error (-3 to 3 for WHZ, -3 to 3 for HAZ, -3 to 3 for WAZ, from observed mean - chosen in Options panel - these values will be flagged and should be excluded

from analysis for a nutrition survey in emergencies. For other surveys this might not be the best

procedure e.g. when the percentage of overweight children has to be calculated):

Line=73/ID=73: **WHZ (-3.926)**, WAZ (-4.491), Weight may be incorrect

Line=98/ID=98: **WHZ (-3.842)**, HAZ (1.171), Height may be incorrect

Line=147/ID=147: HAZ (2.461), Height may be incorrect

Line=224/ID=224: **WHZ (-5.121)**, Weight may be incorrect

Line=229/ID=229: **WHZ (-4.105)**, Weight may be incorrect

Line=420/ID=420: **WHZ (2.467)**, Weight may be incorrect

Line=454/ID=454: **WHZ (-4.238)**, Height may be incorrect

Line=549/ID=549: **WHZ (-3.760)**, Weight may be incorrect

Line=727/ID=727: **WHZ (2.792)**, Weight may be incorrect

Line=855/ID=855: **WHZ (-3.875)**, Weight may be incorrect

Line=876/ID=876: **WHZ (2.475)**, Height may be incorrect

Line=889/ID=889: **WHZ (2.500)**, Weight may be incorrect

Line=891/ID=891: HAZ (1.389), Height may be incorrect

Line=918/ID=918: WAZ (-4.494), Weight may be incorrect

Line=959/ID=959: **WHZ (-4.117)**, Weight may be incorrect

Percentage of values flagged with SMART flags:WHZ: 1.2 %, HAZ: 0.3 %, WAZ: 0.2 %

Age distribution:

Month 6 : ######################

Month 7 : ####################

Month 8 : ######################

Month 9 : ################################

Month 10 : ###############

Month 11 : ###############

Month 12 : ########################

Month 13 : ############

Month 14 : ########################

Month 15 : ##########################

Month 16 : ################

Month 17 : ########################

Month 18 : ##

Month 19 : ################

Month 20 : ##############

Month 21 : #####
Month 22 : ##########
Month 23 : ####
Month 24 : ##
Month 25 : ##########################
Month 26 : ###############
Month 27 : ############
Month 28 : ###############
Month 29 : ###############
Month 30 : ############################
Month 31 : #######
Month 32 : ##################
Month 33 : #######
Month 34 : ##################
Month 35 : ######
Month 36 : ##
Month 37 : ####################
Month 38 : ############################
Month 39 : ################
Month 40 : ##################
Month 41 : ##########
Month 42 : ########
Month 43 : ##########
Month 44 : ##########
Month 45 : ############
Month 46 : #######
Month 47 : ########
Month 48 : ##
Month 49 : ############
Month 50 : ###############
Month 51 : #######
Month 52 : #######
Month 53 : ##############

Month 54 : ##############

Month 55 : #######

Month 56 : ####################

Month 57 : ##################

Month 58 : ####################

Month 59 : ####################

Age ratio of 6-29 months to 30-59 months: 0.97 (The value should be around 0.85).:

p-value = 0.037 (significant difference)

Statistical evaluation of sex and age ratios (using Chi squared statistic):

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	134/116.5 (1.2)	123/113.9 (1.1)	257/230.4 (1.1)	1.09
18 to 29	12	118/113.6 (1.0)	114/111.1 (1.0)	232/224.6 (1.0)	1.04
30 to 41	12	114/110.1 (1.0)	116/107.7 (1.1)	230/217.7 (1.1)	0.98
42 to 53	12	84/108.3 (0.8)	89/105.9 (0.8)	173/214.3 (0.8)	0.94
54 to 59	6	52/53.6 (1.0)	49/52.4 (0.9)	101/106.0 (1.0)	1.06
6 to 59	54	502/496.5 (1.0)	491/496.5 (1.0)		1.02

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.727 (boys and girls equally represented)

Overall age distribution: p-value = 0.016 (significant difference)

Overall age distribution for boys: p-value = 0.076 (as expected)

Overall age distribution for girls: p-value = 0.357 (as expected)

Overall sex/age distribution: p-value = 0.011 (significant difference)

Digit preference Weight:

Digit .0 : ######################################

Digit .1 : ##

Digit .2 : ##

Digit .3 : ##

Digit .4 : ##

Digit .5 : ##

Digit .6 : ##

Digit .7 : ##

Digit .8 : ##

Digit .9 : ##

Digit preference score: **3** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.394

Digit preference Height:

Digit .0 : ##

Digit .1 : ##

Digit .2 : ##

Digit .3 : ##

Digit .4 : ##

Digit .5 : ##

Digit .6 : ##

Digit .7 : ######################################

Digit .8 : ##

Digit .9 : ##

Digit preference score: **5** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.002 (significant difference)

Digit preference MUAC:

Digit .0 : ##

Digit .1 : ##

Digit .2 : ##

Digit .3 : ##

Digit .4 : ##

Digit .5 : ##

Digit .6 : ##

Digit .7 : ##

Digit .8 : ##

Digit .9 : ##

Digit preference score: **3** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

p-value for chi2: 0.504

Evaluation of Standard deviation, Normal distribution, Skewness and Kurtosis using the 3 exclusion

(Flag) procedures

.	no exclusion	exclusion from reference mean (WHO flags)	exclusion from observed mean (SMART flags)
WHZ			
Standard Deviation SD:	1.18	1.17	1.13
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	13.3%	13.2%	12.6%
calculated with current SD:	12.4%	12.2%	11.1%
calculated with a SD of 1:	8.6%	8.6%	8.4%
HAZ			
Standard Deviation SD:	1.03	1.03	1.02
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:	45.3%	45.3%	45.5%
calculated with current SD:	45.0%	45.0%	45.4%
calculated with a SD of 1:	44.9%	44.9%	45.3%
WAZ			
Standard Deviation SD:	0.90	0.90	0.89
(The SD should be between 0.8 and 1.2)			
Prevalence (< -2)			
observed:			
calculated with current SD:			
calculated with a SD of 1:			
Results for Shapiro-Wilk test for normally (Gaussian) distributed data:			
WHZ	p= 0.000	p= 0.000	p= 0.000
HAZ	p= 0.005	p= 0.005	p= 0.004
WAZ	p= 0.000	p= 0.000	p= 0.000
(If p < 0.05 then the data are not normally distributed. If p > 0.05 you can consider the data normally distributed)			
Skewness			
WHZ	-0.33	-0.29	-0.26
HAZ	0.12	0.12	0.01
WAZ	-0.54	-0.54	-0.50
If the value is:			
-below minus 0.4 there is a relative excess of wasted/stunted/underweight subjects in the sample			
-between minus 0.4 and minus 0.2, there may be a relative excess of wasted/stunted/underweight subjects in			

the sample.

-between minus 0.2 and plus 0.2, the distribution can be considered as symmetrical.

-between 0.2 and 0.4, there may be an excess of obese/tall/overweight subjects in the sample.

-above 0.4, there is an excess of obese/tall/overweight subjects in the sample

Kurtosis

WHZ	0.09	-0.03	-0.29
HAZ	-0.18	-0.18	-0.49
WAZ	0.17	0.17	0.06

Kurtosis characterizes the relative size of the body versus the tails of the distribution. Positive kurtosis indicates relatively large tails and small body. Negative kurtosis indicates relatively large body and small tails.

If the absolute value is:

-above 0.4 it indicates a problem. There might have been a problem with data collection or sampling.

-between 0.2 and 0.4, the data may be affected with a problem.

-less than an absolute value of 0.2 the distribution can be considered as normal.

Test if cases are randomly distributed or aggregated over the clusters by calculation of the Index of Dispersion (ID) and comparison with the Poisson distribution for:

WHZ < -2: ID=1.32 (p=0.068)

WHZ < -3: ID=1.19 (p=0.171)

GAM: ID=1.32 (p=0.068)

SAM: ID=1.19 (p=0.171)

HAZ < -2: ID=1.26 (p=0.110)

HAZ < -3: ID=1.46 (p=0.021)

WAZ < -2: ID=1.38 (p=0.042)

WAZ < -3: ID=1.74 (p=0.001)

Subjects with SMART flags are excluded from this analysis.

The Index of Dispersion (ID) indicates the degree to which the cases are aggregated into certain clusters (the degree to which there are "pockets"). If the ID is less than 1 and $p > 0.95$ it indicates that the cases are UNIFORMLY distributed among the clusters. If the p value is between 0.05 and 0.95 the cases appear to be randomly distributed among the clusters, if ID is higher than 1 and p is less than 0.05 the cases are aggregated into certain cluster (there appear to be pockets of cases). If this is the case for Oedema but not for WHZ then aggregation of GAM and SAM cases is likely due to inclusion of oedematous cases in GAM and SAM estimates.

Are the data of the same quality at the beginning and the end of the clusters?

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one

cluster per day is measured then this will be related to the time of the day the measurement is made).

```
Time                                          SD for WHZ
point                 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.15 (n=49, f=0)  ################
02: 1.04 (n=47, f=0)  ##########
03: 1.11 (n=48, f=0)  ##############
04: 1.11 (n=48, f=0)  ##############
05: 0.99 (n=48, f=0)  ########
06: 1.22 (n=46, f=0)  ##################
07: 1.22 (n=46, f=2)  ##################
08: 1.19 (n=46, f=0)  ##################
09: 1.02 (n=43, f=1)  #########
10: 1.09 (n=46, f=0)  ############
11: 1.21 (n=43, f=0)  ##################
12: 1.33 (n=43, f=1)  ######################
13: 1.18 (n=47, f=0)  ################
14: 1.27 (n=44, f=1)  ####################
15: 1.01 (n=42, f=0)  #########
16: 1.47 (n=43, f=2)  ############################
17: 0.90 (n=39, f=0)  ####
18: 1.30 (n=41, f=1)  ######################
19: 1.08 (n=39, f=0)  ############
20: 1.25 (n=36, f=1)  ####################
21: 1.44 (n=30, f=2)  ##########################
22: 1.11 (n=26, f=0)  ##############
23: 1.15 (n=19, f=0)  OOOOOOOOOOOOOOO
24: 1.84 (n=13, f=1)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
25: 0.79 (n=09, f=0)
26: 1.23 (n=05, f=0)  ~~~~~~~~~~~~~~~~~~
27: 1.28 (n=02, f=0)  ~~~~~~~~~~~~~~~~~~~~
28: 0.27 (n=02, f=0)
```

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time

points)

Analysis by Team

Team	**1**	**2**	**3**	**4**	**5**	**6**	**7**
n =	173	146	134	131	137	137	135
Percentage of values flagged with SMART flags:							
WHZ:	0.0	1.4	0.0	1.5	3.6	0.7	1.5
HAZ:	0.6	0.0	0.7	0.8	0.0	0.0	0.0
WAZ:	0.6	0.7	0.0	0.0	0.0	0.0	0.0
Age ratio of 6-29 months to 30-59 months:							
	0.90	1.00	1.23	1.02	0.96	0.85	0.90
Sex ratio (male/female):							
	1.04	0.90	1.27	0.96	0.99	0.93	1.14
Digit preference Weight (%):							
.0 :	6	10	12	2	15	1	7
.1 :	14	9	5	8	8	11	10
.2 :	10	10	11	13	9	10	12
.3 :	11	11	8	15	10	10	13
.4 :	10	5	14	13	5	10	11
.5 :	4	17	8	10	10	6	11
.6 :	10	10	14	11	7	14	11
.7 :	9	10	7	10	11	8	11
.8 :	12	9	11	8	12	15	5
.9 :	13	10	8	11	11	15	7
DPS:	9	10	9	11	9	13	8

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Digit preference Height (%):							
.0 :	5	14	12	4	17	7	11
.1 :	9	14	5	10	7	20	14
.2 :	10	12	9	15	9	17	10
.3 :	8	9	8	9	12	6	5
.4 :	14	7	4	7	6	9	10
.5 :	11	13	7	15	12	7	10
.6 :	12	7	13	10	16	15	16

.7 :	6	10	4	15	7	6	6
.8 :	13	8	13	11	12	8	10
.9 :	11	7	22	4	4	5	7
DPS:	10	9	17	14	14	17	10

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Digit preference MUAC (%):

.0 :	9	12	9	1	7	9	15
.1 :	9	7	12	12	9	16	10
.2 :	11	8	11	15	6	18	7
.3 :	11	10	5	8	4	9	11
.4 :	13	12	12	13	5	4	8
.5 :	6	11	6	12	19	9	10
.6 :	13	8	13	9	14	11	13
.7 :	12	12	4	9	8	11	11
.8 :	8	12	18	8	15	7	9
.9 :	8	10	10	13	12	6	7
DPS:	7	6	13	13	16	14	8

Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)

Standard deviation of WHZ:

SD	1.14	1.20	1.19	1.15	1.23	1.07	1.28

Prevalence (< -2) observed:

%	15.6	10.3	19.4	11.5	13.1	9.5	13.3

Prevalence (< -2) calculated with current SD:

%	13.8	10.0	15.6	12.2	13.1	10.0	12.3

Prevalence (< -2) calculated with a SD of 1:

%	10.7	6.2	11.4	9.1	8.3	8.4	6.8

Standard deviation of HAZ:

SD	1.06	0.96	1.07	1.10	1.02	0.97	0.99

observed:

%	42.2		56.0	43.5	40.9		

calculated with current SD:

%	41.6		52.9	43.9	41.5		

calculated with a SD of 1:

%	41.0	53.0	43.2	41.4

Statistical evaluation of sex and age ratios (using Chi squared statistic) for:

Team 1:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	27/20.4 (1.3)	21/19.7 (1.1)	48/40.1 (1.2)	1.29
18 to 29	12	16/19.9 (0.8)	18/19.2 (0.9)	34/39.1 (0.9)	0.89
30 to 41	12	15/19.3 (0.8)	23/18.6 (1.2)	38/37.9 (1.0)	0.65
42 to 53	12	15/19.0 (0.8)	14/18.3 (0.8)	29/37.3 (0.8)	1.07
54 to 59	6	15/9.4 (1.6)	9/9.1 (1.0)	24/18.5 (1.3)	1.67
6 to 59	54	88/86.5 (1.0)	85/86.5 (1.0)		1.04

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.820 (boys and girls equally represented)

Overall age distribution: p-value = 0.220 (as expected)

Overall age distribution for boys: p-value = 0.090 (as expected)

Overall age distribution for girls: p-value = 0.697 (as expected)

Overall sex/age distribution: p-value = 0.034 (significant difference)

Team 2:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	16/16.0 (1.0)	18/17.9 (1.0)	34/33.9 (1.0)	0.89
18 to 29	12	15/15.6 (1.0)	24/17.4 (1.4)	39/33.0 (1.2)	0.63
30 to 41	12	16/15.1 (1.1)	16/16.9 (0.9)	32/32.0 (1.0)	1.00
42 to 53	12	17/14.9 (1.1)	12/16.6 (0.7)	29/31.5 (0.9)	1.42
54 to 59	6	5/7.4 (0.7)	7/8.2 (0.9)	12/15.6 (0.8)	0.71
6 to 59	54	69/73.0 (0.9)	77/73.0 (1.1)		0.90

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.508 (boys and girls equally represented)

Overall age distribution: p-value = 0.717 (as expected)

Overall age distribution for boys: p-value = 0.889 (as expected)

Overall age distribution for girls: p-value = 0.407 (as expected)

Overall sex/age distribution: p-value = 0.221 (as expected)

Team 3:

Age cat.	mo.	boys	girls	total	ratio boys/girls

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	22/17.4 (1.3)	12/13.7 (0.9)	34/31.1 (1.1)	1.83
18 to 29	12	26/17.0 (1.5)	14/13.3 (1.0)	40/30.3 (1.3)	1.86
30 to 41	12	12/16.4 (0.7)	13/12.9 (1.0)	25/29.4 (0.9)	0.92
42 to 53	12	6/16.2 (0.4)	11/12.7 (0.9)	17/28.9 (0.6)	0.55
54 to 59	6	9/8.0 (1.1)	9/6.3 (1.4)	18/14.3 (1.3)	1.00
6 to 59	54	75/67.0 (1.1)	59/67.0 (0.9)		1.27

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.167 (boys and girls equally represented)

Overall age distribution: p-value = 0.042 (significant difference)

Overall age distribution for boys: p-value = 0.008 (significant difference)

Overall age distribution for girls: p-value = 0.802 (as expected)

Overall sex/age distribution: p-value = 0.001 (significant difference)

Team 4:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	13/14.8 (0.9)	21/15.5 (1.4)	34/30.4 (1.1)	0.62
18 to 29	12	15/14.5 (1.0)	17/15.2 (1.1)	32/29.6 (1.1)	0.88
30 to 41	12	20/14.0 (1.4)	16/14.7 (1.1)	36/28.7 (1.3)	1.25
42 to 53	12	13/13.8 (0.9)	10/14.5 (0.7)	23/28.3 (0.8)	1.30
54 to 59	6	3/6.8 (0.4)	3/7.2 (0.4)	6/14.0 (0.4)	1.00
6 to 59	54	64/65.5 (1.0)	67/65.5 (1.0)		0.96

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.793 (boys and girls equally represented)

Overall age distribution: p-value = 0.092 (as expected)

Overall age distribution for boys: p-value = 0.289 (as expected)

Overall age distribution for girls: p-value = 0.196 (as expected)

Overall sex/age distribution: p-value = 0.025 (significant difference)

Team 5:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	24/15.8 (1.5)	13/16.0 (0.8)	37/31.8 (1.2)	1.85
18 to 29	12	15/15.4 (1.0)	15/15.6 (1.0)	30/31.0 (1.0)	1.00
30 to 41	12	14/14.9 (0.9)	17/15.1 (1.1)	31/30.0 (1.0)	0.82
42 to 53	12	11/14.7 (0.7)	17/14.9 (1.1)	28/29.6 (0.9)	0.65
54 to 59	6	4/7.3 (0.6)	7/7.4 (1.0)	11/14.6 (0.8)	0.57

6 to 59	54	68/68.5 (1.0)	69/68.5 (1.0)	0.99

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.932 (boys and girls equally represented)

Overall age distribution: p-value = 0.755 (as expected)

Overall age distribution for boys: p-value = 0.151 (as expected)

Overall age distribution for girls: p-value = 0.888 (as expected)

Overall sex/age distribution: p-value = 0.098 (as expected)

Team 6:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	14/15.3 (0.9)	19/16.5 (1.2)	33/31.8 (1.0)	0.74
18 to 29	12	14/14.9 (0.9)	16/16.1 (1.0)	30/31.0 (1.0)	0.88
30 to 41	12	20/14.5 (1.4)	15/15.6 (1.0)	35/30.0 (1.2)	1.33
42 to 53	12	8/14.2 (0.6)	12/15.3 (0.8)	20/29.6 (0.7)	0.67
54 to 59	6	10/7.0 (1.4)	9/7.6 (1.2)	19/14.6 (1.3)	1.11
6 to 59	54	66/68.5 (1.0)	71/68.5 (1.0)		0.93

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.669 (boys and girls equally represented)

Overall age distribution: p-value = 0.258 (as expected)

Overall age distribution for boys: p-value = 0.181 (as expected)

Overall age distribution for girls: p-value = 0.845 (as expected)

Overall sex/age distribution: p-value = 0.105 (as expected)

Team 7:

Age cat.	mo.	boys	girls	total	ratio boys/girls
6 to 17	12	18/16.7 (1.1)	19/14.6 (1.3)	37/31.3 (1.2)	0.95
18 to 29	12	17/16.3 (1.0)	10/14.3 (0.7)	27/30.5 (0.9)	1.70
30 to 41	12	17/15.8 (1.1)	16/13.8 (1.2)	33/29.6 (1.1)	1.06
42 to 53	12	14/15.5 (0.9)	13/13.6 (1.0)	27/29.1 (0.9)	1.08
54 to 59	6	6/7.7 (0.8)	5/6.7 (0.7)	11/14.4 (0.8)	1.20
6 to 59	54	72/67.5 (1.1)	63/67.5 (0.9)		1.14

The data are expressed as observed number/expected number (ratio of obs/expect)

Overall sex ratio: p-value = 0.439 (boys and girls equally represented)

Overall age distribution: p-value = 0.593 (as expected)

Overall age distribution for boys: p-value = 0.946 (as expected)

Overall age distribution for girls: p-value = 0.494 (as expected)

Overall sex/age distribution: p-value = 0.335 (as expected)

Evaluation of the SD for WHZ depending upon the order the cases are measured within each cluster (if one cluster per day is measured then this will be related to the time of the day the measurement is made).

Team: 1

```
Time                                                SD for WHZ
point                 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.10 (n=08, f=0)  #############
02: 0.99 (n=08, f=0)  ########
03: 1.24 (n=07, f=0)  ##################
04: 0.49 (n=08, f=0)
05: 1.32 (n=08, f=0)  #####################
06: 1.33 (n=08, f=0)  #####################
07: 1.25 (n=07, f=0)  ##################
08: 1.39 (n=07, f=0)  ########################
09: 0.77 (n=07, f=0)
10: 0.92 (n=08, f=0)  #####
11: 0.96 (n=08, f=0)  #######
12: 1.66 (n=06, f=0)  ####################################
13: 1.47 (n=07, f=0)  ############################
14: 0.80 (n=07, f=0)
15: 0.80 (n=06, f=0)
16: 0.88 (n=07, f=0)  ###
17: 1.29 (n=07, f=0)  ####################
18: 0.89 (n=08, f=0)  ####
19: 0.70 (n=05, f=0)
20: 1.34 (n=05, f=0)  #######################
21: 1.14 (n=05, f=0)  ##############
22: 0.98 (n=05, f=0)  ########
23: 1.06 (n=04, f=0)  OOOOOOOOOOO
24: 1.92 (n=04, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
25: 1.02 (n=04, f=0)  OOOOOOOOO
26: 0.64 (n=02, f=0)
27: 1.28 (n=02, f=0)  ~~~~~~~~~~~~~~~~~~~
28: 0.27 (n=02, f=0)


(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n <
80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time
```

points)

Team: 2

```
Time                                              SD for WHZ
point                0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.35 (n=07, f=0)  ########################
02: 0.92 (n=07, f=0)  #####
03: 1.05 (n=07, f=0)  ###########
04: 1.05 (n=07, f=0)  ##########
05: 0.89 (n=07, f=0)  ####
06: 1.29 (n=06, f=0)  ####################
07: 1.94 (n=07, f=0)  ################################################
08: 0.85 (n=06, f=0)  ##
09: 0.98 (n=07, f=0)  ########
10: 0.70 (n=06, f=0)
11: 1.36 (n=06, f=0)  ########################
12: 1.09 (n=05, f=0)  ############
13: 1.51 (n=07, f=0)  ##############################
14: 1.11 (n=07, f=0)  #############
15: 0.96 (n=07, f=0)  #######
16: 1.35 (n=06, f=0)  ########################
17: 0.99 (n=06, f=0)  ########
18: 2.35 (n=05, f=1)  ###################################################################
19: 1.67 (n=06, f=0)  ####################################
20: 0.99 (n=06, f=0)  ########
21: 1.38 (n=05, f=0)  ########################
22: 0.45 (n=05, f=0)
23: 0.83 (n=03, f=0)  O
24: 0.30 (n=03, f=0)
25: 0.73 (n=02, f=0)


(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n <
80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time
```

points)

Team: 3

```
Time                                                SD for WHZ
point                0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.24 (n=07, f=0)  ##################
02: 1.57 (n=06, f=0)  ################################
03: 1.27 (n=07, f=0)  ####################
04: 1.50 (n=07, f=0)  ##############################
05: 1.11 (n=06, f=0)  #############
06: 1.43 (n=07, f=0)  ##########################
07: 1.14 (n=07, f=0)  ###############
08: 1.21 (n=06, f=0)  #################
09: 1.05 (n=06, f=0)  ###########
10: 1.26 (n=06, f=0)  ###################
11: 0.50 (n=06, f=0)
12: 1.11 (n=07, f=0)  #############
13: 0.93 (n=07, f=0)  ######
14: 1.03 (n=07, f=0)  #########
15: 1.38 (n=06, f=0)  ########################
16: 1.33 (n=06, f=0)  ######################
17: 1.17 (n=03, f=0)  OOOOOOOOOOOOOOO
18: 0.94 (n=05, f=0)  ######
19: 0.80 (n=05, f=0)
20: 0.71 (n=05, f=0)
21: 1.83 (n=03, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
22: 0.70 (n=03, f=0)
23: 0.48 (n=03, f=0)
```

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time

points)

Team: 4

```
Time                                              SD for WHZ
point                0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.33 (n=06, f=0)  ######################
02: 0.86 (n=06, f=0)  ###
03: 1.41 (n=06, f=0)  ##########################
04: 0.71 (n=06, f=0)
05: 1.23 (n=06, f=0)  ##################
06: 0.64 (n=05, f=0)
07: 1.14 (n=06, f=0)  ###############
08: 0.82 (n=06, f=0)  #
09: 1.02 (n=05, f=0)  #########
10: 1.72 (n=06, f=0)  ########################################
11: 1.01 (n=05, f=0)  #########
12: 0.78 (n=06, f=0)
13: 1.01 (n=05, f=0)  #########
14: 0.57 (n=06, f=0)
15: 0.84 (n=06, f=0)  ##
16: 2.13 (n=04, f=1)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
17: 0.57 (n=06, f=0)
18: 1.45 (n=06, f=0)  ############################
19: 0.95 (n=06, f=0)  ######
20: 1.17 (n=04, f=0)  OOOOOOOOOOOOOOOO
21: 1.85 (n=04, f=1)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
22: 1.32 (n=04, f=0)  OOOOOOOOOOOOOOOOOOOOO
23: 1.74 (n=04, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
24: 1.32 (n=03, f=0)  OOOOOOOOOOOOOOOOOOOOO
25: 0.25 (n=02, f=0)
26: 0.39 (n=02, f=0)
```

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time

points)

Team: 5

```
Time                                                SD for WHZ
point                0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.20 (n=07, f=0)  ##################
02: 0.63 (n=06, f=0)
03: 1.03 (n=07, f=0)  ##########
04: 1.37 (n=06, f=0)  ########################
05: 0.70 (n=07, f=0)
06: 1.29 (n=07, f=0)  ####################
07: 1.13 (n=06, f=1)  ##############
08: 1.25 (n=07, f=0)  ###################
09: 1.19 (n=06, f=0)  #################
10: 0.77 (n=07, f=0)
11: 1.32 (n=06, f=0)  ######################
12: 1.24 (n=07, f=1)  ##################
13: 1.43 (n=07, f=0)  ##########################
14: 1.32 (n=05, f=0)  ######################
15: 0.58 (n=05, f=0)
16: 1.95 (n=07, f=1)  ################################################
17: 0.90 (n=05, f=0)  ####
18: 1.23 (n=06, f=0)  ##################
19: 1.05 (n=06, f=0)  ##########
20: 1.99 (n=05, f=1)  ##################################################
21: 1.51 (n=05, f=1)  ##############################
22: 0.76 (n=04, f=0)
23: 1.29 (n=02, f=0)  ~~~~~~~~~~~~~~~~~~~
```

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time

points)

Team: 6

```
Time                                                SD for WHZ
point                0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.10 (n=07, f=0)  ##############
02: 0.90 (n=07, f=0)  ####
03: 1.05 (n=07, f=0)  ############
04: 0.94 (n=07, f=0)  ######
05: 0.81 (n=07, f=0)
06: 1.19 (n=07, f=0)  ################
07: 1.14 (n=07, f=0)  ###############
08: 1.09 (n=07, f=0)  ############
09: 1.54 (n=06, f=1)  ################################
10: 1.21 (n=07, f=0)  ##################
11: 1.30 (n=06, f=0)  ######################
12: 1.45 (n=05, f=0)  ############################
13: 0.81 (n=07, f=0)  #
14: 0.73 (n=05, f=0)
15: 0.90 (n=07, f=0)  ####
16: 1.15 (n=07, f=0)  ################
17: 0.44 (n=07, f=0)
18: 0.83 (n=07, f=0)  #
19: 0.70 (n=06, f=0)
20: 1.16 (n=05, f=0)  ###############
21: 1.63 (n=03, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
22: 1.25 (n=02, f=0)  ~~~~~~~~~~~~~~~~~~
```

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time

points)

Team: 7

```
Time                                                SD for WHZ
point                0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3
01: 1.14 (n=07, f=0)  ###############
02: 1.24 (n=07, f=0)  ####################
03: 0.98 (n=07, f=0)  ########
04: 1.09 (n=07, f=0)  ############
05: 0.88 (n=07, f=0)  ###
06: 1.28 (n=06, f=0)  ####################
07: 0.64 (n=06, f=0)
08: 1.70 (n=07, f=0)  ######################################
09: 0.78 (n=06, f=0)
10: 0.89 (n=06, f=0)  ####
11: 1.39 (n=06, f=0)  ########################
12: 1.46 (n=07, f=0)  ############################
13: 1.23 (n=07, f=0)  ##################
14: 1.56 (n=07, f=1)  ################################
15: 1.54 (n=05, f=0)  ################################
16: 1.43 (n=06, f=0)  ############################
17: 0.72 (n=05, f=0)
18: 1.13 (n=04, f=0)  OOOOOOOOOOOOOO
19: 1.11 (n=05, f=0)  #############
20: 1.31 (n=06, f=0)  ####################
21: 1.24 (n=05, f=0)  ##################
22: 2.41 (n=03, f=1)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
23: 2.22 (n=02, f=0)  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
```

(when n is much less than the average number of subjects per cluster different symbols are used: 0 for n < 80% and ~ for n < 40%; The numbers marked "f" are the numbers of SMART flags found in the different time

points)

(for better comparison it can be helpful to copy/paste part of this report into Excel)
bers marked "f" are the numbers of SMART flags found in the different time points)
(for better comparison it can be helpful to copy/paste part of this report into Excel)

Annex 4: SMART survey questionnaires

Household questionnaire

A. Identification variables: This section is mandatory to fill to all teams in all the HH visited during the survey. The information contained in this section are:

1. **Date of the survey:** This is the date of data collection, it should written in the standard format for all the questionnaires administered during the survey. (day/month/year
2. **Name of the village:** Indicate the name of the sampled village that is visited on the particular day of data collection.
3. **Cluster number:** Indicate the number of cluster allocated for the village or area visited. This is automatically generated by ENA during the sampling stage. Sampling and cluster allocation will be done together with the team at the **training hall.** Important to note that once Cluster number has been assigned it cannot be changed.
4. **Team ID number:** Teams was formed during the training session. Each team was assigned a unique number ranging from 1-6. Each team must indicate the team number on the questionnaires they administer.
5. **Household number:** Each HH in the selected cluster was assigned a number. There are 14 HH in each cluster to be sampled. Each sampled HH should be indicated a number in order of their visit **(e.g. the first randomly selected HH is allocated HH number 1 regardless of whether it is the 10th HH in the village)**
6. **Starting time of the interview:** This is indicated the time of start of the interview in the selected HH.
7. **Consent:** Each team was provided with a consent form that they were required to ask for permission to conduct the survey in each HH. This is meant to seek permission from the HH

head or caregiver to be allowed to conduct the assessment. It is important to note the reason for refusal in case the HH does not accept the interview.

B. **Wash:** Description of the following key WASH indicators

1. **Source of drinking water:** This question was asked to the respondent of the HH to find out where HH are accessing their drinking water. The sources of water are categorised into two main categories I.e. Improved sources and un-improved sources. These are based on the two main recommended categories of responses.
   - Number of HH accessing water from improved sources[11]/ total number of respondents.
   - Number of HH accessing water from unimproved sources[12]/ total number of respondents.
2. **Water treatment methods:** This question was seek to find out what methods HH are using to make their drinking water safe. This indicator will show the proportion of HH practicing safe methods of water treatment in the survey area. The calculation of this will be:
   - Total number of HH practicing safe water treatment methods[13]/ total number of respondents
   - Total number of HH not practicing safe water treatment methods/ total number of respondents.
3. **Water Use/Consumption at HH level:** This question was seeking to find out the amount of water consumed by each individual living in the household per day. The aim of this indicator is to check whether households are consuming the required minimum amount of water per person per day compared to the minimum threshold as defined by the WHO standard for HH water consumption.
4. **Hand washing practices:** Caregivers was asked on hand washing practices to ascertain instances in their daily activities and in the 5 critical points when they wash their hands. The caregiver should not probed for answers/response rather they should be allowed to provide their response independently.
5. **Use of Soap:** A follow up question was asked to ascertain the hand washing practice by asking the caregiver to demonstrate how they wash their hands and what they use to wash their hands,

[11] Piped scheme, protected springs, boreholes with hand pump, well with hand pump, protected karez

[12] River/ stream/ canal. Pond/ reservoir, well with bucket, unprotected karez, unprotected spring.

[13] Boil, use of water filter

they rubs both hands and drying by clean cloths .

Food access and consumption

1. **Food consumption scoring:** this question was seeking to find out the group of food to check whether households are consuming in the past 7 days and check the source of the food.
2. **Reduced coping of strategy index:** this question check enough many and food to buy.
3. **Food security situation:** **the question check the food security in households level** Based on triangulation of Food Consumption Score (FSC) with the food-based or reduced Coping Strategy Index (rCSI).

Child Questionnaire

Identification:

This section is mandatory was filled to all teams in all the HH visited during the survey. The information contained in this section is:

1. **Date of the survey:** This is the date of data collection, it should written in the standard format for all the questionnaires administered during the survey. (day/month/year
2. **Name of the village:** Indicate the name of the sampled village that is visited on the particular day of data collection.
3. **Cluster number:** Indicate the number of cluster allocated for the village or area visited. This is automatically generated by ENA during the sampling stage. Sampling and cluster allocation was done together with the team at the **training hall.**_Important to note that once Cluster number has been assigned it cannot be changed.
4. **Team ID number:** Teams was formed during the training session. Each team was assigned a unique number ranging from 1-6. Each team must indicate the team number on the questionnaires they administer.
5. **Household number:** Each HH in the selected cluster was assigned a number. There are a total of 14 HH in each cluster to be sampled. Each sampled HH should be indicated a number in order of their visit **(e.g. the first randomly selected HH is allocated HH number 1 regardless of whether it is the 10th HH in the village)**
6. **Caregiver Number:** Each caregiver living in the selected HH was assigned a specific unique number. This is the same number that will appear in the Caregiver questionnaire. In case of more than one caregiver in a HH each will be assigned a unique number to identify and distinguish them from each

other. Each caregiver was linked to her/his children selected in the HH to be able to link each caregiver with the children.

7. **Child Number:** Each Child Under the age of 5 years living in the selected HH was assigned a specific unique number. In case of more than one child in a HH each was assigned a unique number to identify and distinguish them from each other. Each child was linked to her/his caregiver selected in the HH to be able to link each caregiver with the children.
8. **Age in months:** Only children between 0 and 59 months old of age will be included. Height will not be considered as a valid criterion in absence of age due to the high stunting rates in The province. Age was confirmed by showing a vaccination card or a birth certificate, if available. If these documents are not available, the use of a local event calendar built for the province was used to determine the age. The age was recorded into the questionnaire in months.
9. **Sex:** Male or female
10. **Weight (in kg):** Children were weighed to the nearest 0.1kg by using an Electronic Uni-scale. The children who can easily stand was asked to stand on the weighing scale and their weight recorded. In a situation when the children could not stand up, the double weighing method was applied.
11. **Height (in cm):** Wooden measuring board was used to measure bare headed and barefoot children. The precision of the measurement is 1 mm. Children of less than 2 years of age will be measured lying down and those equal to or above 2 years of age measured standing up.
12. **Mid-Upper Arm Circumference (in mm):**MUAC will be used as an indicator of mortality risk for malnutrition and will be measured to the nearest 1mm for all children with an indicated age of greater than 6 months, using the UNICEF MUAC strips. An adult MUAC tape was used to measure women of reproductive age (15-49 years)
13. **Oedema:** Only children with bilateral pitting nutrition oedema was recorded as having nutritional oedema this will be checked by applying normal thumb pressure for at least 3 seconds to both feet.

Infant and Young Child Feeding

In this section only children <24 months were considered as eligible respondents. All children within these age groups were selected in the surveyed HH and the following indicators administered to them.

1. **Ever Breastfed:** This indicator looked at the number of mothers who have ever breast fed their children. This looked at the last pregnancy of the mother or the current child who is <24 months old.
2. **Time to Breastfeeding/Initiation to Breast milk:** This indicator assessed at the amount of time it took for mothers to put their children to the breast after giving birth. The focus was on the mother's last pregnancy in which the child is <24 months.
3. **Colostrum feeding:** this indicator looked at the number of mothers with children <24 months who

fed their children with Colostrum within the first 3 days after birth.

4. **Breast-feeding Yesterday:** This indicator investigated the number of mothers who breast-fed their children <24 months one day (day and Night) prior to the data collection day.
5. **Other Liquids offered to the child:** This indicator asked the mothers of children <24 months what other liquids were offered to the child one day (day and night) prior to the data collection day.
6. **Complimentary feeding:** This indicator looked at the number of mothers who gave solid and semi-solid foods to children <24 months one day (day and night) prior to the data collection day.
7. **Minimum Meal frequency:** This indicator asked mothers on the number of times they provided solid and semi-solid foods to their children <24 months one day (day and night) prior to the data collection day.

Child Health status

This section was look at all children in the HH between the ages of 0-59 months.

1. **Type of Illness:** This question asked about the types of illness that the child (0-59 months) has had in the last 14 days prior to the data collection day. A small definition of the key illness is provided in the questionnaire to enable the data collector identify the illness correctly
2. **Vitamin A supplementation:** This question will ask the caregiver of child 6-59 months on whether the child has received vitamin A tablets in the previous 6 months prior to the data collection day. Each team was provided with a Sample of the Vitamin A tablet to enable the caregivers to easily identify it.
3. **Deworming:** This question asked the caregiver of child 24-59 months on whether the child has received deworming tablets in the previous 6 months prior to the data collection day. Each team was provided with a Sample of the deworming tablet to enable the caregivers to easily identify it.
4. **BCG vaccination:** This question asked the caregiver on whether the child 0-59 months has received BCG vaccination.
5. **PENTA vaccination:** the question asked the caregiver on whether the child 3.5-59 months has received PENTA3 vaccination.
6. **Measles vaccination:** the question asked the caregiver whether the child 9-59 months has received the measles vaccination.
7. **Polio vaccination:** the question asked the caregiver whether the child 0-59 months has received the

polio vaccination.

Caregiver questionnaire

Identification:

This section is mandatory was filled to all teams in all the HH visited during the survey. The information contained in this section is:

1. **Date of the survey:** This is the date of data collection, it should written in the standard format for all the questionnaires administered during the survey. (day/month/year
2. **Name of the village:** Indicate the name of the sampled village that is visited on the particular day of data collection.
3. **Cluster number:** Indicate the number of cluster allocated for the village or area visited. This is automatically generated by ENA during the sampling stage. Sampling and cluster allocation will be done together with the team at the **training hall.** Important to note that once Cluster number has been assigned it cannot be changed.
4. **Team ID number:** Teams was formed during the training session. Each team was assigned a unique number ranging from 1-6. Each team must indicate the team number on the questionnaires they administer.
5. **Household number:** Each HH in the selected cluster was assigned a number. There are a total of 13 HH in each cluster to be sampled. Each sampled HH should be indicated a number in order of their visit **(e.g. the first randomly selected HH is allocated HH number 1 regardless of whether it is the 10th HH in the village)**
6. **Caregiver Number:** Each caregiver living in the selected HH was assigned a specific unique number. This is the same number that will appear in the Caregiver questionnaire. In case of more than one caregiver in a HH each will be assigned a unique number to identify and distinguish them from each other. Each caregiver was linked to her/his children selected in the HH to be able to link each caregiver with the children.

Antenatal Care, delivery assist and Health seeking behavior

1. **Antenatal care:** Caregivers between the ages of 15-49 years at household level will be asked on whether they sought ante-natal care during their last pregnancy. In this case, last pregnancy was considered of the last child who is still between 0-59 months for purposes of having a more precise re-call period.
2. **Delivery assisted by SBA:** caregiver who respond positive to getting assistance from Skilled Birth Attendants during the last delivery.

3. **Health seeking behaviour:** Caregivers who respond positive to seeking antenatal care will be asked who they sought assistance from. This question seeks to identify the health seeking pattern of the respondents from the first point of contact to the last point of contact.
4. **Distance to Health centre:** This question seeks to identify how long it takes a caregiver to access the health facility and ascertain if geographical distance is a factor affecting access to the health centre

Maternal Nutrition

This section seeks to identify the nutrition status of pregnant and lactating women.

1. **MUAC measurement:** The caregivers mid – upper arm circumference will be measured using the standard WFP issued adult MUAC tape.
2. **Physiological status:** Each of the caregivers will asked about their current physiological status to ascertain whether they are currently pregnant, lactating, pregnant and lactating or not pregnant.

Iron – Folate supplementation: Caregivers who report to be currently pregnant will be asked whether they are taking iron folate tablets or not. This is to ascertain the number of pregnant mothers who are supplemented and using iron –folate/ferrous.

10. REFERENCES

- ENA software 2011 updated 9 July 2018.
- WHO child Growth Standards 2006
- CSO: updated population 1396 (2017-2018)
- National Nutrition Survey 2013
- Afghanistan Demographic and Health Survey 2015
- WHO: morality emergency thresholds
- WHO: emergency severity classification
- Adapt from WFP (Kabul informal Settlements) Winter Need Assessment FINAL REPORT ON FOOD SECURITY 2016