AFGHANISTAN

Integrated Nutrition, Mortality, IYCF, WASH and FSL SMART Survey Final Report

Nuristan Province, Afghanistan

23rd June to 03rd July, 2019

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Funded by: WFP World Food Programme

Action Against Hunger | Action Contre La Faim

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ACKNOWLEDGMENTS

This survey would not have been possible without the financial support provided by World Food Program (WFP). Action Against Hunger would also like to thank all stakeholders and partners who provided support to the SMART Assessment teams in all districts of Nuristan province:

- Ministry of Public Health (MoPH), especially the M&EHIS Directorate, Public Nutrition Department (PND), AIM-Working Group, Nutrition Cluster and the Nutrition Small Scale Surveys Steering Committee for their support, review and validation of survey protocol.
- Nuristan's Provincial Public Health Directorate (PPHD) and Public Health Officers (PHO) team for their support and authorization, special thanks goes to Dr. Zakiullah Storay, Nuristan's public health directorate for all the facilitations and assistances he has provided for leading this assessment to the maximum success.
- Organization for Research and Community Development (ORCD) especially Dr. Qudratullah Nasrat, Dr. Mirza Khan Bawar for their contribution smooth implementation of the assessments in Nuristan province.
- All community members for welcoming and supporting the survey teams during the data collection process.
- Special appreciation to the survey teams for making the survey a reality.
- Action Against Hunger teams at Kabul, Paris and SMART-Canada for technical, logistics and administrative support.

ABBREVIATIONS

ACF	Action Contre La Faim /Action Against Hunger
AfDHS	Afghanistan Demographic and Health Survey
AHEAD	Assistance for Health Education and Development
BHC	Basic Health Center
BPHS	Basic Package of Health Services
BSU	Basic Sampling Unit
CBR	Crude Birth Rate
CDR	Crude Death Rate
CHC	Comprehensive Health Center
CSO	Central Statistics Organization
DH	District Hospital
DoPH	Directorate of Public Health
EFSA	Emergency food Security assessment
ENA	Emergency Nutrition Assessment
EPHS	essential Public Health Services
FCS	Food Consumption Score
GAM	Global Acute Malnutrition
HH	Household
IDPs	Internal Displaces populations
IPC	Integrated Food Security phases classification
IPD-SAM	In-patient Department for Sever Acute Malnutrition
IYCF	Infant and Young Child Feeding
LCS	Living Condition Survey
M&EHIS	Monitoring and Evaluation Health Information System
MoPH	Ministry of Public Health
MUAC	Mid Upper Arm Circumference
MW	Mean Weight
NSIA	National Statistics and Information Authority
OPD-MAM	Out-patient Department for Moderate Acute Malnutrition
OPD-SAM	Out-patient Department for Severe Acute Malnutrition

ORCD	Organization for Research and Community Development
OW	Observed weight
PH	Provincial Hospital
PHO	Public Health officer
PLW	Pregnant and Lactating Women
PND	Public Nutrition Department
PPHD	Provincial Public Health Directorate
PPS	Probability Proportional to Size
PSU	Primary Sampling Unit
RC	Reserve Cluster
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SMART	Standardized Monitoring and Assessment of Relief and Transition
TWG	Technical Working Group
U5DR	Under five Death Rate
UNICEF	United Nation Children’s Fund
W/H	Weight for height
WFP	World Food Program
WHO	World Health Organization
WHZ	Weight for Height Z score

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1. EXECUTIVE SUMMARY

Nuristan Province is one of the 34 provinces of Afghanistan. Nuristan is a hard-to-reach and hard-to-reach province located in the northeast of Afghanistan. The population of Nuristan province is estimated at 158,211 as of 2018. All the areas of Nuristan province are considered as rural. Nuristan province comprises of 8 districts; Parun (Center of the province), Wama, Kamdish, Bargi Matal, Du Ab, Nurgram, Want Waygal, and Mandol.

The survey applied two-stage cluster sampling using the SMART methodology based on probability proportional to population size (PPS). Stage one sampling involved the sampling of the clusters to be included in the survey while the second stage sampling involved the selection of the households from the sampled clusters. The smallest geographical unit in Nuristan defined a cluster. A total of 1,058 children aged 0-59 months were assessed among which 981 children were from the age group of 6-59 months..

Data collection took place from 23rd June to 03rd July 2019 during the summer season. Out of 672 households planned, 613 were assessed. Most of the households were surveyed. The survey results indicated a Global Acute Malnutrition (GAM) rate for children 6-59 months old based on WHZ of 12.8% (**10.5 - 15.6** 95% CI) it was high. The results also indicated a very high rates of chronic malnutrition of 49.1% (43.7-54.6 95% CI) respectively. And the survey results for pregnant & lactating women nutritional status based on MUAC cut off <230 mm were 35.6%.

It was a cross-sectional population-representative survey following the Standardized Monitoring and Assessment of Relief and Transition (SMART) methodology. The final report presents the analysis and interpretation of the nutritional status of children under five, the nutritional status of women 15-49 years old, pregnant and lactating women (PLW), Infant and Young Child Feeding (IYCF) practices, measles's immunization coverage, Water, Sanitation, and Hygiene (WASH) situation and retrospective mortality rates. The summary of the key findings is presented in table-1 below.

Table 1: Summary of Findings

Malnutrition prevalence – Children under five years old	
Indicator	Prevalence
GAM prevalence among children 6-59 months per WHZ <-2SD[1]	12.8 % (10.5 - 15.6 95% C.I.)
SAM prevalence among children 6-59 months per WHZ <-3SD	2.4 % (1.6 - 3.6 95% C.I.)
GAM prevalence among children 0-59 months per WHZ <-2SD	14.0 % (11.5 - 16.9 95% C.I.)
SAM prevalence among children 0-59 months per WHZ <-3SD	3.3 % (2.4 - 4.5 95% C.I.)
GAM prevalence among children 6-59 months per MUAC <125 mm	13.6 % (10.8 - 16.9 95% C.I.)
SAM prevalence among children 6-59 months per MUAC <115 mm	3.5 % (2.1 - 5.7 95% C.I.)
Combined GAM prevalence among children 6-59 months per WHZ <-2SD or MUAC <125mm	20.5% (17.3-24.2 95% CI)
Combined SAM prevalence among children 6-59 months per WHZ <-3SD or MUAC <115 mm	5.3% (3.7- 7.5 95% CI)
Stunting among children 6-59 months per HAZ <-2SD	49.1 % (43.6 - 54.6 95% C.I.)
Severe Stunting among children 6-59 months per HAZ <-3SD	18.1 % (14.3 - 22.7 95% C.I.)
Underweight among children 6-59 months per WAZ <-2SD	31.9 % (27.6 - 36.6 95% C.I.)
Severe Underweight among children 6-59 months per WAZ <-3SD	7.1 % (5.4 - 9.4 95% C.I.)

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[1] **GAM and SAM prevalence by any indicator include cases of nutritional oedema*

Nutritional Status of Women 15-49 years old	
Indicator	Result
Low MUAC among all women 15-49 years per MUAC <230mm	31.5%
Low MUAC among pregnant women per MUAC <230 mm	30.4%
Low MUAC among lactating women per MUAC <230 mm	35.4%
Low MUAC among all pregnant and lactating women per MUAC <230mm	35.6%

Crude and Under Five Death Rate (Death/10,000/Day)	
Indicator	Result
Crude Death Rate (CDR)	0.68 (0.49-0.94)
Under five Death Rate (U5DR)	0.94 (0.49-1.81)

Infant and Young Children Feeding (IYCF) Practices	
Indicator	Result
Initiation of breastfeeding within 1 hour of birth among children 0-23 months	34.5%
Exclusive breastfeeding among infants 0-5 months	40.3%
Continued breastfeeding at 1 year among children 12-15 months	96.3%
Continued breastfeeding at 2 year among children 20-23 months	67.1%
Introduction of solid, semi-solid, or soft foods (6-8 months)	44.8%

Child Immunization ≥18 months	
Indicator	Result
Second dose measles vaccination among children 18-59 months confirmed by vaccination card	0.5%

Second dose measles vaccination among children 18-59 months confirmed by caregiver recall	79.1%
Second dose measles vaccination among children 18-59 months confirmed by vaccination card or caregiver recall	79.6%

2. INTRODUCTION

The remote and hard to reach province of Nuristan is one of the 34 provinces of Afghanistan, located in the northeast of the country. Nuristan is bordered on the south by Laghman and Kunar provinces, on the north by Badakhshan province, on the west by Panjshir province, and on the east by Khyber Pakhtunkhwa, Pakistan. Nuristan is a mountainous province known for its harsh dusty roads and mountains covered by abundant forests. Nuristan has always been at the center of tourists' attention for its ancient history and unique culture,

The province is divided into eight administrative units (Districts) Parun (Center of the province), Wama, Kamdish, Bargi Matal, Du Ab, Nurgram, Want Waygal, and Mandol are its known districts. Due to harsh living conditions, from the past Nuristan remains as less populated province over the country, according to the most update population estimates of Afghanistan's National Statistics and Information Authority "NSIA" Nuristan has a total population of 158,211[2] individuals.

Geographically, the province is situated amongst high and densely forest mountains and it has less plain areas. With wonderful wooden bridges, few rivers flow among the mountains that add to the beauty of the province. Parun is the capital of Nuristan. Inhabitants of the province are called Nuristani, they are speaking unique local languages, but all are familiar and can speak Pashto as a second language. Nuristan has faced challenges of inaccessibility and lack of infrastructure. The government presence is minimal and it's quite under-developed compared to other neighboring provinces.

A full SMART Data collection was conducted in Nuristan province from 23rd June to 03rd July 2019 [The Months Saratan 1398 in Solar Calendar] at summer season by ORCD with technical support of Action against Hunger (AAH). The survey covered all secure and partially secure villages in all the districts (8 districts) of the Nuristan province. The survey was conducted in close coordination with MOPH (PND) and their local authorities. 37 HFs (2 DH, 1 CHC+, 4 CHC, 8 BHC, HSC 22 and 2 MHT; there is no PH in Nuristan) were providing health services in the province, from those number - 10 HFs had OPD MAM, 19 HFs had OPD SAM and 3 had IPD SAM program in Nuristan.

2.1. Agriculture:

Horticulture is more common in comparison with other agricultural activities in the province. In contrast to other parts of Afghanistan, Nuristan province's farming and agriculture activities are mainly done by

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[2] Afghanistan updated population - NSIA 1397 (2018-2019)

young women, while men are busy with doing local trading, hand-crafts, carpentry and livestock businesses. The province has less land for agricultural purposes since most of its land is occupied by forests, maple, deodar, pine nuts, walnut, and other dry fruit trees. In the western parts of Nuristan toward Nurgram district, people are mainly associated with the livestock and commercial fruit tree gardening profession.

2.2. Description of the survey area

This SMART survey was conducted in the all eight districts of Nuristan province, villages were selected in Parun (capital district), Waygal, Wama, Nurgaram, Du Ab, Mandol, Bargi Matal, and Kamdish districts. All eight districts of the Nuristan province are considered as rural areas and was considered accessible for the survey teams, except 60 villages out of 417 villages (14.3% of the total target area)[3] in Mandol and Bargi Matal districts due to peaks of the insecurity and concurrent armed clashes.

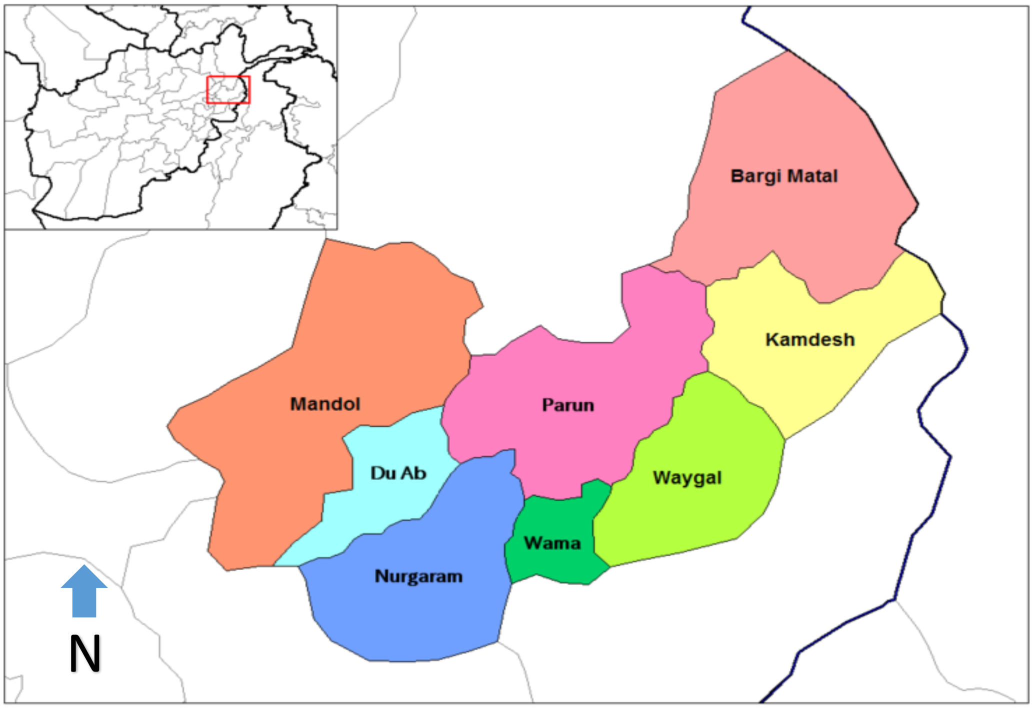

Figure 1: Nuristan districts Map (Source Wikipedia)

From the cultural, ethnic and linguistic origin inhabitant of the excluded villages are in a homogenous relationship with the residence of the included parts of the Nuristan.

The security situation is still highly tense in the country, with multiple ongoing conflicts and frequent armed opposition groups “AOGs” activities in northeastern parts and along the fictional border to

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[3] NSIA 2018-19 population

Pakistan. The situation is hard to handle with for the general population, living so often in precarious conditions, with limited access to livelihoods and basic commodities and services. The UN agencies support the Afghan population in need by providing various humanitarian assistance. Many international aid organizations are also providing humanitarian aid to the crisis-affected population. For instance, national and international humanitarian organizations are providing health and nutrition services in Nuristan province. A local NGO named Assistance for Health, Education and Development "AHEAD" providing health and nutrition services through the BPHS package in Nuristan province. The proposed survey was conducted by Organization for Research and Community Development "ORCD" with technical support of Action Against Hunger and under close coordination with the MoPH/M&EHIS and the local health authorities of Nuristan province

2.3. Demography and Economy

Since Nuristan is a highly ethnically homogeneous province, there are few incidents of inter-ethnic violence. Nuristan are residents of the province who speak Nuristan language. Meanwhile, other ethnicities such as 15% Pashai, 1% Pashto and Tajik spoken people also live in the province[4].

However, there are instances of disputes among inhabitants, some of which have continued for decades. Nuristan has faced challenges of inaccessibility and lack of infrastructure.. Nuristan's formal educational sector is weak, with presence of few professional teachers. Due to its proximity to Pakistan, many of the inhabitants are actively involved in trade and commerce across the border. The primary occupations are agriculture, animal husbandry, and day labor. Nuristan spans the basins of the Alingar, Pech, Landai Sin, and Kunar rivers.

2.4. Health, Nutrition and Food Security

Nuristan is one of the most hard-to-reach regions of eastern Afghanistan, lost among the steep spurs of the Eastern Hindu Kush. This harsh geographical context limits communities' access to health facilities and reduces the program coverage as well. The latest coverage assessment conducted in Nuristan province estimates a nutrition program coverage of 35.0%[5], which is below the nationwide target for the rural areas. Meanwhile, the last SMART assessment carried out in Nuristan province revealed a GAM rate in serious category (GAM rate based on WHZ was of 14.6 % (11.4-18.4 95% C.I.) and GAM based on MUAC

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[4] Pajwak Afghan News – Introduction to the Nuristan province.

[5] Nuristan SQUEAC assessment – 2015.

was of 29.4% (24.4-34.9 95% C.I.)[6], and the SAM rate based on WHZ was 2.5 % (1.4 - 4.4 95% C.I.). Stunting prevalence was 61.5% (57.3 – 65.6 95 C.I.), and severe stunting was 31.8 (28.2 – 35.6 95% C.I). Meanwhile; the maternal nutrition situation results showed a low MUAC rate in pregnant and lactating women 51.4%. And IYCF findings revealed timely initiation of breastfeeding 73.2%, exclusive breast feeding rate 57.0%, and continues breastfeeding up to 1 year was 94.9%. The 2015 SMART survey also showed 51.7% measles immunization in children 9-59 months.

As of September 2018, 9.8 million people (43.6% of the rural population) were estimated to be in Food Crisis and Emergency (IPC Phase 3 and Phase 4) in the country. Unfortunately, Nuristan was among the only three provinces classified in IPC Phase 4[7].

3. SURVEY OBJECTIVES

3.1 Primary objective

- To investigate the nutritional status of children under five years of age and women 15-49 years old living in Nuristan province, Afghanistan.

3.2. Specific objectives

- To estimate prevalence of stunting, wasting and underweight among children 6-59 months.
- To estimate prevalence of wasting, among children aged 0-59 months.
- To determine the nutritional status of women 15-49 years based on MUAC assessment.
- To estimate Crude Death Rate (CDR) and under-five Death Rate (U5DR).
- To determine core Infant and Young Child Feeding (IYCF) practices among children aged <24 months.
- To estimate second dose measles vaccination coverage among children 18-59 months.
- To assess Water, Sanitation, and Hygiene (WASH) proxy indicators: households level main drinking water sources and caregiver hand washing practices.

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[6] Nuristan SMART Assessment - 2015

[7] Out of all 34 provinces nationwide 3 provinces (**Badghis, Nuristan and Kandahar**) have been classified as IPC Phase 4

- To assess the food security situation through the Food Consumption Score (FCS) and the Reduced Coping Strategies Index (rCSI).

3.3. Survey Justification

The target area was suggested and selected by the World Food Program “WFP” to generate updated nutrition data of the Nuristan province considering the below reasons.

- There is no updated data since 2015 and need to have update information for the nutrition programming in the Nuristan province.
- There is a need to investigate the current prevalence of under-nutrition in the province, as the last provincial level nutrition survey was conducted in Nuristan in early 2015 and it was not representative of the whole province since only 3 districts were covered out of total 8.
- Based on the IPC report 2018, Nuristan was identified as in Phase 4. This phase of food security shows that, the people are living in an emergency.
- It will also be an opportunity of building the technical capacity of the ORCD and Nuristan PPHD.

4. METHODOLOGY

4.1.1. Geographic target area and population group

Nuristan full SMART assessment was planned to be done in 56 clusters in the Nuristan province. The surveyed population are children from the age of 0 to 59 months and Pregnant and Lactating Women (PLW) from 15-49 years. Total 417 villages were expected to be covered by the survey, but among them 60 villages (14.3% of the total survey area) were excluded due to insecurity and lack of access in these villages. Annex 5 listed the excluded villages/ clusters.

4.1.2. Survey period

A seven-day training was organized starting on 16th June to 2019 and data collection took place from 23rd June to 03rd of July, 2019, in one phase.

4.1.3. Survey design

SMART assessment has been carried out in the whole province covering all the districts by using two (systematic random and cluster sampling) methods based on the SMART methodology.

4.1.4. Sample size

A pre-determined sample size of 672 households (56 clusters with 12 households per cluster) was chosen for the assessment as per the survey protocol developed and was assumed to be enough to ensure representativeness with acceptable precision. To reach the required sample, the SMART methodology proposes to use a simplified rule to convert children into households.

4.1.5. Sampling procedures

The surveys applied a two-stage cluster sampling method referring to the SMART methodology based on probability proportional to population size (PPS). Stage one sampling involved the sampling of the clusters to be included in the survey while the second stage sampling involved the selection of the households from the sampled clusters. The smallest geographical unit in the province was a cluster.

4.2. Sample Size

The household sample size to survey was determined by using ENA for SMART software version 2011 (updated 9th July 2015). A two-stage cluster methodology was applied. Each village was the Primary Sampling Unit (PSU) while the household was Basic Sampling Unit (BSU). The first stage involves the selection of clusters/villages from a total list of villages using the Probability Proportion to Size (PPS) method. This was applied prior to the data collection. The second stage was involved in the random selection of households from a complete and updated list of households. This was conducted at the field level. Tables 2 and table 3 highlights the parameters used for sample size calculation for anthropometric and mortality surveys.

Table 2: Parameters for sample size calculation for anthropometry

Parameters for Anthropometry	Value	Assumptions Based on Context
Estimated prevalence of GAM (%)	**14.6%**	Based on Nuristan SMART Survey results, August 2015. GAM prevalence (WHZ) 14.6 % (11.4-18.4 95% CI). 14.6% will be used in the planning stage.
Desired precision	**±3.5**	Based on SMART recommendation and consistent with survey objectives in order to estimate the prevalence.
Design Effect	**1.8**	Based on Nuristan SMART Survey, the heterogeneity was seen in the province.
Children to be included	**766**	Minimum sample size-children aged 6-59 months. (However, to avoid the possible bias of selection for younger age group, all children from 0 to 59 months old found in the selected households will be surveyed).
Average HH Size	**7.9**	Based on Nuristan SMART August 2015.
% Children under five	**17.5%**	Based on Nuristan SMART August 2015.
% Non-response Households	**7.2 %**	Based on Nuristan SMART August 2015.
Households to be included	**664**	Minimum sample size-Households to be surveyed

Table 3: Sample size calculation for mortality surveys

Parameters for Mortality	Value	Assumptions based on context
Estimated Death Rate /10,000/day	0.29	Based on Nuristan SMART the mortality rate was 0.29/10,000/day.
Desired precision /10,000/day	±0.3	Based on SMART recommendation and supportive of survey objectives to estimate the death rate.

Design Effect	1.8	Based on Nuristan SMART assessment in August 2015.
Recall Period in days	**100**	The starting point of the recall period is 21st March 2019 (01st Hamal 1398) (Nawroz) to the mid-point of data, collection estimated to be the 28th June 2019 (7th Saratan 1398).
Population to be included	**2,426**	Generated by ENA.
Average HH Size	**7.9**	Based on Nuristan SMART August 2015.
% Non-response Households	**7.2**	Based on the Nuristan SMART Survey in August 2015.
Households to be included	**331**	Households to be included

Based on the SMART methodology, between the calculated anthropometry and mortality sample sizes, the largest sample size will be used for this survey. In this case, the larger sample size is 664 households.

4.3. Sampling Methodology

A two-stage cluster sampling methodology was implemented.

Stage 1:

Selection of clusters/villages has been conducted using probability proportion to size (PPS) using ENA for SMART software version 2011 of (updated 9th July 2015). A list of all updated villages was uploaded into the ENA for SMART software where PPS has been applied. The list of villages/cluster was gathered from the Basic Package of Health Services (BPHS) providers in consultation with PPHD to finalize the sampling frame. Based on the latest EPI micro-plan, all complete insecure or inaccessible villages (if any) has been identified and systematically excluded from the final sampling frame. The villages with a large population have a higher chance of being selected than villages with a small population and vice versa. Reserve Clusters (RCs) will also be selected by ENA software version 2011 (updated 9th July 2015). Reserve clusters will only be used if 10% or more clusters are unable to be reached during the survey. Based on the estimated time to travel to the survey area, select and survey the households, it was estimated that each team could effectively survey 12 HHs per day. (664/12=55.3 clusters, rounded up to 56 Clusters). In each selected village, one or more community member(s) will be asked to help the survey teams to conduct the survey by providing information about the village with regard to the geographical organization or the number of households. Cases where there are large villages, the villages were divided into smaller segments and a segment was selected randomly (if similar in size) or using PPS to represent the cluster. This division was done based on existing administrative units e.g. neighborhoods, streets, or natural landmarks like a river, road, mountains or public places like schools, and mosques.

Table 4: Household selection per day time table

Total working time	8:00 AM to 4:00 PM (8 Hours (480 minutes))
Average time for transportation (round trip)	1.5 hour (90 minutes)
Coordination with village elder and preparation of HH list	30 minutes
Time for a break and pray	1 hour (60 minutes)
The average duration of the HH interview	20 minutes
Distance from one HH to another HH	5 minutes

Stage 2:

Household definition: Group of people living under the same roof and sharing food from the same pot. In households with multiple wives, those living and eating in different houses were considered as separate HHs. Wives living in different houses and eating from the same pot were considered as one HH.

This survey planned to survey 672 (56*12) households and each team was responsible cover effectively 12 households in a day. In this assessment, households were chosen within each cluster using systematic random sampling. 6 teams were engaged during the assessments, while data collection was conducted over 10 days. All households were listed and numbered by the survey team. The 12 households were identified from this enumerated household list used systematic random sampling. And carried materials to assist in selecting households during data collection. For the semi-urban areas in the province, the teams were taken into account multi-storeyed buildings as multiple HHs depending on the HH definition. In the case of a multi-storeyed building containing multiple households were accidentally counted as one HH during the initial listing process, the enumerators were another round of randomization to select one

HH. The selection of households within the selected clusters using a systematic random method as described below.

On arrival at the Chief/Malik:

The survey team introduced themselves and the objective of the survey to the Chief/Malik leader.

- In collaboration with the Chief/Malik leader, the team prepared a list of all households in the cluster. Abandoned households were not listed.
- The required number of households were selected using systematic random sampling.
- The sampling interval was determined by:

$$\text{Sampling interval} = \frac{\text{Total number of sampling units in the population}}{\text{Number of sampling units in the sample (12)}}$$

Every household was asked to consent before any data was collected. All children 0 to 59 months living in the selected house was included for anthropometric measurements, including twins and orphans or unrelated children living with the household. Children aged <24 months were included for IYCF assessment. If a child of a surveyed household was absent due to enrolment in an IPD treatment centre at the time the household was surveyed, teams were not visited any treatment centre to measure the child. Households without children were still assessed for household level questions (PLW nutritional status, WASH, food security, mortality).

Any absent households with missing or absent women or children were revisited at the end of the day before leaving the cluster. The missing or absent child that was not found after multiple visits were not included in the survey. A cluster control form was used to record all household visits and note any missed and absent households. Abandoned HHs were ideally excluded from the total HHs list before surveying Indicators: Definition, Calculation, and Interpretation

4.4. Overview of Indicators

The anthropometric indicators assessed by this survey and the corresponding target population are presented in the Table 5 below.

Table 5: Standardized Integrated SMART Indicators

Indicator	Target Population
Anthropometry	
Acute Malnutrition by WHZ	Children 0-59 and 6-59 months
Acute Malnutrition by MUAC	Children 6-59 months
Acute Malnutrition by Combined (WHZ and/or MUAC)	
Chronic Malnutrition by HAZ	
Underweight by WAZ	
Mortality	
Crude Mortality Rate (CDR)	Entire population
Under Five Mortality Rate (U5MR)	Children under five
IYCF	
Early Initiation of Breastfeeding	Children <24 months
Exclusive Breastfeeding (EBF)	Infants 0-5 months
Continued Breastfeeding at 1 Year	Children 12-15 months
Continued Breastfeeding at 2 Years	Children 20-23 months
Health	
Measles Vaccination (2 doses)	Children 18-59 months
Women of Reproductive Age & PLW	
MUAC	Women 15-49 years and PLW

4.5. Anthropometric, immunization and IYCF Indicators

Age

Age was recorded among children 0-59 months as date of birth (day/month/year) according to the Solar Calendar in the field, and later on, was converted to the Gregorian Calendar for analysis. The exact date of birth was recorded only if the information was confirmed by supportive documents, such as vaccination card or birth certificate. Where the above-mentioned documents were unavailable or questionable, age was estimated using a local calendar of events and recorded in months. In this assessment, the survey teams mostly relied on the utilization of event calendar.

Weight

Weight was recorded among children 0-59 months in Kg to the nearest 0.1 kg using an electronic SECA scale with the 2-in-1 (mother/child) weighing function. Children who could easily stand up were weighed on their own. When children could not stand independently, the 2-in-1 weighing method was applied with the help of a caregiver. Two team members worked in unison to take the measurements of each child.

Height

Height was recorded among children 0-59 months in cm to the nearest 0.1 cm. A height board was used to measure bareheaded and barefoot children. Children less than two years old were measured lying down and those more than two years old were measured standing up. Two team members worked in unison to take the measurements of each child.

MUAC

MUAC was recorded among children 6-59 months[8] and women 15-49 years to the nearest mm. All subjects were measured on the left arm using standard MUAC tapes.

Oedema

The presence of oedema among children 0-59 months was recorded as “yes” or “no”. All children were checked for the presence of oedema by applying pressure with thumbs for three continuous seconds on the tops of both feet. Any suspected cases required confirmation by multiple team members, a supervisor if present, and photo-documented when possible.

4.6. Acute malnutrition

Acute malnutrition in children 6-59 months is expressed by using three indicators.

Weight for Height (W/H) and MUAC are described below. Nutritional oedema is the third indicator of severe acute malnutrition. Additionally, the prevalence of GAM amongst 0-59 was reported.

WHZ

A child’s nutritional status is estimated by comparing it to the weight-for-height distribution curves of 2006 WHO growth standards reference population. 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 weight-for-height index in Z-score was calculated in the field for each child in order to refer malnourished cases to the appropriate center if needed. Moreover, the results were presented in Z-score using WHO reference in the final report. The classification of acute malnutrition

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[8] MUAC is not standardised for infants <6 months

based on WHZ is well-illustrated in Table 6.

Table 6: Definition of Acute Malnutrition, Chronic Malnutrition, and Underweight according to WHO Reference 2006

Severity	ACUTE MALNUTRITION (WHZ)	CHRONIC MALNUTRITION (HAZ)	UNDERWEIGHT (WAZ)
GLOBAL	<-2 z-score and/or oedema	<-2 z-score	<-2 z-score
MODERATE	<-2 z-score and ≥ -3 z-score	<-2 z-score and ≥ -3 z-score	<-2 z-score and ≥ -3 z-score
SEVERE	<-3 z-score and/or oedema	<-3 z-score	<-3 z-score

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 7 provides the cut-off criteria for categorizing acute malnutrition cases.

Table 7: WHO Definition of Acute Malnutrition According to Cut-off Values for MUAC

Severity	MUAC (mm)
GLOBAL	<125 (and/or oedema)
MODERATE	≥ 115 and < 125
SEVERE	<115 (and/or oedema)

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 categorized as being severely malnourished, regardless of their weight-for-height index.

Combined GAM

In Afghanistan, but also at worldwide level, it has been demonstrated that there is a large discrepancy between the prevalence of GAM by WHZ and GAM by MUAC. Therefore, ACF routinely reports the prevalence of GAM by WHZ and/*or* MUAC and/or Oedema as "Combined GAM" among children 6-59 months. Combined GAM considers the cut-offs of both WHZ and MUAC as well as presence of Oedema.

4.7. Chronic malnutrition

Chronic malnutrition is the physical manifestation of longer-term malnutrition which retards growth. Also known as stunting, it reflects the failure to achieve one's optimal height. In children 6-59 months, chronic malnutrition is estimated using Height-for-Age z-score (HAZ).

HAZ is calculated using ENA Software for SMART by comparing the observed height of a selected child to the mean height of children from the reference population for a given age. When using HAZ, the distribution of the sample is compared against the 2006 WHO reference population. Global chronic malnutrition is the sum of moderate and severe chronic malnutrition.

4.8. Underweight

Underweight is the physical manifestation of both acute malnutrition and chronic malnutrition. In children 6-59 months, underweight is estimated using Weight-for-Age (WAZ) z-score. WAZ is calculated using ENA Software for SMART by comparing the observed weight of a selected child to the mean weight of children from the reference population for a given age. When using WAZ, the distribution of the sample is compared against the 2006 WHO reference population. Global underweight is the sum of moderate and severe underweight. WAZ cut-offs are presented in Table 5-3 below.

The prevalence of malnutrition as identified by WHZ, HAZ and WAZ have also been classified by the WHO in terms of severity of public health significance. The thresholds are presented in table 8 below.

Table 8: Classification for Severity of Malnutrition by Prevalence among Children Under Five

LABELS	PREVALENCE THRESHOLDS (%)			
	WASTING	OVERWEIGHT	STUNTING	UNDERWEIGHT[9]
Very low	<2.5	<2.5	<2.5	
Low	2.5-<5	2.5-<5	2.5-<10	<10
Medium	5-<10	5-<10	10-<20	10-19.9
High	10-<15	10-<15	20-<30	20-29.9
Very high	≥15	≥15	≥30	≥30

4.9. Proportion of acutely malnourished children enrolled in or referred to a Program

All children 6-59months identified as severely acutely malnourished by MUAC during the data collection were assessed for current enrolment status. All malnourished children not enrolled in a treatment program were referred to the nearest nutrition program if possible.

4.10. Malnutrition prevalence among women 15-49 years based on MUAC criterion

All women 15-49 years, including PLW, were assessed for nutritional status based on MUAC measurement. Low MUAC was defined as MUAC <230mm.

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[9] WHO threshold

4.11. Retrospective mortality

Demography and mortality were assessed for all households, regardless of the presence of children. All members of the household were counted according to the household definition.

CDR refers to the number of persons in the total population that died over the mortality recall period (100 days). It is calculated by ENA Software for SMART using the following formula:

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

U5DR refers to the number of children under five years that die over the same mortality recall period.

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

4.12. Timely initiation of breastfeeding

Calculated as the proportion of children born in the last 24 months who were put to the breast within one hour of birth. Based on caregiver recall.

4.13. Exclusive Breastfeeding

Calculated as the proportion of infants 0-5 months who were fed exclusively with breast milk in the last day or night. This indicator aims to identify if breastmilk is being displaced by other liquids or foods before the infant reaches six months of age. Based on caregiver recall.

4.14. Continued Breastfeeding at 1 Year

Calculated as the proportion of children 12–15 months who were fed with breast milk in the past day or night. Based on caregiver recall.

4.15. Continued Breastfeeding at 2 Years

Calculated as the proportion of children 20–23 months who were fed with breast milk in the past day or night. Based on caregiver recall.

4.16. Second Dose Measles Coverage

Calculated as the proportion of children 18-59 months who received two doses of the measles vaccine. Assessed based on vaccination card or caregiver recall. As part of the Expanded Program on Immunization (EPI), the first dose of measles immunization is given to infants aged between 9 to 18 months, with the second given at 18 months. As this is the last vaccination dose given to a child under five as per the recommended immunization schedule, the second dose measles coverage indicator can also be used as a proxy for overall immunization status and access to healthcare.

5. SURVEY COORDINATION

With the lead of Action Against Hunger Afghanistan, communication was done on survey objectives to all the relevant administrative authorities as well as stakeholders such as MoPH, M&EHIS, PND, PPHD, ORCD, Health stakeholders and community leaders

6. TRAINING, TEAM COMPOSITION, AND SUPERVISION

Six teams of four members run the field data collection in Nuristan. Each team was composed of one team leader, two measures, and one interviewer. Each team had one female surveyor to ensure acceptance of the team amongst the surveyed households, particularly for IYCF questionnaires. Each female member of the survey team was accompanied by a mahram to facilitate the work of the female data collectors at the community level. The majority of the population speaks uncommon local languages, but understands the verbal and written Pashto language as well; therefore, the survey manager used Pashto to conduct training. The Pashto version of the questionnaires was used. PPHD staff (PNO and PHO teams) done both coverage and content monitoring of the survey teams in targeted villages. ACF technical staff remotely controlled and monitored survey teams in the field and shared productive feedbacks with teams via phone conversation.

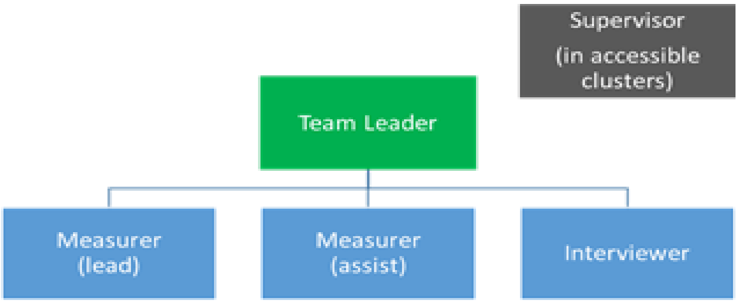

Figure 2: Team Composition

The training took place in Jalalabad city (Center of the neighboring province Nangarhar), all the survey team including supervisors and enumerators received a 7-day training on the survey methodology and all its practical aspects; Three ACF technical staffs facilitated the training session. A standardization test was also conducted over the course of 1 day, 20 children (10 children in the morning and 10 children another afternoon) were measured by each team in order to evaluate the accuracy and the precision of the team members in taking the anthropometric measurements.

Additionally, the teams will conduct 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 anthropometric measurements and on the filling of the questionnaires and the household’s selection was organized on the last day of the training by ACF to ensure overall comprehension before going to the field.

The teams had conducted a one-day field test in order to evaluate their work in real field conditions, the field test was piloted in Mia Sahib village of Jalalabad city. Feedbacks were provided to the team in regard to the results of the field test; particularly in relation to digit preferences and data collection procedures. Refresh training on anthropometric measurements and on the filling of the questionnaires and the household’s selection was organized on the last day of the training by survey manager to ensure the overall understanding before going to the field.

A field guidelines document with instructions including household definition and selection was provided to each team member. All documents, such as local event calendar, questionnaires, and informed consent letters were translated into Pashto languages, for better understanding and to avoid direct translation during the data collection.

7. DATA ANALYSIS

The anthropometric and mortality data were analyzed using ENA for SMART software 2011 version (9th July 2015). Survey results were interpreted in reference to WHO standards 2006; Analysis of other indicators to include IYCF and demographics was done using Microsoft Excel version 2016. Contextual information in the field and from routine monitoring was used in complementing survey findings and strengthening analysis. Interpretation of each result was done based on the existing thresholds for different indicators as well as comparing with other available data sources at the national and provincial level.

8. LIMITATIONS

- Almost all the children (98, 9%) surveyed did not have proper documentation for the exact date of birth, therefore due to the lack of reliable and available documentation of birth, the teams completely relied on a local events calendar to estimate age. This may have reduced the quality of the age determination and may have biased the estimation of the stunting and underweight prevalence.
- In contrast to the rest of Afghanistan, In Nuristan province, young women are responsible for doing Agriculture and livestock husbandry during the spring and summer seasons. Therefore, accessing all caregivers and their eligible children to be surveyed was the biggest challenge for the survey teams during the data collection.
- Cultural practices were among the leading limitation. Village leaders in four villages (clusters) of Nurgaram, Du Ab and Waygal didn’t allow the survey teams to do assessment in their villages. Four clusters were rejected by Wakil Guzar/elders or even the armed opposition groups “AOGs” local commanders.
- In some areas agricultural activities were performing by women, and they were taking their older children (above 3 year) to the fields to get familiar with that tradition from such very young age. This constraints may have impacted the overall ratio of younger (6-29m) and older children (30-59m) as per the plausibility analysis. Due to security high risks, Action Against Hunger technical staff including the survey manager were not allowed to have field visits and direct supervision & monitoring of the survey teams in Nuristan province, which is very important for ensuring data quality and proper application of the methodology in field level.
- A total of 60 villages (14.3% of the total survey area) were excluded at the planning stage due to insecurity and lack of access in these villages.

9. SURVEY FINDINGS

9.1. Survey Sample

Overall, the survey assessed 52 clusters out of 56 planned, 624 households, 4,312 individuals, 809 women 15-49 years, 1,058 children under five, and 981 children 6-59 months. Among the 624 households, the teams attempted to survey, only 11 households were absent or refused to participate to the survey, resulting in a non-response rate of 1.8%. This rate is lower than the estimate done at the planning stage (7.2%) as less households have refused to participate to the survey in comparison to the expectations. Overall, 98.2% of the planned households were assessed and 28.1% more children 6-59 months were assessed comparing to the anticipated sample size for children 6-59 months was achieved.

Table 9: Proportion of household and child sample achieved

Number of clusters planned	Number of clusters surveyed	Number of households planned	Number of households surveyed	Achieved %	Number of children 6-59 months planned	Number of children 6-59 months surveyed	Achieved %
56	52 (93%)	624	613	98.2 %	766	981	128.1 %

The mortality questionnaire was designed to gather demographic data and capture in- and out- migration. Household demographics and movement are presented in Table 10 below. The survey findings indicate that the average household size was 7 (average lower than the one used at planning stage with 7.9 members per household), 48.6% of the population were female, 51.4% of the population were male, and 25.5% were under five. The observed rate of in-migration (0.00) and the out-migration (0.19) during the recall period may have been influenced by the 100 recall period days.

Table 10: Demographic data summary

Parameters	Values
Total number of clusters	52
Total number of HHs	613
Total number of HHs with children under five	551
Average household size	7
Female % of the population	48.6%
Male % of the population	51.4%
Children under five % of the population	25.5%
Birth Rate	1.12
In-migration Rate (Joined)	0.00
Out-migration Rate (Left)	0.19

Households were also assessed for residential status. Among the 613 surveyed households, 94.9%were residents of the area, and 4.9% were internally displaced and 0.2% were nomadic (Kuchi[10]) population. No refugee was found.

Table 11: Household residential status by proportion

Residential Status of Households N= 613	Resident	582	94.9%
	IDP	30	4.9%
	Refugee	0	0.0%
	Nomad	1	0.2%

As the age and sex of all household members were assessed, it was possible to disaggregate the population by sex and five year age interval, as presented in Figure 3 below. The pyramid is wide at the base and narrows towards the apex, indicating a generally youthful population characterized by a high birth rate and a low mortality rate. Afghanistan's national level Crude Birth Rate "CBR" was 37,9 per 1000

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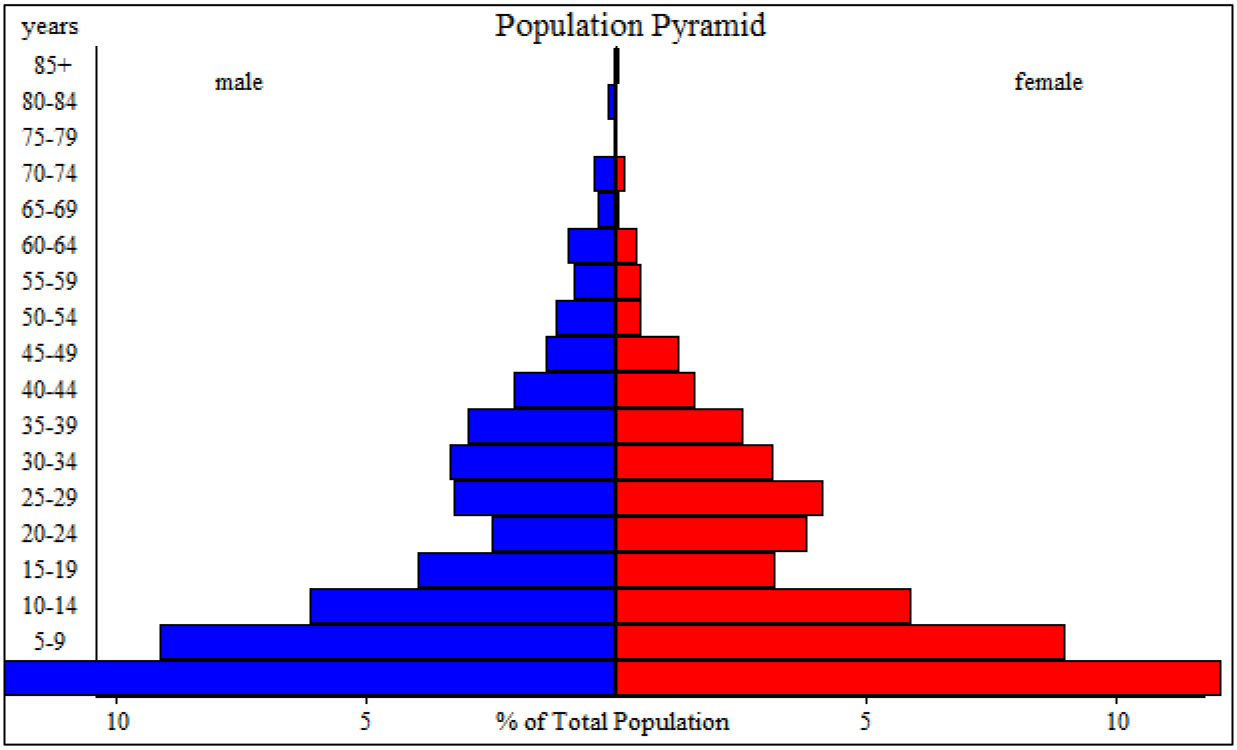
[10] Kuchi is a local term refers to Nomad.

population in 2017 and in accordance with the latest UNICEF[11] report, U5MR is 67.9 per 1000 live births in Afghanistan.

The surveyed sample of children 6-59 months was 981. The distribution as disaggregated by age and sex are presented in Table 12 below. The overall sex ratio (male/female) 1.1, indicating a sample with almost equal representation of boys and girls. The exact birth date was not determined for 99% of the children as only 1.1% of the surveyed children had documentation to evidence their exact date of birth. This may have reduced the quality of the age determination, and therefore may have impacted the estimation of the stunting and underweight prevalence as well.

Figure 3: Nuristan province Population Pyramid



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[11] https://data.unicef.org/country/afg/

Table 12: Distribution of Age and Sex of among Children 6-59 months

	Boys		Girls		Total		Ratio
AGE (months)	no.	%	no.	%	no.	%	Boy:Girl
6-17	103	46.6	118	53.4	221	22.5	0.9
18-29	129	48.5	137	51.5	266	27.1	0.9
30-41	114	50.9	110	49.1	224	22.8	1.0
42-53	107	60.1	71	39.9	178	18.1	1.5
54-59	59	64.1	33	35.9	92	9.4	1.8
Total	512	52.2	469	47.8	981	100.0	1.1

9.2. Data Quality

Sixteen children were excluded from WHZ analysis per SMART flags[12], resulting in an overall percentage of flagged data of 1.6% and judged as excellent by the ENA Plausibility Check.

The standard deviation, design effect, missing values, and flagged values are listed for WHZ, HAZ, and WAZ in Table 13 below. The SD of WHZ was 1.1, the SD of HAZ was 1.06, and the SD of WAZ was 0.85. All WHZ, HAZ and WAZ met the normal range (0.8 and 1.2) indicating an adequate distribution of data around the mean and data of excellent quality.

The overall ENA Plausibility Check score was 12%, which is considered a survey of good quality. The complete Nuristan ENA Plausibility Check report is presented in Annex 3.

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[12] SMART flags as observation +/- 3 SD from the observed mean

Table 13: Mean Z-scores, Design Effects, Missing and Out-of-Range Data of Anthropometric Indicators among Children 6-59 Months.

Indicator	N	Mean z-scores ± SD	Design effect (z-score < -2)	Z-scores not available*	Z-scores out of range
Weight-for-Height*	965	-0.74±1.11	1.38	0	16
Weight-for-Age*	980	-1.66±0.85	2.26	0	1
Height-for-Age	972	-2.05±1.06	2.94	0	9

*Z-scores unavailable for children presenting with oedema

Additional statistical tests to study the distribution of the sample included:

- The Skewness coefficient for WHZ was considered of excellent quality by the ENA Plausibility Check, suggesting the distribution curve was symmetrical.
- The Kurtosis coefficient for WHZ was considered of good quality by the ENA Plausibility Check, suggesting there was no kurtosis.
- The Poisson distribution for WHZ was not statistically significant (0.189) and considered of excellent quality by the ENA Plausibility Check, suggesting there was not observed aggregation of acute malnutrition cases (appears not to be pocket of cases) in the clusters.

9.3. Prevalence of Acute Malnutrition

Acute Malnutrition by WHZ

The prevalence of GAM per WHZ among children 6-59 months in Nuristan was 12.8 (10.5 – 15.6 95% CI) as presented in Table 14 below and was categorized as high level of public health severity. This prevalence seems slightly higher in boys than girls, the difference is statistically significant (p-value = 0.022).

The prevalence of SAM per WHZ among children 6-59 months was 2.4% (1.6 – 3.6 95% CI). According to Afghanistan prioritization it is below from 3%, this SAM prevalence was categorized as acceptable.

Table 14: Prevalence of Acute Malnutrition by WHZ (and/or oedema) by Severity and Sex among Children 6-59 months, WHO 2006 Reference

Indicators	**All** **n = 965**	**Boys** **n = 505**	**Girls** **n = 460**
Prevalence of global acute malnutrition (<-2 z-score and/or oedema)	(124) 12.8 % (10.5 - 15.6 95% C.I.)	(71) 14.1 % (10.9 - 17.9 95% C.I.)	(53) 11.5 % (8.8 - 14.9 95% C.I.)
Prevalence of moderate acute malnutrition (<-2 to ≥-3 z-score)	(101) 10.5 % (8.4 - 13.0 95% C.I.)	(57) 11.3 % (8.6 - 14.7 95% C.I.)	(44) 9.6 % (7.1 - 12.8 95% C.I.)
Prevalence of severe acute malnutrition (<-3 z-score and/or oedema)	(23) 2.4 % (1.6 - 3.6 95% C.I.)	(14) 2.8 % (1.6 - 4.8 95% C.I.)	(9) 2.0 % (1.0 - 3.6 95% C.I.)

*There were 0.0% oedema cases in the sample

The prevalence of acute malnutrition by WHZ was also assessed among children 0-59 months. The GAM per WHZ was 14.0% (11.5 – 16.9 95% CI), as presented in Table 15 below. The prevalence of SAM per WHZ among children 0-59 months was 3.3% (2.4 – 4.5 95% CI). There is not statistically significant difference between boys and girls from 0 to 59 months old (p-value = 0.374).

Table 15: Prevalence of Acute Malnutrition by WHZ (and/or oedema) by Severity and Sex among Children 0-59 months, WHO 2006 Reference

Indicators	All N = 1031	Boys n = 541	Girls n = 490
Prevalence of global acute malnutrition (<-2 z-score and/or oedema)	(144) 14.0 % (11.5 - 16.9 95% C.I.)	(81) 15.0 % (11.7 - 19.0 95% C.I.)	(63) 12.9 % (10.0 - 16.4 95% C.I.)
Prevalence of moderate acute malnutrition (<-2 to ≥-3 z-score)	(110) 10.7 % (8.5 - 13.3 95% C.I.)	(61) 11.3 % (8.6 - 14.7 95% C.I.)	(49) 10.0 % (7.5 - 13.2 95% C.I.)
Prevalence of severe acute malnutrition (<-3 z-score and/or oedema)	(34) 3.3 % (2.4 - 4.5 95% C.I.)	(20) 3.7 % (2.3 - 5.9 95% C.I.)	(14) 2.9 % (1.8 - 4.5 95% C.I.)

*There were 0.0% oedema cases in the sample

When disaggregated by age group, the group with the highest MAM and SAM was 6-17 months, as presented in Table 16 below. The age group with the lowest MAM was 30-41 months and there was no SAM case in the age group of 42-53 months. Results of this disaggregation suggest that the younger age groups (6-29) were more vulnerable to acute malnutrition than older groups (30-59) according to WHZ criterion (p-value <0.05).

Table 16: Prevalence of Acute Malnutrition per WHZ Severity and Age Group

Age (months)	N	Severe wasting* (WHZ <-3)		Moderate wasting (WHZ ≥-3 to <-2)		Normal (WHZ ≥-2)		Oedema	
		n	%	N	%	N	%	n	%
6-17	212	16	7.5	50	23.6	146	68.9	0	0.0
18-29	262	5	1.9	21	8.0	236	90.1	0	0.0
30-41	223	1	0.4	12	5.4	210	94.2	0	0.0
42-53	177	0	0.0	11	6.2	166	93.8	0	0.0
54-59	91	1	1.1	7	7.7	83	91.2	0	0.0
Total	965	23	2.4	101	10.5	841	87.2	0	0.0

*There were 0 oedema cases in the sample

The WHZ distribution curve (in red) as compared to the WHO 2006 reference WHZ distribution curve (in green) and as presented in Figure 5 below demonstrates a shift to the left, suggesting an undernourished population. Figure 4 illustrates the mean WHZ for age categories.

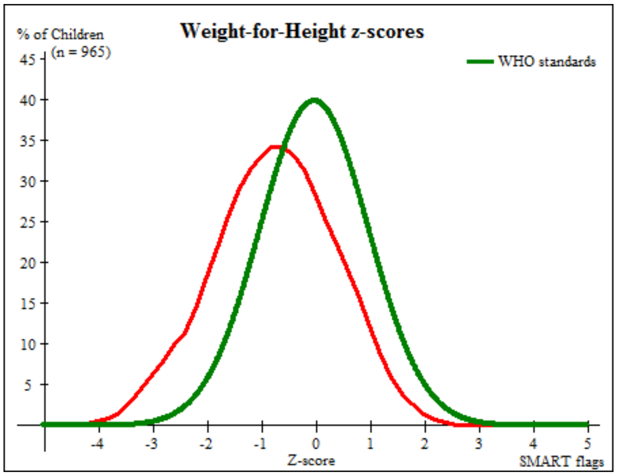


Figure 5: Distribution of WHZ Sample Compared to the WHO 2006 WHZ Reference Curve

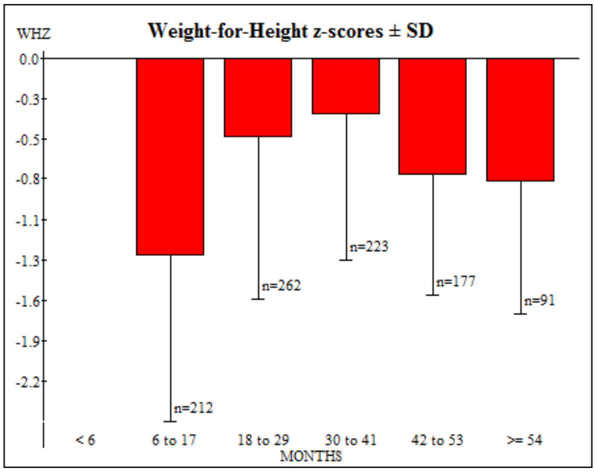


Figure 4: WHZ by Age Groups

Acute malnutrition by MUAC

The prevalence of GAM per MUAC among children 6-59 months in Nuristan was 13.6% (10.8 – 16.9 95% CI), as presented in Table 17 below. This prevalence seems higher in girls than in boys but this difference is not statistically valid (p-value = 0.101). The prevalence of SAM per MUAC among children 6-59 months was 3.5% (2.1 – 5.7 95% CI).

Table 17: Prevalence of Acute Malnutrition by MUAC (and/or oedema) by Severity and Sex among children 6-59 months

Indicators	**All** **n = 981**	**Boys** **n = 512**	**Girls** **n = 469**
Prevalence of global malnutrition (<125 mm and/or Oedema)	(133) 13.6 % (10.8 - 16.9 95% C.I.)	(61) 11.9 % (8.6 - 16.3 95% C.I.)	(72) 15.4 % (12.1 - 19.3 95% C.I.)

Prevalence of moderate malnutrition (< 125 mm to ≥115 mm, no Oedema)	(99) 10.1 % (8.2 - 12.4 95% C.I.)	(48) 9.4 % (6.7 - 13.1 95% C.I.)	(51) 10.9 % (8.5 - 13.8 95% C.I.)
Prevalence of severe malnutrition (< 115 mm and/or Oedema)	(34) 3.5 % (2.1 - 5.7 95% C.I.)	(13) 2.5 % (1.2 - 5.5 95% C.I.)	(21) 4.5 % (2.8 - 7.2 95% C.I.)

*There were not oedema cases in the sample

When disaggregated by age group, the group with the highest MAM and SAM was 6-17 months, as presented in Table 18 below. The age group with no SAM was 42-59 months. Results of this disaggregation suggest that the younger age groups (6-29) were more vulnerable to acute malnutrition compared to older groups (42-59) according to MUAC criterion (p-value < 0.05).

Table 18: Prevalence of Acute Malnutrition per MUAC and/or Oedema by Severity and Age Group

Age (months)	N	Severe wasting* (MUAC<115 mm)		Moderate wasting (MUAC ≥115 mm and <125 mm)		Normal (MUAC ≥125 mm)		Oedema	
		N	%	N	%	N	%	n	%
6-17	221	28	12.7	48	21.7	145	65.6	0	0.0
18-29	266	5	1.9	44	16.5	217	81.6	0	0.0
30-41	224	1	0.4	6	2.7	217	96.9	0	0.0
42-53	178	0	0.0	0	0.0	178	100.0	0	0.0
54-59	92	0	0.0	1	1.1	91	98.9	0	0.0
Total	981	34	3.5	99	10.1	848	86.4	0	0.0

*There were not oedema cases in the sample

Acute Malnutrition by Oedema

No Oedema case was observed in the sample. Table 19 below illustrates data for the presence and absence of oedema cases.

Table 19: Distribution of Severe Acute Malnutrition per Oedema among Children 6-59 Months

	WHZ <-3	WHZ>=-3
Presence of Oedema*	Marasmic kwashiorkor No. 0 (0.0 %)	Kwashiorkor No. 0 (0.0 %)
Absence of Oedema	Marasmic No. 32 (3.3 %)	Not severely malnourished No. 949 (96.7 %)

*There was no oedema case in the sample

Combined Acute Malnutrition by WHZ and MUAC

The prevalence of Combined GAM among children 6-59 months in Nuristan was 20.5% as presented in Table 20 below. The prevalence of Combined SAM among children 6-59 months was 5.3%. Although there is not globally established threshold for Combined GAM, the GAM and SAM prevalence were slightly higher than for WHZ or MUAC, suggesting that Combined GAM indicator captured more acutely malnourished children.

Table 20: Prevalence of Acute Malnutrition by WHZ and/or MUAC by Severity and Sex among Children 6-59 months

Indicators	**All** **n = 965**	**Boys** **n = 505**	**Girls** **n = 460**
Prevalence of Global Acute Malnutrition (MUAC<125 mm and/or WHZ<-2SD)	(198) 20.5% (17.3-24.2 95% CI)	(104) 20.6% (16.6-25.2 95% CI)	(94) 20.4% (16.6-24.9 95% CI)
Prevalence of Severe Acute Malnutrition (MUAC<115 mm and/or WHZ<-3SD)	(51) 5.3% (3.7- 7.5 95% CI)	(24) 4.8% (3.0- 7.5 95% CI)	(27) 5.9% (3.9- 8.7 95% CI)

*There were not oedema cases in the sample

Enrolment in nutrition program _ OPD/IPD for SAM/MAM cases

The proportion of children identified as acutely malnourished by MUAC only and their corresponding treatment enrolment status are presented in Table 21 below.

Overall, out of 133 children 6-59 months old identified as acutely malnourished by MUAC by the teams in the field, 99 were MAM cases and 34 were SAM cases.

Out of them, 16.5% were enrolled in a program at the time of the survey. Out of 111 children identified as malnourished but not enrolled in a treatment program, All 111 children were referred for treatment. The enrolment and referral are described in the below Table 21.

Table 21: Proportion of Acutely Malnourished Children 6-59 Months enrolled in a Treatment Program

Sample	Enrolled in an OPD SAM	Enrolled in an OPD MAM	Enrolled in an IPD SAM	Not Enrolled
Acutely malnourished children 6-59 months by MUAC, or oedema (N=133)	8	14	0	111

9.4. Prevalence of Chronic Malnutrition

The prevalence of stunting per HAZ among children 6-59 months in Nuristan province was 49.1%, as presented in Table 22 below. The prevalence of severe stunting per HAZ among children 6-59 months was 18.1%. According to WHO thresholds 2018, this prevalence was categorized as very high.

This prevalence seems lower in girls than boys but this difference is statistically significant (p-value = 0.006).

Table 22: Prevalence of Chronic Malnutrition by HAZ by Severity and Sex among Children 6-59 months, WHO 2006 Reference

Indicators	All n = 972	Boys n = 505	Girls n = 467
Prevalence of chronic malnutrition (HAZ <-2 SD)	(477) 49.1 % (43.6 - 54.6 95% C.I.)	(269) 53.3 % (47.2 - 59.3 95% C.I.)	(208) 44.5 % (38.2-51.1 95% C.I.)
Prevalence of moderate chronic malnutrition (HAZ <-2 to ≥-3 SD)	(301) 31.0 % (27.7 - 34.4 95% C.I.)	(167) 33.1 % (28.8 - 37.6 95% C.I.)	(134) 28.7 % (24.8-32.9 95% C.I.)
Prevalence of severe chronic malnutrition (HAZ <-3 SD)	(176) 18.1 % (14.3 - 22.7 95% C.I.)	(102) 20.2 % (15.6 - 25.7 95% C.I.)	(74) 15.8 % (11.4-21.6 95% C.I.)

When disaggregated by age group, the age group with the highest severe chronic malnutrition was 18-29 months, as presented in Table 23 below. The age group with the lowest chronic malnutrition was 42-53. Results of this disaggregation suggest that the younger age groups (6-41) were more vulnerable to chronic malnutrition compared to older groups (41-59) (p-value < 0.05).

Table 23: Prevalence of Chronic Malnutrition per HAZ by Severity and Age Group

Age (months)	N	Severe stunting (HAZ <-3)		Moderate stunting (HAZ >= -3 to <-2)		Normal (HAZ>= -2)	
		n	%	N	%	n	%
6-17	217	24	11.1	64	29.5	129	59.4
18-29	262	110	42.0	83	31.7	69	26.3
30-41	224	28	12.5	110	49.1	86	38.4
42-53	177	14	7.9	34	19.2	129	72.9
54-59	92	0	0.0	10	10.9	82	89.1
Total	972	176	18.1	301	31.0	495	50.9

The HAZ distribution curve (in red) as compared to the WHO 2006 reference HAZ distribution curve (in green) as presented in Figure 7 below demonstrates a shift to the left, suggesting a very stunted population in comparison to normal population. Further analysis suggests that linear severe growth retardation is at its highest in the group of children aged 18-29 months (n=262) as shown in figure 6.

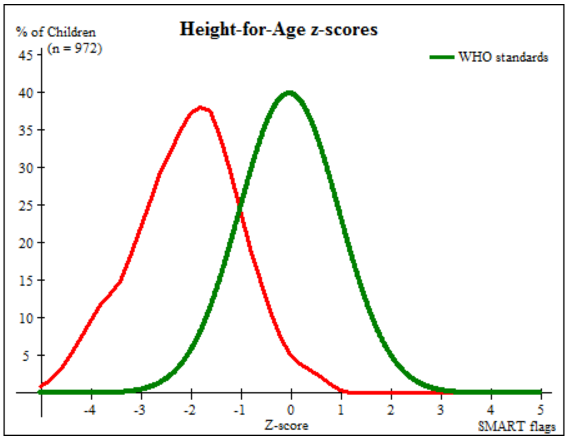


Figure 7: Distribution of WHZ Sample Compared to the WHO 2006 WHZ Reference Curve

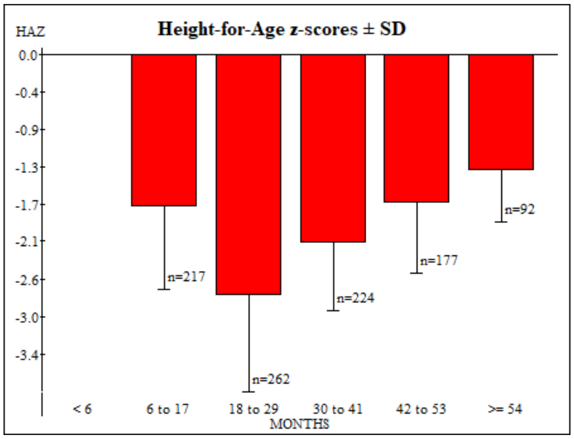


Figure 6: Means WHZ by age groups

9.5. Prevalence of Underweight

The prevalence of underweight per WAZ among

Children 6-59 months in Nuristan was 31.9%, as presented in Table 24 below. This prevalence seems higher in boys than in girls, and the difference is statistically (p-value = 0.0006). The prevalence of severe underweight per WAZ among children 6-59 months was 7.1%.

According to WHO 2018 thresholds, 31.9% underweight prevalence is categorized at very high of severity.

Table 24: Prevalence of Underweight by WAZ by Severity and Sex among Children 6-59 months, WHO 2006 Reference

Indicators	All **n = 980**	Boys **n = 511**	Girls **n = 469**
Prevalence of underweight (WAZ <-2 SD)	(313) 31.9 % (27.6 - 36.6 95% C.I.)	(188) 36.8 % (31.4 - 42.5 95% C.I.)	(125) 26.7 % (21.3 - 32.8 95% C.I.)
Prevalence of moderate underweight (WAZ <-2 and >=-3 SD)	(243) 24.8 % (21.5 - 28.4 95% C.I.)	(141) 27.6 % (23.8 - 31.8 95% C.I.)	(102) 21.7 % (17.3 - 27.0 95% C.I.)
Prevalence of severe underweight (WAZ <-3SD)	(70) 7.1 % (5.4 - 9.4 95% C.I.)	(47) 9.2 % (6.7 - 12.5 95% C.I.)	(23) 4.9 % (3.1 - 7.8 95% C.I.)

When disaggregated by age group, the age group with the highest severe and moderate underweight was 6-17 months, as presented in Table 25 below. The age group with the lowest moderate underweight was 54-59 months.

Table 25: Prevalence of Underweight per WAZ by Severity and Age Group

Age (months)	N	Severe underweight (WAZ <-3)		Moderate underweight (WAZ ≥-3 to <-2)		Normal (WHZ ≥-2)	
		n	%	n	%	N	%
6-17	221	32	14.5	77	34.8	112	50.7
18-29	266	28	10.5	70	26.3	168	63.2
30-41	224	5	2.2	44	19.6	175	78.1
42-53	177	3	1.7	42	23.7	132	74.6
54-59	92	2	2.2	10	10.9	80	87.0
Total	980	70	7.1	243	24.8	667	68.1

Further analysis suggests that linear underweight is at its highest in the group of children aged 6-17 months (n=221) as shown in table 25.

9.6. Malnutrition prevalence among Women 15-49 years old based on MUAC criterion

All women of child-bearing age (15-49 years) were included in the survey. A total of 809 women were assessed for nutrition status by MUAC. The analysis looked at all women 15-49 years, further disaggregating the sample by physiological status (pregnant, lactating, both). 77.8% of the women pregnant and lactating were malnourished. This group of women seems more vulnerable compared to non-pregnant and non-lactating women, with difference statistically significant (p-value <0.05); for more details see table 26 below.

Table 26: Prevalence of Acute Malnutrition among Women per MUAC

Sample	N	MUAC <230 mm	
		n	%
All women 15-49 years	809	255	31.5%
Pregnant women	138	42	30.4%
Lactating women	333	118	35.4%
Pregnant and lactating women*	18	14	77.8%
Non-pregnant and non-lactating women	320	81	25.3%
All PLWs	489	174	35.6%

**Women that were simultaneously pregnant and lactating*

9.7. Retrospective Mortality

The overall death rate for the surveyed population was 0.68 (0.49-0.94) below the WHO emergency thresholds of 1.0/10,000/day. The death rate was slightly higher for female compared to male in the population. The age group with the highest death rate was 65-120 years. In total, 29 deaths were observed in Nuristan.

Table 27: Retrospective Mortality in Nuristan Province

Population	**Death Rate (/10,000/Day)**	**Design Effect**
Overall	0.68 (0.49-0.94)	1.00
By Sex		
Male	0.59 (0.33-1.06)	1.09
Female	0.77 (0.48-1.22)	1.00
By Age Group (in years)		
0-4	0.94 (0.49-1.81)	1.08
5-11	0.30 (0.10-0.95)	1.00
12-17	0.00 (0.00-0.00)	1.00
18-49	0.48 (0.23-0.97)	1.00
50-64	3.14 (1.42-6.82)	1.00
65-120	5.22 (1.53-16.28)	1.04

9.8. Infant and Young Child Feeding (IYCF) practices

Indicators for IYCF practices were asked from all caregivers with children less than 24 months. A total of 406 children under two years were included in the sample, with the core IYCF indicators assessed presented in Table 28 below.

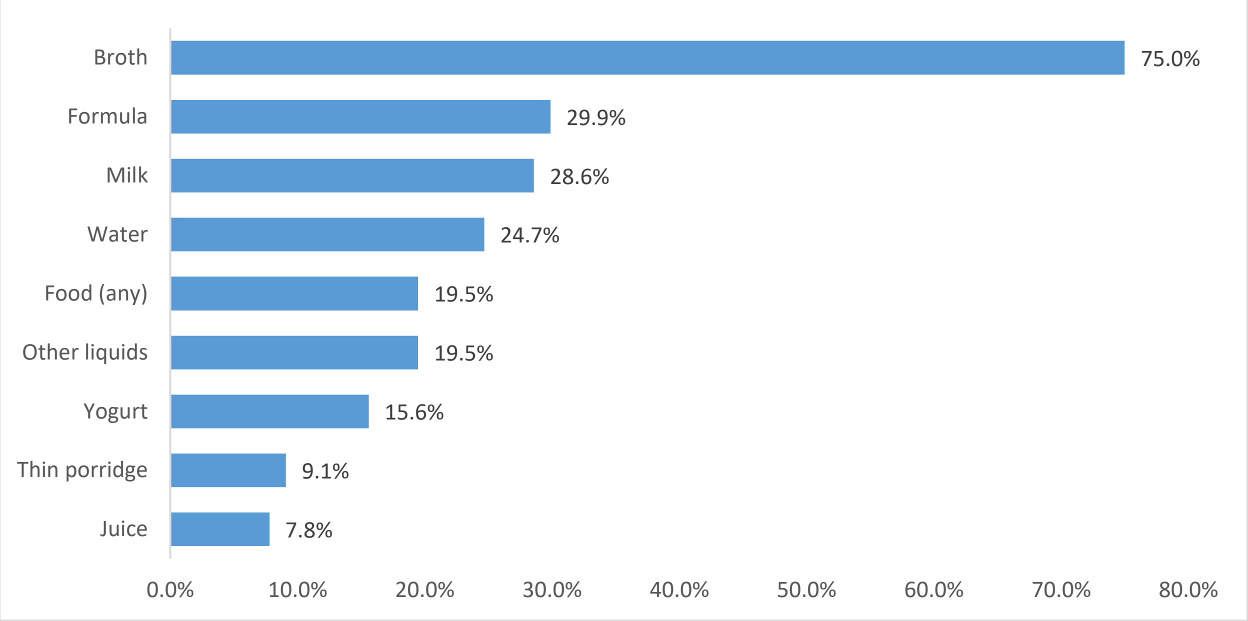
The proportion of infants breastfed within one hour of birth was 33.5% suggesting that they were breastfed within an appropriate amount of time after birth, likely receiving colostrum. However, this highlights that 1 child out of 3 does not get colostrum. The proportion of infants 0-5 months exclusively breastfed was 41.9%, suggesting frequent replacement of breastmilk by other liquids or foods at a stage when an infant should be receiving the protective benefits of exclusive breastfeeding. The proportion of children with continued breastfeeding at one year was 96.1% and at two years was 68.7%, indicating that many children are receiving breastmilk until their first year but fewer are receiving breastmilk until their second year.

Table 28: Infant and Young Child Feeding Practices

IYCF Indicator	Sample	N	n	Results
Timely initiation of breastfeeding	Children 0-23 months	406	140	34.5%
Exclusive breastfeeding	Infants 0-5 months	77	31	40.3%
Continued breastfeeding at one year	Children 12–15 months	81	78	96.3%
Continued breastfeeding at two years	Children 20-23 months	70	47	67.1%

While asking questions about breastfeeding practices, caregivers of infants 0-5 months were also asked if the infant had consumed liquids or soft, semi-soft, or solid foods in the past day. Figure 8 below presents the liquids most frequently displacing breastmilk. Highly consumed food among the families was for 75.0 % broth, followed by 29.9% infant formula Milk and 28.6% milk.

Figure 8: Liquids or Food Consumed by infants 0-5 months



9.9. Child Immunization Status

In Nuristan the survey results indicated that 79.6% of children 18-59 months had received the second dose measles immunization, as confirmed either by vaccination card or caregiver recall. Table 29 below illustrates data on second dose measles immunization coverage in Nuristan province.

Table 29: Second Dose Measles Immunization Coverages among Children 18-59 Months

Indicator		**Frequency**	**%**
Second Dose Measles Immunization (N=760)	Yes by card	4	0.5%
	Yes by recall	601	79.1%
	Yes by card *or* recall	605	79.6%
	No	114	15.0%
	Don’t know	41	5.4%

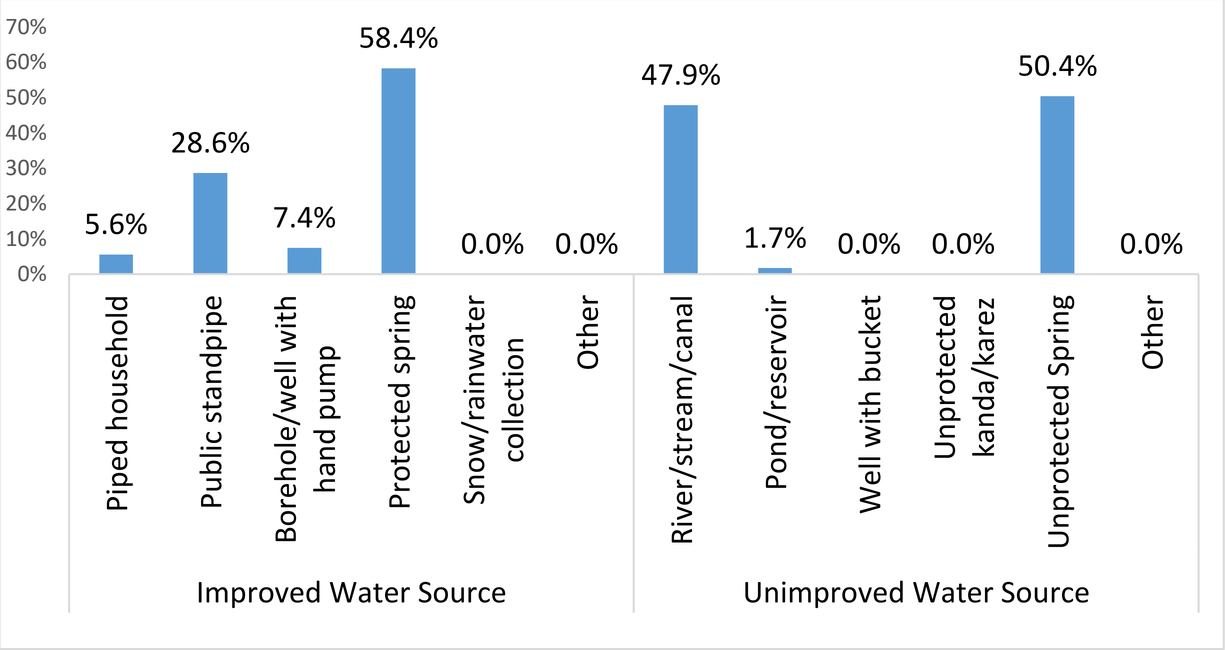
Water, Sanitation, and Hygiene

Households were asked to identify their main source of drinking water, which was then categorized as improved or unimproved during analysis. Among all households surveyed, 377 (61.5%) relied mainly on an improved water source, most commonly was protected spring and public standpipe. Meanwhile, the remaining 236 (38.5%) relied mainly on an unimproved water source, most commonly well with a bucket.

Table 30: Household Main Drinking Water Source

Main Drinking Water Source N= 543	Frequency	%
Improved Water Source	377	61.5%
Unimproved Water Source	236	38.5%

Figure 9: Household Use of Improved and Unimproved Drinking Water Sources



Hand Washing Practices (Use of Soap or Ash) among Caregivers

Caregivers demonstrated how they washed their hands for the interviewer. Overall, only 20.3% of caregivers demonstrated washing their hands with soap/ash and water. For more details refer to table 31 below

Table 31: Hand Washing Practices (Use of Soap or Ash) among Caregivers

Hand washing practices by caregivers N= 897	Frequency	%
Uses soap or ash with water	164	20.3%
Uses only water	634	78.4%
Nothing	11	1.4%

Hand Washing During Critical Moments among Caregivers

Caregiver responses about when they routinely wash their hands were assessed as five critical moments and further grouped into two categories: Hand washing after coming into contact with feces, and hand washing before coming into contact with food. Overall, 34.2% of caregivers reported washing their hands during five critical moments that fell into these two categories, suggesting a low understanding of the importance of hand washing at these moments.

Table 32: Hand Washing Practices by Caregivers at Critical Moments

Hand washing during Five Critical Moments	N	n	Results	Critical Moments in Two Categories[13]	N	n	Results
After defecation	809	752	93.0%	Washes hands after coming into contact with faeces (both options)	809	529	65.4%
After cleaning baby's bottom	809	542	67.0%				
Before food preparation	809	626	77.4%	Washes hands before coming in contact with food (All three options)	809	287	35.5%
Before eating	809	766	94.7%				
Before feeding or breastfeeding children	809	311	38.4%				
Reported washing hands during all five critical moments	809	277	34.2%	Reported washing hands during critical moments in both categories.	809	277	34.2%

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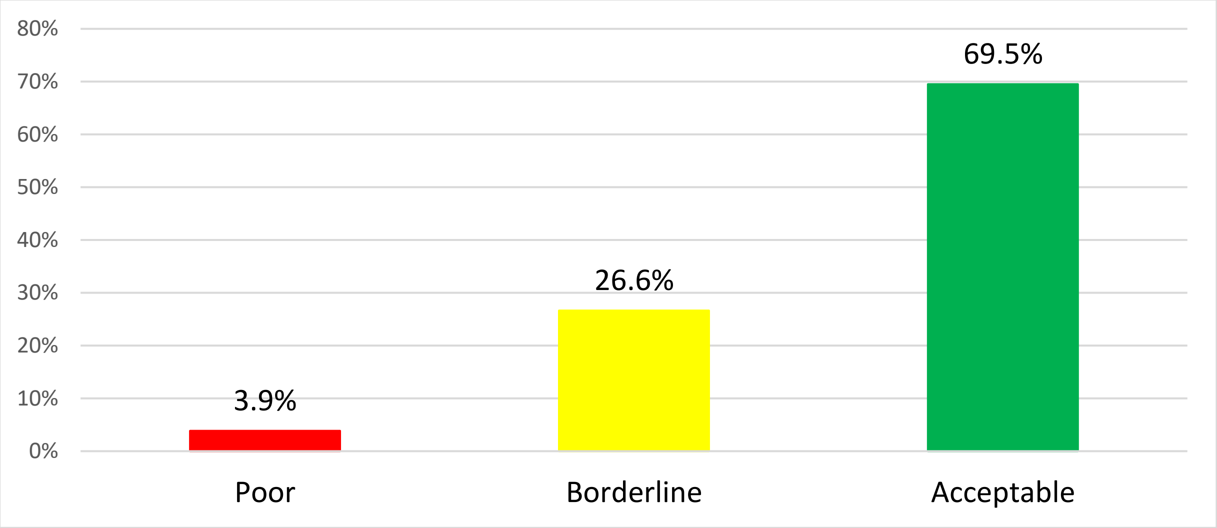
[13] The Sphere Handbook 2018

7.11. Food Security

Food Consumption Score

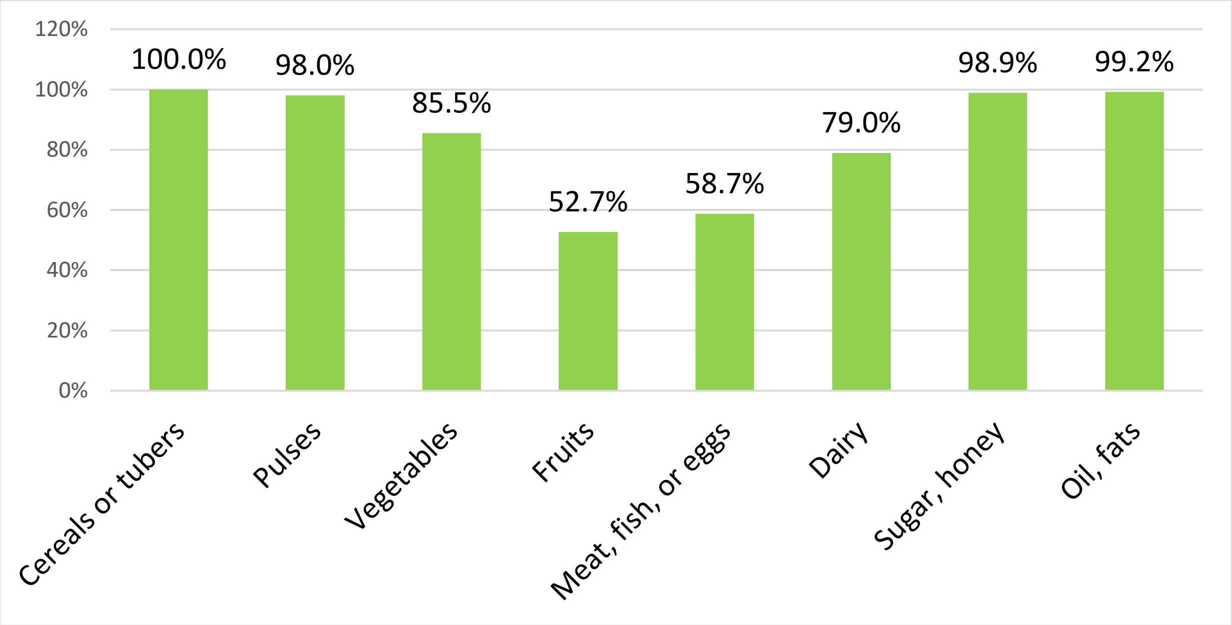
In Nuristan Province, 69.5% of households reported consuming the frequency and quality of food groups suggesting an acceptable consumption score, 26.6% a borderline consumption score, and 3.9% a poor consumption score, as presented in Figure 10 below.

Figure 10: Household Food Consumption Score



Among surveyed households, the most frequently consumed food group was cereals 100.0% and Oil/Fats (99.2%) followed by Sugar/Honey (98.9%). The least frequently consumed food group was Fruits (52.7%), as presented in Figure 11 below.

Figure 11: Frequency of Food Groups Consumed by Households



Reduced Coping Strategies Index

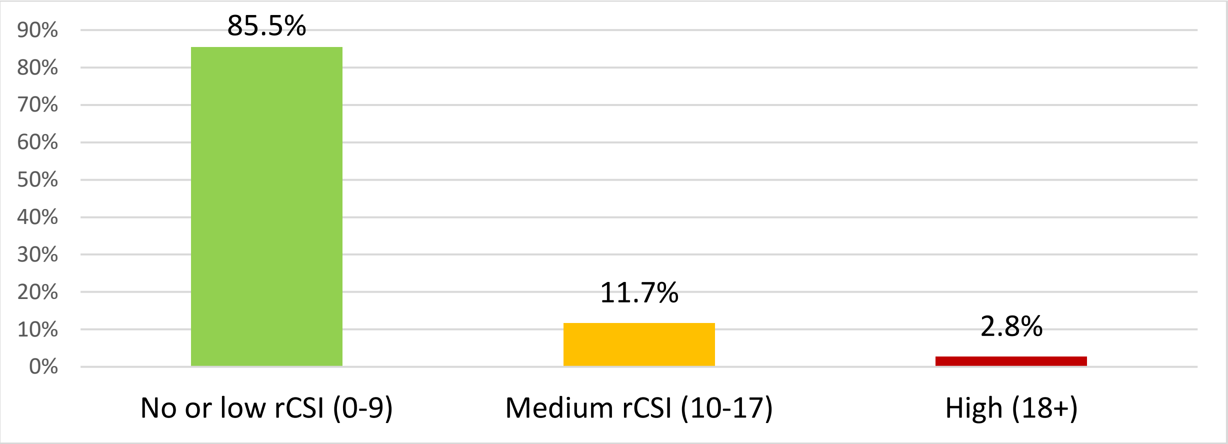
Among surveyed households, 89.1% reported not having sufficient food or money to buy food in the week prior to the survey. The most commonly reported food-related coping strategy was less prepared food (32.7%), followed by borrowing food, or rely on help from friends or relatives (28.0 %) as presented in Table 33 below.

Table 33: Reduce Coping Strategy Index Categories

Household Coping Strategies N=613	Frequency	%
Reported insufficient food or money to buy food per 7-day recall	532	89.1%
Relying on less preferred and less expensive foods	195	32.7%
Borrowing food, or rely on help from a friend or relative	167	28.0%
Limiting portion size at mealtimes	46	7.7%
Restricting consumption by adults in order for small children to eat	96	16.1%
Reducing number of meals eaten in a day	47	7.9%

Calculated and weighted as per the rCSI, it was estimated that 85.5% of households relied on no or low coping strategies, 11.7% relied on medium coping strategies, and 2.8% relied on high coping strategies, as presented in Figure 12 below.

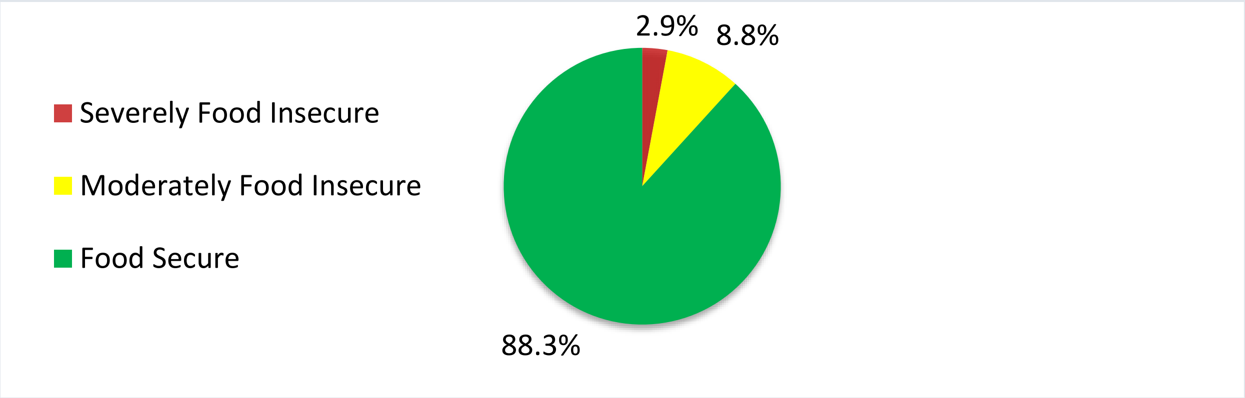
Figure 12: Household Reduced Coping Strategies Index



Food Security Classification

The triangulation of FCS and rCSI attempts to capture the interaction between household food consumption and coping strategies required to more appropriately reflect the food security situation in Nuristan province. Based on this triangulation, 2.9% of households were judged as severely food insecure, 8.8% of households were judged as moderately food insecure, and 88.3% of households were considered food secure, as presented in Figure 13.

Figure 13: Food Security Classification Assessed by FCS & rSCI



10. DISCUSSION

10.1. Nutritional Status of children under five years and women 15-49 years old

Results of this survey are not a reflection of national nutrition situation but are representative for the population living in Nuristan province.

The results of this survey showed a GAM prevalence of 12.8% (10.5 – 15.6 95% C.I.). This situation is classified at high level of severity in Nuristan province according to UNICEF_WHO 2018 threshold and a SAM prevalence of 2.4% (1.6 – 3.6 95% C.I) while the rate of 3% is agreed for Afghanistan to trigger emergency., the Nutrition Cluster and the AIM-WG as the cut-off after which a response should be prioritized in the Afghanistan context. Looking at the last SMART survey conducted in Nuristan province in August 2015, the prevalence of GAM was 14.6% (11.4 – 18.4 95% CI) and the prevalence of SAM was 2.5% (1.4 – 4.4 95% CI). The situation seems to have a reducing trend in both GAM and SAM since 2015.

The GAM prevalence per MUAC is at 13.6% (10.8 – 16.9 95% CI) and the SAM prevalence is at 3.5% (2.1 – 5.7 95% CI). These prevalence are higher than the ones expressed by WHZ.

Considering both indicators, the Combined GAM prevalence is at 20.5% (17.3 – 24.2 95% CI) and the Combined SAM prevalence is at 5.3 % (3.7 – 7.5 95% CI). This suggests a higher proportion of children under five affected by acute malnutrition in Nuristan province when considering both WHZ and MUAC criteria instead of considering separately those 2 indicators. Combined GAM prevalence captures a greater proportion of acutely malnourished children 6-59 months, and may inform better the estimations of SAM and MAM caseloads in Nuristan province, ultimately strengthening planning and programming. All children in the sample detected as acutely malnourished by either by WHZ, MUAC, or oedema are reflected in this prevalence according to combined criteria.

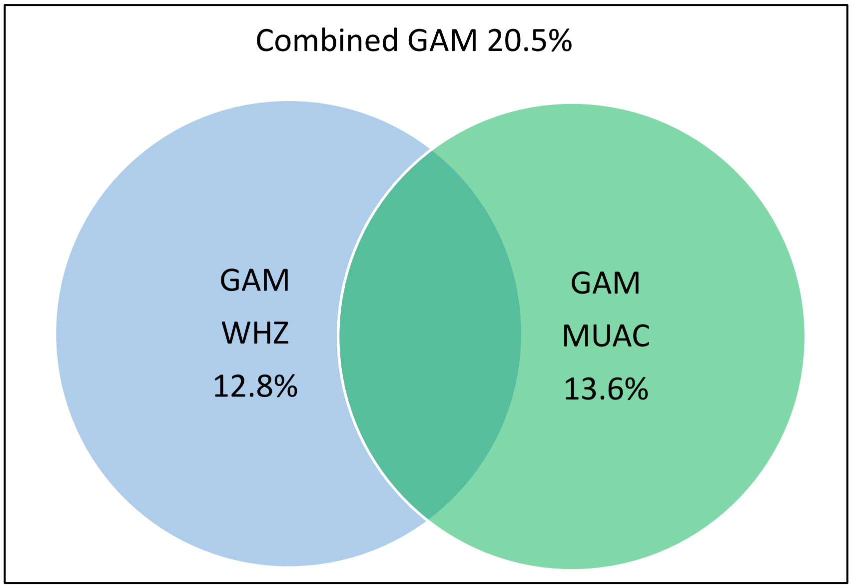


Figure 14: % Children Captured by GAM based on WHZ, MUAC, and cGAM

Across indicators with age disaggregation, a higher vulnerability toward wasting among younger children was highlighted. When the sample of children 0-59 months was compared to the sample of children 6-59 months, as presented in Table 34 below, the prevalence of acute malnutrition was statistically different between children 0-59 month and children 6-59 months old.

Table 34: Prevalence of GAM by WHZ Comparing the 0-59 Month to the 6-59 Month Sample

Sample	GAM by WHZ		SAM by WHZ	
	%	95% CI	%	95% CI
Children 0-59 Months	14.0%	(11.5 – 16.9 95% CI)	3.3%	(2.4 – 4.5 95% CI)
Children 6-59 Months	12.8%	(10.5 – 15.6 95% CI)	2.4%	(1.6- 3.6 95% CI)

By considering the Combined GAM rate, it is estimated that 8,270 6-59 months children are acutely malnourished in Nuristan province as today (out of 158,211 population, with 25.5% of children under five and a Combined GAM rate at 20.5%). Among them, 2,138 are severely acute malnourished (with a Combined SAM rate at 5.3%).

Chronic malnutrition in Nuristan province is also of concern. The prevalence of chronic malnutrition among children 6-59 months was 49.1% (43.7 – 54.6 95% CI), which was classified as very high according to the UNIECF-WHO 2018 thresholds. In other words, about 1 in 2 children in Nuristan province is not reaching his optimal growth and development. This prevalence is of further concern when the simultaneous presence of acute malnutrition is demonstrated. Recent research has concluded that children both stunted and wasted are at a heightened risk of

Concerns for the IYCF practices in Nuristan province were raised, particularly when the prevalence of exclusive breastfeeding was found to be only at 40.3%.

The proportion of children breastfed within 1 hour after birth is 34.5. These rates are unsatisfactory, highlighting the needs to reinforced IYCF intervention.

mortality[14], further suggesting that this should be a priority group for treatment interventions. In Nuristan province, it was found that among the 477 stunted children, 84 of them (17.6%) were also wasted by both criteria (WHZ<-2SD + MUAC<125 mm) and 18 of them (3.8%) were severely wasted.

Acute malnutrition among women in Nuristan province is also of concern, although there is no globally defined cut-off for acute malnutrition among women The results demonstrated that a higher proportion of women simultaneously pregnant and lactating had a low MUAC (35.6%). compared to women no pregnant and no lactating (31.5%). This may be linked to the high energy requirements for breastfeeding and fatal development, further suggesting that this group may be at a heightened risk of acute malnutrition.

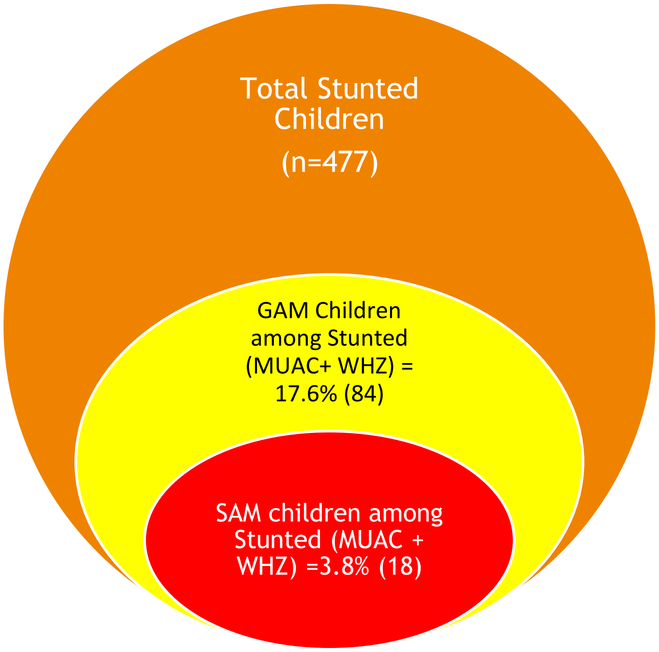


Figure 15: WaSt Children; Among Stunted Children 6-59 Months, those simultaneously wasted (MUAC+WHZ)

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[14] Myatt, M. et al (2018) Children who are both wasted and stunted are also underweight and have a high risk of death: a descriptive epidemiology of multiple anthropometric deficits using data from 51 countries

11. RECOMMENDATIONS

Nuristan PPHD and ORCD Recommendations table for the SMART survey report in Nuristan province

SMART Key Finding	Action to be taken	By who?	Resources Required	Timeline
1. GAM = 12.8 % (10.5 - 15.6 95% C.I.) Based on WHZ. 2. GAM = 13.6 % (10.8 - 16.9 95% CI) based on MUAC 3. Combined GAM =20.5% (17.3-24.2 95% CI)	• 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. • Screening of all U5 children attend HF sought care for their health to identify malnourished cases for the treatment • To launch food demonstration program in all HFs. • To strengthen nutrition education. • To strength implementation CBNP. • To launch food demonstration program in all HPs. • Strengthen HFs internal referral system. • Strengthen referral system from SHCs to upper level HFs.	PHD and Implementer NGO	Training program, RUTF, RUSF, IEC for nutrition program and transport for supervisor. International health and nutrition stakeholders have to provide and allocate resources for HNMT for Nuristan province,	30/06/2021

	Encourage CHWs for screening and referral of all <5 children			
1. Stunting = 49.1 % (43.6 - 54.695% CI**)** **2. Underweight=** 31.9 % (27.6 - 36.6 95% CI)	• To strengthen Growth Monitoring and IYCF counseling for all U2 children to improve nutrition and prevent stunting • To improve health education in HFs & community level. • Appropriate complementary feeding for old age 6 months' children. • Strengthen EPI for under one year children and Pregnant women. Strengthen referral system from SHCs to upper level HFs	BPHS implementer NGO with technical support of PHD	Secured food that is available, accessible, and useable.	30/06/2022
1. 2nd dose Measles immunization coverage=**79.9%** (Lower than National standard 90%)	• To strengthen health education in HFs level and increase communication toward benefits of the vaccination in the community. • To strengthen on the job training about EPI Micro planning. • To strengthen supportive supervision outreach planning in the health facilities. • Apply three type of EPI strategy(Fix, outreach and Mobil).	BPHS implementer NGO and other stockholder like, UNICEP, WHO and PEMT	2nd dose of Measles and IEC material	Continues

	● Encourage CHWs for referral of eligible children for vaccination.			
IYCF 1. Early initiation breastfeeding<24 months =34.5**%.** 2. Exclusive breastfeeding<6 months =40.3% 3. Introduction of solid and semisolid food 6-8 months= 44.8 %	● To communicate with WFP to Support good maternal nutrition, optimal breastfeeding (immediate and exclusive for six months), and appropriate complementary feeding (e.g., dietary diversity in children 6-23 months, continued breastfeeding) tracking change over time in populations served by development nutrition programs ● Increase availability and access to nutrition assessment counselling, and support (NACS) at community and facility levels. ● Strengthen counselling skills ● Improve capacity at community level ● Implement CF mass media(the mentioned action not applicable in Nuristan Province) ● strengthen interpersonal communication ● Performance Improvement and	BPHS implementer NGO and other stockholder like, UNICEP, WHO and PEMT	2nd dose of Measles and IEC material	Continues

	Capacity building through pre-service/in-service and community level training plus reinforcing steps e.g. supervision, monitoring, • improve the content and quality of counselling provided by health workers in the health system and community, in particular regarding early initiation of breastfeeding, exclusive breastfeeding up to 6 months, timely introduction of complementary feeding and continuation of age-appropriate complementary feeding			

WASH 1. Caregiver hand washing practice at all five critical moments = 34.1	• Jointly promote essential WASH, food and environmental hygiene, and nutrition actions in community and facility-based nutrition assessments, counselling, and education • Promote increased availability and affordability of essential commodities to facilitate hygiene practices (e.g., water treatment products, soap, hand washing stations, sanitation options) • Develop multiple use water systems that provide water for both domestic (e.g., drinking water) and productive uses (e.g., to support crops and livestock for income generation) • Focused behaviour change for hand washing should be linked to food preparation and feeding of children during 6-24 months;	BPHS implementer and other relevant stockholder like WFP, UNICEF, IHSAN project etc. under supervision of PHD	Budget in different health area	30/06/2021

1. Pregnant and lactating women (PLWs) nutrition status based on MUAC <230 mm = 35.6%	• To conduct food demonstration for PLWs • To strengthen the health education session in maternal nutrition during pregnancy and lactation and usage of local food recipe initiation in TSFP program to treat malnourished cases.	BPHS implementer NGO- WFP	-IEC material -Food commodities	30/12/2020

12. ANNEXES

Annex 1: Standard Integrated SMART Survey Questionnaire (English)

Date (dd/mm/year)			**Cluster Name**		
Cluster Number		**Team Number**		**HH Number**	

Household Questionnaire

Start date/event of recall period: 100 days [Nawroz 1398]							
1	2	3	4	5	6	7	8
No.	Name	Sex (m/f)	Age (years)	Joined on or after	Left on or after	Born on or after	Died on or after
List all current household members*							
1	Head of household						
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
List all household members which left since the start of the recall period							
1					Y		
2					Y		
3					Y		
4					Y		
5					Y		
List all household members which died since the start of the recall period							

1							Y
2							Y
3							Y

*Household defined as all people eating from the same pot and living together (WFP definition)

Date (dd/mm/year)			**Cluster Name**		
Cluster Number		**Team Number**		**HH Number**	

Household Questionnaire

Q1. What is the household resident status? 1=Resident of this area 2=Internally displaced 3=Refugee 4=Nomadic	

Date (dd/mm/year)			**Cluster Name**		
Cluster Number		**Team Number**		**HH Number**	

Child Questionnaire 0-59 months

1	2	3	4	5	6	7	8	9	10
Child ID	**Sex** (f/m)	**Birthday** (dd/mm/yyyy)	**Age** (months)	**Weight** (00.0 kg)	**Height or length** (00.0 cm)	**Measure** (l/h)*	**Bilateral edema**	**MUAC** (000 mm) *Left arm*	**With clothes** (y/n)
1									
2									
3									
4									
5									
6									
7									
8									

**Note* _only_ *if length is measured for a child who is older than 2 years or height is measured for a child who is younger than 2 years, due to unavoidable circumstances in the field*

Child (6-59 months) ID Number					

For any child that is identified as acutely malnourished (WHZ, MUAC, or edema) **Q5. Is the child currently receiving any malnutrition treatment services?** *Probe, ask for enrollment card, and observe the treatment food (RUTF / RUSF) to identify the type of treatment service* 1=OPD SAM 2=OPD MAM 3=IPD SAM 4=No treatment 98=Don't know					
If the child is <u>not</u> enrolled in a treatment program, refer to nearest appropriate treatment center **Q6. Did you refer the child?** 1=yes 0=no					

Date (dd/mm/year)			**Cluster Name**		
Cluster Number		**Team Number**		**HH Number**	

Child Questionnaire

Child (18-59 months) ID Number					
Q7. Has the child received <u>two doses</u> of measles vaccination? (on the upper right arm) *Ask for vaccination card to verify if available* 1=Received two doses as confirmed by vaccination card 2=Received two doses as confirmed by caregiver recall 3=Has not received two doses 98=Don't know					

Child (<24 months) ID Number					
Q8. How long after birth was the child first put to breast? 1=Within one hour 2=In the first day within 24 hours 3=After the first day (>24 hours) 98=Don't know					

Q9. Was the child breastfed yesterday during the day or night? *This includes if the child was fed expressed breastmilk by cup, bottle, or by another woman (these are also considered "yes")* 1=Yes 0=No 98=Don't know					
Q10. Did the child have any liquid drink other than breastmilk yesterday during the day or night? *Do not read options, probe by asking open questions and record all that apply. Vitamin drops, ORS, or medicine as drops are not counted* 1=Yes 0=No					
A. Plain water					
B. Infant formula					
C. Powdered or fresh animal milk					
D. Juice or soft drinks					
E. Clear broth					
F. Yogurt					
G. Thin porridge					
H. Any other liquids (tea, coffee, etc.)					
Q11. Did the child have any solid, semi-solid, or soft foods yesterday during the day or night? 1=Yes 0=No 98=Don't know					

Date (dd/mm/year)			**Cluster Name**		
Cluster Number		**Team Number**		**HH Number**	

Woman (15-49 years) HH Member ID Number					
Q14. Status of woman 1=Pregnant 2=Lactating 3=Pregnant and lactating 4=None					
MUAC measurement (mm)					

Annex 2: Randomly selected geographical unit/ cluster for Nuristan province SMART survye

Province_Pname	Distract Name	Geographical unit	Population size	Cluster
Nuristan	Kamdish	پاپړوک	49	1
Nuristan	Kamdish	ثمر باغ	905	2
Nuristan	Kamdish	برکامدیش	252	3
Nuristan	Kamdish	اورمړی	455	4
Nuristan	Kamdish	منډګل	2765	5,6
Nuristan	Kamdish	کمو	910	7
Nuristan	Kamdish	کنډک سه (دوآبه)	840	8
Nuristan	Kamdish	نانګل	210	9
Nuristan	Kamdish	کموزآباد	595	10
Nuristan	Paron	بونی	595	RC
Nuristan	Paron	پرونز	749	11
Nuristan	Paron	ډیوه	665	12
Nuristan	Paron	مدینه	490	13
Nuristan	Paron	ثخوم	490	14
Nuristan	Paron	کشتکی	1050	15
Nuristan	Paron	چتراس	1050	16
Nuristan	Paron	ماندی	420	17
Nuristan	Paron	ایشتیوی	700	18
Nuristan	Wama	اسلام اباد	910	19
Nuristan	Wama	سر پل	1400	20
Nuristan	Wama	لنډی اباد	1210	21
Nuristan	Wama	کوردرخوړ	140	22
Nuristan	Wama	بوبی/بونی	210	RC
Nuristan	Wama	ارچیانو	1050	23
Nuristan	Want/Wigal	ژیاک	315	24
Nuristan	Want/Wigal	ینشا	1420	25
Nuristan	Want/Wigal	ګومګل+اشرک	700	26
Nuristan	Want/Wigal	وایګل سفلی	1960	27
Nuristan	Want/Wigal	کانډروک	700	28
Nuristan	Want/Wigal	نیخپای	560	29
Nuristan	Want/Wigal	گکیت	210	30
Nuristan	Want/Wigal	وایګل علیا	864	31
Nuristan	Want/Wigal	کمر کلی	133	32
Nuristan	Want/Wigal	ارانس	490	33
Nuristan	Want/Wigal	نیشګرام	3290	34,35
Nuristan	Want/Wigal	مرګل	364	36

Nuristan	Want/Wigal	کیګل	930	RC
Nuristan	Want/Wigal	کنډ کلی	1120	37
Nuristan	Mandol	کوراج	420	38
Nuristan	Mandol	پړوس	1350	39
Nuristan	Doab	دانه پیار	196	40
Nuristan	Doab	سروج	700	41
Nuristan	Doab	ماوی	910	42
Nuristan	Doab	اشتر+ کویشتک	245	43
Nuristan	Doab	دان بجګل	1050	44
Nuristan	Doab	دوآب	805	45
Nuristan	Norgram	ژانی	714	46
Nuristan	Norgram	کیړی	245	47
Nuristan	Norgram	سرناړک	1750	48
Nuristan	Norgram	کورا	168	49
Nuristan	Norgram	بکوتګل نیشه	350	RC
Nuristan	Norgram	ډینګور	540	50
Nuristan	Norgram	پرک	1260	51
Nuristan	Norgram	دوستو	490	RC
Nuristan	Norgram	مامو	1400	52
Nuristan	Norgram	زیارت کلی	350	53
Nuristan	Norgram	کو یتا	1400	54
Nuristan	Bargimatal	افسی	200	55
Nuristan	Bargimatal	پیشاورک	600	56

Annex 3: Plausibility check for: Nuristan SMART

Plausibility check for: Nuristan_SMART_survey_June_2019_Afghanistan.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 (1.6 %)

Overall Sex ratio        Incl    p     >0.1  >0.05    >0.001   <=0.001
(Significant chi square)                 0      2        4       10         0 (p=0.170)

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=0.020)

Dig pref score - weight  Incl    #     0-7   8-12     13-20     > 20
                                         0     2         4        10        0 (7)

Dig pref score - height  Incl    #     0-7   8-12     13-20     > 20
                                         0     2         4        10        2 (9)

Dig pref score - MUAC    Incl    #     0-7   8-12     13-20     > 20
                                         0     2         4        10        0 (4)

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 (1.11)

Skewness  WHZ            Excl    #     <±0.2 <±0.4    <±0.6    >=±0.6
                                         0     1         3         5        0 (-0.11)

Kurtosis  WHZ            Excl    #     <±0.2 <±0.4    <±0.6    >=±0.6
                                         0     1         3         5        1 (-0.31)

Poisson dist WHZ-2       Excl    p     >0.05 >0.01    >0.001   <=0.001
                                         0     1         3         5        0 (p=0.189)

OVERALL SCORE WHZ =                     0-9  10-14    15-24     >25         12 %
```

The overall score of this survey is 12 %, this is good.

There were no duplicate entries detected.

Percentage of children with no exact birthday: 99 %

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=17/ID=2: **WHZ (2.288)**, Height may be incorrect
Line=37/ID=1: HAZ (-5.759), Age may be incorrect
Line=71/ID=2: HAZ (-5.783), Height may be incorrect
Line=97/ID=2: HAZ (-5.286), Age may be incorrect
Line=120/ID=2: HAZ (1.350), Age may be incorrect
Line=136/ID=1: HAZ (-6.039), Height may be incorrect
Line=147/ID=2: **WHZ (2.286)**, Weight may be incorrect
Line=158/ID=6: HAZ (-5.132), Age may be incorrect
Line=185/ID=1: **WHZ (2.319)**, Height may be incorrect
Line=273/ID=3: **WHZ (-4.739)**, Weight may be incorrect
Line=274/ID=1: **WHZ (-4.425)**, Weight may be incorrect
Line=476/ID=1: **WHZ (-4.996)**, Weight may be incorrect
Line=490/ID=2: **WHZ (-4.834)**, Weight may be incorrect
Line=503/ID=2: **WHZ (2.363)**, Height may be incorrect
Line=561/ID=2: **WHZ (-8.963)**, WAZ (-6.689), Weight may be incorrect
Line=677/ID=2: **WHZ (2.363)**, Weight may be incorrect
Line=835/ID=2: **WHZ (-4.731)**, Height may be incorrect
Line=874/ID=3: **WHZ (-4.137)**, Height may be incorrect
Line=888/ID=2: HAZ (3.121), Height may be incorrect
Line=933/ID=1: HAZ (1.389), Age may be incorrect
Line=965/ID=2: **WHZ (3.791)**, Weight may be incorrect
Line=971/ID=1: **WHZ (-5.181)**, Weight may be incorrect
Line=982/ID=1: **WHZ (2.307)**, Weight may be incorrect
Line=1041/ID=1: **WHZ (-5.339)**, HAZ (3.851), Height may be incorrect

Percentage of values flagged with SMART flags:WHZ: 1.6 %, HAZ: 0.9 %, WAZ: 0.1 %

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: 0.99 (The value should be around 0.85).: p-value = 0.020 (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    103/118.8 (0.9)    118/108.8 (1.1)    221/227.6 (1.0)    0.87
18 to 29      12    129/115.8 (1.1)    137/106.1 (1.3)    266/221.9 (1.2)    0.94
30 to 41      12    114/112.3 (1.0)    110/102.8 (1.1)    224/215.1 (1.0)    1.04
42 to 53      12    107/110.5 (1.0)     71/101.2 (0.7)    178/211.7 (0.8)    1.51
54 to 59       6      59/54.6 (1.1)      33/50.1 (0.7)     92/104.7 (0.9)    1.79
-------------------------------------------------------------------------------------
6  to 59      54    512/490.5 (1.0)    469/490.5 (1.0)                       1.09
```

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

Overall sex ratio: p-value = 0.170 (boys and girls equally represented)
Overall age distribution: p-value = 0.003 (significant difference)
Overall age distribution for boys: p-value = 0.395 (as expected)
Overall age distribution for girls: p-value = 0.000 (significant difference)
Overall sex/age distribution: p-value = 0.000 (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: **7** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.000 (significant difference)

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: **9** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.000 (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: **4** (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)
p-value for chi2: 0.258

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

exclusion (Flag) procedures

```
.                                    no exclusion     exclusion from    exclusion from
.                                                     reference mean     observed mean
.                                                       (WHO flags)      (SMART flags)
WHZ
Standard Deviation SD:                      1.22              1.18          1.11
(The SD should be between 0.8 and 1.2)
Prevalence (< -2)
observed:                                  13.6%             13.3%             12.8%
calculated with current SD:                15.6%             14.3%             12.9%
calculated with a SD of 1:                 10.8%             10.5%             10.5%

HAZ
Standard Deviation SD:                      1.13              1.12              1.06
(The SD should be between 0.8 and 1.2)
Prevalence (< -2)
observed:                                  49.1%             49.1%             49.1%
calculated with current SD:                51.9%             51.7%             52.0%
calculated with a SD of 1:                 52.1%             51.9%             52.1%

WAZ
Standard Deviation SD:                      0.86              0.85              0.85
(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= 0.051          p= 0.048
HAZ                                      p= 0.000          p= 0.000          p= 0.005
WAZ                                      p= 0.000          p= 0.003          p= 0.003
(If p < 0.05 then the data are not normally distributed. If p > 0.05 you can consider the data
normally distributed)


Skewness
WHZ                                        -0.51             -0.15             -0.11
HAZ                                         0.02              0.06             -0.14
WAZ                                        -0.36             -0.18             -0.18
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                                          2.36            0.37            -0.31
HAZ                                          1.14            1.08            -0.18
WAZ                                          1.23            0.25             0.25
```

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=1.17 (p=0.189)
WHZ < -3: ID=0.92 (p=0.630)
GAM:      ID=1.17 (p=0.189)
SAM:      ID=0.92 (p=0.630)
HAZ < -2: ID=1.69 (p=0.001)
HAZ < -3: ID=2.33 (p=0.000)
WAZ < -2: ID=1.81 (p=0.000)
WAZ < -3: ID=1.39 (p=0.033)
```

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: 1.33 (n=52, f=0)  ######################
02: 0.93 (n=50, f=0)  ######
03: 1.10 (n=50, f=0)  #############
04: 1.11 (n=49, f=0)  #############
05: 1.22 (n=52, f=1)  ##################
06: 1.24 (n=51, f=2)  ##################
07: 0.99 (n=50, f=1)  ########
08: 1.22 (n=48, f=1)  ##################
09: 1.25 (n=47, f=1)  ###################
10: 0.97 (n=43, f=0)  #######
11: 1.28 (n=43, f=0)  ####################
12: 1.09 (n=42, f=0)  ############
13: 1.27 (n=42, f=1)  ####################
14: 1.30 (n=43, f=1)  #####################
15: 1.07 (n=42, f=0)  ###########
16: 1.32 (n=39, f=2)  ######################
17: 2.05 (n=36, f=3)  #####################################################
18: 1.48 (n=32, f=1)  ############################
19: 1.28 (n=32, f=1)  ####################
20: 1.16 (n=26, f=0)  ###############
21: 1.20 (n=22, f=1)  OOOOOOOOOOOOOOOOO
22: 1.04 (n=16, f=0)  OOOOOOOOOO
23: 0.70 (n=15, f=0)
24: 0.91 (n=11, f=0)  ~~~~~
25: 0.73 (n=10, f=0)
26: 1.16 (n=10, f=0)  ~~~~~~~~~~~~~~~
27: 1.42 (n=06, f=0)  ~~~~~~~~~~~~~~~~~~~~~~~~~~
28: 0.92 (n=06, f=0)  ~~~~~
29: 0.74 (n=05, f=0)
30: 2.09 (n=03, f=0)  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
31: 1.61 (n=03, f=0)  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
32: 0.63 (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**
n =	154	170	169	183	121	184
Percentage of values flagged with SMART flags:						
WHZ:	0.6	1.8	1.8	1.6	0.8	2.2
HAZ:	2.6	0.6	1.8	0.5	0.0	0.0
WAZ:	0.0	0.0	0.0	0.0	0.8	0.0
Age ratio of 6-29 months to 30-59 months:						
	0.93	1.21	1.45	0.68	0.78	1.02
Sex ratio (male/female):						
	0.93	1.21	0.97	1.15	1.16	1.16
Digit preference Weight (%):						
.0 :	16	19	9	4	1	12
.1 :	17	10	9	16	13	9
.2 :	14	19	9	14	17	9
.3 :	5	15	11	16	7	10
.4 :	6	6	13	14	13	5
.5 :	11	9	9	11	9	9
.6 :	4	4	6	11	9	15
.7 :	3	7	8	3	7	8
.8 :	12	4	12	5	11	14
.9 :	11	7	13	5	12	9
DPS:	16	18	8	16	14	9
Digit preference score (0-7 excellent, 8-12 good, 13-20 acceptable and > 20 problematic)						
Digit preference Height (%):						
.0 :	32	14	28	3	2	11
.1 :	10	3	12	10	6	6
.2 :	10	19	6	15	12	7

.3 :	9	14	11	11	10	13
.4 :	7	5	4	9	17	10
.5 :	3	16	16	13	7	22
.6 :	8	6	6	11	18	10
.7 :	8	8	7	7	10	5
.8 :	5	5	4	10	11	7
.9 :	8	10	7	11	7	9
DPS:	26	17	23	11	15	15

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

Digit preference MUAC (%):

.0 :	5	14	24	1	1	11
.1 :	25	6	6	3	3	11
.2 :	12	11	5	13	12	8
.3 :	4	9	5	14	12	13
.4 :	7	6	7	14	17	10
.5 :	3	15	14	11	8	8
.6 :	10	13	11	10	18	10
.7 :	3	11	8	7	9	10
.8 :	15	8	8	16	12	11
.9 :	17	7	14	11	7	8
DPS:	23	10	19	15	17	5

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

Standard deviation of WHZ:

SD	1.11	1.34	1.22	1.02	1.24	1.23

Prevalence (< -2) observed:

%	14.3	10.6	16.6	12.0	9.9	16.8

Prevalence (< -2) calculated with current SD:

%	14.3	9.1	19.6	16.2	17.2	16.1

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

%	11.8	3.7	14.8	15.8	12.0	11.2

Standard deviation of HAZ:

SD	1.12	1.14	1.27	0.88	0.91	1.14

observed:

%	54.5	65.3	54.4		52.2
calculated with current SD:					
%	57.4	63.1	54.9		55.2
calculated with a SD of 1:					
%	58.3	64.8	56.2		55.9

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      12/17.2 (0.7)      16/18.6 (0.9)      28/35.7 (0.8)    0.75
18 to 29     12      21/16.7 (1.3)      25/18.1 (1.4)      46/34.8 (1.3)    0.84
30 to 41     12      16/16.2 (1.0)      24/17.5 (1.4)      40/33.8 (1.2)    0.67
42 to 53     12      19/16.0 (1.2)      11/17.3 (0.6)      30/33.2 (0.9)    1.73
54 to 59      6        6/7.9 (0.8)        4/8.5 (0.5)      10/16.4 (0.6)    1.50
-------------------------------------------------------------------------------------
6  to 59     54      74/77.0 (1.0)      80/77.0 (1.0)                       0.93
```

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

Overall sex ratio: p-value = 0.629 (boys and girls equally represented)
Overall age distribution: p-value = 0.055 (as expected)
Overall age distribution for boys: p-value = 0.452 (as expected)
Overall age distribution for girls: p-value = 0.040 (significant difference)
Overall sex/age distribution: p-value = 0.007 (significant difference)

Team 2:

```
Age cat.     mo.        boys             girls            total     ratio boys/girls
-------------------------------------------------------------------------------------
6  to 17     12      21/21.6 (1.0)      30/17.9 (1.7)      51/39.4 (1.3)    0.70
18 to 29     12      22/21.0 (1.0)      20/17.4 (1.1)      42/38.5 (1.1)    1.10
30 to 41     12      30/20.4 (1.5)      14/16.9 (0.8)      44/37.3 (1.2)    2.14
42 to 53     12      16/20.1 (0.8)       6/16.6 (0.4)      22/36.7 (0.6)    2.67
```

```
54 to 59      6        4/9.9 (0.4)        7/8.2 (0.9)      11/18.1 (0.6)    0.57
-------------------------------------------------------------------------------------
6  to 59     54      93/85.0 (1.1)      77/85.0 (0.9)                       1.21
```

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

Overall sex ratio: p-value = 0.220 (boys and girls equally represented)

Overall age distribution: p-value = 0.009 (significant difference)

Overall age distribution for boys: p-value = 0.062 (as expected)

Overall age distribution for girls: p-value = 0.003 (significant difference)

Overall sex/age distribution: p-value = 0.000 (significant difference)

Team 3:

```
Age cat.     mo.        boys              girls             total     ratio boys/girls
-------------------------------------------------------------------------------------
6  to 17     12      17/19.3 (0.9)      21/20.0 (1.1)      38/39.2 (1.0)    0.81
18 to 29     12      30/18.8 (1.6)      32/19.5 (1.6)      62/38.2 (1.6)    0.94
30 to 41     12      12/18.2 (0.7)      15/18.9 (0.8)      27/37.1 (0.7)    0.80
42 to 53     12      21/17.9 (1.2)      17/18.6 (0.9)      38/36.5 (1.0)    1.24
54 to 59      6        3/8.9 (0.3)        1/9.2 (0.1)       4/18.0 (0.2)    3.00
-------------------------------------------------------------------------------------
6  to 59     54      83/84.5 (1.0)      86/84.5 (1.0)                       0.97
```

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

Overall sex ratio: p-value = 0.817 (boys and girls equally represented)

Overall age distribution: p-value = 0.000 (significant difference)

Overall age distribution for boys: p-value = 0.009 (significant difference)

Overall age distribution for girls: p-value = 0.003 (significant difference)

Overall sex/age distribution: p-value = 0.000 (significant difference)

Team 4:

```
Age cat.     mo.        boys              girls             total     ratio boys/girls
-------------------------------------------------------------------------------------
6  to 17     12      17/22.7 (0.7)      16/19.7 (0.8)      33/42.5 (0.8)    1.06
```

```
18 to 29     12      16/22.2 (0.7)      25/19.2 (1.3)      41/41.4 (1.0)    0.64
30 to 41     12      19/21.5 (0.9)      21/18.6 (1.1)      40/40.1 (1.0)    0.90
42 to 53     12      23/21.1 (1.1)      11/18.3 (0.6)      34/39.5 (0.9)    2.09
54 to 59      6      23/10.5 (2.2)       12/9.1 (1.3)      35/19.5 (1.8)    1.92
-------------------------------------------------------------------------------------
6  to 59     54      98/91.5 (1.1)      85/91.5 (0.9)                       1.15
```

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

Overall sex ratio: p-value = 0.337 (boys and girls equally represented)
Overall age distribution: p-value = 0.004 (significant difference)
Overall age distribution for boys: p-value = 0.001 (significant difference)
Overall age distribution for girls: p-value = 0.158 (as expected)
Overall sex/age distribution: p-value = 0.000 (significant difference)

Team 5:

```
Age cat.     mo.        boys              girls             total     ratio boys/girls
-------------------------------------------------------------------------------------
6  to 17     12      14/15.1 (0.9)      17/13.0 (1.3)      31/28.1 (1.1)    0.82
18 to 29     12      10/14.7 (0.7)      12/12.7 (0.9)      22/27.4 (0.8)    0.83
30 to 41     12      19/14.3 (1.3)      13/12.3 (1.1)      32/26.5 (1.2)    1.46
42 to 53     12      14/14.0 (1.0)      12/12.1 (1.0)      26/26.1 (1.0)    1.17
54 to 59      6        8/6.9 (1.2)        2/6.0 (0.3)      10/12.9 (0.8)    4.00
-------------------------------------------------------------------------------------
6  to 59     54      65/60.5 (1.1)      56/60.5 (0.9)                       1.16
```

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

Overall sex ratio: p-value = 0.413 (boys and girls equally represented)
Overall age distribution: p-value = 0.534 (as expected)
Overall age distribution for boys: p-value = 0.505 (as expected)
Overall age distribution for girls: p-value = 0.411 (as expected)
Overall sex/age distribution: p-value = 0.095 (as expected)

Team 6:

```
Age cat.     mo.        boys             girls            total     ratio boys/girls
-------------------------------------------------------------------------------------
6  to 17     12      22/23.0 (1.0)      18/19.7 (0.9)      40/42.7 (0.9)    1.22
18 to 29     12      30/22.4 (1.3)      23/19.2 (1.2)      53/41.6 (1.3)    1.30
30 to 41     12      18/21.7 (0.8)      23/18.6 (1.2)      41/40.3 (1.0)    0.78
42 to 53     12      14/21.4 (0.7)      14/18.3 (0.8)      28/39.7 (0.7)    1.00
54 to 59      6      15/10.6 (1.4)        7/9.1 (0.8)      22/19.6 (1.1)    2.14
-------------------------------------------------------------------------------------
6  to 59     54      99/92.0 (1.1)      85/92.0 (0.9)                       1.16
```

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

Overall sex ratio: p-value = 0.302 (boys and girls equally represented)

Overall age distribution: p-value = 0.135 (as expected)

Overall age distribution for boys: p-value = 0.105 (as expected)

Overall age distribution for girls: p-value = 0.491 (as expected)

Overall sex/age distribution: p-value = 0.014 (significant difference)

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: 1.38 (n=09, f=0)  ########################
02: 1.18 (n=09, f=0)  ################
03: 0.74 (n=08, f=0)
04: 0.97 (n=09, f=0)  #######
05: 0.91 (n=09, f=0)  ####
06: 0.62 (n=08, f=0)
07: 0.80 (n=09, f=0)
08: 1.01 (n=08, f=0)  #########
09: 0.76 (n=08, f=0)
10: 0.98 (n=09, f=0)  ########
11: 0.91 (n=07, f=0)  ####
12: 1.06 (n=08, f=0)  ###########
13: 1.28 (n=09, f=0)  ####################
14: 1.40 (n=08, f=0)  #########################
15: 0.82 (n=06, f=0)  #
16: 1.02 (n=07, f=0)  #########
17: 1.59 (n=07, f=1)  #################################
18: 1.09 (n=04, f=0)  OOOOOOOOOOOO
19: 0.23 (n=02, f=0)
20: 0.29 (n=02, f=0)
21: 0.62 (n=02, f=0)
23: 0.81 (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: 1.96 (n=09, f=1)  #################################################
02: 1.21 (n=09, f=0)  #################
03: 1.20 (n=08, f=0)  #################
04: 0.55 (n=09, f=0)
05: 1.92 (n=09, f=1)  ###############################################
06: 1.20 (n=09, f=0)  #################
07: 0.83 (n=09, f=0)  #
08: 0.89 (n=09, f=0)  ####
09: 1.19 (n=09, f=0)  ################
10: 0.73 (n=09, f=0)
11: 1.42 (n=09, f=0)  ##########################
12: 0.81 (n=09, f=0)
13: 1.44 (n=09, f=0)  ###########################
14: 1.59 (n=08, f=0)  #################################
15: 1.23 (n=08, f=0)  ##################
16: 1.41 (n=08, f=0)  #########################
17: 2.27 (n=08, f=1)  ##############################################################
18: 1.04 (n=06, f=0)  OOOOOOOOOO
19: 1.60 (n=09, f=0)  #################################
20: 1.13 (n=05, f=0)  OOOOOOOOOOOOOO
21: 0.71 (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: 1.18 (n=10, f=0)  ################
02: 0.47 (n=09, f=0)
03: 1.36 (n=10, f=0)  #######################
04: 0.88 (n=10, f=0)  ###
05: 1.32 (n=10, f=0)  ######################
06: 1.61 (n=10, f=1)  ##################################
07: 1.32 (n=09, f=0)  ######################
08: 1.05 (n=08, f=0)  ##########
09: 1.09 (n=08, f=0)  ############
10: 0.63 (n=06, f=0)
11: 1.40 (n=07, f=0)  #########################
12: 1.33 (n=05, f=0)  ######################
13: 1.43 (n=06, f=1)  ##########################
14: 0.97 (n=06, f=0)  #######
15: 0.90 (n=07, f=0)  ####
16: 2.14 (n=06, f=1)  ########################################################
17: 1.14 (n=06, f=0)  ##############
18: 1.93 (n=05, f=0)  ################################################
19: 1.13 (n=05, f=0)  ##############
20: 0.98 (n=05, f=0)  ########
21: 1.16 (n=04, f=0)  OOOOOOOOOOOOOOO
22: 0.41 (n=04, f=0)
23: 0.08 (n=02, f=0)
24: 0.13 (n=03, f=0)
25: 0.89 (n=03, f=0)  OOOO
26: 1.52 (n=03, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOO

(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: 0.91 (n=07, f=0)  #####
02: 0.85 (n=07, f=0)  ##
03: 0.31 (n=07, f=0)
04: 1.64 (n=06, f=0)  ###################################
05: 0.84 (n=07, f=0)  ##
06: 1.79 (n=07, f=1)  #########################################
07: 0.37 (n=07, f=0)
08: 1.33 (n=07, f=1)  ######################
09: 0.93 (n=07, f=0)  ######
10: 0.82 (n=06, f=0)  #
11: 0.85 (n=06, f=0)  ##
12: 0.57 (n=06, f=0)
13: 0.54 (n=06, f=0)
14: 0.92 (n=07, f=0)  #####
15: 0.93 (n=07, f=0)  ######
16: 0.56 (n=07, f=0)
17: 1.11 (n=06, f=0)  #############
18: 1.07 (n=07, f=0)  ############
19: 0.72 (n=06, f=0)
20: 0.92 (n=05, f=0)  #####
21: 1.93 (n=06, f=1)  ###############################################
22: 1.40 (n=06, f=0)  #########################
23: 0.78 (n=06, f=0)
24: 1.16 (n=06, f=0)  ###############
25: 0.62 (n=04, f=0)
26: 0.50 (n=04, f=0)
27: 1.74 (n=04, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
28: 1.18 (n=04, f=0)  OOOOOOOOOOOOOOOO
29: 0.56 (n=04, f=0)
30: 2.89 (n=02, f=0)  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
31: 0.83 (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: 0.93 (n=07, f=0)  #####
02: 0.35 (n=07, f=0)
03: 1.39 (n=07, f=0)  #########################
04: 0.86 (n=06, f=0)  ###
05: 0.80 (n=07, f=0)
06: 0.64 (n=07, f=0)
07: 0.92 (n=06, f=0)  #####
08: 1.03 (n=06, f=0)  ##########
09: 0.99 (n=06, f=0)  ########
10: 1.06 (n=05, f=0)  ###########
11: 1.33 (n=05, f=0)  ######################
12: 1.51 (n=06, f=0)  ##############################
13: 1.55 (n=04, f=0)  ################################
14: 0.58 (n=06, f=0)
15: 1.11 (n=06, f=0)  #############
16: 0.32 (n=04, f=0)
17: 5.40 (n=03, f=1)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO
18: 0.50 (n=04, f=0)
19: 1.59 (n=04, f=0)  #################################
20: 0.65 (n=04, f=0)
21: 0.27 (n=03, f=0)
22: 0.25 (n=02, f=0)
23: 0.59 (n=03, f=0)
25: 0.10 (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: 1.11 (n=10, f=0)  #############
02: 0.75 (n=09, f=0)
03: 1.04 (n=10, f=0)  ##########
04: 1.05 (n=09, f=0)  ##########
05: 1.06 (n=10, f=0)  ###########
06: 0.78 (n=10, f=0)
07: 1.22 (n=10, f=1)  ##################
08: 1.20 (n=10, f=0)  #################
09: 1.86 (n=09, f=1)  #############################################
10: 0.93 (n=08, f=0)  #####
11: 1.31 (n=09, f=0)  #####################
12: 1.09 (n=08, f=0)  ############
13: 1.44 (n=08, f=0)  ###########################
14: 1.85 (n=08, f=1)  ############################################
15: 1.30 (n=08, f=0)  #####################
16: 1.49 (n=07, f=0)  #############################
17: 1.16 (n=06, f=0)  ###############
18: 2.20 (n=06, f=1)  ###########################################################
19: 0.52 (n=06, f=0)
20: 0.66 (n=05, f=0)
21: 0.95 (n=05, f=0)  ######
22: 1.50 (n=03, f=0)  OOOOOOOOOOOOOOOOOOOOOOOOOOOOO
23: 0.12 (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)

Annex 4: Standardization test rerults for Nuristan province SMART

Enumerator	Weight	Height	MUAC
Enumerator 1	Good	Good	Good
Enumerator 2	Acceptable	Good	Good
Enumerator 3	Acceptable	Good	Reject
Enumerator 4	Poor	Acceptable	Good
Enumerator 5	Good	Good	Good
Enumerator 6	Good	Good	Good
Enumerator 7	Good	Reject	Good
Enumerator 8	Acceptable	Good	Acceptable
Enumerator 9	Poor	Good	Good
Enumerator 10	Acceptable	Good	Good
Afternoon			
Enumerator 1	Good	Acceptable	Acceptable
Enumerator 2	Acceptable	Good	Good
Enumerator 3	Acceptable	Good	Good
Enumerator 4	Good	Reject	Good
Enumerator 5	Acceptable	Good	Good
Enumerator 6	Acceptable	Good	Poor
Enumerator 7	Acceptable	Good	Good
Enumerator 8	Acceptable	Good	Good
Enumerator 9	Acceptable	Good	Reject
Enumerator 10	Acceptable	Good	Good

Annex 5: Excluded Area due to insecurity and inaccessibility

No	Province	HF/Name	District Name	Geographical unit	Population size
1	Nuristan	Bar Mandagal (HSC)	Kamdish	سانه	105
2	Nuristan	Bar Mandagal (HSC)	Kamdish	بر منډه ګل	420
3	Nuristan	Kantiwa BHC	Paron	اتتی	735
4	Nuristan	Kantiwa BHC	Paron	ادکی	266
5	Nuristan	Kordar (BHC)	Wama	ولسوالی	350
6	Nuristan	Kordar (BHC)	Wama	سنډاګوار	210
7	Nuristan	Wigal (SHC)	Want/Wigal	وزیرګل کلی	210
8	Nuristan	Wigal (SHC)	Want/Wigal	اوچا	140
9	Nuristan	Wigal (SHC)	Want/Wigal	نندرا کی	266
10	Nuristan	Wigal (SHC)	Want/Wigal	بشتیګرام کلی	105
11	Nuristan	Wigal (DH)	Want/Wigal	اګته کور	399
12	Nuristan	Mandol (CHC)	Mandol	پا طوطی	70
13	Nuristan	Mandol (CHC)	Mandol	منډول	280
14	Nuristan	Mandol (CHC)	Mandol	حوض ګردګ	70
15	Nuristan	Mandol (CHC)	Mandol	بالا منډول	245
16	Nuristan	Mandol (CHC)	Mandol	ماهی خانه	70
17	Nuristan	Mandol (CHC)	Mandol	شیردنګر	140
18	Nuristan	Mandol (CHC)	Mandol	دیسوخته	315
19	Nuristan	Mandol (CHC)	Mandol	بلا چتور	140
20	Nuristan	Mandol (CHC)	Mandol	چتور	700
21	Nuristan	Mandol (CHC)	Mandol	چتور نیشا	140
22	Nuristan	Mandol (CHC)	Mandol	ګزین	350
23	Nuristan	Mandol (CHC)	Mandol	رمنا	105
24	Nuristan	Mandol (CHC)	Mandol	لشتګام	560
25	Nuristan	Mandol (CHC)	Mandol	برکوټ	210
26	Nuristan	Mandol (CHC)	Mandol	جشپال	70
27	Nuristan	Mandol (CHC)	Mandol	میدان پوشال	140
28	Nuristan	Poshal (SHC)	Mandol	جناخیل	154
29	Nuristan	Poshal (SHC)	Mandol	توپخانه	140
30	Nuristan	Poshal (SHC)	Mandol	پچاه	490
31	Nuristan	Poshal (SHC)	Mandol	بالا پچاه	105
32	Nuristan	Linar (HSC)	Mandol	بالا مرغاب	224
33	Nuristan	Linar (HSC)	Mandol	سیدا	630
34	Nuristan	Linar (HSC)	Mandol	اچکا در	245
35	Nuristan	Linar (HSC)	Mandol	ګلو نشان	98
36	Nuristan	Kewisht (HSC)	Mandol	بالی جوی	84
37	Nuristan	Kewisht (HSC)	Mandol	دهن کویشت	91

38	Nuristan	Kewisht (HSC)	Mandol	دهن حوض	91
39	Nuristan	Kewisht (HSC)	Mandol	ګردی+دیګام	63
40	Nuristan	Kewisht (HSC)	Mandol	شکورذده	105
41	Nuristan	Kewisht (HSC)	Mandol	دهن پیکاو	140
42	Nuristan	Kewisht (HSC)	Mandol	کوریز +بالاکوریز	147
43	Nuristan	Kewisht (HSC)	Mandol	باغیچه+نمک سنګاه	91
44	Nuristan	Kewisht (HSC)	Mandol	ګوزر+فیززده	98
45	Nuristan	Kewisht (HSC)	Mandol	اورکوڼ+قوریزده	182
46	Nuristan	Kuraj (BHC)	Mandol	بالادشو	245
47	Nuristan	Kuraj (BHC)	Mandol	ګورنیشال	140
48	Nuristan	Kuraj (BHC)	Mandol	دهن سګندو	140
49	Nuristan	Kuraj (BHC)	Mandol	انش	140
50	Nuristan	Kuraj (BHC)	Mandol	در وانه	665
51	Nuristan	Kuraj (BHC)	Mandol	باندول	1050
52	Nuristan	Malil (SHC)	Norgram	ملیل	630
53	Nuristan	Kulatan (SHC)	Norgram	ګدلام	266
54	Nuristan	Kulatan (SHC)	Norgram	شیدلام	252
55	Nuristan	Tetten (BHC)	Norgram	یشکوت	280
56	Nuristan	Tetten (BHC)	Norgram	شیړیک	210
57	Nuristan	Tetten (BHC)	Norgram	شانخیر	210
58	Nuristan	Bargimatal (BHC)	Bargimatal	پیټ ګام+لمکدیش	170
59	Nuristan	Bargimatal (BHC)	Bargimatal	دیوانه بابا	196
60	Nuristan	Bargimatal (BHC)	Bargimatal	سمنک	196

Annex 6: Event Calendar

13. References

- ENA software 2011 updated 9th July 2015.
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