NUTRITION SURVEY REPORT

AL MAHWEET GOVERNORATE, YEMEN:
Highlands and Lowlands Districts

15 to 27 June 2013

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ABBREVIATIONS AND ACRONYMS

ARI	Acute Respiratory Infection
CMAM	Community Management of Acute Malnutrition
CMR	Crude Mortality Rate
EBF	Exclusive Breast Feeding
ENA	Emergency Nutrition Assessment
EPI	Expanded Programme on Immunization
GAM	Global Acute Malnutrition
HAZ	Height-for-Age z-score
HH	Household
MDD	Minimum Dietary Diversity
MOPHP	Ministry of Public Health and Population
MUAC	Middle Upper Arm Circumference
N	Number
OTP	Outpatient Therapeutic Programme
PPS	Population Proportional to Size
SAM	Severe Acute Malnutrition
SD	Standard Deviation
SFP	Supplementary Feeding Programme
SMART	Standardized Monitoring and Assessment of Relief and Transition
TFC	Therapeutic Feeding Centre
UNICEF	United Nation Children's Fund
WASH	Water Sanitation and Hygiene
WAZ	Weight-for-Age z-score
WFP-CFSS	World Food Programme-Comprehensive Food Security Survey
WHO	World Health Organization
WHZ	Weight-for-Height z-score

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EXECUTIVE SUMMARY

Al Mahweet governorate is located to the northwest of the capital Sana'a, and 111 km away from it. It relates Hajjah and part of the Amran governorates from the north, Sana'a governorate from the east, the governorates of Sana'a and Hodeidah from the south and Hodeidah province from the west. The area of the governorate is about (2328) km 2 and is distributed in nine districts. According to 2004 census, the total number of residents in the province is 495,865 people. The population is distributed in the form of stable communities in different parts of the governorate, and most of them are concentrated in the mountainous and highlands parts -more than the low parts.

Al-Mahweet inhabitants depend largely on agricultural activities, of which coffee, fruits, and honey are the most prominent. Almost all the mountainous and plains areas of Al-Mahweet contain some tourism, environmental and historical assets. These include the historical cities of Shibam Kawkaban, which is situated 40 km from the City of Sana'a, and is considered one of the most visited sites, because of the fortifications, walls in addition to the mosques and steam baths found in the city.

Household average annual income in Al-Mahweet amounts to nearly 757,000 YR (national average: 884,000 YR). The main source of income is derived from wages and salaries followed by self-consumption and gifts, whilst returns from agriculture and animal production come into third.

The 2012 WFP-CFSS reported that 12.8, 17.2, 30.0 per cents are severely, moderately, and "severe and moderate" food insecure in Al Mahweet governorate respectively. Regarding malnutrition, the 2012 WFP-CFSS, reported the following prevalence: GAM: 11.0 per cent, SAM: 2.8 per cent, underweight: 47.0 per cent, and stunting: 63.5 per cent. According to the Nutrition cluster strategy 2012/Yemen, Al Mahweet fall within the serious zone (GAM from 10 – 14.9%).

Between 15th to 27th June, 2013, MoPHP and UNICEF conducted two inter-agency nutrition surveys using the Standardized Monitoring and Assessment for Relief and Transition (SMART) methodology covering the Highlands and Lowlands in Al Mahweet Governorate. This was a Yemen Nutrition Cluster initiative to establish and monitor the levels of acute malnutrition, stunting and underweight among children aged 6-59 months in the different livelihood/ ecological zones, identify some of the factors associated with malnutrition, and inform on the appropriate responses.

Using a two-stage Probability Proportionate to Population Size (PPS) sampling methodology, 36 clusters in each of the Highlands and Lowlands were randomly selected for both anthropometric and mortality assessments. The calculated sample sizes for assessing the anthropometry in Al Mahweet Highlands and Lowlands using ENA for SMART software were 734 households each and 676 and 921 for assessing the mortality respectively.

In Al Mahweet Lowlands the Global Acute Malnutrition (GAM) rate was **12.9 per cent** (95% **CI:** 10.1 - 16.2**),** with Severe Acute Malnutrition (SAM) **2.0 per cent** (95% CI: 1.0 - 3.6). GAM and SAM rates in Al Mahweet Highlands were **9.9 per cent** (95% CI: 7.6 - 12.8) and **1.1 per cent** (95% CI: 0.6 – 1.9) respectively. ***According to WHO categorization, these rates indicate that the nutrition situation in Al Mahweet Lowlands with "serious" level (which equal to GAM rates 10-14 per cent) and in Al Mahweet Highlands fits with the upper limit of cut-off values for "poor" (which equal to GAM rates 5-9 per cent).***

Stunting rates is significantly higher in Al Mahweet Highlands than Lowlands: **66.1 per cent** (95% CI: 60.1 – 71.6) and **59.2 per cent** (95% CI: 53.1 – 65.0) respectively. Severe stunting is also significantly higher in Al Mahweet Highlands than Lowlands: **32.7 per cent** (95% CI: 27.9 - 38.0) and **22.4 per cent** (95% CI: 17.9 - 27.6) respectively. ***These rates are much beyond the critical levels of 40 per cent; thus the stunting rates are of great concern.***

Underweight rate in Al Mahweet Highlands is **45.4 per cent** (95% CI: 40.2 - 50.7), with severe underweight of **13.4 per cent** (95% CI: 10.3 - 17.1) while the underweight and severe underweight rates in Al Mahweet Lowlands are **45.9 per cent** (95% CI: 40.2 - 51.7) and **10.6 per cent** (95% CI: 8.3– 13.4), respectively. ***These rates are much more than the critical levels of 30 per cent, as per WHO categorization.***

Such pattern of acute malnutrition in Al Mahweet were found to be less than the levels found from the neighboring Hodeidah however, it is somewhat higher for chronic malnutrition (as reflected by high global stunting rates). This may interpreted as an indication of poor environmental conditions or long-term restriction of a child's growth potential together with chronic food insecurity and poverty.

Drinking water safer main sources significantly higher in the Highlands e.g. house-connected piped water (21.4% vs. 0.5%), house connected yard piped water (10.9% vs. 5.8%), water from protected spring (23.0% vs. 12.6%) respectively. Contrarily, unsafe water sources are higher in the Lowlands e.g. uncovered rainwater harvesting: 10.6 vs. 0.3%, unprotected open well: 1.2% vs. 0.3%, and water tanker: 9.4% vs. 4% respectively, X^2 361.6, P < 0.0001, df 8. Similarly, significantly higher per cent of households in Al Mahweet Highlands is having flush/ pour flush latrine compared to the Lowlands (68.9% vs. 42.2% , X^2 114.9, P < 0.0001, df 1). Contrarily, much more households in the Lowlands reported defecation in open compared to the Highlands (55.7% vs. 24.3%%, X2 148.9, P<0.0001, df 1). The main sources of income also shows statistically significant differences in favour of the Highlands compared to Lowlands for fixed monthly wages (31.5% vs. 14.4%) and Qat cultivation and trade (8.7% vs. 4.1%). Contrarily, casual labour[1], remittance and social insurance are significantly higher in the Lowlands than the Highlands: 52.1% vs. 39.3, 12.3% and 3.4% vs. 7.1 and 2.0% respectively (X^2 83.8, P<0.0001, df 9). Utilization of public health services found to be significantly lower in the Lowlands compared to the Highland (74.8% vs. 93.5%, X2 94.3, P < 0.0001, df 1).

[1] Temporary work is daily wage based work such as work in construction, on others' farms, etc.

There was high prevalence of common disease, as recorded during the survey: diarrhea, Acute Respiratory Infection (ARI) and fever prevalence are the reported cases 2 weeks before the survey while measles was one month before the survey, as shown in table 1 below and all are significantly higher in Al Mahweet Lowlands than Highlands.

Of these morbidities, diarrhea was significantly higher among those who are not on exclusive breast feeding (26.3% vs. 9.1%, X2 5.7, P<0.05, df 1) and measles significantly significantly higher among non-breastfed children (4.6% vs. 1.2%, Fisher exact test: X2 7.7, P<0.05, df 1). Diarrhea and fever found to be significantly higher among children less than 36 months age compared to older children: 38.4% vs. 20.5%, X2 60.5, P<0.0001, df 1 and 57.8% vs. 46.6%, X2 20.8, P<0.0001, df 1 respectively.

Regarding morbidities and malnutrition, having diarrhea found to be significantly associated with GAM (16.7% vs. 9.2%, X^2 19.8, P<0.0001, df 1), severe stunting (32.0% vs. 26.2%, X^2 5.9, P<0.05, df 1), underweight (51.1% vs. 43.1%, X^2 9.3, P<0.01, df 1), and severe underweight (16.0% vs. 10.6%, X^2 9.5, P<0.01, df 1). Similarly, ARI significantly associated with stunting (66.4% vs. 61.2%, X^2 4.0, P<0.05, df 1) and underweight (51.1% vs. 43.5%, X^2 8.1, P<0.01, df 1). Likewise, fever significantly associated with GAM (13.8% vs. 9.1%, X^2 8.5, P<0.01, df 1) and underweight (48.2% vs. 42.2%, X^2 6.8, P<0.01, df 1).

Furthermore, significantly much higher per cent of children slept under a mosquito net the night before the survey in Al Mahweet Lowlands (which is known to be more malaria endemic) compared to the Highlands (31.3% vs. 9.7%, X^2 131.5, P < 0.0001, df 1). Children slept under a mosquito net the night before the survey are less likely to be stunted: (56.6% vs. 64.6%, X^2 8.9, P < 0.01, df 1). Previous interventional studies in Africa shows better nutritional status among children protected by impregnated bed nets.

It is notable that the vitamin A supplementation 6 months prior to the survey in Al Mahweet Highlands and Lowlands which is 69.0 and 65.7% respectively, is still lower than the recommended 95 per cent coverage Sphere Standards, 2011. Only severe stunting was significantly higher among those who did not receive vitamin A compared to those who received it (31.5% vs. 26.5%, X2 4.4, P<0.05, df 1). Whether, this is related to poor immunity and repeated infections among those who did not receive vitamin A or due to other confounding factor such as better socioeconomic status is need to be investigated further.

Regarding vaccination, the percentage of children in the Lowlands and Highlands who have been vaccinated with the third dose of polio was 80.6 vs. 83.5%, and against measles (86% for both) but did not significantly differ between the two lands. Nevertheless, both Al Mahweet High- and Lowlands immunization coverage for polio and measles are still lower than the recommended 95 per cent coverage Sphere Standards. All morbidities found to be higher among those who did not receive the third dose of polio vaccine compared to those who received it but this was only statistically significant for fever (65.6% vs. 53.0%, X^2 15.4, P<0.0001, df 1). Furthermore, all malnutrition found to be significantly higher among those who were not vaccinated for polio, namely wasting (16.2% vs. 10.6%, X^2 7.2, P<0.01, df 1), stunting (68.0% vs. 61.5%,

X^2 4.4, P<0.05, df 1), underweight (52.4% vs. 44.2%, X^2 6.5, P<0.05, df 1).

Only 5.7 per cent of households in the Highlands compared to 4.2% in Lowlands are using adequately iodized salt. Although another 17.9% and 24.9% at the Highlands and Lowlands respectively are using iodized salt, the amount of iodide found to be inadequate. This indicates that in spite of the household tendency to use iodized salt, there is weakness in the food inspection system on salt monitoring at the market level that need to be strengthened together with more awareness raising on the importance of using iodized salt.

Inappropriate IYCF was recorded in Al Mahweet. Only about one out of four children was exclusively breastfed with no significance difference between the Highlands and the Lowlands. Furthermore, while the majority of children (about 90%) continue breastfeeding at one year with no significance difference between the Highlands and Lowlands, continued breastfeeding at two years is significantly higher at the lowlands than Highlands (49.2% vs. 29.8%, X2 4.2, P < 0.05, df 1). Regarding, the MDD only about one out of five children 6–23 months of age receive foods from 4 or more food groups during the day before the survey which indicates poor minimum dietary diversity with no significant difference between the Highlands and Lowlands. However, children with low MDD have higher prevalence of wasting (17.7% vs. 7.7%, X^2 5.7, P<0.05, df 1), underweight (44.5% vs. 32.1%, X^2 5.4, P<0.05, df 1), and severe underweight (16.6% vs. 4.7%, X^2 9.9, P<0.01, df 1).

WASH known to be an important factor in relation to morbidities as well malnutrition. Overall, less than half of Al Mahweet households drink water from clean container (i.e. no algae seen) and this is significantly lower in the Lowlands than the Highlands: 37.6% vs.45.2%, X^2 8.8, P < 0.01, df 1. Diarrhea prevalence found to be significantly higher among households using unclean water container (33.7% vs. 27.8%, X^2 4.0, P<0.05, df 1). Furthermore, among those who are drinking from unclean water container, stunting (67.5% vs. 53.9%, X^2 17.7, P<0.0001, df 1), and underweight (51.6% vs. 38.3%, X^2 16.0, P<0.0001, df 1) are significantly higher. Additionally, severe wasting (2.6% vs. 0.5%, X^2 5.6, P<0.05, df 1), severe stunting (30.3% vs. 21.4%, X^2 9.2, P<0.01, df 1), and severe underweight (13.3% vs. 7.6%, X^2 7.8, P<0.01, df 1) are also significantly higher. Although having no flush/pour latrine was not associated with diarrhea, it was found to be significantly associated with stunting (67.2% vs. 58.0%, X^2 8.0, P<0.01, df 1) and underweight (52.5% vs. 41.4%, X^2 11.3, P<0.01, df 1).

Although households' caretakers WASH practices were poor in both lands, it is significantly much poorer in Al Mahweet Lowlands e.g. for washing hands after toilet: 39.6% vs. 60.1%, X^2 62.2, P < 0.0001, df 1 and for washing hands before cooking: 32.1% vs. 39.7%, X^2 9.3, P < 0.01, df 1. Only very few caretakers in both Lowlands and Highlands are washing hands before child feeding (2.8% vs. 3.4%) and after child faces' disposal (14.2% vs. 17.4%) respectively but with no significant differences between the two lands. Of the WASH practices only not washing hands before cooking was significantly associated with diarrhea: 34.9% vs. 25.3%, X^2 9.9, P<0.01, df 1. Of the household caretaker hand washing practice, only not washing hand after toilet and not washing hand before cook shows significant association with underweight: 50.2% vs.

42.2%, X^2 6.1, P<0.05, df 1 and 50.0% vs. 39.8%, X^2 9.1, P<0.01, df 1 respectively. Likewise, not washing hand after disposal of child faces showed significant association with stunting (64.3% vs. 52.7%, X^2 8.6, P<0.01, df 1) and not washing hand before child feeding and not washing hand before cook showed significant association with severe stunting: 27.0% vs. 10.8%, X^2 4.8, P<0.05, df 1 and 29.2% vs. 21.6%, X^2 6.5, P<0.05, df 1 respectively.

Furthermore, by observation the availability of soap at hand washing facility was significantly lower in Al Mahweet Lowlands than the Highlands: 93.8% vs.96.6%, X^2 6.2, P < 0.05, df 1 respectively. Diarrhea prevalence found to be significantly higher among households with no soap available at hand washing facility (56.4% vs. 30.3%, X^2 11.9, P<0.0001, df 1). Furthermore, among those households with no soap available at hand washing facility, underweight (66.7% vs. 45.3%, X^2 6.3, P<0.05, df 1), and severe stunting (48.6% vs. 25.4%, X^2 9.9, P<0.01, df 1) are significantly higher.

Although whether these are direct effects (e.g. through causing diarrhea) or due to other confounding (e.g. socioeconomic status etc.) that needs to be investigated further, hygiene promotion should be a key intervention contributing reducing morbidities and eventually better nutrition and well-being of the population.

Regarding food insecurity, all indicators found to be significantly much higher in the Lowlands than Highlands e.g. 17.3% reported reducing meals' size and 13.8 reducing meals' number compared to 6.0% and 5.1% (X^2 45.1, P < 0.0001, df 1 and X^2 32.0, P < 0.0001, df 1 and) respectively. Similarly, in the Lowlands 16.3 per cent of households have members experienced to go to the bed hungry compared to only 5.0 per cent in the Highlands (X^2 48.7, P < 0.0001, df 1). Coping strategies in Al Mahweet Lowlands were also significantly higher for both borrowing food/ money to purchase food or purchase food in credit than the Highlands: 45.6 vs. 39.3, X^2 6.0, P < 0.05, df 1 and reducing expenditures of education and/or health: 23.5 vs.13.8, X^2 22.8, P < 0.0001, df 1 respectively. Furthermore, composite score for the five food insecurity indicators was developed and shows higher mean in Al Mahweet Lowlands than the Highlands (1.2 vs. 0.7, F 45.4, P < 0.0001) respectively.

Although the prevalence of most types of malnutrition found to be slightly higher among food insecure households, such difference was not statistically significant except for underweight with lowering meal number and with borrowing food/ money to purchase food or purchase food in credit: 57.3% vs. 45.1%, X^2 4.5, P<0.05, df 1 and (52.4% vs. 41.4%, X^2 11.0, P<0.01, df 1) respectively; severe underweight with lowering meal number (18.3% vs. 10.1%, X^2 5.2, P<0.05, df 1), and severe stunting with borrowing food/ money to purchase food or purchase food in credit (29.6% vs. 23.8%, X^2 3.9, P<0.05, df 1). This may indicates that the malnutrition in Al Mahweet is a complex problem that is a health related (e.g. associated with diarrhea), a practice related (e.g. IYCF), and a food insecurity problem.

Furthermore, all food insecurity indicators (except for borrowing food/ money to purchase food or purchase food in credit) were significantly higher among the female headed households e.g. households have members experienced to go to the bed hungry

(31.9% vs. 10.2%, X^2 22.1, P<0.0001, df 1) and reducing meals' size (27.7% vs. 11.4%, X^2 11.5, P<0.01, df 1)

Illiteracy is very high among caretakers in Al Mahweet (82%) and significantly higher in the Lowlands (84.9% vs. 79.4%, X^2 7.6, P<0.01, df 1). All types of malnutrition are significantly higher among children of illiterate caretakers. Although most morbidities (e.g. diarrhea) are also higher and EBF and MDD are lower among illiterate mothers' children, such differences were not statistically significant. Nevertheless, illiterate caretakers' children have significantly lower polio and measles vaccination and their children is less likely to sleep under mosquito net. Furthermore, WASH practices and food security indicators are significantly lower among illiterate caretakers. Therefore, a focus on girls' education should be a priority for its clear and well documented profits on children and community health.

Finally, overall mortality rates are low and within the acceptable levels according to WHO categorisation, hence not raising major concern.

Recommendations

In a view of the very high chronic malnutrition found in Al Mahweet governorate with poor to serious acute malnutrition, short-term emergency responses alone are not enough to address such long-term problems and there is a need to concentrate on both immediate as well as medium and long term interventions and to adopt multi-sectoral approach. Therefore, there is a need to deliver an integrated package of services to mothers and their children not only to address the acute malnutrition but also to address the high level of stunting and underweight as well as other development indicators.

Immediate Interventions

- Develop detailed integrated response micro-plan articulating district level humanitarian needs, delivering response package, coverage and gaps to document the progress, advocacy and lessons learnt.
- Priority should be given to pockets of vulnerability in both zones through mobilizing outreach services to rapidly address the high GAM/SAM rates.
- Development of CMAM protocol, strengthen and expanding CMAM services to reach all the existed health facilities and outreach services.
- CMAM services should adhere to the CMAM protocol (ensuring systematic treatment and full consideration of moderate acute malnutrition management) that should be integrated with infant feeding, hygiene promotion and food security interventions.
- to promote appropriate IYCF practices (early initiation of breastfeeding, exclusive and sustained breastfeeding for 2 years and promotion of appropriate complementary feeding practices for children aged 6 to 24 months) along with micronutrient supplementations and deworming.
- Accelerate the integration of IYCF counseling into all CMAM services delivered by both fixed and mobile clinics.

- Intensive social mobilisation campaigns on IYCF feeding and caring practices through behavior change / communication interventions mainly in the following areas; timely introduction of complementary food and continue breastfeeding up to two years, along with vitamin A supplementation, micronutrient supplements, and promotion of safe sanitation and hygienic practices including hand washing with soap as well as safe disposal of children's excreta, diarrhoea prevention measures and appropriate management of ARI among young children

Medium Term Interventions

- From the development point of view, there is an essential need for Yemen to be an active member in the global SUN movement.
- High level advocacy with the GOY and politicians to mobilise their commitment to fight undernutrition among U5 Yemeni children.
- Scaling up implementation of the national nutrition strategy and related action to address the high level of malnutrition in line with the lifecycle approach along with promotion of maternal nutrition.
- Continued support for longer term water development and sanitation programmes throughout the governorate, with community mobilization activities to promote safe sanitation and hygienic practices.
- Follow up SMART nutrition survey and coverage survey in 2014 to track the progress on implementation of the response plan.
- Exploring new initiatives to promote small scale income generating projects, draw lessons learnt and replicate the successful projects.
- Promote improved basic infrastructure (e.g. water, sanitation etc.), latrine use, and other hygiene services like Community Led Total Sanitation (CLTS) strategy.

Other Recommendations

- Establish food security and nutrition baselines and monitoring systems
- Undertaking full scale national nutrition and mortality survey.
- In a view of high malnutrition among illiterate mothers' children found in this as well as previous surveys in Yemen, a focus on girls' education is necessary in the long term battle against malnutrition.
- Further investigation is needed to understand the causality tree behind high level of acute malnutrition among boys compared to girls found in this survey (especially for GAM and severe stunting) as well as earlier surveys conducted in Hodeidah, Taiz, Hajjah governorates.
- In malaria endemic areas, and in the view of the perceived benefit from using the impregnated bed net on malnutrition that shown in this survey, pilot a randomize control trail to show the benefit and the cost of such wider scale intervention is recommended.

Table 1. Summary of Al Mahweet Governorate Nutrition Survey Findings, June 2013

Indicator	Al Mahweet Highlands (N= 706)			Al Mahweet Lowlands (N=777)		
	N	%	95% CI	N	%	95% CI
I- Background						
Total number of households assessed	706			777		
Mean household size	7.6			6.6		
Total number of children assessed	937			886		
Child sex: Males (boys)	481	51.3		437	49.3	
Females (girls)	456	48.7		449	50.7	
II- Child Malnutrition						
Global Acute Malnutrition (WHZ<-2 z-score or oedema)	82	9.9	7.6-12.8	100	12.9	10.1-16.2
Severe Acute Malnutrition (WHZ<-3 z score or oedema)	9	1.1	0.6-1.9	15	2.0	1.0-3.6
Oedema	0			0		
Chronic Malnutrition (H/A<-2 z score)	545	66.1	60.1-71.6	465	59.2	53.1-65.0
Severe Chronic Malnutrition (H/A<-3 Z score)	270	32.7	27.9-38.0	176	22.4	17.9-27.6
Underweight prevalence (W/A<-2 Z score)	377	45.4	40.2-50.7	363	45.9	40.2-51.7
Severe Underweight (W/A<-3 z score)	111	13.4	10.3-17.1	84	10.6	8.3-13.4
III- Child Morbidity						
Children reported with suspected measles within one month prior to assessment	7	0.8	0.2-1.4	45	5.1	3.8-6.7
Children reported with diarrhoea in 2 weeks prior to assessment	272	29.3	26.4-32.1	308	34.9	31.7-37.9
Children reported with ARI within two weeks prior to assessment	224	24.3	21.6-27.0	297	33.6	30.6-36.8
Children reported with febrile illness in 2 weeks prior to assessment	449	48.3	45.3-51.6	525	59.5	56.3-62.5
IV- Immunization and Supplementation Status						
Children 9-59 months immunised against measles	664	86.1	83.8-88.4	624	86.0	83.3-88.4
Children who received 3 doses of polio vaccine	699	83.5	80.9-86.0	641	80.6	77.8-83.5
Children reported to have received vitamin A supplementation in last 6 months	543	65.7	62.5-68.8	545	69.0	65.6-72.3
V- Infant and Young Child Feeding (IYCF)						
Exclusive breastfeeding under 6 months	28/98	28.6	19.9-38.6	19/82	23.2	14.6-33.8
Continued breastfeeding at 1 year	59/63	93.7	86.5-98.6	51/60	85.0	75.0-93.7
Continued breastfeeding at 2 years	14/47	29.8	16.3-44.0	31/63	49.2	36.8-60.6
Minimum dietary diversity	52/288	18.1	13.8-23.0	55/270	20.4	15.7-25.7
VI- Salt iodization						
Households consumes adequately iodized salt	40	5.7	4.0-7.6	32	4.2	2.8-5.7
VII- Mortality						
0-5 Death Rate (U5DR) as deaths/10,000/ day	0.15		0.0-1.1	0.33		0.2-0.6
Crude Death Rate (CDR) as deaths/10,000/ day	0.15		0.1-0.3	0.13		0.0-1.0

1.0 INTRODUCTION / BACKGROUND

Al Mahweet governorate is located to the northwest of the capital Sana'a, between longitude (43 -44) to the east and a latitude (15-16) to the north and rises from sea level (2100 m). It is away from the capital Sana'a a distance of (111 km). It relates Haja and part of the Amran governorates from the north, Sana'a governorate from the east, the governorates of Sana'a and Hodeidah from the south and Hodeidah province from the west. The area of the Governorate is about (2328) km 2 and is distributed in nine

The total number of residents in the province is 495,865 people, according to 2004 census. Mlhan district is the most district in terms of population in the governorate with (89,094) people and Mahweet district is the least district in terms of population with (20209) people. The population is growing at an annual rate (2.88%). The population is distributed in the form of stable communities in different parts of the province, and most of them are concentrated in the mountainous and highlands parts - more than the low parts[1].

Climate and Topography

Mahweet climate combines factors of mountainous and plain areas . In the mountainous area the temperate is moderate in summer and cold in winter while in the plain areas near to the Tihama region , the climate is hot in summers and mild winters. Mahweet province is characterized by the continuous rainfall in all its districts, especially in the summer. The rainfall abounds in the highlands and the eastern parts of the governorate. As the rain fall in small quantities and rarely on some parts of the province in the winter[1].

Agricultural terraces, edging villages and fortified towers are some of Al-Mahweet tourism potentials. It also possesses, but rather unexploited, primary potentials for granite, marble and glass industries. Nearly 10% of the total area of the governorate is cultivated with cereals (56%), qat (21%) and coffee (13%). Al-Mahweet inhabitants depend largely on agricultural activities, of which coffee, fruits, and honey are the most prominent. Access to drinking water is available to 24.8% of the population, as compared to the national average of 38.7%[3].

Almost all the mountainous and plains areas of Al-Mahweet contain some tourism, environmental and historical assets. These include the historical cities of Shibam Kawkaban, which is situated 40 km from the City of Sana'a, and is considered one of the most visited sites, because of the fortifications, walls in addition to the mosques and steam baths found in the city. The Grand Mosque of the city is one of the oldest going back more than a thousand years.

[2] National Information Centre. Presidency of the Republic. Al Mahweet.

[3] WFP (2009). YEMEN: Secondary Data Analysis on Food Security and Vulnerability

Socio-political situation

Household average annual income in Al-Mahweet amounts to nearly 757,000 YR (national average: 884,000 YR). The main source of income is derived from wages and salaries followed by self-consumption and gifts, whilst returns from agriculture and animal production come into third.

Although Al-Mahweet possesses a wide range of promising but unexploited advantages, traditional subsistence farming remains the main source of its economic resources. Developing Al-Mahweet is hindered by its difficult topography, limited infrastructures and the extent of its unskilled labour force. These represent major setbacks for private investment to exploit its agricultural, industrial and tourism opportunities. Being a natural museum, it is a location that is naturally gifted with abundant rainfall throughout the year and the governorate should be able with moderate investments in its manpower and infrastructures to attract investment in developing its natural resources and sustaining the livelihood of its inhabitants[4].

Food insecurity and nutritional status

Al Mahweet has average rates of general food insecurity (47.4%). Similar to Dhamar, Al-Mahweet has above average rates of households vulnerable to food insecurity (27%), and a comparatively lower proportion of definitely food insecure households with hunger (16%). It also has particularly low rates of food insecurity with severe hunger (4.7%). Al-Mahweet households are slightly above average in terms of food consumption. Over 90% of Mahweeti households regularly eat dairy products, and approximately three quarters consume some form of animal protein and fruits and vegetables regularly. Furthermore, 70% eat from four to five food groups on a regular basis, compared with 62.8% nationwide[3].

The 2012 WFP-CFSS[5] reported that 12.8, 17.2, 30.0 per cents are severely, moderately, and "severe and moderate" food insecure in Al Mahweet governorate respectively. Regarding malnutrition, the 2010 IFPRI National Food Security Paper estimated GAM rate based on HBS 2005-06 data in Al Mahweet to be 11.5 per cent, with SAM at 4.2 per cent, underweight 42.7 per cent , and stunting 81.6 per cent[6]. The 2012 WFP-CFSS, reported the following prevalence: GAM: 11.0 per cent, SAM: 2.8 per cent, underweight: 47.0 per cent, and stunting: 63.5 per cent. According to the Nutrition cluster strategy 2012/Yemen[7], Al Mahweet fall within the serious zone (GAM from 10 – 14.9%).

[4] WFP (2009). YEMEN: Secondary Data Analysis on Food Security and Vulnerability

5 WFP. Comprehensive Food Security Survey, Yemen. March 2012 WFP (2012). The State of Food Security and Nutrition in Yemen. Summary and Overview

[6] MoPIC and IFPRI. National Food Security Strategy Paper (NFSSP). Final Draft, February 2010

[7] Nutrition cluster strategy 2012/ Yemen

2.0 ASSESSMENT OBJECTIVES

The overall objective of the two SMART surveys was to establish the nutrition situation in Al Mahweet Governorate, determine some of the factors influencing malnutrition, and identify some of the public health services accessible to Al Mahweet population.

Specific objectives were:

To estimate the level of acute malnutrition (wasting), stunting and underweight among children aged 6-59 months in the Highlands and Lowlands Districts of Al Mahweet Governorate.

1. To identify factors influencing nutrition status of the children aged 6-59 months children in the Highlands and Lowlands Districts of Al Mahweet Governorate including IYFC, disease prevalence and access to essential services.
2. To estimate the prevalence of some common diseases (measles, diarrhoea, fever and ARI) of the children aged 6-59 months in the Highlands and Lowlands Districts of Al Mahweet Governorate.
3. To estimate the measles and polio vaccination and Vitamin A supplementation coverage among children aged 6-59 months in the Highlands and Lowlands Districts of Al Mahweet Governorate.
4. To estimate the crude and under-five mortality/death rates in the Highlands and Lowlands Districts of Al Mahweet Governorate.

3.0 METHODOLOGY

3.1: Sampling Design and Sample Size Determination

Two cross-sectional surveys were conducted between 15th to 27th June, 2013 in Al Mahweet Highlands and Lowlands Districts. Using a two-stage Probability Proportionate to Population Size (PPS) sampling methodology, 36 clusters in each of the Highlands and Lowlands Al Mahweet were randomly selected for both anthropometric and mortality assessments. The cluster sampling methodology was selected in view of lack of an exhaustive updated list of household details and accurate demographic characteristic by village; only population estimate at village level was available. The total estimated population in Al Mahweet Highlands was 304582 while the total estimated population in Al Mahweet Lowlands was 315135 (Ref: Annexes 9 and 10: Sampling Frame: Source: CSO Projection, 2012).

Table 2: Parameters used in the Sample Size Determination

Parameters	Al Mahweet Highlands	Al Mahweet Lowlands
Estimated Acute Malnutrition Prevalence (%)	**16.9**	**16.9**
Desired Precision (%)	**4.0**	**4.0**
Design Effect[8]	**2**	**2**
Average Household Size[9]	**7.8**	**6.5**
Under 5 year old (%)[10]	**18.7**	**18.7**
Non response household (%)[11]	**3**	**3**
Sample Size (N)	**734**	**734**

From the Nine districts in Al Mahweet, five districts were put in the Highlands stratum; they are: Al Mahweet City, Al Mahweet, Ar Rujum, Shibam Kawkaban, and At Tawilah districts. The remaining four districts: Al Khabt, Milhan, Hufash, Bani Sa'd were put in the Lowland stratum.

The calculated sample sizes in Al Mahweet Highlands and Lowlands using ENA for SMART software were 734 households each. The calculated sample for the Highlands' death estimation purpose using parameters of estimated death of 0.22 per 10000 per day and desired precision of 0.20 per 10000 per day in a recall period of 90 days resulted in a sample size of 676 households while the calculated sample for the Lowlands' death estimation purpose using parameters of estimated death of 0.25 per 10000 per day and desired precision of 0.20 per 10000 per day in a recall period of 90 days resulted in a sample size of 921 households.

Based on this, it was decided that 17 households per cluster per day could be visited in Al Mahweet Highlands for assessing the anthropometry and mortality; while considering the time needed to travel daily due to the challenging terrain in the Lowlands, it was estimated that a team could visit a maximum of 20 households per cluster per day for

[9] Calculated on basis of Central Statistics office data of population versus households
[10] Estimated on basis of MoH reports and immunization statistics
[11] Non-response rate of 3% was estimated in case the teams encounter refusal, security-related inaccessibility or absence.

anthropometry but continue to complete 19 and 26 households for mortality.

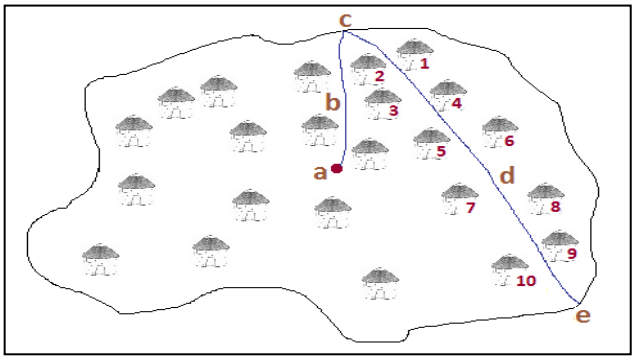
3.2: Sampling Procedure

The ENA for SMART software was used in the random selection of the 36 clusters from the sampling frame, including identification of the reserve clusters. The sampling frame consisted of an exhaustive list of villages or urban area sections known to be accessible within Al Mahweet Governorate and the estimated population size for each of the villages. Independent sampling frames for Highlands and Lowlands were used in this selection process (Ref: Sampling frames in Annexes 9 and 10). In this case, all villages in Al Mahweet Governorate were accessible and were included in the sampling frame, thus giving them an equal chance of being selected.

All the 36 clusters randomly selected from the sampling frames for the Highlands and Lowlands were accessible and were assessed, hence the reserve clusters were not assessed in the two surveys. Upon reaching the cluster/ villages, the survey teams, with the help of an elder or a village guide, requested the village residents' permission to assess the areas. The purpose of the survey was explained and the process of random selection of a representative sample from the cluster was also elaborated.

Once granted permission to continue with the survey, the survey team used the Modified EPI methodology to randomly pick the household to be interviewed. This involved identifying the centre of the cluster/ village, where they had to spin a pen to randomly select the direction to take to the edge/periphery of the village. The team walked to the edge of the cluster/ village. From the edge of the village, the team had to spin the pen again aiming to randomly get a direction to follow to the other extreme edge of the village. In case the pen pointed towards outside of the village, the teams were to spin the pen multiple times till the pen pointed to any of the directions towards the village. Once a new direction was obtained, the team counted all the households along the randomly selected direction, gave each household a number, and then randomly selected the first household to be interviewed from the numbered households (for example, household number 7 in the households numbered 1 to 10, in the figure (2)).

Figure (2): The modified EPI method used for selection of households



Same direction was followed to select the subsequent household for interview, going for next nearest household on the right side and following the selected direction, until the required minimum number of households and children had been assessed (Ref: Figure (2) indicating the household selection process– Figure adopted from the SMART Methodology Guideline).

Anthropometric data alongside other child data were collected from all children aged 6-59 months found in the randomly selected household. The EBD data was collected

only from children under six months but no anthropometric data were collected for this age group.

In case the team assessed all households to the edge of the village and did not reach the required number of households, the team would repeat the process again i.e. start from the cluster/ village centre to randomly select another direction, then walk to the edge, then spin the pen again and count the households to the edge of the cluster. Then randomly pick the first household for interview, and then go the next nearest household, to the right hand side, till the required number of households were interviewed.

In case of absence of the children during the interview time or absence of the members of the randomly selected households, an appointment was made by the survey team to return back before leaving the cluster.

3.3: Study Population and Data Collection Process

As defined in the sampling frame, the study population was the entire population of Al Mahweet Governorate as defined based on the two types of districts– the Highlands and Lowlands Districts.

The activities undertaken in the entire survey period are summarised. Data collection preparation commenced with a four-day training of enumerators, team leaders and supervisors (Ref: Annex 3: Al Mahweet Nutrition Survey Team). The training conducted covered interview techniques, sampling procedures, field procedures (random household selection, introduction and systematic data collection), inclusion and exclusion criteria, sources and reduction of errors, taking of measurements (height, weight and MUAC) focusing on achieving high precision and accuracy, data collection standardisation procedures to ensure data quality, diagnosis of oedema, measles, ARI, diarrhoea and collection of household details necessary to establish household members movement and/or death in order to compute mortality rates, handling of equipment and the general courtesy during the assessment. Seven survey teams were involved in the data collection process.

Quantitative data were collected by means of a household questionnaire for nutrition survey and a mortality survey question, adopted from the SMART Methodology guidelines (Ref: Annex 1: Al Mahweet Nutrition Survey Questionnaire and Annex 2: Al Mahweet Mortality Survey Questionnaire). Only children aged 6-59 month were included in the measurement of height, weight and MUAC. The age estimation was based on birth or immunization card details and/or supported with events calendar and date conversion tables based on the Islamic Calendar (Ref: Annex 5 and 6: Age Conversion Tables and Events Calendar).

Retrospective mortality data were collected from all randomly selected households, irrespective of presence or absence of children aged 6-59 months. A recall period of 90 days prior to the survey was used.

3.4: Measurement Standardization and Quality Control

Seven survey teams (one team as a reserve) underwent rigorous standardisation test procedures using 10 children aged 6 - 59 months. This exercise was conducted at training place in the training venue of Health Office in Al Mahweet city and it aimed at assessing the accuracy and precision of the survey teams for purposes of enhancing the survey data quality. The weak team members were identified and the common mistakes made were identified and addressed (Ref: Annex 4: Al Mahweet Nutrition Survey Standardization Test Report, showing team performance and how errors were rectified/addressed). Further field testing of survey tools and exercise on data collection, including household selection and interview steps and familiarization of questions was conducted, and field level challenges and common mistakes identified and discussed. The field testing was conducted in Al Haden village in Al Khabit district.

Beside training, which also included role playing and field testing, data quality was also ensured through (i) Monitoring of fieldwork by coordination team; (ii) Crosschecking of filled questionnaires on a daily basis, recording of observations and daily de-briefing and discussion; (iii) Confirmation of measles, severe malnutrition especially oedema cases and death cases by supervisors; (iv) Daily entry of anthropometric data, continuous data cleaning and plausibility checks, plus ensuring each team was given feedback on the quality of previous day's data before the start of a new day; (v) Equipment calibration/ monitoring accuracy of equipment (weighing scales) by regularly measuring objects of known weights to check for any differences, (vi) Additional check was done at the data entry level to enable entry only of relevant possible responses and measurements; (vii) Continuous reinforcement of good practices. During the field data collection, all measurements were loudly called by both the enumerators reading and recording them, to reduce errors during recording.

Clear job descriptions were provided to the teams as part of the training, to ensure appropriate guidance in delivering the assigned tasks (Annex 11: Survey Team Job Description). The supervisor had to review the questionnaire and verify the accuracy of the details before the teams leave a household, thus minimizing possibility of incomplete data (missing variables) and outliers.

3.5: Data Entry and Analysis

The anthropometric data were entered and analysed using ENA for SMART software, while the remaining household variables and child-related variables (feeding practices and morbidity) were entered and analysed using Epi info ENA version 3.5.3. Running and tabulation of all variable frequencies was carried out as part of data cleaning. The nutrition indices (z-scores) for Weight for Height (wasting), Height for Age (stunting) and Weight for Age (underweight) were generated and compared with WHO 2006 Growth Standards. Children/cases with extreme z-score values were flagged and investigated and appropriately excluded in the final analysis if deviating from the observed mean (SMART flags).

The classification used for wasting levels was a follows:

W/H < -3 Z-Scores or oedema = Severe acute malnutrition
W/H ≥ -3 Z-Scores < -2 Z-Scores = Moderate acute malnutrition
W/H < -2 Z-score or oedema = Global/total acute malnutrition
W/H ≥ -2Z-Scores = Normal

The classification used for Stunting levels was a follows:

H/A < -3 Z-Scores = Severe stunting
H/A ≥ -3 Z-Scores < -2 Z-Scores = Moderate stunting
H/A < -2 Z-score = Stunting Prevalence rates
H/A ≥ -2Z-Scores = Normal

The classification used for Underweight levels was a follows:

W/A < -3 Z-Scores = Severe Underweight
W/A ≥ -3 Z-Scores < -2 Z-Scores = Moderate underweight
W/A < -2 Z-score = Underweight Prevalence Rates
W/A ≥ -2Z-Scores = Normal

Regarding food diversification this survey assessed few selected IYCF standard indicators from FANTA 2007[12] and was calculated by using the Minimum Dietary Diversity Indicator definition for the 6-23 months age group which is the proportion of children 6-23 months of age who receive food from 4 or more food groups during the previous day (Table 2.6).

Table 3: Definition of food diversification through using the Minimum Dietary Diversity Indicator

Food diversification group	*Minimum Dietary Diversity Indicator cut points*
Poor	< 4
Good	≥ 4

Frequencies and cross-tabulations were used to give percentages, means and standard deviations in the descriptive analysis and presentation of general household and child characteristics using SPSS version 18, 2009.

Mortality data were entered into the individual level sheet of ENA software and analysed immediately.

[12] FANTA; Generating indicators of appropriate feeding of children 6 through 23 months from the KPC 2000+; by Mary Arimond and Marie T. Ruel, November, 2003

3.6: Data Entry Verification and Cleaning

Four team members shared the work of data entry, and then each member would review the work done by another colleague before merging the data on a daily basis.

About 10 per cent of the entered questionnaires were randomly drawn using the Random Number Table of ENA software. These drawn questionnaires were revised for accuracy of entry in the electronic database. The quality of data entry was accepted if accuracy was not less than 95 per cent.

The uniqueness of IDs of both household questionnaire and mortality sheet was also reviewed for any repeating during data entry.

For anthropometry data, all flagged records were also reviewed by means of revisiting original questionnaires.

4.0 ASSESSMENT RESULTS

4.1: Household Characteristics of Study Population

As shown in Table 3 below, the gender of household head in Al Mahweet Highlands and Lowlands is largely male. However, the female headed households is higher in the Lowlands than Highlands: 4.1% vs. 2.1%. Similarly, 84.1% and 91.9% of the household heads are married and living with partner in Al Mahweet Lowlands and Highlands, 9.9% and 4.8% are married but living far from spouse for ≥ 6 months, and 4.6% and 2.7% are widowed respectively.

Of the caretakers, 84.9% and 79.4% were illiterate in Low- and Highlands respectively while the percentage of highly educated caretakers is threefold in the Highlands: 2.4% vs. 0.8% (see Table 3).

Regarding the main sources of income (see Table 3) in the Highlands and Lowlands: 31.5% compared to 14.4% are on fixed monthly wages, 39.3 vs. 52.1 on casual labour[13], and 8.7% vs. 4.1% on Qat cultivation and trade respectively. Contrarily, remittance and social insurance are 12.3% and 3.4% vs. 7.1 and 2.0% in the Lowlands and Highlands respectively.

Table 3 shows that the drinking water main sources also differ between the Highlands and Lowlands e.g. house-connected piped water: 21.4% vs. 0.5%, house connected yard piped water: 10.9% vs. 5.8%, and water from protected spring: 23.0% vs. 12.6% respectively. Contrarily, the Lowlands are more than the Highlands in respect to uncovered rainwater harvesting (10.6 vs. 0.3%), unprotected open well (1.2% vs. 0.3%), and water tanker (9.4% vs. 4%) respectively. Furthermore, still high percentage in both Lowlands and Highlands are depending on unprotected surface water (33.4% vs. 27.1%) respectively.

As shown in Table 3, 68.9% of households in Al Mahweet Highlands is having flush/ pour flush latrine compared to only 42.2% in the Lowlands. Contrarily, much more households in the Lowlands reported defecation in open compared to the Highlands (55.7% vs. 24.3%%).

Regarding using adequately iodized, only 5.7 and 4.2 per cents of households in Al Mahweet Highlands and Lowlands are using adequately iodized salt. Another 17.9% and 24.9% respectively are using iodized salt but not adequately iodized (Table 3).

[13] Temporary work is daily wage based work such as work in construction, on others' farms, etc.

Table 3: Household Characteristics

Indicator	*Al Mahweet Highlands*		*Al Mahweet Lowlands*	
	N	*%*	*N*	*%*
Household members				
Total Households	706		777	
Mean household size	7.6		6.6	
Mean No of Under-five	1.3		1.1	
Sex of Household Head:				
Male	690	97.9	743	95.9
Female	15	2.1	32	4.1
Marital status of household head:				
1. Married and living with spouse	648	91.9	652	84.1
2. Married but living far from spouse for ≥ 6 months	34	4.8	77	9.9
3. Widowed	19	2.7	36	4.6
4. Single	3	0.4	8	1.0
5. Recalcitrant	0	0	1	0.1
6. Divorced	1	0.1	1	0.1
Education level of household caretaker:				
1. Illiterate	560	79.4	658	84.9
2. Read and write	84	11.9	72	9.3
3. Basic education	16	2.3	12	1.5
4. Secondary education	28	4.0	27	3.5
5. Higher education	17	2.4	6	0.8
Main Source of Income:				
1. Fixed monthly waged work	222	31.5	119	15.4
2. Temporary work/ Casual labour	277	39.3	403	52.1
3. Remittance	50	7.1	95	12.3
4. *Qat* cultivation and trade	61	8.7	32	4.1
5. Crops other than *Qat*	30	4.3	35	4.5
6. Handmade work	3	0.4	5	0.6
7. Trade	12	1.7	13	1.7
8. Donations	18	2.6	17	2.2
9. Social insurance	14	2.0	26	3.4
10. Animal and Animal products	10	1.4	23	3.0
11. Others	7	1.0	6	0.8
Main water source for drinking:				
1. House-connected piped water	151	21.4	4	0.5
2. House-connected yard piped water	77	10.9	45	5.8
3. Water from protected open well	90	12.8	111	14.3
4. Unprotected surface water (wadi, springs, etc.)	191	27.1	259	33.4
5. Water tanker	28	4.0	73	9.4
6. Water from unprotected open well	2	0.3	9	1.2
7. Water from protected spring	162	23.0	98	12.6
8. Water from covered rainwater harvesting tank	0	0	87	11.2
9. Water from uncovered rainwater harvesting tank	2	0.3	82	10.6
10. Other e.g. bottled water	2	0.3	7	0.9
Household latrine type:				
1. Flush/pour flush latrine	493	68.9	327	42.2
2. Open pit latrine	2	0.3	11	1.4
3. Simple covered pit latrine	37	5.2	5	0.6
4. Defecation in open (in fields, etc.)	171	24.3	431	55.7
Salt type used				
1. Non iodized salt	534	76.4	541	70.9
2. Inadequately iodized salt (below 15 ppm)	125	17.9	190	24.9
3. Adequately iodized salt (15 ppm and above)	40	5.7	32	4.2

4.2: Morbidity, Immunization Status and Health Seeking Behaviour

The prevalence of all morbidities is high in Al Mahweet especially in the lowlands. For example, the prevalence of diarrhoea during the two weeks prior to the survey recorded among children is 34.9% in Lowlands compared to 29.3 in the Highlands. Similarly, 33.6% of children was having ARI during the two weeks prior to the survey compared to 24.3% respectively. Also, 59.5% of children in Lowlands was having fever during the two weeks prior to the survey compared to 48.3%. Suspected measles[14] during the last month was also higher in Al Mahweet Lowlands (5.1%) compared to only 0.8 % in the Highlands.

Regarding vaccination and supplementation, measles vaccination was 86% for both Low- and Highlands, polio vaccination was 80.6 vs. 83.5%, and Vitamin A supplementation was 69.0% vs. 65.7% respectively.

The percentage of children slept under a mosquito net the night before the survey in Al Mahweet Lowlands was 31.3% compared to 9.7% in the Highlands.

As shown in Table 4, although the majority of households in Al Mahweet are using public health services, this is lower in the Lowlands than Highlands: 74.8% vs. 93.5%. Similarly, in the lowlands 10.2% are using private facilities and 3.7% is using pharmacies compared to 4.7% and 0.3% in the Highlands respectively. Higher per cents (4.1%) in the Lowlands do not seek medical assistance compared to only 0.3% in the Highlands. The main reason for not seeking medical assistance is the high cost (75.2%) and far distance/no transport (21.6%).

Table 4: Health Seeking Behaviour

Indicator	*Al Mahweet Highlands*		*Al Mahweet Lowlands*	
	N	*%*	*N*	*%*
Where health service is sought				
Public health facility	659	93.5	579	74.8
Private clinic	33	4.7	79	10.2
Pharmacy	2	0.3	29	3.7
Personal medication	5	0.7	51	6.6
Do not seek medical assistance	2	0.3	32	4.1
Traditional medication	4	0.6	3	0.4
Morbidity				
Children with diarrhoea within 2 weeks prior to assessment	272	29.3	308	34.9
Children with ARI within two weeks prior to assessment	224	24.3	297	33.6
Children with fever within two weeks prior to assessment	449	48.3	525	59.5
Suspected measles within one month prior to assessment	7	0.8	45	5.1
Immunization				
Children (9-59 months) immunised against measles	664	86.1	624	86.0
Children who have ever received polio vaccine	699	83.5	641	80.6
Supplementation				
Children who received vitamin A supplementation in last 6 months	543	65.7	545	69.0
Sleeping under mosquito net				
Children slept under mosquito net last night	90	9.7	277	31.3

[14] The suspected measles is defined as having rash and fever in addition to at least one of: cough, sore throat, or conjunctivitis.

4.3: Infant and Young Child Feeding (IYCF)

Table 5 shows that only 28.6% and 23.2% were exclusively breastfed in the Highlands and Lowlands respectively. Similarly, continued breastfeeding at one and two year is 93.7% vs. 85% and 29.8% vs. 49.2% respectively.

Regarding, the MDD, only 18.1 per cents of children 6–23 months of age receive foods from 4 or more food groups during previous day at the Highlands compared to 20.4% at the Lowlands.

Table 5: ***Infant and Young Child Feeding (IYCF)***

Indicator	*Al Mahweet Highlands*			*Al Mahweet Lowlands*		
	N	*%*	*95% CI*	*N*	*%*	*95% CI*
V- Infant and Young Child Feeding (IYCF)						
Exclusive breastfeeding under 6 months	28/98	28.6	19.9-38.6	19/82	23.2	14.6-33.8
Continued breastfeeding at 1 year	59/63	93.7	86.5-98.6	51/60	85.0	75.0-93.7
Continued breastfeeding at 2 years	14/47	29.8	16.3-44.0	31/63	49.2	36.8-60.6
Minimum dietary diversity	52/288	18.1	13.8-23.0	55/270	20.4	15.7-25.7

4.4: WASH

Only 39.6% mentioned washing hands after toilet in the Lowlands and 32.1% is washing hands before cooking compared to 60.1% and 39.7% in the Highlands. Only 2.8% are washing hands before child feeding and 14.2% is washing hands after child faces' disposal in the Lowlands compared to 3.4% to 17.4% respectively in the Highlands (see Table 6).

Furthermore, by observation the availability of soap at hand washing facility was 93.8% in Al Mahweet Lowlands compared to 96.6%. in the Highlands. Similarly, clean water container (no algae seen) is lower in the Lowlands: 37.6% vs.45.2%.

Table 6: WASH practices

Indicator	*Al Mahweet Highlands*		*Al Mahweet Lowlands*	
	N	*%*	*N*	*%*
1. Hand washing after toilet	424	60.1	307	39.6
2. Hand washing before meal	253	35.9	255	32.9
3. Hand washing After meal	339	48.1	373	48.1
4. Hand washing before cooking	280	39.7	249	32.1
5. Hand washing before feeding child	24	3.4	22	2.8
6. Hand washing after disposal of child's faces	123	17.4	110	14.2
7. Hand washing after cleaning livestock's place	123	17.4	182	23.5

Indicator	Al Mahweet Highlands		Al Mahweet Lowlands	
	N	%	N	%
8. Availability of water at hand Washing facility	705	100	770	99.4
9. Availability of soap at hand Washing facility	680	96.6	727	93.8
10. Availability of ash/leaves/sand at hand Washing facility	2	0.3	10	1.3
11. Water container clean (no algae seen)	319	45.2	291	37.6

4.5: Food insecurity

Table 7 shows that in Al Mahweet Lowlands 17.3% reported reducing meals' size and 13.8% had reducing meals' number compared to 6.0% and 5.1% in the Highlands. Similarly, in the Lowlands 16.3 per cent of households have members experienced to go to the bed hungry compared to only 5.0 per cent in the Highlands.

Regarding coping strategies, in Al Mahweet Lowlands 45.6 per cent of the households borrow food/ money to purchase food or purchase food in credit and 23.5 per cent reduced expenditures of education and/or health compared to 39.3 and 13.8 per cent respectively in the Highlands.

Table 7: Food insecurity

Indicator (Over the past 30 days)	Al Mahweet Highlands		Al Mahweet Lowlands	
	N	%	N	%
1. reduce the size of meals because of the scarcity of resources	42	6.0	134	17.3
2. reduce the number of meals because of the scarcity of resources?	36	5.1	107	13.8
3. did you or any HH member go the bed in night hungry because of not enough food?	35	5.0	126	16.3
4. did the HH borrow food, borrow money to purchase food or purchase food in credit or mortgage only if the reason that HH has not money?	277	39.3	353	45.6
5. did the HH reduce the expenditure on education or health to save money to purchase food?	97	13.8	182	23.5

4.6: Characteristics of the children assessed for nutritional status

Table 8: Al Mahweet Highlands: Age and Sex distribution

Indicator	*Boys*		*Girls*		*Total*		*Ratio*
AGE (months)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy: girl**
6-17	113	54.3	95	45.7	208	24.8	1.2
18-29	98	48.8	103	51.2	201	24.0	1.0
30-41	102	57.3	76	42.7	178	21.2	1.3
42-53	85	46.4	98	53.6	183	21.8	0.9
54-59	39	57.4	29	42.6	68	8.1	1.3
Total	437	52.1	401	47.9	838	100.0	1.1

Table 9: Al Mahweet Lowlands: Age and Sex distribution

Indicator	*Boys*		*Girls*		*Total*		*Ratio*
AGE (months)	**no.**	**%**	**no.**	**%**	**no.**	**%**	**Boy: girl**
6-17	82	46.3	95	53.7	177	22.3	0.9
18-29	97	49.5	99	50.5	196	24.7	1.0
30-41	99	52.7	89	47.3	188	23.6	1.1
42-53	78	48.1	84	51.9	162	20.4	0.9
54-59	34	47.2	38	52.8	72	9.1	0.9
Total	390	49.1	405	50.9	795	100.0	1.0

Generally there were nearly equal numbers of boys and girls assessed in Al Mahweet Highlands and the Lowlands (overall ratio 1.1 and 1 respectively), implying representativeness of the sample collected during the survey, as shown in Tables 9 & 10.

Regarding the age ratio of 6-29 months to 30-59 months (that should be around 1.0), it was found to be 0.95 and 0.88 in the High- and Lowlands respectively.

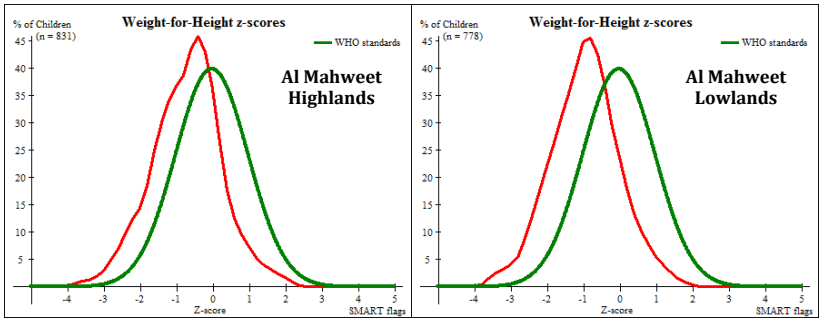
Although the overall sex/age distribution in Lowlands and Lowlands does not significantly differ ($p > 0.05$), it differs significantly for the Highlands which means that the representation of boys and girls according to age groups is different in the Highlands.

4.7: Nutrition Status

Below is a summary of the anthropometric results for Al Mahweet Highlands and Lowlands. Data quality was validated using the plausibility check function of the SMART for ENA software. For both Highlands and Lowlands the data quality was excellent (plausibility data quality scores 3 and 4 respectively) (see Annex 13). The interpretation was made based on the 2006 WHO Growth Standards.

4.6.1: Acute Malnutrition Rates

The graph shows that there is an overall shift of the study population to the left when compared with the reference population (especially for the Lowlands), which is implying presence of malnutrition.



The level of wasting – also known as (GAM) – found in Al Mahweet Lowlands is **12.9 per cent,** compared to **9.9 per cent** in the Highlands as shown in Tables 11 & 12 (including the confidence intervals)**.**

Furthermore, the SAM prevalence found to be 1.9 in the Lowlands compared to 1.1 in the Highlands.

Table 10: Al Mahweet Highlands: Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

Indicator	*All n = 831*			*Boys n = 431*			*Girls n = 400*		
	N	*%*	*95% CI*	*N*	*%*	*95% CI*	*N*	*%*	*95% CI*
Prevalence of global acute malnutrition (<-2 z-score and/or oedema*)	82	9.9	7.6 - 12.8	47	10.9	7.9 - 14.8	35	8.8	6.1 - 12.4
Prevalence of moderate acute malnutrition (<-2 z-score and >=-3 z-score	73	8.8	6.8 - 11.2	42	9.7	7.2 - 13.1	31	7.8	5.4 - 10.9
Prevalence of severe acute malnutrition (<-3 z-score and/or oedema*)	9	1.1	0.6 - 1.9	5	1.2	0.5 - 2.7	4	1.0	0.4 - 2.7

Table 11: Al Mahweet Lowlands : Prevalence of acute malnutrition based on weight-for-height z-scores (and/or oedema) and by sex

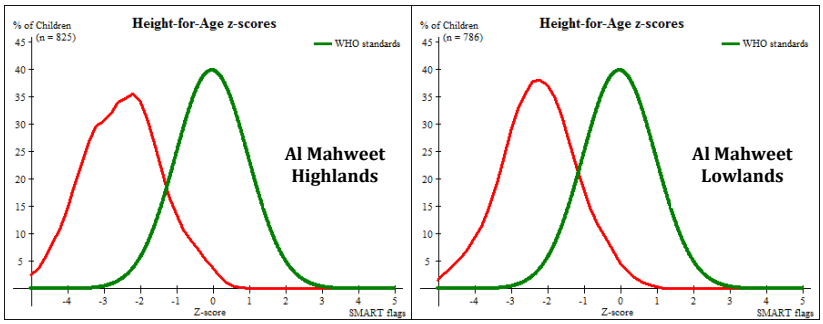
Indicator	*All n = 778*			*Boys n = 378*			*Girls n = 400*		
	N	*%*	*95% CI*	*N*	*%*	*95% CI*	*N*	*%*	*95% CI*
Prevalence of global Acute malnutrition (<-2 z-score and/or oedema*)	100	12.9	10.1 - 16.2	59	15.6	11.0 - 21.6	41	10.3	7.4 - 14.0
Prevalence of moderate malnutrition (<-2 z-score and >=-3 z-score	85	10.9	8.4 - 14.1	48	12.7	8.4 - 18.7	37	9.3	6.7 - 12.7
Prevalence of severe malnutrition (<-3 z-score and/or oedema*)	15	2.0	1.0 - 3.6	11	2.9	1.3 - 6.5	4	1.0	0.4 - 2.6

*The prevalence of oedema is 0.0 per cent

The prevalence of acute malnutrition based on the NCHS reference is reflected in the summary Table 16 below.

4.6.2: Chronic Malnutrition

There is also an overall shift to the left of the study population from the reference population (especially for the Highlands) implying presence of chronic malnutrition.



Global and severe stunting is higher in the Highlands than the lowlands (66.1 and 32.7 vs. 59.2 22.4 per cent). The details of the stunting rates are as shown in the tables 13 & 14 below.

Table 12: Al Mahweet Highlands: Prevalence of stunting based on height-for-age z-scores and by sex

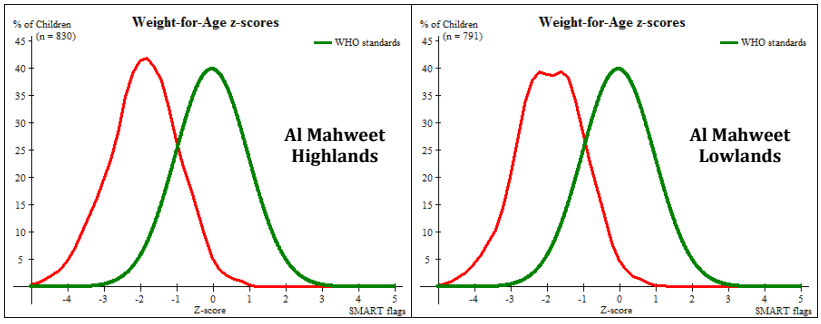
Indicator	*All n = 825*			*Boys n =431*			*Girls n =394*		
	N	*%*	*95% CI*	*N*	*%*	*95% CI*	*N*	*%*	*95% CI*
Prevalence of stunting (H/A<-2 z-score)	545	66.1	60.1- 71.6	291	67.5	60.8 - 73.6	254	64.5	56.6 - 71.6
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	275	33.4	29.9 - 36.9	141	32.7	27.7 - 38.2	134	34.0	28.7 - 39.7
Prevalence of severe stunting (H/A<-3 z-score)	270	32.7	27.9 - 38.0	150	34.8	29.2 - 40.9	120	30.5	24.3 - 37.4

Table 13: Al Mahweet Lowlands: Prevalence of stunting based on height-for-age z-scores and by sex

Indicator	*All n = 786*			*Boys n = 388*			*Girls n = 398*		
	N	*%*	*95% CI*	*N*	*%*	*95% CI*	*N*	*%*	*95% CI*
Prevalence of stunting (H/A<-2 z-score)	465	59.2	53.1 - 65.0	238	61.3	54.3 - 67.9	227	57.0	50.4 - 63.5
Prevalence of moderate stunting (<-2 z-score and >=-3 z-score)	289	36.8	33.3 - 40.4	142	36.6	31.3 - 42.2	147	36.9	33.2 - 40.9
Prevalence of severe stunting (H/A<-3 z-score)	176	22.4	17.9 - 27.6	96	24.7	19.9 - 30.3	80	20.1	15.0 - 26.4

4.6.3: Underweight Rates

Regarding underweight, an overall shift of the study population from the reference is shown in the graphs, implying presence of underweight.



While underweight prevalence is nearly similar in the High- and Lowlands (45.4 and 45.9 per cents respectively), the severe underweight is higher in the Highlands (13.4 vs. 10.6 per cents). The details of the underweight rates are as shown in the tables 15 & 16 below.

Table 14: Al Mahweet Highlands: Prevalence of underweight based on weight-for-age z-scores by sex

Indicator	*All n = 830*			*Boys n = 432*			*Girls n = 389*		
	N	*%*	*95% CI*	*N*	*%*	*95% CI*	*N*	*%*	*95% CI*
Prevalence of underweight (<-2 z-score)	377	45.4	40.2 - 50.7	210	48.6	42.2 - 55.0	167	42.0	36.0 - 48.2
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	266	32.0	28.5 - 35.8	152	35.2	29.9 - 40.9	114	28.6	25.0 - 32.6
Prevalence of severe underweight (<-3 z-score)	111	13.4	10.3 - 17.1	58	13.4	9.9 - 18.0	53	13.3	9.5 - 18.3

Table 15: Al Mahweet Lowlands: Prevalence of underweight based on weight-for-age z-scores by sex

Indicator	*All n = 791*			*Boys n = 387*			*Girls n = 404*		
	N	*%*	*95% CI*	*N*	*%*	*95% CI*	*N*	*%*	*95% CI*
Prevalence of underweight (<-2 z-score)	363	45.9	40.2 - 51.7	183	47.3	40.7 - 54.0	180	44.6	37.6 - 51.8
Prevalence of moderate underweight (<-2 z-score and >=-3 z-score)	279	35.3	30.8 - 40.0	138	35.7	30.0 - 41.7	141	34.9	29.4 - 40.9
Prevalence of severe underweight (<-3 z-score)	84	10.6	8.3 - 13.4	45	11.6	8.7 - 15.3	39	9.7	6.8 - 13.4

The following table (Table 16) summarizes the malnutrition rates in both the Highlands and Lowlands. It also gives the prevalence of acute malnutrition based on the NCHS reference.

Table 16: Summary of Malnutrition Rates by type of districts

Indicator	*Al Mahweet Highlands*			*Al Mahweet Lowlands*		
	N	*%*	*95% CI*	*n*	*%*	*95% CI*
Global Acute Malnutrition (WHZ<-2 or oedema)	82	9.9	7.6 - 12.8	100	12.9	10.1 - 16.2
Severe Acute Malnutrition (WHZ<-3 or oedema)	9	1.1	0.6 - 1.9	15	2.0	1.0 - 3.6
Oedema	0			0		
Global Acute Malnutrition (WHM<80% or oedema)*	66	7.9	6.2 - 10.1	92	11.7	8.8 - 15.3
Severe Acute Malnutrition (WHM<70% or oedema)*	6	0.7	0.3 - 1.5	6	0.8	0.3 - 1.9
Stunting rate (HAZ<-2 z score)	545	66.1	60.1- 71.6	465	59.2	53.1 - 65.0
Severe stunting rate (HAZ <3 z score)	270	32.7	27.9 - 38.0	176	22.4	17.9 - 27.6
Underweight Rates (WAZ<-2 z score)	377	45.4	40.2 - 50.7	363	45.9	40.2 - 51.7
Underweight rate (WAZ_-3 z score)	111	13.4	10.3 - 17.1	84	10.6	8.3 - 13.4

* NCHS reference is used.

4.8: Mortality

Table 17: Mortality data

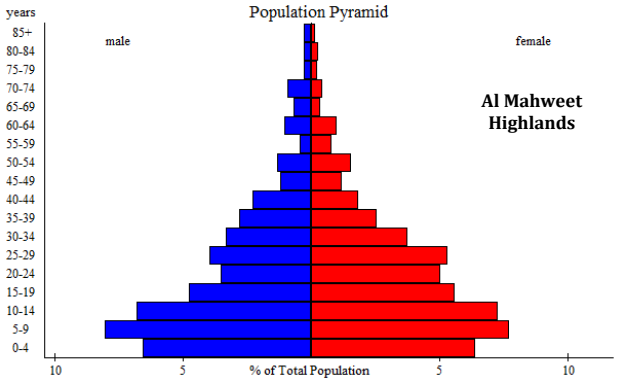
Indicator	*Al Mahweet Highlands*		*Al Mahweet Lowlands*	
	U5	*Total*	*U5*	*Total*
Total HHs surveyed	-	706	-	777
Total Population assessed in HHs	754	5854	831	6851
Number who joined the HHs	25	438	29	498
Number who left the HHs	36	605	15	760
Number of births	-	0	-	0
Number of deaths	1	5	1	15
Mortality rate (per 10,000/day)				
Under-five	0.15 (0.02-1.11)		0.13 (0.02-1.00)	
Crude	0.15 (0.06-0.33)		0.33 (0.19-0.95)	

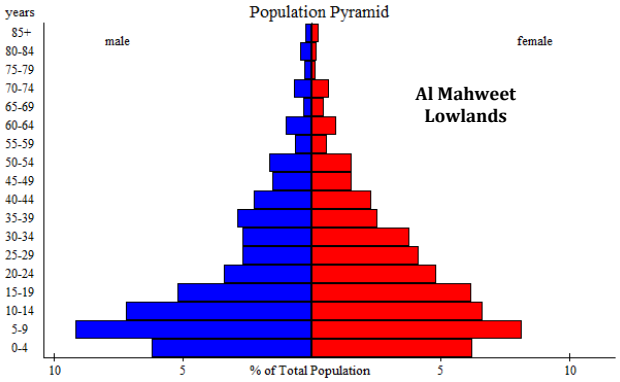
Table 17 shows the crude and under-five death rate In Al Mahweet High- and lowlands. While the under-five mortality is nearly similar in both lands (0.15 vs. 0.13 respectively), the crude mortality rate is somewhat higher in the Lowlands (0.33 vs. 0.15). Although, in Highlands the crude death rate is higher among males than females (0.26 vs. 0.04), it is slightly higher in females than males (0.37 vs. 0.29) in the Lowlands.

Overall these rates are low and within the acceptable levels according to WHO categorisation, hence not raising major concern.

4.9: Population Pyramid

Information about household members during the previous 90 days was collected. The resulting population pyramid for each land is shown below. The pyramid is a stage one (expanding) population pyramid where there is high birth rate; high death rate, and short life expectancy. The population distribution shows almost equal number of the men and women (0.9 : 1) both in the Highlands and Lowlands.





5. Discussion

5.1 Introduction

There are important and significant socio demographic differences between Al Mahweet Lowlands and Highlands that need to be considered. The female headed households is significantly higher in the Lowlands than Highlands (4.1% vs. 2.1%, X2 4.8, P<0.05, df 1). WFP[15] finds that female headed households are more vulnerable to food insecurity and poverty which is also shown in this survey (See 5.9). Furthermore, significantly more women are married but living far from spouse for ≥ 6 months in the Lowlands than Highlands: 9.9% 4.8% as well as more or widowed: 4.6% vs. 2.7% respectively, X^2 21.9, P<0.01, df 5. The reasons behind such significant socio demographic differences between the two lands needs to be investigated further.

Although illiteracy is very high among caretakers in Al Mahweet, illiteracy is much higher in the Lowlands (84.9% vs. 79.4%, X^2 7.6, P<0.01, df 1). Similarly, the percentage of highly educated caretakers is much lower in the Lowlands: 0.8% vs. 2.4%, X^2 6.5, P<0.05, df 1. Significant associations between education level of caretakers and the child nutritional status, morbidities, child health, WASH and food insecurity were found in this survey (see 5.10).

The main sources of income also shows statistically significant differences in favour of the Highlands compared to Lowlands for fixed monthly wages (31.5% vs. 14.4%) and Qat cultivation and trade (8.7% vs. 4.1%). Contrarily, casual labour[16], remittance and social insurance are significantly higher in the Lowlands than the Highlands: 52.1% vs. 39.3, 12.3% and 3.4% vs. 7.1 and 2.0% respectively (X^2 83.8, P<0.0001, df 9).

Drinking water main sources also significantly differ between the two Lands where the per cents of safer sources are much higher in Highlands e.g. house-connected piped water (21.4% vs. 0.5%), house connected yard piped water (10.9% vs. 5.8%), water from protected spring (23.0% vs. 12.6%) respectively. Contrarily, unsafe water sources are higher in the Lowlands e.g. uncovered rainwater harvesting: 10.6 vs. 0.3%, unprotected open well: 1.2% vs. 0.3%, and water tanker: 9.4% vs. 4% respectively, X^2 361.6, P < 0.0001, df 8.

Regarding sanitation, significantly higher per cent of households in Al Mahweet Highlands is having flush/ pour flush latrine compared the Lowlands (68.9% vs. 42.2% , X^2 114.9, P < 0.0001, df 1). Contrarily, much more households in the Lowlands reported defecation in open compared to the Highlands (55.7% vs. 24.3%%, X2 148.9, P<0.0001, df 1).

All these differences are reflecting the better-off socioeconomic situation in Al Mahweet Highlands compared to the Lowlands that need to be considered in interpreting the findings of this survey and showed impact on the nutritional, health, WASH and food security.

[15] WFP (2008c). Impact of Rising Food Prices on Household Food Security in Yemen.
[16] Temporary work is daily wage based work such as work in construction, on others' farms, etc.

5.2 Malnutrition

The levels of acute malnutrition in Al Mahweet were found to be less than predicted based on data collected from the neighboring Hodeidah however, however, it is somewhat higher for chronic malnutrition (as reflected by high global stunting rates). This may interpreted as an indication of poor environmental conditions or long-term restriction of a child's growth potential together with chronic food insecurity and poverty.

The overall GAM rate in Al Mahweet is 11.3 fit with the 10-14 per cent WHO serious level. For the Lowlands, the current GAM rate of 12.9% fits with the 10-14 per cent "serious" level compared to 9.9% GAM rate for the Highlands that fits with the upper limit of 5-9 per cent "poor" level however, no significant differences were found between the two lands. Similarly, the current SAM rate for the Lowlands is 2.0% compared to 1.1% rate for the Highlands with no significant differences between the two lands.

Compared to the national figures, Al Mahweet GAM rates of 11.3 per cents slightly lower than the 12.3 per cent national level of the 2003 Family Health Survey, much lower than the 2010 IFPRI estimation based on the 2005-06 HBS of 15.7, and Lower than the recent 2012 WFP-CFSS estimates of 13.0. Nevertheless, Al Mahweet current rate 11.3%) is similar to Al Mahweet 2010 IFPRI estimation of 11.5 and to the 2012 CFCS WFP Al Mahweet GAM rate of 11.0 per cent.

Regarding SAM, even the highest current SAM figures of 2.0 for Al Mahweet Lowlands it is much less than the 3.0 per cent national level of the 2003 Family Health Survey and the 4.2% Al Mahweet 2010 IFPRI estimation based on the 2005-06 HBS but slightly lower than the 2012 WFP-CFSS recent estimates for Al Mahweet governorate of 2.8 per cent.

For chronic malnutrition, the overall stunting rate in Al Mahweet is 62.7. Such stunting prevalence is higher than the estimated national stunting levels of 58 per cent (as per 2003 PAPFAM survey), the 2010 IFPRI estimation based on the 2005-06 HBS of 55.7, and the recent WFP-CFSS estimates of 46.6 per cent. Although it is similar to the recent WFP-CFSS stunting rate of 63.5 for Al Mahweet, it is much lower than the 81.6 per cent of the 2010 IFPRI stunting estimates based on the 2005-06 HBS for Al Mahweet Governorate. Furthermore, the stunting rate is significantly higher in the Highlands than the Lowlands (66.1 vs. 59.2, X^2 8.4, P <0.01). ***Generally, the current stunting rates in both High- and Lowlands are much beyond the WHO critical levels of 40 per cent; thus Al Mahweet stunting rates are of great concern.***

Regarding the severe stunting, the current prevalence for Al Mahweet of 27.7 is higher than the national figures of 21.7 per cent but lower than the 2102 WFP-CFSS rate for Al Mahweet which 32.1 per cent. Furthermore, severe stunting also significantly higher in the Highlands than the Lowlands (32.7 vs. 22.4, X^2 21.6, P <0.0001, df 1).

Al Mahweet has higher rates of underweight children than other governorates where it is nearly similar in both lands: 45.5 vs. 45.9 per cents. Such rate is higher than the recent WFP-CFSS estimated national figure of 35.5 but similar to the 2012 WFP-CFSS Al Mahweet Governorate figure of 47.0 and slightly higher than 2010 IFPRI estimation based on the 2005-06 HBS of 42.7. Regarding the severe underweight, although it is slightly higher in Al Mahweet Highlands than the Lowlands (13.4 vs. 10.6) the difference is not statistically significant. These figures are somewhat similar to the 2102 WFP-CFSS national figure of 12.6 but lower than the 2102 WFP-CFSS Al Mahweet underweight rate of 16.2 per cent and the 2010 IFPRI estimation based on the 2005-06 HBS of 17.1.

Generally, the current underweight rate which is a composite variable for acute and chronic malnutrition levels is much beyond the WHO critical levels of 30 per cent; thus Al Mahweet underweight rates are of great concern.

In a view of such very high chronic malnutrition found in this survey together with poor to serious acute malnutrition, short-term emergency responses alone are not enough to address such long-term problems. Such trends reflects the cumulative effects of undernutrition and infections since and even before birth and could be interpreted as an indication of poor environmental conditions or long-term restriction of a child's growth potential as well as chronic food insecurity and poverty that need to be addressed in a more holistic approach.

Regarding the gender differences, all types of malnutrition found to be higher among males than females, however such difference is only statistically significant for GAM (13.1% vs. 9.5%, X^2 5.2, P<0.05, df 1) and severe stunting (30.0% vs. 25.3%, X^2 4.5, P<0.05, df 1). Similar gender associations were reported from the previous SMART surveys.

Furthermore, children aged below 36 months have significantly higher GAM prevalence than older children (13.2% vs. 8.4%, X^2 8.8, P<0.01, df 1) as well as higher underweight prevalence (13.5% vs. 9.9%, X^2 4.7, P<0.05, df 1) which may be related to poor child IYCF practices (see 5.3). Contrarily, stunting found to be higher among children aged 36 and above than younger group (68.0% vs. 59.1%, X^2 12.9, P<0.0001, df 1) which may indicates poor environmental conditions as well as chronic food insecurity and poverty (see 5.9).

5.3 Infant and Young Child Feeding (IYCF)

Inappropriate IYCF was recorded in Al Mahweet. Only about one out of four children was exclusively breastfed with no significance difference between the Highlands and the Lowlands. Furthermore, while the majority of children (about 90%) continue breastfeeding at one year with no significance difference between the Highlands and Lowlands, continued breastfeeding at two years is significantly higher at the lowlands than Highlands (49.2% vs. 29.8%, X2 4.2, P < 0.05, df 1). Although no significant association was found between continued breastfeeding at one or two years with malnutrition, continued breastfeeding at two years at the Lowlands may cause mothers' dependency on breastfeeding of their children with poor weaning practices which may (with other factors) contribute to the higher malnutrition rates in the

Lowlands.

Regarding, the MDD, only about one out of five children 6–23 months of age receive foods from 4 or more food groups during the day before the survey which indicates poor minimum dietary diversity with no significant difference between the Highlands and Lowlands. However, children with low MDD have higher prevalence of wasting (17.7% vs. 7.7%, X^2 5.7, P<0.05, df 1), underweight (44.5% vs. 32.1%, X^2 5.4, P<0.05, df 1), and severe underweight (16.6% vs. 4.7%, X^2 9.9, P<0.01, df 1). Nevertheless, MDD does not significantly associated with mother illiteracy, morbidities, or food insecurity.

5.4 Vitamin A Supplementation

Although vitamin A supplementation 6 months prior to the survey does not significantly differs between Al Mahweet Highlands and Lowlands (69.0 and 65.7% respectively), it is notably still lower than the recommended 95 per cent coverage Sphere Standards, 2011. No significant associations were found between vitamin A supplementation and gender, morbidities, and malnutrition except for the severe stunting which is higher among those who did not receive vitamin A compared to those who received it (31.5% vs. 26.5%, X^2 4.4, P<0.05, df 1). Whether, this is related to poor immunity and repeated infections among those who did not receive vitamin A or due to other confounding factor such as better socioeconomic status is need to be investigated further.

5.5 Vaccination coverage

Regarding vaccination, the percentage of children in the Lowlands and Highlands who have been vaccinated with the third dose of polio (80.6 vs. 83.5%) or against measles (86% for both) did not significantly differ between the two lands. Nevertheless, both Al Mahweet High- and Lowlands immunization coverage for polio and measles are still lower than the recommended 95 per cent coverage Sphere Standards.

Although the polio vaccination coverage did not differ by gender, all morbidities found to be higher among those who did not receive the third dose of polio vaccine compared to those who received it but this was only statistically significant for fever (65.6% vs. 53.0%, X^2 15.4, P<0.0001, df 1). Furthermore, all malnutrition found to be significantly higher among those who were not vaccinated for polio, namely wasting (16.2% vs. 10.6%, X^2 7.2, P<0.01, df 1), stunting (68.0% vs. 61.5%, X^2 4.4, P<0.05, df 1), underweight (52.4% vs. 44.2%, X^2 6.5, P<0.05, df 1).

Similarly, the prevalence of malnutrition found to be higher among those who were vaccinated for measles, however this was only statistically significant with underweight (54.1% vs. 44.7%, X^2 6.3, P<0.05, df 1) and severe stunting (38.5% vs. 26.7%, X^2 12.1, P<0.0001, df 1). Alike, although morbidities are higher among those who did not receive measles vaccine, this was only statistically significant with higher fever prevalence (63.6% vs. 52.7%, X^2 8.6, P< 0.01, df 1). Whether, these associations are related to repeated infections among unvaccinated children for polio or measles or due to other confounding factor such as better socioeconomic status is need to be investigated further.

5.6 Salt iodization

Around 2 billion people worldwide are deficient in iodine - and this is one of the leading preventable causes of mental retardation[17]. Iodized salt is important because it prevents iodine deficiency commonly leads to thyroid gland problems, specifically endemic goitre. Only 5.7 per cent of households in Al Mahweet Highlands compared to 4.2% in the Lowlands are using adequately iodized salt. Although another 17.9% and 24.9% at the Highlands and Lowlands respectively are using iodized salt, the amount of iodide found to be inadequate. This indicates that in spite of the household tendency to use iodized salt, there is weakness in the food inspection system on salt monitoring at the market level that need to be strengthened together with more awareness raising on the importance of using iodized salt.

5.7 Morbidity

The morbidities during the last two weeks prior to the survey was commonly recorded in Al Mahweet where 32.0% of children reported to have diarrhoea (compared to national figure of 30[18]), 28.8% to have ARI (compared to national figure of 42%[19]) and 53.8% to have fever (compared to national figure of 40%[20]). The high fever prevalence is need to be investigated as it may reflects the endemicity of malaria which is knowing to be high Al Hodeida neighbouring governorate

The prevalence of all morbidities is also significantly higher in the Lowlands, namely diarrhea (34.9% vs. 29.3, X^2 6.5, P< 0.05, df 1), ARI (33.6% vs. 24.3% X^2 19.7, P< 0.0001, df 1), fever (59.5% vs. 48.3%, X^2 22.5, P< 0.0001, df 1), and measles (5.1% vs. 0.8 X^2 30.7, P< 0.0001, df 1). Such higher prevalence of morbidities in the Lowlands than the Highlands indicates more inappropriate living condition at the Lowlands, predisposing the population to illness. The high fever prevalence may reflects the endemicity of malaria which is knowing to be high in the Lowlands that are bordering Al Hodeida most malaria endemic governorate in Yemen. Furthermore, the poor utilization of health services that found to be a significant problem in the Lowlands compared to the Highland (74.8% vs. 93.5%, X2 94.3, P < 0.0001, df 1) could be an attributing factor. Such high morbidities is calling for improving living condition and an appropriate and adequate health service provision in order to address the negative health outcomes from infections including malnutrition.

Diarrhea was significantly higher among those who are not on exclusive breast feeding (26.3% vs. 9.1%, X^2 5.7, P<0.05, df 1). This may be related to unhygienic preparation or administration of artificial milk or other foods. Although diarrhea did not differ by gender, vitamin A supplementation, or polio or measles vaccination, diarrhea found to be significantly higher among children less than 36 months age compared to older children (38.4% vs. 20.5%, X^2 60.5, P<0.0001, df 1).

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[17] Basil S Hetzel The Nature and Magnitude of the. Iodine Deficiency Disorders (IDD). http://www.ceecis.org/iodine /01_global/02_oxfd/SECTION_01.pdf

18 Multiple Indicator Cluster Surveys (MICS), 2006

19 Family Health Survey, 2003

20 Family Health Survey, 2003

The association between diarrhea and malnutrition has been found in similar previous surveys. In this survey having diarrhea also found to be significantly associated with GAM (16.7% vs. 9.2%, X^2 19.8, P<0.0001, df 1), severe stunting (32.0% vs. 26.2%, X^2 5.9, P<0.05, df 1), underweight (51.1% vs. 43.1%, X^2 9.3, P<0.01, df 1), and severe underweight (16.0% vs. 10.6%, X^2 9.5, P<0.01, df 1). Repeated attacks of diarrhoea – that may be associated with poor environmental sanitation- found to be associated with tropical enteropathy with resultant poor nutrient absorption and considerable nutrient losses[21]. The resulting nutritional deficiency causes impaired immunity and increased vulnerability to more infection resulting in a vicious cycle of infection and malnutrition.

Regarding the ARI, gender, age less than 36 months, vitamin A supplementation, polio or measles vaccination, EBF, and MDD were not significantly associated with ARI. However, ARI significantly associated with stunting (66.4% vs. 61.2%, X^2 4.0, P<0.05, df 1) and underweight (51.1% vs. 43.5%, X^2 8.1, P<0.01, df 1).

Fever two weeks prior to the survey did not differ by gender, EBF, and MDD but it is significantly higher among children less than 36 months age compared to older children (57.8% vs. 46.6%, X^2 20.8, P<0.0001, df 1). Fever also significantly associated with GAM (13.8% vs. 9.1%, X^2 8.5, P<0.01, df 1) and underweight (48.2% vs. 42.2%, X^2 6.8, P<0.01, df 1). Fever also significantly higher among children not vaccinated for polio or measles (see 5.5).

Similarly, measles prevalence does associated with gender, age less than 36 months, or malnutrition, but it significantly higher among non-breastfed children (4.6% vs. 1.2%, Fisher exact test: X^2 7.7, P<0.05, df 1).

Furthermore, significantly much higher per cent of children slept under a mosquito net the night before the survey in Al Mahweet Lowlands compared to the Highlands (31.3% vs. 9.7%, X^2 131.5, P < 0.0001, df 1) which may goes with the malaria endemicity in the Lowlands that bordering the highly endemic Hodeida governorate. Children slept under a mosquito net the night before the survey are less likely to be stunted: (56.6% vs. 64.6%, X^2 8.9, P < 0.01, df 1). Previous interventional studies in Africa shows better nutritional status among children protected by impregnated bed nets[22].

5.8 WASH and Morbidities and Nutrition Situation

WASH known to be an important factor in relation to morbidities as well malnutrition. Overall, less than half of Al Mahweet households drink water from clean container (i.e. no algae seen) and this is significantly lower in the Lowlands than the Highlands: 37.6% vs.45.2%, X^2 8.8, P < 0.01, df 1. Diarrhea prevalence found to be significantly higher

[21] Jean H Humphrey. Child undernutrition, tropical enteropathy, toilets, and Handwashing. Lancet.com Vol 374 September 19, 2009:1032-35

[22] D'Alessandro U, Olaleye BO, McGuire W, Langerock P, Bennett S, Aikins MK, Thomson MC, Cham MK, Cham BA, Greenwood BM. Mortality and morbidity from malaria in Gambian children after introduction of an impregnated bednet programme. Lancet 1995; 345: 479-483.

among households using unclean water container (33.7% vs. 27.8%, X^2 4.0, P<0.05, df 1). Furthermore, among those who are drinking from unclean water container, stunting (67.5% vs. 53.9%, X^2 17.7, P<0.0001, df 1), and underweight (51.6% vs. 38.3%, X^2 16.0, P<0.0001, df 1) are significantly higher. Additionally, severe wasting (2.6% vs. 0.5%, X^2 5.6, P<0.05, df 1), severe stunting (30.3% vs. 21.4%, X^2 9.2, P<0.01, df 1), and severe underweight (13.3% vs. 7.6%, X^2 7.8, P<0.01, df 1) are also significantly higher.

Around half of households in Al Mahweet are having flush or pour flush latrine and this is significantly higher at the Highlands (68.9% vs. 42.2%). Although having no flush/pour latrine was not associated with diarrhea, it was found to be significantly associated with stunting (67.2% vs. 58.0%, X^2 8.0, P<0.01, df 1) and underweight (52.5% vs. 41.4%, X^2 11.3, P<0.01, df 1).

Although households' caretakers WASH practices were poor in both lands, it is significantly much poorer in Al Mahweet Lowlands e.g. for washing hands after toilet: 39.6% vs. 60.1%, X^2 62.2, P < 0.0001, df 1, for washing hands before cooking: 32.1% vs. 39.7%, X^2 9.3, P < 0.01, df 1. Only very few caretakers in both Lowlands and Highlands are washing hands before child feeding (2.8% vs. 3.4%) and after child faces' disposal (14.2% vs. 17.4%) respectively but with no significant differences between the two lands.

Of the WASH practices only not washing hands before cooking was significantly associated with diarrhea: 34.9% vs. 25.3%, X^2 9.9, P<0.01, df 1). Furthermore, of the household caretaker handwashing practice only not washing hand after toilet and not washing hand before cooking shows significant association with underweight: 50.2% vs. 42.2%, X^2 6.1, P<0.05, df 1 and 50.0% vs. 39.8%, X^2 9.1, P<0.01, df 1. Likewise, while not washing hand after disposal of child faces shows significant association with stunting (64.3% vs. 52.7%, X^2 8.6, P<0.01, df 1), not washing hand before child feeding and not washing hand before cook shows significant association with severe stunting: 27.0% vs. 10.8%, X^2 4.8, P<0.05, df 1 and 29.2% vs. 21.6%, X^2 6.5, P<0.05, df 1.

Furthermore, by observation the availability of soap at hand washing facility was significantly lower in Al Mahweet Lowlands than the Highlands: 93.8% vs.96.6%, X^2 6.2, P < 0.05, df 1 respectively. Diarrhea prevalence found to be significantly higher among households with no soap available at hand washing facility (56.4% vs. 30.3%, X^2 11.9, P<0.0001, df 1). Furthermore, among those households with no soap available at hand washing facility, underweight (66.7% vs. 45.3%, X^2 6.3, P<0.05, df 1), and severe stunting (48.6% vs. 25.4%, X^2 9.9, P<0.01, df 1) are significantly higher.

Although whether these are direct effects (e.g. through causing diarrhea) or due to other confounding (e.g. socioeconomic status etc.) that needs to be investigated further, hygiene promotion should be a key intervention contributing reducing morbidities and eventually better nutrition and well-being of the population.

5.9 Food insecurity

Three parameters to assess food accessibility and two parameters to assess coping strategies were used in this survey in which all were measuring the practice 30 days prior to the survey.

Al Mahweet Lowlands households are having much more difficulty in accessing food than the Highlands where 17.3% reported reducing meals' size and 13.8 reducing meals' number compared to 6.0% and 5.1% (X^2 45.1, P < 0.0001, df 1 and X^2 32.0, P < 0.0001, df 1) respectively. Similarly, in the Lowlands 16.3 per cent of households have members experienced to go to the bed hungry compared to only 5.0 per cent in the Highlands (X^2 48.7, P < 0.0001, df 1).

Regarding coping strategies, in Al Mahweet Lowlands significantly higher per cent of the households borrow food/ money to purchase food or purchase food in credit than the Highlands: 45.6 vs. 39.3, X^2 6.0, P < 0.05, df 1, and had reduced expenditures of education and/or health: 23.5 vs.13.8, X^2 22.8, P < 0.0001, df 1 respectively. Furthermore, composite score for the five food insecurity indicators was developed and shows higher mean in Al Mahweet Lowlands than the Highlands (1.2 vs. 0.7, F 45.4, P < 0.0001) respectively.

Although the prevalence of most types of malnutrition found to be slightly higher among food insecure households, such difference was not statistically significant except for underweight with lowering meal number (57.3% vs. 45.1%, X^2 4.5, P<0.05, df 1), severe underweight with lowering meal number (18.3% vs. 10.1%, X^2 5.2, P<0.05, df 1), underweight with borrowing food/ money to purchase food or purchase food in credit (52.4% vs. 41.4%, X^2 11.0, P<0.01, df 1), and severe stunting with borrowing food/ money to purchase food or purchase food in credit (29.6% vs. 23.8%, X^2 3.9, P<0.05, df 1). This may indicates that the malnutrition in Al Mahweet is a complex problem that is a health related problem (e.g. associated with diarrhea), a practice problem (e.g. IYCF), and a food insecurity problem.

All food insecurity indicators (except for borrowing food/ money to purchase food or purchase food in credit) were significantly higher among the female headed households e.g. households have members experienced to go to the bed hungry (31.9% vs. 10.2%, X^2 22.1, P<0.0001, df 1) and reducing meals' size (27.7% vs. 11.4%, X^2 11.5, P<0.01, df 1)

5.10 Household Caretaker Education

Illiteracy is very high among caretakers in Al Mahweet (82%) and significantly much higher in the Lowlands (see 5.1). The association between education level of mothers and the child nutritional status is well reported by nutritional survey done in Yemen since 1991.

All types of malnutrition are predominately higher among children of illiterate caretakers (see Table 4.1).

Although most morbidities (e.g. diarrhea) are higher and EBF and MDD are lower among illiterate mothers' children, such differences were not statistically significant. Nevertheless, illiterate mothers' children have significantly lower polio and measles vaccination and their children is less likely to sleep under mosquito net (Table 4.1) .

Furthermore, WASH practices and food security indicators are significantly lower among illiterate caretakers (Table 4.1).

Therefore, a focus on girls' education should be a priority for its clear and well documented profits on children and community health.

Table 18 Significant associations of care taker illiteracy and malnutrition, child health, WASH, food insecurity and IYCF

Illiteracy	Yes/NO	Prevalence	Stat. significance
I. Malnutrition			
1. GAM			
Care taker illiteracy	Yes	11.9%	X2 : 3.9, P ≤ 0.05, df 1
	No	6.9%	
2. Stunting	Yes	64.4%	X2 : 9.5, P < 0.01, df 1
Care taker illiteracy	No	52.2%	
3. Severe Stunting			
Care taker illiteracy	Yes	28.3%	X2 : 6.8, P < 0.01, df 1
	No	18.8%	
4. Underweight			
Care taker illiteracy	Yes	49.5%	X2 : 16.0, P < 0.0001, df 1
	No	33.2%	
5. Severe Underweight			
Care taker illiteracy	Yes	12.3%	X2 : 8.8, P < 0.01, df 1
	No	4.8%	
II. Child Health			
1. Pentavalent Polio 3 immunization coverage			
Care taker illiteracy	Yes	79.6%	X2 : 20.6, P < 0.0001, df 1
	No	93.7%	
2. Measles immunization coverage			
Care taker illiteracy	Yes	85.0%	X2 : 6.3, P < 0.05, df 1
	No	92.2%	
3. Sleeping under mosquito net			
Care taker illiteracy	Yes	20.2%	X2 : 5.4, P < 0.05, df 1
	No	27.7%	

Illiteracy	Yes/NO	Prevalence	Stat. significance
III. WASH			
1. Hand washing after toilet			
Care taker illiteracy	Yes	47.1%	X2 : 14.1, P < 0.0001, df 1
	No	59.9%	
2. Hand washing before meal			
Care taker illiteracy	Yes	31.8%	X2 : 19.8, P < 0.0001, df 1
	No	46.2%	
3. Hand washing before cooking			
Care taker illiteracy	Yes	32.6%	X2 : 29.7, P < 0.0001, df 1
	No	50.4%	
4. Hand washing before child feeding			
Care taker illiteracy	Yes	2.5%	X2 : 9.5, P < 0.01, df 1
	No	6.1%	
5. Hand washing after disposal of child faces			
Care taker illiteracy	Yes	13.1%	X2 : 37.5, P < 0.0001, df 1
	No	28.2%	
6. Drinking Water container cleanness			
Care taker illiteracy	Yes	36.5%	X2 : 64.1, P < 0.0001, df 1
	No	63.5%	
IV. Food Insecurity			
1. Reducing size of the meals			
Care taker illiteracy	Yes	13.0%	X2: 7.7 , P < 0.01, df1
	No	6.9%	
2. Reducing number of meals			
Care taker illiteracy	Yes	10.5%	X2: 5.7 , P < 0.05, df1
	No	5.7%	
3. Went bed hungry			
Care taker illiteracy	Yes	12.2%	X2: 13.1 , P < 0.0001, df1
	No	4.6%	
4. Borrow food/money to purchase food/in credit			
Care taker illiteracy	Yes	45.2%	X2: 20.0 , P < 0.0001, df1
	No	30.5%	
5. Reducing expenditure on health and education			
Care taker illiteracy	Yes	20.6%	X2: 13.9 , P < 0.0001, df1
	No	10.7%	

6.0 RECOMMENDATIONS

The levels of acute malnutrition in Al Mahweet were found to be less than the levels found from the neighboring Hodeidah however, it is somewhat higher for chronic malnutrition (as reflected by high global stunting rates). This may interpreted as an indication of poor environmental conditions or long-term restriction of a child's growth potential together with chronic food insecurity and poverty.

Inadequate access to food, inadequate maternal and child care practices, poor access to water and sanitation and health services contribute to malnutrition in Yemen. Furthermore, in Yemen critical issues of malnutrition are inadequate IYCF practices and high prevalence of morbidities especially diarrhoeal diseases exacerbated by inadequate practices of treating the sick child.

Although mortality is still low as all SMART surveys in Yemen showed, the critical levels of stunting and underweight in both lands that are above the critical levels as per WHO categorization as well as poor to serious GAM rates require an urgent intervention to address the situation a cross the governorate. It is also important to note that there are pockets of vulnerability in the two zones with high levels of acute and chronic malnutrition, comparable to the prevalence seen in the neighbouring Hodeidah Governorate.

The existence of multi-sectoral aggravating factors like poor IYFC, high prevalence of communicable diseases, weak basic infrastructures (water, sanitation etc.) and insufficient coverage with essential health services like immunization and micronutrient supplementation in addition to high level of illiteracy among the majority of caretakers are appealing and calling for an integrated multi-sectoral action. The need to deliver an integrated package of services to mothers and their children not only to address the acute malnutrition but also to address the high level of stunting and underweight as well as other development indicators.

Politicians and decision makers along with development partners need to keep the fighting undernutrition among U5 children on top of their political and development agenda. Since early 1970s; stunting among U5 children was and continue to be one of the highest levels in the world. Through simple analysis utilizing the data collected from Hodeidah, Hajja, Ryema, Taiz, Lahj, Aden, Ibb, Abyan, Dhamar, and finally Al Mahweet governorates which are dwelled by more than 70 per cent of Yemenis, it simply can be identified that more than one million of U5 children in these governorates are stunted; threatening the development future of Yemen.

Below are the main immediate and medium-term recommendations:

Immediate Interventions

- Develop detailed integrated response micro-plan articulating district level humanitarian needs, delivering response package, coverage and gaps to document the progress, advocacy and lessons learnt.
- Priority should be given to pockets of vulnerability in both zones through mobilizing outreach services to rapidly address the high GAM/SAM rates.
- Development of CMAM protocol, strengthen and expanding CMAM services to reach all the existed health facilities and outreach services.
- CMAM services should adhere to the CMAM protocol (ensuring systematic treatment and full consideration of moderate acute malnutrition management) that should be integrated with infant feeding, hygiene promotion and food security interventions.
- to promote appropriate IYCF practices (early initiation of breastfeeding, exclusive and sustained breastfeeding for 2 years and promotion of appropriate complementary feeding practices for children aged 6 to 24 months) along with micronutrient supplementations and deworming.
- Accelerate the integration of IYCF counseling into all CMAM services delivered by both fixed and mobile clinics.
- Intensive social mobilisation campaigns on IYCF feeding and caring practices through behavior change / communication interventions mainly in the following areas; timely introduction of complementary food and continue breastfeeding up to two years, along with Vit. A supplementation, micronutrient supplements, and promotion of safe sanitation and hygienic practices including hand washing with soap as well as safe disposal of children's excreta, diarrhoea prevention measures and appropriate management of ARI among young children

Medium Term Interventions

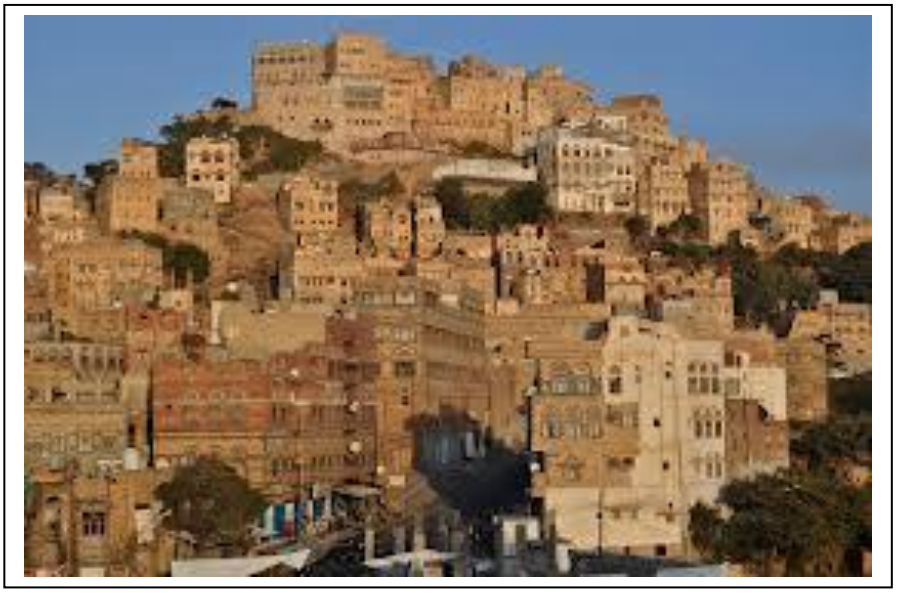
- From the development point of view, there is an essential need for Yemen to be an active member in the global SUN movement.
- High level advocacy with the GOY and politicians to mobilise their commitment to fight undernutrition among U5 Yemeni children.
- Scaling up implementation of the national nutrition strategy and related action to address the high level of malnutrition in line with the lifecycle approach along with promotion of maternal nutrition.
- Continued support for longer term water development and sanitation programmes throughout the governorate, with community mobilization activities to promote safe sanitation and hygienic practices.
- Follow up SMART nutrition survey and coverage survey in 2014 to track the progress on implementation of the response plan.
- Strengthening livelihoods and resilience of vulnerable groups via increasing agricultural productivity, water use efficiency, income diversification, and employment generation. Exploring new initiatives to promote small scale income generating projects, draw lessons learnt and replicate the successful projects.

- Promote improved basic infrastructure (e.g. water, sanitation etc.), latrine use, and other hygiene services like Community Led Total Sanitation (CLTS) strategy.

Other Recommendations

- Establish food security and nutrition baselines and monitoring systems
- Undertaking full scale national nutrition and mortality survey.
- In a view of high malnutrition among illiterate mothers' children found in this as well as previous surveys in Yemen, a focus on girls' education is necessary in the long term battle against malnutrition.
- Further investigation is needed to understand the causality tree behind high level of acute malnutrition among boys compared to girls found in this survey (especially for GAM and severe stunting) as well as earlier surveys conducted in Hodeidah, Taiz, Hajja governorates.
- In malaria endemic areas, and in the view of the perceived benefit from using impregnated bed net on malnutrition that shown in this survey, pilot a randomize control trail to show the benefit and the cost of such wider scale intervention is recommended.

7. Annexes



استبيان رقم: .....

Annex 1: Al Mahweet Nutrition Survey Questionnaire

الجمهورية اليمنية
وزارة الصحة العامة والسكان
مكتب الصحة العامة والسكان بمحافظة المحويت

مسح الحالة التغذوية والوفيات في محافظة المحويت، يونيو 2013

استبيان الأسرة (نموذج 1)

أولاً. يتم الشرح للساكنين في المسكن (البالغين منهم) عن المسح والتعريف بالجهة القائمة عليه والأشخاص العاملين فيه (أعضاء الفريق)، ثم بعد ذلك الحصول على الموافقة الشفهية منهم.

الموافقة	1.	نعم		
	2.	لا		انتقل إلى النهاية

تاريخ المقابلة	**يوم**		**شهر**		**سنـــــة**			
			6	Ø	3	1	Ø	2

المديرية	العزلة	القرية/ الحارة
الاسم	الاسم	الاسم

اسم رب الأسرة:	

فريق المسح رقم		**الاسم**	**التوقيع**
	الاسرة والأنثروبومتري		
	الوفيات		
	رئيس الفريق		

بين فيما إذا كان هناك:		
1.	غياب الأسرة عند الزيارة الأولى ويتطلب الأمر زيارة ثانية	
2.	غياب طفل عند الزيارة الأولى ويتطلب الأمر زيارة ثانية*	

* عند غياب الطفل، تستكمل كل بياناته عدا القياسات الإنثروبومترية والأوديما حيث تستكمل عند حضوره.

ملاحظة: البيانات في الغلاف هي للاستخدام الميداني والإداري من قبل أعضاء الفريق.

استبيان رقم: .....

يملئ من قبل رئيس الفريق (تستخدم لإدخال البيانات)

غياب الأسرة حتى بعد الزيارة الثانية (1 نعم ، 2 لا)	
الموافقة (1 نعم ، 2 لا)	

رقم الفريق	

رقم استبيان الأسرة				

تاريخ المقابلة	ي ي		ش ش		س س س س				
			Ø	6	3	1	Ø	2	

هل المنطقة حضرية (1) أم ريفية (2)	

رمز القرية / الحارة			رمز العزلة	
رمز المديرية			رمز المحافظة	7 2
رقم **طبقة** المسح			رقم العنقود	

العمل المكتبي

	الاسم	اليوم		الشهر		السنة				التوقيع
إدخال البيانات										
المراجعة										
ترميز أخرى										

الملاحظات

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استبيان رقم: .....

س 001: بيانات عن الأسرة (الأحياء فقط والذين يعيشون حاليا في الأسرة)

H001a	عدد أفراد الأسرة (الأحياء فقط الذين يعيشون حاليا في الأسرة تاريخ المسح)	**العدد**	

H001b	عدد الأطفال أقل من 5 سنوات (الأحياء فقط الذين يعيشون حاليا في الأسرة تاريخ المسح)	**العدد**	

H001c	عدد الأطفال أقل من 6 أشهر (الأحياء فقط الذين يعيشون حاليا في الأسرة تاريخ المسح)	**العدد**	

س 002 – س 003: بيانات رب الأسرة

H002	مانوع رب الأسرة		
	1. ذكر		
	2. أنثى		

H003	الحالة الاجتماعية لرب الأسرة		
	1. متزوج ويعيش مع شريكه.		
	2. متزوج لكنه لا يعيش مع الشريك منذ ستة أشهر أو أكثر.		
	3. أرمل.		
	4. مطلق.		
	5. حانق		
	6. عازب.		

س 004: بيانات راعي الأسرة

H004	المستوى التعليمي لراعي الأسرة		
	1. أمي.		
	2. يقرأ ويكتب.		
	3. تعليم أساسي.		
	4. تعليم ثانوي.		
	5. تعليم عالي (جامعة أو كلية أو معهد).		

استبيان رقم: .....

س 005: مصدر دخل الأسرة

H005	ماهو مصدر الدخل **<u>الرئيسي</u>** للأسرة؟			
	1.	منتجات زراعية غير القات.		
	2.	حيوانات ومنتجات الحيوانية.		
	3.	اسماك.		
	4.	تجارة.		
	5.	عمل مؤقت.		
	6.	وظيفة دائمة براتب شهري.		
	7.	حوالات (من المغتربين).		
	8.	أعمال حرفية.		
	9.	زراعة/ بيع/ نقل القات.		
	10.	هبات (من الأهل أو الأصدقاء).		
	11.	ضمان إجتماعي.		
	12.	أخرى: تذكر		

س 006 – س 012: بيانات عن الماء والإصحاح البيئي والنظافة

H006	ماهو المصدر الرئيسي **<u>لمياه الشرب</u>** في منزلكم؟ (خيار واحد فقط)			
	1.	أنابيب مياه موصلة إلى البيت.		
	2.	أنابيب مياه موصلة إلى فناء البيت.		
	3.	بئر مفتوحة غير محمية.		
	4.	بئر مفتوحة محمية.		
	5.	خزان مغطى لحصاد مياه الأمطار.		
	6.	خزان مفتوح لحصاد مياه الأمطار.		
	7.	سيارة نقل المياه (وايت ماء)		
	8.	مياه صحية معبأة (حدة، شملان، كوثر الخ)		
	9.	مياه سطحية غير محمية (وادي، عين ماء جاري، الخ)		
	10.	عين ماء محمية		
	11.	أخرى: تذكر		

H007a	هل تقومون بمعالجة الماء قبل **الشرب؟**			**إنتقل إلى**
	1.	نعم		
	2.	لا		H008 ←
	3.	لا أعرف		H008 ←

H007b	ماهي طريقة المعالجة **الرئيسية** المستخدمة **لمياه الشرب** (خيار واحد فقط)			
	1.	غلي الماء قبل الشرب		
	2.	استخدام الكلور		
	3.	الترشيح عبر قماش نظيف		
	4.	استخدام مرشح سيراميك أو رمل أو ماشابه (فلتر أو قطارة)		
	5.	ترك الماء ساكنا قبل الشرب لترسيب الشوائب.		
	6.	استخدام الشب (شب الفؤاد)		
	7.	أخرى: تذكر		

H008	**للملاحظة**: **تحقق** من توفر نقاط تخزين المياه **لغرض الشرب**: هل الوعاء الحاوي لمياه الشرب نظيف؟ (عدم وجود طحالب يعني رقم 1 ووجود الطحالب يعني رقم 2)			
	1.	نعم.		
	2.	لا.		

H009	اين تتم عملية قضاء الحاجة (التبرز)؟ (اختر فقرة من التالي)- **تحقق** من توفر المرافق والممارسات			
	1.	مرحاض - يتوفر فيه صب الماء للتنظيف الذاتي (سيفون أو دلو).		
	2.	مرحاض - حفرة دون غطاء.		
	3.	مرحاض - حفرة مغطاة بطريقة بسيطة (الجاف).		
	4.	قضاء الحاجة في العراء (في الحقول مثلا، الخ.)		
	5.	أخرى: تذكر		

H010	متى تقومين بغسل اليدين باستخدام الصابون أو الرماد أو التراب أو أوراق الشجر أو ي مادة اخرى؟ (ضع علامة أمام أكثر من فقرة إذا قام الشخص بذكرها. **يرجى عدم طرح خيارات الإجابة على المستجيب**					
	a.	بعد قضاء الحاجة	.1	نعم		
			.2	لا		
	b.	قبل الأكل	.1	نعم		
			.2	لا		
	c.	بعد الأكل	.1	نعم		
			.2	لا		
	d.	قبل الطبخ	.1	نعم		
			.2	لا		
	e.	قبل إطعام الطفل	.1	نعم		
			.2	لا		
	f.	بعد التخلص من براز الطفل	.1	نعم		
			.2	لا		
	g.	بعد التنظيف لمكان المواشي والدواجن	.1	نعم		
			.2	لا		
	h.	اية إجابات أخرى: تذكر:				

H011	**للملاحظة**: في نقطة غسل اليدين، تحقق من وجود التالي				
	a.	الماء	.1	نعم	
			.2	لا	
	b.	الصابون	.1	نعم	
			.2	لا	
	c.	الرماد/ التراب/ القضاض/ أوراق الشجر.	.1	نعم	
			.2	لا	

H012a	أين تحصلون بصورة رئيسية على الرعاية الصحية عندما يمرض أحد أفراد الأسرة؟		**إنتقل إلى**
	.1	لا أطلب مساعدة طبية	
	.2	تداوي شخصي	
	.3	معالج تقليدي/ شعبي	
	.4	شيخ/ القرآن	
	.5	صيدلية	
	.6	عيادة خاصة	C013 ←
	.7	مرفق صحي عام	C013 ←

H012b	في حالة عدم الحصول على الخدمة الصحية، ماهو السبب الذي يجعلكم لاتسعون للحصول على الخدمة في مرفق صحي أو عيادة عند المرض؟		
	.1	الكلفة عالية	
	.2	المرفق بعيد ولا تتوفر مواصلات	

	3.	لايوجد وقت كافي		
	4.	لا نثق في خدما ت المرافق القريبة		
	5.	أخرى: تذكر		

س 013 – س 017: خاص بحالة الأمن الغذائي (الإجابة على هذه الإسئلة يجب أن تكون وفقا للحالة خلال الـ 30 يوم الماضية)

H013	خلال الثلاثين اليوم الماضية، هل حدث أن لجأ (الاسم) أو أحد أفراد الأسرة إلى تصغير حجم الوجبات في اليوم بسبب شحة الموارد؟			
	1.	نعم		
	2.	لا		

H014	خلال الثلاثين اليوم الماضية، هل حدث أن لجأ (الاسم) أو أحد أفراد الأسرة إلى تقليل عدد الوجبات في اليوم بسبب شحة الموارد؟			
	1.	نعم		
	2.	لا		

H015	خلال الثلاثين اليوم الماضية، هل حدث أن ذهب (الاسم) أو أحد أفراد الأسرة إلى النوم في الليل وهو جائع بسبب عدم كفاية الغذاء؟			
	1.	نعم		
	2.	لا		

H016	خلال الثلاثين اليوم الماضية، هل حدث وأن قامت الأسرة باستلاف الغذاء، أو أقترضت نقودا من أجل شراء الغذاء أو قامت بشراء الغذاء بالآجل (الدين) أو الرهن **بسبب عدم توفر النقود**؟			
	1.	نعم		
	2.	لا		

H017	خلال الثلاثين اليوم الماضية، هل حدث أن قللت الأسرة الإنفاق على التعليم والصحة لشراء مواد غذائية؟			
	1.	نعم		
	2.	لا		

س 018: حالة تيويد ملح الأسرة

H018	قم بفحص الملح الذي استخدمته الأسرة يوم أمس بواسطة كاشف اليود السريع؟			
	1.	لايوجد اليود.		
	2.	يود أقل من 15 جزء في المليون		
	3.	يود بنسبة 15 جزء في المليون أو أكثر		
	4.	لم يعمل الفحص		

س 019 – س 023: حالة التحصين وتزويد فيتامين (أ) للأطفال في سن 6-59 شهراً في الأسرة

		C019	C020a	C020b	C021	C022	C023
رقم الطفل	الاسم الأول للطفل	نوع الطفل 1= ذكر 2 = أنثى	تاريخ الميلاد (بالهجري أو الميلادي) للأطفال من بسن (0 إلى 59 شهر)	عمر الطفل (بالأشهر)	**للأطفال بعمر 6 أشهر فأكثر** هل تم إعطاء الطفل فيتامين (أ) خلال الستة أشهر الماضية؟ (إظهار عينة) 1 = نعم 2 = لا 3= لا أعرف	**للأطفال بعمر 6 أشهر فأكثر** هل أخذ الطفل جرعة لقاح الخماسي3/ الشلل3؟ 1 = نعم 2 = لا	**للأطفال بعمر تسعة أشهر فأكبر.** هل تم تطعيم الطفل ضد الحصبة. (حقنة في اليد اليسرى)؟ 1 = نعم من البطاقة. 2 = نعم بالتذكر. 3 = لا أعرف 4 = لم يطعم
.1			**يوم** **شهر** **سنـــة**				
.2			**يوم** **شهر** **سنـــة**				
.3			**يوم** **شهر** **سنـــة**				
.4			**يوم** **شهر** **سنـــة**				
.5			**يوم** **شهر** **سنـــة**				
.6			**يوم** **شهر** **سنـــة**				
.7			**يوم** **شهر** **سنـــة**				

س 024 – س 027: القياسات الجسمانية ومراضة الأطفال بين سن 6-59 شهر في الأسرة (يترك فارغا للأطفال بسن أقل من 6 أشهر)

			C024	C025	C026	C027
رقم الطفل (كما سبق أعلاه)	الاسم الأول للطفل	عمر الطفل (بالأشهر)	الوزن (كيلو جرام) 88.8 = رافض 99.9 = غائب	الطول (سم) 888.8 = رافض 999.9 = غائب	التوذم (أوديما) في كلا القدمين. 1 = نعم 2 = لا 8 = رافض 9 = غائب	قياس محيط الذراع (سم) (الميواك) 88.8 = رافض 99.9 = غائب
.1			.	.		.
.2			.	.		.
.3			.	.		.
.4			.	.		.
.5			.	.		.
.6			.	.		.
.7			.	.		.

س 028 – س 033: مراضة الأطفال بين سن 0-59 شهر في الأسرة

			C028	C029	C030	C031	C032	C033
رقم الطفل (كما سبق أعلاه)		عمر الطفل (بالأشهر)	الإسهال خلال الأسبوعين الماضيين 1 = نعم 2 = لا	سعال أو صعوبة في التنفس خلال الأسبوعين الماضيين 1 = نعم 2 = لا	الحمى خلال الأسبوعين الماضيين 1 = نعم 2 = لا	الاشتباه بالحصبة خلال الشهر الماضي (طفح جلدي + حمى + (سعال أو إلتهاب حلق أو إلتهاب الملتحمة) 1 = نعم 2 = لا	هل نام الطفل تحت شبك الناموس الليلة الماضية؟ 1 = نعم 2 = لا	هل الطفل مسجل حالياً في أي مركز تغذية 1= SFP (تغذية تكميلية) 2= TFC (معالجة سوء التغذية في القسم الداخلي في المستشفى) 3= OTP (معالجة سوء التغذية في العيادة خارجية) 4= أخرى 5 = غير مسجل
.1								
.2								
.3								
.4								
.5								
.6								
.7								

س 034 – س 035: دون ممارسة إطعام الأطفال بين سن 0 إلى 24 شهر خلال الـ 24 ساعة الماضية (يترك فارغا للأطفال بعمر أكبر من 24 شهرا)

رقم الطفل (كما سبق أعلاه)	الاسم الأول للطفل	عمر الطفل (بالأشهر)	C034a	C034b	هل تناول الطفل أمس أيا من المجموعات الغذائية أدناه. إبدئي بسؤال اليوم من الوقت الذي استيقظ فيه الطفل صباح أمس وحتى نومه في المساء. اتركي الأم تتذكر وعندما تنتهي قم بذكر المواد أدناه 1 = نعم 2 = لا 3 الأم لاتعرف								
			هل رضع الطفل من ثدي أمه خلال الـ 24 ساعة الماضية؟ أحيانا لاتكون هناك رضاعة مباشرة لكن لبن الأم يستخرج من الثدي ويعطى للطفل بطريقة أخرى. 1 = نعم 2 = لا	كم عدد المرات التي رضع فيها الطفل و عدد المرات التي أعطى فيها الطفل لبن الأم خلال الـ 24 ساعة الماضية؟	C035a	C035b	C035c	C035d	C035e	C035f	C035g	C035h	C035i	C035j
					ماء مع أو بدون سكر	حليب أطفال	عصيدة أو شبيسة أو خبز أو أرز أو مكرونة أو اي غذاء مصنوع من الحبوب. بطاطا بيضاء أو أية أغذية درنية أخرى.	أي أغذية مصنوعة من الفول أو الفاصوليا أو البازيليا أو العدس أو الفول السوداني أو أي بقوليات أخرى.	الحليب أو الجبن أو الزبادي أو الحقين أو الأيسكريم أو الثريب (الثرابة).	كبد أو كلى أو قلب أو أحشاء أخرى. أي لحوم بقر أو غنم أو ماعز أو دواجن. اسماك طازجة أو مجففة أو معلبة.	بيض	دبا أو جزر أو بطاطا حلوة جوفها أصفر أو برتقالي. أي خضراوات ورقية داكنة الخضرة. مانجو أو باباي ناضجة.	أي فواكه أو خضراوات أخرى لم تذكر في الخانة السابقة.	أية مشروبات أو أغذية أخرى
.1														
.2														
.3														
.4														
.5														
.6														
.7														

مسح الحالة التغذوية والوفيات في محافظة المحويت، يونيو 2013م

استمارة رصد أفراد الأسرة خلال فترة 90 يوم من تاريخ المسح (نموذج 2)

مديرية المسح: _____ الحي: _____ التاريخ: _____ رقم العنقود: _____ رقم الفريق: _____

_____ رقم إستبيان الأسرة: _____ طبقة المسح: _____

م	الاسم (اختياري)	الجنس (ذكر أو أنثى)	العمر بالسنوات	التحق أثناء فترة 90 يوم	غادر أثناء فترة 90 يوم	ولد أثناء فترة 90 يوم	توفي أثناء فترة 90 يوم	سبب الوفاة	موقع الوفاة
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

هام: يتم تسجيل كل الأفراد الموجودين حاليا و كل من التحق بالأسرة أو غادرها أو توفى أو ولد خلال 90 يوم من تاريخ المسح

رموز أسباب الوفاة	
1 = الاسهال	**5 = سوء التغذية**
2 = الحمى	**6= العنف / بسبب الصراعات**
3= الحصبة	**7= أخرى (حدد)**
4 = مشاكل في التنفس	
رموز مواقع الوفاة	
1 = في الموقع الحال	
2= أثناء الهجرة	
3= في آخر مكان سكن فيه	
4 = أخرى (حدد)	

Questionnaire Number:

Republic of Yemen
Ministry of Public Health and Population
Office of Public Health and Population, Al Mahweet Governorate

Nutritional Status and Mortality Survey – Al Mahweet Governorate, June 2013

Household Questionnaire (Form 1)

First: Explain to the residents of the household (adults) about the survey and inform them of the agency conducting the survey and survey staff (team members). Then request their verbal agreement to participate in the survey.

Consent	1.	Yes.		
	2.	No.		Go to the end.

Date of interview	day		month		year			
			Ø	6	2	Ø	1	3

District	Ozla (Sub-district)	Village/ Hara
Name	Name	Name

Name of head of household	

Survey team number		Name	Signature
	Household and anthropometric data		
	Mortality data		
	Team leader		

Indicate which situation applies:		
1.	Absence of household upon first visit which necessitated a second visit	
2.	Absence of child upon first visit which necessitated a second visit *	

* If the child is not present, all data should be filled in except anthropometric measurements and edema which should be completed only if the child is present.

Note: The data inside the cover is for field and administrative use by the team members.

Questionnaire Number:

To be filled by the Team Leader (for data input purposes)

Repeated absence of the household even after the second visit (1=yes, 2=no)	
Consent (1=yes, 2=no)	

Team Number		

Household Questionnaire Number				

Date of Interview	day		Month			year			
			Ø	6		2	Ø	1	3

Is the region urban (1) or rural (2)?	

Village or neighborhood code number			Sub-district code number		
District code			Governorate code number	2	7
Survey zone (stratum) number			Cluster number		

Stratum number is (1) for Highland Zone and (2) for Lowland

.....

Desk work

	Name	day		month		Year				Signature
Data entry										
Review										
Other encoding										

Remarks:

.....

.....

.....

.....

.....

.....

Q001: Household data (only those who are alive and living together continuously)

H001a	Number of household members (only those who are alive and living with the household on the date of the survey)	Quantity	

H001b	Number of children under five (only those who are alive and living with the household on the date of the survey)	Quantity	

H001c	Number of children under six months (only those who are alive and living with the household on the date of the survey)	Quantity	

Q002 – Q003: Head of household data

H002	Gender of the head of household			
	1.	Male		
	2.	Female		

H003	Social status of the head of household			
	1.	Married and living with partner		
	2.	Married and not living with partner for at least six months or more.		
	3.	Widow/widower		
	4.	Divorced		
	5.	Angered and separated/ Recalcitrant		
	6.	Single		

Q004: Household caretaker data

H004	Education level of household caretaker			
	1.	Illiterate.		
	2.	Can read and write (literate).		
	3.	Basic education.		
	4.	Secondary education.		
	5.	Tertiary education (university, college, or institute).		

Q005: Household income source

H005	What is the **primary** source of income for the household?			
	1.	Non-qat agricultural products		
	2.	Livestock and livestock products		
	3.	Fishery		
	4.	Trading		
	5.	Temporary work (Casual work)		
	6.	Monthly salary		
	7.	Remittance (from emigrants)		
	8.	Craftsmanship		
	9.	Farming/sale/transport of qat		
	1Ø.	Donation (from friends and relatives)		
	11.	Social insurance		
	12.	Other: specify -		

Q006 – Q012: Water, environmental sanitation, and hygiene data

H006	What is the main source of **<u>drinking water</u>** in your home? (choose one only)			
	1.	Piped water connected to home.		
	2.	Piped water connected to yard.		
	3.	Open, unprotected well.		
	4.	Open, protected well.		
	5.	Covered rainwater collection tank.		
	6.	Open rainwater collection tank.		
	7.	Water delivery truck.		
	8.	Bottled water (Hadda, Shamlan, Kawthar, etc.)		
	9.	Unprotected surface water (valley, running spring, etc.)		
	1Ø.	Protected spring water.		
	11.	Other: specify -		

H007a	Do you treat the water before drinking?			Go to
	1.	Yes		
	2.	No		→ H008
	3.	Don't know.		→ H008

H007b	What is the **main** method used to treat **drinking water**? Choose only one.			
	1.	Boil water before drinking.		
	2.	Use chlorine substance.		
	3.	Filter through clean cloth.		
	4.	Use ceramic or sand filter or similar filter method.		
	5.	Let water settle before drinking.		
	6.	Use of alum crystal to disinfect.		
	7.	Other.		

H008	**Note**: **Investigate** availability of storage for **drinking water**. Is the water container clean (no algae seen)?			
	1.	Yes.		
	2.	No.		

H009	What is used for defecation? Choose one of the following. **Verify** existence of facilities and practices.			
	1.	Toilet – equipped with flush mechanism to wash water down.		
	2.	Toilet – uncovered pit.		
	3.	Toilet – simple dry covered pit.		
	4.	Outdoors in the open air (in fields, for example).		
	5.	Other: specify -		

H010	When do you clean your hands with soap, ashes, dust, tree leaves, or any other material? Place a check mark for each answer said by the respondent. **Do not give the respondent any choices for the answer.**					
	a.	After using the toilet.	1.	Yes		
			2.	No		
	b.	Before eating.	1.	Yes		
			2.	No		
	c.	After eating.	1.	Yes		
			2.	No		
	d.	Before cooking.	1.	Yes		
			2.	No		
	e.	Before feeding the child.	1.	Yes		
			2.	No		
	f.	After disposing of child's waste.	1.	Yes		
			2.	No		
	g.	After cleaning the livestock or poultry areas.	1.	Yes		
			2.	No		
	h.	Any other answers: Specify -				

H011	Note: With regard to hand-washing, confirm the use of the following:					
	a.	Water.	1.	Yes		
			2.	No		
	b.	Soap.	1.	Yes		
			2.	No		
	c.	Ashes, dust, limestone powder, tree leaves.	1.	Yes		
			2.	No		

H012a	Where do you obtain health care if someone in the household gets sick?			Go to
	1.	No medical help is sought.		
	2.	Personal medicines.		
	3.	Traditional healer.		
	4.	Shaykh.		
	5.	Pharmacy.		
	6.	Private clinic.		C013
	7.	Public health facility.		C013

H012b	Why don't you seek health services at a health facility or clinic when someone gets sick?			
	1.	High cost.		
	2.	Facility is distant and transportation is not available.		
	3.	Not enough time.		
	4.	We do not have confidence in the nearby services.		
	5.	Other: specify -		

Q013 – Q017: The food security situation part (to be answered for the situation in the past 30 days)

H013	Over the past 30 days, did you or any HH member use to reduce the size of meals because of the scarcity of resources?			
	1.	Yes		
	2.	No		

H014	Over the past 30 days, did you or any HH member use to reduce the number of meals because of the scarcity of resources?			
	1.	Yes		
	2.	No		

H015	Over the past 30 days, did you or any HH member go the bed in night hungry because of not enough food?			
	1.	Yes		
	2.	No		

H016	Over the past 30 days, did the HH borrow food, borrow money to purchase food or purchase food in credit or mortgage **only if the reason that HH has not money**?			
	1.	Yes		
	2.	No		

H017	Over the past 30 days, did the HH reduce the expenditure on education or food to save money to purchase food?			
	1.	Yes		
	2.	No		

Q018: Situation of salt iodisation

H018	Use the rapid test reagent to check the iodisation status of the salt HH was used yesterday?			
	1.	Not iodised.		
	2.	Below 15 ppm.		
	3.	15 ppm and above.		
	4.	The test was not made.		

Nutritional Status and Mortality – Al Mahweet Governorate, June 2013

Individual household members monitoring form for the 90 days following survey commencement date (Form 2)

District surveyed: _____ Village/neighborhood: _____ Date: _____ Cluster number: _____
Team number: _____ Household questionnaire number: _____ Survey zone (stratum): _____

No.	Name (optional)	Sex (M, F)	Age in years	Joined within the 90 day period	Left within the 90 day period	Born within the 90 day period	Died within the 90 day period	Cause of death	Place of death
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
20									

Important: All individuals present in the household should be recorded, whether joining or leaving the household, and whether born or died within the 90 day period from commencement of the survey.

Symbols for causes of death	
1 = diarrheal disease	5 = malnutrition
2 = fever	6 = violence / impacts of conflicts
3 = measles	7 = other (specify)
4 = respiration disorders	

Symbols for places of death
1 = at the current location
2 = during emigration
3 = at a different residence
4 = other (specify)

Annex 3: Al Mahweet Nutrition Survey Team, June 2013

Team No	Name	Position	Duty Station
Survey Team			
1	Mohamed Hasan Hasan Al Dohmasi		
	Amat Al Malek Ali Al Ashmori		
	Samar Yahea Showel		
	Faten Mohamed Al Sorehi		
2	Abdul Azez Katran Al Mesraa'h		
	Hanan Ahmed Al Alabi		
	Tahani Hassan Al Najar		
	Basema Mohmaed Al Moskef		
3	Ali Yehea Al Fakeh		
	Nadeia Ali Al Zoberi		
	Mahdeah Hasan Al Magrebi		
	Fatema Mohmaed Al Tahabi		
4	Ahmed Mohamed Al Rathi		
	Fatema Hosen Al Tholaya		
	Latefa Naser Al Moamori		
	Gadah Kaed Omar		
5	Fawas Ahmed Abdo		
	Hanan Ali Al Tobari		
	Bodor Al Alkathi		
	Afrah Yahea Al Kaderi		
6	Ahmed Hasan Yoser		
	Ebtesam Hmood Al Shemi		
	Ahlam Abdullah Al Mofak		
	Faeroz Ali Mogber		
Data Entry team			
Logistics			
1	Mohamed Ahmed Al Shahethi	Mahawit GOPHP	
2	**Survey Technical Supervisors**		
3	Zayed Ali Al Mosheki	Dhamar	EPI
4	Ali Ahmed Kasem Al Mandalek	Amran	Health Instructor
5	Nabel Hamod Zaed	Dhamar	Dhamar Nutrition Department

6	Mohamed Mohsen Al Faras	Hajja	Nutrition Director
Survey Manager			
1	Nassar Hammod Nagi Al Ashwal	Nutrition Dept	MoPHP – Sana'a
2	**Technical Advisor**		
3	Nagib Abdulbaqi Ali	Nutrition Specialist	UNICEF – Sana'a
Data Analysis and Report Writing			
1	Prof. Abdulwahed Al-Serouri	SMART Consultant	UNICEF – Sana'a

Annex 4: Al Mahweet Nutrition Survey Standardization Test Report for Evaluation of Enumerators

Report for Evaluation of Enumerators

Weight:

	Precision: Sum of Square [W2-W1]	Accuracy: Sum of Square [Superv.(W1+W2)-Enum.(W1+W2]	No. +/- Precision	No. +/- Accuracy
Supervisor	0.13		0/5	
Enumerator 1	1.81 POOR	11.22 POOR	1/1	0/9
Enumerator 2	0.08 OK	0.05 OK	0/2	2/3
Enumerator 3	0.16 OK	0.19 OK	1/4	3/2
Enumerator 4	0.03 OK	0.22 OK	1/2	3/1
Enumerator 5	3.02 POOR	2.95 POOR	0/9	1/8
Enumerator 6	0.25 OK	0.44 POOR	3/3	5/2
Enumerator 7	0.43 POOR	0.38 OK	1/4	0/7

Height:

	Precision: Sum of Square [H2-H1]	Accuracy: Sum of Square [Superv.(H1+H2)-Enum.(H1+H2]	No. +/- Precision	No. +/- Accuracy
Supervisor	0.57		4/4	
Enumerator 1	4.74 POOR	3.19 POOR	7/2	8/2
Enumerator 2	3.17 POOR	6.60 POOR	6/1	5/4
Enumerator 3	112.03 POOR	121.00 POOR	3/3	1/8
Enumerator 4	173.09 POOR	179.26 POOR	4/3	4/6
Enumerator 5	6627.90 POOR	6410.27 POOR	5/2	1/9
Enumerator 6	6236.81 POOR	6119.94 POOR	4/5	4/4
Enumerator 7	3.10 POOR	10.27 POOR	7/2	10/0

MUAC:

	Precision: Sum of Square [MUAC2-MUAC1]	Accuracy: Sum of Square [Superv.(MUAC1+MUAC2)-Enum.(MUAC1+MUAC2]	No. +/- Precision	No. +/- Accuracy
Supervisor	39.00		4/6	
Enumerator 1	116.00 POOR	109.00 OK	1/7	4/6
Enumerator 2	472.00 POOR	203.00 POOR	3/6	6/4
Enumerator 3	217.00 POOR	170.00 POOR	9/0	4/6
Enumerator 4	165.00 POOR	240.00 POOR	3/5	2/8
Enumerator 5	365.00 POOR	424.00 POOR	2/7	0/10
Enumerator 6	49.00 OK	172.00 POOR	3/5	8/2
Enumerator 7	400.00 POOR	375.00 POOR	9/0	9/1

Annex 5: Reference Table for Age Estimation

اليوم: ..... التاريخ: ...../ ...../ 2013م
رقم الفريق: .....

رقم العنقود: .....

اسم القرية/الحارة: .....

رقم الاستبيان	رقم الطفل	اسم الطفل	كلام الام او راعي الطفل عند استجوابها عن تاريخ ميلاد الطفل

توقيع اعضاء الفريق 1 ..... 2 ..... 3 ..... رئيس الفريق:

Annex 6: Calendar of Events for Al Mahweet for Reference in Age Estimation

	2007		2008		2009		2010		2011		2012	
Jan		69	New Year's day	57	New Year's day	45	New Year's day	33	New Year's day	21	New Year's day	9
Feb		68		56		44		32		20		8
Mar		67		55		43		31	7th Oct burn event	19		7
Apr		66		54		42		30		18		6
May		65	National Day	53	National Day	41	National Day	29	Zengebar crisis National day	17	National Day	5
Jun		64		52		40		28		16		4
Jul		63		51	Tarq Alfadly event	39		27		15	Ramadan	3
Aug		62		50	Ramadan	38	Ramadan	26	Ramadan Alfater Aid	14		2
Sep		61	revolution Day Ramadan	49	revolution Day Alfater Aid	37	revolution Day Alfater Aid	25	revolution Day	13	revolution Day	1
Oct		60	revolution Day Alfeter Aid	48	revolution Day	36	revolution Day	24	revolution Day	12	revolution Day	0-1
Nov		59	dependence day	47	dependence day Aladah Aid	35	dependence day Aladah Aid Gulf 20	23	dependence day Aladah Aid	11	dependence day	
Dec		58	Aladah Aid	46	ALmagalah event	34		22		10		

Annex 7: Cluster Sampling for Al Mahweet Highlands

رمز المديرية	المديرية	رمز العزلة	العزلة	رمز القرية	المدينة/القرية	رمز المحلة	المحلة/ الحارة	عدد السكان	رقم العنقود
1	شبام كوكبان	1	ضلاع الأعلى	41	المراشحه	41	المراشحه	267	1
1	شبام كوكبان	1	ضلاع الأعلى	42	وادي غزوان	42	وادي غزوان	1284	2
1	شبام كوكبان	2	شبام	43	شبام	43	الخلف	282	3
1	شبام كوكبان	1	ضلاع الأعلى	44	كوكبان	44	الضلعي	241	4
1	شبام كوكبان	3	الأهجر	45	المحجر	45	المحجر	1832	5
1	شبام كوكبان	3	الأهجر	46	قرية العماد	46	قرية العماد	772	6
2	الطويلة	4	الضلاع الاسفل	47	بيت منعين	47	بيت منعين	1372	7
2	الطويلة	4	الضلاع الاسفل	48	بني جوهر	48	بيت شاس	736	8
2	الطويلة	5	بني الحجاج	49	بيت الحاشدي	49	بيت جباره	16	9
2	الطويلة	6	بني سري	50	المطرح الحزه	50	العريف	29	10
2	الطويلة	7	القصبة	52	الطويلة	52	بيت الشيخ	470	11
2	الطويلة	8	بني الخياط	53	بيت الحزيف	53	بيت الحزيف	583	12
2	الطويلة	8	بني الخياط	54	جوعان	54	جوعان	598	13
2	الطويلة	8	بني الخياط	55	بيت قطينه	55	بيت قطينه	1532	14
2	الطويلة	9	شمات (حصن المخير)	56	السائله	56	السائلة السفلي	285	15
3	الرجم	10	الروحاني	57	الخارجي	57	العين	71	16
3	الرجم	11	العزكي	58	القصبه	58	انياس	173	17
3	الرجم	11	العزكي	59	بيت داوود	59	بيت داوود	114	18
3	الرجم	12	البشاري	60	الحمامي	60	الحمامي	1256	19
3	الرجم	12	البشاري	61	حناضة	61	حناضة	473	20
3	الرجم	13	المدني	62	المقصر	62	المقصر	508	21
3	الرجم	14	الرجم	63	الرجم	63	الوسطى	246	22
3	الرجم	17	بني البدي	66	العزفة	66	العزفة	96	23
3	الرجم	18	الذاري	67	المغارب	67	المغارب	627	24
3	الرجم	19	بني المصعب	68	الطرائف	68	الطرائف	1159	25
4	مدينة المحويت	20	المحويت	69	مدينة المحويت	69	المجلاب	301	26
4	مدينة المحويت	20	المحويت	69	مدينة المحويت	70	المجمع	163	27
4	مدينة المحويت	20	المحويت	70	ردمان	71	بيت قوزع	240	28
4	مدينة المحويت	20	المحويت	71	هجرة الدواعر	72	هجرة الدواعر	1428	29
5	المحويت	21	قبلة ابن عبدالله	72	الزعلاء	73	الزعلاء	188	30
5	المحويت	22	بني ابجر	73	السنامه	74	السنامه	170	31
5	المحويت	23	العرقوب	74	محظـه	75	محظـه	390	32
5	المحويت	24	الأحجول	75	رايس	76	رايس	238	33
5	المحويت	25	الوسط	76	بيت الخياطي	77	بيت الخياطي	554	34
5	المحويت	26	عنبر	77	المقبل	78	المقبل	349	35
5	المحويت	28	بني الوليد	79	المعصره	80	عفرة	34	36

Annex 8: Cluster Sampling for Al Mahweet Lowlands

رمز المديرية	المديرية	رمز العزلة	العزلة	رمز القرية	المدينة/القرية	رمز المحلة	المحلة/ الحارة	عدد السكان	رقم العنقود
6	بنى سعد	29	بني شديد	1	الحود	1	الحود	424	1
6	بنى سعد	30	بنى سباء	2	بيضان	2	بيضان	372	2
6	بنى سعد	32	الجعافره الغربيه	4	بيت هيجان	4	الدمنه	106	3
6	بنى سعد	33	عتمه	5	رشاح	5	رشاح	535	4
6	بنى سعد	34	قيهمه	6	النويدره	6	المسقاله	26	5
6	بنى سعد	35	بنى على	7	القاطع	7	القاطع	74	6
6	بنى سعد	36	بنى حمادي	8	الجمجمه	8	الجمجمه	107	7
6	بنى سعد	37	بنى الشويشى	9	الحنكه	9	البقعه	68	8
7	حفاش	38	الذارى	10	حصن جبل مشرق	10	حصن جبل مشرق	721	9
7	حفاش	39	بني احمد	11	انشام	11	جدد	63	10
7	حفاش	40	بنى دهمان	12	عاره	12	المقطره	10	11
7	حفاش	41	بني أسعد	13	بيت الجلال	13	بيت العتمي	107	12
7	حفاش	42	بني مأمون	14	تبيح	14	تبيح	192	13
7	حفاش	43	جبل نعمان	15	الهاب	15	الهاب	425	14
8	الخبت	44	الشعافل العليا	16	اللحف الاعلى	16	اللحف الاسفل	129	15
8	الخبت	45	الشعافل السفلى	17	الخطمه	17	مدافن منابر	245	16
8	الخبت	46	الظاهر	18	قلحكم	18	قلحكم	595	17
8	الخبت	47	عبان	19	وادي العين	19	وادي العين	290	18
8	الخبت	48	أذرع	20	الخواجر	20	الخواجر	1173	19
8	الخبت	49	نمره	21	المغربه	21	المغربه	1106	20
8	الخبت	52	عبس	24	بيت المرعوي	24	بيت المرعوي	179	21
8	الخبت	53	بني عماره	25	الرجمه	25	بيت المامون	87	22
8	الخبت	52	عبس	26	المرواح	26	المرواح	380	23
9	ملحان	54	القبله	27	جهش	27	المخدر	61	24
9	ملحان	54	القبله	28	حمي	28	بيت داغس	460	25
9	ملحان	54	القبله	29	العليه	29	الموضع	20	26
9	ملحان	55	باحش	30	الحضن	30	الحضن	197	27
9	ملحان	56	بني علي	31	الحرق	31	الحرق	224	28
9	ملحان	57	همدان	32	جحشر	32	جحشر	465	29
9	ملحان	59	بني مليك	34	الشرف	34	الحارق	96	30
9	ملحان	60	بني وهب	35	الفقيه	35	الجميمه	232	31
9	ملحان	61	الروضه	36	الروضه	36	الروضه	399	32
9	ملحان	62	الشجاف	37	الشجاف	37	النجود	117	33
9	ملحان	63	العسوس	38	وادي منصور	38	الغمره	134	34
9	ملحان	51	جبع	39	المراحل	39	الوهط	49	35
9	ملحان	58	بدح	40	غربي بدح	40	قلعة مسعود	79	36

Annex 11: Job Descriptions for Survey Teams (Extracted from SMART Training Materials

Each survey team should be composed of at least 3 people. Including women in survey teams is highly recommended since they are usually more comfortable interacting with children. Generally, two surveyors are involved in anthropometric measurements while another one, the team leader, records the data on the forms. However, it is strongly suggested that each team member knows how to accomplish the tasks of his teammates, because unexpected events can happen and a change in the staff may be required.

All team members must have the following qualifications:

- They should be able to write and read English or French (depending on the country where the survey takes place) and speak the local languages of the areas where the survey will be conducted.
- They should have sufficient level of education, as they will need to read and write fluently and count accurately.
- They should be physically fit to walk long distances and carry the measuring equipment.
- They do not (necessarily) have to be health professionals. In fact, anyone from the community can be selected and trained as long as he meets the above criteria.

1. Survey Manager (or supervisor)
The manager guarantees the respect of the survey methodology; he has the responsibility for:

1- Gathering available information on the context and survey planning,

2- Selecting team members,

3- Training team members,

4- Supervision of the survey: Taking necessary actions to enhance the accuracy of data collected:

4.1 Visiting teams in the field and making sure that before leaving the field, each team leader reviews and signs all forms to ensure that no pieces of data have been left out; making sure that the team returns to visit the absent people in the household at least once before leaving the area.

4.2 It is particularly important to check cases of oedema, as there are often no cases of oedema seen during the training and some team members may therefore be prone to mistaking a fat child for one with oedema (particularly with younger children). The supervisor should note teams that report a lot of oedema, confirm measles and death cases, and visit some of these children to verify their status.

4.3 Ensuring that households are selected properly and, that the equipment is checked and calibrated each morning during the survey, and that measurements are taken and recorded accurately.

4.4 Deciding on how to overcome the problems encountered during the survey. Each problem encountered and decision made must be promptly recorded and included in the final report, if this has caused a change in the planned methodology.

4.5 Organizing data entry into ENA and checking any suspect data every evening, by using the appropriate sections of the plausibility report.

4.6 Organizing an evening "wrap up" session with all the teams together to discuss any problems that have arisen during the day[23].

4.7 Ensuring that the teams have enough time to take appropriate rest periods and has refreshments with them. It is very important not to overwork survey teams since there is a lot of walking involved in carrying out a survey, and when people are tired, they may make mistakes or fail to include more distant houses selected for the survey.

5- Analyse and write the report.

2. Team Leader

Skills and required abilities:

To be able to read, write and count; know the area to survey; be reliable and friendly.

Tasks:

1. Ensures all forms and questionnaires are ready at start of day;
2. Ensures all equipment is ready at start of day;
3. Calibrates measurement instruments on daily basis;
4. Ensures all food/refreshments are ready at start of day;
5. Organises briefing meeting with his team before departure in morning;
6. Speaks with chief of village to explain the survey and its objectives,
7. Draws a map of the area to survey and use a random table;
8. Manages the households selection procedure;
9. Uses a local events calendar to estimate the age;
10. Calculates the Weight-for-Height ratio after taking anthropometric measurements;
11. Checks if the child is malnourished (checks for the presence of oedema);
12. Fills the anthropometric form;
13. Fills survey questionnaires when needed;
14. Fills the referral form if necessary;
15. Ensures that houses with missing data are revisited before leaving the field the same day;

[23] This may not be possible if the survey area is large since the teams might be widely separated and remain in the field for several days. In that case, communication with teams in the field might often be very difficult; hence, each team leader must be sufficiently trained to be able to take decisions independently.

16. Checks that all forms are properly filled out before leaving the field.
17. Ensures that all the equipment is maintained in a good state;
18. Manages time allocated to measurements, breaks and lunch,
19. Ensures security of team members,
20. Note and report the problems encountered.

3. Measurers

Skills and required abilities:

To be able to read, write and count; know the area to survey; be reliable and friendly.

Tasks:

1. Measures the height, weight and arm circumference (if included in the survey);
2. Assesses the presence of edema;
3. Uses a local events calendar to estimate the age;
4. Respects the time required for measurements, breaks and meals;
5. Takes care of the equipment;
6. Follows security measures.

The measurers must acquire some special skills and knowledge although they don't have the primary responsibility for tasks that are related:

1. Know how to calculate the weight-for-height ratio;
2. Know how to select households for the survey;
3. Know how to check if a child is malnourished;
4. Learn how to make a reference for a malnourished child.

Annex 12: Referral Form for the Malnourished Children

مسح الحالة التغذوية للأطفال تحت سن الخامسة في محافظة المحويت، يونيو 2013

استمارة إحالة طفل مصاب بسوء تغذية حاد وخيم

الأخوة/ المرفق الصحي : .....

نود إحاطتكم أن الطفل/ الطفلة : ..... كان/ كانت ضمن عينة المسح المشار إليه أعلاه ووجد أنه مصاب بسوء تغذية حاد من خلال القياسات التالية:

محيط ذراع الطفل بالسنتيمتر (ØØ. Ø)	سنتيمتر .	

طول / ارتفاع الطفل بالسنتيمتر (ØØØ. Ø)	سنتيمتر .	

وزن الطفل بالكيلوجرام (ØØ. Ø)	كيلوجرام .	

نقطة الانحراف المعياري (Z)

وجود التوذم: (نعم / لا)

سبب الاحالة : المواك <11.5 ( ) نقطة الانحراف المعياري (z) ≥ -3 ( ) التوذم ( )

تاريخ القياس	يوم	شهر	سنـــــة
			2 Ø 1 3

يرجى تعاونكم معه/ معها

وتقبلوا تحيات فريق المسح

اسم المشرف الميداني .....

توقيعه

Annex 13: Assessments Quality Checks..... 74

Plausibility check for: Al Mahweet Highland June 2013.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**
Missing/Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-10	>10	
(% of in-range subjects)			0	5	10	20	**0** (0.6 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**0** (p=0.214)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**0** (p=0.137)
Dig pref score - weight	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**0** (2)
Dig pref score - height	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**2** (8)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>1.20	
			0	2	6	20	**0** (0.96)
Skewness WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (-0.09)
Kurtosis WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (0.30)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<0.000	
			0	1	3	5	**1** (p=0.036)
Timing	Excl	Not determined yet					
			0	1	3	5	
OVERALL SCORE WHZ =			0-5	5-10	10-15	>15	**3** %

At the moment the overall score of this survey is 3 %, this is excellent.

Plausibility check for: Al Mahweet Lowland June 2013.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**
Missing/Flagged data	Incl	%	0-2.5	>2.5-5.0	>5.0-10	>10	
(% of in-range subjects)			0	5	10	20	**0** (2.1 %)
Overall Sex ratio	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**0** (p=0.595)
Overall Age distrib	Incl	p	>0.1	>0.05	>0.001	<0.000	
(Significant chi square)			0	2	4	10	**0** (p=0.257)
Dig pref score - weight	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**0** (1)
Dig pref score - height	Incl	#	0-5	5-10	10-20	> 20	
			0	2	4	10	**4** (11)
Standard Dev WHZ	Excl	SD	<1.1	<1.15	<1.20	>1.20	
			0	2	6	20	**0** (0.93)
Skewness WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (-0.01)
Kurtosis WHZ	Excl	#	<±1.0	<±2.0	<±3.0	>±3.0	
			0	1	3	5	**0** (0.11)
Poisson dist WHZ-2	Excl	p	>0.05	>0.01	>0.001	<0.000	
			0	1	3	5	**0** (p=0.066)
Timing	Excl	Not determined yet					
			0	1	3	5	
OVERALL SCORE WHZ =			0-5	5-10	10-15	>15	**4** %

At the moment the overall score of this survey is 4 %, this is excellent.