SOOL PLATEAU OF
SOOL & SANAG REGIONS

NUTRITION SURVEY
May 2003

FSAU/MOHL/UNICEF/SRCS

FSAU

FAO
FIAT PANIS

Table of contents

Abbreviations and acronyms

ARI	Acute Respiratory Infections
FAO	Food and Agriculture Organisation
FEG	Food Economy Group
FSAU	Food Security Assessment Unit
GAM	Global Acute Malnutrition
Ha	Hectares
H/A	Height for Age
IDP	Internally Displaced People
KM	Kilo Metres
MCH	Maternal and Child Health
MT	Metric Tonnes
NCHS	National Centre for Health Statistics
NGOs	Non-Governmental Organisations
NIDs	National Immunisation Days
OR	Odds Ratio
SACB	Somalia Aid Coordination Body
UN	United Nations
UNICEF	United Nations Children's Fund
WFP	World Food Programme
W/H	Weight for Height
WHO	World Health Organisation

Definitions

Deyr Season:
Short rains normally expected from October to December in southern Somalia. Deyr rains are less widespread and less reliable than the Gu rains. They are usually patchy and localised. Its harvest is normally expected between December and January and provides key food requirement to take households through the Jilaal season. The harvest is normally not significant when compared to the primary/main harvest of the year.

Gu Season
The main rainy season in Somalia normally expected between April and June. About 70% of the annual crop and livestock production depend on the Gu rains. This is the heaviest and most reliable rainfall in Somalia. Its harvest is normally expected between July and August.

Jilaal Season
This is the dry season of the year in Somalia normally between January and March. There is normally no crop production during this season and the river levels normally drop. Consequently, most livestock migrate in search of water and pasture during this period.

Acknowledgements

The Nutrition Surveillance Project of the Food Security Assessment Unit (FSAU) acknowledges the participation of UNICEF, MOHL and SRCS in the provision of qualified staff as survey supervisors; the Sool and Sanag health team and SRCS for the provision of supervisors, and enumerators. The contribution of SRCS field team in provision of training venue is highly acknowledged. The contribution of SRCS field team in provision of a training venue and the facilitation of MOHL in community mobilisation and provision of the background information is highly appreciated.

Much gratitude goes to the mothers, caregivers and leaders in Sool plateau whose co-operation and support helped the survey team achieve its objective.

Comments from partners in Somaliland and members of the Nutrition Working Group in Nairobi on the preliminary results are also gratefully acknowledged.

FSAU also expresses its sincere appreciation to the entire team for the high level of commitment and sincerity demonstrated during all stages of this survey.

Executive Summary

The Sool plateau is an ecosystem mainly inhabited by pastoralists, who keep camels, goats, sheep and cattle. The surveyed area covered part of Sool plateau situated in Sool and Sanag Regions of Somalia. This is the largest part of the plateau and is currently one of the most food insecure areas in northern Somalia, a situation exacerbated by severe water shortage, and also by the late and scanty 2003 Gu rains. Sool plateau food economy zone has experienced frequent vulnerability and deficits in food availability mainly attributed to chronic drought situation that has persisted for the last three to four years. The drought led to severe depletion of pastures and exhaustion of water- points with subsequent negative consequences on livestock and human. Massive deaths were also reported for livestock and cattle while about 40-60% of the population had moved in search of water and pasture. However, the middle and poor pastoral groups remained in the plateau due to physical weakness for their animals. The political tensions have significantly constrained humanitarian activities. Though there was good nutrition surveillance activities in the region assisted by the nutrition monitor in the Sool and Sanag Regions, constraints in data flow were still noted mainly due to limited health facilities in the plateau.

Food security assessment undertaken by FSAU in April 2003 indicated extremely high levels of human suffering in the ecosystem with the poor who could not move being the most affected. These reports of worsening food security situation and delayed Gu rains led to increased demand by the various stakeholders for reliable and timely nutrition information on the area; thus a nutrition survey was undertaken.

Between 24th May and 1st June 2003, FSAU in collaboration with MOHL, UNICEF and SRCS conducted a nutrition survey in the Sool plateau of Sool and Sanag Regions aimed at determining the levels of malnutrition through anthropometric measurement using the Weight for Height of children between 6-59 months or 65-110 cm. It also sought to identify childcare and health risks associated with the nutrition situation as well as to establish people's ability to meet their food needs.

A 30 by 30 two-stage cluster sampling methodology was used in which 895 children were assessed from 482 households for the nutrition survey and a further 903 households for a mortality assessment. Additional qualitative data on childcare practices, food security situation, migration issues etc were also collected using focus group discussions, seasonal calendars, direct observation and key informant interviews.

Majority (about 68%) of the surveyed households reported purchasing or sourcing their foods through the markets at the time of the survey with incomes from social support network or gifts (about 37%), selling the few remaining animals and animal products (37%) as well as petty trade: operating roadside tea-shops, selling firewood etc 24%. Most of the households are surviving on credit facilities (52%) for their daily upkeep. As is reported at the time, households have reached a stage of mere survival. The energy intake estimates among the poor wealth group was 1800 Kcal/person/day and 2000Kcal/person/day. The food security assessment further estimates the current food deficit at between 25 and 35% should Deyr rains be normal and worse should Deyr be below normal.

At the time of the survey the most of the people were obtaining water from boreholes, (45%), and berkads (23%) while the rest were depending on water tankering/vending and wells/streams/dams on almost similar proportions at about 16%.

An overwhelming majority (92%) of the households seek medical care from healthcare practioners. Of those who seek healthcare services, majority (over 50%) consult private

clinics/pharmacies and a significant proportion consult traditional healers. Those reporting not seeking healthcare services when a member is sick cite distance as the major impediment in addition to poverty.

The overall incidence of diarrhoea (during the two weeks prior to the study) among the surveyed children was over 24 per cent, 12 per cent were reported to have suffered from malaria two weeks prior to the study while the incidence of measles within the study population was about 4%. Overall measles vaccination among children aged 9- 59 months was` low 26% and so was Vitamin A supplementation in the past six months 47 %.

At the time of the survey, 61% of the children aged between 6-24 months were breastfeeding. Of those who had been stopped from breastfeeding, about 36% had stopped breastfeeding quite early between the ages of 0- 5 months, 33% between 6-11 months while only 31% were stopped from breastfeeding after the first year of their life.

A high proportion, 84% of the children aged between 6 and 24 months were introduced to foods other than breast milk too early, between the time of birth and the second month of life, 13% between 3-5 months, while only about 3% were introduced to complementary feeding at six months and above. About 56% of the children are fed three times in a day a relatively high proportion; about 17% of the children were fed not more than two times in a day.

The prevalence of total/global acute malnutrition was 12.5% (W/H<-2 z-scores or oedema), while severe acute malnutrition defined as (<-3 z-score or oedema) was 1.8%. The results indicate an increased malnutrition rate compared to an assessment in the same region July 2002 that showed a GAM of only 6.3% and other survey results in the North that usually show a rate less than 10%. Malnutrition rate was found to be highest among children aged 12-23 months and lowest among children aged below one year. Comparing the age groups individually, the results indicate a statistically significant (p-value <0.05) lower rate of malnutrition for the age group 6-11 months than any other age group.

Mortality results show that the under five mortality was 1.9 deaths per 10,000 persons per day while crude mortality rate was 0.88 deaths per 10,000 persons per day. These rates are serious that signals a heightened health problem.

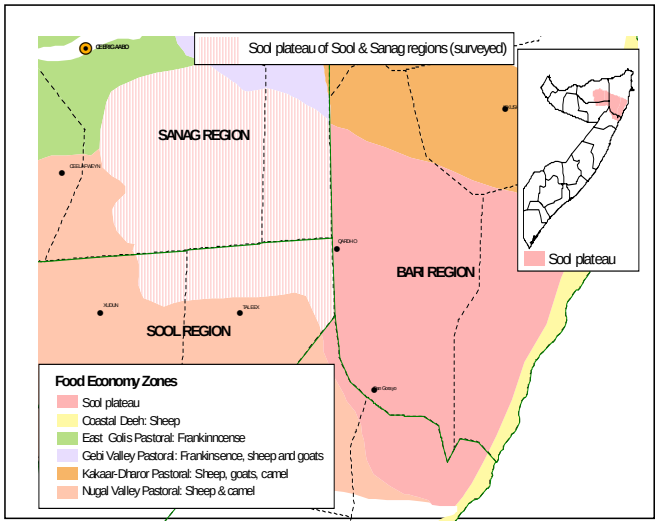
In conclusion, food insecurity greatly impacted on the observed malnutrition rates. The populations' livelihood sources were greatly eroded after animals either died or moved away. This negatively affected availability of variety foods, reduced access to milk, reduced purchase of high energy and protein foods, and also led o increasing poverty levels. Access to health services and better care practices were therefore equally affected. However, inadequate childcare practices, inadequate healthcare provision and ignorance among the caregivers were also a major problem. The Gu rains remained inadequate, Animal productivity will continue to be below normal and recovery will be difficult unless the 2002 Deyr rains are extremely good. Thus malnutrition rates are likely to increase unless proper interventions are implemented immediately. Through consultations with partners, it was recommended that close monitoring of the food and nutrition situation should continue. Targeted general food distribution in highly vulnerable areas and supplementary feeding of malnourished children in the next 2-3 months in addition to rehabilitation of boreholes and berkards were recommended as immediate interventions. Other medium to long-term interventions suggested included**:** Intensification of promotive and preventive health care interventions, promotion of nutrition education through the MCH/outposts and other outreach services and promotion of alternative income generating activities through a credit programme.

SUMMARY OF FINDINGS

Indicator	No	%
Children under five years screened during the survey	895	98.5
Global acute malnutrition – Weight for Height <-2 Z-score or presence of oedema	112	12.5
Severe acute malnutrition – Weight For Height <-3 Z-score or presence of oedema	16	1.8
Global acute malnutrition - Weight For Height <80% of median or presence of oedema	58	6.5
Severe acute malnutrition - Weight For Height <70% of median or presence of oedema	3	0.2
Oedema	5	0.5
Crude Mortality Rate	0.88deaths/10,000/day	
Under-five Mortality Rate	1.9deaths/10,000<5s/day	
Proportion of children with diarrhoea in two weeks prior to the survey.	219	24.5
Proportion of children with malaria in two weeks prior to the survey	110	12.3
Proportion of children with measles in one month prior to the survey.	33	3.7
Proportion of children supplemented with Vitamin A in the six months prior to the survey	427	47.7
Proportion of children immunised against measles	217	26
Proportion of children from displaced households	134	27.8
Estimated food intake for the poor wealth group	1800Kcal/person/day	
Estimated food intake for the middle wealth group	2,000 Kcal/person /day	
Projected food deficit for the poor should 2003 Deyr be normal	25-35% food deficit	

1 INTRODUCTION

The Sool plateau is an ecosystem mainly inhabited by pastoralists. They keep mainly camels, goats, sheep and cattle. The surveyed area covered part of Sool plateau situated in Sool and Sanag Regions of Somalia. This is the largest part of the plateau and is currently one of the most food insecure areas in northern Somalia, a situation exacerbated by severe water shortage, and also by the late and scanty 2003 Gu rains. Sool plateau food economy zone has experienced frequent vulnerability and deficits in food availability mainly attributed to chronic drought situation that has persisted for the last three to four years. The drought led to severe depletion of pastures and exhaustion of water- points with subsequent negative consequences on livestock and human. Massive livestock deaths were also reported for livestock and cattle and about 40-60% of the population had moved in search of water and pasture. However, the middle and poor pastoral groups remained in the plateau due to physical weakness for their animals.



1.1 Survey Justification

A Food security assessment undertaken in April 2003 indicated extremely high levels of human suffering in the ecosystem with the poor who could not move been critically affected.

During the Gu 2003 season (April/May), the rains delayed and people became even more pessimistic on the possibility of adequate rains. This led to delayed seasonal return of some livestock to the area.

Limited humanitarian access into the Sool plateau in Sool and Sanag and within eastern Sanag at large mainly due to political tensions between the Puntland and Somaliland has contributed to a gap in information flow. The reports of worsening food security situation and delayed Gu rains led to increased demand by the various stakeholders for reliable and timely nutrition information on the area; thus a nutrition survey was undertaken.

1.2 Survey Objectives

- ❑ To determine the levels of malnutrition in Sool plateau of Sanag and Sool regions through anthropometric measurement using the Weight for Height of children between 6-59 months or 65-110 cm.
- ❑ To assess the ability of people to meet their food needs.
- ❑ To describe the possible causes of malnutrition in sool plateau.
- ❑ To determine the coverage of measles vaccination and Vitamin A supplementation in Sool plateau.
- ❑ To determine the incidence of diarrhoea, measles and ARI two weeks prior to the survey.
- ❑ To establish childcare issues that influence child nutrition in Sool plateau

- ❑ To Estimate under 5 and crude mortality rates
- ❑ To provide guidance on decision making related to future interventions.

2 BACKGROUND INFORMATION

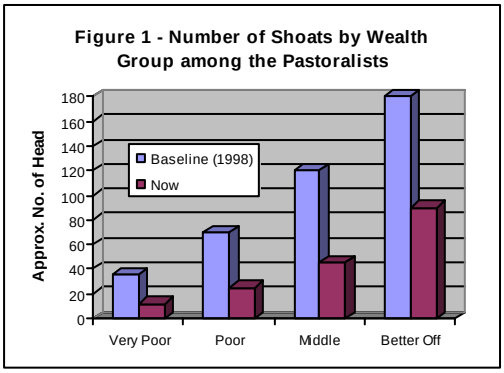
2.1 General background

Sool plateau in an ecosystem mainly inhabited pastoralists. The plateau covers three regions in northern Somalia: Sanag, Sool and Bari Regions. The survey was conducted in the part of Sool plateau covering Sanag and Sool Regions and it is the largest part of the plateau. The survey area had an estimated population size of about 75,700 (May 2003 MOHL estimates*).* The population of the plateau are mainly pastoralists most whom live the nomadic lifestyle and keeping camels, goats, sheep and cattle with insignificant agro-pastoral inhabitants. The surveyed part of the plateau has had recurrent political tensions being claimed by both the Somaliland and Puntland governments.

2.2 Food security overview

The Sool plateau is predominantly a pastoral community (accounting for 85-90% of the population) who keep camel, cattle, sheep and goats. The rest of the 10-15% of the population in the plateau is urban people. The area is a potentially good grazing area and can sustain a high livestock population. Traditionally, the area was used only as a wet season grazing area though with increased numbers of livestock over the last two decades, area has been converted into an all year grazing area. Berkards were constructed and water became available thereby attracting even larger influx of animals.

The plateau has had three successive years of poor rains since 2000 and with the pastoral communities accounting about 90% of the total inhabitants, the resulting effect of extreme pasture depletion and water scarcity has been severe. Grazing animals (sheep, donkeys and cattle) were initially more severely affected than browsing animals (goats and camels). The continued livestock ban imposed by the Gulf States in 2000 also led to further increase of livestock and markets were quite constrained. Consequently, the calving rates have gone down particularly for camels. In 2002, there were reports of animal's deaths. There have been therefore a lot of livestock movements to neighbouring food economy systems like Nugal and Haud valleys. The milk production also went down.



Although parts of Sool plateau received good 2003, Gu rains, (30% of normal rains) it was scanty and late in some areas of the plateau. The onset of rains normally coincides with the kidding of sheep, therefore due to the long dry spell the body condition was weak resulting to the new born kids being slaughtered to save the ewe. The onset of rains also led to increased deaths of livestock. The better-off and some of

the middle moved from the area towards Nugal valley and Bernade plains when rains were not forthcoming. The poor and some of the middle wealth group could not move due the physical weakness of their livestock and lack of either pack animals or money to hire transport. There was also internal movement within the plateau triggered by sporadic rains experienced early in some areas. The current increased water trucking is an indicator of constrained access to water for both human and livestock. By April 2003 expenditure on water was accounting more than 40% 0f the household's meagre income. Food sources from own livestock dropped to the lowest level while income sources totally eroded.

However, pastoralists in Sool plateau from all wealth groups have lost animals: camels, shoats and even cattle. Fewer animals mean less milk and reduced livestock sales, the main productive element for this livelihood group. Not only are the numbers of animals possessed by households declining, the cattle and camel herds owned by the rich wealth group and some middle wealth groups are still outside of the area, so their production remains inaccessible to the households in the area.

It is important to note that, by and large, animal and milk prices have been quite good, that is if the households under consideration are sellers and if their animals make the grades for which the prices are quoted. The reality is that the 'poor' and 'very poor' are not able to access milk because it is either not available or because the little available is unaffordable. None of their animals are in good enough condition to be classified 'export' or top 'local quality'.

Poorer households depend more on income earned through social network support including begging from relatives and splitting of families, casual labour and little petty trade along the roads. The drought and the loss of animals through sales or out-migration made life very difficult for this group by reducing the opportunities for livestock labour.

Large numbers of people in Sool Plateau are expected to be vulnerable; if the 2002 Haggai and Deyr rains fail once again

The table below shows the fluctuation in herd sizes and the extent to which the pastoralist have lost their livelihood source.

Herd fluctuation May, 2002 compared to - May 2003

Wealth group	Species	Herd size in May 2002 (numbers)	Herd Size May 2003 (numbers)
Poor	Shoats	50-60	30-40
	Camels	1-3	0-1
Middle	Shoat	80- 100	50-60
	Camel	10-15	3-5
Better off	Camel	35-40	15-20

2.3 Humanitarian operations in Sool plateau

2.3.1 Development Activities

Humanitarian and other development activities have been hampered by the prevailing political tensions between the Somaliland and Puntland. The political tension has led to occasional confrontations and even car jacking of vehicles belonging to international

agencies in the past. However, there are few international agencies operating in the region such as CEFA and CINS that are involved in agriculture, fisheries, rehabilitation of social services etc. CARE international is also based in Erigavo and is involved in education and community mobilisation activities, Horn relief if involved in pastoral issues, ILO in rehabilitation of basic infrastructure and NPA in both rehabilitation and health issues. SRCS is also providing health services. It is notable that all these organisations are specifically more active in areas outside the plateau like Erigavo, Las Anod and Eil Fweyn with limited ongoing activities in the plateau.

2.3.2 Health

The Ministry of Health with the support from UNICEF-Hargeisa is supporting a system of healthcare provision through 3 MCHs and 11 health posts in the plateau of Sanag and Sool Regions. The health facilities are located in the densely populated permanent settlements/centres in the ecosystem and are estimated to serve just over a half of the population. It is also estimated that some people in the un-reached areas of the plateau have to travel 20-30 Kms to reach the nearest health facility.

2.3.3 Morbidity

Diseases like suspected malaria, diarrhoea and respiratory infections, are quite common in the ecosystem. During the month of may 2003, high incidences of water borne diseases, ARI, and malaria were observed.

2.3.3 Selective Feeding

In October 2002 UNICEF responded to the deteriorating food security by supporting nutrition interventions in the most affected areas of Sool and Sanaag regions namely Dhahar, Badhan, Erigavo and Eil Afwein. The interventions included provision of Vitamin A and iron/folic acid supplementation, distribution of supplementary food for malnourished children, immunisation of under five children against six killer diseases and provision of treatment against major communicable diseases. They were implemented through the health centre based mobiles.

2.4 Water and environmental sanitation

Barkards and shallow wells are the main water source for Sool plateau population. But due to persistent drought in the district most of these water points have dried up forcing household members to travel long distances in search of water. Livestock have equally suffered. The water points are of low and of poor quality.

2.5 Previous nutrition surveys in Sool plateau

No nutrition survey has been conducted specifically for Sool plateau. However, nutrition surveys and assessments have been conducted that included different parts of the plateau, all of which have revealed high levels of malnutrition (about or more than 10%). Similarly, the May 2003 growth monitoring data from Huddun MCH revealed high malnutrition of 12.3 % defined as W/H (-<2z-scores) and severe acute malnutrition of 2.9 % defined as W/H (-< 3Zscore).

Table 4: Summary of nutrition survey and nutrition assessment results conducted in parts of Sool plateau

Date	Agency	Population or areas surveyed	< -2z-score or oedema	<-3z-score or oedema	MUAC <12 .5 cm or oedema.	<11cm or oedema.
May 2002	UNICEF/MOHL /FSAU	Sanag	10.4 %	1.7		
Aug/Sept 2002	UNICEF/FSAU/ MOHL	Iskushuban,Bargal,Alulla, Kandalla	12.6	2.1		
July 2002	FSAU	Sool Plateau			6.3	0.4
April 2002	FSAU/MOSA	Bari region			17	2

3 METHODOLOGY

3.1 Survey Design

This study was both descriptive and analytical in nature. Using a standard questionnaire (see appendix) quantitative data was collected. Mortality assessment was concurrently conducted using a questionnaire attached in the appendix section. Additional qualitative data were collected through focus group sessions and key informant interviews. Data collection took place between 27th and 1st June 2003.

3.2 The sampling procedure

Using a two-stage cluster sampling methodology, 30 clusters were randomly selected based on population proportional basis from Sool plateau of Sool and Sanag Regions. Initially a sampling frame was constructed from which a representative sample could be drawn. A list of villages, and sections in the case of major urban settlements in ecosystem like Dhahar, with their respective populations was used to construct cumulative population figures for the plateau. The population figures were initially received from the ministry of Health and Labour (MOHL) in Sanag and Sool Regions population estimates. UNICEF, SRCS and FSAU field teams verified these figures for authenticity. An estimated population of 75,700 (MOHL May 2003 population estimates) was used from which a cluster interval of 2,523 was calculated. Using random number tables a random number of 189 was chosen within the cluster interval to determine the first cluster. The subsequent clusters were determined systematically by adding the cluster interval (2,523) to the first randomly selected number (see appendix). Due to absence of population in some clusters occasioned by people's movements, one of the randomly selected cluster/village were replaced by the nearest accessible villages inhabited by population with similar basic characteristics with the selected villages while populations of two clusters were followed some 45km outside the plateau to their current resident and surveyed. From the 30 randomly selected clusters, a total of 908 children between the heights/length of 65 and 110cm and 6-59 months old were screened during the survey. However, insufficient information on some children and extreme measurements led to the dropping off of 13 children at analysis. Thus only 895 were included in the analysis of child data.

3.2.1 Study population and sampling criteria

The study population consisted of people living in the district and comprised all the children aged 6-59 months or measuring 65-110 cm for height/length. On the visit to each cluster, the centre was identified and a pen was spun to determine the direction to follow in the selection of the households with children aged 6 to 59 months. The total number of the households from the centre to the end was established and given numbers to enable random selection of the first household with a child of the required age or height. From the first household with a child aged 6-59 months, the same direction was followed to get the next household. On reaching the edge of the cluster the right-hand direction (clockwise direction) was followed until details of 30

children were collected from that cluster. If a cluster was exhausted of children before the required 30 children had been reached, a neighbouring area was randomly selected. All eligible children in the household were measured and if a child or primary caregiver was absent, an appointment was booked for a later visit in the course of survey. If a child was in a relative or neighbour's house, the child could be called and accessed.

3.3 Data collection

3.3.1 Anthropometric measurements

The anthropometric data were collected using the procedure stipulated by the WHO (1995) for taking anthropometric measurements. Adherence to this procedure was ensured. The protocol used was as follows:

Weight. Salter Scale with calibrations of 100g-unit was used. This was adjusted before weighing every child by setting it to zero. The female children would be lightly dressed before having the weight taken while clothes for the male children were removed. Two readings were taken for each child and the average recorded on the questionnaire.

Height. For height, a vertical or horizontal measuring board reading a maximum of 175cm and capable of measuring to 0.1cm was used to take the height or length of a child. The child would stand on the measuring board barefooted; have hands hanging loosely with feet parallel to the body, and heels, buttocks, shoulders and back of the head touching the board. The head would be held comfortably erect with the lower border of the orbit of the eye being in the same horizontal plane as the external canal of the ear. The headpiece of the measuring board was then pushed gently, crushing the hair and making contact with the top of the head. Height/length was then read to the nearest 0.1cm. Two readings were recorded and the computed average used in the analysis.

Length. For children aged 6 to 24 months or between 65cm to 84.5cm length instead of height was taken. The child was made to lie flat on the length board. The sliding piece was placed at the edge of the bare feet as the head (with crushing of the hair) touched the other end of the measuring device. Then two readings were taken and the average computed.

3.3.2 Child age determination

Difficulties were encountered in determining the exact ages of children. Useful documents like growth monitoring/clinic attendance cards, or any other viable formal card were used when available. Calendars of events (see in the appendix) were also used as proxies to accurate age determination. Though not entirely accurate, ages were still regarded as important indicators though not used for anthropometric analysis and were approximate/average pointers. The nutrition indicator employed was *weight for height* as interest was in the wasting status (acute malnutrition).

3.3.3 Oedema

Defined as bilateral oedema on the lower limbs detected by gently pressing the feet to check if a depression is left after at least three seconds of pressing.

3.3.4 Morbidity

Diarrhoea: Diarrhoea was defined for a child having three or more loose or watery stools per day.

Measles: A child with more than three signs of the following was considered having measles: fever, and skin rash, runny nose or red eyes, and/or mouth infection, or chest infection

Acute Respiratory Infection (ARI): Asked as *oof wareen or wareento.* The signs asked included cough, rapid breathing and fever.

Suspected malaria/acute febrile illness: The signs to be looked for are periodic chills, fever, sweating and sometimes a coma.

3.3.5 Mortality

A proxy indication of mortality was taken retrospectively to provide some idea on the health situation of the population. The mortality assessment was done concurrently with nutrition survey in which a 30 by 30 cluster sampling methodology was used. The survey methodology used for the nutrition survey was adopted with the exception that households were selected as the second sampling unit. The selection of clusters and households were the same as for nutrition survey. At least 30 households were randomly selected in each cluster and the mortality questionnaire administered to a responsible member of that household. **All households within the selected cluster were eligible for inclusion** in the mortality survey, whether there was under-five or not. Households were systematically surveyed until the 30th household. Each household surveyed was asked the composition of their members in two parts; - those members less than 5 years and the total number of household members. The household was then asked how many if any of the household members had died in the last three months. The mortality questionnaire is appended in the report. A total of 904 households with and with no under-five child at the time of the survey were included in the survey.

The overall mortality was calculated by taking the total number of deaths multiplied by a factor (10,000). This was divided by the population of the surveyed households using the formulae below:

MR=n/{[(n+N)+N]/2}
Where n=total number of persons reported dead in the households surveyed
N=total number of people living in those households at the time of survey

The mortality was calculated retrospectively for the past 3 **months,** the recall period. Mortality rates per 10,000 persons per day were obtained by dividing the figure above by 93 days that was used as the recall period. Calculation of under-five

mortality rates was done using the same formulae but with a denominator of under-five children in the surveyed households.

In case a member had died, the household was asked to explain the signs and symptoms of the person before he/she died.

Mortality rates can be interpreted according to the following reference

- For under-five years old children
  -Under-five mortality rates >= 2 deaths/10,000/day indicate a situation of alert
  -Under five mortality rate >=4 deaths/10,000 children/day indicate an emergency
- For the total population
  -Mortality rates >=1 deaths/10,000 persons/day indicate an alert situation
  -Mortality rates >=2 deaths/10,000 persons/day indicate an emergency.

3.3.6 Food intake estimates

The calculation of energy intake and food deficit was based on the household economy approach spreadsheet that estimates the food intake from various sources and compares that with the baseline data to obtain the deficit.

3.4 Description of survey activities

Table 5: Chronology of activities for the Sool plateau nutrition survey

Major Activity	Dates. 2003
Preparation of tools, methodology & review of secondary data (Nairobi)	May 12 – 21
Training of enumerators and pre-testing (Erigavo, Sanag)	May 24 – 26
Cluster Identification	May 26
Collection of data	May 27 – June 1
Entry of data and preliminary analysis	3-7 June
Presentation of preliminary results	8/June/03
Report writing	8 – 22nd June 03
Circulation of report	30th June – 7th July

Six teams consisting of two enumerators and one supervisor conducted the survey with each team handling one cluster in a day. An elder from a particular village/cluster assisted the teams in identification of the cluster and its centre. Supervisors were seconded from the participating partners namely; MOHL, SRCS, and FSAU. Overall support, supervision and co-ordination was done by two FSAU nutritionists, one UNICEF nutrition officer and 1 MOHL national PHC coordinator. MOHL staff and FSAU nutrition monitor in the region assisted in the identification of the qualified enumerators who were selected on the basis of their experience with previous nutrition surveys and multi-indicator cluster surveys (UNICEF).

3.5 Quality control procedures

A comprehensive training of enumerators and supervisors was conducted covering

interview techniques, sampling procedure, inclusion and exclusion criteria, sources of errors taking of measurements, standardising the questions in the questionnaire, levels of precision required in measurements, diagnosis of oedema, verification of deaths within households, handling of equipment, interview techniques and the general courtesy during the survey.

Rigorous standardisation of measurement and pre-testing of the questionnaire and equipment was carried out in one of the villages (not selected for data collection). Standardisation involved taking repeated measurement of 10 children from a MCH by all the teams and comparing with some reference. Pre-testing also involved familiarising survey teams with village/cluster entry; administering the questionnaire, sampling procedure, correct taking of measurements and documentation. After the field exercise, views were exchanged to address the difficulties identified, appropriateness of the questions reviewed and necessary changes were made.

Quality of data was also ensured through (i) close monitoring of fieldwork by FSAU team led by two nutritionists, UNICEF nutrition officer and national MOHL PHC coordinator, (ii) crosschecking of filled questionnaires on daily basis and (iii) daily review undertaken with the enumerators to address any difficulties encountered, (iv) progress evaluation was carried out according to the time schedule and progress reports shared with partners on regular basis, (v) continuous data cleaning after entry in the field that made it easy to detect any outliers/ mistakes and to replace or repeat households depending on magnitude of error and (vi) monitoring accuracy of equipment (weighing scales) by regularly measuring objects of known weights.

3.6 Data analysis

3.6.1 Entry, cleaning, processing and analysis

Data was entered and analysed using EPIINFO computer based package. Running and tabulating all variable frequencies was carried out as part of data cleaning. The EPINUT programme was used to convert the measurements (weight and height) into nutritional indicators and comparison made with the National Centre for Health Statistics (NCHS) references as designed by WHO (1983).

3.6.2 General characteristics of study population

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.

3.6.3 Creation of nutritional status indices

The anthropometric measurement of weight and weight were used to compute the W/H nutritional status indicators of the studied children. Weight For Height (W/H) expressed the weight of the child as a percentage of the expected weight for the standard child of that height as given by NCHS. WFH measures acute malnutrition or wasting. Using EPINUT Z-scores were generated and the anthropometric indicator, WFH, was used to classify children into categories of nutritional status as follows:

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

4. SURVEY RESULTS

3.7 Household characteristics of study population

Table 3: Household characteristics

	n	*(%)*
Sex – Household head (n=482):		
Male	395	82
Female	87	18
Household size:	6.6 (SD=2.5)	
Household residence status (n=482)		
Those in their usual residential areas	348	72.2
Those who have moved internally within the FEZ or from outside	134	27.8
Place of origin (n=134):		
Within the FEZ	128	95.5
From South and Central Somalia	6	4.5
Date of arrival (n=134)		
<=3 months	116	86.7
4 – 20 months	18	13.3
Reason for movement (n=134):		
Pasture shortage/food shortage	91	67.9
Water shortage only	37	27.6
Others (insecurity in areas of origin and job search)	6	4.5

A total of 482 households were surveyed. The mean household size of the surveyed population was 6.6 (SD=2.5). The male and female-headed households comprise 82% and 18 % respectively. About 72% of the surveyed households were in their usual areas of residence while about 28% of the households had moved out of their usual residential areas of which about 96% moved to close villages within the ecosystem while about 5% had come from S/C Somalia into the food economy zone. Most of the movements (about 87%) had taken place within the three months prior to the survey. The movement was mainly occasioned by the drought experienced between January and April 2003 that led to acute pasture shortage (68%) and/or water shortage (28%) while only a few, 4.5% had moved because of insecurity in their areas of origin (South and Central Somalia) or in search of jobs.

4.2 Food sources and intake, income sources and survival strategies

Majority (about 68%) of the surveyed households reported purchasing or sourcing their foods through the markets at the time of the survey. Other important sources of food were animal and animal products as well as social support network. It in notable that most households would normally buy cereals which could only be sourced from markets with incomes from social support network or gifts (about 37%), selling the few remaining animals and animal products (37%) as well as petty trade (24%): operating roadside tea-shops, selling firewood etc. Other notable sources of income included charcoal burning.

Table 4: Food sources, income sources and survival strategies

Food source	N	%
Market based source of food/Purchases	326	67.6
Own animal/product Sources	112	23.2
Social support	39	8.1
Others (e.g. crop production)	5	1
Income source		
Social support network/Gifts /Casual work and charcoal sale	180	37.3
Sale of animal products	177	36.7
Petty trade & charcoal sale	117	24.3
Others (e.g. sale of crops)	8	1.7
Coping Strategy	N	%
Credit/borrowing and exchange	251	52.1
Social network support/splitting families	155	32.2
Sale of more livestock assets	70	14.5
Others	6	1.2
FOOD INTAKE		
Recommended intake	2,100 Kcal/person/day	
Current intake		
Poor wealth group	about 1800Kcal/person/day	
Middle wealth group	about 2,000Kcal/person/day	

Most of the households are surviving on credit facilities (52%) for their daily upkeep. As is reported at time of survey, households have reached a stage of mere survival and are using any source available in order to survive. This has definitely stretched the indebtedness of most of the pastoralists to the near limit. The social support mechanism including gifts and remittances is also playing a major role in people's survival mechanism with about 30% of the surveyed households depending on social network support (voluntary support by clansmen, free gifts and splitting of families). Increased sale of livestock products do account for about 15% of the survival strategies. This would normally be the typical coping mechanism, but however with the drought situation and the poor animal body condition, the pastoralists have very few saleable animals. Further sale of their animals also has the effect of further depleting their assets.

Results from a concurrent food security analysis shows a population that is already facing a food intake deficit of at least 15% but with a further projection of between 25% and 35% amongst the poor should the 2003 Deyr rains be normal and even a worse scenario if Deyr is below normal while some middle wealth groups are also having substantial deficits.

4.3 Water and sanitation and health seeking behaviour

Majority of the people were obtaining water from boreholes, about 45% and berkads 23% while the rest were depending on water tankering/vending and wells/streams/dams on almost similar proportions at about 16% as at the time of the survey. It is notable that water tankering is mainly drawn from boreholes but with other people drawing tinkered water from wells and berkards. Water had become available in some parts of the ecosystem as a result of the 2003 Gu rains at the time of the survey. However there were also a number of areas with inadequate access to water since the rains were late, scanty and inadequate in these areas of the plateau. Prices therefore continued to be high.

Presence of pit latrine is uncommon in the area, about 36% report using latrines. However, it was observed that a high percentage, 80% of those who own them used and kept them relatively clean.

Table 5: Water, sanitation and health seeking behaviour

	N	*(%)*
Main source of drinking water (n=482):	215	44.6
Boreholes	113	23.4
Berkads	78	16.2
Water tankering/vending	76	15.8
Others: streams, dams, wells & ponds		
Sanitation facility (n=482):		
Pit latrine	171	35.5
Bush/open grounds	311	64.5
Observe (n=1701:		
Used and clean	136	80
Unused	8	4.7
Used and dirty	26	15.3
Health seeking behaviour		
	N	*(%)*
Seek healthcare assistance when a member is sick (n=482):		
Yes	439	91.5
No	41	8.5
Reason (n=41)		
No health facility in near distance	38	92.6
Where (n=441):		
Traditional healer	167	37.5
Private clinic/pharmacy	239	54.2
Public health facility	35	7.9

An overwhelming majority, 92% of the households seek medication from healthcare practioners. Of those who seek healthcare services, majority (over 50%) consult private clinics/pharmacies and a significant proportion do consult traditional healers. In line with the limited health facilities in the ecosystem, less than 10% visit public health facilities. Those reporting not seeking healthcare services when a member is sick cite distance as the major impediment in addition to poverty.

Summary of household water sources, sanitation and health seeking behaviour is on table 5.

4.4 Characteristics of study children

Table 6: Distribution according to age and sex

	Boys		Girls		Total	
	N	%	n	%	N	%
6-11 months	62	53.9	53	46.1	115	12.8
12-23 months	93	55.7	74	44.3	167	18.7
24-35 months	105	49.3	108	50.7	213	23.8
36-47 months	103	51.2	98	48.8	201	22.5
48-59 months	94	47.2	105	52.8	199	22.2
Total	457	51.1	438	48.9	895	100
6-23 months	155	55	127	45	282	31.5
24-59 months	302	49.3	311	50.7	613	68.5

A total of 908 children were surveyed during the survey period. However, due to flagging of cases as a result of incomplete records or some cases having extreme measurements/ outside the criteria for inclusion, only 895 children aged 6-59 months or measuring 65-110 cms were analysed of whom were 51% boys and the rest girls. Most of the surveyed children were aged more than 24 months at the time of the survey as indicated on table 6 below.

4.5 Nutritional status of survey children using anthropometry

Table 7: Malnutrition prevalence using W/H Z-score categories

Z SCORES						
Nutrition status categories	**Males**		**Females**		**Total**	
	Proportion	***No.***	***Proportion***	***No.***	***Proportion***	***No.***
Total malnutrition (W/H<-2 z score)	13.5 (CI 10.5-17)	61	10.5 (CI 7.9-13.9)	46	**12 (CI 10-14.4)**	107
Severe malnutrition (W/H<-3 z score)	1.3 (CI 0.5-3.0)	6	1.1(CI 0.4-2.8)	5	**1.2 (CI 0.7-2.3)**	11
Oedema	0.9	4	0.2	1	0.55 (CI 0.2-1.4)	5
Std prevalence[1]	33.3%		27%		30.2	

As indicated in the table 7 and 8, total/global acute malnutrition (<-2 z-scores or oedema) was 12.5% while severe acute malnutrition (using <-3 z-score or oedema) was 1.8%. Oedema cases alone accounted for 0.6%. However, the standardized prevalence shows a high rate of malnutrition indicating that the nutritional status of a large proportion of the children do appear outside the that of the reference population and hence do not compare to that of the reference population.

The malnutrition rate as indicated by percentage of median <80% was 6.5% thus showing about 6% difference in malnutrition prevalence using the two indicators. Most children appeared to be more or less at the borderline hence a more strict cut-off using z-scores was bound to higher.

Table 8: Summary of Global Acute malnutrition and Severe Acute Malnutrition

Malnutrition Rates	**Proportion**	No.
Global Acute Malnutrition (<-2 Z score or oedema)	**12.5 (CI 10.5-14.9)**	112
Severe Acute Malnutrition (<-3 Z score or oedema)	**1.8 (CI 1.1 -3.0)**	16

Table 9: Malnutrition prevalence using W/H percentage of median categories

PERCENTAGE OF THE MEDIAN						
Nutrition status categories	**Males**		**Females**		**Total**	
	Proportion	***No.***	***Proportion***	***No.***	***Proportion***	***No.***
Total malnutrition (W/H<80% of the median)	7.1 (CI 5.0-9.9)	32	5.9 (CI 4.0-8.7)	26	6.5 (CI 5.0-8.4)	58
Total malnutrition (W/H<80% and/or oedema)	7.9 (CI: 4.4-11.4)	36	6.2 (CI: 3.0 – 9.4)	27	7.0 (CI: 4.9 – 9.7)	63
Severe malnutrition (W/H<70% of the median)	0.2 (CI 0-1.4)	1	0.2 (CI 0-1.5)	1	0.2 (CI 0-0.9)	2
Oedema	0.9	4	0.2	1	0.55 (CI 0.2-1.4)	5
Severe malnutrition (W/H<70% and/or oedema)	1.1 (CI	5	0.7 (CI	3	0.8 (CI 0-1.6)	8

1 Proportion of children from the surveyed population falling outside the reference population's normal curve

Table 10: Distribution of nutritional status (using weight for height z-score) by sex

There was no statistically significant difference in the nutritional status of both the sexes (P-value>0.05)

	Severe (<-3Zs)	Moderate	Total malnutrition	Normal (>-2Zs)
Males	6 (1.3%)	55 (12.2%0	61 (13.5)	392 (86.5%)
Females	5 (1.1%)	41 (9.4%)	46 (10.5%)	391 (89.5%)
Total	11 (1.2%)	96 (10.8%)	107 (12.0%)	783 (88%)

Table 11: Nutrition status using W/H z-scores or oedema according to age groups

Age groups	Severe (<-3z or oedema)	Moderate (>=-3z/<-2z)	Total malnourished (<-2z or oedema)	Normal (>-2 z or no oedema)
6-11 months	2 (1.7%)	7 (6.1%)	9 (7.8%)	106(92.2%)
12-23 months	5 (3%)	20 (12%)	25 (15%)	142 (85%)
24-35 months	4 (1.9%)	20 (9.4%)	24 (11.3%)	189(88.7%)
36-47 months	3 (1.5%)	23 (11.4%)	26 (12.9%)	175(87.1%)
48-59 months	2 (1%)	26 (13.1%)	28 (14.1%)	171(85.9%)
Total	16(1.8%)	96 (10.8%)	112 (12.6%)	783(87.4%)

On table 11, the nutritional status of the surveyed children is presented according to their age groups. The results show that malnutrition rate was highest among children aged 12-23 months and lowest among children aged below one year. The results showed that malnutrition had no significant statistical association with age groups. However, the ANOVA analysis for the various in group differences reveal that children aged 12-23 months showed significantly higher malnutrition than children aged less than one year.

4.6 Mortality Rates

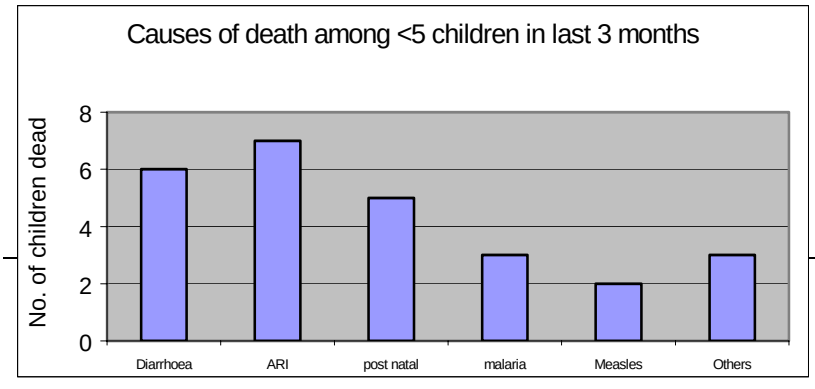
A total of 903 households were surveyed for mortality indicator with a follow-up period of 93 days prior to the assessment. The results are presented below:

Mortality rates;
For children aged 0-69 months (under-five mortality rate)

Under five population in surveyed households =1,454
Number of under five deaths =26
Under five mortality rate =1.9 deaths per 10,000 children per day

For the total population

Total population in surveyed households =4,624
Total number of deaths in the households =38
CMR =0.88 deaths per 10,000 persons per day



Main cause of death among under-fives
Acute respiratory infections and diarrhoea were the leading causes

of the death among the under fives. Post-natal deaths were also common further underscoring the inadequacy of proper healthcare provision. The respondents also mentioned measles as a significant cause of death.

4.7 Health, feeding practices and immunisation coverage for survey children

4.7.1 Morbidity, measles immunisation and vitamin A supplementation

The overall incidence of diarrhoea within the two weeks prior to the survey among the surveyed children was about a quarter. Over a tenth of the study children, 12%, were reported to have suffered from malaria two weeks prior to the study while the incidence of measles within the study population was about 4% as shown on table 12.

Tables 12: Morbidity, measles immunisation and vitamin A supplementation

	Number	%
Incidence of major child illnesses (n=895)		
Diarrhoea within two weeks prior to survey	219	24.5
Malaria within two weeks prior to survey	110	12.3
Measles within one month prior to the survey	33	3.7
Measles immunisation		
Children receiving measles vaccination (9 - 11 months) (N=56)	13	23.2
Children receiving measles vaccination (12–23 months) (N=167)	42	25.1
Children receiving measles vaccination (9 – 59 months) (N=836)	217	26
Verification for those vaccinated By card	52	14.3
Vitamin A supplementation N=895		
Children receiving Vitamin A supplementation in past 6 months	427	47.7

The overall measles vaccination among the various age groups was generally low. Results indicated that measles vaccination among children aged 9- 11 months was 23%, age 12- 24 months (about 25 %) while children 9- 59 months was 26%. Similarly, Vitamin A supplementation in the past six months was low at less than a half of the children. Only about 14% of the immunisation/vaccination coverage could be verified by card.

4.7.2 Feeding practices

At the time of the survey, 61% of the children aged between 6-24 months were breastfeeding. Of those who had been stopped from breastfeeding, about 36% had stopped breastfeeding quite early between the ages of 0- 5 months, 33% between 6-11 months while only 31% were stopped from breastfeeding after the first year of their life.

Table 13: Feeding practices

	N	*(%)*
Are you breastfeeding child (age 6-24months) (n=282):		
Yes	172	61.0
No	110	39.0
Age when child stopped breastfeeding (n=110):		
0 - 5 months	40	36.4
6 - 11 months	36	32.7
12 months or more	34	30.9
Weaning age (n=282(i.e. 6 -23 months aged):	238	84.4
0 - 2 months	37	13.1
3 – 5 months	7	2.5
6 months or more		
Feeding frequency (n=889):		
Once	12	1.3
2 times	138	15.5
3 times	495	55.7
4 or mores times	244	27.4

A high proportion, 84%, of the children aged between 6 and 24 months were introduced to foods other than breast milk early enough in life between the time of birth and the second month of life, 13% between 3 and 5 months, while only about 3% were introduced to complementary feeding at six months and above.

About 56% of the children are fed three times in a day while a relatively high proportion; about 17% of the children were fed not more than two times in a day.

4.8 Relationship between malnutrition and other factors

Risk factors and relation to total malnutrition

Exposure variable	*n*	*(%)*	*Crude RR*	*95% CI*	*p-value*
Household head sex:					
Male	95	12.8	1.16	0.7 – 1.9	0.64
Female	17	11			
Sanitary facility:					
Pit latrine/flush toilet	36	12	0.94	0.65 1.37	0.84
Bush/open ground	76	12.8			
Child sex:					
Male	65	14.2	1.33	0.9 – 1.9	0.14
Female	47	10.7			
Age group:					
6-23	34	12.1	0.95	0.65-1.38	0.87
24-59	78	12.7			
Diarrhoea:					
Yes	32	14.6	1.23	0.8 – 1.8	0.34
No	80	11.8			

Malaria:					
Yes	16	14.5	1.19	0.7 -1.9	0.59
No	96	12.2			
Measles:					
Yes	5	15.2	1.22	0.5-2.8	0.4
No	1o7	12.2			
Vitamin A:					
Yes	53	12.4	0.98	0.7-1.39	0.99
No	59	12.6			
Weaning age:					
0-6 months	109	12.7	1.43	0.5 – 4.3	0.37
7 months or more	3	8.8			

The survey data reveals no statistically significant association between malnutrition rate and household size, morbidity, immunisation, weaning age or vitamin A supplementation as revealed in table 14. However, further analysis to investigate the in-group differences shows that children aged 12-23 months were statistically significantly more malnourished than the children aged 6-11 months.

4.9 Qualitative information

Qualitative information, generated from focus group discussions, key informants and secondary data review, indicate that the Gu rains at the time of the survey were erratic in terms of onset, intensity and distribution. The cumulative numbers of days that it rained were below normal despite the rains being also late. It was estimated that about 40 - 60% of the pastoral population had moved out to other food economy zones like the Nugal valley and the Haud in search of water and pasture. This movement mainly involved members of the rich wealth groups who migrated when the animals were still relatively strong and capable of covering long distances. However, the most middle and poor pastoral groups remained in the plateau due to physical weakness of their animals and lack of pack animals. It is estimated that the remaining population had lost between 30 and 60% of their livestock depending on the species. Cattle and camel died more than any other livestock breed. This was a relatively strange phenomenon as camels would normally be the last animals to die. Local community says that this was a unique occurrence with severe implications on their food security in the near future. Thus, pastoralists that remained are finding it increasingly difficulty to obtain sufficient cash to purchase food having up to 60% of their livestock holdings. At the time of the survey, majority of the people were coping through social network support, splitting of families and increased sale of livestock although sellable livestock is limited due to poor body condition. The majority of residents also report that, milk has been very scarce due to the movement of livestock from the area and the poor condition of the remaining animals, mainly sheep and goats.

Focus group discussions also indicated poor feeding practices for the young children. Complementary feeding is introduced early between 0-5 months or later between 8-12 months. The main complementary foods for infants consist of mashed rice or bread with milk (if available only) or "*anjera*"-Somali pancake. The first food children are introduced to is sugar and water "*fax"* mainly within a few hours after birth. Breastfeeding is stopped immediately when a mother becomes pregnant again.

The community members indicated that they have reduced the number of meals per day

including for the children. Milk was totally unavailable even for the young children. Thus children were mainly fed on rice and “fax”-water added to sugar.

Hygiene standards at food preparation level are inadequate mainly occasioned by inadequate water and low awareness on personal and food hygiene. The waste disposal is also poor. Human is likewise poorly disposed with most households in the permanent settlements within the ecosystem having poor access to toiletry.

Water accessibility is constrained since the rains had not been received in some villages of the plateau. But even for the areas that had started receiving rains, it was still not enough. Berkads had not replenished sufficiently and the prices were still very high especially for the middle and poor groups. Majority reported usage of only about 20 litres of water for an average family of 6, far below the recommended per capita water usage.

5. DISCUSSION

5.1 Food security situation: Food sources, income and coping mechanisms

Sool plateau has experienced shortage of rains for the last three years (since 2000). The effect of these below normal rains has been cumulative. The situation has been made particularly worse in 2003 as abnormally high deaths of animals including the less common ones like deaths of camels was witnessed. The food security situation is poor and one of the worst seasons for the residents. People have exhausted nearly all the household assets and the death of pack animals even makes condition worse.

The imported food commodities are readily available in the markets although extremely expensive and inaccessible to a large number of the population due to the low purchasing power.

Milk availability is quite low or non-existent in most pastoral villages within the plateau. The recent 2003 Gu rains has not improved milk production as animals had moved outside the ecosystem, reproductively is at its lowest and the animal body condition is still very poor

Overall accessibility of food is affected by the high market price. Food is mainly accessed through market purchase (about 68%), while income is mainly accessed through social network support including gifts and remittances and assisting clan members with some few casual work opportunities available. The focus group discussions also reveal that the amount of food items being purchased is lower than what they would normally purchase. This was also reflected in the food intake of the residents where they operate on a food intake deficit for both the middle and the poor pastoralists in the ecosystem.

Although the term of trade is favourable to the pastoralists (one local shoat can be exchanged for a 50kg bag of cereal-rice), there are very few saleable animals as the body condition is poor and significant loss of animal body weight. Further sale of the few remaining animals will also worsen the recovery chances for the pastoralists.

Casual work opportunities are currently limited. Casual work opportunities would normally involve herding, construction of berkads and construction. All these are constrained to the current low economy.

As was widely reported by the local community, the pastoralists in the ecosystem are currently surviving. The main survival strategies were credit/borrowing, social support network including gifts, remittances and splitting of families in addition to income from charcoal burning. The increased borrowing has led to a huge debt burden that could be extremely difficult to service given that their household asset holdings have been greatly eroded. Households resorting to borrowing may find it difficult to repay the borrowed assets if animals do not fully recover. This could result in a major drain in their assets that could offset the food security balance.

The food deficit is already projected to be remarkably huge especially for the poor of about 25-35% and some substantial amount also for the middle wealth groups should 2003 Deyr rains be normal. In case of below normal 2003 Deyr rains, the deficit would be bigger. The poor form 20-30% of the population while the middle wealth group form 40-45%. However, the deficit would have been wider safe for the fairly strong social network, which is bound to collapse as the impact of drought becomes more widespread. Indications are already clear that these strategies are getting eroded by day and soon will be exhausted to the disadvantage of the residents. Implications are obvious as the food intake deficit will increase and malnutrition levels worsen. Again most families have lost their livestock due to drought and recovery will take some time. As has been reported, the camel calving rate is very low at less than 5%. This has negative implications on the herd size in the future. Livestock, which should be the main source of food and income for the pastoralists, rank quite low at the moment. In addition rains came late and were still scanty and inadequate with some areas within the ecosystem not receiving any rains at all. This makes recovery even more difficult.

5.2 Health issues influencing nutritional status

The results indicate that most families (more than a half) seek healthcare assistance from private health practioners including pharmacies. An equally high proportion of families visit traditional healers when a member of the family is sick. Although these avenues bridge the gap in health service provision, in an environment where standards and ethical regulations are hardly enforced, it becomes extremely hard to establish the efficacy of these health provision systems. Results indicate that less than one-tenth of the families to seek medication at public health facilities. This shows a clear gap in health care provision and it was therefore not surprising that immunisation and vitamin A supplementation coverage were extremely low. Focus group discussions reveal that residents of some of the villages have to walk approximately 20-30kms to reach the nearest health facility. Although the government supported are available, the uneven distribution in the ecosystem remains a major hindrance to their usage.

Although the results show no significant relationship between malnutrition levels and measles immunisation or vitamin A supplementation, this was understandable, as the area had had no outbreak of measles. In addition, most of the children (over three quarters) had not been immunised. Even for the children getting immunised, the timing is still also at a very late age. Less that a quarter of children aged 9-11 months were immunised at the time of survey. Otherwise information from literature indicates a strong synergistic influence between protein energy malnutrition, measles and the micronutrient deficiencies such as Vitamin A deficiency. Although there was no statistical significance between vitamin A supplementation or measles with malnutrition there is need to step up the immunisation and vitamin A supplementation.

The incidences of common childhood illnesses were also high at about 25% for diarrhoea and 12% for malaria. With the low basic healthcare coverage, it is highly unlikely that these sick children were to get appropriate healthcare. It was also clear from the focus discussions that the adverse practice of presenting sick children late

at the health facilities when home remedies have failed is common. Women also have poor autonomy over their health seeking behaviour. This is so since women rarely control the household resources. With 82% of the households headed by males, any strategies aimed at improving utilisation of health facilities and childcare practices would be meaningless if fathers are not targeted.

An under-five mortality rate of 1.9-deaths/10,000 under-five children/day is clear tending towards a serious situation and indicates a compromised health situation. Delivery related causes of deaths were also reported. This confirms the magnitude of inadequate health service provision in the plateau, with the severe implications of compromised health status. The crude mortality rate was no better either at 0.88-deaths/10,000 people/day.

5.3 Water and Sanitation

Currently the main water sources are boreholes, berkads, tankering/vending, streams and wells. Boreholes are unevenly in the ecosystem and people have to travel long distances for water. This also leads to concentration of animals in the few water points, which normally leads to faster depletion of pasture around these areas. Water is currently available in some parts of the plateau as the 2003 Gu rains replenished most water points. However, water has been (and is still in some parts that have not received good GU) a serious problem before the Gu rains started as most of the water points had dried up while some boreholes were not in working condition. Water prices are still significantly high thus affecting access to water at the household level in some villages. In April 2003 the water price for 200-litre (drum) ranged between Ssh. 30,000- 50,000 compared to Ssh 10,000 in normal times. This leads to diversion of the little household income for only purchase of water, cereals and sugar at the expense of other non-food items including medication. At household level, waste matter disposal is sub-optimal. A combination of poor waste disposal and reduced water availability/quality might have contributed to the high incidences of water and sanitation related infections (diarrhoea, malaria) two weeks prior to the survey. The water situation may further deteriorate in the coming months since berkads have not replenished sufficiently. This could worsen the already poor hygienic conditions. The overall incidence of diarrhoea (during the two weeks prior to the study) among the surveyed children was about 24%. Poor water sources at household level ultimately have negative child and mother care aspects at family level including breastfeeding patterns. The incidences of diarrhoeal diseases among children recorded during the survey are strongly associated with the reduced availability and consumption of safe water.

5.4 Childcare and its effect on nutritional status

Exclusive breastfeeding and good complementary feeding practices are crucial for improving the nutritional and health status of infants and young children. Suboptimal feeding of infant and young children reduces their chance for optimal growth. Results of the survey shows that about 97%of children aged <24months had been introduced to complementary food before six months into their life. Thus, only about 3% of children assessed during the survey were exclusively breastfed. As

recommended by UNICEF, children less than six months should be exclusively breastfed. The reasons for early introduction of foods other than breast milk for six months of a child's life included: frequent pregnancies especially among teenage mothers with the woman stopping breastfeeding as soon as she becomes pregnant; lack of knowledge on appropriate child feeing practices among young mothers; prolonged bleeding during labour and diseases like tetanus suffered by mothers after delivery cause early introduction of non-breast milk foods and fluids; and the aesthetic value husbands attach firm breasts.

The survey also indicates that a high proportion, about 36% of the children aged less than two years were stopped breast-feeding before 5 months of their lives. These figures can be regarded high considering the cultural values of the Somali community that support breastfeeding of children for up to around two years. Information from focus group discussions indicate that factors like close birth intervals, low awareness on care issues, as well as mothers having to leave children for long hours in search of water and food could be contributing to these practices.

Focus group discussions also revealed that children are mainly weaned on "fax'- Somali hot water with sugar, *"anjera"* and tea or bread. At a time when milk is scarce for children, this means that children can only get some energy and fewer proteins. In addition families have now reduced the quantity of food provision to members of the family including children. It as been observed that the family diet consumed by young children is usually simple and monotonous, dictated by local availability and price of foods in the market. Nevertheless, children receive priority during feeding times, both in terms of quality and quantity.

5.5. Nutritional status

The global/total acute malnutrition rate was 12.5% with a severe rate of about 2%. In April 2002, a nutrition assessment using MUAC conducted in Bari Region covering part of the plateau revealed a high malnutrition rate of about 15% (MUAC <12.5cms) and another nutrition survey conducted in Sanag Region in May 2002, again covering part of Sool plateau also revealed a high malnutrition rate of about 14% (WFH<-2 z-scores) *(FSAU August 2002 nutrition update)*. However, by July 2002, another FSAU led assessment revealed a temporary improvement in the nutritional status in some parts of the plateau (MUAC <12.5 cms at about 6%). In normal times, malnutrition rates in northern Somalia is normally less than 10%. The current malnutrition rates are also high especially in a pastoral set up that traditionally had rich diet consisting of animal products and supplemented by cereals that they normally find quite accessible due to exchanges with animals or animal products. This is the only survey covering purely Sool plateau and reveals serious levels of malnutrition

As in a number of previous studies, the data showed a high proportion of the older age group (48-59 months) with 22% of the children measured, still within the height criteria for inclusion in the survey. With accurate determination of age a common problem in situations where documentation is rare and literacy level is low, lack of statistically significant difference in the levels of malnutrition among the age groups (with exception of the 12 to 23 months old children), the high proportion of the older

age group did not necessarily affect the survey results. The higher number in the older age category would however suggest that a number of children who qualified within the height criteria were in fact over the age of five years and most likely stunted in growth. Malnutrition among the age group 12-23 months also signals insufficient weaning practices as well as other care aspects.

The food security situation as indicated above was greatly compromised reflected in inadequate food intake (the foods are inaccessible; the variety is restricted, compromised quality, restricted quantity etc), reduced frequency of food consumption, and minimal survival options.

The significantly high malnutrition amongst children aged 12 to 23 months, also seen in other surveys, can partly be explained by the fact that this is the age when most children are either introduced to weaning foods or to full family foods or stop breastfeeding. The weaning foods described were inadequate in quantity and also in quality. Cessation of breastfeeding also denies the child many nutrients. This could be contributed to by not only the poor understanding of appropriate weaning foods among the care givers on the type of foods but also on limited actual availability of appropriate weaning foods

There was no significant difference in nutritional status between the sexes, confirming findings of other studies in Somalia, which indicates that both boys and girls are treated equally when it comes to food intake at household level (FSAU food utilisation study 2002).

The survey has depicted that domestic use of substandard water could be a major contributor to diarrhoea and subsequently, the poor nutrition status. Additionally, there is poor personal hygiene due to inadequate water and sub-optimal environmental sanitation, which predispose individuals to diseases, with the subsequent result of a poor nutrition state.

Just as the under-five mortality rate was serious, so was the malnutrition rate. Malnutrition rates observed here was therefore not related only to a food security problem but has also become a major health issue that required some intervention. Access to health services became restricted as the population directs all their limited income to purchase of food items and water. Causes of death included diarrhoea, ARI and child birth related -causes.

In conclusion, although the food security situation had drastically worsened, malnutrition was still not as bad as those recorded in other parts of Somalia. The factors which might explain why the situation was not worse are as follows:

- Pastoralists usually prioritise young children when it comes to difficult situations and particularly with scarce supplies of milk2.
- The relatively strong social network support has provided some good buffer in the short run. However, as the food insecurity situation becomes more widespread, even the ‘’wealthier’’ providing support will also be affected. Thus coping will collapse.

2 “Food Utilisation in Somalia”: FSAU/FAO Nutrition Project, 2002

- Disease was not found in the survey to be significantly associated with malnutrition, even diarrhoea (although 25% of children had had diarrhoea in the previous weeks).
- "Standardized prevalence". The survey results revealed a disproportionately high concentration of study children around the -2 Z scores cut-off point. In effect this means that most children are on the verge of falling into the "malnourished" category, and any slight change to the negative could see a sudden and large increase in malnutrition levels below this cut-off.

5.6. Current and expected outlook of Sool plateau

Outlook: Milk availability: "Poor" pastoralists currently own around 30-40 shoats and most have no camels. Of these shoats the majority will be goats, with around 10-15 likely to be deliver and give milk at the beginning of the dry season (Haggaa). However, goat milk production does not continue throughout the *Haggaa* season. Within two months – by August – this supply will have finished and there will be little available for infants and young children. Wealthier kin will still be away in better grazing/water areas, and there will be little milk given as kin support.

Outlook: Health: There are concerns about outbreak of infectious disease – particularly measles. Increased incidences of childhood diseases is currently reported by nearby facilities in the region.

Outlook: food security: There is high concern that the lack of water and inability of the "poor" pastoralists to truck their animals to better areas will create extreme hardship as trucked water prices will be too high, most of their animals are unmarketable and there will be little milk available for families.

It is clearer that the nutritional problem in Sool plateau is severely influenced by factors relating to household food insecurity and health care, although the negative impact of the common practice of feeding children foods and fluids other than breast milk before the recommended age of six months and poor hygienic practices at the household level and generally sub-optimal childcare practices can not be over-emphasised. Healthcare provision is also an acute problem as manifested by the serious mortality rates and heightened by food insecurity as people cannot afford healthcare from the meagre income (people can only afford minimal food items). The drought in itself has led to limited variety of food items, limited access to milk (a key food for children), created acute water shortage with major expenditure implications on the households and shifts of expenditure only to essential items for their sustainability, led to increased poverty levels and thus limited access to health services. The situation is likely to deteriorate with malnutrition rates continuing to rise particularly when the small supplies of goat milk - currently available - run out, around August. . This is so since livestock is unlikely to recover as there has been inadequate regeneration of pasture and replenishment of water points, the calving rates remain low and the fact that most livestock are still outside the region. The attached appendix shows vulnerable villages in the Sool of Sanag and Sool Regions as were identified during the concurrent food security assessment.

6. Conclusion and Recommendations

The malnutrition rates are high at about 13%, an observation that is confirmed by an already observed energy intake deficit of 5-15% and a huge projection of food deficit of between 25-35% among the poor pastoralists in the plateau should the Deyr rains be normal which could be worse if the rains are below normal. However, with minimal indications of quick recovery and the likelihood of collapse in the coping strategies (currently increases indebtedness and with additional social network support), the malnutrition levels could easily deteriorate towards critical levels if no intervention or if no adequate rains (Deyr) come soon. Recovery is made even more difficult by the fact that the pastoralists have lost most of their livestock (including the rare significant death of camels) due to drought related deaths and transport stress. It is imperative for interventions to address the short-term acute food insecurity of the affected population as well as providing supplementary food for young children. Water remains the critical limiting factor and creative ideas for addressing this in the short and long-term are vital.

On 9th June 2003, partners in the survey presented preliminary results in Hargeisa attended by both UN agencies and the local authorities. Through these consultations with partners, the following recommendations have been put forward for interventions within the short and well as long-term period.

- Targeted food distribution in the highly vulnerable areas of the plateau for the next 2-3 months or until proper 2003 Deyr rains with an estimated vulnerable population of about 3,500 households in the plateau of Sanag and Sool Regions.
- Supplementary feeding programme for pregnant/lactating mothers and children under five years in the plateau also in the next 2-3 months.
- Continued close monitoring the food and nutrition situation in the area/intensification of surveillance activities.
- Intensify promotive and preventive health care interventions focusing on immunisation, hygiene, and control of water related diseases.
- Promote nutrition education through the MCH/outposts focusing on breastfeeding, complementary feeding and frequency of feeding of infants and young children as well as feeding of sick children.
- Rehabilitate run-down boreholes, berkads and dams with an aim of increasing access to water for both human and livestock. The water points normally dry up very fast and needs to be deep enough to have constant water supply.
- Promote alternative income generating activities through a credit programme to reduce over-reliance on livestock sources of livelihood.

7. APPENDICES

The Vulnerable population in the affected areas of Sool Plateau of Sanag regions

The name of Village/ water-point	Estimated vulnerable population
1. Dararwene	150 Households
2 . Xamilka	70 HH
3. Sabawanaag	65 HH
4. Ceeryaan	82 HH
5. Qotonka	50 HH
6. Bohol	70 HH
7. Dogobleh	62 HH
8. Dabablehe	100HH
9. Kulmiye	80 HH
10. Jiidele	95 HH
11. Yube	83 HH
12. Armale	70 HH
13. Hadaaftimo	95 HH
14. Fiqifuliye	75 HH
15. Arddaa	50 HH
16. Damalo Hagarre	81 HH
17. Biyo guduud	65 HH
18. Dawaco / Dhardalool	50 HH
19. Hingalool	98 HH
20. Beraagaha	110 HH
21. Balibusle	85 HH
22. Mindhicir	45 HH
23. Qoyan	30 HH
24. Sanka haber shiro	42 HH
25. Kala dhac	58 HH
26. Eel Buuh	94 HH
27. Laako	53 HH
28. Midigle	68 HH
29. Cow sane	40 HH
30. Shimbiraale	67 HH
31. Goof	68 HH
32. Beer wayso	42 HH
33. Kal Sheikh	40 HH
34. Fadhi gaab	100 HH
35. God Anood	55 HH
36. Garab cad	70 HH
37. Wardheer	80 HH
38. Eel Afweyn	180 HH
39. Erigavo	200 HH
40. Dhahar	180 HH
TOTAL =	**3220 HH**

The Vulnerable population in the affected areas of Sool plateau of Sool region

1. The Name of the Village/ water-point	Estimated vulnerable population
2. Sarmaanyo	250 HH
3. God' aalo	160 HH
4. Laaso- urdan	150 HH
5. Kal- ad	100 HH
6. Habaalo- amaare	60 HH
7. Awr – Bogays	150 HH
8. Hadhan	70 HH
9. Habaal-as	100 HH
Halin	200 HH
TOTAL =	**1,240 HH**

Sampling frame for the Sool plateau survey June 2003

Location	Settlement status P=permanent NP= Not permanent	Population Estimate	Cumulative population	Cluster Number
Fiqifuliye	P	2000		1
Damalexagare	P	1500	3500	2
Wardheer	NP	500	4000	
Baraaklaqol	NP	2000	6000	3
Xiingalool	P	8000	1400	4,5,6
Qoyancamp	P	500	14500	
Balleybusle	P	1000	15500	7
Kaladhacda	P	800	16500	
Midhicir	NP	500	16800	
Hilburan Camp	NP	700	17500	
Dhahar	P	12000	29500	8, 9, 10, 11, 12
Waro camp	NP	500	30000	
Laamlooyo	NP	500	30500	13
Durufe	NP	500	31000	
Bilcilo	NP	400	31400	
Hinhiglale	P	500	31900	
Carmalle	P	1000	32900	
Qablaale	NP	500	33400	14
Danweine	P	700	34100	
Ceeryaan	P	1500	35600	15
Garabcad	P	2000	37600	
Jawle	NP	1000	38600	16
God doofar	NP	500	39100	
Cad Cadde	NP	600	39700	
Goof	NP	1200	40900	17
Beerwayso	NP	1500	42400	
Dararweine	P	2500	44900	18
Dalya	NP	1500	46400	19
AdanKun	NP	700	47900	
Laymaadh	NP	800	47900	
Xamilka	NP	1500	49400	20
Calaydhyaale	NP	600	50000	
AddinQuadhac	NP	350	50350	
Siigodheer	NP	1400	51750	21
Dogobleh	NP	800	52550	
Tuurdibr	NP	500	53050	
Gacamaalle	NP	700	53750	22
Darkeynshixun	NP	500	54250	
Laba dugsile	NP	600	54850	
God biyaale	NP	500	55350	
Kurlimaale	NP	500	55850	23
Bacaroor	NP	400	56250	
Salahley	NP	600	56850	
Bohol	P	1500	58350	24

Sinarro	NP	600	58950	
Kulaal	P	1000	59950	
Kal Sheikh	NP	600	60550	
Sarmaanyo	PV	2000	62550	25
Awrbogays	P	2500	65050	26
Laaso Curdin	NP	200	65250	
God Allo	NP	700	65750	
Shirmbiraale	NP	400	66150	27
Ceel wein	NP	800	66950	
Xudun	P	2000	68950	28
Yaskax	NP	700	69650	
Laanquraadhe	NP	400	70050	
Sufur Weine	NP	200	70250	
Dhardhaar	P	500	70750	
Bagaslay	NP	500	71250	29
Jiriqaalay	NP	250	71500	
Duqdhaliije	NP	200	71700	
Laata Buulka	NP	300	7200	
Sal dedib	NP	500	72500	
Abaar Canalch	NP	400	72900	
Cadaab Hoomay	NP	600	73500	30
Hoos Weyno	NP	700	74200	
Bilcil	NP	300	74500	
Xaabooyin	NP	400	74900	
Galool buur	NP	300	75200	
Laan qudhac dheer	NP	500	75700	

Cluster sampling interview 2,523 and 1st Random number 189

SOOL PLATEAU NUTRITION SURVEY: QUESTIONNAIRE

Date_____ Team Number_____ Cluster Number_____ Name of Village/Town _____Household Number _____

Name of the household head _____

Q1 What is the sex of the household head? 1=Male 2=Female

Q2 How many people live in this household (HH size) _____

Q3 How many children are below five years in this household (Number of < 5 years) _____

Q4. What is your present household residence status? _____ 1= Residents 2= Internally displaced 3=Returnees 4=others (specify)_____

If answer to the above is **1**, then move to Question **8**. If the answer is **2 or 3** continue with question **5**

Q5 Where did you come from before settling in this current location? (Place of origin) _____

Q6 How long have you lived in this current location? (Duration of stay in months) _____

Q7 What was your reason for coming to this current location (Reason for movement): 1= Insecurity 2=Lack of jobs 3= Food shortage 4=Water shortage 5=others; specify_____

Q8-13 Household background information

Q8 Households **main** food source ***1=Animal products from own production*** *2=Household crop production* *3=Purchases* *4=Remittances/Gifts* *5=Begging* *6=Wild foods collection* *7= Others Specify* _____	**Q9** Households **main** income source *1=Small business* *2=Casual work* *3=Salaried employment* *4= Sale of crops* *5=Sales of animals and animal products* *6=Remittances/Gifts* *7=Others specify* _____	**Q10** How does this household survive during food **shortages** (coping strategies)? *1=Remittances/Gifts* *2=Sale of more livestock* *3=Splitting of the family* *4=Begging* *5=Borrowing* *6=Food aid* *7=Purchases* *8=Wild food collection* *9=Others specify* _____	**Q11** Source of drinking water *1=Borehole* *2=Open wells* *3=Protected wells* *4=Berkads* *5=Catchments/pond* *6=Stream/river* *7=Muscid* *8=Tap/piped water* *9=Tanker/truck vendor* *10=Others specify*____	**Q12a.** What ty a toilet does family use *1= Pit latrines* *2=Flash toilets* *3=Bush/Open ground* **Q12b** Conditio the facility above. *1=Used and cl* *2=Unused* *3=Used and di* *4=Others (spec* ----------

Q14-18 Anthropometrics for all children aged 6 – 59 months (or 65 – 110cm) in the household.

Serial No	Name	Q14 Sex 1= M 2= F	Q15 Age in months	Q16 Oedema 1=*Yes 2= No*	Q17 Height (cm)
1					
2					
3					

Q19-28 Morbidity, feeding and immunization status of children aged 6 – 59 months (or 65 – 110cm) in the household.

Sno	Name	Q19 Diarrhoea in last two weeks? 1= Yes 2= *No*	Q20 ARI in the last two weeks? 1= Yes 2= *No*	Q21 Malaria in the last two weeks? 1= Yes 2= ***No***	Q22 Measles in last one month? 1= Yes **2= *No***	Q23 Vaccinated against measles? *1=In past six months (Card) 2= In past six months (Recall) 3=Before six months 4= Before six months (Recall) 5= Not vaccinated*	Q24 Vitamin A provided in the last 6 months? 1= Yes 2= *No*	**Q25 Are you breast feeding the child?** 1= Yes **2= *No***	**Q26 If not breast feeding, how old was the child when you stopped breast-feeding?** 1= Less than 6 months *2= 6 – 11 months* *3=12 – 18 months* *4=18 months or more*
1									
2									
3									

Q29-31 Has any member of the household passed away in the past one year?_____Yes/No

SNo	Name	Q29 Sex (F/M)	Q30 Age in Years /months	Q31 Signs and symptoms leading t (E.g. Diarrhea, Vomiting, Fever, Convulsion, complications in delive
1				
2				
3				

MORTALITY QUESTIONNAIRE SET

Date_____ Team Number _____ Cluster Number _____
Name of Interviewer _____Name of Village/Town _____
Name of section _____ Household Number _____
Name of the household head _____

MORTALITY MODULE
CHILD: *(This questionnaire should be preferably administered to all women in the household)*

1. Have you ever given birth? *(Birth- a child who ever breathed or cried or showed signs of live even if he/she lived only a few minutes or hours)*	Yes…… No……
2. Have you any other child in this household who is not your biological child?	Yes…… No……..
3. If yes to Q1 and/or Q2, then how many? If No to both Q1 & 2, then go to Q11 *(List the names somewhere separate and account for everybody as per the questions below)*	No. below 5 years …… No. above 5 years ……
4. Have you any live birth between the first day of ARAFO 2003 and now?	Yes…… No…….. If yes, how many?…….
5. Have you any under five child other than your own in your household coming in since the first day of ARAFO 2003?	Yes……. No…….. If yes, how many?……
6. How many Under 5yrs children were living in this household as on the first day of ARAFO 2003?	Number……..
7. How many Under 5yrs children live with you now?	Sons at home…… Daughters at home ……
8. Have you any Under 5yrs children born alive but do not live with you now?	Yes…….No……. If yes then, how many? No. of sons ….. No. of daughters ……
9. Do you have any Under 5yrs child who has died since the first day of ARAFO 2003?	Yes…….No……If yes, then Sons dead …… Daughters dead……..
10. If there has been death of an Under 5yrs child in this household, then what were the signs and symptoms of death?/suspected cause of death?	Child1…….. Child2…….. Child3…… Child4 ……
ABOVE FIVE YEARS OLD IN THE HOUSEHOLD	
11. How many above five years old were living in this household as on the **first day of ARAFO 2003?** *(List the names somewhere separate and account for everybody as per the questions below)b*	Number >5yrs……..
12. Has there been any above 5yrs old who has come to the household since the **first day of the ARAFO 2003?**	Yes…….. No…….. If yes, then how many……
13. Has there been any above 5yrs old who has left the household since the **first day of ARAFO 2003?**	Yes…….. No…….. If yes, then how many……
14. How many above 5 yrs live in this household now?	Number……..
15. Do you have any over 5 years old person in this household who has died since the **first day of ARAFO 2003**?	Yes…. No…….. If yes, no. >5yrs……..
16. If there has been death of >5yrs person in this household, then what were the signs and symptoms of death?	Peron1…….. Person2…….. Person3…… Person4 ……

TRADITIONAL CALENDAR FOR NUTRITION SURVEY IN Sool plateau: May 2003

Month	1998	1999	2000	2001	2002	2003
Jan.		52	40	28	16	4
Feb.		51	39	27 SAKO	15 SAKO	3
Mar.		50	38	26	14	2
Apr.		49	37	25	13	1
May	60	48	36	24	12	
Jun.	59	47	35	23 QAX BADHAN	11	
Jul.	58	46	34	22	10	
Aug.	57	45	33	21	9	
Sep.	56	44	32	20 DAB SHID	8 DABSHID	
Oct.	55r	43	31	19	7	
Nov.	54	42	30	18 RAMADAAN	6 RAMADAAN KII u DAMBEEYEY	
Dec.	53	41	29 Ramadan	17	5	

Jiilaal
GU'
Xagaa
Deyr

8. REFERENCES

Boss LP, Toole MJ, Yip R. Assessments of mortality, morbidity, and Nutritional status in Somalia during the 1991-1992 famine: recommendations for standardisation of methods. JAMA. 1994; 272:371-376.

CDC. Nutrition and mortality assessment -- southern Sudan, March 1993. MMWR. 1993;42:304-308.

FSAU and partners: Sanag Nutrition survey Report. May, 2002

FSAU, Sept 2002: Food Utilisation in Somalia

Institute of medicine: 1998: Prevention of micronutrient deficiency. Tools for policy makers and public health workers. National Academy Press, Washington, D.C. Pg. 45

Moren 1995.

Moore PS, Marfin AA, Quenemoen LE, et al. Mortality rates in displaced and resident populations of central Somalia during 1992 famine disaster. Lancet. 1993;41:913-917.

Nutrition survey methodology in Somalia. SACB

Standardized Monitoring and Assessment of Relief and Transition (SMART). Standardizing Survey methodology. Technical Series. July 23 – 26, 2002. Washington, DC.

U.S. Committee for Refugees. World Refugee Survey. Washington, DC. 1994.

WHO: 1995: Guide on rapid nutritional assessment in emergencies