MODULE 7

MEASURING MALNUTRITION: POPULATION ASSESSMENT

Part 1: Fact sheet
Part 2: Technical notes
Part 3: Trainer’s guide
Part 4: Training resource list

Harmonised Training Package (HTP):
Acknowledgements

Numerous experts from many different organisations have been involved in writing the content of the HTP. Each module has been reviewed by a minimum of two reviewers from many of the academic institutions and operational agencies in the sector who have participated generously to ensure a high quality resource.

Module 7: Measuring malnutrition: Population assessment

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The HTP Version 2 (2011) was produced and published by the Emergency Nutrition Network (ENN)
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The entire HTP is hosted on the UN Standing Committee on Nutrition (UNSCN) website

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ISBN: 978-1-908182-00-5

The technical update of the HTP to produce Version 2 (2001) was made possible through the generous support of the American people through the Office for Disaster Assistance (OFDA) of the United States Agency for International Development (USAID) under the Agreement No. GHN-A-00-08-00001 to the Emergency Nutrition Network entitled Strengthening Capacity to Respond to Emergencies in the Food Security and Nutrition Sectors. The content does not necessarily reflect the views of USAID or the United States.
The Harmonised Training Package (HTP):
Resource Material for Training on Nutrition in Emergencies

What is the HTP?

The Harmonised Training Package: Resource Material for Training on Nutrition in Emergencies (the HTP) is a comprehensive documentation of the latest technical aspects of Nutrition in Emergencies (NiE). The word Harmonised reflects the pulling together of the latest technical policy and guidance, the word Training refers to its main application and the word Package refers to the bringing together of the subject matter into one place. It is organised as a set of modules by subject, each containing technical information, training exercises and a resource list for use in training course development.

The HTP is an initiative of the IASC Global Nutrition Cluster (GNC) and has been endorsed by the GNC and its member’s agencies. In 2007, the IASC GNC commissioned the UK based partnership, NutritionWorks, to develop a training resource to facilitate capacity development in the NiE sector. HTP Version 1 was launched in 2008. HTP Version 2 update in 2010/11 was funded under an USAID OFDA grant to the UK based charity, the Emergency Nutrition Network (ENN). The update was undertaken in an ENN/NutritionWorks collaboration, with NutritionWorks responsible for overall coordination and editorial management, and editorial oversight and module production supported by the ENN.

What the HTP is not

The HTP is not a ready-to-use training course. It cannot be used as an ‘off the shelf’ package; rather, it should be used as a resource package during a process of course development by experienced trainers.

Who is the HTP for?

The HTP is a primarily a resource for trainers in the NiE sector and it can be used by individuals to increase their technical knowledge of the sector. It is designed to provide trainers from any implementing agency or academic institution with information from which to design and implement a training course according to the specific needs of the target audience, the length of time available for training and according to the training objectives. It is written in clear English and will be available in other languages in the future.

How is the HTP organised?

The HTP is organized into four sections containing a total of 21 modules which can be used as stand-alone modules or as combined modules depending on the training needs.

Section 1: Introduction and concepts
1. Introduction to nutrition in emergencies
2. The humanitarian system: Roles, responsibilities and coordination
3. Understanding malnutrition
4. Micronutrient malnutrition
5. Causes of malnutrition

Section 2: Nutrition needs assessment and analysis
7. Measuring malnutrition: Population assessment
8. Health assessment and the link with nutrition
9. Food security assessment and the link with nutrition
10. Nutrition information and surveillance systems
Section 3: Interventions to prevent and treat malnutrition

11. General food distribution
12. Management of moderate acute malnutrition
13. Management of severe acute malnutrition
14. Micronutrient interventions
15. Health interventions
16. Livelihoods interventions
17. Infant and young child feeding
18. HIV/AIDS and nutrition
19. Working with communities in emergencies

Section 4: Monitoring, evaluation and accountability

20. Monitoring and evaluation
21. Standards and accountability in humanitarian response

Each module contains 4 parts which have a specific purpose as follows:

**Part 1:** The Fact Sheet – provides an overview of the module’s topic and is designed for non-technical people to obtain a quick overview of the subject area.

**Part 2:** The Technical Notes – for trainers and trainees, provides detailed technical guidance on current policies and practice.

**Part 3:** The Trainers’ Guide – aims to help trainers develop a training course and provides tips and tools which can be adapted to the specific training context.

**Part 4:** Resources – lists of relevant available resources (including training materials) for the specific technical area.
How to use the HTP

The HTP should be used during a process of course development. The process of course development involves a number of steps and these are summarised in the diagram below.

1. Identify the needs of the target audience
2. Define the overall objectives of the training course to meet these needs
3. Decide on the length of the course
4. Decide on the number and content of the training sessions
5. Decide on the blend of theoretical content, practical exercises, field visits, and assessment methods
6. Select content from the HTP to build your course and adapt as appropriate
7. Implement and evaluate training course. Review effectiveness and revise course design as necessary
PART 1: FACT SHEET

The fact sheet is the first of four parts contained in this module. It provides an overview of how to measure malnutrition in a population. Detailed technical information is covered in Part 2. The measurement of micronutrient malnutrition is not included as it is covered in Module 4. Words in italics are defined in the glossary.

Introduction

Nutrition assessments are essential to guide response during an emergency. There are three main methods used to assess the nutrition of populations: rapid nutrition assessments, nutrition surveys and nutrition surveillance. Module 7 explains how to conduct nutrition surveys.

Survey objectives

The most common objective for anthropometric surveys during emergencies is to measure the prevalence (level) of acute malnutrition within a specified population. Prevalence of acute malnutrition needs to be interpreted in regard to contextual information such as food security, feeding practices, public health, water and sanitation and shelter conditions among others. Results of anthropometric surveys can be used to establish a baseline or to follow trends.

Survey populations

Nutrition surveys need to be representative of the affected population. The population to be surveyed may be refugees or internally displaced people (IDPs) living in camps or people living within a livelihood zone (area where the population has similar livelihoods) or a particular administrative area (district or region). Survey results are only representative of the geographical area from which the survey sample is selected and may only be generalized beyond the survey area with caution and strong clear justification.

Children aged 6 to 59 months are typically measured as they are nutritionally vulnerable and act as a proxy for the nutritional status of the entire population. Since almost all anthropometry surveys in emergencies measure children aged 6-59 months, this also provides an opportunity for comparison across areas over time.

Data collection

International guidelines recommend that information on anthropometry (body measurements) be collected. Some limited additional information can be coupled with an anthropometric survey. Measles vaccination coverage is often asked as part of an anthropometric nutrition survey as it is relatively easy to collect and can lead to clear recommendations. Mortality surveys are often coupled with nutrition surveys when no data on mortality is available. It can seem attractive to collect additional information about the determinants of malnutrition together with an anthropometric nutrition survey, but it is inadvisable to attempt to obtain all this additional information via a nutrition survey.

Sampling

Anthropometric surveys are done by sampling a sub-set of the affected population. This requires the use of internationally recognized statistical methods so that the prevalence of acute malnutrition in the sampled population can be generalized to that of the whole population of the area.

The most common forms of sampling procedure are simple and systematic sampling and cluster sampling. A cluster is a group of neighbouring households. The cluster sampling methodology involves selecting a number of clusters randomly in the first stage (generally between 25 and 40) and then selecting children or households randomly within each cluster in the second stage.
Planning and preparation for surveys

Practical and technical issues relating to nutrition surveys include: getting permission from local authorities to carry out the survey, checking the security situation, obtaining and testing measuring equipment, organising transport, obtaining population data, developing, testing and translating questionnaires, recruiting and training fieldworkers and piloting all procedures. National staff and agencies should be involved from the outset to build national capacity and to ensure recognition of the survey findings.

It is also important to factor in seasonality as prevalence of acute malnutrition can vary quite dramatically depending on the season.

Timing

Field data collection for nutrition surveys can take anything from a few days in camp situations to several weeks for dispersed populations in large rural areas. In addition to field work, survey preparation can take up to two weeks, and analysis and report writing one to two weeks.

Survey teams

Teams are usually composed of three people each. The composition of team members needs to be sensitive to the local context in terms of gender, ethnicity and language skills as well as local knowledge of the survey area. At least two people are required to do weight and height measurements and one to record the data. The latter is the team leader responsible for the quality and reliability of the data collected. Two to six teams can be used depending upon the time allocated to complete the survey and the size and accessibility of the area to be covered.

Training and field data collection

The training usually takes at least two or three days. There should be regular supervision of survey teams by the supervisor or coordinator throughout the survey. In addition, whenever feasible, there should be a daily ‘wrap up’ session with all the teams to discuss any problems that have arisen during the day.

It is advisable to inform the population in advance that a survey will take place and ask people to stay home. Once the team is in the area to be surveyed, local authorities must be informed of the survey. When arriving in a household, permission for measuring the children should be sought from an adult caretaker.

Data analysis

Analysis of anthropometric data can either be done by hand or using freely-available software, including Emergency Nutrition Assessment (ENA) for SMART, Epi Info combined with ENA hybrid or WHO Anthro.¹

Presenting results

Nutrition survey results are presented in a standard way. The prevalence (level shown as a percentage) of malnutrition is always accompanied by the 95 per cent confidence interval (equivalent to saying that if the survey is done 100 times, the value will be within the range of the confidence interval 95 times out of 100). The age and sex distributions are always shown. For children aged 6 to 59 months, weight-for-height index in Z-score according to WHO standards should primarily be reported. Weight-for-Height in Z-score according to NCHS reference may also be reported in addition to allow comparison with past surveys. Wasting and severe wasting measured by MUAC (Mid Upper Arm Circumference) should be included when appropriate (e.g., when feeding programs use MUAC as admission criterion). For surveys measuring adult malnutrition, the BMI (Body Mass Index) or MUAC are the most commonly used indicators.

The prevalence of malnutrition should be interpreted in relation to what is expected for that time of the year (season) and in the context of the overall situation. Currently, there are no universally agreed thresholds which indicate the severity of a nutritional situation but the United Nations stipulate that a prevalence of acute malnutrition (wasting) of 10 to 14 per cent indicates a serious situation and over 15 per cent indicates a critical situation.

The findings of a nutrition survey should be written up and disseminated as soon as possible after completion of the survey. Reports should be as clear as possible and always include a summary of one to two pages with key findings and recommendations.

Key messages

1. Anthropometric nutrition surveys are commonly conducted during emergencies to estimate the level of acute malnutrition in a population.
2. Two-stage cluster sampling is commonly applied.
3. Nutrition surveys require time, financial resources, trained staff and logistical support.
4. There are standard ways of presenting anthropometric data in reports as prevalence with 95 per cent confidence intervals.
5. Survey reports should include a description of objectives, methodology, limitations as well as the findings and recommendations.
6. Level of malnutrition should be interpreted in line with contextual factors, such as food security, public health and care practices.
The technical notes are the second of four parts contained in this module. They provide information on measuring malnutrition in populations. The measurement of micronutrient malnutrition is not included as it is covered in Module 4. The technical notes are intended for people involved in nutrition programme planning and implementation. They provide technical details, highlight challenging areas and provide clear guidance on accepted current practices. Words in italics are defined in the glossary.

**Summary**

This module concentrates on nutrition surveys and provides an overview of the steps that should be followed in carrying out a survey.

**Key messages**

1. Anthropometric nutrition surveys are commonly conducted during emergencies to estimate the level of malnutrition in a population.
2. Two-stage cluster sampling is commonly applied.
3. Nutrition surveys require time, financial resources, trained staff and logistical support.
4. There are standard ways of presenting anthropometric data in reports as prevalence with 95 per cent confidence intervals.
5. Survey reports should include a description of objectives, methodology, limitations as well as the findings and recommendations.
6. Level of malnutrition should be interpreted in line with contextual factors, such as food security, public health and care practices.

These technical notes are based on the following references and Sphere standards in the box below:

Sphere standard

Food security and nutrition, Assessment Standard 2: Nutrition
Where people are at increased risk of undernutrition, assessments are conducted using internationally accepted methods to understand the type, degree and extent of undernutrition and identify those most affected, those most at risk, and the appropriate response.

Key actions
- Compile existing information from pre-disaster and initial assessments to highlight the nature and severity of the nutrition situation
- Identify groups with the greatest nutritional support needs and the underlying factors that potentially affect nutritional status
- Determine if population level qualitative or quantitative assessments are needed to better measure and understand anthropometric status, micronutrient status, infant and young child feeding, maternal care practices, and associated potential determinants of undernutrition
- Consider the opinions of the community and other local stakeholders on the potential determinants of undernutrition
- Include an assessment of national and local capacity to lead and/or support response
- Use nutrition assessment information to determine if the situation is stable or declining

Key indicators
- Assessment and analysis methodologies including standardised indicators adhering to widely accepted principles are adopted for both anthropometric and non anthropometric assessments
- Assessment findings are presented in an analytical report including clear recommendations of actions targeting the most vulnerable individuals and groups


Introduction
Nutrition assessments are essential to guide response during an emergency. In this module, nutrition assessments encompass analysis of anthropometric data as well as contextual factors such as food security, mortality, public health and caring practices, and interventions which are key to analyse to interpret the overall nutrition situation.

This module has three parts. It starts with a short discussion of rapid nutrition assessments and then concentrates on anthropometric nutrition surveys, and finally describes the information needed for an overall analysis of the nutrition situation.

Nutrition surveillance is covered in depth in Module 10. The assessment of micronutrient malnutrition is covered in Module 4.

Rapid nutrition assessments
In some situations a rapid nutrition assessment must be carried out to quickly establish whether there is a major nutrition problem or not and to identify immediate needs. In the initial stages of an emergency, a rapid nutrition assessment may be carried out to verify the existence or threat of a nutrition emergency, estimate the number of people affected; establish immediate needs; identify local resources available and external resources needed.

Rapid assessments are also done where there is poor security and very limited access.
Commonly, information relating to nutrition is gathered from key informants as part of a broader emergency needs rapid assessment. For example, informants may be asked whether malnutrition has become more common and whether any children are displaying signs of kwashiorkor (oedema or fluid retention) or micronutrient deficiencies. Informants may be asked about changes in dietary habits such as reduction in food quantity, quality and reduced frequency of meals. Consumption of unusual wild foods is also frequently a sign that nutrition is becoming compromised. Direct observations of population and environment can also be used as well as review of records from available feeding centres and/or health facilities.

Anthropometric household rapid assessment can also be undertaken. In this case, as it is often not possible to draw a random sampling representative of the population surveyed, the findings must be used cautiously. The measurement of the mid-upper arm circumference (MUAC) is often used in these circumstances as it can be done quickly and requires very little equipment (only a measuring tape). Case example 1 provides an example from the Central African Republic.

Case example 1: Rapid anthropometric nutrition assessment in Central African Republic: 2007

An upsurge of violence in the north of the Central African Republic in 2006 led to the displacement of thousands of people. The conflict had serious consequences for food security. The loss of food stocks and productive assets, increased food prices and complete disruption to trade with rest of the country caused imported goods such as sugar, oil and salt to be entirely absent in rural markets. An assessment by the World Food Programme (WFP) found a significant decrease in food frequency and diet diversity. Most people only ate once a day and meat, fish and oil had disappeared from their diet. Cereal consumption had also decreased. Most families had consumed roots, tree bark and wild fruit the day before the assessment. People were also reported to have few cooking instruments and little access to water.

A rapid anthropometric nutrition assessment was conducted in two provinces in the north, in areas which were not representative of the entire population but which were relatively secure. Among 104 displaced children aged 6 months to 59 months who were screened using MUAC, none had a MUAC of less than 110 mm and only one had a MUAC of less than 120 mm. Among the 381 resident children screened, four (or one per cent) had a MUAC of less than 110 mm and 16 (4.2 per cent) had a MUAC of less than 120 mm. No oedematous children were found.


Anthropometric nutrition surveys

Anthropometric nutrition surveys involve the collection of anthropometric information which is used to establish the prevalence (level) of acute malnutrition in a population (Box 1). In addition, underweight and stunting can be estimated, keeping in mind that the uncertainties about the age will undermine the accuracy of those results in some populations.

Rapid assessments are frequently multi-agency (involving several agencies) and multi-sectoral (involving several technical sectors) in order to have a broad analysis of risks, needs and priorities and to make recommendations to ensure all the health and nutrition needs of an emergency-affected population are met. An initiative to improve the effectiveness of rapid assessments has resulted in a multi-cluster Initial Rapid Assessment (IRA) tool. This has been developed by the nutrition, health and WASH (water, sanitation and hygiene) clusters since 2007. It serves to collect, compile and analyse information on the public health, food and nutrition status of the population and the current availability of nutrition and health services. It mainly involves analysis of secondary data and interviews with key informants. It is designed to provide a quick, initial description of the current situation and identify the priority problems, risks and gaps in service provision. The tool includes guidelines, a standard data collection form, an associated aide memoire for field teams, and a data entry and analysis template and software. A Needs Assessment Task Force was also established by OCHA (Office for the Coordination of Humanitarian Affairs) to improve coordination of rapid assessments.

Surveys are cross-sectional (one-off) and provide a ‘snap-shot’, e.g., the information collected reflects the situation for a particular point in time. When repeated surveys of the same population are conducted, trends can be established. Most of the time, it is not possible to measure everyone in the area surveyed so a sample of the population will be selected who will then be measured to determine the prevalence of acute malnutrition.

1 For details go to http://www.who.int/hac/global_health_cluster/guide/tools/en/index.html
2 The ‘Cluster approach’ is one of the outcomes of the Humanitarian Reform, led by the Inter-Agency Standing Committee with the aim of improving coordination and the quality of humanitarian action. For details see http://www.humanitarianreform.org/
3 For details see the IASC website http://www.humanitarianinfo.org/asc
Box 1: Definitions of key epidemiological terms

**Survey:** a systematic canvassing/investigation of persons to collect information, often from a representative sample of the population.

**Sample:** a selected subset of a population. A sample can be random or non-random and representative or non-representative.

**Sample, random:** a sample of persons chosen in such a way that each one has the known (and often the same) probability of being selected.

**Sample, representative:** a sample whose characteristics correspond to those of the original or reference population.

**Prevalence:** the proportion of persons in a population who have a particular disease at a specified point in time.

**Confidence Interval** a range of values for a measure (e.g. prevalence) constructed so that the range has a specified probability (often, but not necessarily, 95%) of including the true value of the measure. A narrow confidence interval indicates high precision; a wide confidence interval indicates low precision.


Other data can be collected in addition to anthropometry but it is not recommended that many additional data are added to the survey as it might undermine the quality of the whole survey due to surveyors’ and respondents’ fatigue. Moreover, information on food security or public health might be available from secondary data or might be collected more efficiently using other types of assessment methodologies.

Due to the significant financial, human and logistic resources needed, it is essential to consider carefully the reasons for doing a survey. A survey is undertaken when there is a reasonable indication from a rapid assessment, surveillance or early warning systems that there is likely to be a nutritional problem. Before starting the survey, it is important to identify how the results will be used and to ensure that a survey leads to action if a problem is identified. Although there are well-established techniques for doing anthropometric nutrition surveys, there are some unresolved technical challenges and some limitations in conducting and interpreting anthropometric surveys that practitioners and policy makers need to be aware of (Box 2).

Box 2: Some drawbacks in conducting and interpreting anthropometric nutrition surveys

- Accurate population data is needed to list the population in villages or population units. This may not be available in an emergency.
- The data cannot be disaggregated to produce statistically reliable results for geographical sub-samples when cluster sampling is used.
- Surveys are time- and resource-consuming, but are often necessary to assess the anthropometric situation with accuracy.
- Mobile and pastoral populations are difficult to assess because they do not easily form an identifiable cluster with sufficient children to be measured.
- Sampling is especially challenging in big towns, particularly when clusters represent a large number of households and where households are aggregated, such as in buildings.
- Interpreting results of anthropometric nutrition surveys in relation to contextual factors and interventions is not straightforward and requires a wealth of information including food security and public health.

A good survey design is crucial as a poor design may mean that the survey results are invalid. Once it has been decided that a nutrition survey is necessary, the key steps shown in Box 3 should be followed.
Box 3: Key steps in designing and implementing a nutrition survey

1. Decide whether or not to do a survey
2. Define objectives
3. Define the geographical area and population group to be surveyed
4. Gather relevant background information
5. Communicate with stakeholders
6. Determine the timing of the survey
7. Decide what information to collect
8. Design the survey: determine the appropriate sampling method, calculate sample size and select the sample
9. Design the questionnaires
10. Obtain and prepare equipment and survey material
11. Select and train field workers
12. Field test questionnaires and data collection procedures
13. Conduct field work and supervise teams
14. Check measurements, enter and clean data
15. Check data quality and analyse the data
16. Write and disseminate the findings through reports and presentations

Survey objectives

It is important to develop specific survey objectives so as to avoid any unnecessary collection of data.

The objective for anthropometric nutrition surveys during emergencies is generally to measure the prevalence (level) of acute malnutrition among children aged 6-59 months within a specified geographical area.

The results of an anthropometric nutrition survey can be used for different purposes:

- For advocacy to highlight a nutritional problem and elicit a response
- For defining appropriate interventions
- For measuring change in nutritional status over time to inform the evolution of the situation in relation to contextual factors and interventions and whether programmes need to continue or can be safely phased out

Survey populations

Anthropometric nutrition surveys need to be representative of the affected population. The population to be surveyed may be refugees or internally displaced persons (IDPs) living in camps or other settlements, or people living within a livelihood zone (area where the population has similar livelihoods) or a particular administrative area (district or region). It is preferable to survey livelihood zones, as people's food security within the zone will tend to be similar as well as their nutritional status. Survey results are only representative of the geographical area from which the survey sample is selected. Generalization to other similar or neighbouring areas should be done with extreme caution and followed by clear justification as to why the prevalence in these areas may be similar to the area that was surveyed.
Once the population has been defined, the specific group within the population who will be assessed needs to be defined. Typical groups are:

1. **Children aged from 6 months to 59 months**
   
   In most African and Asian countries young children are the most nutritionally vulnerable and act as a proxy for the nutritional status of the entire population. Since the children aged 6-59 months are routinely measured in nutrition surveys, they serve as a principal group for which comparisons could be drawn among populations measured at different times and places.

2. **Other age groups**
   
   Younger or older children, adults and the elderly are assessed less frequently but may be included where there is reason to believe that they are nutritionally vulnerable. For example, the elderly were found to be more nutritionally vulnerable during the Bosnian crisis of the early 1990s while the focus in Kosovo 2000 was on infants under six months of age. The nutritional status of women, usually mothers or carers, is sometimes assessed in nutrition surveys. Women who care for young children are often nutritionally vulnerable, especially as they are most likely to be pregnant or lactating.

### Sampling

**Sampling methods**

Anthropometric nutrition surveys are usually based on the representative sampling of a sub-set of the affected population. This requires the use of internationally recognized statistical methods so that the prevalence of acute malnutrition in the sampled population can be generalized to that of the whole population. For nutrition surveys to be representative, every individual measured has to have an equal chance of being selected. Different sampling methods are described in Table 1.

<table>
<thead>
<tr>
<th>Sampling method</th>
<th>Brief description</th>
<th>Main use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Census or exhaustive survey</td>
<td>If the population of interest is sufficiently small, a survey of the entire population can be carried out.</td>
<td>Small static communities such as a refugee or displaced camp</td>
</tr>
<tr>
<td>Simple random sampling</td>
<td>Individuals (or households) are randomly chosen (using a random numbers table) from a complete list of all the individuals (or households) in the population.</td>
<td>Communities with up-to-date lists of all individuals (or households) or where houses or tents are laid out in blocks such as established refugees or displaced camps or villages/towns with accurate census information</td>
</tr>
<tr>
<td>Systematic or interval sampling</td>
<td>If a complete list of all individuals (or households) is available, then every Nth entry on the list is selected. If there is no list but dwellings are arranged in some order and the total number of dwellings is known, then every Nth dwelling can be selected.</td>
<td>Communities with up-to-date lists of individuals (or households) or where houses or tents are laid out in blocks such as established refugees or displaced camps or well-organized villages</td>
</tr>
<tr>
<td>Cluster sampling</td>
<td>Cluster sampling involves a number of stages. Two-stage cluster sampling starts with the first stage where a number of clusters (collections of individuals or households) are randomly selected. The second stage is when individuals or households are randomly selected within each cluster.</td>
<td>Cluster sampling is done very frequently. It allows random sampling in situations where other forms of sampling are not possible. It can be used in widely dispersed populations such as rural households. However, the survey sample needs to be larger than with other methods.</td>
</tr>
</tbody>
</table>

In practice while simple or systematic random sampling can be used in some camp settings, it is necessary to use cluster sampling in many situations.
Cluster methodology involves selecting a number of clusters (cluster refers to a grouping of neighbouring households, i.e. a village or part of a city) randomly in the first stage. For the survey to be representative of the surveyed area, at least 25 clusters need to be surveyed. The clusters are randomly selected from the population data of the smallest available administrative units with probability-proportional-to-size: the larger the population size, the higher chance for the administrative unit to be selected.

A design of 30 clusters of 30 children was recommended in the past. It was adopted because it is relatively simple to understand and implement, and will guarantee a good precision around the estimate of acute malnutrition prevalence in most emergency settings, i.e. it involves random selection of the sample and ensures sufficient sample size. However, new recommendations are to calculate the sample size needed (see below) and to derive the number of clusters from the sample size and the number of children or households measurable per day. For example, if it is estimated that it takes a team on average 20 minutes to complete each household survey and the field work will be on average 4 hours per day, then each team could measure 12 households per day. If the total sample size requirement is 396 households, 33 clusters (396/12) will be visited to achieve the overall sample size. Annex 1 describes how to do cluster sampling in more detail.

There are a number of options for the second step of sampling (box 4 and Annex 2).

**Box 4: Selection of households to form the clusters**

1. **Simple or systematic random sampling**
   The best method is to treat each cluster as if it is a “small population” and to select the houses using the simple or systematic random sampling methods as described in table 1.

2. **Segmentation and simple or systematic sampling**
   If the cluster is to be taken from a larger population, the first step of stage two is to subdivide the population into segments of roughly the same number of people. One of these segments is then chosen from the random number table. In this way the “village” is reduced to an area containing up to 250 households. These households are then listed, and the required households selected from the list by simple or—if they are arranged in some logical order—systematic random sampling. If the population is divided in segments of unequal household sizes, segments should be chosen with probability-proportional-to-size.

3. **Modified “EPI” (Expanded Programme of Immunisation) method**
   If it is not possible to select the households in the ways proposed above, the modified “EPI” method can be used (see Annex 1).
   Although, this method is simple, widely known, easy to train, and rapid, it results in a somewhat biased sample, as households closer to the centre of the village are most likely to be selected. However, the time taken to select the sample and move from house to house is far less when the EPI method is used.

From SMART manual version 1, April 2006

1. **Calculation of sample size**
   The sample size is the number of individuals or households who will be assessed in the survey and which will be representative of the entire population from which the sample is drawn. Sample size is related to three factors:

   1. The expected **prevalence** of acute malnutrition: The smaller the expected proportion of children presenting with acute malnutrition, the lower the size of the sample required for a given level of precision. Expected prevalence can be drawn from previous assessments in the area.
   2. The expected **precision** of the survey results: Precision is a measure of how close the survey value is to the true value. It is reflected in the confidence intervals of the results. The greater the precision required, the more people are needed in the sample. The survey should have a sufficient precision to ensure the results are meaningful for planning purposes.
There are specific problems of sampling pastoral populations as they often represent mobile, scattered populations where detailed population data is lacking.

A new method for estimating prevalence of acute malnutrition in pastoral areas has been developed. There are two phases to the assessment: qualitative and quantitative. During the qualitative phase, the sampling frame of pastoralist troupe is constructed using information gathered locally from key informants in the pastoralist community. This information is managed using an organogram (organisational chart). During the quantitative phase, the selected communities are located and surveyed and the data analysed. The nutrition assessment is carried out by measuring all eligible children in the sampled troupe. Data can be computerised using specially designed software.

This method was tested in Mali and the authors concluded that the method is practical for use in pastoral populations, is valid and is simple to apply. The quantitative data collection and data entry should present no difficulties for staff that are already familiar with cluster surveys. Many staff will be unfamiliar with collecting and analysing qualitative data and will require some training in the methods and experienced staff may be needed during the early stages. The delay between qualitative data and quantitative data collection needs to be as short as possible because seasonal changes and other movements of people affect the validity of the qualitative data. Further testing is necessary, especially in different pastoralist settings.

3. The design effect, which is only applicable in cluster surveys, reflects the extent to which the variable being measured (acute malnutrition) is spread in the population. Malnutrition, for example, may be geographically clustered because the determinants of malnutrition are likely to affect individuals living in the same area. The latest evidence suggests a design effect of about 1.5 for acute malnutrition; in areas with previously documented higher design effects this may be adjusted accordingly. This means that the sample size for a nutrition cluster survey must be increased about 1.5 times compared to the sample size needed for a simple or systematic random survey.

A common misunderstanding is that the size of the sample needed for a ugoon nutrition survey is dependent on the population size. In fact, the sample size makes little difference except in populations of fewer than 5,000. The only factors that affect the sample size are those described above. This means that bigger samples are not needed for bigger populations.

The sample size can be calculated by hand by following a particular formula. See Annex 3. Alternatively the computer software programmes that can be used for analysing nutrition surveys also include programmes for calculating sample sizes (see Data analysis chapter below).

New methods for interpreting results of nutrition surveys have recently been proposed. They are based on comparison of prevalence found in the survey to a given threshold. This has implications on the sample size required (Challenge 1).

For children’s anthropometry, the number of children required for the sample can be converted to a number of households, if the average number of eligible children per household is known. Even households without eligible children need to be interviewed for mortality and other information not specific to children.

Planning and preparation for surveys

There are a number of practical and technical issues that have to be addressed in the process of planning and preparing for a survey. These are shown in Table 2. It is extremely important to involve national staff from government departments and from civil society at the outset to build national capacity and to ensure the recognition of the survey findings.

It is also important to factor in seasonality as prevalence of acute malnutrition can vary quite dramatically depending on the season. For example, levels of acute malnutrition are usually higher during the uhungury season, just before the harvest, when food stocks are low, and which also may coincide with higher levels of infection such as malaria and diarrhoea as a result of weather patterns. The seasonal factors will also directly affect the logistical aspects of the survey in terms of road access, accommodation for field staff and the likelihood of finding the survey population.

Timing

Field data collection for nutrition surveys can take anything from a few days in camp situations to several weeks for dispersed populations in large rural areas. In addition to field work, survey preparation can take up to two weeks, and analysis and report writing one to two weeks.
Challenge 1: New methods for interpreting results of nutrition surveys

A new method for interpreting results of surveys has recently been proposed. It is based on the Lot Quality Assurance Sampling (LQAS). This approach aims at classifying the results of a survey above or below a given threshold (generally, 10, 15 and 20%) to assess the severity of the situation. The sample size needed is lower than when the objective of the survey is to assess the actual prevalence with sufficient precision. Cluster sampling of 33 clusters of 6 children or 67 clusters of 3 children have been proposed.

This method of interpretation has been challenged as being prone to producing false-positive results and therefore suggesting interventions when there is no need. Alternatively, interpretation using the probability of prevalence to exceed the threshold has been proposed.

Validity and field use of these new methods are still not entirely clear.


Table 2: Planning nutrition surveys

<table>
<thead>
<tr>
<th>Practical and procedural issues</th>
<th>Technical issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Confer with the relevant local authorities and obtain permission to carry out the survey.</td>
<td>• Gather accurate population data</td>
</tr>
<tr>
<td>• Check out the security situation. The safety of fieldworkers is paramount.</td>
<td>• Develop, translate, back-translate and test questionnaires and/or data assessment sheets.</td>
</tr>
<tr>
<td>• Obtain and test equipment such as height/length boards, scales, pens, clipboards, etc.</td>
<td>• Recruit and train fieldworkers.</td>
</tr>
<tr>
<td>• Organize transport, fuel and timetables for moving fieldworkers from one site to another.</td>
<td>• Pilot all survey procedures to identify challenges.</td>
</tr>
</tbody>
</table>

Survey teams

Teams are usually composed of three people each. The composition of team members needs to be sensitive to the local context in terms of gender, ethnicity and language skills as well as local knowledge of the survey area. At least two people are required to do weight and height measurements and one to record the data. The latter is the team leader responsible for the quality and reliability of the data collected. The team leader can also conduct interviews if additional information is included in the survey. It is important to have team leaders who have taken part in planning the assessment and, ideally, who has previous experience with nutrition surveys.

Two to six teams can be used depending upon the time allocated to complete the survey and the size and accessibility of the area to be covered. Although it is faster with more teams, it is much more difficult to train, supervise, provide transport and equipment, and organise a large number of teams.

Data collection

Minimum information to be collected is:

- Age in months from a known date of birth or based on an estimate derived from a calendar of local events
- Sex
- Weight in kilograms (to the nearest 100g)
- Height/length in centimetres (to the nearest millimetre)
- Presence or absence of bilateral oedema

MUAC is also often collected. Further details on how to collect this information are given in Module 6. Additional data collected will depend on the objectives (e.g. vaccination coverage, micronutrient supplementation or deficiencies) and the age group(s) to be surveyed.

Data collection forms should be simple to understand and use. An example can be found in Annex 4. In many cases, the data collection forms and questionnaires will have to be translated into the local language. To avoid misunderstanding, it is essential to use one translator to translate into the local language and a second translator to translate back from the local language.
Data which can be collected in addition to anthropometry in surveys

It can be attractive to collect additional information about the determinants of malnutrition together with an anthropometric nutrition survey. However, it is inadvisable to attempt to obtain all this additional information via a nutrition survey. Firstly, in many settings, this information will already be available or will be collected as part of assessments done by other sectors (including food security and health) (Challenge 2). Each additional piece of data that is collected as part of a nutrition survey will prolong the training and the survey itself, complicate the analysis and potentially degrade the accuracy of the data.

Challenge 2: Which additional data to collect during an anthropometric survey

The decision to collect additional information during a nutrition survey should be clearly stated and justified in the objectives and have a realistic prospect of leading to a meaningful intervention. Consideration has to be given to whether the information is available from secondary sources, could be collected more efficiently in other ways (e.g. secondary data collection from health clinics, sentinel sites or a surveillance system), or whether it would be better to conduct a separate assessment to collect the supplementary information. If additional information is to be included in the survey it should be quickly and reliably obtainable during a short visit to the household.

Nevertheless, some limited additional information can be coupled with an anthropometric survey. Measles vaccination coverage is often asked as part of an anthropometric nutrition survey as it is relatively easy to collect and can lead to clear recommendations. Data on the health status of the person being measured is also sometimes collected by asking about illness during the previous two weeks. However, the quality of the response is questionable and there might be suspicion that both the lack of standardisation of questionnaires and the difficulty for the households to diagnose the illness might lead to poor data. Mortality surveys are often coupled with nutrition surveys when no data on mortality is available.

Training and field data collection

The training usually takes at least two or three days and should include the following topics:

- A clear explanation of the objectives of the survey
- A discussion of the ethical considerations (including importance of getting consent from families)
- An explanation of the sampling method
- A standardisation test of anthropometric measurements to evaluate the strengths and weaknesses of each surveyor and select the best measurers
- Practice on estimating age with the local events calendar

- An explanation of any additional data that needs to be obtained
- A pilot field-testing of the questionnaire and procedures

There should be regular supervision of survey teams by the supervisor or coordinator throughout the survey. In particular, teams usually need the most support from the supervisor or coordinator at the early stages of the survey as many of the procedures are new, as well as at the end of the survey as team members tire and make more mistakes. In addition, whenever feasible, there should be a daily ‘wrap up’ session with all the teams to discuss any problems that have arisen during the day.

It is advisable to inform the population in advance that a survey will take place and ask people to stay home. This will diminish the risk of bias where a high number of families are absent when the survey is conducted. Once the team is in the area to be surveyed, local authorities must be informed of the survey. The sampling principle should be explained and it should be made clear that the survey will not necessarily lead to humanitarian assistance in this area. When arriving in a household, permission for measuring the children should be sought from an adult caretaker. Again, it should be explained to the family that the survey will not automatically lead to humanitarian assistance.
Data analysis

Analysis of anthropometric data can either be done by hand or using freely-available software, including Emergency Nutrition Assessment (ENA) for Standardised Monitoring and Assessment of Relief and Transitions (SMART), Epi Info combined with ENA hybrid or WHO Anthro.4

International guidelines (The Sphere Handbook, 2010) stipulate that where anthropometric surveys are conducted among children 6 months to 59 months, they should report primarily weight-for-height index in Z-score according to WHO standards. Weight-for-Height in Z-score according to NCHS reference may also be reported in addition to allow comparison with past surveys. Wasting and severe wasting measured by MUAC should be included.

For adult malnutrition the prevalence of the Body Mass Index (BMI) and corresponding cut-offs can be calculated using EpiInfo or other statistical programmes. The same is true for MUAC. See Module 6 for a detailed explanation of nutritional indices.

Before starting the analysis, the data needs to be prepared and “cleaned”. Some of the information collected will probably be incorrect due to errors in measurement and recording. The objective of “cleaning” is to remove any false or improbable data and to check where there are missing data. For example, outliers of height, weight and anthropometric indices will be excluded from final analysis. ENA also includes a battery of tests for assessing the overall quality of the data, such as age heaping and digit preference for weight and height (box 5).

Box 5: Plausibility checks in ENA Software

Measurement bias occurs when the team has not been adequately trained or supervised or when the measuring equipment is faulty. There are several useful methods to check the quality of the anthropometric data collected during a nutrition assessment and after the data has been collected:

1- **The distribution of the final decimal for height and weight.** This will tell you if the team members are rounding weights and height to the nearest kilogram or centimeter, respectively. This phenomenon is called “digit preference.” ENA examines the data for digit preference. Furthermore, it examines the digit preference for each of the teams. There may be one team that is “cutting corners” or has been improperly trained or supervised.

2- **The standard deviation of the z-scores for Weight-For-Height (WFH) should be examined.** This can tell you if there is substantial random error in the measurements. If the standard deviation is high (over 1.2), it is likely that there are a lot of extreme values.

3- There are other statistical measures that are computed on the data and for each team’s results to assess the extent to which the survey results are valid.

From SMART manual version 1, April 2006

Presenting and interpreting results

Anthropometric nutrition survey results are usually presented in a standard way. ENA software provides the results in a standardized reporting form.

Age and sex distributions

The age and sex distribution of the population is frequently analysed to check that there was no bias in the survey sampling. The sex ratio (number of male divided by number of female) should be around 1. A low proportion of children in some age groups could indicate either a problem with the survey method or high age-related mortality. The prevalence of acute malnutrition is generally expected to be higher in the 6 month to 36 month age group.
Prevalence and Confidence Intervals

The prevalence of acute malnutrition in the sample measured represents an estimate of the overall prevalence of acute malnutrition in the population at a given point in time. The ‘precision’ of the estimate is measured by a statistical term known as the confidence interval (CI). This reflects the error introduced by the sampling method and the sample size. Confidence intervals are usually associated with a probability of 95 per cent, which is equivalent to saying that if the survey is done 100 times the true population value of acute malnutrition will be within the range of the confidence interval 95 times out of 100. A true difference between two percentages can be assumed where CIs do not overlap. When the CIs overlap slightly, there may still be a significant difference between the two estimates, but this needs to be statistically tested. Centers for Disease Control and Prevention (CDC) developed a simple calculator to test the difference between two survey estimates5. The percentage of oedematous children should be recorded separately within the report, as well as being included in the overall percentage of acute malnutrition.

Table 3 illustrates a table of results from nutrition surveys conducted in Pakistan in December 2005. The minimum information that should be presented is shown. In this example, it is possible to conclude that the prevalence of acute malnutrition is higher among residents of Mansehra district compared to IDPs from Muzaffarabad district as the CI ranges do not overlap. However, there is an overlap in the CI ranges for all other groups.

Table 3: Presentation of anthropometric data

<table>
<thead>
<tr>
<th>Survey Area</th>
<th>Muzaffar-abad district IDP camps</th>
<th>Muzaffar-abad district</th>
<th>Mansehra district IDP camps</th>
<th>Mansehra district</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>Displaced</td>
<td>Residents</td>
<td>Displaced</td>
<td>Residents</td>
</tr>
<tr>
<td>Global acute malnutrition % (95% CI)</td>
<td>4.2 (1.9-6.5)</td>
<td>5.7 (3.8-7.5)</td>
<td>6.0 (3.9-8.0)</td>
<td>10.5 (6.7-14.3)</td>
</tr>
<tr>
<td>Severe acute malnutrition % (95% CI)</td>
<td>1.2 (0.0-2.3)</td>
<td>2.5 (1.1-4.0)</td>
<td>3.2 (1.5-5.0)</td>
<td>4.7 (2.5-6.8)</td>
</tr>
<tr>
<td>Oedema</td>
<td>1.0</td>
<td>2.5</td>
<td>1.7</td>
<td>2.6</td>
</tr>
<tr>
<td>Measles immunization coverage % (proved by card)</td>
<td>77.0</td>
<td>64.3</td>
<td>46.5</td>
<td>37.4</td>
</tr>
<tr>
<td>Women’s anthropometric status</td>
<td>BMI &lt; 16: 2.7% BMI &lt; 18: 16.1%</td>
<td>BMI &lt; 16: 1.5% BMI &lt; 18: 15.5%</td>
<td>BMI &lt; 16: 1.0% BMI &lt; 18: 17.4%</td>
<td>BMI &lt; 16: 2.3% BMI &lt; 18: 14.8%</td>
</tr>
<tr>
<td>Crude mortality (/10,000/day) (95% CI)</td>
<td>0.2 (0.06-0.47)</td>
<td>0.44 (0.21-0.8)</td>
<td>0.2 (0.0-0.4)</td>
<td>0.1 (0.0-0.3)</td>
</tr>
</tbody>
</table>


5 Available at http://www.cdc.gov/nceh/ierh/ResearchandSurvey/calculators.ht
Seasonality and trend data

The prevalence of acute malnutrition should be interpreted in relation to what is expected for that time of the year (season). This will confirm whether the prevalence is unusually severe for that time period. In many parts of the world prevalence of acute malnutrition increases in the hunger period before the main harvest also often corresponding to the rainy season when there is increased incidence of disease. It can be useful to conduct surveys in hunger gap and post-harvest periods to document seasonal variations. Analysis of trends can be done by comparing results of the current survey to results of previous surveys conducted in the same area and taking into account the season when the surveys were done.

Thresholds

Currently, there are no universally agreed thresholds that indicate the severity of a nutritional situation. Rather, acute malnutrition levels are very context-dependent and whereas in one context a prevalence of 15 per cent may lead to immediate emergency action, in other contexts it is considered ‘normal’. Module 1 discusses classification systems and thresholds in detail. Table 4 presents the thresholds set by the United Nations for child acute malnutrition prevalence. There are no thresholds set for adult malnutrition. The rationale behind these thresholds is not clear. Moreover, they were determined with the NCHS reference and it is unclear whether they remain applicable with the World Health Organisation (WHO) standards.

For those interested in comparing survey estimates to the thresholds CDC has developed a simple calculator that provides a probability of the true population value exceeding a given threshold based on observed survey results.

Table 4: United Nations thresholds for acute malnutrition

<table>
<thead>
<tr>
<th>Interpretation</th>
<th>Prevalence of global acute malnutrition (&lt; 80% below median/or &lt; -2 Z scores)</th>
<th>Mean weight-for-height Z score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptable</td>
<td>&lt; 5%</td>
<td>&gt; -0.4</td>
</tr>
<tr>
<td>Poor</td>
<td>5-9%</td>
<td>-0.4 to -0.69</td>
</tr>
<tr>
<td>Serious</td>
<td>10-14%</td>
<td>-0.7 to -0.99</td>
</tr>
<tr>
<td>Critical</td>
<td>&gt; 15%</td>
<td>&lt; -1.00</td>
</tr>
</tbody>
</table>

Source: The Management of Nutrition in Major Emergencies 2000 (IFRC, UNHCR, WFP, WHO)

Report preparation and dissemination

The findings of a nutrition survey should be written up and disseminated as soon as possible after completion of the survey. Reports should be as clear as possible and always include a summary of one to two pages with key findings and recommendations. The summary can be turned into a separate fact sheet. It is useful to do a verbal presentation of the results to help get the message across quickly and accurately as many people will not have the time to read through whole reports. See Annex 5 and 6.

Interpretation of the results, which leads to clear recommendations, is advisable. This will require interpretation of anthropometric surveys in line with contextual factors (see below). Box 6 illustrates how to ensure that recommendations are clear.

Survey reports should also be sent to global initiatives that collate nutrition survey results, including Complex Emergency Database (CE-DAT) and United Nations System Standing Committee on Nutrition (SCN) Nutrition Information in Crisis Situations (NICS).

Follow-up surveys

In many cases follow-up surveys will be needed to assess whether the situation is improving, remaining the same or deteriorating. Repeat surveys among the same population should be carried out at the same time of the year to take account of seasonal differences.

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7 Available at http://www.cdc.gov/nceh/ierh/ResearchandSurvey/calculators.htm

Box 6: Report recommendations

There is no fixed blueprint for interventions in nutrition emergencies, it is useful to consider the following:

• severity of the situation (including an understanding of malnutrition, mortality and the major acute determinants of malnutrition and whether the situation is going to get better or worse), which dictates the urgency of the required response
• sub-groups of the population that are at greatest nutritional risk
• chronic determinants of malnutrition that need to be addressed
• community's recommendations and understanding of their existing levels of capacity
• feasibility of possible responses

Nutrition Survey Recommendations need to:

• be based on need and prioritized
• be linked to assessment findings
• be based on Sphere standards
• be time specific and feasible
• be built on existing capacity and community recommendations
• promote coordination and avoid duplication

All agencies undertaking nutrition surveys must send their results to the government, or the UN agency responsible for emergency nutrition interventions, so that they can build up a central database of information on the prevalence of acute malnutrition in different parts of the country.


Putting results of anthropometric surveys into context: assessing and analysing the overall nutrition situation

Anthropometric data can only provide information on the level of malnutrition. Non-anthropometric data has to be collated to interpret the level of acute malnutrition and to understand the overall humanitarian situation as well as to determine adequate response. Annex 7 provides a checklist of questions to consider as part of an overall assessment of the nutrition situation.

This information will help in identifying the factors likely to be associated with malnutrition in a specific context and in designing appropriate interventions and emergency responses. The conceptual framework on the determinants of malnutrition (immediate, underlying and basic) is illustrated in Module 5.

The conceptual framework illustrates that while immediate determinants include inadequate dietary intake and disease, there are interrelated underlying determinants:

• insufficient access to food (household food insecurity)
• inadequate maternal and child caring practices
• poor water and sanitation, and inadequate health services
• basic determinants related to the political and social systems at a national and international level

Basic determinants reflect the resources available to a population (human, structural and financial), whereas the political ideology determines how these resources are allocated. Poverty is often the overriding determinant of malnutrition. Basic determinants include macroeconomic and government policies or development strategies that exclude or marginalize a section of the population. The existence of a competent government, which is politically accountable to all sections of society, is probably the most important determinant in freedom from famine. It is important to assess the underlying determinants of malnutrition in the context of the most likely basic determinants.

9 This is also referred to as the Conceptual framework on the determinants of undernutrition
Lack of standardization in assessing the determinants of malnutrition

There are no standard methods for collecting information on the determinants of malnutrition either in terms of what to collect or how to collect it. Different agencies tend to use their own data collection forms and collect different types of information. These frequently reflect the particular interest and specialization of that agency. For example, agencies that are largely concerned with delivery of food aid may concentrate heavily on household food security and focus less on health or water and sanitation. Agencies with a bias towards health may concentrate more on the health or therapeutic care needs of the community.

Box 7: Common assessment tools

- **Secondary information**
  Collation of existing information from various sources such as government departments or international agencies working in the area (e.g., previous survey results, information from surveillance or early warning systems)

- **Questionnaires**
  Questionnaires of set questions that may be qualitative or quantitative; often filled in by the survey fieldworkers who take a sample of mothers (of children who are being anthropometrically measured) or household heads from the geographical area of interest

- **Key informant interviews**
  Individual interviews possibly with local leaders or government representatives varying in the degree to which they are ‘formalized’ (using set questions) or ‘open’ (encouraging informants to articulate their own opinions and concerns)

- **Focus group interviews**
  Possibly with small groups of local people such as village women or farmers; the degree to which the interviews are ‘formalized’ varies.

- **Direct observations**
  Observations of the environment such as sources of drinking water, sanitation systems, quality of housing, and health facilities and services

- **Seasonal calendars**
  Seasonal calendars drawn to illustrate the seasonal variation of various factors that affect nutritional status, such as disease, different sources of food and the agricultural cycle

Currently, agencies use different sources and techniques and collect very different types of non-anthropometric data. The risk of non-standardization is that assessments are not comparable and that recommendations for interventions will be based on different kinds of information. See Challenge 3. Despite the difficulties of non-standardization, non-anthropometric data should still be collected using rigorous methods.

Assessing household food insecurity

A household’s ability to secure adequate food to meet the dietary needs of all members, either through its own food production or food purchases, is an essential pre-requisite for adequate nutritional intake. Food security assessment involves assessment of food availability, food access and food utilization at the household level. Emergency-affected populations often have to change the way they access and prepare food and household food security becomes compromised. Food security assessments are discussed in detail in Module 9. A module to assess food security in combination with an anthropometric nutrition survey is proposed by SMART.
Challenge 3: Lack of standardization in assessment of causal information on nutrition

There are no standards for the collection of information relating to the potential determinants of malnutrition in an emergency. As a result, each assessment tends to collect a unique set of non-anthropometric indicators that are specially developed for a particular context. These are usually a mixture of quantitative (numeric) and qualitative (descriptive) indicators. Furthermore, a variety of different tools are employed to collect the data, typically individual questionnaires, focus group interviews, key informant interviews and rapid appraisal techniques.

The lack of standardization means that non-anthropometric information is often patchy and can be skewed towards a particular determinant. For example, food security is often emphasized above the other underlying causal factors of health and care. This can be because food aid is easily available and so information to justify the distribution of food aid is needed. Causal information is often presented in a way that is not easily translated into appropriate interventions. For example, lists of coping strategies may not necessarily mean much without comparative data.

Despite the absence of standard methodologies, rigorous methods need to be employed to collect information on all three underlying determinants in nutrition assessments. Methods should be clearly explained.

As household food security worsens, so often does nutritional status, although this is not always the case. Sometimes households can become severely food insecure before there is any sign of malnutrition. Household food security changes seasonally and is often worse before the harvest when food prices are highest.

Assessing maternal and child caring practices

Appropriate childcare is an essential element of good nutrition and health and is often disrupted in emergency situations. The major childcare activities that influence nutritional status are feeding behaviours (breastfeeding and weaning) and hygiene practices. These, in turn, are culturally determined and dependent on resources such as income, time and knowledge. Assessments should aim to identify adverse changes in caring practices such as having less time for child care because of the need to forage for wild food. A guideline for collecting and analysing data on infants and young child feeding was recently developed.10

In addition to individual caring practices, there are often changes that occur among wider social networks. Formal and informal support systems change and individuals resort to new coping mechanisms such as borrowing or illegal behaviour in order to meet their needs. Displacement or forced migration is likely to cause social disruption and assessments can provide an opportunity to identify the main manifestations of this.

Assessing health and sanitation environment

Exposure to, and therefore incidence of, infectious disease increases morbidity and can affect malnutrition and mortality rates (case example 3). Seasonal factors are crucial. For example, diarrhoea and malaria are often more prevalent during rainy seasons. Measles vaccination coverage is also essential information as measles outbreaks might have a major impact in emergencies. Module 8 describes health assessments in detail.

Case example 3: Health and nutrition of Sudanese refugees in Eastern Chad: 2004

High levels of malnutrition (above 20 per cent) were found among Sudanese refugees living in four camps in Eastern Chad in 2004. Repeat surveys carried out three months later showed that although mortality rates were stabilizing, acute malnutrition rates were still high in two of the camps: northern and southern. Humanitarian aid provisions were assessed to be similar in all four camps. Further analysis concluded that unhygienic conditions in the most northern camp due to the population sleeping with their animals and slaughtering sick animals at the camp site was likely to be causing widespread disease. Similarly, in the most southern camp, there was an increase in diarrhoeal disease associated with deteriorating malnutrition prevalence among young children.


10 Care USA (2010) Infants and Young child feeding practices: Collecting and using data: a step by step guide.
Module 7  Measuring malnutrition: Population assessment

Assessing mortality rate

It is essential to know about mortality rates to understand the overall humanitarian situation. Mortality rates can be collected through ongoing surveillance systems or estimated by collecting retrospective data, usually 90 days prior to the survey date. This is described in detail in Module 8. Methodology of mortality surveys is included in the SMART manual and mortality rates can be calculated by ENA software.

In emergencies, mortality rates are expressed as number of deaths per 10,000 people per day (unlike stable contexts where they are expressed per annum). Two types of mortality are important: crude mortality rate (CMR) equivalent to all deaths and under-five mortality rate (U5MR) equivalent to the deaths of children under five years of age.

Mortality data can be extremely difficult to collect accurately as Challenge 4 illustrates.

Challenge 4: Collection of mortality data in emergencies

Mortality data can be collected during emergencies through:

- Official data: through consulting lists of deaths registered by local authorities, clinics, hospitals or religious authorities.
- Grave counting: possible in some situations to go around counting graves, though not possible where, for example, bodies are burnt.
- Retrospective mortality surveys: surveys conducted to estimate the number of deaths over the previous 90 days.

The problems associated with collection of mortality data include:

- Lack of official data: during conflict, official statistics possibly lost or unavailable.
- Bias: health services or registration with official authorities inaccessible to the poorest and most vulnerable.
- Inaccurate population figures: where population numbers are rapidly changing due to migration.
- Double counting: where one death is reported more than once.
- Clustering of deaths: deaths very high in particular area due, for example, to aerial bombardments or other types of military action.
- Political pressure: pressure to either overestimate or underestimate civilian casualties and/or combatant casualties in a conflict situation.

Mortality data should always be analysed in relation to nutrition survey findings but should be treated with caution as it may not be accurate.

Assessing coverage of nutrition programmes

Nutrition programme coverage could be estimated during an anthropometric nutrition survey by asking the mother if the child attends a feeding centre. The coverage will be the percentage of targeted children who attend the programme.

For blanket feeding programmes, surveys will likely provide adequate precision for coverage prevalence, as all children in the sample are eligible for the programme and can be assessed for enrolment.

For selective feeding programmes however the surveys will likely provide inadequate precision in measuring coverage. Since only a small proportion of the survey sample would be malnourished and eligible for enrolment, this sample size (only including those malnourished in the sample) would be inadequately low to estimate coverage with acceptable precision, especially for severe acute malnutrition.

Two other methods, which have a good precision, for estimating programme coverage, have been developed, especially suitable for Therapeutic Feeding Programmes (TFPs). These approaches use different kind of sampling than the ones described above: the Centric Systematic Area Sampling (CSAS) and the Lot Quality Assurance Sampling (LQAS). They have been successfully used in several countries.¹¹


HTP, Version 2, 2011
Conclusion

Nutrition assessments are essential to guide response during an emergency. Anthropometric nutrition surveys are frequently carried out to establish the prevalence of acute malnutrition. Additional data, such as information on food security, public health and care practices is needed to understand the overall nutrition and humanitarian situation.

There are well-established techniques for conducting anthropometric nutrition surveys and a large number of guidelines are available but their implementation still needs careful preparedness, training and supervision.

There are some technical challenges to current practice, however. For example, methods for comparing prevalence of malnutrition to thresholds are being tested, while the collection of non-anthropometric data remains non-standardised.
Annex 1: Two-stage cluster sampling methodology

In this example, the sample size required is 600 children. It was estimated that 20 children could be surveyed by day and therefore that 30 clusters needed to be selected.12

Step 1: Selection of the clusters

1. Identify the population to be surveyed (e.g., population of a refugee camp or drought stricken area).
2. Divide the population into the lowest existing or natural groupings (e.g., villages, districts or camp sections).
3. Estimate the population in each village, district or camp section (use census data if available).
4. Make a table with six columns (see Box below).
   - Column 1 should include the name of each locality (village, district or camp section) in any order.
   - Column 2 should contain the estimated total population of each locality.
   - Column 3 should contain the estimated population of the children in each locality.
   - Column 4 should contain the cumulative population of the children (obtained by adding the population of each locality to the combined population figure of the preceding localities).
   - Column 5 should contain the attributed numbers for each unit – the range of the cumulative population for each unit.

<table>
<thead>
<tr>
<th>Geographical unit</th>
<th>Estimated total population</th>
<th>Estimated children 6-59 months</th>
<th>Cumulative population 6-59 months</th>
<th>Attributed numbers</th>
<th>Location of clusters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locality 1</td>
<td>2,500</td>
<td>500</td>
<td>500</td>
<td>1-500</td>
<td>1</td>
</tr>
<tr>
<td>Locality 2</td>
<td>1,000</td>
<td>200</td>
<td>700</td>
<td>501-700</td>
<td>2</td>
</tr>
<tr>
<td>Locality 3</td>
<td>800</td>
<td>160</td>
<td>860</td>
<td>701-860</td>
<td>0</td>
</tr>
<tr>
<td>Locality 4</td>
<td>3,250</td>
<td>650</td>
<td>1,510</td>
<td>861-1,510</td>
<td>3, 4</td>
</tr>
<tr>
<td>Etc...</td>
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<tr>
<td>Total</td>
<td>50,000</td>
<td>10,000</td>
<td></td>
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<td>30</td>
</tr>
</tbody>
</table>

5. Calculate the ‘sampling interval.’ This is obtained by dividing the total 6 to 59 months population by the desired number of clusters, which is 30 in this example. The sampling interval is therefore 10,000/30 = 333.

6. Determine the location of the first cluster. Its location is randomly chosen by selecting a number within the first sampling interval (1 to 333 in this example). The number can be randomly selected using a random number table. Let us assume that 256 is the starting point. This number places the first cluster in ‘Locality 1’ in the example because it has the attributed numbers 1 to 500.

7. Select the other clusters. Add the sampling interval sequentially to the starting number until 30 numbers are chosen. Each number chosen represents the population of a geographic unit. In this example, the first cluster is at 256 (Locality 1), the second cluster at 256 + 333 = 589 (Locality 2), the third cluster is at 589 + 333 = 922 (Locality 4), the fourth cluster is at 922 + 333 = 1,255 (Locality 4), etc. A large geographical unit may appear twice - two clusters are drawn in Locality 4 in the example. In the same way, a small geographical unit (smaller than the sampling interval) may not be selected – Locality 3 in the example.

12 ENA and ENA for epi-info software can do the selection automatically
Module 7
Measuring malnutrition: Population assessment

Step 2: Selection of the 20 children in each of the 30 clusters

In this example it was assumed that there was an estimated 1.5 eligible children per household, meaning that 14 households (20/1.5 = 13.3, rounded up to 14) needed to be surveyed per cluster.

Random or systematic sampling

There are several methods of choosing the households from the cluster. The best way is to treat each cluster as if it is a “small population” and to select the houses using the simple or systematic random sampling methods described above (see table 1 p 9). If the cluster is to be taken from a larger population, the first step of stage 2 is to subdivide the population into segments of roughly the same number of people. One of these segments is then chosen from the random number table. If segments are of unequal size, one segment should be chosen by probability-proportional-to-size.

Modified EPI method

If it is not possible to select the households in this way, the “EPI” method can be used. Although, this method is simple, widely known, easy to train, and rapid, it results in a somewhat biased sample. However, the time taken to select the sample and move from house to house is far less in some circumstances (e.g. no list of households, sparse population) when the EPI method is used.

When the team arrives at the village that will contain the cluster, the following procedure should be followed after discussions with the village leaders:

1. Go to somewhere near the center of the selected cluster area.
2. Randomly choose a direction by spinning a bottle, pencil, or pen on the ground and noting the direction it points when it stops.
3. Walk in the direction indicated, to the edge of the village. At the edge of the village spin the bottle again until it points into the body of the village. Walk along this second line counting each house on the way.
4. Using a random number list select the first house to be visited by drawing a random number between 1 and the number of households counted when walking. For example, if the number of households counted was 27, then select a random number between one and 27. If the number 5 was chosen, go back to the fifth household counted along the walking line. This is the first house you should visit.
5. Go to the first household and examine all children aged 6-59 months in the household for the nutrition survey and complete the additional questionnaire(s), if any (e.g. mortality).
6. The subsequent households are chosen by proximity. In a village where the houses are closely packed together, choose the next house on the right. Continue in this direction until the required number of children or households have been surveyed. The same method should be used for all the clusters. If the village is spread out, choose the house with the door closest to the last house surveyed, whether on the right or left; this saves a lot of time in an area where the dwellings are spread.

---

13 From SMART manual, Version 1
Annex 2: Second Stage Sampling Decision Tree

1. Is there an updated list of HH in the village?
   - No
   - Yes
     - Is it possible to make a list using the local knowledge?
       - No
         - Simple of Systematic Random Sampling
       - Yes
         - What is the approximate number of HH in the village?
           - < 150-250 HH
             - Are HH arranged in a defined geometric setting?
               - No
                 - Modified EPI Method
               - Yes
                 - Systematic Random Sampling
           - > Approx 150-250 HH
             - Segmentation into smaller parts (maximum 150-250 HH each)
               - Unequal segments
                 - Selection of one segment using the PPS method
               - Equal segments
                 - Choose randomly the segment that will include the cluster
                   - Is it possible to make a list of HH in that segment?
                     - No
                       - Simple Random Sampling
                     - Yes
                       - Are HH arranged in a defined geometric setting?
                         - No
                           - Modified EPI Method
                         - Yes
                           - Systematic Random Sampling
Annex 3: Calculation of sample size (n)

The population of an emergency-affected district in rural Asia is 10,000 and the estimated (expected) prevalence of acute malnutrition (weight for height < -2 SD) is 10 per cent. The precision required is 3 per cent and the design effect is 1.5.

Using the formula below where:

- \( p \) = estimated prevalence of acute malnutrition
- \( d \) = estimated precision
- \( deff \) = design effect

\[
\frac{p \times (1 - p)}{(1.962 \times d^2) \times deff} = \frac{0.10 \times (1 - 0.10)}{1.962 \times 0.032 \times 1.5}
\]

The required sample size is a minimum of 390 children aged 6 to 59 months.
Annex 4: Examples of anthropometric data collection forms

CLUSTER COLLECTION FORM (1 form to be filled per cluster)

Date _______ Team Number _______ Cluster Number _______ Cluster Name ____________ District: ____________

<table>
<thead>
<tr>
<th>Chid no.</th>
<th>HH no.</th>
<th>Age in months</th>
<th>Sex (F/M)</th>
<th>Weight (kg)</th>
<th>Height (cm)</th>
<th>Oedema (Y/N)</th>
<th>WHM</th>
<th>Measles Card = 1 Yes but no card = 2 No = 0</th>
<th>Vit A within the last 6 months(Y/N)</th>
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<tr>
<td>Household Number</td>
<td>Date</td>
<td>Team Number</td>
<td>Cluster Number</td>
<td>Cluster Name</td>
<td>District</td>
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</tbody>
</table>

**HOUSEHOLD COLLECTION FORM (one form to be filled per household)**

<table>
<thead>
<tr>
<th>First Name</th>
<th>Age (months)</th>
<th>Sex</th>
<th>Oedema</th>
<th>Height (cm)</th>
<th>Weight (kg)</th>
<th>MUAC (cm)</th>
<th>Diarrhoea¹</th>
<th>Serious ARI²</th>
<th>Febrile illness/ suspected Malaria³ in the last two weeks</th>
<th>Suspected Measles⁴ in last one month</th>
<th>Where did you seek healthcare assistance when child was sick? (If yes in 1 = No assistance sought 2 = Own medication 3 = Traditional healer 4 = Private clinic/ Pharmacy 5 = Public health facility)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</tbody>
</table>

¹ Diarrhoea is defined for a child having three or more loose or watery stools per day
² ARI asked as oof wareen or wareento. The three signs asked for are cough, rapid breathing and fever
³ Suspected malaria/acute febrile illness: the three signs to be looked for are periodic chills/shivering, fever, sweating and sometimes a coma
⁴ Measles (Jadeeco): a child with more than three of these signs: fever and, skin rash, runny nose or red eyes, and/or mouth infection, or chest infection
CHILD COLLECTION FORM (one form to be filled per child)

Team no. … Cluster no. … Household no. … Child ID

Date / / Child ID

C. Child Questionnaire
(This should be administered to the primary caretaker of the child).
Complete one form per child aged 6-59 months in the household visited.

| C 1.1 | What is the child’s name? (optional) |
| C 1.2 | Date of birth of child |
|       | (record from EPI/ health card if available) |
| C 1.3 | Age of child (months) |
|       | (estimate using event calendar |
|       | if EPI/health care not available) |
| C 1.4 | Sex of child |
|       | Male ……………………………………………………… 1 |
|       | Female …………………………………………………… 2 |
| C 1.5 | Weight (Kg) |
|       | N/A (refused to measure/not measured) …………… 88.8 |
| C 1.6 | Height/length (cm) |
|       | N/A (refused to measure/not measured) …………… 888.8 |
| C 1.7 | Bilateral pitting oedema |
|       | Yes ……………………………………………………… 1 |
|       | No …………………………………………………… 2 |
| C 1.8 | Mid upper arm circumference (mm) |
|       | N/A (refused to measure/not measured) …………… 888 |
| C 1.9 | Weight-for-height (% median or z-score) |
| C 2.0 | Child referred |
|       | Yes ……………………………………………………… 1 |
|       | No …………………………………………………… 2 |
| C 2.1 | If any of the above measurements was not |
|       | done, what was the reason for not measuring |
|       | the child? |
|       | Not present at the time of measuring …………… 1 |
|       | Sick …………………………………………………… 2 |
|       | Not willing to be measured …………………… 3 |
|       | Other specify ………………………………… 4 |
Annex 5: Template for a nutrition survey report


Report summary
- Write the summary last, after you have finished the rest of the report.
- Ninety per cent of readers will probably only look at this section. Make sure all important information is here and it is very clear. Diagrams are very useful.
- This section of the report should be short (one or two pages).
- Information should include: the area covered, the date and the objectives of the assessment, the methodology used, the main results and the recommendations.

Report introduction
- The context in which the assessment was carried out should be described. What population was surveyed, over what period and in which geographical area?
- The introduction should set out the context, so that someone who has never been to the area can understand how the surveyed community lives and what has happened to them.
- This information is mainly from secondary sources, or interviews with district officials, etc.

Objectives of the assessment
- The objectives of the assessment should be clearly stated.
- What was measured, in which population and why?

Methodology
- Describe in a straightforward way the methods employed, including area surveyed, population data, and sampling techniques. This is necessary so that readers can be sure of the validity of the assessment and have a clear reference for future comparison.
- Describe selection criteria for inclusion in the survey.
- Describe what measurements were taken, by whom and using what instruments.
- Describe how the training and how the questionnaires were designed and piloted.
- Describe field work including supervision
- Describe the methods for cleaning data, how data were analysed (including definition of acute malnutrition), calculation of Confidence Intervals, which software was used.

Results
- Describe any problems encountered or suspected bias during the survey
- Describe the population surveyed: how many children absent, how many data discarded from the survey
- A table of the distribution of the sample, according to age and sex, is required.
- All nutrition assessments should report the anthropometric statistics tables and analysis of additional variables if any were included
Discussion

- The discussion puts the results into context. The aim of the discussion is to explain the results (prevalence of acute malnutrition and potential additional data) in terms of the determinants of malnutrition – health, care environment and food security.

- Organize your discussion by addressing the questions:
  - Is the level of acute malnutrition typical (referring back to previous surveys or baseline levels)?
  - What are the likely major determinants of malnutrition resulting from the emergency (taking into account determinants already addressed by other interventions)?
  - What are the prospects for the coming months?
  - Who is worst affected?
  - What might be the chronic determinants of malnutrition?
  - What does the community recommend?
  - Do the results seem plausible? Are there any unanswered questions?

- Much of the information for the discussion will come from referring back to the results section and looking at the findings in the light of your causal analysis based on secondary data, key informant interviews, observations, etc.

- A diagram showing the location specific causal framework of malnutrition may be useful.

Conclusions

- This section describes the seriousness of the situation.

Recommendations

- A report must include recommendations based on the findings. When possible, estimates on how the situation is likely to evolve are needed and the recommendations should give a clear indication of the appropriate time line so that they can have the maximum impact.

<table>
<thead>
<tr>
<th>Pre-survey preparation and planning</th>
<th>Methods (Con)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective of the survey</strong></td>
<td><strong>Methods</strong></td>
</tr>
<tr>
<td>1) Nutrition</td>
<td>37) Recall period stated</td>
</tr>
<tr>
<td>2) Mortality</td>
<td>38) Denominator calculation indicated</td>
</tr>
<tr>
<td>3) Vaccination</td>
<td>39) Census method indicated</td>
</tr>
<tr>
<td><strong>Population</strong></td>
<td>40) Questionnaire is provided in Appendix</td>
</tr>
<tr>
<td>4) Type of population stated</td>
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<tr>
<td>5) Total population in universe stated</td>
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<tr>
<td><strong>Location</strong></td>
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<td>6) Geographical scope of the survey stated</td>
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<td>7) Area excluded from sampling frame listed</td>
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<tr>
<td><strong>Time period</strong></td>
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<tr>
<td>8) Survey dates are stated (dd-mm-yyyy)</td>
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<tr>
<td><strong>Translation</strong></td>
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<td>9) Language of the questionnaire is stated</td>
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<tr>
<td>10) Language of the interview is stated</td>
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<tr>
<td><strong>Questionnaire/tool</strong></td>
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<td>11) Pre-testing of questionnaire stated</td>
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<tr>
<td>12) Use of local event calendar stated</td>
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<tr>
<td><strong>Training</strong></td>
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<tr>
<td>13) Training organization stated</td>
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</tbody>
</table>

**Sampling design**

14) Type of sampling design stated
15) Rationale for sampling design explained
16) State if PPS was used
17) Number of clusters
18) State final stage sampling
19) State if HH without US were included
20) Stated whether sample size was increased to account for non-response?
21) State definition of HH
22) State selection of US in the HH
23) HH selection in a compound is explained
24) Procedure for choosing respondent stated
25) Procedure for re-visiting absent HH stated

**Final stage**

26) Expected GAM:
27) Expected Deff for GAM:
28) Desired precision for GAM:
29) Expected CMR:
30) Expected Deff for CMR:
31) Desired precision for CMR:
32) GAM includes bilateral oedema
33) Inclusion criteria in terms of age or height described?
34) Weight and height smallest rounding unit described?
35) Cut-off for measuring children lying or standing stated?
36) Questionnaire is provided in Appendix

**Household**

22 only if nutrition/vaccination module included, otherwise \( \& \) 23

**Sample size precision**

26-28 only if nutrition module included, \( \& \) 29
29-31 only if mortality module included, otherwise \( \& \) 32
32 only if nutrition module included, \( \& \) 33-35
36 only if nutrition module included, otherwise \( \& \) 37

**Mortality indicators**

50) CMR expressed as death per 10,000/day, 1,000/month or 1,000/year
51) Confidence interval
52) Design effect

**Demographic indicators**

53) Births:
54) Deaths:
55) Persons joined:
56) Persons left:
57) Population at the time of the survey:
58) n° of households:
59) n° of US (0-59 months):
60) MCV coverage by card and history
61) Confidence interval
62) Age range for inclusion in analysis stated?
63) n° of children in the analysis:

**Vaccination indicators**

60-63 only if vaccination module included, otherwise \( \& \) 64

**Discussion**

64) % non response:
65) % inaccessible clusters:
66) Final number of clusters:
67) Replacement method stated?
68) Potential bias described?
69) Results are compared to a reference
70) Recommendations are given

**Comparison of results**

70) Recommendations are given

**Results**

41) Name, version of the software and statistical procedure stated
42) Prevalence of GAM based on Weight for Height Z-scores reported?
43) Type of growth ref. used (WHO or NCHS) stated?
44) Confidence interval
45) Design effect
46) Plausibility checks mentioned
47) Definition of flags stated
48) Flags exclusion from analysis described?
49) Sample size of 6-59 months:

**Limitation and bias**

65-67 only if cluster sampling, \( \& \)
67 only if replacement was made, otherwise \( \& \) 68

**Interpretation of results**

41) Name, version of the software and statistical procedure stated
42) Prevalence of GAM based on Weight for Height Z-scores reported?
43) Type of growth ref. used (WHO or NCHS) stated?
44) Confidence interval
45) Design effect
46) Plausibility checks mentioned
47) Definition of flags stated
48) Flags exclusion from analysis described?
49) Sample size of 6-59 months:
Annex 7: Nutrition assessment checklist

Below are sample questions for assessments examining the underlying causes of undernutrition, the level of nutrition risk and possibilities for response. The questions are based on the conceptual framework of the causes of undernutrition. The information is likely to be available from a variety of sources and gathering it will require various assessment tools, including key informant interviews, observation and review of secondary data.

Pre emergency situation:
• What information already exists on the nature, scale and causes of undernutrition among the affected population?

The current risk of undernutrition:
1. The risk of undernutrition related to reduced food access: See Sphere Appendix 1 for food security and livelihoods assessment checklists.

2. The risk of undernutrition related to infant and young child feeding and care practices:
   a) Is there a change in work and social patterns (e.g. due to migration, displacement or armed conflict) which means that roles and responsibilities in the household have changed?
   b) Is there a change in the normal composition of households? Are there large numbers of separated children?
   c) Has the normal care environment been disrupted (e.g. through displacement), affecting access to secondary caregivers, access to foods for children, access to water, etc?
   d) Are any infants not breastfed? Are there infants who are artificially fed?
   e) Has there been any evidence or suspicion of a decline in infant feeding practices in the emergency, especially any fall in breastfeeding initiation or exclusive breastfeeding rates, any increase in artificial feeding rate, and/or any increase in proportion of infants not breastfed?
   f) Are age-appropriate, nutritionally adequate, safe complementary foods and the means to hygienically prepare them accessible?
   g) Is there any evidence or suspicion of general distribution of breastmilk substitutes such as infant formula, other milk products, bottles and teats, either donated or purchased?
   h) In pastoral communities, have the herds been away from young children for long? Has access to milk changed from normal?
   i) Has HIV/AIDS affected caring practices at household level?

3. The risk of undernutrition related to poor public health:
   a) Are there any reports of disease outbreaks which may affect nutritional status, such as measles or acute diarrhoeal disease? Is there risk that these outbreaks will occur?
   b) What is the estimated measles vaccination coverage of the affected population?
   c) Is Vitamin A routinely given with measles vaccination? What is the estimated Vitamin A supplementation coverage?
   d) Are there any estimates of mortality rates (either crude or under five)? What are they and what method has been used?
   e) Is there, or will there be, a significant decline in ambient temperature which is likely to affect the prevalence of acute respiratory infection or the energy requirements of the affected population?
   f) Is there a high prevalence of HIV?
   g) Are people already vulnerable to undernutrition due to poverty or ill health?
   h) Is there overcrowding, or a risk of high prevalence of TB?
   i) Is there a high incidence of malaria?
   j) Have people been in water or wet clothes or exposed to other harsh environmental conditions for long periods of time?
4. What formal and informal local structures are currently in place through which potential interventions could be channelled?
   • What is the capacity of the Ministry of Health, religious organisations, community support groups, breastfeeding support groups, or NGOs with a long- or short-term presence in the area?
   • What nutrition interventions or community-based support were already in place and organised by local communities, individuals, NGOs, government organisations, UN agencies, religious organisations, etc.? What are the nutrition policies (past, ongoing and lapsed), the planned long-term nutrition responses, and programmes that are being implemented or planned in response to the current situation?
The trainer’s guide is the third of four parts contained in this module. It is NOT a training course. This guide provides guidance on how to design a training course by giving tips and examples of tools that the trainer can use and adapt to meet training needs. The trainer’s guide should only be used by experienced trainers to help develop a training course that meets the needs of a specific audience. The trainer’s guide is linked to the technical information found in Part 2 of the module.

Module 7 describes how to assess the nutritional status of populations through nutrition surveys. This module can be used to provide a practical training for field workers to plan and carry out a nutrition survey. It can also provide a short practical briefing on different ways of interpreting survey results for senior managers. This module focuses on population assessment while individual assessment (anthropometry) is covered in Module 7.

Navigating your way around the guide

The trainer’s guide is divided into six sections.

1. **Tips for trainers** provide pointers on how to prepare for and organise a training course.
2. **Learning objectives** set out examples of learning objectives for this module that can be adapted for a particular participant group.
3. **Testing knowledge** contains an example of a questionnaire that can be used to test participants’ knowledge of nutrition surveys either at the start or at the end of a training course.
4. **Classroom exercises** provide examples of practical exercises that can be done in a classroom context either by participants individually or in groups.
5. **Case studies** contain examples of case studies (one from Africa and one from another continent) that can be used to get participants to think by using real-life scenarios.
6. **Field-based exercises** outline ideas for field visits that may be conducted during a longer training course.
MODULE 7  Measuring malnutrition: Population assessment

TRAINER’S GUIDE

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2. Learning objectives

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   Exercise 3: Allocation of clusters
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   Handout 6a: Case study I: Political and economic turmoil in Malawi 2002
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1. Tips for trainers

Step 1: Do the reading!

- Read Part 2 of this module.
- Familiarise yourself with the technical terms from the glossary.
- Read through the following key document (see full references and how to access them in Part 4 of this module):  

  Essential readings

More readings
  - FAO. (2007). Distance Learning Course: Nutritional Status Assessment and Analysis. Rome: FAO.

Step 2: Know your audience!

- Find out about your participants in advance of the training:
  - How many participants will there be?
  - Have any of the participants already been involved in doing nutrition surveys?
  - Could participants with experience be involved in the sessions by preparing a case study or contribute through describing their practical experience?

Step 3: Design the training!

- Decide how long the training will be and what activities can be covered within the available time. In general, the following guide can be used:
  - A 90-minute classroom-based training session can provide a basic overview of the steps involved in a survey and the data that needs to be collected.
  - A half-day classroom-based training session can provide an overview of the steps involved in designing a survey and calculating a representative sample and include practical exercise 2 or 3.
  - A one-day classroom-based training session can provide a more in-depth understanding of survey methodology and practice with some practical exercises and a case study.
  - A three- to four-day classroom and field training can provide participants with the skills needed to design and implement a survey.
  - This module does not cover the use of statistical software to analyse anthropometric data.
- Identify appropriate learning objectives. This will depend on your participants, their level of understanding and experience, and the aim and length of the training.
- Decide exactly which technical points to cover based on the learning objectives that you have identified.
- Divide the training into manageable sections. One session should generally not last longer than an hour.
- Ensure the training is a good combination of activities, e.g., mix PowerPoint presentations in plenary with more active participation through classroom-based exercises; mix individual work with group work.

---

1 Survey and anthropometric measurements methodology and analysis are evolving. The readings indicated might not be totally up to date but give basic principles.
Step 4: Get prepared!

- Prepare PowerPoint presentations with notes (if they are going to be used) in advance and do a trial run. Time yourself! Recommended PowerPoint presentations that can be adapted from existing sources include (see full references and how to access them in Part 4 of this module):

**Existing PowerPoint presentations for a session on measuring malnutrition: population assessment**

<table>
<thead>
<tr>
<th>Author</th>
<th>Specific session</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SMART Contact: <a href="http://www.smartmethodology.org">www.smartmethodology.org</a>; check the SMART website for latest updates on manuals and associated standardised training materials</td>
<td>Nutritional Status Assessment and Analysis (2.5-3 hours) • Nutritional Status and Food Security • Assessing Status • Nutritional Status Indicators</td>
</tr>
<tr>
<td>2. FAO (2007). FAO Food Security Information for Action Distance Learning Material – Food Security Information Systems and Networks; Reporting Food Security Information; Nutritional Status Assessment and Analysis. <a href="http://www.foodsec.org/dl/dlintro_en.asp">http://www.foodsec.org/dl/dlintro_en.asp</a> (Free of charge registration provides access to the material)</td>
<td>Unit II (Sessions 7 to 14) covers assessment and analysis of nutritional problems in emergencies with a view to guiding an appropriate humanitarian response. The power point teaching aids are presented in the Appendix.</td>
</tr>
</tbody>
</table>

- Prepare exercises and case studies. These can be based on the examples given in this trainer’s guide but should be adapted to be suitable for the particular training context.

- Find the appropriate equipment for the session including a few copies of the United Nations System Standing Committee on Nutrition (SCN) Nutrition in Crisis Situations (NICS) publication, which lists nutrition survey results around the world on a quarterly basis.

- Prepare a ‘kit’ of materials for each participant. These should be given out at the start of the training and should include:
  - Timetable showing break times (coffee and lunch) and individual sessions
  - Parts 1, 2 and 4 of this module
  - Pens and paper

**REMEMBER**

People remember 20 per cent of what they are told, 40 per cent of what they are told and read, and 80 per cent of what they find out for themselves.

People learn differently. They learn from what they read, what they hear, what they see, what they discuss with others and what they explain to others. A good training is therefore one that offers a variety of learning methods which suit the variety of individuals in any group. Such variety will also help reinforce messages and ideas so that they are more likely to be learned.
2. Learning objectives

Below are examples of learning objectives for a session on measuring malnutrition in populations. Trainers may wish to develop alternative learning objectives that are appropriate to their particular participant group. The number of learning objectives should be limited; up to five per day of training is appropriate. Each exercise should be related to at least one of the learning objectives.

Examples of learning objectives
At the end of the training participants will:

• Be able to design appropriate objectives and methods for nutrition surveys.
• Understand how to calculate sample sizes for nutrition surveys.
• Understand how to do cluster sampling.
• Be aware of the practical steps involved in implementing nutrition surveys.
• Be able to interpret anthropometric and non-anthropometric nutrition survey results.
• Understand the meaning of prevalence and confidence intervals.
• Be able to summarize the essential content of a nutrition survey report.
3. Testing knowledge

This section contains one exercise which is an example of a questionnaire that can be used to test participants’ knowledge about nutrition surveys either at the start or at the end of a training session. The questionnaire can be adapted by the trainer to include questions relevant to the specific participant group.

Exercise 1: What do you know about nutrition surveys?

<table>
<thead>
<tr>
<th>What is the learning objective?</th>
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<tbody>
<tr>
<td>To test participants’ knowledge about nutrition surveys</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>When should this exercise be done?</th>
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<tbody>
<tr>
<td>Either at the start of a training session to establish knowledge level.</td>
</tr>
<tr>
<td>Or at the end of a training session to check how much participants’ have learned</td>
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</table>

<table>
<thead>
<tr>
<th>How long should the exercise take?</th>
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<tr>
<td>15 minutes</td>
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<table>
<thead>
<tr>
<th>What materials are needed?</th>
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<tbody>
<tr>
<td>Handout 1a: What do you know about nutrition surveys? Questionnaire</td>
</tr>
<tr>
<td>Handout 1b: What do you know about nutrition surveys? Questionnaire answers</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What does the trainer need to prepare?</th>
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<tbody>
<tr>
<td>Familiarize yourself with the questionnaire questions and answers.</td>
</tr>
<tr>
<td>Add your own questions and answers based on your knowledge of the participants and their knowledge base.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Instructions</th>
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<tbody>
<tr>
<td>Step 1: Give each participant a copy of handout 1a</td>
</tr>
<tr>
<td>Step 2: Give participants 10 minutes to complete the questionnaire working alone</td>
</tr>
<tr>
<td>Step 3: Give each participant a copy of handout 1b</td>
</tr>
<tr>
<td>Step 4: Give participants 5 minutes to mark their own questionnaires and clarify the answers where necessary.</td>
</tr>
</tbody>
</table>
Handout 1a: What do you know about nutrition surveys?: Questionnaire

**Time for completion:** 10 minutes

**Answer all the questions**

For some questions there is only ONE correct answer while for other questions there are SEVERAL correct answers.

1. True or false?
   Cross-sectional random-sampled anthropometric surveys can only provide an estimate of the level of malnutrition in a population.

2. Which of these populations would be difficult to survey? Circle the correct answers.
   a) Pastoralists living in small remote communities.
   b) Children aged 6 to 59 months in Internally Displaced Person (IDP) camps
   c) Populations living in insecure areas with many landmines

3. True or false?
   Sample size depends mainly on the sampling method used and not the size of the target population.

4. Which are the commonly used sampling method for anthropometric surveys? Circle the correct answer.
   a) Simple random sampling
   b) Interval/systematic sampling
   c) Cluster sampling

5. Nutrition status (wasting) should be expressed as: Circle the correct answer.
   a) Estimated prevalence of height-for-age in Z scores and percentage of the median with 95 per cent confidence intervals
   b) Estimated prevalence of weight-for-height in Z scores with 95 per cent confidence intervals

6. Name three common tools which can be used to assess non-anthropometric data
   1.
   2.
   3.

7. Which of these should be included in the summary of a nutrition survey report? Circle the correct answers.
   a) Methodology
   b) Description of the emergency and emergency-affected population
   c) Results
   d) Tables of coping strategies
   e) Recommendations

8. True or false?
   Repeat anthropometric surveys should be carried out in the same season
Handout 1b: What do you know about nutrition surveys? Questionnaire answers:

1. True or false?
   Cross-sectional nutrition surveys can only provide an estimate of the level of malnutrition in a population.

2. Which of these populations would be difficult to survey?
   a) Pastoralists living in small remote communities
   b) Children aged 6 to 59 months in IDP camps
   c) Populations living in insecure areas with many landmines
   Access and security are primary concerns in doing nutrition surveys.

3. True or false?
   Sample size depends mainly on the sampling method used and not the size of the target population.

4. Which are the commonly used sampling methods for nutrition surveys?
   a) Simple random sampling
   b) Interval/systematic sampling
   c) Cluster sampling
   The three methods can be used. Simple and interval/systematic will be used when a list of target population is available or living accommodation is well organised. Cluster sampling will be used when the target population is dispersed and the above statements do not apply.

5. Nutrition status (wasting) should be expressed as:
   a) Estimated prevalence of height-for-age in Z scores and percentage of the median with 95 per cent confidence intervals
   b) Estimated prevalence of weight-for-height in Z scores with 95 per cent confidence intervals

6. Name three common tools used to assess non-anthropometric data.
   Sample answers: Questionnaires, focus group interview, key information questionnaires, direct observation, secondary information, seasonal calendars, maps.

7. Which of these should be included in the summary of a nutrition survey report?
   a) Methodology
   b) Description of the emergency and emergency-affected population
   c) Results
   d) Tables of coping strategies
   e) Recommendations

8. True or false?
   Repeat anthropometric surveys should be carried out in the same season
   While it is good practice to carry out repeat surveys during the same season so as to compare over time and attribute seasonality appropriately, it is not always possible to do this. Sometimes repeat surveys are needed every three months at the peak of an emergency to assess if interventions are contributing to lowering malnutrition prevalence. Afterwards it may be possible to do surveys every 6 or even 12 months depending on the context. Financial limitations often mean repeat surveys are not always timed optimally.
4. Classroom exercises

This section provides examples of practical exercises that can be carried out in a classroom context either by participants individually or in groups. Practical exercises are useful between plenary sessions, where the trainer has done most of the talking, as they provide an opportunity for participants to engage actively in the session. The choice of classroom exercises will depend upon the learning objectives and the time available. Trainers should adapt the exercises presented in this section to make them appropriate to the particular participant group. Ideally, trainers should use case examples with which they are familiar.

**Exercise 2: Designing appropriate objectives and information to be collected**

- **What is the learning objective?**
  - To be able to design appropriate objectives and data collection for nutrition surveys

- **When should this exercise be done?**
  - Half-way through the session

- **How long should the exercise take?**
  - 45 minutes

- **What materials are needed?**
  - **Handout 2a:** Designing a nutrition survey: Gaza Strip 2003
  - **Handout 2b:** Designing a nutrition survey: Gaza Strip 2003: Model answers

- **Instructions**
  - **Step 1:** Divide participants into pairs.
  - **Step 2:** Give each participant a copy of Handout 2a.
  - **Step 2:** Give participants 30 minutes to read the case study and address the questions.
  - **Step 3:** Allow 15 minutes of discussion in plenary.
Handout 2a: Designing a nutrition survey: Gaza Strip 2003


Time for completion: 30 minutes

Read the following case example

The Palestinian population of the Gaza Strip has been exposed to varying levels of hardship and violence for decades. In 2003 the humanitarian situation was deteriorating. A second intifada (uprising by the Palestinians) was declared in 2000 while Israel had imposed severe restrictions on movement by Palestinians between the Gaza Strip and Israel. This meant that over 120,000 people who had worked in Israel before September 2000 lost their jobs. The United Nations estimated that the unemployment rate had reached around 50 per cent, compared to 10 per cent before the intifada. These figures were of great concern given that many households were dependent on the income of one person only. Poverty had increased from 21 to 66 per cent between 2000 and 2002 and the World Bank warned that the Palestinian economy was disintegrating and close to collapse.

The 1,197,591 inhabitants of the Gaza Strip were confined to a land area of 360 square kilometres of which 30 per cent was under Israeli occupation. Movement from the villages to the fields was becoming increasingly difficult for the few who had access to land at a time when purchasing power was reduced. As a result, the World Food Programme estimated that two thirds of households were having difficulty in obtaining food. There are five zones in the Gaza Strip, all of which had been negatively affected by the situation.

Information from various sources indicated that while wasting in children was relatively low (less than 2 per cent), stunting was on the increase.

Since September 2000, assistance activities have expanded in scope and scale. According to United Nations figures, over half of Palestinians (55 per cent of the total population) were dependent on external assistance in 2003. A large-scale food assistance programme was launched, targeting vulnerable groups and providing 2500 kcals per day (a full ration).

Although Israeli authorities officially agreed to facilitate the delivery of humanitarian assistance, in practice there have been serious obstacles.

You have been asked to design a nutrition survey to be conducted in the Gaza Strip. Briefly outline your design by addressing the following questions:

1. What are your objectives?
2. Which population groups will be included in the sample?
3. What type of information will you collect?
Handout 2b: Designing a nutrition survey: Gaza Strip 2003: Model answers


The goal of the survey was to evaluate the anthropometric nutritional status of Palestinian children in Gaza Strip, aged 6 to 59 months.

There are a number of food assistance programmes but the percentage of the population receiving food assistance and from which source is not clear. The anthropometric survey was taken as an opportunity to ask a few well-defined questions about food assistance.

Other information was of interest to understand the overall nutrition and humanitarian situation such as the major diseases affecting the children, the source of drinking water, the food security pattern and the infant and young child feeding practices. Most of this information was available from secondary sources. For example, there was a good morbidity surveillance system in place through the health structures from which data on major diseases could be extracted. Several food security assessments had been undertaken by various agencies from which a global pattern on food security could be drawn. Information on infant and young child feeding practices (IYCF) was lacking. However, it was decided not to include questions on these in the current survey as the target population for IYCF is mothers of children 0-24 months, so the households and sample size needed would be different than those for anthropometry. Moreover, the questionnaire will be of a significant length and it was thought that adding these questions to the current survey could undermine the quality of the survey.

1. What are your objectives?
   • To determine the prevalence of different types of malnutrition (wasting, stunting and underweight) among Palestinian children 6-59 months of age in the Gaza Strip
   • To determine the percentage of families that have received any food donation in the last six months

2. Which population groups will be included in the sample?
   Total population estimated: 1,197,591
   Target group: Anthropometry: Children from 6 to 59 months
                 Food assistance: Households

3. What type of information will you collect?
   Anthropometric information collected: Age, Sex, weight, height, oedema, MUAC
   Non-anthropometric information collected:
   • Food donation: to know if the family received any food donation in the last six months
   • Type of food donation: to specify source, if the family receives any food donation
Exercise 3: Allocation of clusters

What is the learning objective?
• To understand how cluster sampling is done

When should this exercise be done?
• Half-way through the session

How long should the exercise take?
• 20 to 30 minutes

What materials are needed?
• Handout 3a: Cluster allocation form
• Handout 3b: Cluster allocation form: Model answers
• Random number tables
• Calculators

Instructions
Step 1: Give each participant a copy of Handout 3a and the random number tables.
Step 2: Give participants 20 minutes to allocate the clusters and then allow 10 minutes for plenary feedback and discussion.
Handout 3a: Cluster allocation form

Time for completion: 20 minutes

Allocate the 30 CLUSTERS to the villages using the information below.

Interval between clusters:
Random number to begin cluster allocation:

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<th>WILAYA</th>
<th>VILLAGE/Daira</th>
<th>TOT POP*</th>
<th>UNDER-5 POP</th>
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* ESTIMATED POPULATION BASED ON UNHCR DATA
### Handout 3b: Cluster allocation form: Model answers

Interval between clusters: 26758/30 891 (always round down the sampling interval to the lower digit)
Random Number to begin between 1 and 891: e.g., 89

<table>
<thead>
<tr>
<th>WILAYA</th>
<th>VILLAGE/DAIRA</th>
<th>TOT POP*</th>
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<td>9215</td>
<td>8108, 8999</td>
<td>10&amp;11</td>
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<td>11463</td>
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<td>Tichla</td>
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<td></td>
<td>Bir-Gendouz</td>
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<td>936</td>
<td>16598</td>
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<td></td>
<td>Mijek</td>
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<td>Farsia</td>
<td>7554</td>
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<td>23&amp;24</td>
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<tr>
<td></td>
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<td>1326</td>
<td>21944</td>
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<tr>
<td></td>
<td>J’Deria</td>
<td>7268</td>
<td>1308</td>
<td>23252</td>
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<td>26&amp;27</td>
</tr>
<tr>
<td></td>
<td>Tifariti</td>
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<td>1166</td>
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<td>24146</td>
<td>28</td>
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<tr>
<td></td>
<td>Bir Lahlou</td>
<td>5249</td>
<td>945</td>
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<td>25037</td>
<td>29</td>
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<tr>
<td></td>
<td>Mahbes</td>
<td>5590</td>
<td>1006</td>
<td>26369</td>
<td>25928</td>
<td>30</td>
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<tr>
<td></td>
<td>27 feb school</td>
<td>2160</td>
<td>389</td>
<td>26758</td>
<td>–</td>
<td>–</td>
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<tr>
<td>TOTAL</td>
<td></td>
<td>148654</td>
<td>26758</td>
<td>26758</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*ESTIMATED POPULATION BASED ON UNHCR DATA

In order to ensure that no mistakes were made: if the number corresponding to the 30th randomly selected cluster is added to the sampling interval (891), the resulting number should be outside the range of the target population, i.e. above 26 758.
Exercise 4: Assessing quality and completeness of nutrition survey reports

What is the learning objective?
• To be able to judge the quality and completeness of a nutrition survey report

When should this exercise be done?
• Half-way through the session

How long should the exercise take?
• 90 minutes

What materials are needed?
• Handout 4a: Nutrition survey report
• Handout 4b: Nutrition survey report completeness check list

Instructions
Step 1: Divide participants into pairs.
Step 2: Give each participant a copy of Handout 4a.
Step 2: Give participants 45 minutes to read the case study and address the questions.
Step 3: Ask one pair to present their conclusions about information missing/inadequate; ask the other pairs if they found additional information missing.
Handout 4a: Nutrition survey report

Time for completion: 45 minutes

Read the following survey report.

Working in pairs, fill the completeness checklist and make a list of missing/inadequate information. Do not complete the mortality-related data checklist because mortality was not assessed in the survey.

EXECUTIVE SUMMARY

The nutrition situation in Gedo region has remained precarious over the years with the most recent livelihood-based assessments conducted in Gedo in April 2007 reporting critical nutrition levels that were above the emergency threshold of 15%. The poor nutrition situation in the region has largely been attributed to the chronic food insecurity arising from man-made disasters (conflicts) and natural causes such as drought which affected the livelihood and social support systems in the region. The chronically high levels of morbidity particularly diarrhoea and poor child feeding and care practices have also been identified as major contributory factors to malnutrition. These factors have not been addressed sufficiently creating the need for continued nutrition surveillance in order to give reliable information that can be used in designing appropriate responses.

Food Security Analysis Unit (FSAU) and partners\(^2\) conducted three nutrition assessments in Gedo Region in May 2008:- Gedo Pastoral, Gedo Agro pastoral and Gedo Riverine livelihood systems (See map 1). A two stage Probability proportionate to size (PPS) methodology was used in sampling. Using the Emergency Nutrition Assessment (ENA) for Standardised Monitoring and Assessment of Relief and Transitions (SMART) software, a total of 715 households were calculated as the minimum number of households required in each of the livelihood systems for both anthropometric and mortality assessments from which 26 clusters per livelihood were sampled. Overall, samples of 1000; 742 and 782 children aged 6-59 months were assessed from Pastoral, Agro pastoral and Riverine Livelihoods respectively for anthropometric assessment. The main objective of the survey was to determine the level of wasting among children aged 6-59 months in the specific livelihood systems in the region.

Results indicate critical to very critical nutrition levels with Global Acute Malnutrition (GAM) rates of >15%. The pastoral and riverine livelihoods reported a Very Critical nutrition situation with GAM rates of 23.3% (18.9-27.7) and 21.5% (17.6-25.4) respectively, while the agro-pastoral livelihood reported a Critical level with a GAM rate of 18.8% (15.2-22.3). A total of six oedema cases were identified in the region that included three (0.4%) in Agro-pastoral, two (0.2%) in pastoral and one (0.1%) in the Riverine livelihoods. When compared with the most recent nutrition assessments conducted in April 2007 where the Pastoral livelihood reported a GAM rate of 19.9% (17.4-22.7), Agro-pastoral livelihood recorded a GAM of 16.7% (14.4-19.3) and the Riverine livelihood a GAM rate of 17.7% (CI: 15.3-20.4), the results indicate a deterioration from critical to very critical levels of acute malnutrition among the Pastoral and Riverine populations and a sustained critical nutrition situation among the Agro-pastoral population, according to FSAU Nutrition Categorization Framework. However, as the confidence interval ranges overlap between the current and April 2007 results there is no statistically significant difference between these findings. Similarly there is no statistical difference between the acute malnutrition rates reported in the three livelihood zones as the GAM rate ranges overlap.

\(^2\) For the sake of the exercise, the report was amended and does not correspond to the original report.

\(^3\) UNICEF, GHC, SRCS, NCA, WFP and COSV
Possible explanation for the deterioration of the situation could be the negative impact of the poor rain performance in the region which has affected crop production as well as pasture and water availability, ultimately affecting livestock body conditions and milk production. The effect of the global rise in food prices and inflation has made the situation of the chronically food insecure population in the region even worse. This is particularly worrying given that the main source of staple food reported across all livelihoods, is purchase.

The nutrition situation in Gedo Region is overall **Very Critical** and has deteriorated since the April 2007 nutrition assessment and the integrated nutrition analysis during post Deyr '07/08 in January 2008 which reported a Critical situation. The nutrition situation seems to have worsened and reverted back to very critical levels recorded prior to April 2007. This could be attributed to the impact of the poor Deyr 07/08 cereal production of 2% PWA and crop failure in the Gu '07 particularly in North Gedo and the overall poor Gu'08 rains reported across Gedo. This has negatively affected crop and livestock production in the region. The situation has been made worse by rising global food prices coupled with the chronically high morbidity and poor child feeding and care practices, which have remained unaddressed over years. Rehabilitation of acutely malnourished children through existing selective feeding programs coupled with active case finding of acutely malnourished children in the rural areas are needed until household food security is restored and critical public health issues are addressed. Capacity building of the existing MCH and the community to manage acute malnutrition could also be explored.

### SUMMARY OF THE FINDINGS

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Pastoral</th>
<th>Agro-pastoral</th>
<th>Riverine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>Total number of households surveyed</td>
<td>403</td>
<td>100</td>
<td>418</td>
</tr>
<tr>
<td>Total number of children assessed</td>
<td>1000</td>
<td>100</td>
<td>742</td>
</tr>
<tr>
<td>Child sex:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males (boys)</td>
<td>519</td>
<td>51.9</td>
<td>421</td>
</tr>
<tr>
<td>Females (girls)</td>
<td>481</td>
<td>48.1</td>
<td>321</td>
</tr>
<tr>
<td>Global Acute Malnutrition (&lt;-2 Z score or oedema WHO standards)</td>
<td>228</td>
<td><strong>22.8</strong></td>
<td>(18.2-27.4)</td>
</tr>
<tr>
<td>Severe Acute Malnutrition (&lt;-3 Z score or oedema WHO standards)</td>
<td>51</td>
<td><strong>5.1</strong></td>
<td>(3.3-6.9)</td>
</tr>
<tr>
<td>Global Acute Malnutrition (WHZ&lt;-2 or oedema NCHS ref)</td>
<td>233</td>
<td><strong>23.3</strong></td>
<td>(18.9-27.7)</td>
</tr>
<tr>
<td>Severe Acute Malnutrition (WHZ&lt;-3 or oedema NCHS Ref)</td>
<td>30</td>
<td><strong>3.0</strong></td>
<td>(1.8-4.2)</td>
</tr>
<tr>
<td>Oedema</td>
<td>2</td>
<td>0.2</td>
<td>(0.5-0.9)</td>
</tr>
<tr>
<td>Global Acute Malnutrition (WHM&lt;80% or oedema NCHS Ref)</td>
<td>130</td>
<td><strong>13.0</strong></td>
<td>(9.8-16.2)</td>
</tr>
<tr>
<td>Severe Acute Malnutrition (WHM&lt;70% or oedema NCHS Ref)</td>
<td>13</td>
<td><strong>1.3</strong></td>
<td>(0.5-2.1)</td>
</tr>
<tr>
<td>Children (9-59 months) immunised against measles</td>
<td>728</td>
<td>77.0</td>
<td>(66.4-87.5)</td>
</tr>
</tbody>
</table>

**N=946**
1.0 Introduction

Gedo Region is located in the South West of Somalia (See Map 1) and borders Ethiopia to the North, Kenya to the West and has an estimated population\(^4\) of 328,378. Gedo region comprises six districts (Luq, Dolo, Belet Hawa, Garbaharey, El Wak, and Bardera) with six main district capital urban centres. The main rural livelihoods zones in Gedo region are Bay Bakool Agro Pastoralist, Dawa Pastoralist, Juba Pump Irrigation Riverine, Southern Agro Pastoral and Southern Inland Pastoral (See Map 1).

Gedo is one of the regions in Somalia that have been greatly affected by a series of shocks from both natural and man-made causes. The devastating impact of these frequent shocks gives limited opportunity to the population to recover between shocks leading to a chronic emergency situation for parts of the population. According to the FSAU Integrated Food Security and Livelihood Phase Classification, parts of the region persistently faced a Humanitarian Emergency (HE) situation from 2004 to 2007.

However, the more recent analysis by FSAU during the Post Deyr 07/08 assessment indicated that the overall food security situation in southern Gedo, had improved to the Generally Food Insecure (GFI) phase (from Chronic Food Insecure watch situation in Gu’07) following good Deyr ’07/08 cereal harvest, which amounted to 291% of the Post War Average (PWA), with 99% coming from Bardera District. In addition, the Southern Inland Pastoralists in southern Gedo experienced livestock recovery with high calving and kidding, leading to increased access to milk and milk products. However, the situation remained either in the Acute Food and Livelihood Crisis (AFLC) or HE in northern Gedo following poor Deyr 07/08 cereal production of 2% PWA and crop failure in the Gu ’07. Live-stock had also not fully recovered. About 35,000 and 10,000 people were classified in AFLC and HE phases respectively. This makes the overall food security in the Region precarious given that the livelihood system has been diminished or destroyed completely in parts of Gedo over years due to recurrent shocks.

Nutrition Situation trends

A poor nutrition situation has persisted in the region with critical levels of acute malnutrition that are above emergency threshold of 15% recorded over years. From 1980 to 1988 nutrition assessments conducted in Gedo region indicated varying levels of Global Acute Malnutrition (GAM) below 15% (\(\text{WHM}< 80\%\) or oedema) indicating a worrying nutrition situation. The nutrition situation further deteriorated in the early nineties following the collapse of the government and subsequent conflict leading to famine conditions with extremely high levels of acute malnutrition with highest GAM rates of 38% and 37% recorded in Bardera in January 1993 and in Belet Hawa in July 1996 respectively. However, the more recent livelihood-based assessments conducted in Gedo in April 2007 reported lower yet still critical nutrition levels above the emergency threshold of 15%. This was a slight improvement (though still critical) from the previous regional assessment that reported a very critical nutrition situation with GAM rates of >20%. The poor nutrition situation in the region has largely been attributed to the chronic food insecurity arising from man made disasters (conflicts) and natural causes such as drought which affected the livelihood and social support systems in the region. The chronically high levels of morbidity particularly diarrhoea and poor child feeding and care practices have also been identified as major contributory factors to malnutrition. Chart 3 illustrates the trends of acute malnutrition in Gedo Region from 1995 to 2008. The trend clearly shows a precarious nutrition situation that requires constant monitoring to form the basis for feasible and appropriate interventions. This, therefore, necessitated the need for this assessment.

\(^5\) Weight for Height Percentage of Median, <80% classified as global acute malnutrition.
2.0 ASSESSMENT OBJECTIVES

The overall objective of the three livelihood-based assessments was to establish the extent and severity of acute malnutrition and to monitor the trends of acute malnutrition in Gedo region.

Specific Objectives were:

1. To determine the prevalence of acute malnutrition and nutritional oedema among children aged 6-59 months in the three livelihood groups of Pastoral, Agro-pastoral and Riverine in Gedo region.

2. To determine the measles vaccination coverage among children in the three livelihood groups of Pastoral, Agro-pastoral and Riverine in Gedo region.

3.0 METHODOLOGY

Three cross-sectional assessments were conducted among the Pastoral, Agro-pastoral and Riverine livelihood populations of Gedo region covering all the six districts – Belet Hawa, Elwak, Dolo, Garbahare, Luuq and Bardera.

Sampling procedure

A multistage Proportional to Population Size sampling methodology was used to select 26 clusters in each livelihood from which 28 households were randomly selected for the assessment. A list of all settlements/villages/towns within each of the three assessed livelihoods in the region with their respective populations formed a sampling frame from which 26 clusters were randomly selected using Epinfo ENA software. For the respective estimated acute malnutrition, population sizes, desired precision, design effects and the sample size for each livelihood see Appendix 1.

Quantitative data was collected through a standard household questionnaire for nutrition assessment (Appendix 2). Quantitative data collected included child and woman anthropometry and measles immunization coverage.

The second stage of sampling was carried out in the cluster to select the first and subsequent households. Each team, directed by assessment guides selected from the community, went to the middle of the cluster assigned and determined a random direction by spinning a pencil. All households along the direction selected to the border of the cluster were counted and assigned numbers on a piece of paper. The assessment guide randomly selected the first household to be visited from among those numbers. Subsequent households were selected on the basis of proximity following a clockwise direction. All eligible children in each household visited were measured and weighed. If a caregiver or child was absent an appointment was made and the household revisited until the child was examined. Household -was defined as a group of people living together and sharing food from the same pot.

* Due to lack of UNDP population figures at settlement level, NID polio figures (March 2007) further verified by the assessment team were used for sampling.
Training and supervision

A five-day training of enumerators and supervisors was conducted covering interview techniques, sampling procedure, inclusion and exclusion criteria, sources and reduction of errors, taking of measurements (height, weight and MUAC), standardisation of questions in the questionnaire, levels of precision required in measurements, diagnosis of oedema, handling of equipment, and the general courtesy during the assessment.

Standardisation of measurements and pre-testing of the questionnaire and equipment were carried out in a section of Dolo town that had not been selected as a cluster for the actual assessment. Quality of data was also ensured through (i) monitoring of fieldwork by coordination team, (ii) crosschecking of filled questionnaires on daily basis and recording of observations and confirmation of measles, severe malnutrition and death cases by supervisors. All households sampled were visited and recorded including empty ones (iii) daily review was undertaken with the teams to address any difficulties encountered, (iv) progress evaluation was carried out according to the time schedule and progress reports shared with partners on a regular basis, (v) continuous data cleaning and plausibility checks (vi) monitoring accuracy of equipment (weighing scales) by regularly measuring objects of known weights and (vii) continuous reinforcement of good practices. All measurements were loudly shouted by both the enumerators reading and recording them to reduce errors during recording.

Data analysis

Child and women data was entered, processed (including cleaning) and analysed using Epinfo and ENA software. The plausibility check was carried out using Epiinfo ENA software to determine the quality of data collected.

Variables examined

Age – Only children aged 6-59 months were selected for examination. The age of a child was determined from the mother/caregiver’s recall, the under fives card, or from a local events calendar (appendix 3) when the birth date was not known or documented on a children health record.

Weight – UNICEF electronic scales were used to weigh children to the nearest 100g.

Height – Children were measured barefoot and bare head using height measuring boards graduated to the nearest 0.1 cm. Children with height < 85 cm were measured lying, while those equal to or >85 cm were measured standing.

Oedema – Children were examined for the presence of bilateral pedal oedema. The occurrence of pitting as a result of thumb pressure on the foot or leg for 3 seconds was indicative of nutritional oedema.

Measles immunisation status – the information was either provided by the mother or recorded from the child’s vaccination card.

Arm Circumference: The Mid Upper Arm Circumference was measured using a MUAC tape to the nearest 0.1 cm.

Definition of nutritional status

The anthropometric measurement of weight and height were used to compute the WFH nutritional status indicators of the studied children.

WFH, was used to classify children into categories of nutritional status as follows:

-3 Z-Scores or oedema of WHO standards or NCHS reference = Severe acute malnutrition
-3 Z-Scores ≤WFH< -2 Z-Scores of WHO standards or NCHS reference = Moderate acute malnutrition
<-2 Z-score or oedema of WHO standards or NCHS reference = Global/total acute malnutrition

Similarly, MUAC measurements were also used to classify children into categories of nutritional status and mortality risks as follows according SACB Nutrition assessment guidelines:

<11.0 cm = Severe malnutrition
>=11.0 < 12.5 = Moderate malnutrition
>=12.5 -- < 13.5 = At risk of Malnutrition
>=13.5 cm = Normal
4.0 ASSESSMENT RESULTS

Malnutrition by livelihoods

A total of 2524 children aged 6-59 months, including 1000 from pastoral, 742 and 782 from agro-pastoral and riverine livelihoods respectively were assessed. The results from the pastoral and riverine livelihoods using NCHS references indicate a Very Critical nutrition situation with GAM rates of 23.3% (18.9-27.7) and 21.5% (17.6-25.4) respectively while the agro-pastoral livelihood indicate a Critical level with GAM rate of 18.8% (15.2-22.3). A total of six oedema cases were identified in the region that included three (0.4%) in agro-pastoral, two (0.2%) in pastoral and one (0.1%) in the riverine livelihood. Analysis of the data using the WHO Anthro references show more or less the same GAM results with the pastoral and riverine livelihoods recording GAM rates of 22.8% (18.2-27.4) and 22% (17.4-26.7) respectively, while agro-pastoral livelihood’s results showed a GAM rate of 19.0% (15.3-22.7). However as indicated in the table below, the Severe Acute Malnutrition (SAM) rates by WHO Anthro across livelihoods were almost double those derived by NCHS references.

Agro-pastoral livelihood assessment recorded the highest stunting rate of 32% (26.0-38.0) followed by riverine with a rate of 26.5% (20.0-42.8) while pastoral had relatively lowest rate of 19% (15.4-22.6). Similarly, the underweight levels were highest among the agro-pastoral population at 38.2%, then riverine livelihood at 36.3% and pastoral with rate of 32.2%. A summary of the findings for malnutrition rates is given in the table below.

Summary of Malnutrition rates by livelihood systems

<table>
<thead>
<tr>
<th>Malnutrition rates</th>
<th>Pastoral</th>
<th>Agro-pastoral</th>
<th>Riverine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>% (CI)</td>
<td>No</td>
</tr>
<tr>
<td>Global Acute Malnutrition (&lt;-2 Z score or oedema)</td>
<td>233</td>
<td>23.3 (18.9-27.7)</td>
<td>139</td>
</tr>
<tr>
<td>Severe Acute Malnutrition (&lt;-3 Z score or oedema)</td>
<td>30</td>
<td>3.0 (1.8-4.2)</td>
<td>14</td>
</tr>
<tr>
<td>Oedema</td>
<td>2</td>
<td>0.2 (0.5-0.9)</td>
<td>3</td>
</tr>
<tr>
<td>Global Acute Malnutrition (&lt;-2 Z score or oedema WHO Anthro)</td>
<td>228</td>
<td>22.8 (18.2-27.4)</td>
<td>149</td>
</tr>
<tr>
<td>Severe Acute Malnutrition (&lt;-3 Z score or oedema WHO Anthro)</td>
<td>51</td>
<td>5.1 (3.3-6.9)</td>
<td>36</td>
</tr>
<tr>
<td>GAM (WHM&lt;80% /oedema)</td>
<td>130</td>
<td>13.0 (9.8-16.2)</td>
<td>78</td>
</tr>
<tr>
<td>SAM (WHM&lt;70% /oedema)</td>
<td>13</td>
<td>1.3 (0.5-2.1)</td>
<td>8</td>
</tr>
<tr>
<td>Stunting (HAZ &lt; -2)</td>
<td>190</td>
<td>19.0 (15.4-22.6)</td>
<td>237</td>
</tr>
<tr>
<td>Underweight (WAZ &lt; -2)</td>
<td>322</td>
<td>32.2 (26.4-38.0)</td>
<td>283</td>
</tr>
</tbody>
</table>

Overall, the distribution of the weight-for-height scores in the Gedo assessments were skewed towards the left depicting a poorer nutrition situation according to international (WHO) standards. A summary of the Nutrisurvey quality checks for the assessments is given in appendix 4.
Malnutrition by sex in the three livelihoods

Distribution of children by nutritional status (WHZ-score or oedema) and child sex

<table>
<thead>
<tr>
<th>Nutrition status</th>
<th>Pastoral</th>
<th></th>
<th>Agro-pastoral</th>
<th></th>
<th>Riverine</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Males</td>
<td>Females</td>
<td>Males</td>
<td>Females</td>
<td>Males</td>
<td>Females</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>GAM (WHZ &lt;-2 /oedema)</td>
<td>128</td>
<td>24.7</td>
<td>105</td>
<td>21.8</td>
<td>87</td>
<td>20.7</td>
</tr>
<tr>
<td>SAM (WHZ &lt;-3 /oedema)</td>
<td>19</td>
<td>3.4</td>
<td>11</td>
<td>2.3</td>
<td>10</td>
<td>2.4</td>
</tr>
<tr>
<td>Oedema</td>
<td>2</td>
<td>0.4</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0.7</td>
</tr>
</tbody>
</table>

In the three livelihoods a higher proportion of boys than girls were acutely malnourished. In the pastoral livelihood 24.7% of boys as compared to 21.8% of girls were acutely malnourished. Similarly 20.7% boys and 16.3% girls, 23.8% boys and 18.6% girls were acutely malnourished in agro-pastoral and riverine livelihoods respectively. However, statistically both sexes were equally likely to be acutely malnourished (p>0.05).

Malnutrition by Age in the three Livelihoods

Distribution of Acute Malnutrition (WHZ Scores) by Age

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>Pastoral</th>
<th></th>
<th>Agro-pastoral</th>
<th></th>
<th>Riverine</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SAM</td>
<td>GAM</td>
<td>SAM</td>
<td>GAM</td>
<td>SAM</td>
<td>GAM</td>
</tr>
<tr>
<td>6-17</td>
<td>7 (3.0%)</td>
<td>41 (17.5%)</td>
<td>4 (2.9%)</td>
<td>28 (20.0%)</td>
<td>5 (2.8%)</td>
<td>28 (15.8%)</td>
</tr>
<tr>
<td>18-29</td>
<td>9 (3.6%)</td>
<td>63 (25.4%)</td>
<td>1 (0.6%)</td>
<td>32 (19.5%)</td>
<td>9 (4.1%)</td>
<td>50 (22.6%)</td>
</tr>
<tr>
<td>30-41</td>
<td>4 (1.7%)</td>
<td>51 (21.7%)</td>
<td>2 (1.0%)</td>
<td>36 (18.3%)</td>
<td>9 (5.5%)</td>
<td>41 (24.8%)</td>
</tr>
<tr>
<td>42-53</td>
<td>5 (2.6%)</td>
<td>45 (23.0%)</td>
<td>7 (4.4%)</td>
<td>28 (17.7%)</td>
<td>8 (5.3%)</td>
<td>39 (25.7%)</td>
</tr>
<tr>
<td>54-59</td>
<td>5 (5.7%)</td>
<td>33 (7.9%)</td>
<td>0</td>
<td>15 (18.1%)</td>
<td>2 (3.0%)</td>
<td>10 (15.2%)</td>
</tr>
<tr>
<td>Total</td>
<td>30 (3.0%)</td>
<td>233 (23.3%)</td>
<td>14 (2.4%)</td>
<td>139 (18.8%)</td>
<td>33 (4.2%)</td>
<td>168 (21.5%)</td>
</tr>
</tbody>
</table>
The proportion of acutely malnourished children varied across livelihoods and age category. Among the pastoral population the age categories with highest (25.4%) and the lowest (7.9%) proportion of acutely malnourished children were 18-29 and 54-59 months age categories respectively. In the agro-pastoral livelihood the age category with the youngest children aged 6-17 months recorded the highest proportion of acutely malnourished children while children in the age category of 42-53 months had the lowest acute malnutrition level (17.7%). While amongst the riverine population, children in the age category of 42-53 and those aged 54-59 recorded the highest (25.7%) and the lowest (15.2%) proportion of the acutely malnourished children respectively. However, analysis of distribution of acute malnutrition between the breastfeeding age group 6-24 months and the 25-59 months category, showed no statistical difference among them (p>0.05). Equally there was no statistical difference (p>0.05) in acute malnutrition levels among the children in the age of 6-29 months and 30-59 months age bands.

**Acute Malnutrition by MUAC**

**Child Malnutrition by MUAC**

<table>
<thead>
<tr>
<th>Malnutrition rates</th>
<th>Pastoral</th>
<th>Agro-pastoral</th>
<th>Riverine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child MUAC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gam (MUAC &lt; 12.5 cm or oedema)</td>
<td>70</td>
<td>7.0 (5.5-8.8)</td>
<td>77</td>
</tr>
<tr>
<td>Sam (MUAC &lt; 11.0 cm or oedema)</td>
<td>6</td>
<td>0.6 (0.2-1.4)</td>
<td>8</td>
</tr>
</tbody>
</table>

Based on MUAC measurements, acute malnutrition rates (MUAC < 12.5 cm or oedema) were significantly lower when compared to GAM rates assessed using by <-2 WHZ or oedema at 7.0% (CI: 5.5-8.8), 10.4% (CI: 8.3-12.9) and 11.3% (CI: 9.2-13.7) among Pastoral, Agro-pastoral and Riverine livelihoods respectively indicating serious malnutrition situation (see table above).

**Measles vaccination coverage**

<table>
<thead>
<tr>
<th>Malnutrition rates</th>
<th>Pastoral</th>
<th>Agro-pastoral</th>
<th>Riverine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children (9-59 months) immunised against measles</td>
<td>728</td>
<td>77.0</td>
<td>278</td>
</tr>
</tbody>
</table>

Coverage was all below the recommended coverage of 95% level (Sphere, 2004) across the three livelihoods with agro-pastoral livelihood recording the lowest levels.
5.0 Discussion

Results indicate critical to very critical nutrition levels with a GAM rate of >15% recorded in all three livelihoods assessed. The pastoral and riverine livelihoods assessments show a Very Critical nutrition situation with GAM rates of 23.3% (18.9-27.7) and 21.5% (17.6-25.4) respectively while the agro-pastoral livelihood recorded a Critical level with GAM rate of 18.8% (15.2-22.3). This was inclusive of a total of six oedema cases that included three (0.4%) in Agro-pastoral, two (0.2%) in pastoral and one (0.1%) in the Riverine livelihood. When compared with the most recent nutrition assessments conducted in April 2007, where the Pastoral livelihood reported a GAM rate of 19.9% (17.4-22.7), Agro-pastoral livelihood recorded a GAM of 16.7% (14.4-19.3) and the Riverine livelihood a GAM rate of 17.7% (CI: 15.3-20.4), the results indicate a deterioration from critical to very critical levels of acute malnutrition among the Pastoral and Riverine populations and a sustained critical nutrition situation among the Agro-pastoral population. However, as the confidence interval ranges overlap between the current and April 2007 results there is no statistically significant difference between these findings. Similarly there is no statistical difference between the acute malnutrition rates reported in the three livelihood zones as the GAM rate ranges overlap. Stunting and underweight levels are high in the three livelihoods. The pastoral livelihood recorded stunting and underweight rates of 19.0% (15.4-22.6) and 32.2% (26.4-38.0) respectively. The stunting and underweight rates among the riverine were 26.5% (20.0-33.0) and 36.3% (29.9-42.8) respectively. Among the agro-pastoralist, the respective stunting and underweight rates were 32.0% (26.0-38.0) and 38.2% (33.2-43.2).

Possible explanation for the deterioration of the situation could be the negative impact of the poor rain performance in the region which affects crop production as well as pasture and water availability, ultimately affecting livestock body conditions and milk production and also the out migration of livestock to areas with better pasture and water availability such as Juba. The effect of the global rise in food prices and inflation has made the situation of the chronically food insecure population in the region even worse. This is particularly worrying given that the main source of staple food reported across the livelihoods is purchase. Qualitative information indicated that households have resorted to various coping strategies including reduction in purchase of food and non-food items, switching to cheaper cereals and skipping meals and increased sale of bush products.

Measles vaccination was far below the recommended coverage. Nevertheless the reported coverage does not confirm whether the child is fully immunized due to lack of health records.

In conclusion, the overall nutrition situation in Gedo Region is Very Critical and has deteriorated since the April 2007 nutrition assessment and the integrated nutrition analysis during post Deyr ’07/08 in January 2008, which reported a Critical situation. The nutrition situation seems to have reverted back to very critical levels recorded prior to April 2007. The worsening nutrition situation could be attributed to the impact of the poor Deyr’07/08 cereal production of 2% PWA and crop failure in the Gu’07 particularly in North Gedo and the overall poor Gu’08 rains reported across Gedo. This has negatively affected crop and livestock production in the region. The situation has been made worse by rising global food prices coupled with the chronically high morbidity and poor child feeding and care practices which have remained unaddressed over years.

Intervention efforts, therefore, need to be strengthened and broadened to address both immediate life saving needs such as rehabilitation of acutely malnourished children and measures to cushion against the impact of food prices and poor rain performance. This is in addition to developing longer term strategies to enhance the provision of basic services, sustainable strategies for livelihood support and social protection mechanisms.

6.0 Recommendations

The slight recovery of food security and nutrition situation recorded in April 2007 in Gedo seems to have been lost and the situation reverted to the very critical nutrition situation with higher proportions of people facing food insecurity. Intervention efforts, therefore, need to be strengthened and broadened to address both immediate life saving needs such as rehabilitation of acutely malnourished children and measures to cushion against the impact of food prices and poor rain performance. This is in addition to developing longer term strategies to enhance the provision of basic services, sustainable strategies for livelihood support and social protection mechanisms.
### Appendix 1: Clusters Sampling for Gedo 2007 assessment

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pastoral</th>
<th>Agro-pastoral</th>
<th>Riverine</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Anthropometric surveys</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated malnutrition prevalence</td>
<td>19.9%</td>
<td>16.7%</td>
<td>17.7%</td>
</tr>
<tr>
<td>Children below 5 years</td>
<td>9094</td>
<td>7720</td>
<td>7710</td>
</tr>
<tr>
<td>Desired precision</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
</tr>
<tr>
<td>Design effect</td>
<td>1.5</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>Children to be included</td>
<td>711</td>
<td>619</td>
<td>647</td>
</tr>
<tr>
<td>Households to be included</td>
<td>594</td>
<td>518</td>
<td>541</td>
</tr>
</tbody>
</table>
## Appendix 2: Nutrition assessment household questionnaire, 2008

Household Number _______________ Date __________________________ Team Number ________________________  
Cluster Number _______________ Cluster Name __________________________ District __________________________

Anthropometry and measles vaccination for children aged 6-59 months in the household

<table>
<thead>
<tr>
<th>First Name</th>
<th>Age</th>
<th>Sex</th>
<th>Oedema</th>
<th>Height (cm)</th>
<th>Weight (kg)</th>
<th>MUAC (cm)</th>
<th>(If ≥9 months old)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 = Male</td>
<td></td>
<td>To the nearest tenth of a cm</td>
<td>To the nearest tenth of a kg</td>
<td>To the nearest tenth of a cm</td>
<td>Has child been Vaccinated against measles?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 = Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 = Yes 2 = No</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>1 = yes</td>
<td>0 = No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>1 = yes</td>
<td>0 = No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>1 = yes</td>
<td>0 = No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>1 = yes</td>
<td>0 = No</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 3: Traditional calendar of events

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>59 Malmadoone/ Milihore</td>
<td>47 Malmadoone/ Milihore</td>
<td>35 Malmadoone/ Milihore</td>
<td>23 Malmadoone/ Milihore ICU took control</td>
<td>11 Malmadoone/ Milihore/Jamadul-awl</td>
<td></td>
</tr>
<tr>
<td>58 Jamadul-Awal/</td>
<td>46 Jamadul-Awal/</td>
<td>34 Jamadul-Awal/</td>
<td>22 Jamadul-Awal/</td>
<td>10 Jamadul-Awal/</td>
<td></td>
</tr>
<tr>
<td>56 Rajab/ Shacbaan</td>
<td>44 Rajab/ Shacbaan</td>
<td>32 Rajab/Shacbaan</td>
<td>20 Rajab/Shacbaan</td>
<td>8 Rajab/Shacbaan</td>
<td></td>
</tr>
<tr>
<td>55 Shacbaan</td>
<td>43 Shacbaan</td>
<td>31 Shacbaan/</td>
<td>19 Shacbaan/</td>
<td>7 Shacbaan</td>
<td></td>
</tr>
<tr>
<td>54 Soon (Ramadhan)</td>
<td>42 Soon (Ramadhan)</td>
<td>30 Soon (Ramadhan)</td>
<td>18 Soon (Ramadhan)</td>
<td>6 Soon (Ramadhan)</td>
<td></td>
</tr>
<tr>
<td>53 Soon fur</td>
<td>41 Soonfur</td>
<td>29 Soonfur</td>
<td>17 Soonfur ICU overthrown from Mogandishu</td>
<td>5 Sidatal</td>
<td></td>
</tr>
</tbody>
</table>

Mawlid: Mawlid Mawlid Mawlid Mawlid/Jamadul-awl. Mawlid
Malmadoone/ Milihore Malmadoone/ Milihore Malmadoone/ Milihore Malmadoone/ Milihore/Jamadul-awl
Jamadul-Awal/ Jamadul-Awal/ Jamadul-Awal/ Jamadul-Awal/ Jamadul-Awal/
Rajab/ Shacbaan Rajab/ Shacbaan Rajab/Shacbaan Rajab/Shacbaan Rajab/Shacbaan
Shacbaan Shacbaan Shacbaan/ Shacbaan/ Shacbaan
Soon (Ramadhan) Soon (Ramadhan) Soon (Ramadhan) Soon (Ramadhan) Soon (Ramadhan)
Soon fur Soonfur Soonfur Soonfur ICU overthrown from Mogandishu
Soonfur ICU overthrown from Mogandishu
Soonfur ICU overthrown from Mogandishu
Soonfur ICU overthrown from Mogandishu

Election of president Abdulahi Yusuf in Kenya.
## Appendix 4: Assessments plausibility checks

<table>
<thead>
<tr>
<th></th>
<th>Gedo Pastoral</th>
<th>Gedo Agro-pastoral</th>
<th>Gedo Riverine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digit Preference score-Weight</td>
<td>4.31 (good)</td>
<td>3.83 (good)</td>
<td>5.4 (acceptable)</td>
</tr>
<tr>
<td>Digit Preference score-Height</td>
<td>8.18 (acceptable)</td>
<td>19.8 (poor)</td>
<td>19.9 (poor)</td>
</tr>
<tr>
<td>Age preference</td>
<td>49</td>
<td>59</td>
<td>None</td>
</tr>
<tr>
<td>SD of WHZ</td>
<td>1.04</td>
<td>1.09</td>
<td>1.14</td>
</tr>
<tr>
<td>Skewness of WHZ</td>
<td>0.86 (&lt;1: normal)</td>
<td>1.16</td>
<td>0.96 (&lt;1: normal)</td>
</tr>
<tr>
<td>Kurtosis of WHZ</td>
<td>1.86</td>
<td>3.19 (&gt;2: problem)</td>
<td>2.02 (&gt;2: problem)</td>
</tr>
<tr>
<td>Percent of flags</td>
<td>(2 cases) 0.2%</td>
<td>(5 cases) 0.7%</td>
<td>(4 cases) 0.5%</td>
</tr>
<tr>
<td>Age groups (6-29)</td>
<td>No bias</td>
<td>No bias</td>
<td>No bias</td>
</tr>
<tr>
<td>Age Groups (30-59)</td>
<td>No bias</td>
<td>No bias</td>
<td>No bias</td>
</tr>
<tr>
<td>Sex Ratio (M/F)</td>
<td>1.08</td>
<td>1.31</td>
<td>1.24</td>
</tr>
</tbody>
</table>
REFERENCES

FSAU, April 2004: Dietary Diversity in Somalia.
Handout 4b: Nutrition survey report completeness checklist (refer to http://www.cedat.be for latest version of checklist)

<table>
<thead>
<tr>
<th>Pre-survey preparation and planning</th>
<th>Methods (Ctd)</th>
</tr>
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<tbody>
<tr>
<td><strong>Objective of the survey</strong></td>
<td><strong>Methods</strong></td>
</tr>
<tr>
<td>1) Nutrition</td>
<td>37) Recall period stated</td>
</tr>
<tr>
<td>2) Mortality</td>
<td>38) Denominator calculation indicated</td>
</tr>
<tr>
<td>3) Vaccination</td>
<td>39) Census method indicated</td>
</tr>
<tr>
<td><strong>Population</strong></td>
<td>40) Questionnaire is provided in Appendix</td>
</tr>
<tr>
<td>4) Type of population stated</td>
<td><strong>Results</strong></td>
</tr>
<tr>
<td>5) Total population in universe stated</td>
<td></td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td><strong>Analysis</strong></td>
</tr>
<tr>
<td>6) Geographical scope of the survey stated</td>
<td>41) Name, version of the software and statistical procedure stated</td>
</tr>
<tr>
<td>7) Area excluded from sampling frame listed</td>
<td></td>
</tr>
<tr>
<td><strong>Time period</strong></td>
<td></td>
</tr>
<tr>
<td>8) Survey dates are stated (dd-mm-yyyy)</td>
<td></td>
</tr>
<tr>
<td><strong>Translation</strong></td>
<td></td>
</tr>
<tr>
<td>9) Language of the questionnaire is stated</td>
<td></td>
</tr>
<tr>
<td>10) Language of the interview is stated</td>
<td></td>
</tr>
<tr>
<td><strong>Questionnaire/tool</strong></td>
<td></td>
</tr>
<tr>
<td>11) Pre-testing of questionnaire stated</td>
<td></td>
</tr>
<tr>
<td>12) Use of local event calendar stated</td>
<td></td>
</tr>
<tr>
<td><strong>Training</strong></td>
<td></td>
</tr>
<tr>
<td>13) Training organisation stated</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Methods</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sampling design</strong></td>
<td></td>
</tr>
<tr>
<td>14) Type of sampling design stated</td>
<td></td>
</tr>
<tr>
<td>15) Rationale for sampling design explained</td>
<td></td>
</tr>
<tr>
<td>16) State if PPS was used</td>
<td></td>
</tr>
<tr>
<td>17) Number of clusters</td>
<td></td>
</tr>
<tr>
<td><strong>Final stage</strong></td>
<td></td>
</tr>
<tr>
<td>18) State if final stage sampling</td>
<td></td>
</tr>
<tr>
<td>19) State if HH without US were included</td>
<td></td>
</tr>
<tr>
<td>20) Stated whether sample size was increased to account for non-response</td>
<td></td>
</tr>
<tr>
<td><strong>Household</strong></td>
<td></td>
</tr>
<tr>
<td>21) State definition of HH</td>
<td></td>
</tr>
<tr>
<td>22) State selection of US in the HH</td>
<td></td>
</tr>
<tr>
<td>23) HH selection in a compound is explained</td>
<td></td>
</tr>
<tr>
<td>24) Procedure for choosing respondent stated</td>
<td></td>
</tr>
<tr>
<td>25) Procedure for re-visiting absent hh stated</td>
<td></td>
</tr>
<tr>
<td><strong>Sample size precision</strong></td>
<td></td>
</tr>
<tr>
<td>26) Expected GAM:</td>
<td></td>
</tr>
<tr>
<td>27) Expected Defit for GAM:</td>
<td></td>
</tr>
<tr>
<td>28) Desired precision for GAM:</td>
<td></td>
</tr>
<tr>
<td>29) Expected CMR:</td>
<td></td>
</tr>
<tr>
<td>30) Expected Defit for CMR:</td>
<td></td>
</tr>
<tr>
<td>31) Desired precision for CMR:</td>
<td></td>
</tr>
<tr>
<td><strong>Nutrition survey</strong></td>
<td></td>
</tr>
<tr>
<td>32) GAM includes bilateral oedema</td>
<td></td>
</tr>
<tr>
<td>33) Inclusion criteria in terms of age or height described</td>
<td></td>
</tr>
<tr>
<td>34) Weight and height smallest rounding unit described</td>
<td></td>
</tr>
<tr>
<td>35) Cut-off for measuring children lying or standing stated</td>
<td></td>
</tr>
<tr>
<td>36) Questionnaire is provided in Appendix</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Discussion</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Limitation and bias</strong></td>
<td></td>
</tr>
<tr>
<td>64) % non response:</td>
<td></td>
</tr>
<tr>
<td>65) % inaccessible clusters:</td>
<td></td>
</tr>
<tr>
<td>66) Final number of clusters:</td>
<td></td>
</tr>
<tr>
<td>67) Replacement method stated?</td>
<td></td>
</tr>
<tr>
<td>68) Potential bias described?</td>
<td></td>
</tr>
<tr>
<td><strong>Comparison of results</strong></td>
<td></td>
</tr>
<tr>
<td>69) Results are compared to a reference</td>
<td></td>
</tr>
<tr>
<td><strong>Interpretation of results</strong></td>
<td></td>
</tr>
<tr>
<td>70) Recommendations are given</td>
<td></td>
</tr>
</tbody>
</table>
Exercise 5: Summarizing nutrition survey reports

What is the learning objective?
- To be able to summarize the essential content of a nutrition survey report

When should this exercise be done?
- Towards the end of the session on Module 7

How long should the exercise take?
- 60 to 75 minutes

What materials are needed?
- Handout 5a: Nutrition survey report
- Handout 5b: Nutrition survey summary report: Model answers
- Laptops with PowerPoint or flip chart paper

Instructions
Step 1: Divide participants into groups of two or three people.
Step 2: Give each participant Handout 5a.
Step 3: Explain that the task is to present the results of the survey at a nutrition cluster coordination meeting in a clear and succinct manner.
Step 4: Give participants 60 minutes to read and summarize the survey report.
Step 5: In plenary, each group should present their summary in the form of a role play, where the presenting group represents the agency who carried out the survey, and the rest of the participants represents members of the nutrition cluster coordination group in that country (e.g., government representatives, donors, other nutritionists).
Handout 5a: Nutrition survey report

Time for completion: 60 minutes

Read the following survey report. Working in small groups of two or three, prepare a summary of the reports (with PowerPoint slides or flipchart paper) with key information on methods, results and recommendations. You should prepare about 10 slides or chart pages in total.

Present your findings to members of the nutrition cluster coordination group in that country (e.g., government representatives, donors, other nutritionists) as if you were part of the agency that had carried out the survey.

Introduction

Shinile zone is one of the nine administrative zones in the Somali National Regional State. The majority of the zonal population are pastoralists, dependent on livestock for their livelihoods. In addition, 15 to 25 per cent of the zonal population are agro-pastoralists, found in the Shinile agro-pastoral food economy zone (FEZ).  

This report covers the agro-pastoral areas of Shinile, Dambal and Erer districts in the zone. The population in these districts is made up of different Somali groups. The Issa, the majority of whom are pastoralists, are the dominant clan in the Shinile zone. The Gurgura, Gadabursi and Hawiya are mainly agro-pastoral and inhabit the Erer, Dambal and Mieso districts. Erer and Shinile are located along the railway line, while Dambal is far from the railway. The other major route in the zone is the loose surface gravel road between Dire Dawa and Djibouti, which passes through parts of three districts, Shinile, Dambal and Ayshia.

The main rainy seasons in this FEZ are the gu and karan. The gu normally starts in late March and ends mid-May. The karan rains start in July and continue up to early September. The gu rains are followed by the hagaa season, which is a dry period that can cause crop failure if the gu rains are not sufficient.

Access to arable land is free unless there are clan animosities. The main crops grown by the agro-pastoralists are sorghum, followed by maize. The karan rains determine what is harvested from the long maturing cereal varieties planted in the gu and also provide a second opportunity for cultivation of a short maturing variety of maize (dega nugul). The performances of the ‘gu’ and ‘karan’ rains determine whether the year is considered normal, good or bad.

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7 For the sake of the exercise, the report was amended and does not correspond to the original report.
The major vulnerability/risk factor is the failure of seasonal rains, which adversely affect crop, pasture and water availability and lead to poor livestock production, body condition and low prices. Other risk factors include restrictions on the collection of bush products like charcoal, firewood and construction materials, which are important sources of income for the poor groups. Clan and other conflicts are another source of risk because they can block access to markets, farmland and grazing as well as water sources.

There is cross-border trade with Somaliland and Djibouti, which provides income for livestock traders and labourers involved in rental of pack-camels to transport goods from either Djibouti or Somaliland. The railway passes through almost all Shinile districts, which also provides trade benefits for Shinile agro-pastoralists.

Coping strategies employed by households in this FEZ include: increased sales of livestock, sending children to stay with wealthier relatives, increased employment seeking, reduced number of meals, substitution of less expensive foods and migration in search of pasture and water. The better off groups would also reduce gifts. In bad years, these strategies become less effective as more people are involved and returns fall.

Generally, the infrastructure of Shinile zone is very poor, with only one main road connecting Dire Dawa and Djibouti that passes through Aysha town. There are only rough roads connecting all the peasants’ associations (PAs) within the zone, and there is often no road access to many parts of the zone during the rainy seasons. There is no public transport between the PAs of Shinile zone, except between Dire Dawa and Shinile town. Pack animals are the major means of transportation in rural areas. The main Addis Ababa-Djibouti railway also passes through Shinile zone.9

Health facilities are limited and of poor quality. There is 1 health centre, 27 health stations or clinics, and 4 health posts within the 3 districts included in the survey. However, these health facilities are often insufficient, with poor staffing levels and a shortage of drugs and medical supplies. Regarding health staff the numbers are as follows: 1 doctor, 14 junior nurses, 2 midwives, 2 lab technicians, 3 sanitarians and 7 senior nurses.10

The number of school facilities in the surveyed districts are as follows: 21 primary schools, 4 intermediate, 2 secondary and the total number of teachers is 158. The main market within the zone is in Dire Dawa town.

There is also a significant traffic of unofficial cross-border trade from Djibouti. The trade mainly consists of non-food household items, and the final destination for this traffic is the Shinile zone, primarily Adarem district.11

Survey objectives
The survey objectives were to:
1. Estimate the prevalence of acute malnutrition in agro-pastoral Peasant Associations (PAs) of Dambal, Shinile and Erer districts of the Shinile zone.
2. Estimate the measles vaccination coverage in agro-pastoral PAs of Dambal, Shinile and Erer districts of the Shinile zone.
3. Determine main livelihoods of the area, condition of livestock and the proportion of households receiving relief food.

Methodology
Sampling procedure and sample size
The sample size was calculated using EPI-INFO and was based on an estimated prevalence of 20 per cent global acute malnutrition in children aged less than 5 years, a precision of +/- 5 per cent, 95 per cent confidence limits and a design effect of two. This number was rounded up to 900 with 30 children measured in each of 30 clusters.

The smallest administrative unit was considered to be the peasant association (PA). The district administration office and the bureau of agriculture provided the population figures in August 2004. The cumulative population was calculated and the sampling interval determined. Thirty-three clusters including three contingency clusters were randomly selected by assigning probability proportional to population size.

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9 SCUK Nutrition survey report in pastoral areas of Shinile, Erer and Dambal districts, April 2004.
10 SCUK Nutrition survey report in pastoral areas of Shinile, Erer and Dambal districts, April 2004.
Selection of households and children

So that the teams did not have to walk the entire way across each PA before starting a cluster, a list of the names of the villages in each PA was obtained from each PA official. A village was randomly selected in each PA where a cluster was selected.

The centre of the village was located as the starting point in each cluster. A direction was selected randomly and houses in that direction to the end of the village were counted. One house was randomly selected and every subsequent nearest household was visited, always selecting to the right hand side.

All children between the ages of 6 and 59 months in each selected household (65-110cm) were included in the sample, including all those in the last selected household. If the child’s age was unknown, only children between 65 cm and 100 cm were eligible for this survey. Absent children were followed up with a second visit. If still absent, they were not replaced by another child. Teams were instructed to measure children currently in hospital or feeding programmes at this location.

Data collected

Anthropometric data

Nutritional indicators: Weight-for-height and/or oedema were used as the indicators for moderate and severe acute malnutrition.

Definitions:

Global Acute Malnutrition (GAM): <-2 Z-Scores / <80% median weight-for-height (WFH) and/or oedema (NCHS reference)

Severe Acute Malnutrition (SAM): <-3 Z-Scores / <70% median weight-for-height (WFH) and/or oedema (NCHS reference)

Age: Children between 6 and 59 months were measured. Age was recorded from immunisation cards when available or was determined using a local calendar. Only children under 110 cm (proxy for 5 years) and over 65 cm (proxy for 6 months) were measured if age could not be estimated.

Weight: A 25-kg Salter spring scale was used for children. Weight was recorded to the nearest 100 g.

Height: Children between 65 cm and 85 cm were measured lying down on a wooden height board while those above 85 cm and below 110 cm measured standing up. Length/height was recorded with 0.5 cm precision.

Oedema: The presence of nutritional oedema was determined by pressing both feet for three seconds. If a shallow print remained in both feet it was recorded as positive oedema.

Retrospective morbidity of children

Mothers were asked whether or not their children had been sick in the 15 days prior to the survey. Sickness was defined as diarrhoea (loose stools more than three times per day), cough (coughing or difficulty breathing), fever, and measles or ‘other’.

Vaccination status and coverage

A completed vaccination card for measles was recorded as positive for measles vaccination. If a child did not have a card, mothers were asked to confirm whether or not their children had had a measles vaccination.

Household and key informant questionnaires

Household and key informant questionnaires were developed. The questionnaires focused on data on food security and relief. Data were both qualitative and quantitative. Every fifth house was asked the household questionnaire (including those without children). These questionnaires provided the basis for the food security analysis.

Training and piloting

The regional disaster prevention and preparedness bureau (DPPB) and local staff who were employed on temporary basis were trained. Ten of the team members had been involved in several nutrition surveys.
Initial training was provided in the following areas:

- survey design
- anthropometric measurements
- recognition of malnutrition signs and symptoms
- data collection and interview techniques

A pilot test was conducted in one area not selected for the survey. Household sampling, anthropometric measurements and questionnaires were tested.

**Data analysis**

Initial analysis was done by hand in the field. Further analysis was conducted using EPI-INFO version 6.04d.

**Results**

**Anthropometric results**

891 children were considered for the analysis. Nine children were excluded from final analysis due to aberrant anthropometric values.

<table>
<thead>
<tr>
<th>Table 1: Distribution of age and sex of sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
</tr>
<tr>
<td>No.</td>
</tr>
<tr>
<td>6-17 months</td>
</tr>
<tr>
<td>18-29 months</td>
</tr>
<tr>
<td>30-41 months</td>
</tr>
<tr>
<td>42-53 months</td>
</tr>
<tr>
<td>54-59 months</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2: Prevalence of acute malnutrition based on weight-for-height Z scores and/or oedema</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-59 months No. = 891</td>
</tr>
<tr>
<td>Prevalence of global malnutrition (&lt; -2 Z score and/or oedema)</td>
</tr>
<tr>
<td>95% CI (6.2-10.0%)</td>
</tr>
<tr>
<td>Prevalence of severe malnutrition (&lt; -3 Z score and/or oedema)</td>
</tr>
<tr>
<td>95% (0.0-0.7%)</td>
</tr>
</tbody>
</table>

The prevalence of oedema is 0 per cent.
Table 3: Prevalence of malnutrition by age based on weight-for-height Z scores and oedema

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>Total no.</th>
<th>Severe malnutrition (&lt; -3 Z score)</th>
<th>Moderate malnutrition (≥ -3 and &lt; -2 Z score)</th>
<th>Normal (≥ -2 Z score)</th>
<th>Oedema</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>06-17</td>
<td>165</td>
<td>0.0</td>
<td>17</td>
<td>10.3</td>
<td>148</td>
</tr>
<tr>
<td>18-29</td>
<td>165</td>
<td>1.2</td>
<td>13</td>
<td>7.9</td>
<td>150</td>
</tr>
<tr>
<td>30-41</td>
<td>239</td>
<td>0.4</td>
<td>15</td>
<td>6.3</td>
<td>223</td>
</tr>
<tr>
<td>42-53</td>
<td>195</td>
<td>0.0</td>
<td>10</td>
<td>5.1</td>
<td>185</td>
</tr>
<tr>
<td>54-59</td>
<td>127</td>
<td>0.0</td>
<td>14</td>
<td>11.0</td>
<td>113</td>
</tr>
<tr>
<td>Total</td>
<td>891</td>
<td>0.3</td>
<td>69</td>
<td>7.7</td>
<td>819</td>
</tr>
</tbody>
</table>

Table 4: Distribution of acute malnutrition and oedema based on weight-for-height Z scores

<table>
<thead>
<tr>
<th>Oedema present</th>
<th>&lt; -2 Z score</th>
<th>≥ -2 Z score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marasmic Kwashiorkor</td>
<td>0 (0%)</td>
<td>Kwashiorkor</td>
</tr>
<tr>
<td>Oedema absent</td>
<td>Marasmic</td>
<td>72 (8.1%)</td>
</tr>
</tbody>
</table>

Table 5: Prevalence of acute malnutrition based on the percentage of median and/or oedema

<table>
<thead>
<tr>
<th>Prevalence of global acute malnutrition (&lt; 80% and/or oedema)</th>
<th>6-59 months No. = 891</th>
<th>6-29 months No. = 330</th>
</tr>
</thead>
<tbody>
<tr>
<td>(35) 3.9% 95% CI (2.8-5.1%)</td>
<td>(18) 5.4% 95% CI (2.9-8.0%)</td>
<td></td>
</tr>
<tr>
<td>Prevalence of severe acute malnutrition (&lt; 70% and/or oedema)</td>
<td>(1) 0.1% 95% (0.0-0.3%)</td>
<td>(1) 0.3% 95% (0.0-0.9%)</td>
</tr>
</tbody>
</table>

The prevalence of oedema is 0 per cent.

Table 6: Prevalence of malnutrition by age based on weight-for-height medians and oedema

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>Total no.</th>
<th>Severe malnutrition (&lt; 70% median)</th>
<th>Moderate malnutrition (≥ 70% and &lt; 80% median)</th>
<th>Normal (≥ 80% median)</th>
<th>Oedema</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>06-17</td>
<td>165</td>
<td>0.0</td>
<td>11</td>
<td>6.7</td>
<td>154</td>
</tr>
<tr>
<td>18-29</td>
<td>165</td>
<td>0.6</td>
<td>6</td>
<td>3.6</td>
<td>158</td>
</tr>
<tr>
<td>30-41</td>
<td>239</td>
<td>0.0</td>
<td>8</td>
<td>3.3</td>
<td>231</td>
</tr>
<tr>
<td>42-53</td>
<td>195</td>
<td>0.0</td>
<td>3</td>
<td>1.5</td>
<td>192</td>
</tr>
<tr>
<td>54-59</td>
<td>127</td>
<td>0.0</td>
<td>6</td>
<td>4.7</td>
<td>121</td>
</tr>
<tr>
<td>Total</td>
<td>891</td>
<td>0.1</td>
<td>34</td>
<td>3.8</td>
<td>856</td>
</tr>
</tbody>
</table>

36 HTP, Version 2, 2011
Table 7: Mean percentage of the median weight-for-height

<table>
<thead>
<tr>
<th>6-59 months</th>
<th>No. = 891</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean percentage of weight-for-height median</td>
<td>91.9%</td>
</tr>
<tr>
<td>95% (91.3-92.5%)</td>
<td></td>
</tr>
</tbody>
</table>

Children’s morbidity

Table 8: Prevalence of reported illness in children two weeks prior to interview (No. = 93)

<table>
<thead>
<tr>
<th>6-59 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of reported illness</td>
</tr>
</tbody>
</table>

Table 9: Symptom breakdown in the children who reported illness two weeks prior to interview (No. = 891)

<table>
<thead>
<tr>
<th>6-59 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhoea</td>
</tr>
<tr>
<td>17.2%</td>
</tr>
<tr>
<td>Cough</td>
</tr>
<tr>
<td>34.4%</td>
</tr>
<tr>
<td>Fever</td>
</tr>
<tr>
<td>26.9%</td>
</tr>
<tr>
<td>Measles</td>
</tr>
<tr>
<td>–</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>21.5%</td>
</tr>
</tbody>
</table>

Vaccination results

Table 10: Vaccination coverage: Measles for 9-59 months

<table>
<thead>
<tr>
<th>Measles (with card) No. = 829</th>
<th>Measles (with card or confirmation from mother) No. = 829</th>
</tr>
</thead>
<tbody>
<tr>
<td>(10) 1.2%</td>
<td>(423) 51.0%</td>
</tr>
<tr>
<td>95% CI (0.0-2.7%)</td>
<td>95% (43.4-58.7%)</td>
</tr>
</tbody>
</table>

Food security

110 households were interviewed.

Dependency/livelihood

90% of interviewed key informant reported to depend on both animal and agriculture.
3% of interviewed key informant reported to depend on agriculture.
3% of interviewed key informant reported to depend on animal products.
3% of interviewed key informant reported to depend on salary wage.

Livestock holdings/possession

78% reported to have animals of any kind.
22% reported they do not have any animal.

Condition of livestock of those household reported having animals

47% reported that their animal condition is average.
31% reported that their animal condition is good.
21% reported that their animal condition is poor.
Discussion.

Nutritional status

A total of 891 children aged 6 to 59 months were analysed. The sex ratio and age distributions indicate that the sample was unbiased. The prevalence of global acute malnutrition (< -2 Z scores weight-for-height) was estimated at 8.1% (95% CI 6.2-10.0%) and severe acute malnutrition (< -3 Z scores weight-for-height) was estimated at 0.3% (95% CI 0.0-0.7%).

This level of malnutrition with the absence of aggravating factors is considered typical for chronically malnourished population as per the disaster prevention and preparedness commission (DPPC) emergency nutrition assessment guidelines (December 2002). The levels of malnutrition remained stable since May 2004. The stability of nutritional status within an acceptable level since May 2004 could be linked to the ongoing relief food distribution in the areas since December 2002.12

Other supportive indicators, such as the food security and health situation, do not show a serious situation. In view of these findings, it is important to describe and discuss the food security, health and care situation in the surveyed areas before drawing any further conclusions and making recommendations.

Comparison with previous surveys

Three rounds of emergency nutrition surveys were conducted in agro-pastoral areas of Dambal, Shinile and Erer districts of Shinile zone in December 2002, in September 2003 and in May 2004. Therefore, the current survey is the fourth of its kind in the areas. The same sampling methodology and techniques were applied during the past three surveys and the current one. The same population and area have also been covered during those assessment times. As a result the current findings can be compared with the past three surveys.

The following table and graphs show the trends in the prevalence of malnutrition in the areas since December 2002.

### Table 11: Prevalence of acute malnutrition based on weight-for-height Z scores and/or oedema

<table>
<thead>
<tr>
<th></th>
<th>December 2002</th>
<th>September 2003</th>
<th>May 2004</th>
<th>August 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6-59 months</td>
<td>6-59 months</td>
<td>6-59 months</td>
<td>6-59 months</td>
</tr>
<tr>
<td></td>
<td>No. = 912</td>
<td>No. = 898</td>
<td>No. = 899</td>
<td>No. = 891</td>
</tr>
<tr>
<td>GAM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(164) 18.0%</td>
<td>(101) 11.2%</td>
<td>(69) 7.7%</td>
<td>(72) 8.1%</td>
</tr>
<tr>
<td></td>
<td>95% CI (14.3-21.7%)</td>
<td>95% CI (8.2-14.3%)</td>
<td>95% CI (5.9-9.5%)</td>
<td>95% CI (6.2-10.0%)</td>
</tr>
<tr>
<td>SAM</td>
<td>(18) 2.0%</td>
<td>(7) 0.8%</td>
<td>(4) 0.4%</td>
<td>(3) 0.3%</td>
</tr>
<tr>
<td></td>
<td>95% CI (0.9-3.1%)</td>
<td>95% CI (0.2-1.4%)</td>
<td>95% CI (0.0-0.9%)</td>
<td>95% CI (0.0-0.7%)</td>
</tr>
<tr>
<td>Oedema</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

The tables and graphs above show the results of the current survey (August 2004) in comparison with the three previous surveys (December 2002, September 2003 and May 2004) that were conducted in the agro-pastoral areas of the surveyed districts.

It can be seen that the nutritional status of the surveyed population remains within an acceptable and stable trend in particular since the survey in May 2004. It has to be noted that there was a significant reduction in the level of malnutrition since the survey in December 2002 that might indicate an overall improvement in the level of malnutrition since then.

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12 Emergency Drought Relief and Recovery Programme for Shinile zone, Ethiopia. Implemented by SCUK and SCUS and funded by USAID/OFDA and food aid intervention through JEOP since December 2002.
13 Prevalence of global acute malnutrition (< -2.00 Z score and/or oedema)
14 Prevalence of severe acute malnutrition (< -3.00 Z score and/or oedema)
The stability of the nutritional status at an acceptable level since May 2004 and the general improvement in the nutrition situation could be associated with the existing relief food distribution and the seasonal variation in the timing of the survey.

**Food security situation**

**Livelhood**

Farmers within the agro-pastoral food economy zone are usually dependent on both agriculture and livestock. Interviews conducted with key informants indicated that the majority of the surveyed population in this food economy zone are dependent on both livestock and agriculture. Few reported to have developed a number of livelihood strategies such as depending on pure livestock or agriculture and wage.

**Rains and their effects**

The gu or (dirra) and the karan rains are the main rainy season in the agro-pastoral part of the surveyed districts. The gu or (dirra) rains normally fall between late March and mid-May. The karan rains start in July and continue up to early September. The karan rains determine what is harvested from the long maturing cereal varieties planted in the gu or dirra and also provide a second opportunity for the growing of short maturing variety of maize.\(^{15}\)

At the time of the survey, the discussion conducted with the key informants indicated that the performance of the last gu rains was not favourable and may have resulted in poor prospects of the long cycle crops that are widely grown in the agro-pastoral areas of the zone.

This condition is anticipated to affect the general condition of the livestock as the gu rains are one of the most important and determinant factors for the improvement of grazing and surface water availability.

A similar discussion conducted with these key informants indicated that the start of the current year karan rains was reported to be late by most of the key informants. Very few of them said that they haven’t received karan rains at all at the time of the survey. Some of these key informants reported that the current karan rains started on time. The late start of the current karan rains is evident throughout the zone as these and similar reports through other sources (Somali Region Quarterly Food Security Update) have reported a delay of about three weeks.

It has to be noted that the poor performance of both gu and karan rains still remains a specific concern for farmers living in the vicinity as pasture and water availability is seriously affected and anticipated to become below normal particularly in the coming jilaal season.\(^{16}\)

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15 HFE, Baseline study by SCUK and Partners, October 2001.

16 Jilaal is the long dry season that usually happens between October and March.
Condition of livestock, cereal and shoot prices:

Shoot is reported to be the first, and cattle the second, dominant livestock within the surveyed areas. Most of the households own animals of some kind. At the time of the survey, the condition of livestock was reported as good/average by the majority of the interviewed households. A similar discussion conducted with key informants also reflected that the current condition of livestock was rated as good/medium.

Cereal prices have gradually increased in the past one year. This could be associated with the very poor food crop production, which was mentioned in the majority of surveyed villages. A very poor food grain supply from adjacent districts is also mentioned as one of the other reasons for the cereal price increases. Cereal prices are also dependent on the availability and continuity of relief food distributions.

Relief food

The provision of relief food has been carried out in the surveyed districts since December 2002. The SCUS/SCUK Emergency Drought Relief and Recovery Programme office mentioned that the revision in the number of beneficiaries was carried out in February 2004 which resulted in a reduction of about 40 per cent of the number of previous beneficiaries. The office also indicated that, currently, about 103,300 beneficiaries from both pastoral and agro-pastoral areas of Errer, Dambal, Ayisha and Shinille districts are still receiving food aid since February 2004.

The commodities that have been provided to the beneficiaries include wheat grain, corn soy blend, oil and lentils. At the time of the survey almost all the interviewed households received relief food in the last three months. The average family size within the surveyed areas was reported to be six people. However, the amount of relief wheat distributed per household varies from 10 kg to 100 kg with an average of about 36 kg per household. This is about 6 kg of relief wheat per person per month. This amount is below the recommended amount of 15 kg /person/month.

Although the quantity distributed at household level was below the recommended norms, it still has been an important contribution to the overall improvement of the nutritional status of the population, and has also played an important role in maintaining market stability.

Health

Measles vaccination coverage as confirmed by card is only 1 per cent though it increases to 51 per cent when mothers were asked to confirm whether or not their children had been vaccinated against measles or not. The current levels of measles vaccination coverage is better than all the previous years but still remains low according to the international standards.

Vaccination coverage for measles has shown an increase in coverage since the survey in December 2002. This might indicate that the general health services in the surveyed areas are getting better over time and areas located at far distances have been included for vaccination. Moreover, it may also reflect the routine Expanded Programme on Immunisation (EPI) services underway in the areas and that the measles/polio vaccination campaign has reached the remote areas as well.

Measles vaccination coverage since December 2002

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17 Emergency Drought Relief and Recovery Programme for Shinile zone, Ethiopia. Implemented by SCUK and SCUS and funded by USAID/OFDA and food aid intervention through JEP since December 2002.
Recommendations

Short-term recommendations
Monitor the performance of the current year harvest.

Continue monitoring the nutrition situation

Although the current measles vaccination coverage has increased since the previous survey it is still low. Therefore, it is important to advocate for increased vaccination coverage.

Long-term recommendations
The surveyed areas have been food insecure due to the recurrent drought. As a result, annual production is not expected to cover food needs. Therefore, it is very important to create an opportunity for households to generate cash income through establishing income diversification projects, promoting off-farm opportunities and saving and credit associations.
SCKUK undertook a nutrition survey in Shinile, Dambal, and Errer districts in August 2004. A summary of the main findings is presented in this document.

A total of 891 children aged 6 to 59 months were analysed. The prevalence of global acute malnutrition (< -2 Z scores weight-for-height) was estimated at 8.1 per cent (95 per cent CI 6.2-10.0 per cent) and severe acute malnutrition (<-3 Z scores weight-for-height and or oedema) was estimated at 0.3 per cent (95 per cent CI 0.0-0.7 per cent).

This level of malnutrition with the absence of aggravating factors is considered typical for a chronically malnourished population as per the disaster prevention and preparedness commission (DPPC) emergency nutrition assessment guidelines (December 2002). The stability of nutritional status within an acceptable level since May 2004 could be linked to the ongoing relief food distribution in the areas since December 2002.

Food security situation: The gu or (dirra) and the karan rains are the main rainy season in the agro-pastoral part of the surveyed districts. The gu or (dirra) rains normally fall between late March and mid-May. The karan rains start in July and continue up to early September. The karan rains determine what is harvested from the long maturing cereal varieties planted in the gu or dirra and also provide a second opportunity for the growing of short maturing variety of maize.18

At the time of the survey, the discussion conducted with the key informants indicated that the performance of the last gu rains was not favourable and may have resulted in poor prospects of the long cycle crops that are widely grown in the agro-pastoral areas of the zone.

This condition is anticipated to affect the general condition of the livestock, as the ‘gu’ rains are one of the most important and determinant factors for the improvement of grazing and surface water availability.

It has to be noted that the poor performance of both gu and karan rains still remains a specific concern for farmers living in the vicinity as pasture and water availability is seriously affected and anticipated to fall below normal particularly in the coming jilaal season.

Condition of livestock, cereal and shoat prices: At the time of the survey, the condition of livestock was reported as good/average by the majority of the interviewed households. A similar discussion conducted with key informants also reflected that the current condition of livestock was rated as good/medium.

Health:

Nearly 10 per cent of mothers reported that their children had been ill in the two weeks prior to the survey. Diarrhoea, cough, fever and other disease like malaria were reported as the most common health problems usually affecting the health of children under five.

Measles vaccination coverage as confirmed by card is only 1 per cent though it increases to 51 per cent when mothers were asked to confirm whether or not their children had been vaccinated against measles. The current levels of measles vaccination coverage is better than all the previous years but still remains low according to the international standards.

Vaccination coverage for measles has shown an increase in coverage since the survey in December 2002. This might indicate that the general health services in the surveyed areas are improving and areas located at far distances have been included for vaccination. Moreover, it may also reflect the routine EPI services underway in the areas and that the measles/polio vaccination campaign has reached the remote areas as well.

**Recommendations**

**Short-term recommendations**
- Monitor the performance of the current year harvest.
- Continue monitoring the nutrition situation
- Although the current measles vaccination coverage has increased since the previous survey it is still low. Therefore, it is important to advocate for increased vaccination coverage.

**Long-term recommendations**
- The surveyed areas have been food insecure due to the recurrent drought. As a result, annual production is not expected to cover food needs. Therefore, it is very important to create an opportunity for households to generate cash income through establishing income diversification projects, promoting off-farm opportunities and saving and credit associations.
5. Case studies

Two case studies, from Malawi and from Ethiopia, are presented in this section. Case studies are useful for getting participants to think through real-life scenarios. They also provide an opportunity for participants to work in a group and develop their analytical and decision-making skills. Trainers should develop their own case studies which are contextually appropriate to the particular participant group. Ideally, trainers should use scenarios they are familiar with. More detailed case study exercises have been developed for the other modules in the training course.

Exercise 6: Interpreting nutrition survey data

What are the learning objectives?
• To be able to interpret anthropometric and non-anthropometric nutrition survey results
• To understand the meaning of prevalence and confidence intervals

When should this exercise be done?
• As part of a longer in-depth training

How long should the exercise take?
• 60 to 90 minutes

What materials are needed?
• Handout 6a: Case study I: Political and economic turmoil in Malawi 2002
• Handout 6b: Case study I: Political and economic turmoil in Malawi 2002-Suggested answers
• Handout 6c: Case study II: Somali refugees in Hartisheik camp, Ethiopia 1988-1990
• Handout 6d: Case study II: Somali refugees in Hartisheik camp, Ethiopia 1988-1990-Suggested answers

What does the trainer need to prepare?
• Prepare a case study from a context familiar to the participants based on the templates in Handouts 6a and 6c and suggested answers according to Handouts 6b and 6d.

Instructions

Step 1: Distribute Handouts 6a and/or 6c on the day before this activity, so that participants can read it through in advance. If this is not possible make sure you allocate 15 additional minutes for participants to read the case study, especially if English is not their first language.

Step 2: Divide the participants into groups of (Maximum) five people.

Step 3: Ask each group to complete the task in 40 minutes. This includes preparing a five-minute presentation of their answers.

Step 4: Give each group five minutes for feedback in plenary and discuss the presentations.
Handout 6a: Case study I: Political and economic turmoil in Malawi 2002

Time for completion: 40 minutes

Spend up to 15 minutes reading through the case study you have been given.

In your group, and once you have all had time to read through the case study, nominate a rapporteur to record your main points and a spokesperson to provide feedback to the wider group. Answer the questions below.

1. What do the survey results tell us about nutritional status in Salima District?
2. What are the likely causes of malnutrition?
3. Is there any additional information you would have liked to have to help with the interpretation of the results?

Background

Malawi is a small country, 118,484 sq km, with a population of 10.18 million, in comparison with Zimbabwe which is 390,580 sq km and has a population of about 12 million. Infant and under-five mortality rates are estimated at 104 and 189 per 1,000 live births, respectively and maternal mortality is at 1,120 per 100,000 live births.\[^{19}\]

The country gained independence in 1964 and its first president, Dr. Hastings Banda, of the Malawi Congress Party, became president for life. He was eventually forced, by church-led civil society, to announce a referendum about a multi-party democracy. Bakili Muluzi, of the United Democratic Front, was elected in 1994, re-elected in 1999 and recently it has been announced that the Government of Malawi will seek to change the constitution to enable him to stand for a third term in 2004.

Food security

Agriculture is the most important sector of the economy. Tobacco is Malawi’s main export, and tea is its second cash crop. Fish from Lake Malawi is important as a staple food for lakeshore communities as well as an export.

Malawi is heavily dependent upon maize, which makes up 73 per cent of the total kilocalorie intake. Maize cultivation, to the exclusion of almost all other crops, was strongly encouraged during Dr. Banda's regime. Annual maize consumption levels are about 2 million metric tons (MT). The last good year of above-average production was 1999-2000, when the total yield was around 2.5 million MT. Efforts by NGOs to encourage diversification into other staples, such as sweet potato and cassava, have enabled some communities in the north to withstand the worst of the maize shortages, but this is taking time to have an impact on the country as a whole.

Population density is high and rural small holdings are generally not large enough to produce sufficient food for a household’s needs. Fertilizer is hard to come by and expensive for farmers that do not have enough land to optimize crop rotation practices. It is estimated that only 10 per cent of the country’s irrigation potential is utilized, and the livestock sector is very underdeveloped. There is very little employment in the district’s rural areas. The road network is poor; there are only a few sealed roads and others are regularly damaged by the heavy rains that can occur during the rainy season from January to April.

There is usually a hungry season of two to three months, before the harvest in April and May. People are used to this, and have various ways of coping, such as reducing the number of meals per day and increasing consumption of wild fruits.

Circumstances leading to the 2002 crisis

Northern Malawi experienced flooding in early 2000, but Malawi as a whole was spared by Cyclone Eline and the flooding that had devastated southern Mozambique. However, Malawi did not escape the following year. In 2001, some 335,000 people in the south and central regions, and some areas of northern Malawi, were affected by serious flooding, which destroyed crops, homes and possessions. Thousands of people spent months in camps. The flooding and late rains in February and March 2001 also meant that crop yields were down as the maize could not mature and dry out. In many places, it rotted in the fields.

At around the same time, the national grain reserves were sold off, including 15,000 MT of donor grain. This was not replaced, leaving the country without an emergency grain stock. The usual relief assistance provided by the government to see rural populations through the hungry season was therefore not available.

\[^{19}\] Malawi Demographic and Health Survey 2000, National Statistical Office, Zomba, Malawi.
Growing shortages forced the Agricultural and Marketing Board (ADMARC) to suspend price-fixing on maize in October 2001. The price of a kilogram increased overnight by over 300 per cent, from 5MK to 17MK. This caused a panic, with people selling other produce, such as sweet potato, seasonal fruits and vegetables, at very low prices in order to buy their favourite staple food. This helped to push up prices still further.

By December 2001 the food scarcity and increased maize prices were starting to have negative effects on rural communities. Fewer hectares of land were being planted, which would lead to a lower-than-normal harvest the following year. The government announced that it would import 150,000 to 200,000 MT to meet the anticipated shortfall. In February 2002, following more floods which delayed planting of some crops, there was an unseasonal dry spell that affected the maize crops at a crucial point in its growth cycle. Crops began withering and dying in the fields, having produced very small, if any, cobs. The president finally declared a state of disaster on 27 February 2002.

Current situation
As of March 2002, the government had only replaced less than half of maize stock requirements. Transport bottlenecks, financial difficulties and importation problems are cited as reasons for the slow importation of maize. There is a serious regional shortage of maize, South Africa being the only country in the region currently in a position to export it. Serious food shortages are being reported at government ADMARC outlets, and many of them are empty. Traders are taking advantage of the situation to increase their profits.

Most households cannot afford current prices and are resorting to reducing the number of meals they eat per day, harvesting premature crops, selling livestock and other assets, and eating poor quality foods, (e.g. wild foods and maize husks/bran). In addition, due to the early onset of a hungry season, normal patterns of work have broken down. Instead of preparing for a new season and working in their gardens, many Malawians have gone further afield to look for work, including migrating across borders, sleeping outside the ADMARC depots to wait to buy food, camping outside district administrators’ offices in the hope that they will receive some food aid assistance, digging up and eating banana tree roots and other wild roots and tubers, scavenging for food, begging, and selling off livestock and other possessions. In many instances, it is the men who leave home to look for work or other income, leaving women and children behind in the villages. There have been reports of women leaving young children alone or in the company of other children while they go out to look for food, and even of children being sold to bring in some income. The increasing theft of green maize and other immature crops from fields, with consequent severe punishments, in communities with strong moral teachings, is an indication of the severity and volatility of the situation.

Nutritional status
SCUK took cluster sample nutrition surveys in the district of Salima regularly between 2001 and 2004. Salima borders the lake where SCUK was implementing programmes prior to the emergency in 2002, which led SCUK to set up selecting feeding programmes and food security programmes from 2002 to 2004. The results of these surveys are shown below.

<table>
<thead>
<tr>
<th>Acute malnutrition in Z scores</th>
<th>December 2001</th>
<th>February 2002</th>
<th>February 2003</th>
<th>February 2004</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5 GAM (%)</td>
<td>10.5 (9.2-11.8)</td>
<td>19.0 (17.7-20.3)</td>
<td>13.1 (10.8-15.4)</td>
<td>8.2 (6.9-9.5)</td>
</tr>
<tr>
<td>&lt; 5 SAM (%)</td>
<td>4.9 (4.0-5.8)</td>
<td>6.0 (4.9-6.1)</td>
<td>2.6 (1.6-3.6)</td>
<td>1.4 (0.9-2.9)</td>
</tr>
<tr>
<td>CMR (per 10,000/day)</td>
<td>–</td>
<td>1.2</td>
<td>1.1</td>
<td>1.0</td>
</tr>
<tr>
<td>&lt; 5MR (per 10,000/day)</td>
<td>–</td>
<td>2.8</td>
<td>2.1</td>
<td>1.8</td>
</tr>
</tbody>
</table>
Morbidity and health environment in 2002

In the flooded areas along the lake and other low-lying regions, cholera outbreaks have so far claimed over 1,000 lives (as reported in health centres). The lack of ringers-lactate in the country to contain cholera is a great concern. Malaria and anaemia are common, especially in low-lying southern areas and near the lake.

The water table remains high and it has been very difficult to replace the latrines that collapsed during the flooding. The usage of latrines is usually very low anyway (35 per cent in Salima district) and there is no well-established system of hygienic rubbish disposal. Water points are shared by people and livestock, for washing, drinking and bathing.

Many families with wage earners already have to look after additional children of relatives who have died as a result of AIDS. In rural areas the number of child-headed households is steadily increasing. The case of children being ‘orphaned’ repeatedly is common, as parents, aunts, uncles, grandparents die. This year it is widely acknowledged that the HIV infection is taking its toll and adding to hunger-related deaths: many HIV-positive people rely on a simple and healthy lifestyle as a guard against illness because access to health care and medicines is difficult and costly.
Handout 6b: Case study I: Political and economic turmoil in Malawi 2002 – Suggestion of answers

Question 1. Nutritional status was bad in 2002 and had almost doubled compared to 2001. It improved the following years in 2003 and 2004.

Question 2. Likely determinants:
   - Food insecurity in 2002: Floods; bad harvest; suspension of price-fixing of maize; insufficient importation of maize; food price increase; …
   - Effect of HIV/AIDS epidemics which render many children orphans and increasing number of households child-headed.

Question 3. More information on:
   - Household main sources of income and food
   - Household food consumption, including infant and young child feeding practices
   - Humanitarian aid provided in 2002
   - Information on food security in 2003 and 2004
   …
Handout 6c: Case study II: Somali refugees in Hartisheik camp, Ethiopia 1988-1990

Time for completion: 40 minutes

Spend up to 15 minutes reading through the case study you have been given.

In your group, and once you have all had time to read through the case study, nominate a rapporteur to record your main points and a spokesperson to provide feedback to the wider group. Answer the questions below.

1. What do the survey results tell us about the nutritional status of the refugees and the local population?
2. What are the likely causes of malnutrition?
3. Is there any additional information you would have liked to have to help with the interpretation of the results?

The population

In June 1988 the population in northwest Somalia fled to Ethiopia, because of the outbreak of the civil war. The population was mainly from the town of Hargeisa, and was an urban, educated and fairly well-nourished population. They had to travel for three to four days. They were housed in six camps, one of which was Hartisheik. People settled themselves, and hence camps were disorganized. The population in Hartisheik was about 200,000. A large proportion of the refugee population was women and children, as many of the men in the area were either killed or were soldiers with the SNM, who continued fighting in Somalia.

The local environment

The area is flat scrubland, with heavy rains in March, and small rains in October and November. Previously only nomadic pastoralists inhabited the area, as the land is unsuitable for farming. The camp is in an isolated area, with no large markets nearby. The movement of food was restricted in Ethiopia, and particularly the availability of fresh fruit was limited.

The provision of aid to refugees was politicized as the Mengistu government tried to minimize the severity of the situation. In addition, the Ogaden region, where the refugees had settled, had long been a contested area between Ethiopia and Somalia, as most of the inhabitants are ethnic Somalis. The Somali Western Liberation Front, fighting for the liberation of the Ogaden from Ethiopia, was active in the region, and the Ethiopian military had bases in the area.

Movement in and out of the camps was restricted both for aid agencies and refugees. Agency staff could only operate in the camp from 8 a.m. until 2 p.m., and were based in Jijiga, almost a two hours’ drive from the camp.

Nutritional status

Nutrition surveys in September 1988 based on two-stage cluster sampling were completed among the refugee population and the local resident population and showed the following results:

<table>
<thead>
<tr>
<th>Acute malnutrition (weight-for-height)</th>
<th>Somali refugees</th>
<th>Somali refugees % of the median</th>
<th>Resident population Jijiga</th>
<th>Resident population Jijiga % of the median</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5 GAM (%)</td>
<td>14.7</td>
<td>17.0 (15.7-18.3)</td>
<td>15.9 (13.6-18.5)</td>
<td>16.2 (13.8-18.8)</td>
</tr>
<tr>
<td></td>
<td>(12.5-17.2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 5 SAM (%)</td>
<td>2.2</td>
<td>3.0 (1.9-4.1)</td>
<td>1.4 (0.8-2.5)</td>
<td>1.6 (1.0-2.4)</td>
</tr>
<tr>
<td></td>
<td>(1.4-3.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women’s MUAC &lt; 18.5cm</td>
<td>3.0%</td>
<td>0.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CMR (per 10,000/day)</td>
<td>1.6</td>
<td>0.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 5MR (per 10,000/day)</td>
<td>2.2</td>
<td>1.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles immunization with card</td>
<td>76.2%</td>
<td>52.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin A distribution with card</td>
<td>32.1%</td>
<td>51.3%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Mortality and morbidity

Regular mortality surveillance was not carried out at the start of the programme. The normal patterns of disease in the area include diarrhoea and respiratory infections during the rainy season in March and October through November, and a high incidence of chest and eye infections during the cold dry season in December and January. The prevalence of TB in the area is also high.

Health environment

Water supply was limited to three to five litres per person per day, which had to be trucked into the camp on a daily basis. Sanitation programmes are non-existent. There are no milling facilities in the camp.

Food assistance

Relief assistance was provided by the Administration of Refugee Affairs (ARA) of the Government of Ethiopia (GOE), the office of the UNHCR, the World Food Programme and a number of NGOs. Food had to be stored in Jijiga, as there was no space for warehouses in the camp. In the camp, food distribution was centralized, using family ration cards. Fuel or firewood for cooking was not provided.

Population figures

The official number of refugees registered for rations was 300,000 (e.g., number of ration cards). The true population was estimated to be around 170,000. To supply food for the camp, WFP and UNHCR used a planning figure of 200,000. Camp officials managing ration distribution waited until there was sufficient food in the camp to distribute a full ration to the number according to the ration cards. Distributions were therefore irregular. Weekly rations were given out at two- to three-week intervals.

The planned ration is shown below:

<table>
<thead>
<tr>
<th>Per person per day</th>
<th>g</th>
<th>Kcal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat grain</td>
<td>500</td>
<td>1725</td>
</tr>
<tr>
<td>Or wheat flour</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Pulses</td>
<td>50</td>
<td>172</td>
</tr>
<tr>
<td>Vegetable oil</td>
<td>30</td>
<td>270</td>
</tr>
<tr>
<td>Sugar</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>Corn soy blend</td>
<td>30</td>
<td>114</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>2361</strong></td>
</tr>
</tbody>
</table>

In practice, the actual ration that was distributed per ration card was:

<table>
<thead>
<tr>
<th>Per person per day</th>
<th>Jan-August 1989</th>
<th>Feb-May 1989</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat grain</td>
<td>412g 1421</td>
<td>290g 1000</td>
</tr>
<tr>
<td>Pulses</td>
<td>42g 143</td>
<td>33g 112</td>
</tr>
<tr>
<td>Vegetable oil</td>
<td>28g 252</td>
<td>25g 225</td>
</tr>
<tr>
<td>Sugar</td>
<td>3g 12</td>
<td>3g 12</td>
</tr>
<tr>
<td>Corn soy blend</td>
<td>28g 106</td>
<td>30g 114</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>1934</strong></td>
<td><strong>1463</strong></td>
</tr>
</tbody>
</table>
Handout 6d: Case study II: Somali refugees in Hartisheik camp, Ethiopia 1988-1990
– Suggestion of answers

Question 1. Nutritional status is precarious although similar to the nutritional status of the surrounding resident population. Mortality seems higher among refugees than residents.

Question 2. Likely determinants:
- Food insecurity: irregular food distribution; absence of milling and distribution of firewood so refugees must use part of their ration for this; no possibility of income-generating activities.
- Poor public health, including access to water and sanitation

Question 3. More information on:
- Household main sources of income and food
- Household food consumption, including infant and young child feeding practices
- Micronutrient status
- Confidence Intervals of mortality rates
...
Exercise 7: Designing and implementing a nutrition survey

What is the learning objective?
- To be able to design appropriate objectives and methods for nutrition surveys
- To understand how to calculate sample sizes for nutrition surveys
- To understand how to do cluster sampling
- To be aware of the practical steps involved in implementing nutrition surveys

When should this exercise be done?
- As part of a longer in-depth training

How long should the exercise take?
- 1 day

What materials are needed?
- Handout 6a: Case study III: Afghanistan 2002
- Handout 6b: Case study III: Afghanistan 2002: Model answers

What does the trainer need to prepare?
- Prepare a case study from a context familiar to the participants based on the templates in Handouts 7a and b.

Instructions
Step 1: Distribute Handout 7a on the day before this activity, so that participants can read it through in advance. If this is not possible make sure you allocate additional time for participants to read the case study, especially if English is not their first language.
Step 2: Divide the participants into groups of (Maximum) five people.
Step 3: Ask each group to complete the task over the course of one day. This includes preparing a presentation of their answers.
Step 4: Give each group 30 minutes for feedback in plenary and discuss the presentations.
Handout 7a: Case study III: Afghanistan 2002

This case study is based on a real survey carried out in Badghis province, Afghanistan in March and April 2002. It has been simplified somewhat in the interests of time. Please read each background section carefully and then discuss each question. Try not to look ahead, as the background for the next question may narrow your discussion of the prior question (or worse, just give you the answer).

Part I: Survey planning

Twenty years of civil conflict has destroyed most of the infrastructure, and there has not been a well-functioning government in Afghanistan since before the conflict began. Moreover, the northern and western areas of the country have suffered a drought for the past three years. Some NGOs have reported widespread malnutrition in some villages in provinces in these areas. The vulnerability assessment mapping done by the World Food Programme during the summer of 2001 estimated that many districts in the north and west produced less than 75 per cent of their food needs (see Figure 1).

All the organizations working in health and nutrition in Afghanistan need data on the nutritional status of young children in order to plan emergency nutrition interventions. Also, the donors are demanding confirmation of the level of malnutrition before committing to provide millions of dollars to import and distribute thousands of tons of food to the population. They also want a baseline against which to evaluate the efficacy of any interventions implemented as a result of your investigation.

1. How would you gather the data needed by these organizations? Discuss the relative advantages and disadvantages of the following data collection methods.
   a) Surveillance
   b) Qualitative methods
   c) Survey
   d) Other methods?

Badghis province has been selected to be the first province in a series of province-wide nutrition and health assessment surveys. Badghis was selected because: 1) it is considered at high risk, 2) it is, on average, at a lower altitude so the snow melts earlier in the spring granting access to mountainous areas, and 3) it is close to the regional capital of Herat. Moreover, World Vision is implementing blanket supplementary feeding in two of the five districts in Badghis province for children less than five years of age and pregnant and lactating women. As a part of registration for this programme, World Vision staff screened more than 23,000 children one to four years of age with mid-upper arm circumference (MUAC) and found a worrying situation.

UNICEF has invited you to conduct a population-based survey in Badghis province to confirm or refute these results and to guide future nutrition programming. The rest of this exercise concerns planning and carrying out a province-wide survey.
2. During talks with various organizations in Islamabad, Pakistan and Herat, Afghanistan, what are the first questions you need answered in these cities in order to begin survey planning?

After meetings with UNICEF staff and the medical and nutrition coordinators of various NGOs, you determine that the objectives of this survey will be:

1) The prevalence of acute malnutrition (as indicated by weight-for-height) and chronic malnutrition (as indicated by height-for-age) in children less than five years of age

2) The prevalence of malnutrition in women of reproductive age (15 to 49 years of age), as measured by body mass index (weight divided by height squared)

3) Crude mortality rate and causes of death

4) Age-specific mortality rates, including the mortality rate among children less than five years of age

5) The coverage of recent measles vaccination campaigns among children nine months to five years of age

6) The prevalence of having a safe water source for household members

3. If you were planning to do a survey to only meet Objective 1, what variables would you need to collect? Remember other variables you will need during analysis.

4. Write the questions to be posed to an adult household member to meet Objective 6.

Part II: Sample size calculation

You have formulated objectives as listed above and have begun circulating a draft data collection form for comment to all organizations working in Badghis. Now you are ready to begin planning for the sampling phase. The first thing you need to do is to determine what you will sample. Because you will include both young children and women as survey subjects, you will probably need to sample households. It would be too time consuming to select one sample of young children and a separate sample of women.

Now you need to decide how many households you will need to select. Sample size calculation is the next step because the sample size will determine many of the logistics needs of the survey, such as how many teams will be needed for data collection, how many data collection forms you will need to have printed, etc. The current population of Badghis province is estimated to be about 680,000, but this estimate does not fully account for the substantial emigration last winter because of drought.

1. What assumptions do you need to formulate before calculating sample size?

You decide that, for this survey, nutritional status will be the main outcomes which will determine the final sample size. Several NGOs say that there is a lot of acute malnutrition among children less than five years of age in provinces in the north and west of Afghanistan. There have been no reports concerning adult nutritional status, but a few NGO workers say that mothers are starving themselves in order to feed their young children. In addition to these qualitative impressions, there have been two nutrition surveys in Afghanistan in the past year that generated estimates of the prevalence of acute malnutrition. Data from other neighbouring countries in south Asia demonstrate that the prevalence of chronic malnutrition is 60 to 65 per cent.

<table>
<thead>
<tr>
<th>Survey</th>
<th>Place</th>
<th>Date</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>A UNICEF Multiple Indicator Cluster Survey (MICS)</td>
<td>6 eastern provinces</td>
<td>September 2001</td>
<td>9.9%</td>
</tr>
<tr>
<td>Save the Children – US</td>
<td>Kohistan district Faryab province (next door to Badghis)</td>
<td>April 2001</td>
<td>7.0%</td>
</tr>
</tbody>
</table>

These surveys and other data demonstrate that each household has on average 1.3 children and 1 woman 15 to 49 years of age. Since this is an emergency nutrition assessment, you decide that you do not really need very much precision. However, the results of this survey will be used as a baseline against which to judge the efficacy of various nutrition programmes.
2. Complete the table below for each nutrition outcome. Be sure you can justify each of your assumptions.

<table>
<thead>
<tr>
<th>Target population</th>
<th>Outcome</th>
<th>Estimated prevalence</th>
<th>Desired precision</th>
<th>Sample size (assuming simple random sampling)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children 0-59 months of age</td>
<td>Acute malnutrition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children 0-59 months of age</td>
<td>Chronic malnutrition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women 15-49 years of age</td>
<td>Malnutrition</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Do you need to adjust the sample size calculated above for any other factors? If so, which factors?

4. Assuming that 25 per cent of selected households will be empty or the family unavailable, how many households must be selected to obtain 246 children less than five years of age and 246 women 15 to 49 years of age?

5. Which of the three nutrition outcomes above will be more important in determining your final sample size?

Part III: Cluster sampling

Now it is time to decide how you will select a sample of the population of Badghis province.

1. What information do you need to find in order to decide what sampling method to use?

You find out from NGO staff that they have recently registered every village and/or sub-village in Badghis province in order to carry out general food distribution during the winter of 2001 and 2002. You obtain from these NGOs their lists of villages in electronic form and create a spreadsheet containing the district where the village is located, the village name, the number of households in the village and an estimate of the village population. With this wealth of data, you decide that cluster sampling will be easy. But now you have to adjust your sample size to reflect the loss of statistical precision inherent in cluster sampling.

Of course, in order to do this you need to make some assumptions about the design effect. From your discussions with people that have travelled and worked throughout Badghis province, you get the impression that nutritional status is generally the same throughout the province. Nonetheless, Jawand district is more isolated than the other districts and the snow melts there last, so roads open later in the spring. The prior surveys in Afghanistan have found that the design effect for acute and chronic malnutrition have been less than 2. No prior survey has included an assessment of the nutritional status of adults.

2. Formulate assumptions about the design effect and complete the table you started in Question 1 in Part II to determine how many households you will need to include in the survey.

<table>
<thead>
<tr>
<th>Target population</th>
<th>Outcome</th>
<th>Estimated prevalence</th>
<th>Desired precision</th>
<th>Sample size (assuming simple random sampling)</th>
<th>Design effect</th>
<th>Sample size needed</th>
</tr>
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<tbody>
<tr>
<td>Children 0-59 months of age</td>
<td>Acute malnutrition</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Children 0-59 months of age</td>
<td>Chronic malnutrition</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women 15-49 years of age</td>
<td>Malnutrition</td>
<td></td>
<td></td>
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</tbody>
</table>

You decide that, given the difficulty in travelling and the shortage of time, you will include 30 clusters.
3. Using the list of villages at the end of this exercise, or on the spreadsheet supplied, select a sample of 30 villages probability proportional to size to determine where your clusters will be.

- What is the total number of households in Badghis province?
- What is the sampling fraction for the first sampling stage?

You have chosen 30 villages in Badghis province to include in the survey. You may notice that some of your selected villages are very large, with more than 1,000 households. Other selected villages are much smaller with only 50 to 100 households. You visit a few villages in Badghis province and village leaders, as well as your Afghan survey team members, tell you that all households in the province belong to a mosque to which they pay a small annual subscription fee. No household belongs to more than one mosque. Depending on the size of the mosque and the popularity of the mullah, mosques may have 25 to 150 households as subscribers. The mullah of each mosque knows each family belonging to his mosque.

You decide, based on your sample size calculations and available resources, to include 600 households in the survey.

4. How many households should be in each cluster? Should each cluster be the same size, or should clusters be larger in larger villages and smaller in smaller villages?

5. How will you select households in each village? Discuss the advantages and disadvantages of each of the following techniques:

a) EPI method of spinning a bottle to determine a random direction
b) Segmentation and random selection of one segment
c) Enumeration and random selection
d) Letting the mullah or village leaders choose the households

Because some villages are so large that it would take hours to list every household (if it could be done at all), you decide to select one mosque in villages with more than 200 households. The required number of households would then be selected from a list of all the households belonging to that mosque.

6. Below is a list of mosques and the approximate number of households belonging to each which are found in one selected village. Select one mosque probability proportional to size using the random number table in Appendix 2. (Hint: use the extra columns to add the cumulative total.)

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<th>Name of mullah</th>
<th>Number of families</th>
<th>Cumulative number families</th>
<th>Selected mosque</th>
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Part IV: Logistics and implementation

You have now completed the first stage of sampling and have figured out how you will select either households or mosques in the second and third stages of sampling. Now it is time to plan for all the survey activities, probably the most tedious but most important part of carrying out a survey.
1. You must first determine what you need to complete the survey. After reviewing the objectives of the survey (see page 2), make a list of all the equipment and supplies that you will need to carry out your survey and meet these objectives.

2. What tasks are necessary to collect the data? What should the qualifications of the person who performs these tasks?

You have enough personnel to form three teams. You estimate the team will require about half an hour at each house for data collection, and that it takes only 10 minutes to walk to the next house. However, driving to the next cluster takes one day.

3. How much time should you budget for data collection?

Most of your planning is done. Of course, you have to arrange duplication of the data collection forms, decide on the pay scale for the various survey team members, organize and carry out the training, and take care of many other details before you can actually load up the vehicles and get started. But there is no need to include those details here.

Table 1: Random number table

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</table>

Table 1: Random number table
List of villages in Badghis province, Afghanistan (abridged for case study)

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<th>Village no.</th>
<th>District</th>
<th>Sub-district</th>
<th>Area</th>
<th>Village</th>
<th>No. HHs in village</th>
<th>Culm no. HHs</th>
<th>Cluster no.</th>
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List of villages in Badghis province, Afghanistan (abridged for case study) (continued)

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List of villages in Badghis province, Afghanistan (abridged for case study) (continued)

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Handout 7b: Case study III: Afghanistan 2002: Model answers

Part I: Survey planning

1. How would you gather the data needed by these organizations? Discuss the relative advantages and disadvantages of the following data collection methods.

   a) Surveillance
      Too long to set up
      May not be population-based

   b) Qualitative methods
      No given quantitative estimate useful for comparison to future surveys
      May not use standard case definitions of nutritional status

   c) Survey
      Provides a snapshot of the situation at this point in time
      Probably best method for this situation

   d) Other methods?
      Discourage use of convenience samples, obviously biased reports from community members, journalists’ accounts, etc.

2. During talks with various organizations in Islamabad, Pakistan and Herat, Afghanistan, what are the first questions you need answered in these cities in order to begin survey planning?

   • What data are to be collected?
     • Meet with NGOs working in health and nutrition.
     • Determine what nutrition programs currently in place.
     • Determine what decisions will be made based on survey results.

   • What are the goals and objectives for survey?
     • What nutritional outcomes you want to assess
     • Who are the target groups for survey

   • What are the constraints to meeting the objectives determined above?
     • Equipment availability
     • Cultural barriers to targeting subgroups

After meetings with UNICEF staff and the medical and nutrition coordinators of various NGOs, you determine that the objectives of this survey will be:

1) The prevalence of acute malnutrition (as indicated by weight-for-height) and chronic malnutrition (as indicated by height-for-age) in children less than five years of age

2) The prevalence of malnutrition in women of reproductive age (15 to 49 years of age), as measured by body mass index (weight divided by height squared)

3) Crude mortality rate and causes of death

4) Age-specific mortality rates, including the mortality rate among children less than five years of age

5) The coverage of recent measles vaccination campaigns among children nine months to five years of age

6) The prevalence of having a safe water source for household members
3. If you were planning to do a survey to only meet Objective 1, what variables would you need to collect? Remember other variables you will need during analysis.

- Identification of cluster
  - Date of data collection
  - District
  - Village name
  - Cluster number
  - Household number
  - Team identification number
  - Follow-up of household (completed, refused, family moved away, missing and number of revisits)
- All children 0 to 59 months of age currently in household
  - Demographic information
- Date of birth or age in months
- Sex
  - Acute malnutrition
- Weight
- Length (less than 24 months of age) or height (24 to 59 months of age)
- Presence of deformity preventing measurement of length/height
- Oedema

NOTE: Don’t let the students forget to mention these items. Date of data collection is necessary to calculate the exact age of those children for who birth date is recorded. A cluster number will be necessary during data analysis to account for cluster sampling. Oedema is necessary to exclude those with oedema from an analysis of weight-for-height.

4. Write the questions to be posed to an adult household member to meet Objective 1.
Judge specificity and clarity of questions developed.

Part II: Sample size calculation

1. What assumptions do you need to formulate before calculating sample size?
   - Estimate of the prevalence of the outcome to be measured
   - Precision desired around this estimate
   - Level of confidence – Choose 95%

2. Complete the table below for each nutrition outcome. Be sure you can justify each of your assumptions.

<table>
<thead>
<tr>
<th>Target population</th>
<th>Outcome</th>
<th>Estimated prevalence</th>
<th>Desired precision</th>
<th>Sample size (assuming simple random sampling)</th>
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<td>Acute malnutrition</td>
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<tr>
<td>Children 0-59 months of age</td>
<td>Chronic malnutrition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women 15-49 years of age</td>
<td>Malnutrition</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
3. **Do you need to adjust the sample size calculated above for any other factors? Is so, which factors?**
   - Households which are not available; may be estimated from prior surveys or other information about the stability of the population
   - Households or individuals which refuse participation
   - Average number of children and women in each household

4. **Assuming that 25 per cent of selected households will be empty or the family unavailable, how many households must be selected to obtain 246 children less than five years of age and 246 women 15 to 49 years of age?**
   
   **For children**
   
   \[ \frac{246 \text{ children}}{1.3 \text{ children per household}} = 189 \text{ households} \]
   
   \[ 189 \text{ households} = 75\% \text{ of X households} \quad \text{or} \quad 189 \text{ households}/0.75 = 252 \text{ households} \]
   
   **For women**
   
   \[ \frac{246 \text{ women}}{1 \text{ woman per household}} = 246 \text{ households} \]
   
   \[ 246 \text{ households} = 75\% \text{ of X households} \quad \text{or} \quad 246 \text{ households}/0.75 = 328 \text{ households} \]

5. **Which of the three nutrition outcomes above will be more important in determining your final sample size?**
   
   Acute malnutrition in children and malnutrition in adult women. Chronic malnutrition is generally of less concern in emergency situations because it does not indicate acute food insufficiency.

**Part III: Cluster sampling**

1. **What information do you need to find in order to decide what sampling method to use?**
   - Is there list of all basic sampling units (e.g., households) in the province?
     - If no, must consider cluster sampling
   - Is there a geographic subunit which can be sampled?
     - Do you have some indication of size, such as population or number of households?
     - If yes, can use this as first stage sampling (geographic unit will be primary sampling unit)
   - In primary sampling unit, can you select sample of households?
     - If no, must find smaller geographic unit to select within primary sampling unit
     - If yes, determine how to select households

2. **Formulate assumptions about the design effect and complete the table you started in Question 1 in Part II to determine how many households you will need to include in the survey.**

<table>
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<tr>
<th>Target population</th>
<th>Outcome</th>
<th>Estimated prevalence</th>
<th>Desired precision</th>
<th>Sample size (assuming simple random sampling)</th>
<th>Design effect</th>
<th>Sample size needed</th>
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<td>Women 15-49 years of age</td>
<td>Malnutrition</td>
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</table>

3. **Using the list of villages at the end of this exercise, or on the spreadsheet supplied, select a sample of 30 villages probability proportional to size to determine where your clusters will be.**
   - What is the total number of households in Badghis Province? 113,933
   - What is the sampling fraction for the first sampling stage? 3797

You decide, based on your sample size calculations and available resources, to include 600 households in the survey.
4. How many households should be in each cluster? Should each cluster be the same size, or should clusters be larger in larger villages and smaller in smaller villages?

- 30 clusters of 20 households each
- Cluster size must be the same in order to end up with a sample where the probability of selection is the same for each household in Badghis.

5. How will you select households in each village? Discuss the advantages and disadvantages of each of the following techniques:

a) EPI method of spinning a bottle to determine a random direction
   - **Advantages**
     - Easy to carry out quickly
   - **Disadvantages**
     - Bias toward centre of village
     - Irregularly shaped villages to some households not noticed
     - Relies on judgment of survey workers regarding next closest house

b) Segmentation and random selection of one segment
   - **Advantages**
     - All selected households close together, so less travel
   - **Disadvantages**
     - Proximity of households may increase clustering and therefore design effect
     - May be more difficult to train survey workers in this method

c) Enumeration and random selection
   - **Advantages**
     - Allows truly random sample
     - Sample is dispersed throughout village, so less clustering
   - **Disadvantages**
     - Requires list of all households in village
     - May take time to compile list
     - May be more difficult to train survey workers in this method

d) Letting the mullah or village leaders choose the households
   - **Advantages**
     - Easy and saves time
   - **Disadvantages**
     - Likely to produce highly biased sample of mullah's friends and relatives, or people the mullah doesn't like
     - Violates a basic requirement of second-stage sampling, that is, that each eligible sampling unit has equal chance of selection

Because some villages are so large that it would take hours to list every household (if it could be done at all), you decide to select one mosque in villages with more than 200 households. The required number of households would then be selected from a list of all the households belonging to that mosque.
6. Below is a list of mosques and the approximate number of households belonging to each which are found in one selected village. Select one mosque probability proportional to size using the random number table in Appendix 2. (Hint: use the extra columns to add the cumulative total)

<table>
<thead>
<tr>
<th>Name of mullah</th>
<th>Number of families</th>
<th>Cumulative number families</th>
<th>Selected mosque</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saed Rachid</td>
<td>63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abdil Hamid</td>
<td>84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Haji Jawid Ahmad</td>
<td>121</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mirwais Azamy</td>
<td>96</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jalad Kolay</td>
<td>134</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mohd Azfal Hydary</td>
<td>60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abduk Khalik</td>
<td>73</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Part IV: Logistics and implementation

1. You must first determine what you need to complete the survey. After reviewing the objectives of the survey (see page 2), make a list of all the equipment and supplies that you will need to carry out your survey and meet these objectives.

<table>
<thead>
<tr>
<th>Training equipment</th>
<th>Logistics and sampling</th>
<th>Transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overhead projector</td>
<td>Maps of districts and province</td>
<td>Vehicles</td>
</tr>
<tr>
<td>Flip chart</td>
<td>Cluster list for each team</td>
<td>Drivers</td>
</tr>
<tr>
<td>Markers for flipchart</td>
<td>Random number table</td>
<td>Fuel</td>
</tr>
<tr>
<td>Scotch tape</td>
<td>Cluster control forms</td>
<td>Spare parts</td>
</tr>
<tr>
<td>Equipment for demonstration</td>
<td>Local calendar</td>
<td>Spare tire and patch kit</td>
</tr>
<tr>
<td></td>
<td>Verbal autopsy questions</td>
<td></td>
</tr>
<tr>
<td>Stationary</td>
<td>Anthropometry</td>
<td>Living</td>
</tr>
<tr>
<td>Clipboards</td>
<td>Height boards</td>
<td>Bedding</td>
</tr>
<tr>
<td>Large file folders</td>
<td>Scales</td>
<td>Extra food</td>
</tr>
<tr>
<td>Copies of training manual</td>
<td>Portable stadiometers</td>
<td>Spending money</td>
</tr>
<tr>
<td>Pencils and erasers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pencil sharpeners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pens</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Writing pads</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. What tasks are necessary to collect the data? What should the qualifications be of the person who performs these tasks?

<table>
<thead>
<tr>
<th>Task</th>
<th>Team member</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choosing one mosque at large villages</td>
<td>University education, preferably public health or statistics training</td>
</tr>
<tr>
<td>Choosing sample of households at each selected village or mosque</td>
<td>Same</td>
</tr>
<tr>
<td>At each selected household, introducing team members and explaining survey</td>
<td>Respected member of community, Team supervisor</td>
</tr>
<tr>
<td>Interviewing adult respondent (often man) to gather household information (e.g., water supply and household census)</td>
<td>Male interviewer, literate</td>
</tr>
<tr>
<td>Interviewing mother to determine measles vaccination status</td>
<td>Female interviewer, literate</td>
</tr>
<tr>
<td>Weighing and measuring children &lt; 5 years of age</td>
<td>Nurse, community health worker, other educated person</td>
</tr>
<tr>
<td>Weighing and measuring women 15-49 years of age</td>
<td>Female nurse, community health worker, other educated person</td>
</tr>
</tbody>
</table>
You have enough personnel to form three teams. You estimate the team will require about half an hour at each house for data collection, and that it takes only 10 minutes to walk to the next house. However, driving to the next cluster takes one day.

3. How much time should you budget for data collection?

<table>
<thead>
<tr>
<th>Each household</th>
<th>Travel between households</th>
<th>Working hours per day</th>
<th>Households per day</th>
<th>Time for each cluster</th>
<th>Total team-days</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 minutes</td>
<td>5 minutes</td>
<td>12</td>
<td>20</td>
<td>2 days</td>
<td>60</td>
</tr>
</tbody>
</table>

Therefore, with three teams, data collection will take 20 days, without any rest days.
6. Field-based exercises

This section outlines ideas for exercises that can be carried out as part of a field visit. Field visits require a lot of preparation. An organization that is actively involved in programming has to be identified to ‘host’ the visit. This could be a government agency, an international NGO or a United Nations agency. The agency needs to identify an area that can be easily and safely visited by participants. Permission has to be sought from all relevant authorities and care taken not to disrupt or take time away from programme activities. Despite these caveats, field-based learning is probably the best way of providing information that will be remembered by participants.

Exercise 8: Practising household selection for a cluster survey

What is the aim?
- To understand how to do cluster sampling

When should this exercise be done?
- As part of an in-depth course and after the session on measuring malnutrition

How long should the exercise take?
- 1 day, including travel time to site

What materials are needed
- Handout 8a: Cluster survey: Instructions
- Handout 8b: Cluster allocation form
- Handout 8c: Anthropometric survey form
- Random number tables

What does the trainer need to prepare?
- A list of villages/population units for the local area where the training is taking place with population figures
- Agreement with local representatives to visit a number of these places and allow participants to practice selecting the first house to be surveyed (Appendix 3, Part 2)
- Transport and logistical support to visit these places
Exercise 8: Practising household selection for a cluster survey (continued)

Instructions
The timing for this session will depend on the sites to be visited. It may be necessary to do the classroom part one day and the site visit the following day.

Step 1: Divide the participants into groups of four. They will all work on the same task.

Step 2: (30 min.) Distribute Handout 8a and ask the groups to allocate the clusters for the population given. It is possible each group’s allocation will be different because of the random number they chose. However the sampling interval should be the same.

Step 3: (half day) Choose one or two sites to visit depending on your logistical means and the number of experienced surveyors you have to hand to supervise. Explain to the participants you will simulate a survey by going to a cluster site and that they should use the cluster survey instructions to select the first two households to visit. They should interview the family and fill out the non-anthropometric parts of the questionnaire for practice. They should visit at least two houses. Once in the field site it may take the group 1 to 2 hours to do this.

Step 4: Find a suitable place to discuss the procedures and help participants correct their own mistakes if they have made any. This is a good opportunity to clear doubts on how to proceed when there is a block of flats, or a river which cannot be crossed. It is also useful to discuss how the household members responded to the visit and the questioning, so that participants become aware of how invasive surveys are.

Additional exercise
You can make this exercise more complete by using it as a chance to practice anthropometric measurement taking. For this you will need to prepare the correct equipment.

- Weighing scales and pants
- Height board
- MUAC strips
- Stationary to complete questionnaire
Handout 8a: Two-stage cluster survey: Instructions

Step 1: Selection of the 30 clusters

i) Identify the population to be surveyed (e.g., population of a refugee camp or drought-stricken area).

ii) Divide the population into existing or natural groupings (e.g., villages, districts or camp sections).

iii) Estimate the population in each village, district or camp section (use census data if available).

iv) Make a table with six columns (see box below).

- Column 1 should include the name of each locality (village, district or camp section) in any order.
- Column 2 should contain the estimated total population of each locality.
- Column 3 should contain the estimated population of the children in each locality.
- Column 4 should contain the cumulative population of the children (obtained by adding the population of each locality to the combined population figure of the preceding localities).
- Column 5 should contain the attributed numbers for each unit – the range of the cumulative population for each unit.

<table>
<thead>
<tr>
<th>Geographical unit</th>
<th>Estimated total population</th>
<th>Estimated children 6-59 months</th>
<th>Cumulative population 6-59 months</th>
<th>Attributed numbers</th>
<th>Location of clusters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locality 1</td>
<td>2,500</td>
<td>500</td>
<td>500</td>
<td>1-500</td>
<td>1</td>
</tr>
<tr>
<td>Locality 2</td>
<td>1,000</td>
<td>200</td>
<td>700</td>
<td>501-700</td>
<td>2</td>
</tr>
<tr>
<td>Locality 3</td>
<td>800</td>
<td>160</td>
<td>860</td>
<td>701-860</td>
<td>0</td>
</tr>
<tr>
<td>Locality 4</td>
<td>3,250</td>
<td>650</td>
<td>1,610</td>
<td>861-1,610</td>
<td>3,4</td>
</tr>
<tr>
<td>Etc.</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Total</td>
<td>50,000</td>
<td>10,000</td>
<td></td>
<td></td>
<td>30</td>
</tr>
</tbody>
</table>

v) Calculate the ‘sampling interval’. This is obtained by dividing the total 6- to 59-month-old population by the desired number of clusters, which is usually between 25 and 40 (30 in this example). In this example, the sampling interval is 10,000/30 = 333).

vi) Determine the location of the first cluster. Its location is randomly chosen by selecting a number within the first sampling interval (1 to 333 in this example). The number can be randomly selected using a random number table. Let us assume that 256 is the starting point. This number places the first cluster in ‘Locality 1’ in the example because it has the attributed numbers 1 to 500.

vii) Select the other clusters. Add the sampling interval sequentially to the starting number until 30 numbers are chosen. Each number chosen represents the population of a geographic unit. In this example, the first cluster is at 256 (Locality 1), the second cluster at 256 + 333 = 589 (Locality 2), the third cluster is at 589 + 333 = 922 (Locality 4), the fourth cluster is at 922 + 333 = 1,255 (Locality 4), etc. A large geographical unit may appear twice – two clusters are drawn in Locality 4 in the example. In the same way, a small geographical unit (smaller than the sampling interval) may not be selected – Locality 3 in the example.
Step 2: Selection of the children in each of the 30 clusters

Having identified the 30 clusters, a team of data collectors should go to the site of each cluster. In this example, a sample size of 700 children was required. Previous data showed that on average there were 1.5 children per household. Therefore, 458 households (700/1.5 = 457.5, rounded to 458) needed to be included in the sample, or 16 households per cluster (458/30 = 15.3, rounded to 16). At any given cluster, or locality the following procedure is followed:

1. Ask the village leaders if a list of all households in the locality exist. If yes, attribute a number to each household and chose 16 households with simple or systematic sampling, where you will go to conduct the survey.
2. If no list of households exists, draw a rough map of the households in the locality and carry out systematic random sampling of households.

To select 16 households by systematic sampling, you need first to determine the sampling step, which is the total number of households in the locality divided by the number of households to be sampled. For example, if there are 87 households in the locality, the sampling step will be 5 (87/16 = 5.4, rounded to 5). The first household to be visited will be determined by choosing a random number between 1 and 5.

If the locality is large enough to make the techniques above too time-consuming, it can be divided into segments of roughly the same number of households, generally not more than 250 households. The procedures indicated above can then be followed.

If it is absolutely not possible to follow the above procedures, then the çspinning the penè method can be used:
- Go to the centre of the selected locality (Ask local people for information.).
- Randomly choose a direction by spinning a pencil or pen on the ground and noting the direction in which it points when it stops.
- Walk in the direction indicated by the pen, from the centre to the outer perimeter of the locality, counting the number of households along this line.
- The first household to be visited should be the one selected by drawing a random number between one and the number of households counted when walking. For example, if the number of households counted was 27, then select a random number from 1 to 27. If the number five was chosen, then the fifth household on the walking line is the first you should visit.
- The subsequent households are chosen by proximity. In a locality where there is a high population concentration, proceed by always choosing the next house to the right or to the left (Decide which at the beginning of the survey). Continue to go to the left/right until the required number of children has been measured. The same method should be used for all clusters. However, if the locality has a very spread out population, then proceed by simply choosing the nearest house. The nearest house is the one with the door nearest to the last house surveyed, whether it is on the right or left (this should save you a lot of time in an area where the dwellings are very spread out). Continue the process until the required number of children has been measured.

All eligible children in a household are included and thus should be measured and weighed. This means that all eligible children in the last randomly selected household should be measured even if this means exceeding the number required to complete the cluster (that is 24 children). If a child is not present at the time of the survey go back to the house later to find the child (continue to look for the missing children until leaving the survey area). If a child cannot be found, don’t replace him/her and record him/her as absent from the selected household. If a child has been admitted to a feeding centre, the team should go to the centre and measure him or her there, if feasible. If there are no eligible children in a household, collect the household-based data (if applicable) and proceed to the next household. This household is part of the 16 households that should form the cluster, even if no eligible children were found. It is extremely important to follow this house-to-house method. If children are just called to the centre of the locality, it is likely that some of the children could be missed which could result in bias.

If there are insufficient households found in a locality (that is 16 households) then proceed to the nearest locality. Repeat the process of spinning a pen and randomly select a household to start until the required 16 households are surveyed to complete the cluster. Proceed from house to house until you have surveyed 16 households.
## Handout 8b: Cluster allocation form

Interval between clusters 76,269/30 = 2542
Random number between 1-2542 = 2025

<table>
<thead>
<tr>
<th>No.</th>
<th>KABELLE NAME</th>
<th>NEW KABELLE DIVISIONS</th>
<th>TOTAL* Pop</th>
<th>Under-5 years estimates (18%)</th>
<th>Cumulative &lt;5yr pop</th>
<th>CLUSTER ALLOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GAMA WALANA</td>
<td></td>
<td>10422</td>
<td>1876</td>
<td>1876</td>
<td>–</td>
</tr>
<tr>
<td>2</td>
<td>GUNUNO</td>
<td>Gununo1&amp;Gununo2</td>
<td>14151</td>
<td>2547</td>
<td>4423</td>
<td>2025</td>
</tr>
<tr>
<td>3</td>
<td>LEGAMMA</td>
<td></td>
<td>11322</td>
<td>2038</td>
<td>6461</td>
<td>4567</td>
</tr>
<tr>
<td>4</td>
<td>ADMANCHO ARFITA</td>
<td></td>
<td>10772</td>
<td>1939</td>
<td>8400</td>
<td>7109</td>
</tr>
<tr>
<td>5</td>
<td>DANGARA MADALCHO</td>
<td></td>
<td>12312</td>
<td>2216</td>
<td>10616</td>
<td>9651</td>
</tr>
<tr>
<td>6</td>
<td>CHAMA HEMBECHO</td>
<td></td>
<td>11790</td>
<td>2122</td>
<td>12738</td>
<td>12193</td>
</tr>
<tr>
<td>7</td>
<td>GARA GODE</td>
<td></td>
<td>10202</td>
<td>1836</td>
<td>14575</td>
<td>–</td>
</tr>
<tr>
<td>8</td>
<td>MATALA WALANA</td>
<td></td>
<td>9227</td>
<td>1661</td>
<td>16236</td>
<td>14735</td>
</tr>
<tr>
<td>9</td>
<td>AREKA 1</td>
<td>Yukara&amp;Areka 1</td>
<td>11901</td>
<td>2142</td>
<td>18378</td>
<td>17277</td>
</tr>
<tr>
<td>10</td>
<td>ACHURA</td>
<td></td>
<td>9260</td>
<td>1667</td>
<td>20045</td>
<td>19819</td>
</tr>
<tr>
<td>11</td>
<td>DOGE ANCHUCHO</td>
<td></td>
<td>13160</td>
<td>2369</td>
<td>22413</td>
<td>22361</td>
</tr>
<tr>
<td>12</td>
<td>WORMUMA</td>
<td></td>
<td>13372</td>
<td>2407</td>
<td>24820</td>
<td>–</td>
</tr>
<tr>
<td>13</td>
<td>AREKA 2</td>
<td>Areka2&amp;Tadisa</td>
<td>10752</td>
<td>1935</td>
<td>26756</td>
<td>24903</td>
</tr>
<tr>
<td>14</td>
<td>MOROCHA WALANA</td>
<td></td>
<td>9247</td>
<td>1664</td>
<td>28420</td>
<td>27445</td>
</tr>
<tr>
<td>15</td>
<td>GADALA</td>
<td></td>
<td>10070</td>
<td>1813</td>
<td>30233</td>
<td>29987</td>
</tr>
<tr>
<td>16</td>
<td>GIDO HOMBA</td>
<td></td>
<td>11662</td>
<td>2099</td>
<td>32332</td>
<td>–</td>
</tr>
<tr>
<td>17</td>
<td>HEREJE</td>
<td></td>
<td>10182</td>
<td>1833</td>
<td>34165</td>
<td>35529</td>
</tr>
<tr>
<td>18</td>
<td>MATALA HEMBEC</td>
<td></td>
<td>12501</td>
<td>2250</td>
<td>36415</td>
<td>35071</td>
</tr>
<tr>
<td>19</td>
<td>AMBE BADAYE</td>
<td>Ambe&amp;Badaye</td>
<td>17810</td>
<td>3206</td>
<td>39621</td>
<td>37613</td>
</tr>
<tr>
<td>20</td>
<td>DUBBO</td>
<td></td>
<td>10542</td>
<td>1898</td>
<td>41518</td>
<td>40155</td>
</tr>
<tr>
<td>21</td>
<td>KORKE DOGE</td>
<td></td>
<td>9691</td>
<td>1744</td>
<td>43263</td>
<td>42697</td>
</tr>
<tr>
<td>22</td>
<td>ZABA</td>
<td></td>
<td>9922</td>
<td>1786</td>
<td>45049</td>
<td>–</td>
</tr>
<tr>
<td>23</td>
<td>AFAMA BANCHA</td>
<td></td>
<td>13802</td>
<td>2484</td>
<td>47533</td>
<td>45239</td>
</tr>
<tr>
<td>24</td>
<td>SHAYAMBA</td>
<td></td>
<td>8957</td>
<td>1612</td>
<td>49145</td>
<td>47781</td>
</tr>
<tr>
<td>25</td>
<td>ADILA</td>
<td></td>
<td>10022</td>
<td>1804</td>
<td>50949</td>
<td>50323</td>
</tr>
<tr>
<td>26</td>
<td>OSSE</td>
<td>Osse&amp;Mole</td>
<td>10573</td>
<td>1903</td>
<td>52852</td>
<td>–</td>
</tr>
<tr>
<td>27</td>
<td>DOLA</td>
<td></td>
<td>10522</td>
<td>1894</td>
<td>54746</td>
<td>52865</td>
</tr>
<tr>
<td>28</td>
<td>WAYBO</td>
<td></td>
<td>10584</td>
<td>1905</td>
<td>56651</td>
<td>55407</td>
</tr>
<tr>
<td>29</td>
<td>ANCHUCHO CHAWKARE</td>
<td></td>
<td>9022</td>
<td>1624</td>
<td>58275</td>
<td>57949</td>
</tr>
<tr>
<td>30</td>
<td>SUNKALE</td>
<td></td>
<td>9666</td>
<td>1740</td>
<td>60015</td>
<td>60491</td>
</tr>
<tr>
<td>31</td>
<td>DNAAGARA SALATA</td>
<td></td>
<td>13222</td>
<td>2380</td>
<td>62395</td>
<td>–</td>
</tr>
<tr>
<td>32</td>
<td>DEMBE ZAMINE</td>
<td></td>
<td>12852</td>
<td>2313</td>
<td>64709</td>
<td>63033</td>
</tr>
<tr>
<td>33</td>
<td>BOMBE</td>
<td>Bombe1&amp;Bombe2</td>
<td>14796</td>
<td>2663</td>
<td>67372</td>
<td>65575</td>
</tr>
<tr>
<td>34</td>
<td>AFAMA MINO</td>
<td></td>
<td>9522</td>
<td>1714</td>
<td>69086</td>
<td>68117</td>
</tr>
<tr>
<td>35</td>
<td>BASA GOFARA</td>
<td></td>
<td>10604</td>
<td>1909</td>
<td>70995</td>
<td>70659</td>
</tr>
<tr>
<td>36</td>
<td>DACHE GOFARA</td>
<td></td>
<td>9584</td>
<td>1725</td>
<td>72720</td>
<td>–</td>
</tr>
<tr>
<td>37</td>
<td>FARA WOCHA</td>
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TOTAL 423718 76269

* 1994 Census
| HH no. | Child no. | Name | Sex (F/M) | Age in months | Weight (kg) | Oedema (Y/N) | WHZ | WHM | Measles Vaccination Card = 1; Yes, no card = 2 No = 0 |
PART 4: TRAINING RESOURCE LIST

The training resource list is the fourth of four parts contained in this module. It provides a comprehensive list of reference material relevant to this module including guidelines, training courses and reference manuals. Part 4 provides background documents for trainers who are preparing training material.¹

What can you expect to find here?

1. An inventory of existing guidelines and manuals listed alphabetically by agency name with details about their availability.
2. A list of known training resources listed alphabetically by agency name with details about:
   - Overall content
   - Intended use
   - Target audience
   - Length of time the course session has been designed for

Guidelines and manuals

Survey methodology

   A manual detailing a basic integrated method for assessing nutritional status and mortality rate in emergency situations. It includes details of how to use the Nutrisurvey software for analysing data. The manual is aimed at host government partners and humanitarian organisations as part of the SMART initiative to enhance capacity and draws from core elements of several existing methods and best practice. It includes an optional chapter on food security which is based on a simplified version of the household economy approach. Of particular relevance:
   - Chapter 2: Introduction
   - Chapter 3: The steps in undertaking a survey
   - Chapter 4: Nutrition and mortality survey
   - Chapter 5: Using Nutrisurvey software step by step
   - Chapter 7: Appendices
   - Availability: Downloadable in pdf form in English.
   - Contact: www.smartmethodology.org; check the SMART website for latest updates on manuals and associated standardised training materials.

¹ Survey and anthropometric measurements methodology and analysis are evolving. The resources indicated might not be totally up to date but give basic principles.
   Manual is for WFP staff and aims to provide guidance on issues relating to nutrition and mortality surveys, and to standardise survey methodologies. It is aimed at WFP staff involved in nutrition-related data collection and intervention as well as WFP consultants and partners. A six-day training course has been developed to accompany it (separate reference). Of particular relevance:
   - Chapter 1: Defining and measuring malnutrition
   - Chapter 2: Defining and measuring mortality
   - Chapter 3: Designing a survey
   - Chapter 4: Using and interpreting survey results for decision making
   - Chapter 5: Ethical issues
   - Chapter 6: The end point: example of a good survey report
   Availability: Downloadable pdf version in English.
   Contact: www.wfp.org
   Available at: www.unscn.org/en/resource_portal

   Manual aimed at mid-level managers in all sectors who would like to better understand nutrition information and its use. The manual sets out all the steps involved in nutrition data collection and analysis including practical guidance for use by survey enumerators, health facility workers and other field workers. Additional materials have also been prepared to support the use of the manual during training. Of particular relevance:
   - Chapter 4: Methods of nutritional assessment and analysis
   - Chapter 5: Analysis and interpretation of the nutrition situation
   Appendices
   Availability: downloadable pdf format in English.
   Contact and available at: www.fsausomali.org

   Manual intended to provide straightforward and comprehensive guidance to nutritionists and other fieldworkers responsible for assessments in emergency settings. It is divided into six parts including how to assess the causes of malnutrition and how to interpret assessment data alongside mortality and malnutrition information. The appendices include anthropometry tools and a glossary. Of particular relevance:
   - Part A: Assessing the causes of malnutrition
   - Part B: Assessing the prevalence of malnutrition
   - Part C: Assessing the rate of mortality
   - Part D: Interpreting the findings
   - Part E: Fifteen practical steps for conducting an assessment
   Appendices
   Availability: Printed version and CD-Rom in English.
   Contact: www.savethechildren.org.uk
   Available at: www.unscn.org/en/resource_portal

   Field guide on conducting nutrition surveys including anthropometry, the causes of malnutrition and report writing. Of particular relevance:
   - Chapter 1: Introduction
   - Chapter 2: Why conduct a nutrition survey
   - Chapter 3: A public nutrition approach
   - Chapter 4: The causes of malnutrition
   - Chapter 5: What to assess
   - Chapter 6: Nutritional survey methods
   - Chapter 7: Analysis
   - Chapter 8: Report writing
   Availability: Printed and downloadable pdf version in English.
   Contact: www.oxfam.org.uk
   Available at http: www.unscn.org/en/resource_portal
   - Chapter 1: Introduction
   - Chapter 2: Planning the survey
   - Chapter 3: Selecting the survey subjects
   - Chapter 4: Selecting the sample
   - Chapter 5: Survey methodology
   - Chapter 6: Data recording
   - Chapter 7: Training and supervision
   - Chapter 8: Data analysis
   - Chapter 9: Interpreting results and reporting findings
   Contact: www.who.int
   Available at: www.unscn.org/en/resource_portal

General

7. UNICEF (2007). *Emergency Field Handbook: A Guide for UNICEF staff.* New York: UNICEF. A guide for UNICEF field staff structured around UNICEF’s Core Commitments for Children in Emergencies. These commitments make a clear distinction between life-saving interventions that should be carried out immediately (within the first six to eight weeks of any crisis) and the broader spectrum of essential activities that may be added once an initial response is well established. Of particular relevance:
   - Part 3. Assessment and monitoring
   Availability: Printed version in English
   Contact and available at: www.unicef.org

8. The Sphere Project (2011). *The Sphere Handbook: Humanitarian Charter and Minimum Standards in Disaster Response.* Geneva: The Sphere Project. The new edition of the Sphere Handbook takes into account recent developments in humanitarian practice in water and sanitation, food, shelter and health, together with feedback from practitioners in the field, research institutes and cross-cutting experts in protection, gender, children, older people, disabled people, HIV/AIDS and the environment. It is the product of an extensive collaborative effort that reflects the collective will and shared experience of the humanitarian community, and its determination to improve on current knowledge in humanitarian assistance programmes. Of particular relevance:
   - Chapter 1: The Core Standards
   - Food security and Nutrition Assessment in Chapter 3: Minimum Standards in Food Security and Nutrition
   Availability: Printed version and pdf downloadable form website in English, French, Spanish and Arabic.
   Contact and available at: www.sphereproject.org

Survey Software

9. Epi Info / ENA Software
   The purpose of Epi Info/ENA software is to make analysis of nutrition and mortality data collected in field surveys as easy and reliable as possible. By combining Epi Info and ENA for SMART, one software package was created that is able to generate anthropometric scores using both WHO and NCHS growth standards, produce automated analyses of key mortality and nutrition indicators, conduct automated plausibility and data quality checks, and generate reports that include results of these automated analyses.
   Availability: Free, downloadable in English.
   Contact: www.cdc.gov/nceh/ierh/ResearchandSurvey/enasoftware.htm

10. SMART Software. *Emergency Nutrition Assessment for SMART.* Software developed as part of the SMART initiative to analyse nutrition and mortality surveys. It provides standard analysis of nutrition and mortality surveys in emergency situations and therefore contains all necessary calculations in one programme. The software has different sheets (planning, training, data entry, results, options) which follows the steps of a survey.
   Availability: Free downloadable in English but can be translated into French.
   Contact: http://www.nutrisurvey.net/ena_delta
11. **WHO Anthro Software**

   WHO Anthro 2005 software consists of three modules:
   1) Anthropometric calculator;
   2) Individual assessment;
   3) Nutritional survey (cross-sectional). The ENA for SMART software has been designed specifically to be used for combined anthropometric and mortality surveys (cross-sectional), along with the SMART manual. Anthro software therefore has a larger scope of use. Both software contain similar features for entering and analyzing anthropometric data from children and will generate identical results.

   **Availability:** Free, downloadable in English but can be translated into French.
   **Contact:** [www.who.int/childgrowth/software/en/](http://www.who.int/childgrowth/software/en/)

### Training courses


   **Contact:** [www.smartmethodology.org](http://www.smartmethodology.org); check the SMART website for latest updates on manuals and associated standardised training materials.


   This training course provides an understanding of the nutritional outcomes of emergencies (malnutrition, mortality and morbidity), and also the causes of malnutrition and mortality in emergencies (the process and dynamics of an emergency). The course has an operational focus, and at the same time incorporates relevant applied research.

   The course itself is divided into three parts. Of particular relevance: Unit II (Sessions 7 to 14) covers assessment and analysis of nutritional problems in emergencies with a view to guiding an appropriate humanitarian response.

   **Availability:** Free, download in English
   **Contact:** [www.fsausomali.org](http://www.fsausomali.org) Available at: [www.unscn.org/en/resource_portal](http://www.unscn.org/en/resource_portal)

14. **FAO. (2007). *FAO Food Security Information for Action Distance Learning Material – Food Security Information Systems and Networks; Reporting Food Security Information; Nutritional Status Assessment and Analysis*. The Distance Learning Component offers self-paced e-learning, developed by international experts to support capacity building and on-the-job Training and Workshops at national and local food security information systems and networks. Courses available: Food Security Information Systems and Networks; Reporting Food Security Information; Availability Assessment and Analysis; Baseline Food Security Assessments; Food Security Concepts and Frameworks; Collaboration and Advocacy Techniques; Livelihoods Assessment and Analysis; Markets Assessment and Analysis; Nutritional Status Assessment and Analysis; Food Security Policies – Formulation and Implementation; Targeting; Vulnerability Assessment and Analysis. Availability: free of charge registration provides access to the material

   **Contact:** [http://www.foodsec.org/dl/dlintro_en.asp](http://www.foodsec.org/dl/dlintro_en.asp)


   Training modules aiming to improve the technical capacity for humanitarian response in nutrition. They are aimed at staff with some responsibility for designing or monitoring nutrition related projects and aim to ensure an understanding of the scope and content of Standards in the Food Security, Nutrition and Food Aid chapter of the Sphere handbook, the key indicators, and the scientific/practical rationale behind these. The modules include a lesson plan, handouts and visual materials for each of the eight sessions. Of particular relevance:

   **Session 2: Assessment and Analysis**

   **Availability:** Printed version and pdf downloadable from website in English, French, Spanish and Arabic.

   **Contact:** [www.sphereproject.org](http://www.sphereproject.org)
Other reports of interest

   Technical paper written for non-technical humanitarian actors using mortality data. It provides an overview of epidemiological concepts and indicators of mortality to allow for interpretation and use of mortality reports. Of particular relevance:
   - Chapter 1: Introduction
   - Chapter 2: Applications of mortality data
   - Chapter 3: Overview of methods to measure mortality
   - Chapter 4: Interpreting and using mortality data
   - Chapter 5: The politics of mortality
   - Chapter 6: Conclusion
   Availability: Downloadable pdf file in English
   Contact: www.odi.org.uk

17. Prudhon C. & Spiegel P.B. A review of methodology and analysis of nutrition and mortality surveys conducted in humanitarian emergencies from October 1993 to April 2004
   Scientific manuscript reviewing the quality of the methodology used in surveys submitted to SCN NICS and examining the trends in quality from 1993 to early 2004. The objectives of this paper are to identify common methodological errors in nutrition and mortality surveys conducted in humanitarian emergencies, to examine the trends over time, and to provide recommendations on how to improve surveys in the future.
   Availability: Free, downloadable pdf version in English.
   Contact: www.ete-online.com/

   Technical paper aimed at non-technical humanitarian actors, especially decision-makers, to understand, interpret and use nutritional data by looking at how it is collected, analysed and used. It also looks at how technical issues are linked to pragmatic institutional constraints. Of particular relevance:
   - Chapter 1: Introduction
   - Chapter 2: Basic concepts
   - Chapter 4: Estimating malnutrition in emergency-affected populations
   - Chapter 5: Interpretation and decision-making
   Availability: Downloadable pdf file in English
   Contact: www.odi.org.uk

Survey Database Repository

19. CE DAT. Complex Emergency Database
   CE-DAT is a global database on the human impact of conflicts and other complex humanitarian emergencies and serves as a unique source of health indicators for monitoring conflict-affected populations and for the production of trend analysis, impact briefings and policy recommendations.
   Survey reports should be sent to: contact@cedat.org
   Contact: www.cedat.org

   Quarterly report with updates of nutrition situations.
   Each report presents the summarised results of nutrition surveys around the world.
   Availability: Printed and downloadable pdf form in English.
   Survey reports should be sent to: scn@who.org
   Contact: www.unscn.org