



COST OF THE DIET

A PRACTITIONER'S GUIDE

Version 2







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Save the Children

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ABBREVIATIONS

AVG	Average
BDT	Bangladesh Taka
CotD	Cost of the Diet
CSAS	Centric systematic area sampling
CV	Coefficient of variation
DC	Data Collector
DE	Data entry
EAR	Estimated Average Requirements
FAC	Conversion factor
FAO	Food and Agriculture Organization
FEWSNET	Famine Early Warning Systems Network
FGD	Focus group discussion
HEA	Household Economy Analysis
INV	Inverse of the standard normal cumulative distribution
NFE	Non Food Expenditure
NGO	Non-Government Organisation
NS	Not in season
OCHA	Office for the Coordination of Humanitarian Affairs
PCT	Percentile
PLW	Pregnant and lactating women
RNI	Recommended nutrient intake
SD	Standard deviation
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
USD	United States Dollar
USDA	United States Department of Agriculture
WFP	World Food Programme
WHO	World Health Organization



1

● INTRODUCTION

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1.1 The Cost of the Diet method

The Cost of the Diet (CotD) is an innovative method and software developed by Save the Children to estimate the amount and combination of local foods that are needed to provide individuals or a family with foods that meet their average needs for energy and their recommended intakes of protein, fat and micronutrients. The method was developed as a response to research undertaken by Save the Children which demonstrated that the impact of traditional nutrition education programmes has been limited because of poverty rather than a lack of knowledge.

Figure 1 is a conceptual framework for the Cost of the Diet method. The boxes in yellow/brown show information that needs to be collected; the boxes in blue/grey show information that is embedded within the software; and the boxes in green show information that can be collected if necessary, but is embedded within the software.

Figure 1 shows two streams of information, one related to nutrients from foods and the other related to an individual's recommended intake of energy and nutrients. The information on nutrients from food is taken from food composition tables for nine countries (section 2.1.1.2). It is also possible to add new foods directly into the software from analyses or other food composition tables (section 5.5.4).

A list of all foods (local, imported, wild and produced in the home) is created (section 4.3) and the price per 100g and seasonal availability of these foods is recorded during market surveys of local traders (section 4.4). Interviews and focus group discussions are held with local women to understand typical dietary habits (section 4.6). The portion size of each food, which determines the maximum weight that can be included in each meal, have been developed by Save the Children (section 2.1.1.3) but values can be changed if required (section 5.8.5.2). The recommendations of the World Health Organization (WHO) and the Food and Agriculture Organization's (FAO) for daily amounts of energy, protein, fat and 13 micronutrients for 237 individuals are embedded in the software (section 2.1.1.1).

Using this information, the bespoke Cost of the Diet software uses linear programmingⁱ routines generated by an open access linear programming solverⁱⁱ to minimise the cost of locally available foods to meet these specifications for energy and nutrients. The software generates a hypothetical combination of foods that will enable a family to meet the amounts of energy and nutrients recommended by the WHO and FAO at the lowest possible cost. As the software may identify a diet that is not realistic in terms of the frequency with which foods are eaten, for example by specifying that a particular food is eaten three times a day every day, the frequency with which each food is consumed can be adjusted to reflect typical dietary patterns.

The Cost of the Diet software can therefore:

- Estimate the minimum cost of a locally specified diet for individuals and households of multiple individuals;
- Take into account seasonal variation in prices when costing the diet;
- Identify the least expensive sources of energy and all nutrients;
- Identify nutrients for which it may be hard to meet requirements;
- Identify the foods and food groups that contribute the most to the cost of the diet;
- Estimate the cost of the diet for typical families of between 4 and 10 members that are aligned with income data generated during a Household Economy Analysis (HEA)ⁱⁱⁱ, and can be used to estimate the affordability of the diet;
- Estimate the impact on the diet or its cost of potential interventions that might help households to meet their needs for energy and nutrients.

A Cost of the Diet assessment is most useful when chronic malnutrition and micronutrient deficiencies have been identified as nutritional problems and when the availability or affordability of nutritious foods are likely to be among the underlying causes of malnutrition.

Once data collectors are trained and communities mobilised, an assessment can be done as part of a situation analysis in order to understand the causes of malnutrition and price data can be collected on a regular basis to monitor changes over time. Such regular assessments could also be incorporated into a nutrition and food security surveillance system.

The results from an assessment can be used:

- To understand the extent to which economic poverty, typical dietary habits and the availability of food prevents households and vulnerable individuals from consuming a nutritious diet;
- To inform and influence nutrition and food security related policy and advocacy processes and debates at a national and global level;
- To help understand changes in food and nutrition insecurity in a particular context;
- As an indicator within food security and nutrition early warning systems;
- To inform nutrition, food security, livelihood and social protection programmes.

ⁱ A mathematical technique used for maximising or minimising a linear function of several variables, such as output or cost

ⁱⁱ Called `lp_solve` version 5.5.2.0

ⁱⁱⁱ A livelihoods-based framework developed by Save the Children to analyse the way people obtain access to the things they need to survive

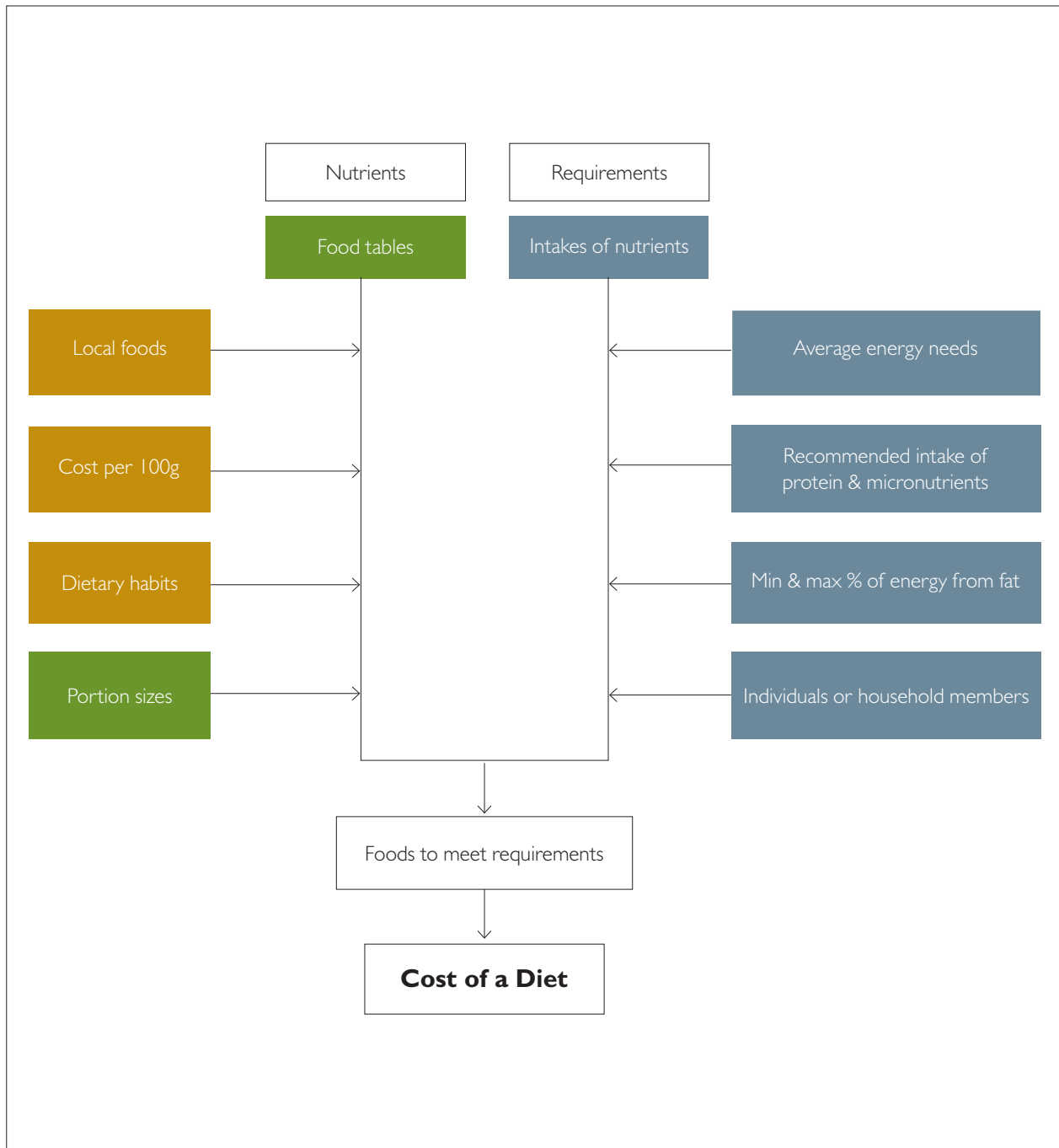



Figure 1. A conceptual framework of the Cost of the Diet tool

I.2 How to use the Practitioner's guide, access the new software and request additional resources

This guide aims to provide a Cost of the Diet practitioner with the information required to run a full Cost of the Diet assessment and is divided into the following sections:

1. Introduction and links with other research methods and software
2. The parameters embedded within the Cost of the Diet software
3. Planning a Cost of the Diet assessment
4. Data collection
5. How to use the Cost of the Diet software
6. Interpreting the Cost of the Diet results and generating 'What if?' models
7. Potential uses for the Cost of the Diet results.

Many '*Hints and tips*' have been included in the guide to provide useful information about additional functions of the programme. Key points have been highlighted using a  symbol.

It is recommended that a Cost of the Diet practitioner certified by Save the Children is used to conduct an assessment. This will help to ensure the data are collected, analysed and reported to a high standard. To become a certified Cost of the Diet practitioner an individual is required to attend a Practitioner's Training, lead an assessment on their own, and send the data and the final report for review to the Save the Children UK headquarters in London. Once certified, practitioners will receive an official certificate.

These guidelines and the Cost of the Diet software are free to use and can be downloaded from www.savethechildren.org.uk/costofthediet. A French version of this guide and the Cost of the Diet reporting guidelines are available on request by contacting cotd@savethechildren.org.uk.

The following Microsoft Excel spreadsheets can be made available by emailing cotd@savethechildren.org.uk if required:


- The affordability analysis spreadsheet: required if the household size differs by wealth group (section 3.4.2).
- The monetising free food spreadsheet: required if the results from an HEA are to be used to include free foods in the diet (section 4.7)

Cost of the Diet reports can be deposited and made freely available to others at: www.heawebsite.org.

To offer suggestions or experiences with using the tool as part of programming, research and advocacy, contact the Cost of the Diet team by emailing cotd@savethechildren.org.uk.

If problems are encountered whilst using the Cost of the Diet software please contact cotd@savethechildren.org.uk.

I.3 The links between the Cost of the Diet and other nutrition and food security research tools

It is important to understand the context in which nutrition and food security programming is to take place.  The Cost of the Diet tool could be used to provide key information as part of a causal analysis that involves other tools such as a nutrition survey, ProPAN or a Household Economy Analysis. In fact it is generally recommended that an HEA is completed in the assessment area before a Cost of the Diet takes place as it provides the following contextual data for a Cost of the Diet assessment:

- The division of a region into livelihood zones;
- The location of markets and villages;
- The division of the population by wealth group;
- The typical annual income by wealth group;
- The typical annual non-food expenditure by wealth group;
- The typical household size by wealth group;
- The sources of food for households;
- A seasonal activity calendar.

It is possible to do a Cost of the Diet assessment without an HEA. Sections 3.3 and 3.4 describe other sources of the information listed above, and what to consider before using these data.

Data on infant and young child feeding practices and food consumption from nutrition surveys or ProPAN software may be useful to:

- Give an impression of the current diet of people in the area;
- Highlight possible deficiencies and nutritional problems within the current diet;
- Validate focus group discussion data collected as part of a Cost of the Diet assessment on the consumption of staple foods, livestock products and wild foods;
- Validate Cost of the Diet results on limiting nutrients.

There are also several research tools with innovative software that collect similar data to the Cost of the Diet but use this data to do different calculations and provide different output such as Optifoods and NutVal. Table 1 summarises the research tools similar to the Cost of the Diet and provide a comparison of:

- Study objectives and planning requirements;
- Study subjects and sampling methods;
- Data collection principles and methods;
- Analysis and results.

 It is recommended that these are considered before proceeding with a Cost of the Diet assessment. Additional information on the tools described in Table 1 can be found from the following websites:

- Household Economy Analysis: www.feg-consulting.com/hea and www.heawebsite.org
- SMART survey: www.smartmethodology.org
- Optifood: www.fantaproject.org/tools/optifood
- ProPAN: www.paho.org
- NutVal: www.nutval.net
- Nutmeg: www.nutmeg-uk.com

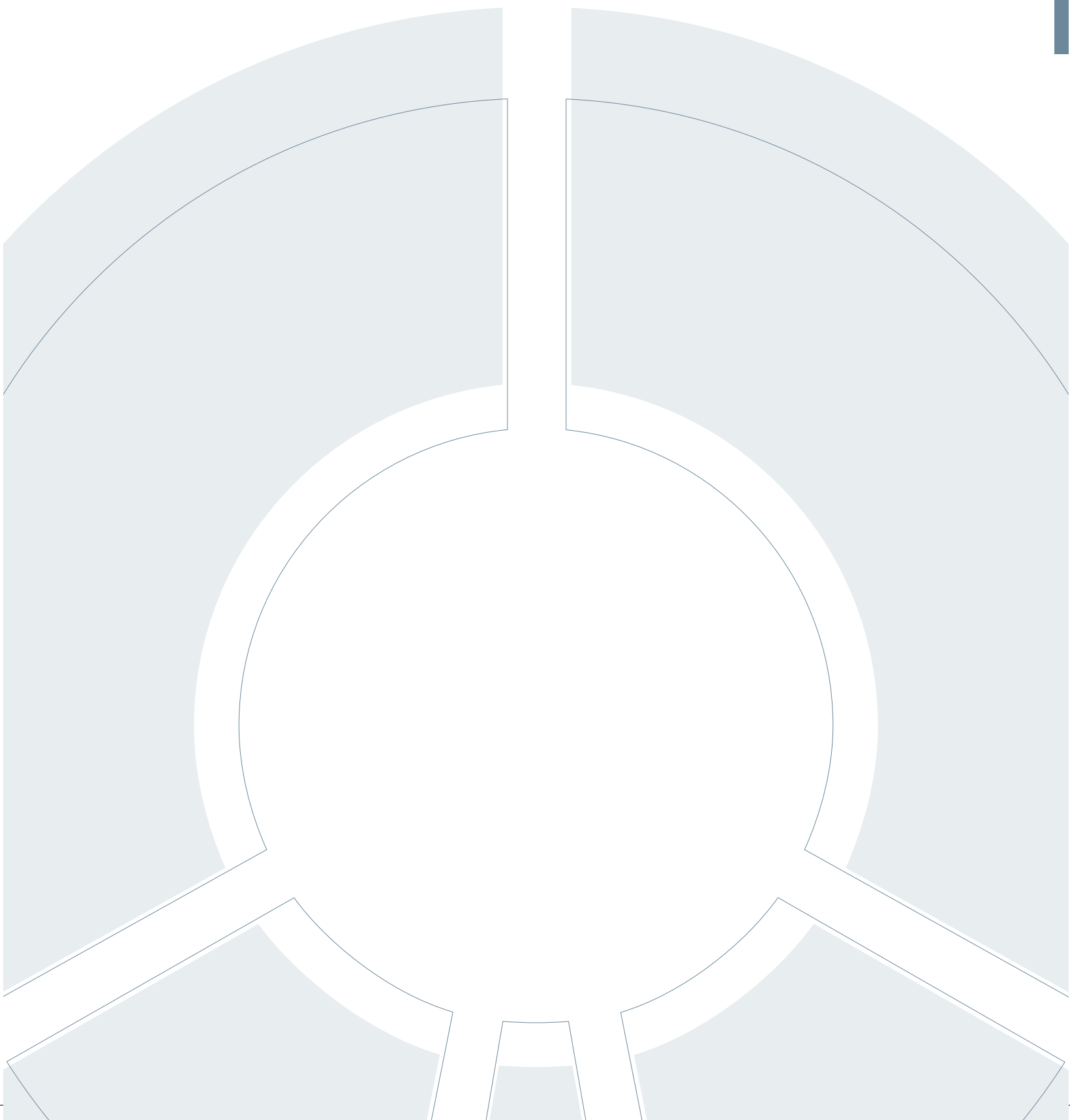
Table 1. A summary and comparison of the Cost of the Diet method and other similar or complementary research tools.

	Cost of the Diet	Household Economy Analysis	SMART survey	
Methods and planning requirements	Objective of method	Estimates the amount of money required to buy local foods that meet average energy and recommended nutrient requirements for households and individual children > 2 years. Focus is on the afford-ability of the diet, specific foods containing essential nutrients, and models to reduce the cost, improve the quality and affordability of the diet.	Provides a clear and accurate representation of the household economy in arbitrary wealth groups.	Assesses anthropometric status and mortality rate of children, usually during an emergency. Optional food security component.
	Study area and specificity of data	Livelihood zone: may be > 1 in any given district; ecological or agricultural zone covering > 1 district;	Livelihood zone: may be > 1 in any given district	District or administrative area
	Information required for planning	Mapping of livelihood, ecological or agricultural zone; market and village location; typical house-hold size (HEA), income and expenditure data (HEA)	Mapping of livelihood zones, markets and villages	Map of districts and villages, with estimated population per village
Study subjects and sampling methods	Study subjects	Possible to selecting any of 237 individuals, including pregnant or lactating women. Software will analyse data for individuals or a household	A typical family	Children 6-59 months and their mother
	Sampling unit	Community	Community	Individuals within clusters e.g. village
	Principle of sampling	Centric area sampling, so geographical	Centric area sampling, so geographical	Random sample
	Weighting of sample	No	No	Population proportional to size
	Sample size calculation	No	No	Yes
Basis of sampling	Purposeful, to capture typicality	Purposeful, to capture typicality	Prevalence of key parameters; precision; design effect (estimate of clustering)	

	Optifood	ProPAN	NutVal	Nutmeg
	Generates food-based complementary feeding recommendations that take into account nutrition, dietary patterns, and cost. Identifies nutrient gaps and suggests combinations of foods that the local diet can fill, or come close to filling. It also helps to identify the limits to local foods to meet nutrient needs and tests strategies to fill nutrient gaps, such as using fortified foods or micronutrient powders.	A tool to design and evaluate interventions for improved complementary feeding. By combining data from the questionnaires ProPAN is able to identify specific issues and causes of suboptimal feeding practices and suggest tailored interventions	An Excel spreadsheet application to plan and monitor the nutritional content of general food aid rations. It calculates the nutrient content of different rations and compares them with recommended intake. It also includes a monitoring sheet to analyse on-site food distribution results.	A tool to plan menus and analyse recipes. The software identifies the causes of any excess or deficit in nutrients and suggests alternatives to replace foods, considering the cost implications.
	Dependant on targeted population	Dependant on targeted population	Ration distribution area	Schools, hospitals, care homes, social services
	Quantitative intakes of food; cost per 100g of food; edible portion sizes; food composition tables	Select communities that represent the target population and markets	Commodities and weight (g) per person per day included in the ration	Recipe ingredients
	Children aged 6-8, 9-11 and 12-32 months; pregnant and lactating women with children under 6 months	Children aged 1-24 months; caretakers	Whole population or disaggregated age groups; pregnant, lactating or HIV positive.	All ages dependant on target of the recipe
	Household	Children <2, caretakers	Ration area	Menu
	Random sample	Random sample / systematic sampling	Dependant on emergency ration need	N/A
	No	No	No	N/A
	Yes	Yes	No	N/A
	Purposeful, to capture typicality	Purposeful, to capture typicality	Dependant on emergency ration need	N/A

		Cost of the Diet	Household Economy Analysis	SMART survey
Data collection: principles and methods	Survey team	Two to three teams of two people. Should be from the community, speak the local language and be able to read and write	Minimum of two teams of two people, should be experienced HEA practitioners (been on two HEA baseline trainings)	Two to six teams of 3-4 educated people. Should be from the community who speak the local language.
	Principle of data collection	Lowest cost of meeting average energy needs and recommended micronutrient intake from local foods	Food and income are converted into energy then expressed as cost of staple food and compared with estimated requirements	Representative data on key anthropometric indicators
	Data collected	Price of foods per 100g; typical food habits.	Sources of food to meet energy requirements; sources of income and expenditure; coping strategies in times of shock	Anthropometric measurements; dietary habits; recent deaths
	Data collection methods	Survey in food markets; structured interviews and focus group discussions with representatives of each wealth group	Focus group discussions with community leaders and households representing wealth groups	Individual measurements of subjects. Data recorded on weight, height, age, oedema and sometimes MUAC. Any deaths during the recall period in the household are recorded.
Analysis and results	Summary outcome data	Cost per 100g of foods; food availability and seasonality; food habits. By wealth group: affordability	By wealth group: sources of income and food; expenditure; risks to livelihoods and coping strategies. Map of markets.	For whole sample: prevalences with 95% CI; dietary habits and diversity; death rate; coverage of services
	Key analysis	Descriptive: cost of diet; sources of key nutrients; nutrients that are hardest to meet specifications for Analytical: predict the effect of changes and interventions (modelling)	Descriptive: income by wealth group Analytical: predict the effect of changes and interventions (outcome analysis)	Descriptive: current situation; recent mortality rate Analytical: associations between variables
	Disaggregation of data	By arbitrary wealth groups	By arbitrary wealth groups	By age, sex though with lower precision
	Limitations of data	Not statistically representative, hypothetical diets not current diet	Not statistically representative; arbitrary classification of wealth groups	Unable to determine causality
	Period covered	Describes season of survey and estimates price/100g per season	Describes a reference or normal year	Cross-sectional data describes state at time of survey

	Optifood	ProPAN	NutVal	Nutmeg
	Eight data collectors and three nutritionists (two field supervisors and one field coordinator)	Eight-person teams including two supervisors and six field workers	None required	N/A
	Create food-based recommendations based on identified 'problem nutrients'	Identify problems related to young child nutrition, breastfeeding and complementary feeding	Calculate the nutrient content of food aid rations	Identify the causes of any excess or deficiency in nutrients and suggest alternative foods to compensate.
	Price of foods per 100g, quantitative portion size and food frequency data	Nutritional intake of children, breastfeeding practices, and the feeding practices of their caretakers. The demographic and socioeconomic characteristics of their families and communities.	Ration content, family size and ration weight (g)	The foods and weight (g) using in the recipe
	Survey in food markets; 7-day qualitative 24-hour recall/ 24-hour recall and/or food frequency questionnaire	General survey, 24-h dietary recall, market survey, opportunistic observation, semi-structured interview, food attributes exercise	Monitoring the nutritional composition of the planned ration	N/A
	Cost per 100g of foods; infant feeding habits	Anthropometric data; food habits (average servings and serving size)	Weight of commodity per person; nutritional content of ration	Nutrient profile of recipe by food/ nutrients
	Descriptive: cost of diet; sources of key nutrients; nutrients that are hardest to meet requirements for Analytical: formulate food-based recommendations (FBR) for a specific target group; predict the effect of micronutrient Sprinkles or fortified foods	Descriptive: identify problems related to young child nutrition, breastfeeding and complementary feeding; define the context in which these problems occur, barriers and enablers Analytical: behaviour change recommendations and nutritional recipes	Descriptive: sources of key nutrients Analytical: predict if the rations meet nutritional needs	Descriptive: causes of nutritional imbalances Analytical: menu composition analysis, cost and nutritional implications of changes in food
	By age group	By age group	By age group and sex	By food or nutrient
	Limited modelling functionality of software	Recommendations tested for a short period (1-2 weeks), so only represent likelihood of uptake	By age group and sex Not specific to household composition, just size	Based on recipe content, but not consumption
	N/A	N/A	Ration distribution monitored dates	N/A



2.

THE UNDERLYING PARAMETERS USED IN THE COST OF THE DIET SOFTWARE

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The Cost of the Diet is a bespoke computer programme that applies linear programming to estimate the amount, combination and cost of foods that are needed to provide individuals or families with their average needs for energy and their recommended intakes of protein, fat and micronutrients. This combination and amount of foods is called a 'nutritious diet' and is the basis of a Cost of the Diet assessment.

The software is written using Delphi XE4© and incorporates an open access solver (lp_solve version 5.5.2.0) which estimates the cost of the diet by applying linear optimisation routines to mathematical equations explained in detail in Annex 1 to minimise cost while meeting specifications for energy and nutrients and amounts of food.^{iv}

2.1 The data required and the assumptions made by the Cost of the Diet software


This section describes the information required by the software to calculate the cost of a nutritious diet and where these data come from. It also lists and explains the nutrients that are included in an analysis to generate the mixture of foods. Finally the assumptions that the software makes during the calculations are described.

To calculate a diet, the software requires the following information:

- The division of a year into up to six periods or seasons, usually identified during interviews with key informants or taken from an HEA and entered into the software;
- The average price per 100g of all foods on sale in local markets in each period of a year or season, usually obtained during a market survey in the assessment area and entered into the software;
- The energy and nutrient composition of all local foods, obtained from the inbuilt food composition tables, or added to the software when new foods are identified and composition data are available;
- The average energy intake of each individual recommended by the WHO, obtained from the inbuilt energy specifications database and adjustable between the 1st and 99th percentile;
- The intake of protein per kilogram of body weight recommended by the WHO, adjustable between the 1st and 99th percentile, then calculated based on body weight;
- The intakes of nine vitamins and four minerals for each individual recommended by the WHO, obtained from the inbuilt nutrient specifications database and adjustable individually or collectively between the 1st and 99th percentile;
- The maximum amounts of energy and specific micronutrients that can be consumed by each individual each day, obtained from an inbuilt database;
- The minimum and maximum frequency with which each food can be consumed each week to replicate typical local dietary habits, reported during interviews and focus group discussions and entered into the software;
- The typical weight of food portions obtained from an inbuilt database for a fixed individual and then scaled according to average energy specifications, so to limit the amounts that can be consumed at any one meal.

The software includes parameters for energy and the following nutrients in calculations, with their units:

- Energy (kcal)
- Protein (g)
- Fat (g)
- Vitamin A (µg retinol equivalents)
- Vitamin C (mg)
- Vitamin B1 (mg)
- Vitamin B2 (mg)
- Niacin (mg niacin equivalents)
- Pantothenic acid (mg)
- Vitamin B6 (mg)
- Folic acid (µg DFE)
- Vitamin B12 (µg)
- Calcium (mg)
- Iron (mg)
- Magnesium (mg)
- Zinc (mg)

 These nutrients are included because there are published recommended intakes^v for individuals, and data on their concentration is usually included in food composition tables. A number of nutrients are not included mostly because values are not given in food composition tables, specifically: biotin, iodine, vitamin D, vitamin E and vitamin K. The calculations do not include values for essential fatty acids or amino acids.

2.1.1 Data requirements and integrated databases

The software contains four databases of values used in calculations:

- The energy and nutrient specifications of individuals specified by the WHO;
- The nutrient composition of foods from food tables;
- The weight of portions of foods;
- Standard Cost of the Diet families aligned with typical families identified during an HEA for Asia and in the rest of the world.

Each database is introduced in the following sections and more details are given in Annexes 2 to 9.

^{iv} The equations have been checked by Dr. Paul Parham and Tommy Allieri of Imperial College, London

^v By the World Health Organization and the Food and Agricultural Organization

2.1.1.1 Energy and nutrient specifications of individuals and households

The software contains a database of the average intake of energy and the recommended intake of micronutrients for 237 individuals:

- Boys, girls and a child of either sex aged 1-5 months, 6-8 months, 9-11 months and 12-23 months;
- Boys, girls and a child of either sex aged 2-18 years, by year of age;
- Men aged 19-29, 30-59 or 60+ years
 - with a body weight of 50 to 90kg in 5 kg intervals
 - for three levels of physical activity (light moderate and vigorous);
- Women aged 19-29, 30-59 or 60+ years
 - with a body weight of 45 to 85kg in 5 kg intervals
 - for three levels of physical activity (light moderate and vigorous).¹

There are also data for the additional energy and nutrients specified during three stages each of pregnancy or lactation. These specifications can be added to any woman in the database to create a pregnant or lactating woman (PLW) at each stage of pregnancy or lactation.

The software can select an unlimited number of individuals to create a group, such as might live in a household: an adult male father, an adult female mother, and any number of children aged up to 18 years. Other members can be added, such as an elderly adult woman to represent a mother-in-law, or additional adult women in places where polygamy occurs. Any such group is called a 'household' and the number of individuals in a household is often obtained from an HEA which reports the typical family size by wealth group during an analysis. The choice of individuals to achieve alignment with an HEA is described in section 2.1.1.8.

Energy specifications

The needs of individuals for energy are specified as the estimated average requirements (EAR) published by the World Health Organization¹ and are the default values in the software. This means that the probability that the energy needs of any given individual are met is 0.5 or 50%.

Version 2 of the software allows the manual adjustment of the amounts of energy for each individual^{vi} or collectively for all individuals selected to between the 1st and 99th percentile of the recommended intake. The table in Annex 2 shows the values of percentiles equivalent to standard deviations and vice versa which can be applied to investigate the effect of the WHO recommendations on the cost of the diet.

Because no standard deviations of average energy intakes are available, a typical coefficient of variation (CV) of 15%ⁱ has been applied as default to estimate the standard deviation from the average energy requirement (AVG) and then adjust the amount of energy to a specified percentile (PCT) by applying a mathematical function to calculate the inverse of the standard normal cumulative distribution (INV)^{vii} as follows:

$$(I) \text{ Energy} = \text{EAR} + ((\text{AVG} * \text{CV}) * (\text{INV}(\text{PCT}/100)))$$

So to calculate the 80th percentile of energy intake for a person with an average energy intake of 2,500 kcal:

$$\begin{aligned} \text{Energy} &= 2500 + (2500 * 0.15) * \text{INV}(80/100) \\ &= 2500 + (375 * 0.842) \\ &= 2500 + 816 \\ &= 2816 \text{ kcal} \end{aligned}$$

The default coefficient of variation of 15% cannot be adjusted.

An upper limit has been set for the daily amount of energy that the software can include in the diet. The limit is set at the average energy requirement but can be adjusted by the user between the 1st and 99th percentile^{viii}. This may be useful when estimating the range in costs of an energy only diet (section 2.2.1) to provide a range in energy per person, or to add an extra amount of energy to examine the effects of heavy physical activity or needs during convalescence.

Protein specifications

The needs of individuals for protein are specified as the 95th percentile of the distribution of requirements per kg body weight² multiplied by body weight, and is the default value in the software. This means that the probability that any given individual's protein needs are met is 0.95 or 95%.

The exceptions are children aged 1- 6 months. For these individuals the recommended daily intake of protein is calculated from the quantity of protein contained in the amount of breast milk required to meet recommended average energy requirements. This is based on the assumption that the amount of protein in breast milk is sufficient to meet the needs of all infants in this age range.

Version 2 of the software allows the manual adjustment of the amounts of protein for each individual^{vi} or collectively to between the 1st and 99th percentile of the recommended intake for protein intake, calculated per kilogram of body weight. The table in Annex 2 shows the values of percentiles equivalent to standard deviations and vice versa which can be applied to investigate the effect of the WHO recommendations on the cost of the diet.

^{vi} Apart from children aged 1-12 months

^{vii} This function can be generated in Excel using the NORMSINV or NORM.S.INV functions

^{viii} For example if the EAR was 500 kcals the software would need to meet this but cannot exceed it

The default value in the calculations is the 95th percentile, as recommended by the WHO². To do this calculation the software applies the estimated average requirement (EAR) and standard deviation (SD) of protein per kilogram of body weight specified by the WHO and the inverse of the standard normal cumulative distribution (INV) to calculate the percentile of protein intake per kg body weight:

$$(2) \text{ Protein (g/kg)} = \text{EAR} + (\text{SD} * (\text{INV}(\text{PCT}/100)))$$

The amount of protein is then multiplied by the body weight of adults, which is specified in the values given by the WHO for average energy intake, and ranges from 45-85 kg for women and 45-90 kg for men in 5 kg intervals.¹ The body weight of children is taken from the median values published by the WHO for boys and girls by month of age from zero to 19 y of age in the standard growth references.^{ix} The weight of children of either sex and the same age is taken as the midpoint between the median weight of boys and girls. The body weight of children in a range in age used in the software is calculated from the mid point in weight of boys and girls at the midpoint in the age range. For example the weight of a child of either sex aged 12-23 months is taken to be the midpoint between the weight of a boy and a girl aged 18 months published by the WHO^{ix}.

To calculate the weight of protein required each day by any given individual, the weight of protein required per kilogram is multiplied by body weight:

$$(3) \text{ Protein (g/day)} = \text{Protein (g/kg)} * \text{body weight (kg)}$$

To calculate the 95th percentile of protein intake for a person weighing 50 kg with a mean requirement of 0.66 g/kg/day and a standard deviation of 0.09 using equations (2) and (3):

$$\begin{aligned} \text{Protein g/kg} &= 0.66 + (0.09 * 1.6449) \\ &= 0.66 + 0.148 \\ &= 0.808 \end{aligned}$$

$$\begin{aligned} \text{Protein g/day} &= 50 * 0.808 \\ &= 40.4 \text{ g} \end{aligned}$$

Fat specifications

The needs of individuals for fat are specified as a minimum and maximum percentage of energy intake which is converted into grams of fat by applying an energy density of 9 kcal/g, and vary by age group.³ The software aims to include in the diet a minimum amount of fat as a percentage of energy but not to exceed a maximum, also set as a percentage of energy. The default values applied in the software are specified as follows:

- For children aged 1 to 6 months the minimum amount of fat is based upon the quantity contained in the amount of breast milk required to meet recommended average energy requirements; the maximum is set at 60% of energy specifications for this age group, as recommended.³

- For children aged between 6 and 23 months it is recommended that the percentage of energy from fat reduces gradually from 40-60% to 25-35% so it has been set at: a minimum of 35% and a maximum of 50% for children aged 6-8 months and 9-11 months; and a minimum of 30% and a maximum of 40% for children aged 12-23 months.³
- For individuals aged 2 to 18 years it is recommended that a minimum of 25% and a maximum of 35% energy comes from fat.³
- For adults aged 19 to 60+ years it is recommended that a minimum of 20% of energy and a maximum of 35% of energy comes from fat.³

Version 2 of the software allows the manual adjustment of the amounts of fat for each individual^{vi} or collectively to between 1% and 99% of energy from fat.

Micronutrient specifications

The needs of individuals for each vitamin and mineral are specified as the recommended nutrient intake (RNI) published by the WHO⁴ and are the default values in the software. The default amounts for all except vitamin A, which is expressed as a recommended safe intake, are set at 2 standard deviations above the estimated average requirement. This is equivalent to the 97.725th percentile of the normal distribution of individual specifications, so the probability that any given individual's needs are met is 0.97725 or 97.725%. This specification serves to drive up the cost of foods for diets that are set to meet the default micronutrients specifications.

Version 2 of the Cost of the Diet software allows the adjustment of the recommended intakes of all micronutrients except for pantothenic acid and magnesium^x between the 1st and the 99th percentiles for all individuals aged >12 months. The table in Annex 2 shows the values of percentiles equivalent to standard deviations and vice versa which can be applied to investigate the effect of the WHO recommendations on the cost of the diet.

For all micronutrients the RNI is divided by a published conversion factor⁵ (FAC) to calculate the estimated average requirement (EAR):

$$(4) \text{ EAR} = \text{RNI} / \text{FAC}$$

The standard deviation is thus half the difference between the EAR and the RNI, assuming a normal distribution. To calculate the amount equivalent to a percentile, a mathematical function is applied in the software to calculate the inverse of the standard normal cumulative distribution (INV) for the percentile (PCT) expressed as a probability e.g. 50th percentile = 0.5. This function is then used as a multiplier to calculate the amount of nutrient that is equivalent to the percentile of the normal distribution as follows:

$$(5) \text{ Percentile amount} = \text{EAR} + (\text{INV}(\text{PCT}/100) * (\text{RNI} - ((\text{RNI}/\text{FAC}))/2))$$

^{ix} Median weight values for children aged 0-10 years are taken from the WHO Growth reference 2007. Median weight values for children aged 10-18 years are taken from WHO measuring change in nutritional status, 1983

^x No conversion factors are published for these nutrients

For example, to calculate the 80th percentile of a nutrient with an RNI of 400 and a conversion factor of 1.4:

$$\text{EAR} = \text{RNI} / \text{FAC} = 400 / 1.4 = 286$$

$$\text{then: } \text{INV}(\text{PCT}/100) = \text{INV}(80/100) = \text{INV}(0.8) = 0.84$$

$$\begin{aligned} \text{Percentile amount} &= 286 + (0.84 * ((400 - (400/1.4)/2)) \\ &= 286 + (0.84 * (400 - 286)/2) \\ &= 286 + (0.84 * (114/2)) \\ &= 286 + (0.84 * 57) \\ &= 286 + 48 \\ &= 334 \end{aligned}$$

Upper limits to the daily amounts of several micronutrients have also been specified where evidence suggests that nutrients could be toxic or have harmful effects. The nutrients are: vitamin A,⁶ vitamin C,⁷ niacin,⁸ calcium,⁷ and iron.⁶ The software will not allow these limits to be exceeded and if they are met for one nutrient the specifications for other nutrients may not be reached, despite the availability of foods that could provide these missing nutrients. The upper limits can be viewed in the energy and nutrient specifications database but are greater than the RNI and cannot be adjusted in the software.

2.1.1.2 Nutrient composition of foods

The software contains a database of 3,580 foods and supplements derived from four main food tables: the Worldfood Dietary Assessment System published by the Food and Agriculture Organization (FAO) which contains data on foods from six countries (Egypt, Kenya, India, Indonesia, Mexico and Senegal);⁹ a table of foods published by the United States Department of Agriculture (USDA);¹⁰ a table of foods from West Africa;¹¹ and a table of foods from Bangladesh published by the University of Dhaka and used with permission.¹² The food tables can be viewed within the software and constitute a useful source of dietary information.

Because the food table contains many of the same foods with slightly different nutrient values, version 2 of the software provides data on average values for many common foods calculated from the individual foods in the Worldfood Dietary Assessment database. The values for these 'CotD' foods can be used when analysing generic foods or if no national or local food composition data are appropriate.

It is recommended that the values for the 'CotD' foods are used when comparing analyses between countries.

Within the food composition table are data published by manufacturers on the nutrient composition of 54 supplements including infant formulas, ready-to-use-therapeutic foods and micronutrient powders.^{13 14 15 16 17}

Data on the following nutrients have been included when available for both food and supplements per 100g:

Energy (kcal)	Vitamin A (µg RE)	Calcium (mg)
Protein (g)	Vitamin C (mg)	Absorbed calcium (mg)
Fat (g)	Vitamin B1 (mg)	Copper (mg)
Carbohydrate (g)	Vitamin B2 (mg)	Iron (mg)
Saturated fatty acids (g)	Niacin (mg NE)	Absorbed iron (mg)
Mono saturated fatty acids (g)	Pantothenic acid (mg)	Phosphorus (mg)
Poly unsaturated fatty acids (g)	Vitamin B6 (mg)	Potassium (mg)
Cholesterol (mg)	Folic acid (µg DFE)	Manganese (µg)
Dietary fibre (g)	Vitamin B12 (µg)	Magnesium (mg)
Sucrose (g)	Vitamin D (mg)	Selenium (µg)
Phytate (mg)	Vitamin E (mg)	Sodium (mg)
	Vitamin K (µg)	Zinc (mg)


If there are no data for a nutrient in a food, the cell will be empty in the database when viewed in the software. The food table can be viewed on its own and is a useful resource.

Each food has been classified by food group, for which there are three subdivisions: major, minor and sub-group. These classifications have been based on terms applied by the European Commission/FAO,¹⁸ the World Food Programme¹⁹ and the European Food Safety Authority.²⁰ A full list of the food groups and divisions can be found in Annex 3.

Absorption factors and bioavailability

The absorption of iron and calcium from the diet is reduced by substances such as phytate and oxalate in plant foods, so a proportion of these nutrients are not bioavailable from foods consumed. Absorption factors have been applied to each food in the database to take into account the bioavailability of these nutrients from the diet. Annexes 4 and 5 give details of these factors, which are applied by food group, and the sources of the values.

Several factors are known to reduce the bioavailability of zinc, including phytate and oxalate, while other factors promote the absorption of zinc, including protein.⁴

 Users have the ability to change both the percentile of the RNI for zinc and change the degree of absorption of zinc from the diet between low, moderate and high bioavailability, depending on the diet of households in the assessment area. For example, if households typically consume a diet rich in vegetables containing oxalate or phytate such as spinach and cereals, the bioavailability setting for zinc could be changed from moderate, which is the default, to low, which increases the amount of this nutrient that the software needs to meet.

Utilisation


This term describes losses of nutrients during storage, food processing and cooking. These losses are not included in a Cost of the Diet assessment unless cooked foods are selected for analysis and those cooked foods have nutrient values that account for such losses. To investigate the effect of the loss of nutrients the new foods would need to be added manually to the software. The fact that the RNI is set to 2 SD above the mean requirement may allow for losses during cooking.

Edible proportions

This describes the proportion of each raw food bought in a market that is edible. For example if an estimated 69% of a whole banana is edible, the edible portion size scaling factor is 0.69. This factor is applied to raw food when calculating how much energy and nutrients it provides in this form:


$$(6) \text{ Edible portion (g) = raw weight of food (g) * scaling factor}$$

These factors have been derived from the Bangladesh¹² and West Africa¹¹ food composition tables. Edible portion size factors have been applied to every food embedded within the software but for many foods this value is 1.0, indicating that all the food is edible.

 The scaling factors help users to understand not just the quantity of food that would need to be consumed in its edible form, but the quantity of food that needs to be bought from the market to produce this edible quantity. The tables of results produced by the software show the weight of edible food that is calculated to meet energy and nutrient specifications and the weight of each raw food that needs to be bought in the market.

2.1.1.3 Portion sizes and portion scaling factors

The amount of any single food that can be consumed at any one meal and in total over any given period is limited by applying a maximum portion size. This is calculated for each individual by applying to a base or standard portion size for each food a scaling factor proportional to energy

 specifications. This serves to prevent the software from adding an amount of any given food that would be too bulky to consume at a meal.

The standard portion sizes for all food groups are based on portion sizes for a child aged 1-3 years. The weight of these food portions is calculated by dividing 2 SD above the average energy requirement for the individual by the average energy requirement of the child aged 1-3 years:

$$(7) \text{ Portion size scaling factor} = \frac{\text{Mean} + 2\text{SD energy requirement of individual}}{\text{Mean energy requirement of child 1-3 y}}$$

$$(8) \text{ Maximum portion size (g)} = \text{Portion size for 1-3 y child} * \text{scaling factor}$$

The numerator in equation (8) is set at 2 SD above the mean to allow for people with a large energy requirement based on the assumption that they can meet their daily energy needs from food with an energy density of 1.0 kcal/g.^{xi}

Thus for a food with a portion size of 20 g and for an individual whose energy requirement 2 SD above the mean is 3,750 kcal, the maximum weight of that food per meal is:

$$\text{Maximum portion size} = 20 * (3750/1038.5) = 72 \text{ g}$$

The base or standard portion sizes do not represent the average or typical amounts of any given food that can be eaten by a child aged 1-3 years, which would be larger if the mean values derived from a portion size database were applied.²⁰ If values are large (>100g) then the software can meet nutrient specifications from only a few foods and the dietary variety is small; if the values are small (<20g) then the software is forced to add additional foods in similarly small amounts, some of which are more costly than the least expensive but most nutritious alternatives. However this contributes to the diversity of the diet and is more typical of what people eat over a period of time.

The portion sizes and their scaling factors have an impact on the amounts of staple foods selected by the software and are not calculated to replicate the dietary habits of poor people, many of whom may obtain >70% of their energy from a single staple food. The portion sizes are chosen to try to create a balance between dietary diversity and moderate amounts of food and are based on a recommended maximum energy intake of 50% from carbohydrate foods, 30% from fats, 10% from fruit and vegetables and 10% from protein foods. For example, the default portion size for rice is calculated as follows:

$$\begin{aligned} 50\% \text{ of the average energy intake of a child aged 1-3 y} &= 1038.5 * 0.5 \\ &= 519 \text{ kcal/d} \end{aligned}$$

$$\begin{aligned} \text{Divided by the average energy density of rice} &= 519/2.81 \\ &= 184 \text{ g/d} \end{aligned}$$

$$\begin{aligned} \text{Divided into a maximum of three meals} &= 184/3 \\ &= 61 \text{ g (rounded to 60g)} \end{aligned}$$

^{xi} This is the mid point between 0.6 and 1.5, which are the thresholds set by the British Nutrition Foundations (2009: <http://www.nutrition.org.uk/healthyliving/fuller/what-is-energy-density>) for a low energy density diet

The exceptions to this rule are: milk powder, supplements and infant foods, sugar, honey and confectionary, herbs, spices, salt, flavourings and condiments and beverages.

The baseline portion size for milk powder is based upon the quantity needed to make the baseline portion of milk, which is 100g. This ensures that when scaled up for other individuals the quantity of milk powder remains proportionate to the quantity of milk specified for an individual.

All foods specified in the 'supplements and infant foods' food group are dosage specific depending on the individual. The default portion size for these foods is therefore 1g and users should change this according to the steps outlined in section 5.8.5.2.

The portion size for salt is based on the recommendation that a child aged 1-3 years should consume no more than of 2g salt per day.²¹

The portion size for sugar, herbs, spices and flavourings is set at 1g to prevent the software including large quantities of these foods. The portion size for honey, confectionary and condiments is set at 5g for the same reason. The portion size for beverages has been set at 1g but users should change this depending on local circumstances as described in section 5.8.5.2.

The default values for the portion sizes applied in the software are shown in Annex 6.

If actual portion sizes are wanted for an assessment the software includes a database of standard portion sizes which have been calculated using a combination of the European Food Safety Authority's Comprehensive European Food Consumption Database²⁰ and a review of portion data by Save the Children. The mean portion size values for toddlers (aged 1-3 years) generated from surveys in seven member states (Belgium, Bulgaria, Finland, Germany, Italy Netherlands and Spain²⁰) for the European database have been used for the majority of portion sizes for food groups and sub groups. Missing data has been supplemented by data for children aged 1-3 years from: Bangladesh,²³ Ghana,²³ Great Britain,²⁴ Ireland,²⁵ Latin America,²³ 26 South Africa,²⁷ South Asia,²⁶ Tanzania,²⁸ USA,²⁹ and West Africa.²⁶ Annex 7 shows the portion sizes and references used for each food group category.


The following portion sizes for breast milk are automatically included in the diet by the software for the nine children of either sex aged 6-23 months:

Boy, girl or child aged 6-8 months: 635g/day

Boy, girl or child aged 9-11 months: 583g/day

Boy, girl or child aged 12-23 months: 532g/day

These portion sizes have been calculated based upon WHO recommendations that complementary foods should provide 200 kcal a day for infants aged 6-8 months, 300 kcal a day for infants aged 9-11 months, and 550 kcal a day for children aged 12-23, so the remainder is assumed to come from breast milk.³⁰


 The portion sizes are adjustable but, as they drive the diversity of foods and the cost of the diet, they should not be changed if data are to be compared between assessments and, if they have been changed from the default values, they need to be reported with the data on costs so that the analysis can be replicated.

If practitioners want to collect their own data on portion sizes it is recommended that the ProPAN³¹ guidance is used to collect such data as it includes a comprehensive description about doing 24 hour recall assessments, including estimating portion sizes. It is important to note that the portion sizes should be collected for children aged 1-3 years to ensure that the portion size scaling factors remain relevant for version 2 of the Cost of the Diet software. A description of how to do this in the software can be found in section 5.8.5.2.

2.1.1.4 Limits to the number of times foods can be included in the diet

The number of times per week a food can be included in a diet is limited by applying minimum and maximum values, called constraints. For example, if the minimum constraint for chicken egg is set at 7 and the maximum is set at 14 this means that the software must include chicken egg in the diet no less than 7 times a week (once a day) but no more than 14 times a week (twice a day).

For the energy only, macronutrient and nutritious diets (see section 2.2) the minimum and maximum constraints are set at defaults of 0 and 21 for all foods. This gives the software the option to include or exclude a food from the diet (because the minimum constraint is 0) but cannot include a food more than 21 times a week (three meals a day).


For the food habits nutritious diet (section 2.2.4), the minimum and maximum constraints are adjusted for each food to create a diet that captures typical dietary habits.  These constraints are derived from a one hour interview and focus group discussion with women. See section 4.6 for more details on how these constraints are calculated for this diet.

2.1.1.5 Limits to the number of times food groups can be included in the diet

The number of times per week a food from any given food group can be included in the diet is limited by applying a maximum food group constraint. This enables the user to adjust the frequency with which food groups can be consumed in a period of a week. For all diets the maximum frequency is set at a default value of 105 times per week for all food groups. This gives the software the option to include up to 5 foods from a food group for 3 meals a day, 7 days a week.

2.1.1.6 Limits to the total quantity of food included in the diet

Although the human stomach can stretch to accommodate a large meal, there is a physical limit to the amount of food that can be consumed.

 As there are no published data on the maximum capacity of the stomach for each individual whose data are applied in the software, an empirical approach has been taken based on the assumption that someone with a large requirement for energy could satisfy their requirement from a diet with a relatively low average energy density.

To calculate this weight, an upper limit has been based on the amount of food required to provide energy that is two standard deviations above the average energy requirement for each individual specified in the software, divided by a typical energy density for the diet. The energy density has been calculated based on the age and likely diet of the individual.

For children under the age of 6 months the maximum weight of breast milk consumed has been calculated by dividing an energy requirement of 2SD above the mean by an average energy density of breast milk of 0.67 kcal/100g.

For children aged 6-23 months the maximum weight of food has been calculated as the weight of complementary foods with an assumed energy density of 1.0 kcal/g plus the recommended intake of breast milk calculated using an energy density of 0.67 kcal/g.

For children aged 2 - 18 years and all men and women the maximum weight of food has been calculated by dividing an energy requirement that is 2 SD above the mean by an assumed energy density of the diet of 1.0 kcal/g.¹¹


2.1.1.7 Volume to weight conversion factors

A factor to convert the volume of a fluid to a weight has been applied to every liquid food in the food composition database.³² The factor for each food, which is the density per gram, is used as a multiplier by the software to convert foods that are measured in millilitres during a market survey to a weight in grams and then to a price per 100g. This is important for food such as oils which have a specific gravity less than 1.0. For example, as maize oil has a density of 0.92 g/mL at 25°C: 100 mL of maize oil = 100 × 0.92 = 92g

2.1.1.8 Standard families for analysis and comparison

Version 2 of the Cost of the Diet software allows users to specify the members of a typical family or household whose specifications for energy and micronutrients need to be met using foods available in local markets. The families have been selected to be aligned with families chosen in an HEA.

An HEA expresses all cash income and food grown by different wealth groups as a percentage of the energy needs of members of a typical family in the wealth group based on a daily requirement of 2,100 kcal/person/day, irrespective of age. This amount is estimated to meet the energy needs of a typical population in a developing country, assuming a standard population distribution, body size, ambient temperature and light physical activity.

 To align the Cost of the Diet and HEA methods, the Cost of the Diet method has selected a family of the same number of individuals (N) as selected by the HEA that require as close to the total energy requirement of N × 2,100 kcal as possible.

This alignment of the two methods enables data on the cost of the diet to be compared with data on income generated by an HEA in order to estimate the affordability of the diet, usually expressed as a percentage of total income. If the energy requirement of a family used to estimate the cost of the diet was greater or smaller than the total energy requirement used to estimate a household's income or expenditure in an HEA, then the affordability of the diet would be either under- or over-estimated. When data on the cost of the diet are to be compared with data from an HEA, the HEA/CotD families should be selected for analysis in the software to ensure that the methods are aligned and data can reliably be compared.

Version 2 of the software includes a database of 14 families aligned with the HEA based on total average requirements. Seven of these families are specific to Asia, as each includes a woman aged 60+y to represent a mother-in-law, and ranges from 4 to 10 members in total; the other seven families can be used in the rest of the world and exclude the elderly woman but also range from 4 to 10 members. These households always include a child aged 12-23 months, a lactating woman and an adult man.


If any other families are required to be aligned with an HEA, then the total daily average energy requirement should be as close to $N \times 2,100$, where N is the number of individuals in the typical family identified during the HEA.

There are advantages in using these standard families in a Cost of the Diet assessment.

First, this aligns the HEA and Cost of the Diet methods based on total average energy requirements so that data generated by the HEA can be used for calculations in a Cost of the Diet assessment, particularly affordability (see section 6.6).


Second, these families could be used to show how the Cost of the Diet changes depending on household size.

Third, these families (with an average of 2,100 kcals per person) are aligned with the amount of energy used by agencies such as the UNHCR, the WFP and UNICEF to calculate energy requirements when designing food rations.

 A Cost of the Diet assessment thus offers a way of calculating a ration to meet specified energy needs based on local foods at the lowest cost. This presumes that local foods are available, which they may not be during an emergency.

Fourth, if all Cost of the Diet assessments used standard families then data could be compared between livelihood zones in the same country or even between countries, although this would require standardisation in terms of currency. This can be achieved by setting the currency conversion factor to United States dollars (USD) simply to compare the costs in that currency. Because exchange rates fluctuate and differ depending on whether currency is being bought or sold, we recommend using either the most recent average annual rate published by the World Bank or apply the average annual rate for 2005. The 2005 dollar exchange rate in each country is used for comparing

purchasing power parity and as a benchmark for international comparisons of poverty. The rates can be found here: <http://data.worldbank.org/indicator/PA.NUS.FCRF>

 The Cost of the Diet method offers the potential for indices of purchasing power based on diets specified to meet needs of individuals for energy or energy and micronutrients. This will be a future development.

The composition of these HEA/CotD standard families is shown in Annex 8 and 9 with their total average energy requirement.

2.2 The diets calculated by the software

The term 'diet' is used here to describe the foods selected by the software to meet the recommended intakes of energy, protein, fat and micronutrients based on specifications to limit the intake of foods and nutrients to avoid toxicity.

The diets can be calculated for any of the 237 individuals whose specifications for energy and nutrients are specified in the software, or new individuals can be added. A combination of individuals is called a family, because it is usually based on at least two adults and a number of children, but this can be modified as required.

The software can calculate the lowest cost of four standard, theoretical diets:

- A diet that meets only recommended average energy specifications, called an energy only diet;
- A diet that meets recommended intakes for energy, protein and fat, called a macronutrient diet;
- A diet that meets recommended intakes for energy, protein, fat and 13 micronutrients, called a nutritious diet;
- A diet that meets recommended intakes for energy, protein, fat and 13 micronutrients based upon typical dietary habits of households in the assessment site, called a food habits nutritious diet.

Only the last standard diet selects foods in amounts that are likely to be consumed by individuals; the others are calculated simply to meet the specifications for combinations of energy, macronutrients and micronutrients.

2.2.1 Energy only diet

In this standard specification the software calculates a diet at lowest cost that meets only the average energy requirements of the individual or family. The analysis is not used to promote an energy only diet because it is unlikely to be nutritious, but it is useful to illustrate:

- The potential for micronutrient deficiencies in a diet that provides energy only;
- The additional cost of meeting all nutrient specifications, including micronutrients, in addition to energy, when other diets are calculated.

2.2.2 Macronutrients diet

In this standard specification the software calculates a diet at lowest cost that meets the recommended intakes for energy, protein and fat of the individual or family. This analysis illustrates:

- The potential for micronutrient deficiencies in a diet that meets only specifications for energy and macronutrient specifications ;
- The additional cost of meeting recommended micronutrient specifications, in addition to energy, protein and fat, when other diets are calculated.

2.2.3 Nutritious diet

In this standard specification the software calculates a diet at lowest cost that meets the recommended intakes for energy, protein, fat and all micronutrients specified for the individual or family. The diet does not reflect people's typical dietary patterns but it is useful to illustrate:

- The differences in the foods selected and their cost when compared with a diet that takes into account typical dietary patterns in the food habits diet, below;
- The extra cost of meeting specifications for micronutrients when compared with the energy only or macronutrients diet;
- The relatively small number of foods that can provide a nutritious diet, although often in unrealistic quantities.

2.2.4 Food habits nutritious diet

In this standard specification the software calculates a diet at lowest cost that meets the recommended intakes for energy, protein, fat and all micronutrients specified for the individual or family whilst applying a minimum and maximum number of times a week that the foods can be included in the diet. In version 1 of the software this was called a locally appropriate cost optimised nutritious diet (LACON diet), but this term has been simplified to a more informative term, a food habits nutritious diet. It more closely reflects typical dietary habits and is useful to illustrate:

- The extra cost of meeting average energy and recommended nutrient intakes but taking into account typical dietary habits such as the main staple consumed, the frequency with which foods are eaten and food taboos.

The last two diets are described as nutritious as they attempt to meet recommended intakes of energy and all nutrients specified: protein, fat, nine vitamins and four minerals.

Table 2 summarises the specifications for the four diets.

Diet name	Definition	Energy needs met	Protein needs met	Fat needs met	Micro-nutrient needs met	Reflects a typical diet
Energy only diet	A lowest cost diet that meets only the average energy specifications of the members of the household	×				
Macronutrient diet	A lowest cost diet that meets only the average energy and the recommended protein and fat specifications of the members of the household	×	×	×		
Nutritious diet	A lowest cost diet that meets specifications for energy, protein, fat and micronutrients but does not take into account typical dietary habits	×	×	×	×	
Food habits nutritious diet	A lowest cost diet that meets specifications for energy, protein, fat and micronutrients and takes into account typical dietary habits	×	×	×	×	×

Table 2. A summary of the diets analysed using the Cost of the Diet software

2.3 The output produced by the Cost of the Diet software

The software produces the following output for each of the four diets:

- The daily cost of the diet by season for an individual or household;
- The annual cost of the diet for an individual or household;
- The average monthly cost of the diet for an individual or household;
- The average daily cost of the diet for an individual or household;
- The total daily weight (g) of each food selected by the software;
- The edible daily weight (g) of each food selected by the software;
- The cost of the edible daily weight of each food selected by the software;
- The daily number of servings of the foods selected by the software;
- The daily quantity of each nutrient provided by the edible portion of foods selected by the software;

- The percentage (%) of each nutrient target provided a day by the edible portion of foods selected by the software;
- The total weekly weight (g) of each food selected by the software;
- The edible weekly weight (g) of each food selected by the software;
- The cost of the edible weekly amount of each food selected by the software;
- The weekly number of servings of the foods selected by the software;
- The weekly quantity of each nutrient provided by the edible portion of foods selected by the software;
- The percentage (%) of each nutrient target provided a week by the edible portion of foods selected by the software;

- The percentage of nutrient specifications met by the diets, by season for an individual or household;
- The annual diet summary for an individual or household;
- The affordability of the diets by wealth group for an individual or household, if data from an HEA or other source of income are available.

The software produces the following output for the food habits diet only:

- The cost of the food groups by week for an individual and the total household
- Seasonal cost fluctuations of the food habits diet for an individual or household

3.

PLANNING A COST OF THE DIET ASSESSMENT

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A Cost of the Diet assessment follows a logical process from identifying the objectives and scope of the assessment, to data collection and analysis, writing a report, making recommendations and drawing conclusions.

Figure 2 is a flow diagram of the different stages of an assessment and summarises the tasks and information required at each stage. The remainder of the guidelines will describe each of these stages in the flow diagram.



Figure 2. An overview of the Cost of the Diet assessment process.

This section of the practitioner's guide aims to describe the planning stages of a Cost of the Diet assessment such as:

- The capacity, budget and time required to do an assessment;
- Defining the objectives of the assessment;
- Defining the location and seasonality of an assessment;
- Undertaking a literature review to find local data on:
- General information on the nutrition and food security situation of the assessment area;
- Household composition and size;
- Definitions of wealth and how households are grouped;
- Annual income and non-food expenditure data for each wealth group.

3.1 The capacity, timeframe and budget required for a Cost of the Diet assessment

A Cost of the Diet assessment typically involves the following four individuals:

Assessment leader. This individual commissions an assessment based on an understanding of why and where it is needed as a result of knowledge of the local environment and its effects on food production, diet, nutrition and livelihoods. The assessment leader typically works in the field of food security or nutrition.

The practitioner. This individual can be the same as the Assessment leader but may be a consultant or a senior member of staff. This individual trains the data collectors, oversees data collection, analyses the data and writes the final report. Depending on the knowledge and capacity of the agency or country office commissioning the assessment, the practitioner may be required to provide support planning an assessment, such as defining the objectives and the scope of the study.

It is recommended that a practitioner certified by Save the Children conducts an assessment. This will ensure that the data are collected, analysed and reported to a high standard. To become a certified Cost of the Diet practitioner an individual is required to attend a Practitioner's Training, lead an assessment on their own and send the data and the final report for review by staff of Save the Children UK. Once certified, practitioners will receive an official certificate.

The data collectors. These individuals will be hired from the area in which the assessment is being conducted and will collect the market survey data and conduct interviews and focus group discussions. For more information about the skills required by these individuals and how they should be trained, refer to section 4.8.

An assessment administrator. This individual organises the recruitment of data collectors and makes practical arrangements for data collection including permission from managers of food markets to visit and interview traders; booking the training venue, hotel and transport for the team; and ordering stationary and equipment. This individual should be based in the assessment area or have very good knowledge of it. If the assessment is being done in an area that is new to an agency, it might be necessary to identify a local partner organisation to provide this individual or support.

Table 3 shows approximately how long each stage of a Cost of the Diet assessment in one location takes and the roles of each individual. The duration will depend on the objectives of the assessment, the number of market surveys, interviews and focus group discussions required and the resources available, such as the number of data collectors.

As Table 3 shows, a Cost of the Diet assessment requires the practitioner for about 3-4 weeks to support data collection and run an initial analysis of the data to present to the agency for feedback. The final report can be written in 1-2 weeks.

	Week					
	1	2	3	4	5	6
CotD practitioner	Literature review	Training data collectors, supervising data collection, initial analysis			Report writing	
Data collectors	Training and data collection					
Country administrator	Planning assessment	Supporting Assessment				


Table 3. An estimated timeframe of a standard Cost of the Diet assessment.

When designing a budget for a Cost of the Diet assessment, the costs related to the items outlined in Table 4 should be considered.

Line item	Description
Personnel (practitioner, data collectors, country admin support)	Personnel costs: salary or consultancy fee Transport Accommodation Per diem for meals
Data collection equipment	Computer or laptop Printer and supplies (toner, paper) Food weighing scales with 1g precision and batteries, 1 per team of 2 people Salter hanging scales, 1 per team of 2 people Back packs, stationary and equipment pens, pencils, erasers, measuring jugs, clipboards, plastic bags
Training session	Venue hire Stationary (flip charts, markers, notebooks)

Table 4. A description of the line items that have budgetary implications in a standard Cost of the Diet assessment.

3.2 Defining the objectives of a Cost of the Diet assessment

 Defining the objectives and the use of a Cost of the Diet study is very important to ensure that the scope of the data collection and analysis will provide all of the information required. For example, if more information about infant and young child feeding is required, more questions may need to be added to the focus group discussion script. If actual portion sizes need to be collected, this will require data collectors to be trained in how to collect these data, and additional women and more time may be needed for the focus group discussions. If data on the actual diet is required, a 24 hour dietary recall will need to be undertaken.

The results from a Cost of the Diet study have been used by Save the Children to inform the following:

- Nutrition, food security and social protection programme design
- For advocacy at a national and global level

A Cost of the Diet could also be used to inform early warning and nutrition surveillance through the regular collection of food price data in markets.


For more information and case studies of how the Cost of the Diet has been used to inform these different areas, refer to section 7.

3.3 Defining the scope of a Cost of the Diet assessment

The scope of a Cost of the Diet assessment refers to the location and the season(s) that the study will be undertaken in. The decisions made about these issues will depend on the objectives and the way in which the Cost of the Diet results will be used. The following sections describe what to consider when determining the location and seasons in more detail.

3.3.1 Choosing the assessment location

The location of a Cost of the Diet assessment will ultimately depend on the objectives of the study.

 An assessment can be done in any locality, rural or urban, but the key principle when deciding is that the crops grown, the diet and the availability of food should be relatively homogenous. An assessment is therefore likely to be undertaken in:

- A geographic region of a country such as a province or district;
- In a poor urban or peri-urban community within a city;
- A livelihood zone: an area within which people's pattern of livelihood is relatively homogenous;
- An ecological zone: an area within which the ecosystem is relatively homogenous;
- An agricultural zone: an area within which the plants grown are relatively homogenous.


Once the area in which the assessments is to be done has been defined, the villages and markets for data collection can be identified, mapped and selected as described in section 4.1.

Hints and tips

- If a Cost of the Diet assessment is done among a nomadic population such as pastoralists, it will be necessary to identify the places they migrate to and collect market survey data from all locations.
- If the Cost of the Diet assessment is being done in an unfamiliar area it might be useful to consider including local partners, the Ministry of Health or government officials in the assessment in order to build capacity, increase credibility and strengthen partnerships. Local staff will also be able to provide useful information about the assessment area.

3.3.2 Choosing the seasons to conduct an assessment in

In many countries the production of food, its availability and prices vary throughout the year, so a year is the basic unit of analysis and reporting for a Cost of the Diet assessment. It is possible to capture these differences by repeating market surveys, which can add useful contextual information. The easiest way to do this is by collecting market survey data by season or at times of the year in which prices change, such as religious festivals. The average prices of each food in a season or period are then applied to calculate the cost of the diet in all days in that season.

 A Cost of the Diet assessment can be conducted in up to six seasons or periods in a year. The seasons or periods selected will depend on the objectives of the assessment. For example, market data on foods could be collected during the lean and harvest seasons to compare the effect of availability and prices. Or an assessment could be done during a period of food subsidy or food distribution and repeated during a period without, also to examine the effect of availability and prices.

3.3.2.1 Defining the season(s) or period(s)

The definition of the seasons or periods is often context specific: they can be separated according to the weather, staple food prices, livelihood activities, agricultural events, religious festivals or just the annual calendar. For a Cost of the Diet assessment the following information about the seasons or periods is required and should be collected by the practitioner with help from the administrator and data collectors who know the locality or researched using the secondary sources described in section 3.4.1:

- The local name of the seasons or periods that will prompt the market trader to provide the correct data on food prices and availability. This is important for retrospective market surveys in which data on historical prices are collected.
- The dates in the year that the seasons start or end. These dates may need to be converted into the Gregorian calendar of dates used by the software.

- A seasonal calendar showing when key livelihood activities take place. This is not essential but will be useful to provide contextual information for the seasonal Cost of the Diet analysis. It will also help to determine whether a retrospective analysis has provided realistic food price information.

There are two ways in which seasonal or periodical market survey data can be collected: currently or retrospectively, both of which have their advantages and disadvantages as explained below.

3.3.2.2 Continuous price and weight data collection

This option will require a team of data collectors to conduct a market survey prospectively during every season or period identified in a year. This method will produce the most reliable data on food availability and prices, however it will take as long as data collection to produce the full Cost of the Diet assessment and report. For example if data are to be collected for a full year then the analysis and report would not be available for more than 12 months.

3.3.2.3 Current and retrospective price and weight data collection

If the assessment budget does not support continuous data collection, data can be gathered for the current season and retrospectively. This option will require a team of data collectors to collect current price data in markets and, at the same time, ask traders to recall prices during the preceding seasons in the recall year (e.g. December 2014 – January 2014). Although this is quicker than data collected during a period of a year, the quality of data may not be as good as traders are expected to remember the price and availability of foods, perhaps in several seasons over quite a long period.

As a compromise between a prospective and a retrospective assessment, it is recommended that a retrospective Cost of the Diet assessment for the previous year is conducted first. This allows the number of foods to be reduced based upon dietary patterns and the foods selected by the software. Data can be collected prospectively for this smaller number of foods in the remainder of the year. This will provide immediate Cost of the Diet results which can be updated seasonally.

Hints and tips

- The price of foods can fluctuate within a season so it is important that a market survey is undertaken when food prices are representative of that season.
- It is important to allow additional time for retrospective price data to be collected that is as accurate as possible.

3.4 Contextual information required

This section outlines the essential and desired information required before the data collection can begin, collected mostly through a literature review of secondary data.

3.4.1 General information on the nutrition and food security situation of the assessment area


To help to contextualise the assessment location and the Cost of the Diet results it might be useful for the assessment leader and the practitioner to find the following information before data collection begins:

- The prevalence of stunting, wasting and underweight.
- The prevalence of micronutrient deficiencies and coverage of supplements.
- The prevalence of helminth infections in the area and the coverage of deworming treatments.
- The prevalence of good infant and young child feeding practices such as exclusive breastfeeding and appropriate complementary feeding.
- Data on dietary diversity and food taboos.
- The prevalence of sanitary latrines, sources of clean water and good hygiene practices such as washing hands with soap.
- The sources of food such as home production, gathering wild foods, and markets.

This information can be obtained from a variety of sources including:

- Demographic and Health Surveys
- Local nutrition or SMART surveys
- Food security reports from FEWSNET, ReliefWeb, FAO, WFP, OCHA
- Government reports
- National agricultural surveys
- Comprehensive Food Security and Vulnerability Analysis

3.4.2. Typical household composition and size of the assessment area

 Information on the typical number of people in a household in a locality is essential for a Cost of the Diet assessment as the software estimates the cost based on the specifications for energy and nutrients of the individuals that make up a household. This is usually defined as all people who eat from the same cooking pot but may need to be defined based on local social arrangements.

It is recommended that information of household size, meaning the number of individuals, is collected for all wealth groups. For example if an analysis of affordability is planned for four wealth groups, the number of individuals in a typical family in each wealth group will be needed. If an affordability analysis is not required, data on the typical


number of people in a family and their age and sex should be collected. This could be obtained from published reports, from a statistical analysis of demographic data, by collecting data from households in a sample of each wealth group, or by interviews with key informants or focus group discussions to identify a typical household size.

An HEA uses focus group discussions with each wealth group in a livelihood zone to identify a typical household size. If these data are used, the HEA/CotD standard families should be used in the software as described in section 2.1.1.8. If an HEA has not been conducted, the method used to collect this data could be used and can be found in the HEA practitioner's guide.³³

Hints and tips

- If the household size differs by wealth group, this will affect the calculation of affordability. Users will need to run a separate analysis for each household size, extract the annual cost of the diets and enter this into the 'affordability' Excel spreadsheet which will be provided to all practitioners who have attended a training course. This spreadsheet can be requested by emailing cotd@savethechildren.org.uk

3.4.3 Definitions of wealth, income and expenditure data

 The cost of a nutritious diet becomes a more meaningful figure when compared with the income and expenditure of the poorest members of the community. A diet may be inexpensive in comparison with other contexts, but if it is beyond the means of the poor, then the risk of malnutrition remains. If an analysis is wanted of the affordability of the diets generated by the Cost of the Diet software, the following information will need to be collected:

- Definitions of wealth by group in the assessment area;
- Percentage of the population of the assessment area by wealth group (desirable but not essential);
- Data on the annual income and non-food expenditure for each wealth group in the assessment area.

Non- food expenditure (NFE) is the amount of money spent on essential non-food items such as healthcare, schooling and clothing. A Household Economy Analysis, undertaken in the same livelihood zone will provide all the information listed above. To calculate the annual non-food expenditure figure from HEA data, the annual amount of money spent on staple and non-staple foods should be subtracted from the total annual expenditure figure for each wealth group. If an HEA has not been conducted, the method used to collect these data can be found in the HEA practitioner's guide.³³

Alternatively data may be found in reports of household income and expenditure produced by the government or the World Bank, but may not be specific to the livelihood zone or to the extremely poor.

3.4.4 Considerations to make when using secondary data

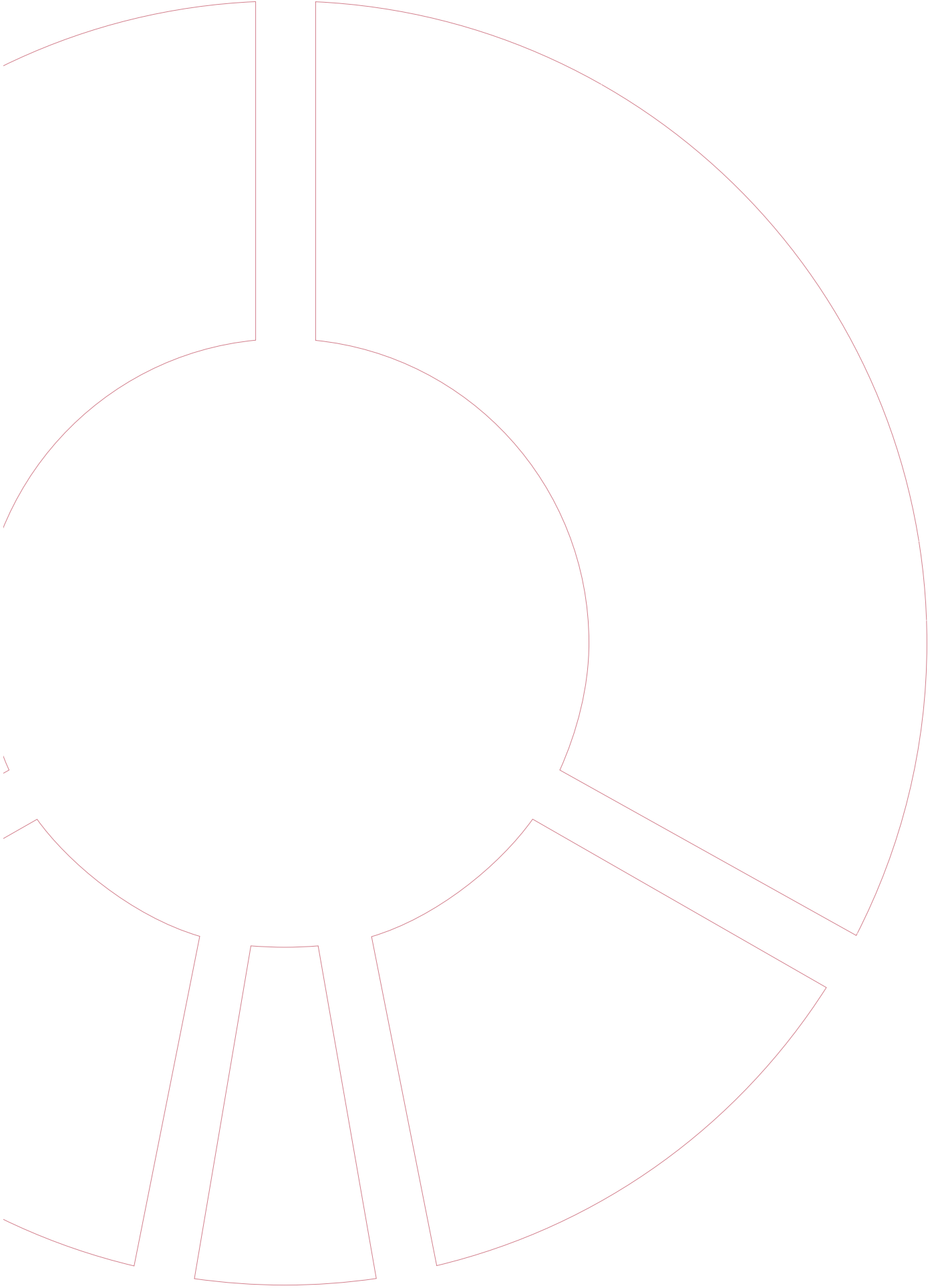
Using secondary data to provide contextual information can have flaws. To ensure that the data are relevant and of good quality the following should be considered before using it.

3.4.4.1 Geographical overlap

If possible the information should be specific to the assessment area. At the very least it should come from the same region as the assessment area to ensure the data is representative. National data should be avoided if possible.

3.4.4.2 Age of the data

The age of the data may affect its relevance and quality. Data generated by an HEA assessment is considered to be relevant for five years unless there are substantial changes in the assessment area. If income and expenditure data are a few years old it may be necessary to update figures to account for inflation. As it is rare to find inflation rates specific to a livelihood, agriculture or ecological zone, national inflation rates will probably need to be used. However, any income data that is updated using national inflation rates should be used with caution as these rates may not be locally appropriate.



4. DATA COLLECTION

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The following data are needed for a Cost of the Diet assessment:

- A list of all the foods (local, imported, wild and produced in the home) available in some or all seasons of the year; that are found in the assessment area;
- The availability of these foods by season;
- The weight in grams of all foods sold in the smallest amounts, which are typically bought by the poor;
- The prices in retail food markets of all foods by season;

The typical dietary habits of local people.

To obtain information on the foods found in the assessment area, an exhaustive list is written using secondary sources and the local data collectors (section 4.3). Data on food availability, prices and weights are collected by a survey in a representative sample of local food markets and shops which are used by the poor (section 4.4). Data on typical dietary habits are collected using interviews and focus group discussions with local women from each wealth group (section 4.6).


This section describes the following:

- How to select villages and market sites;
- How to prepare the data collection plan;
- How to conduct data collection, and the equipment required;
- How to include wild or free foods in a Cost of the Diet assessment;
- What skills are needed by the data collectors;
- How the data collectors should be trained.

4.1 Selecting the sites for data collection within the assessment zone


Site selection is a two-stage process: first villages or towns must be chosen that are representative of the livelihood zone; then the market(s) where the poorest households from these villages purchase their food from must be identified.

The total number of villages or towns selected will depend on the number of market surveys, interviews and focus group discussions that are undertaken. As a general guide it is recommended that between 6-8 market surveys and 4 interviews and focus group discussions are conducted during a standard Cost of the Diet assessment. **The final**

 **number of surveys and interviews undertaken will however depend on the objective of the Cost of the Diet assessment and the size of the livelihood zone.** Obtaining representative data on the cost is the main objective when deciding on the number of data collection sites to choose and is therefore assessment specific.

Sections 4.1.1 and 4.1.2 below describe the recommended method of selecting representative villages and markets for both rural and urban assessments.

4.1.1 Selecting villages or towns

 If an HEA has recently been conducted in the same livelihood zone as the Cost of the Diet assessment, the villages or towns selected for the HEA can be used. If an HEA has not been done, two approaches can be used to select sites for data collection:

- Villages or towns that are broadly representative of the overall zone can be selected;
- Villages or towns can be randomly selected using a sampling procedure.

If the first method is chosen it is recommended that national staff with knowledge of the local area are used to help select the representative villages or towns. It is also important that the villages or towns chosen cover the whole area of the assessment zone, as the cost of food may be higher in remote locations. The reasons for choosing the specific sites should also be documented to be described in the methods of the assessment.

If the second method is chosen, a Centric Systematic Area Sampling (CSAS) method is recommended to randomly select villages or towns. To do this:

1. Compile a list of all the villages and towns in the assessment zone and plot these on a map.
2. Place a grid of equal sized squares over the map as shown in Figure 3. The number of squares in the grid should be the same as the number of sites from which data will be collected. For example, in Figure 3, six squares are shown over the map, so that six villages or towns will be selected.
3. Select the village or town which is located nearest the centre of each square (shown in blue in Figure 3). These will be selected for data collection.

Of the villages or towns selected, it is recommended that interviews and focus group discussions are done in a minimum of four sites, a number used as a guide. The key objective is to decide on a number of interviews and focus group discussions to generate representative information on the dietary habits of households in the assessment area.

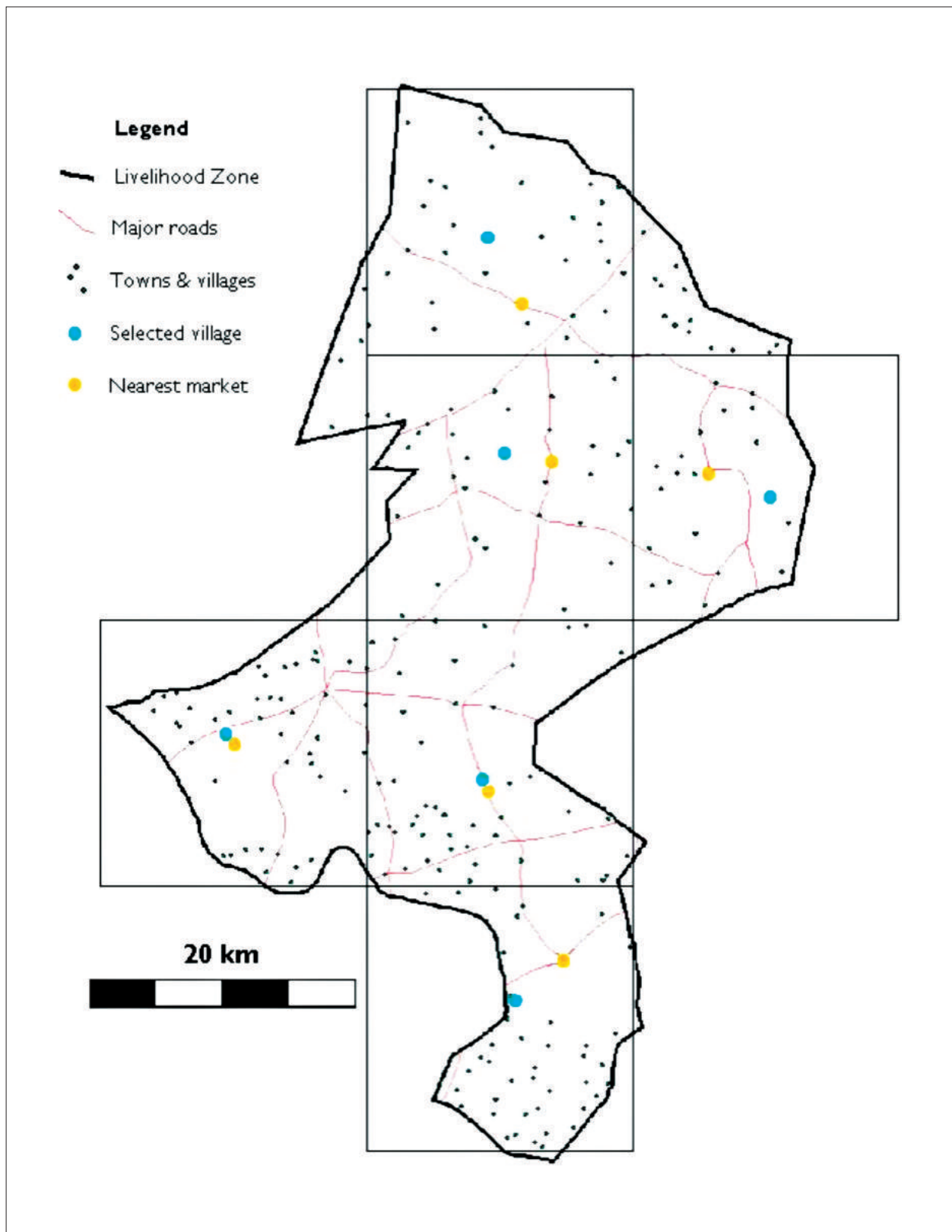


Figure 3. An example of how to use the Centric Systematic Area Sampling method to identify sites to collect data in a Cost of the Diet assessment (Myatt, M. 2008).

4.1.2 Selecting markets for the market survey

Once villages or towns have been selected for sampling, the markets that will be visited to collect food price data need

 to be selected. For the Cost of the Diet method a market is defined as any place of trade where poor households from the selected villages or towns purchase their food.

A market could therefore be any one of the following:

- A formal indoor or outdoor market or
- Traders selling outside formal market structure such as:
 - Beside a road
 - Within their homestead
 - Or small shops.


Once the villages or towns are selected a list of all the sites where poor households purchase their food should be identified by key informants, such as staff working in the assessment area.

Once all the markets have been listed, a representative sample of these should be selected for the market survey.


 As a rough guide, 6-8 markets are recommended but the main objective is to select a number of markets that will generate representative data on the price per 100g of all foods sold in the assessment area, so large food markets will provide the broadest range of foods.

During the data collector training (section 4.8.2) it is sensible to undertake a pilot market survey so that the data collectors can practice talking to traders, and learn how to use the scales to weigh food samples and then record the data on the market survey questionnaires printed from the software. An extra market will therefore need to be selected for this pilot. This market should be near to the training venue and contain a sufficient variety of local foods for the data collectors to spend 2-3 hours practicing their market survey skills. The data from this market are not included in the final analysis, so the pilot market does not need to be in the same zone as the assessment.

Figure 3 above, highlights the markets selected from each village in yellow.

 Once the data collection sites have been identified, it is important to get formal permission from the market or community leaders and local traders. The data collectors may also need to have a letter or document describing the objectives of the assessment so that they can explain to community members what they are doing, and how the information will be used.

Hints and tips

-  • Always choose back up markets in case something unforeseen happens and it is no longer possible to go to a market originally selected.
- Markets may not be held on every day of the week and at different times of the day such as morning or evening, depending on the produce; this should be taken into account when planning the schedule of visits

- If there is a main road within the assessment area it might be possible that food sold in markets located near this road are more available and less expensive than food sold in markets that are far away from this road. It might be necessary to use another method to sample these markets separately and treat them as separate assessments to ensure these differences are adequately captured.
- If regular market surveys of current prices are planned, the initial contact with the community will be critical as repeated data collection may become burdensome to traders and community members. Establishing a good relationship with these key informants will be important, as will managing their expectations.


4.2 Developing a data collection plan

The plan should describe a day-by-day description of the villages and markets that will be visited by field teams during data collection. This plan requires information on the following:

- The locations in villages and towns of all markets;
- The days that each market operates;
- The time when the market is open and when all foods will be available;
- The estimated driving time from the base to each market;
- The time of day that women are available to hold the interviews and focus group discussions;
- Any physical problems with access to villages and markets;
- Any potential security issues with access to villages and markets.

It is recommended that this plan is finalised after the first day of data collection, once the local data collectors have checked the markets and villages selected are big enough to visit and are operating.

Hints and tips

-  • Use staff from the local area to provide this information. If the assessment is being conducted in an area that your agency does not operate in, find a local partner to help provide this information and to make arrangements.
- It is essential that the teams visit the markets when all foods are available but avoid collecting data during the busiest time of the day: the traders will have little time to help as they are selling food, while crowds of people can make it difficult to get accurate price and weight data.
- The field team may also require accommodation away from the base during data collection, which should be organised and budgeted for.
- The number of vehicles required for data collection will depend on the number of data collectors that have been hired and the distance between markets.

4.3 Developing the list of foods for the market surveys and interviews


An exhaustive list is needed of all the foods - local, imported, wild and produced in the home – that are available in some or all seasons of the year that are found in the assessment area. The list requires the English and local names for each food; if the English name is not known, the Latin name should be used.

It is recommended (although not essential) that an initial food list is written by the Cost of the Diet practitioner before the data collector training, using secondary sources. Websites, reports or books that include lists of locally available foods, crops, plants and wild foods with both local and English names, are very useful. These can sometimes be obtained from nutrition, agricultural or other academic research centres. A visit to a local market is also useful.

This initial list can be expanded with the help of data collectors during the first day of training and can be added to after the visit to the training market, when new foods should be identified and recorded. The full list of foods will be entered into the Cost of the Diet software which then allows the market survey and interview questionnaires to be printed (section 5.9.6). The food list forms the basis of the Cost of the Diet assessment, so it is important to ensure that no important food is missed.

4.3.1 What foods should be included and excluded?

Before deciding on foods that should be included in the food list it is important to think back to the objectives of the Cost of the Diet assessment and how the results will be used. For example, a nutritious diet ideally should not include foods that are expensive or are not nutritious such as soda, sweets and junk food unless they are relied upon as

 a major source of energy or nutrients. *Adapting the food list to the local context is therefore very important.*

The food list should include all foods in the following 11 food groups:

- Grains and grain-based products
- Roots and tubers
- Legumes, nuts and seeds
- Meat and offal
- Fish, seafood, amphibians and invertebrates
- Eggs and egg products
- Milk and milk products
- Vegetables and vegetable products
- Fruit and fruit products
- Oils and fats
- Supplements and infant foods.


It should also include wild foods, foods eaten on special occasions, taboo foods, and foods that are consumed by households but not purchased from the market, such as foods grown or produced, donated food, food aid or food obtained using vouchers.

The food list may include foods from the following food groups but their appropriateness will be locally specific:

- Herbs, spices and condiments
- Beverages
- Composite dishes
- Sugars and confectionary

For example, only the herbs, spices and condiments that are consumed regularly by households should be included in the food list. Furthermore, only manufactured foods that are nutritious should be included such as canned fish, unless these foods are a major source of energy or a particular nutrient.

Hints and tips

 It is essential that a detailed description of the food is written as different varieties will have different nutrient values. For example:

- Maize can be white, yellow or green grains, off or on the cob, or as unrefined or refined flour.
- When identifying meat and meat products it is essential that the animal itself and the part of the animal are described: for example liver is not detailed enough; the animal from which the liver comes needs to be written.
- Just recording a variety of fish is not detailed enough: it is necessary to state whether the fish is fresh, dried, smoked or fried, all of which influence the nutrient content.

4.4 How to conduct the market surveys

The aim of the market survey is to collect data from market traders, food sellers and shop keepers on the weight and price of a representative sample foods in the seasons specified. The values are entered into the software which calculates the cost per 100g of each food by season and applies these values to the Cost of the Diet calculations.


This section provides guidelines on how to collect data as accurately and quickly as possible but should be adapted to suit the local context.

Step 1: Data collectors should be paired and allocated to market or to a food group

It is recommended that the data are collected in pairs: one person asks the questions and the other person writes down the answers. To ensure that traders are interviewed only once it is also recommended that the data collectors are allocated to collect data in a specified area of the market or from traders selling specific foods, if such specialisation exists. In this case the data collectors should

be given a list of the specific foods to collect data on, plus the sheet to record any new foods that they find. If traders sell a variety of foods then the market should be divided by area and the data collectors working in each area should be given the full list of foods.

Step 2: A clear and concise introduction is essential


The market survey can be a time consuming process depending on the number of foods on sale.  **Establishing a good rapport with the trader by outlining the aim of the study and the information required is important so that traders feel empowered to provide information needed.**

Each data collector should introduce themselves and the organisation that they work for; explain the aims of the Cost of the Diet study; and describe the information that is required. During the introduction no promise should be made that assistance will result from the study. For example:

Hello, my name is Amy and this is Simon, Esther and George. We are from Save the Children, a Non-Government Organisation that works to improve the lives of children and families. We are doing a study of all the foods that are available in this area and would like to ask you about the prices of the foods you are selling today and to weigh some samples. Would you allow us to do this?

Step 3: Always ask the trader's permission and don't use incentives

The data collectors should always ask a trader's permission before starting to collect data. If permission is refused they should explain again how important the study is. If this does not persuade the trader, then data cannot be collected from that trader.

 **Traders should not be given money as an incentive to allow data to be collected.** This is particularly important if data are to be collected again because traders will expect to be paid every time. If a trader asks for money the data collectors should explain again how important the study is. If this does not persuade the trader, then data cannot be collected from that trader.

Step 4: Identify a food on the market survey form

Once a trader has granted permission to collect data, the data collectors should identify the foods that they need to collect data on.

If a food is not listed on the market survey form, it should be added to the section of the form entitled 'New foods'. Data on the weight and price of that food can then be collected. Each evening after the market survey, the practitioner should ask each team if new foods were found. These should be cross referenced with the food list so that a food is not included twice in an assessment. The practitioner should update both the market survey form and the interview questionnaires with the new foods found, as described in section 5.5.3.

If the data collectors do not know what a food is and it is not in the food list, data on the weight and price should still be collected. The data collectors should ask the trader for the local name of the food and write this in the 'New foods' section of the market survey form. They should then take a photo of the food by doing the following:

- Place the food on a flat surface on a white background, such as the back of a data collection form;
- Place a ruler divided into centimetres next to the food to indicate the size of the item;
- Take a photograph from directly above the food.

Step 5: Ask for the smallest unit that the food is sold in


The units in which foods are sold in will differ by trader, but small amounts often cost more than large amounts.

 **As poor people typically buy the smallest amounts, data collectors should record the weight and price of the smallest unit of each food for sale.** A unit could be the following:

- A bowl or can
- A bunch or a bundle
- A piece or a pile
- A fixed weight in any units
- A bottle or a cup
- A fixed volume

The exception is food sold by weight at a fixed unit price. For example, for foods such as fish or meat and very large items such as pumpkin or gourd, the price will depend on the weight of the food being purchased. In this instance, the trader usually states a price per kilogram. This should price be recorded per kilogram without weighing three samples of the food.

Step 6: Ask for the price of the smallest unit in the current season

 **It is important that the data collectors stress to traders that they should state the true price that they sell food to local people.** The traders have nothing to gain by inflating the price and incorrect prices given incorrect results. This is one reason perhaps why strangers to the area should not do from data collection: the price may go up.

Step 7: Weigh three samples of the specified unit of each food

The weight of three samples is needed as this is the minimum number to generate an average. For example, if the smallest unit of sale of tomatoes is a pile of 5, then three different piles of 5 tomatoes should be weighed. The following tips should be applied when weighing different units:

- Piece: weigh a small, medium and large piece
- Cup: take the weight of the cup first and subtract this weight from the total weight so that only the weight of food is recorded. A scale that can be tared is useful: this sets the scale to zero when the cup or receptacle is on the plate; when the food is added, only the weight of the food is shown on the display. The trader should be asked to give the data collectors three samples to weigh as he/she may under- or over-fill the cup. The objective is the weigh the amount of food that the trader would give to local people.
- Pile: weigh three samples of the pile
- Volume: record the volume in millilitres clearly by crossing out the g and writing ml
- Weight: the traders should weigh three samples of a food on their scales and then the data collectors should weigh the sample on their scale to check accuracy. If a trader refuses this may be because the trader's scale has been tampered with. If the trader refuses, then move to another trader.

Exception: If the price of the food is weight dependant (refer to step 4)

Exception: If the food is sold in a sealed tin, packet, sachet or bottle. The net weight of such foods should be printed on the packaging. This weight should be recorded once, not three times, as the packet cannot be opened to check it, and it is assumed to be standardised.

Exception: If the trader has an accurate electronic scale and is selling exact weights. This only applies when the smallest unit is a weight. If the data collectors weigh a sample on their scale which has been weighed by a trader using an electronic scale and the weights are the same, there is no need to weigh three samples. The data collectors should just ask for the smallest unit and write this in the 'weight 1' column.

Exception: If the trader does not have three samples to weigh. In this case, weigh what they have.

Step 8 (for retrospective assessments only): Ask if the smallest unit changes in the previous seasons

In some contexts a trader may sell more or less of a food for the same price depending on that food's availability. A change in unit weight for the same price will change the price per 100g, so data on the weight of the larger or smaller amount of food needs to be collected.

For example, a trader may sell a pile of 5 tomatoes in a season for 3 USD but in another season may sell only 3 tomatoes for 3 USD. The data collectors should weigh three samples of three tomatoes (see step 6) and write these weights and the season that the data applies to in the 'When and how does the unit change across the seasons?' box.

Step 9 (for retrospective assessments only): Ask for the price of the smallest unit in the previous seasons

As described in step 5. If prices vary substantially between seasons, the data collectors should ask why and write the traders response in the 'comments' box.

If the trader says that the food is not available during a season, write NS (not in season) in the price box for that season.

Step 10: Ask the trader additional questions if relevant

In addition to collecting data on prices, it is useful to ask traders and key informants in the markets for their views on current prices and market conditions. This will allow data on seasonal changes to be contextualised. Try to establish what changes are typical for this season or time of year and what are unusual. For example, the following questions could be asked:

- Have traders noticed any changes in prices?
 - What are the changes?
 - For which foods?
- What caused the price changes?
- Have there been any changes in demand and/or supply of foods?
- Are seasonal changes in price normal, more or less than previous years?

Step 11: Four sets of data should be collected for each food in every market

Price and weight data should be collected for all foods on the food list in each market. Collecting four sets data for each food will result in 4 sets of price data and 12 sets of weight data. **This should be the aim for every food in every market to ensure a representative sample.** This means that 4 questionnaires for each food will need to be filled in by the data collectors.

Exception: If there are not four traders selling a food item. In this case, select data on samples of foods available.

Hints and tips

- For messy foods such as butter or meat, provide a plastic bag to weigh a sample of these foods.
- For foods sold in units larger than 5kg, weigh them in a bag using hanging scales.
- Liquids such as milk should be measured using a measuring jug and the volume recorded. The software applies a factor to convert volume into weight for each liquid food as described in section 2.1.1.7.
- The data from the market survey should be entered into the Cost of the Diet software every evening by the practitioner and/or the data collectors using the method outlined in section 5.6.2.

4.4.1 Filling in the market survey questionnaire

The market survey forms can be printed from the Cost of the Diet software (section 5.9.6). Figure 4 is an example of a market survey form collecting current data and shows:

- The trader did not sell wheat flour, so the line has been left blank to be filled in when wheat flour is found at another trader's stall.
- The price of yellow maize grain in the current season was 20 BDT. The first weight was 500g, the second, 450g and the third 550g.
- Red amaranth leaf was sold at 10 BDT but the trader only had two samples to weigh, which were 200g and 250g.
- Green amaranth leaf is normally available in the market but was not found during data collection due to poor rainfall.
- Bananas were not in season.
- The price of tomato in the current season was 10 BDT. The weights were 45g, 80g and 100g

Figure 5 is an example of a market survey form recording retrospective data and shows:

- The price of wheat flour in seasons 1 to 3 is 20 BDT, 25 BDT and 20 BDT. This food was packaged so one weight of 500g was recorded
- The price of yellow maize in seasons 1 to 3 is 30 BDT, 35 BDT and 40 BDT. The three weights were 400g, 300g and 350g
- The price of red amaranth leaf in seasons 1 to 3 is 15 BDT, 15 BDT and 20 BDT. The weights for season 1 and 3 are 50g, 100g, and 75g. In season 2, red amaranth is more common, so the trader sells more for 15 BDT. The three weights for season 2 is 150g, 200g and 175g
- The price of green amaranth leaf in season 1 and 3 is 10 BDT. The three weights are 100g, 102, and 105g. Green amaranth leaf is not in available in season 2
- The price of bananas in seasons 1 to 3 is 20 BDT, 25 BDT and 50 BDT. The reason for the high price in season 3 is because this food is not as widely available in the market. The three weights are 300g, 325g, and 352g
- Tomatoes are only available in season 1 and costs 15 BDT. The three weights are 30g, 50g and 45g.

Date	7th September	Village/place of trade	Konjho	Trader ID/Sheet	I	Interviewer	Rama
If the food is not in season write NS							
Local name	English Name	Price (BDT) Season 1	Weight 1	Weight 2	Weight 3	Comments	
Grains and grain-based products							
Ata, sada, packet	Wheat, flour, white		g	g	g		
Bhutta, kancha	Maize, yellow, on the cob, raw	20	500g	450g	550g		
Vegetables and vegetable products							
Lal shak	Leaf, amaranth, red, raw	10	200g	250g	g		
Sobuj data shak	Leaf, amaranth, green, raw		g	g	g	Not available this year due to poor rains	
Fruit and fruit products							
Kola, Sagar, paka	Banana, sagar, ripe	NS	g	g	g		
Paka tomato	Tomato, red, ripe, raw	10	45g	80g	100g		

Figure 4. An example of a completed real-time price and weight data collection form.

Date	7th September	Village/place of trade	Konjho	Trader ID/Sheet number	I	Interviewer	Rama	
If the food is not in season write NS								
If the unit changes across the seasons write the season name and three weights for that unit								
Local name (English Name)	Price (BDT) Season 1	Weight 1	Weight 2	Weight 3	Price (BDT) Season 2	Price (BDT) Season 3	When and how does the unit change across the seasons?	Comments
Grains and grain-based products								
Ata, sada, packet (Wheat, flour, white)	20	500g	g	g	25	20		
Bhutta, kancha (Maize, yellow, on the cob, raw)	30	400g	300g	350g	35	40		
Vegetables and vegetable products								
Lal shak (Leaf, amaranth, red, raw)	15	50g	100g	75g	15	20	Season 2: 150g, 200g, 175g	Get more in season 2 as it is more available
Sobuj data shak (Leaf, amaranth, green, raw)	10	100g	102g	105g	NS	10		
Fruit and fruit products								
Kola, Sagar, paka (Banana, sagar, ripe)	20	300g	325g	352g	25	50		High price in season 3 as it is less available
Paka tomato (Tomato, red, ripe, raw)	15	30g	50g	45g	NS	NS		

Figure 5. An example of a completed retrospective price and weight data collection form.

4.4.2 Market survey equipment requirements

As with all surveys the quality of the data on weight is only as good as the equipment used to measure it. It is suggested that Tanita KD-400SV scales are used to weigh foods up to 5 kg with a precision of 1 g, and Salter hanging scales are used to weigh 5 kg or more. If the Tanita scales are not available, a scale with a precision of 1g should be purchased. The scales should be checked periodically with standard weights. The small food scale could be checked with weights of 100 g, 500 g, 1 kg and 2 kg, giving a range from 100g to 3.6 kg in total.

Standard survey stationery such as pencils, erasers, clipboards etc. are also required. A full list of stationary and equipment required for the market survey can be found in Annex 11.



Figure 6.
An image of Tanita KD-400SV weighing scales and Salter hanging scales.

4.5 Checking the quality of the market survey data

It is recommended that the market weight and price data are entered into the Cost of the diet software every evening, immediately after collection. The quality of data should be checked by the practitioner during this time. The practitioner should look for the following issues:

- Incorrect data entry
- Inconsistent data, suggesting data entry errors
- Gaps in the data or missing data for some foods or food groups
- Large price differences by season for foods
- Large price differences between food groups
- Conflicting seasonal availability data for foods

The next sections offers a set of techniques and questions that can be asked when checking the quality of the market survey data.

4.5.1 Checking for incorrectly entered price and weight data

It is important that the values entered for prices and weights are cross referenced with the printed market survey sheets to correct any errors. However the software can also help practitioners highlight any potentially incorrect weight values.

Section 5.6.4 describes how to open the market survey results summary screen. Weights that fall below the 5th percentile or above the 95th percentile are highlighted in yellow (as shown in Figure 7) and should be reviewed by the Cost of the Diet practitioner by checking the market survey forms.

A weight will fall beyond the 5th and 95th percentile for three reasons:

1. Data entry error: If a weight is highlighted because it has been entered incorrectly this should be easily picked up by checking the highlighted weight with the corresponding form and then correct the value in the software (section 5.6.2).

2. Natural variance: If a weight has been highlighted but entered correctly, the practitioner should check the highlighted weight with the values in the 5th and 95th percentile columns of the market survey summary screen. If the difference is negligible, for example $\pm 10g$, it's likely that this is due to natural variance in the weights.

3. Difference in unit of sale by trader: If the difference between the entered weight and the values in the 5th and 95th percentile columns is large for a food, for example 25% or more, it is important to check the price entered for these weights of food compared with data from other traders selling the same food. So if the weights are larger or smaller than for other traders, does the price reflect this?


For example if Trader 1 was selling 100g of rice for 10 Taka, and Trader 2 was selling 1 kg of rice for 100 Taka this difference in weight and price is proportionate. However if Trader 2 was selling 1kg of rice for 15 Taka, this is probably incorrect and the values should be discussed with the data collectors. If they are sure that this is what the trader told them, then the practitioner should decide whether to keep or delete the price and weight data sample for that food.

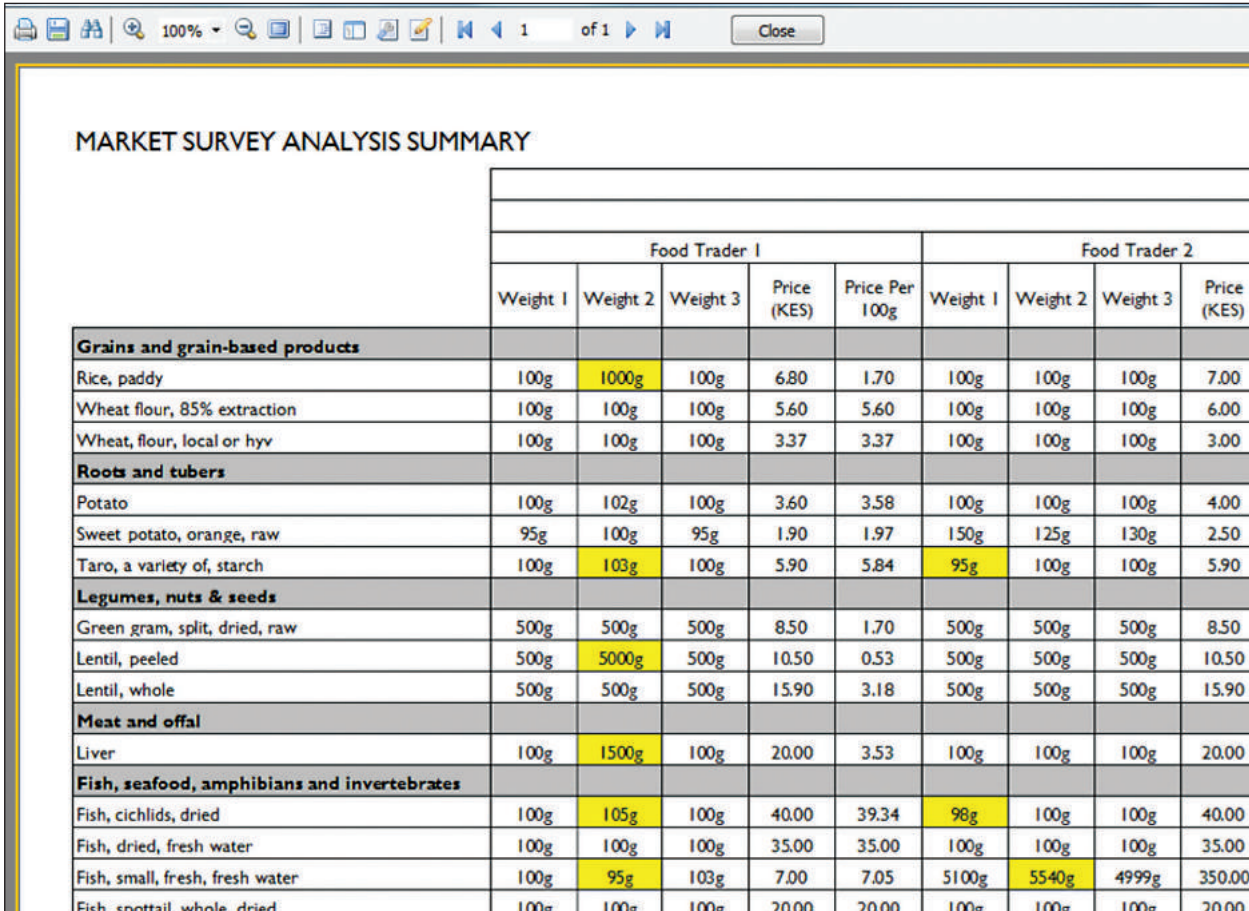
4.5.2 Checking for missing data and the overall representativeness of price and weight data

Practitioners should ask themselves the following questions when checking the quality of the price and weight data collected in each market, questions that can also be applied to checking the overall representativeness of the market survey data collected:

- Do price differences between commodities make sense?
 - e.g. do animal source foods cost more per 100g than staples?

- Do price differences by season make sense for each food and food group?
 - These should be checked against a seasonal calendar
- Are the seasonal variations consistent for a food by each trader and market?
 - e.g. if Trader 1 says that mangos are not available in a particular season, does Trader 2 say the same or something different?
- Is there missing data for any foods or food groups?
- Are there foods with poor availability?
 - A food is considered available in a market if it is sold by two or more traders
 - A food is considered available in the assessment zone if it is found in half or more of the markets visited.

 Anomalous data should be cross checked with the data collectors. If foods or food groups are missing that are known to be found in the assessment area, revisiting markets might be necessary to find those foods.



	Food Trader 1					Food Trader 2			
	Weight 1	Weight 2	Weight 3	Price (KES)	Price Per 100g	Weight 1	Weight 2	Weight 3	Price (KES)
Grains and grain-based products									
Rice, paddy	100g	1000g	100g	6.80	1.70	100g	100g	100g	7.00
Wheat flour, 85% extraction	100g	100g	100g	5.60	5.60	100g	100g	100g	6.00
Wheat, flour, local or hyv	100g	100g	100g	3.37	3.37	100g	100g	100g	3.00
Roots and tubers									
Potato	100g	102g	100g	3.60	3.58	100g	100g	100g	4.00
Sweet potato, orange, raw	95g	100g	95g	1.90	1.97	150g	125g	130g	2.50
Taro, a variety of, starch	100g	103g	100g	5.90	5.84	95g	100g	100g	5.90
Legumes, nuts & seeds									
Green gram, split, dried, raw	500g	500g	500g	8.50	1.70	500g	500g	500g	8.50
Lentil, peeled	500g	5000g	500g	10.50	0.53	500g	500g	500g	10.50
Lentil, whole	500g	500g	500g	15.90	3.18	500g	500g	500g	15.90
Meat and offal									
Liver	100g	1500g	100g	20.00	3.53	100g	100g	100g	20.00
Fish, seafood, amphibians and invertebrates									
Fish, cichlids, dried	100g	105g	100g	40.00	39.34	98g	100g	100g	40.00
Fish, dried, fresh water	100g	100g	100g	35.00	35.00	100g	100g	100g	35.00
Fish, small, fresh, fresh water	100g	95g	103g	7.00	7.05	5100g	5540g	4999g	350.00
Fish, spottail, whole, dried	100g	100g	100g	20.00	20.00	100g	100g	100g	20.00

Figure 7. A screen shot of the market survey data summary screen in the Cost of the Diet software highlighting in yellow the values below the 5th percentile or above the 95th percentile.

4.6 How to conduct interviews and focus group discussion

The aim of the interviews and focus group discussions is to understand the typical eating habits of households in the assessment area. The results are translated into minimum and maximum food frequency constraints which are applied in the Cost of the Diet software to specify how many times a week a food can and cannot be included in the diet. *Using these constraints a food habits nutritious diet can be created (section 2.2.4).*

The interviews and focus group discussions should be conducted in a minimum of 4 villages; more may be needed if the assessment area is very large. *The key objective when choosing how many villages to visit is to obtain representative data on habits of people in the assessment area.* In each village 8 women who are the main preparer of food for their household and who represent a range of wealth groups should be selected. The women will be interviewed independently by the data collectors and then brought together for the focus group discussion. The full session should take about 3 hours.

This section aims to provide guidelines on how to conduct the interviews and focus group discussions and can be adapted to suit the specific objectives of the Cost of the Diet assessment.

Step 1: Adapt the food list, if necessary

The food list entered into the Cost of the Diet software is based upon the raw foods that are found in the market. Some of these raw foods are made into products that are then consumed. For example in Ethiopia, raw teff is

purchased from the market but is made into injera, which is then eaten; in India, wheat flour is purchased from the market but made into chapattis. It might be necessary for some of the raw foods to be replaced by their cooked counterparts to make it easier to prompt the women about each food. This can be done by exporting the interview questionnaires into Excel as described in section 5.9.6 and manually changing the names of the foods.

Step 2: Practitioners should select a team leader

It is recommended that the practitioner selects a team leader for the interviews and focus group discussions. This person will lead the introduction, consolidate the interview results, and lead the focus discussions. The practitioner should also select two scribes who will write down the answers that the women give during the focus group discussions. Tape recorders could also be used with the interviewees permission.

Step 3: A clear and concise introduction is essential

The interviews and focus group discussions are time consuming for the women who participate. It is important to outline the aim of the study and to explain the information required so that they understand, and then thank them for agreeing to participate.

As with the market survey, the team leader should introduce the team, explain the objectives of the Cost of the Diet study, the aim of the interview and focus group discussion and the information that the women will be asked to give. The leader should also name the organisation

DIETARY HABITS INTERVIEW SHEET					
Date	11 th November 2014				
Village	Dharmermati	Season	All year		
Interviewee	Archana	Interviewer	Nabila		
<i>When available or in season, how many days in a typical week does your household eat X?</i>					
FOOD NAME		Consumption frequencies from interviews			
Local name	English Name	Usually	Often	Rarely	Never
		(5 days + per week)	(1-4 days per week)	(Once a year, once a month etc.)	
Grains and grain-based products					
Ata, lal	Wheat, flour, brown, wholegrain, raw	√			
Ata, sada, packet	Wheat, flour, white		√		
Chaler kura	Rice, bran, raw				
Chira	Rice, flaked				√
Muri	Rice, puffed, salted		√		
Pawruti	Bread, white, for toasting		√		

Figure 8. An example of a completed dietary habits interview form.

that they work for and some of the important work that the organisation has done. The leader should explain that the session will last approximately 3 hours and will be split into 2 sections: an interview and then a focus group discussion. It is important that the data collectors do not make promises to provide assistance to the village as a result of the study. For example:

Hello, my name is Amy and this is Simon, Esther and George. We are from Save the Children, an organisation that works to improve the lives of children and families. We are doing a study on all the foods available in this area and would like to ask you about the foods your household eat and the reasons for this.

Step 4: Conduct the interviews

The aim of the interviews is to collect quantitative data on the number of days a week households consume the foods in the food list. This requires the data collectors asking the following questions for all the foods in the list:

‘When available or in season, how many days in a typical week does your household eat X, in which X is each food on the list?’


The responses are classified as follows:

- “**never**” means never consuming the food
- “**rarely**” means eating the food either once a month or on special occasions
- “**often**” means consuming the food 1-4 days each week
- “**usually**” means consuming the food on 5 days in week or more.

When an answer is given, the data collectors should tick the appropriate response for each food in the interview questionnaire as shown in Figure 8.

Step 5: Consolidating the interview results

During the break between the interview and the focus group discussion the team leader or practitioner should summarise the responses to the questions about each food.

 Practitioners should always print one extra interview questionnaire to summarise the results. Whoever is analysing the results should go through each questionnaire and tick under the ‘never’, ‘rarely’, ‘sometimes’ or ‘usually’ box for each food. There should be 8 (the number of participants) ticks distributed between the 4 boxes for each food as shown in Figure 9.

Step 6: Highlighting foods that were ‘usually’ or ‘never’ eaten


Once the interview results have been summarised, a star (*) should be written next to any foods that have a score of 6-8 in the ‘usually’ column or a combined score of 6-8 in the ‘rarely’ and ‘never’ column.

This will act as a prompt for the team leader during the first section of the focus group discussion in which the women are asked the reason why these foods are usually or never consumed.

DIETARY HABITS INTERVIEW SHEET					
Date	11 th November 2014		Season	All year	
Village	Dharmermati		Interviewer	Nabila	
Interviewee	Archana				
<i>When available or in season, how many days in a typical week does your household eat X?</i>					
FOOD NAME		Consumption frequencies from interviews			
Local name	English Name	Usually	Often	Rarely	Never
		(5 days + per week)	(1-4 days per week)	(Once a year, once a month etc.)	
Grains and grain-based products					
Ata, lal	Wheat, flour, brown, wholegrain, raw	IIII 4	II 2	I	I
Ata, sada, packet	Wheat, flour, white		IIII 4	IIII 4	
Chaler kura	Rice, bran, raw	II 2	I	IIII 4	I
Chira	Rice, flaked	IIII 4	II 2	II 2	
Muri	Rice, puffed, salted	III 3	III 3	I	I
Pawruti	Bread, white, for toasting		II 2	IIII 4	II 2

Figure 9. An example of a consolidated dietary habits interview form.

Step 7: Conduct the focus group discussion

The aim of the focus group discussions is to collect qualitative data on the reasons for current dietary habits. It also asks women about staple foods, taboo foods, foods that are specifically given or withheld from vulnerable groups, and foods that are eaten but are not purchased from the market such as wild foods, food aid and foods grown or produced in the home.  The focus group discussion questions can be adapted, removed or added to, depending on the objectives below. The following sections aim to provide a guide for practitioners.

Section 1: Clarifying the interview results

The focus group discussion should begin by going through the interview results and asking why the specific starred (*) foods are 'usually or 'never' eaten by households. In addition it is important that the team collect information on the following:

- The staple foods
- If the staple food differs by season
 - If so, between what seasons does the staple food change?
 - How does the staple food change i.e. from what, to what?
- Taboo foods and the reasons for these taboos
- Whether these typical dietary habits are the same for the rest of the community
 - If not, what is different and why
- Whether these typical dietary habits differ by wealth group
 - If so, how do they differ and for which wealth groups.


Section 2: Discuss typical dietary habits

In this section, the team should ask the women the following questions:

- How many times per day do people consume a meal?
- Does this vary by season?
 - If so, what is the meal frequency during the different seasons?
- Does daily meal frequency differ for particular individuals (i.e. a young child)?
 - If so, how?
- Are there foods that children aged 6-23 months are specifically given?
 - If so, what foods?
 - Why?
- Are there foods that pregnant women are specifically given?
 - If so, what foods?
 - Why?

- Are there foods that breast feeding women are specifically given?
 - If so, what foods?
 - Why?
- Are there foods that children aged 6-23 months are not given?
 - If so, what foods?
 - Why?
- Are there foods that pregnant women are not given?
 - If so, what foods?
 - Why?
- Are there foods that breast feeding women are not given?
 - If so, what foods?
 - Why?
- Are there any foods that sick people are given?
 - If so, what foods?
 - Why?
- Are there foods that used to be eaten but are no longer available?
 - If so, what foods
 - Why are these foods no longer available?

Section 3: Present the nutritious diet

The initial nutritious diet results generated using data from the market surveys or the pilot market survey should be presented to the women. To generate these results refer to  section 5.7.3. This exercise is used as another way to capture what foods should be included in or excluded from the food habits diet.

The team leader should read out the list of foods and the number of meals a day or week they should be eaten to the women and ask them the following questions:

- Is this a diet that they would eat?
 - If not, why not?

Section 4: Discuss the typical household size and composition

If an HEA has not been done before the assessment, questions regarding typical household size and composition could be asked during the focus group discussions. For example:

- How many people are normally in a household?
- Does this differ by wealth group?
 - If so, what is the normal household size for the different wealth groups?
- What is the normal composition of a household?
- Does this differ by wealth group?
 - If so, what is the normal household composition for the different wealth groups?

Section 5: Discuss foods that are consumed but not purchased in the market

In this final section of the focus group discussion, the team leader should ask the following questions:

- Are there any foods that you consume but don't purchase from the market?
 - If so, what foods?
 - Which seasons do you eat these foods?
 - How many days a week does your household eat these foods during these seasons?

If wild foods are mentioned, it would be useful to try to estimate the portion size that a child aged 1-3 years might consume. If they are foraged nearby, a couple of team members should go with the women to gather enough for one portion for this child, per meal. This portion should then be weighed using the market survey weighing scales. Photos of the wild foods should also be taken as recommended in section 4.4.

Hints and tips


- If portion sizes specific to the area are needed for the assessment, it is recommended that these are collected during the focus group discussions as recommended in section 2.1.1.3.
- Seasonality is not taken into account in the interviews because these data should be accurately collected during the market survey. If there is no price per 100g for a food in a season, the software will not include it in the diet for that period.
- If households are being given food aid or food through Government social protection schemes, it is important to collect data on what foods, the quantity given and how often these foods are given to households. A 'What if?' model (section 6.7) could be generated using the software to see what impact these rations are having on the cost, quality and affordability of the food habits diet.
- The interview results should be entered into the Cost of the Diet software every evening by the practitioner and/or the data collectors..
- The transcript of the focus group discussions should be typed up into a Microsoft Word document every evening. This should be done by the data collector team to ensure that no information is missed.

4.6.1 Interview and focus group discussion equipment requirements

As the women are taking valuable time from their day to participate, it is suggested that they should each be given a snack and drink during the break when the interview results are being summarised. It is also recommended that a pair of the market survey scales is brought to the discussions in case portion sizes for wild foods are required. Standard survey stationary such as pencils, erasers, clipboards etc. are also required. A full list of stationary and equipment for the interviews and focus group discussions can be found in Annex 11.

4.6.2 Determining the minimum and maximum food frequency constraints for the food habits diet

The final minimum and maximum food frequency constraints entered into the Cost of the Diet software should create a food habits diet which provides a combination of foods that are typically eaten by households, but it does not simulate the diet that households are currently consuming as this may not be nutritious.

 Finding this balance is very important: a diet that is too restrictive is unlikely to be nutritious and defeats the objective of the food habits diet, but a diet that does not include the staple foods or includes taboo foods will not be realistic.

It is recommended that the results from the interviews and focus group discussions should be used together to create the final minimum and maximum food frequency constraints. The Cost of the Diet software will calculate the minimum and maximum constraints based upon the interview results but the practitioner should check and alter these depending on the results from the focus group discussions.

There are no strict rules on how to alter the minimum and maximum constraints as every local context will differ. The following sections aim to provide a guide for a practitioner and should be applied as appropriate.

4.6.2.1 Calculating the minimum and maximum constraints from the interview results using the Cost of the Diet software

Section 5.6.6 describes how to enter the consolidated interview data by village into the Cost of the Diet software. This section aims to explain how the software calculates the minimum and maximum results from the interview data entered.

For every village, each interview response for a food (usually, often, rarely, never) is given the following values:

Usually = 2

Often = 1

Rarely = 0.5

Never = 0

The values are added together for each food to give a total score, by village. For example:

Chicken egg had the following response in Janga village, where 8 women were interviewed:

2 × usually = 4

3 × often = 3

3 × rarely = 1.5

The total score for eggs in Janga village is therefore 8.5.

This total score is then translated into the minimum and maximum constraints for each food, in a village according to Table 5 below.

Table 5. The total score for a food and the associated minimum and maximum constraint that the Cost of the Diet software applies

Total score	Minimum constraint	Maximum constraint
0-1.5	0	0
2-8.5	0	7
9-15.5	0	14
16	7	14

Once the interview results from all of the villages have been entered the software consolidates minimum and maximum constraints for each food between the villages by choosing the modal values i.e. the most common minimum and maximum constraints. For example:

The total score for eggs in Janga village = 8: minimum and maximum constraint of 0 and 7

The total score for eggs in Hele village = 10: minimum and maximum constraint of 0 and 14

The total score for eggs in Flabj village = 5: minimum and maximum constraint of 0 and 7

The consolidated minimum and maximum constraint for eggs will therefore be 0 and 7.

Sections 5.6.7 and 5.6.8 describe how to view the interview results and the minimum and maximum constraints by village and the consolidated for the assessment area.

Hints and tips

- It is recommended that 8 participants are interviewed in each village. However, in practice this is not always achieved. In the village reports the scores awarded to a food are always recalculated for a participant response rate of 8 people using the following formula:

Number of 'usually/often/rarely/never' responses * the score for each response / the number of participants * the standard number of people expected in an interview

For example if data are entered for 10 people who all say that they 'usually' eat rice, the software will do the following calculation:

$$(10*2)/10*8 = 16$$

- To consolidate the village interview results in order to identify the final minimum and maximum constraints, the software gives values from each village an equal weight, regardless of the number of participants who attended the interviews. This prevents the final results from being skewed towards villages where more or less than the recommended 8 participants attended.

For example if 5 people attend the interview in village 1 and all say they 'usually' eat rice and 10 people attend the interview in village 2 but only 1 person says they 'usually' eat rice, the software will do the following calculation to give the final 'usually' results for rice:

$$5/5 = 100\%$$

$$1/10 = 10\%$$


The average of 100% and 10% = 55%

So a total 55% of respondents gave a 'usually' response for rice.

4.6.2.2 Updating the consolidated minimum and maximum constraints based on the results of the focus group discussions

There is no standard method for updating minimum and maximum constraints with the results of the focus group discussions. However the following rules could be used as a guide to change the minimum and maximum constraints for individuals or for the household for all or specific seasons:

- Staple foods such as rice, maize, lentils etc. should have constraints of 7 and 14;
- Taboo foods for the household or individuals should have constraints of 0 and 0;
- If households or individuals are eating 3 or more meals a day, the maximum constraints for popular foods should be changed to 21 or higher;
- Regularly eaten foods could have a minimum constraint of 1 or 2;
- Foods that are eaten but not purchased should be included in the diet during the seasons they are eaten and for the number of times stated in the FGD.

 Once decided, the consolidated interview-based minimum and maximum constraints can be updated manually in the Cost of the Diet software as described in section 5.7.6.

4.7 Including 'free foods' in a Cost of the Diet assessment

In some contexts households may rely as an essential source of energy and nutrients on the consumption of wild foods, food aid and the foods they produce. These foods have no monetary value and are often termed 'free foods'. It is therefore important that these foods are included in the Cost of the Diet assessment to ensure that the cost estimates include these 'free' sources of food. These data can be included in an analysis in two ways:

1. By monetising the quantity of the 'free food' consumed by each wealth group and adding this amount to their annual income; this is recommended if an HEA has been done in the same livelihood zone.
2. By collecting the information outlined in section 4 of the focus group discussion in detail and replicating this consumption using the Cost of the Diet software; this is recommended if an HEA has not been done.

4.7.1 Monetising the value of 'free foods'

The steps below describe how to monetise the value of the free foods consumed. The HEA baseline Excel spreadsheet and the 'monetising free foods' Excel spreadsheet will be required. To request, email cotd@savethechildren.org.uk

1. When opening the raw HEA data, click on the 'sum' tab at the bottom. The page should look as shown in Figure 10 below:
2. Copy and paste all the information in columns A – F into the 'monetising free foods' Excel spreadsheet into the tab called 'Raw HEA data'.
3. In the 'monetising free food' spreadsheet extract the HEA food, income and expenditure summary data for each wealth group and copy this into the 'Income' tab.

4. Refer to the 'Raw HEA data' tab and extract all of the free sources of food (except purchase) and the percentage of the kilocalorie requirement each free food source provides and paste it into the 'Income' tab. For example, Figure 11 shows in row 84 that 22% of the better off wealth group's kilocalorie requirements came from camel milk, butter and ghee in season 1. Row 85 shows that that the middle wealth group obtain 9% of their kilocalorie requirement from camel milk, butter and ghee in season 2.
5. Copy and paste the annual income for each wealth group in the top left hand corner of each wealth group tab. This is cell B1 in Figure 12.
6. The energy requirements for the family for a year should then be calculated (cell E1 in Figure 12). To do this, go back to the HEA spreadsheet and extract the typical household size for each wealth group from the wealth group characteristics summary. Multiply this number by 2,100, the average energy requirement used in an HEA, and multiply this by 365. For example if there were 7 people in a typical poor family the equation required would be $7 \times 2100 \times 365$.
7. Copy and paste the sources of 'free foods' extracted from the raw HEA data (as discussed in point 4) and paste into column A.
8. Copy and paste the percentage of the energy requirement that each 'free food' provides for the corresponding wealth group into column B and convert these figures into a decimal (E.g. 10% becomes 0.1) by formatting the cell. Once complete, highlight the cells with a decimal value in a different colour as shown in Figure 13.

HEA Baseline Assessment, May-June 2012		Central Pastoral LZ			
		SUMMARY			
WEALTH GROUP		BASELINE			
District		Poor	L.Middle	U.Middle	B/Off
Village/settlement					
Interview number					
Interviewers					
Reference year					
Currency					
Food Summary: total (%)		100%	106%	106%	107%
crops		0%	0%	0%	0%
livestock products		4%	34%	51%	57%
wild foods		15%	7%	2%	0%
purchase		30%	36%	45%	47%
food aid		37%	19%	6%	2%
other (gifts, payment in kind)		14%	9%	3%	1%
Income Summary: total (cash per year)		53325	99513	157563	238500
crop sales		0	0	0	0
livestock product sales		75	188	313	500
livestock sales		6750	58125	117750	208000
wild food sales		1500	1200	0	0
petty trade or safety nets		0	0	0	0
self-employment (e.g. firewood)		44000	36000	32000	0

Figure 10. A screen shot of the 'sum' tab in the HEA baseline Microsoft Excel spreadsheet.

9. To calculate the values in column C (in Figure 13) the proportion of the energy requirement in kcal that each food provides (column B in Figure 13) should be multiplied by the energy requirement in kcal for the family per year (cell E1 in the Figure 13).
10. The information required for column D (the total number of kilocalories per 100g of each food) can be found in the food composition database in the Cost of the Diet software. For wild foods, this information can be found in the raw HEA data spreadsheet (usually in the 'data 3' tab, if not it will be signposted in the 'sum' tab) and is often given in kilocalorie per kg which will need to be converted into kilocalorie per 100g. For example, Figure 14 below shows that Erut contains 1995 kcals per kg (row 11) and that Edapal contains 1220 kcals per kg (row 18). To convert into kcals per 100g, divide these figures by 10.
11. To calculate the information in Column E (in Figure 12) the total number of kilocalories provided by each 'free food' per household per year (column C) needs to be divided by the kilocalories per 100g of each food (column D).
12. To calculate the information in Column F the price per 100g for each food (obtained from the Cost of the Diet market survey) should be averaged across the seasons if seasonal data has been collected. If this information for wild foods could not be collected, it can be found as outlined in point 10.
13. The final step is to calculate the monetary value of each of the 'free foods' by multiplying the price per 100g (column F in Figure 12) by how much of the food in weight is produced by the household (column E in Figure 12). Once the monetary value of all the 'free foods' have been calculated these need to be added together to give the final annual value as shown in cell G16 in Figure 12.

These steps should be completed for each wealth group. The final figure then needs to be added to the annual income of each wealth group as determined by the HEA, to give the final annual income figure that will be used by the Cost of the Diet to estimate the affordability of the diet.

81	ghee/butter sales: kg sold				
82	ghee/butter price (cash)				
83	ghee/butter income (cash)				
84	milk+ghee/butter kcals (%) - 1st season		13%	19%	22%
85	milk+ghee/butter kcals (%) - 2nd season		6%	9%	11%

Figure 11. A screen shot of the HEA baseline data in the 'sum' tab which demonstrates the kcals (%) data that needs to be copied into the 'income' tab of the 'monetising the value of free foods' spreadsheet.

	A	B	C	D	E	F	G	
1	Income Summary: total (cash per year)			Kcal requirement for family per year				
2								
3	Food Summary - detailed	Proportion of Kcal req for family met	Total Kcal	Kcal per 100g	Total lots of 100g	Price per 100g	Monetary value	
4	What is this?		The total number of Kcal provided by the food per household per year	The total number of Kcal per 100g	How much of the food in weight is produced by the HH	(average across all seasons)	The cash value of the food	
5	Source of data	HEA	Proportion of kcal req * kcal req for family per year	Database in COD	Total Kcal/ kcal per 100g	CoD	Price per 100g * total lots of 100g	
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16	Total cash value of food produced and consumed by HH							0.00

Figure 12. A screen shot of the table that is used to monetise the value of free foods for different wealth groups

	A	B	C	D	E
1	Income Summary: total (cash per year)	99,513		Kcal requirement for family per year	11,497,500
2					
3	Food Summary - detailed	Proportion of Kcal req for family met	Total Kcal	Kcal per 100g	Total lots of 100g
4	What is this?		The total number of Kcal provided by the food per household per year	The total number of Kcal per 100g	How much of the food in weight is produced by the HH
5	Source of data	HEA	Proportion of kcal req * kcal req for family per year	Database in COD	Total Kcal/ kcal per 100g
6	Camels' milk				
7	milk+ghee/butter kcals (%) - 1st season	0.13			
8	milk+ghee/butter kcals (%) - 2nd season	0.06			
9	Camels' meat				
10	kcals (%)	0.04			
11	Cows' milk				
12	milk+ghee/butter kcals (%) - 1st season	0.02			
13	milk+ghee/butter kcals (%) - 2nd season	0.01			
14	Cow's meat				
15	kcals (%)	0.02			
16	Goats' milk				
17	milk+ghee/butter kcals (%) - 1st season	0.06			
18	Shoat Meat				
19	kcals (%)	0.01			

Figure 13. A screen shot showing the data that should be extracted from the HEA baseline spreadsheet and copied into columns A and B.

	A	B	C	
1	WILD FOODS + FISHING			
2				
3	WEALTH GROUP	P	P	
4	District/Ward number	Turkana South	Turkana South	Turkana South
5	Village	Kaaruko	Nakalei	Nakalei
6	Interview number	1	2	
7	HH size	8	8	
8				
9	WILD FOODS (kg = kg/wk x wks)			
10	Wild food: Erut - kg gathered	416		
11	kcals per kg	1995		
12	sold/exchanged (kg)	416		
13	price (cash)	4		
14	income (cash)	1664		
15	other use (kg)			
16	kcals (%)	0%		
17	Wild food: Edapal - kg gathered	68.8	0	
18	kcals per kg	1220		
19	sold/exchanged (kg)	50		
20	price (cash)	10		
21	income (cash)	500		
22	other use (kg)			
23	kcals (%)	0%	0%	

Figure 14. A screen shot from the HEA baseline spreadsheet to demonstrate where to access kilocalorie data for wild foods.

4.7.2 Including 'free foods' in the Cost of the Diet software

To include free foods in a Cost of the Diet assessment using the second option where HEA data are not available, it is important that the focus group discussion is used to collect detailed data on the following information:

- The 'free' foods that households consume;
- The seasons that these foods are consumed 'free' of cost;
- The number of times a week these foods are eaten;
- The portion size that is being consumed, if possible.


To include these foods in the software the following steps should be taken:

1. Add these foods to the food list for the second time (section 5.5.3)
2. Set the price of these foods to '0' (section 5.8.5.1)
3. Change the portion sizes if this information has been collected (section 5.8.5.2)
4. Change the minimum and maximum constraints of these foods for the specific seasons these foods are eaten to replicate the consumption pattern (section 5.7.6)

4.8 Recruiting data collectors

As with all surveys, the quality of the data is only as good as the quality of the data collectors. It is essential that the team are recruited and trained effectively. This section aims to provide recommendations for the number of data collectors hired, the skills and experience they should have and how they should be trained.

4.8.1 Deciding on the number of data collectors to be hired

 It is recommended that between 6 to 8 data collectors are hired for a Cost of the Diet assessment. However this will depend on:

- The time available for data collection;
- How many markets surveys, interviews and focus group discussions are to be conducted;
- The size of the markets, so the number of traders and food availability;
- The distance to travel between markets, villages and base camp

The main advantage of having a large team is that data collection can be done quickly. However, there are also advantages to having a smaller team as individuals can be trained extensively so that minimal support is required and the quality of the data is increased. Ideally training on the Cost of the Diet should build capacity in a country so that data collectors can conduct a Cost of the Diet assessment without external support.

The data collectors must be hired from the assessment area as their local knowledge will be needed to write the food list (see section 4.3) and could be used to check that the markets and villages selected for the assessment are appropriate, as described in section 4.1. The individuals selected should be chosen based upon the following criteria:


- Speak the language of the Cost of the Diet practitioner (essential)
- Speak the local language of the assessment area (essential)
- Be literate and numerate so that they can fill in the data sheets (essential)
- Be computer literate so that they can help the practitioner enter market survey data (desirable)
- Have previous experience doing market surveys, interviews or focus group discussions (desirable).

Hints and tips

- The sex of the people hired to collect data should be considered. In some settings it might be best to use men to collect market survey data and women to conduct the interviews and focus group discussions.
- The ethnicity of the data collectors may also need to be considered, depending on the assessment area.

4.8.2 Data collector training

As a guide, it is recommended that 3-4 days are spent training the data collectors how to do market surveys and conduct interviews and focus group discussions.

 The length of time spent training will, however, depend on the competency of the team and is up to the practitioner's discretion.

It is recommended that the training itself is a mixture of short presentations, practical role plays, writing the food list and a pilot market survey. It may also be useful to use this time to discuss the assessment location, the villages and markets selected for data collection, the length and timings of the seasons and the typical household size of poor wealth groups. A generic training schedule can be found in Annex 10. The activities of each day are described in more detail below.

Day 1

Team work is essential when conducting market surveys and focus group discussions. It is therefore important that the first day of training consists of activities that will enable the data collectors to learn each other's name and to get them working as a team. It is also the practitioner's opportunity to set the tone of the training and data collection and start to establish a rapport with their team.

A short presentation should be given that explains what the Cost of the Diet is and the aims of the study. **It is important that the data collectors know what a nutritious diet is and the reasons why households might not achieve this to set the context of the data that they are collecting and to improve their understanding of the study.** This will enable them to explain the study to the general community, the traders and to the women who are interviewed, if asked. This session is also a good opportunity for the practitioner to learn about the local context of the assessment.

The food list should be written during the first day of data collector training. The easiest way to write the food list is by food group. At the beginning of this session, a short presentation should be given to teach the team about what foods are included and excluded from the food list. An activity that assesses the data collector's knowledge of food groups and what foods are included in each is also recommended. The team should then be divided into pairs and given flip chart paper with the name of their food group to work on. Each pair should then list the local and English name of all of the foods in the food groups that they have been given. Once complete, the lists should be presented back to the group so that any mistakes can be corrected or missing foods can be added.

The last session of the first day should be spent confirming the name and dates of the seasons for the market survey, typical household size and composition (if an HEA has not been done) and the representativeness of the selected village and market sites.

In the evening the practitioner should set up the assessment in the Cost of the Diet software (section 5.5.1) and enter the food list and the local names for these foods (section 5.5.3 and 5.5.5). If foods have been identified but are not found in the Cost of the Diet software database, they should be added as a new food as described in section 5.5.4. Once data collection is over, the practitioner should try and find food composition data on these foods. Information can occasionally be found through national nutrition or agricultural research centres, databases such as the Infood network, or through organisations such as Kew Gardens in the UK or the World Agroforestry centre in Nairobi.

Market survey and interview questionnaires should then be printed ready for practice on the second day of training. If the team are going to practice the market survey data collection the practitioner should obtain some food for them to weigh.

Day 2

The second day of data collection training should start with a presentation that describes the aim of the market survey and how to collect market survey data. As the practitioner is going through the presentation the use of the weighing scales should be demonstrated using the practice foods. Once the presentation is complete the knowledge of the data collectors should be tested. It is recommended that this is done using a practical market survey role play exercise.

The same process should be repeated for the interviews and focus group discussions; a short presentation and demonstration by the practitioner followed by a practical activity to enable the data collectors to practice the methods they are learning.


In the evening the practitioner should get the equipment ready for the pilot market survey the following day.

Day 3

It is recommended that data collectors conduct a pilot market survey to practice asking traders about the price and weight of foods, filling in the questionnaire and using the scales to weigh foods. The practitioner should take this opportunity to look for mistakes or misunderstandings and check that methods are being applied correctly. It is recommended that the team spend 2-3 hours in the market.

When the team returns to the training venue, time should be spent answering questions, adding new foods found to the food list, and clarifying the market survey data collection techniques. If there is time the practitioner may want to teach the teams how to enter the data collected into the Cost of the Diet software.

Hints and tips

-  A Cost of the Diet practitioner who has been certified by Save the Children will have all of the materials and skills required to teach a group of data collectors.
- It is important that the data collectors provide the name of the season that will prompt the trader to give the right price information. These names might be different to the standard season names.
- It does not matter if there are a few foods missing from the food list. During the pilot market survey or the data collection, new foods may be found and can easily be added to the food list and questionnaires using the Cost of the Diet software (see section 5.5.3).
- It is recommended that the data from the pilot market survey is entered into the Cost of the Diet software as a separate assessment (see section 5.5.1). The results could be used to generate a nutritious diet that is presented to the women during the focus group discussion.



5.

HOW TO USE THE COST OF THE DIET SOFTWARE

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5.1 Introduction

This 'How to' section aims to give a practitioner the knowledge to be able to run a Cost of the Diet assessment, including: how to use the software to prepare for data collection; how to enter market survey and dietary habits interview data; how calculate the cost of a diet using these data; how to summarise the results; and how to run 'what if?' models.

Version 2 of the Cost of the Diet programme was developed by Management Systems Modelling Ltd (MSM Software) and is written using Delphi XE5© incorporating the following open source components:

- Ip_solve version 5.5.2.0, an open access linear programming solver
- TMS Grid Pack matrix utilities
- FastReport report generator
- Devarc UniDAC universal data access components.

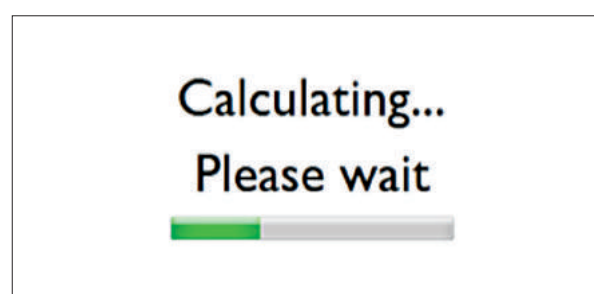
There are 3 different types of files embedded within the software:

- .db3 file: The database file which contains all of the underlying databases and assessments
- .cod file: The exported file of one assessment only and contains all of the information within this assessment
- Cod.sys file: The exported file from the underlying database only.

The software runs on Microsoft Windows XP and Windows 7 operating systems. It has not been tested on Windows 8 or on the Apple operating system. The software should always be run directly from a laptop or a computer as described in section 5.4.1.






 It should not be run directly from a USB stick.

Depending on the number of seasons, market surveys, traders and villages in an assessment, the software might take a few minutes to import, refresh and analyse the data and produce reports. During these operations the progress bar shown in Figure 15 will appear. If the progress bar is moving, the software is calculating and should not be stopped. If the progress bar stops for a prolonged period of time then the software needs to be stopped by clicking Ctrl Alt Del and using the Task Manager and the problem reported to cotd@savethechildren.org.uk ideally with an explanation of when it happened.



5.1.1 Symbols used in the Cost of the Diet software and their function

The software uses the following symbols to signify different functions of the programme.

-  This function enables users to add information such as seasons, markets, food traders and villages.
-  This function enables users to delete information such as seasons, markets, food traders and villages.
-  This function enables users to change the order of information such as seasons, markets, food traders and villages.
-  This menu function enables users to access the results reports that the software produces.
-  This function enables users to sort the assessments, food tables and nutrient specifications by different criteria. For example foods in the food table database can be sorted by local name, energy content, fat content etc.

5.2 Terms and conditions of acceptable use of the software

By using the software the user will enter into a license agreement, full details of which can be found in the 'License Agreement' document provided at point of download.

Save the Children provides no guarantee that the software will work on any operating systems other than Windows 7 and XP Professional. Users run the software on other operating systems at their own risk and Save the Children cannot be held responsible for the impact that doing otherwise has on the software or a computer.

Save the Children provides no warranty or guarantee for this software and cannot be responsible for any unintentional changes it makes to the computer it is run from.

Save the Children has made every effort to check that the results and output are correctly calculated but as there is no independent method of verifying calculations, **Save the**


 **Children cannot be held responsible for any decisions made on the basis of an assessment that is subsequently shown to be incorrect.**

Figure 15. A screen shot showing the progress bar that pops up when the software is calculating a diet and exporting or importing an assessment

Save the Children requests that new users register and download the software from www.savethechildren.org.uk/costofthediet. By registering, this will ensure that all users are notified about future updates to the software or its underlying databases. Save the Children cannot be held responsible if unregistered users continue to use versions of the software or databases that become unsupported in the future.

If a problem is found with the Cost of the Diet software users are requested to email cotd@savethechildren.org.uk with a detailed description of the steps taken that led to the problem.

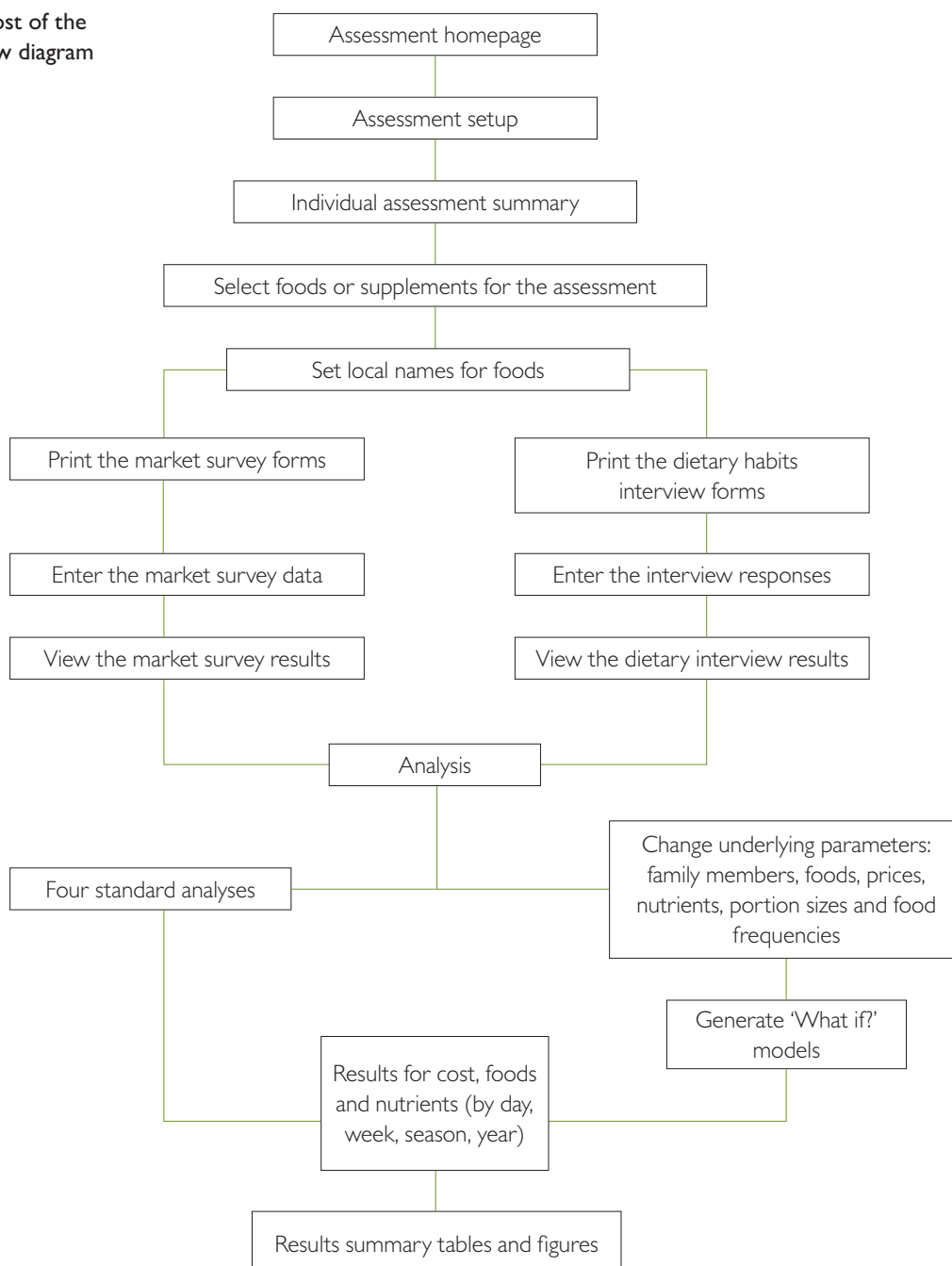
5.3 Cost of the Diet software flow diagram

Figure 16 is a flow diagram of the Cost of the Diet software, showing the different screens and how they are related. When creating a new assessment the software follows a logical process to guide the user through data collection, data entry and analysis. Once this process has been completed the user can easily return to the specific screens to view raw data, results and reports.

The software was designed so that users can easily navigate through the system and its different screens. Each screen has a heading in the top left hand corner, which have been referenced in inverted commas (") throughout this section. The data entry screens and the results screens also show the name of the screen and use vertical lines to separate screens by their level, for example:

Enter market survey data: Season name | Market name | Food trader name

Figure 16. The Cost of the Diet software flow diagram



5.4 Getting started

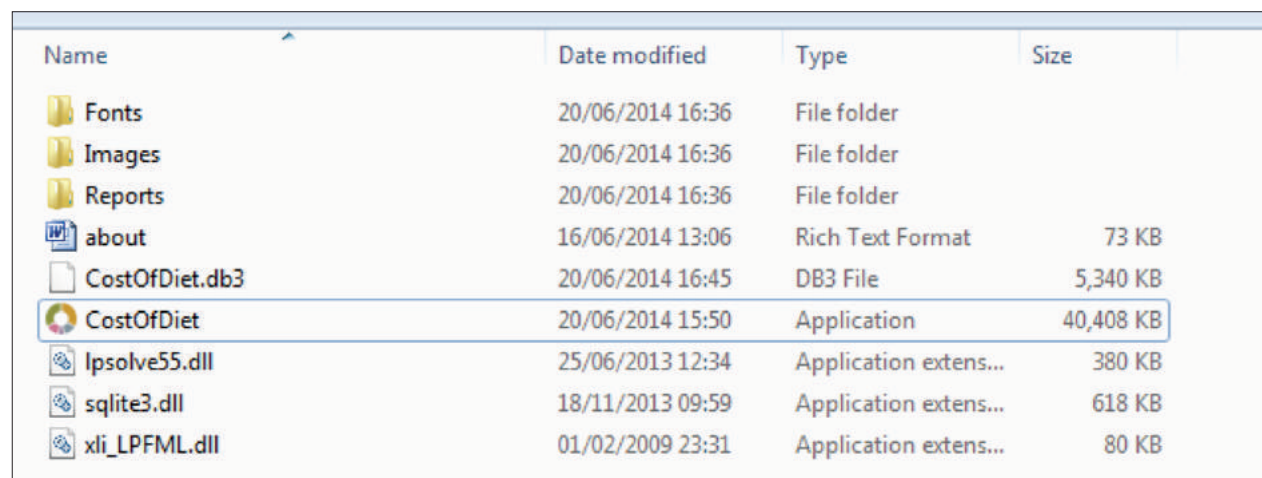
5.4.1 Copy the software to a new sub-directory

The software may be put onto a USB stick as a way of sharing the program with other users. However, it should not be run from a USB stick and instead, should always be run from a sub-directory on a laptop on computer. The software does not require any installation and does not change or install any files in the Windows system sub-directory, so no administrator rights are required. The files simply need to be downloaded or copied to a new sub-directory on your computer, for example: C:\Software\CotD or D:\Data\CotD or whatever you chose to call it.

Once copied you can create a shortcut to the main application file by going to the Desktop, right click on the screen to show a pop-up menu, select New, then Shortcut, then click on the Browse button and find and select the file CostofDiet.exe, as shown in the screen shot below. This will launch the software every time you click on the Shortcut. The Cost of the Diet logo should be applied to the shortcut.

5.4.2 Run the Cost of the Diet software

The software can be started from the shortcut or directly by clicking twice on the file CostOfDiet in the folder subdirectory.



Name	Date modified	Type	Size
Fonts	20/06/2014 16:36	File folder	
Images	20/06/2014 16:36	File folder	
Reports	20/06/2014 16:36	File folder	
about	16/06/2014 13:06	Rich Text Format	73 KB
CostOfDiet.db3	20/06/2014 16:45	DB3 File	5,340 KB
CostOfDiet	20/06/2014 15:50	Application	40,408 KB
lpsolve55.dll	25/06/2013 12:34	Application extens...	380 KB
sqlite3.dll	18/11/2013 09:59	Application extens...	618 KB
xli_LPFML.dll	01/02/2009 23:31	Application extens...	80 KB

Figure 17. A screen shot showing the Cost of the Diet application file that should be selected to launch the software.

If the message below pops up, click 'Run'.

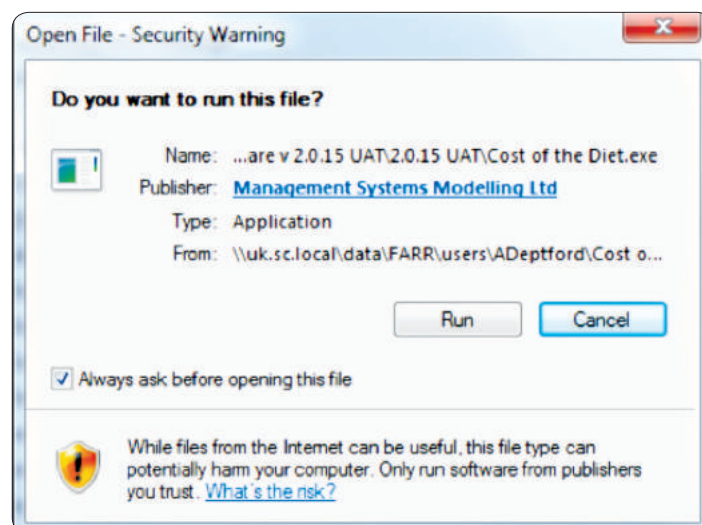


Figure 18. A pop up security message that may appear when launching the software the first time.

1. The software 'splash' screen (shown in Figure 19) should pop up for a few seconds and then the programme opens the assessment homepage screen.

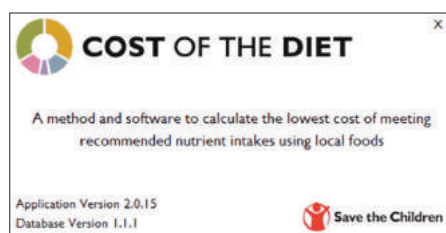


Figure 19. A screen shot of the Cost of the Diet software 'splash' screen that should appear when the software is launched.

5.5 Assessment set up

5.5.1 How to set up a new assessment

1. Open the 'Assessments' homepage and click the 'Add New' button/link.
2. The 'Assessment Setup' screen will pop up where the assessment details should be entered as Figure 20 shows.
3. To add or delete Seasons, Markets, Food traders and Villages click on the '+' or 'X' signs.
4. To change the order of the Seasons, Markets, Food traders and Villages, click on the grey triangles. ▲
5. To be able to complete the assessment set up, at least one Season, Market, Food trader and Village must be added.
6. To export the data in this screen to Microsoft Excel, follow the steps described in section 5.9.6.
7. Click the 'Save/Continue' button to save without leaving this screen.
8. To save incomplete data and leave this screen, click the 'Save/Continue' button and then the 'Close' button.
9. Once all the details have been added click 'Save/Close'. The software will open the assessment homepage.

Figure 20. A screen shot of a completed 'Assessment Setup' page in the Cost of the Diet software.

Hints and tips

- To add specific, detailed information about the assessment area, click on the ' + ' sign next to 'Sub-location' and type in the additional details.
- The currency selected in the 'Location' section is the currency that the results will be shown in.
- If a country is selected in the 'Default Food List' drop down menu, the software will automatically load all the foods from this country in the 'Select Foods' screen.
- Only 1 season or period needs to be added to do an assessment. If more than one season or period is added, all the seasons or periods in the year must be included and must add up to a total of 365 or 366 days, if the current year is a leap year.
- If a market sells food in a currency that is different to the main currency of the assessment area, this can be changed at the market level of the assessment set up screen. The software will automatically convert the price per 100g into the main currency using conversion factors that are stored in the currency database.

5.5.2. View an existing assessment

1. Open the 'Assessments' homepage and click on the hyperlinked name of the assessment you would like to view.
2. The software will open the 'Assessment Summary' screen where you can view and edit the assessment details, market survey and dietary habit interview data and the diet analysis.
3. To export the data in this screen to Microsoft Excel, follow the steps described in section 5.9.6.



Figure 21. A screen shot of the 'Assessments' homepage screen in the Cost of the Diet assessment, showing a newly added assessment.

Hints and tips

- Use the ' ↑ ↓ ' icon to sort the assessment by name, livelihood zone, organisation, assessor or last updated.

5.5.3 Add foods or supplements to an assessment from the food composition table database

1. Open the specific 'Assessment Summary' screen and click on the 'Add/ or edit foods' link.
2. The software will open the 'Select Foods' screen shown below. Use the drop down menus in the top left hand corner of this screen to filter the food list by Food Table (by country), Food Group and Name to Display to make food selection quicker. Alternatively, use the search function on the right to find specific foods in the database.
3. The foods in the food composition database are shown in the left panel. To select a food and add it to the assessment click on the '>' button. The selected food should move to the right panel.
4. To remove a food from the assessment food list, select it from the right panel and click the '<' button.
5. To view the additional information for a food, click on the blue 'View' hyperlink in the nutritional information section at the bottom right hand corner of the screen.
6. Click the 'Save/Continue' button to save without leaving this screen.
7. To save incomplete data and leave this screen, click the 'Save/Continue' button and then the 'Close' button.
8. Once all the details have been added click 'Save/Close'. The software will return to the assessment summary screen.

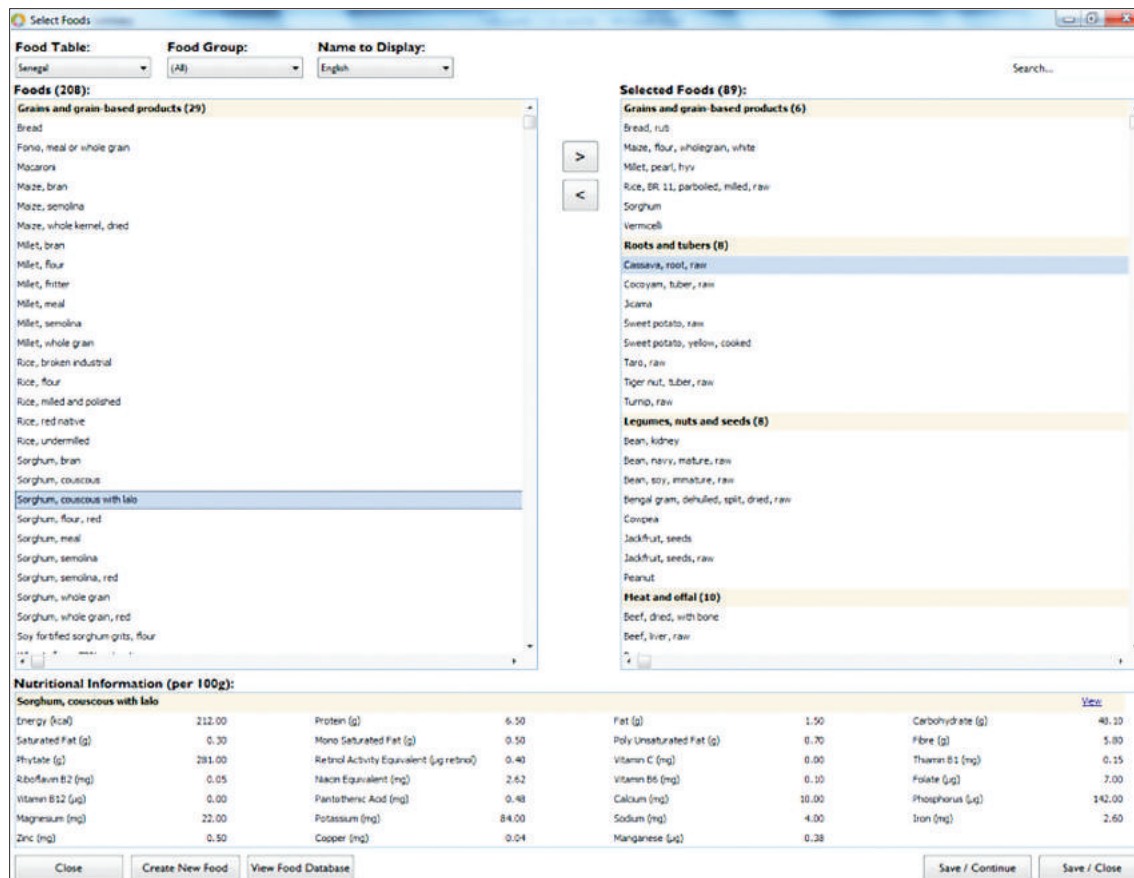


Figure 22. A screen shot of the 'Select Foods' screen with a completed food list in the Cost of the Diet software.

Hints and tips

- A food cannot be added twice to the food list.
- To add multiple foods to the food list simultaneously, select a food and hold the 'Ctrl' key and then select the other foods desired. The software will highlight in blue all of the foods and move them all into the food list when the '>' button is selected. The same method can be applied to removing foods from the assessment food list.
- The software will always add one more food to the food list when it comes to analysing the diet. This food is breast milk, which is automatically included in the diet of children aged 6-23 months. For example, 30 foods may be added to the food list but when it comes to analysing the diet, the software will consider 31 foods. This difference is noticeable in the 'Analysis' section of the 'Assessment Summary' screen as the 'Foods' column will always contain an additional food.

5.5.4 How to create a new food or supplement and add it to an assessment

1. Open the 'Select Food' screen and click the 'Create New Food' button in the bottom left of the screen.
2. The software will open the 'Add a food to the local food list' screen shown in Figure 23. Fill in the food details and nutrient information sections as Figure 23 demonstrates:

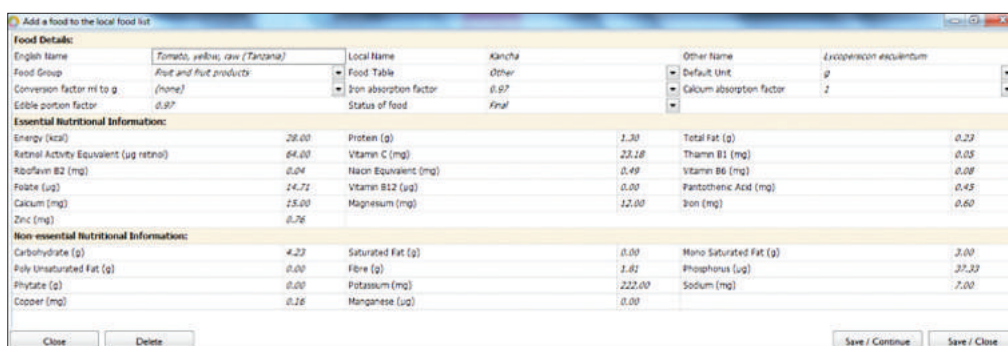


Figure 23. A screen shot of a completed 'Add a food to the local food list' screen in the Cost of the Diet software.

3. If some of the nutrient information for a new food or supplement is not yet known, select the food status as 'draft'. The food or supplement can still be added to the assessment but the missing data will need to be updated and the status changed to 'Final' before data analysis takes place.
4. To export the data in this screen to Microsoft Excel, follow the steps described in section 5.9.6.
5. Click the 'Save/Continue' button to save without leaving this screen.
6. To save incomplete data and leave this screen, click the 'Save/Continue' button and then the 'Close' button.
7. When completed, click 'Save/Close'. The software will return to the 'Select Food' screen.
8. To add or remove the new food or supplement to the assessment, use the '>' and '<' buttons as described in section 5.5.3.
9. To edit or remove the new food or supplement's details, select the food in the 'Select Food' screen and click on the blue 'Edit' hyperlink in the nutritional information section at the bottom right hand of the screen. The software will open the 'Add a food to the local food list' screen where the information can be changed or the delete button selected

Hints and tips

- If the edible portion factor for a food is not known, use the food composition table database as a reference by finding a similar food and using the same factor.
- If the country origin of the new food is not in the 'Food Table' drop down menu, select 'other' and write this country in brackets after the food name e.g. Banana (Ethiopia)
- To enter symbolic text in the 'Local Name' or 'Other Name' cell, either type this directly into the cell using the 'Alt Key' and numeric keypad numbers e.g. Alt 230 gives the μ symbol, or copy and paste the text from Notepad or Microsoft Word into the cells
- To ensure accurate results, the data for the following nutrients must be added for a new food or supplement in these units:

Energy (kcal)	Vitamin B2 (mg)	Absorbed calcium (mg)
Protein (g)	Niacin (mg Niacin Equivalents)	Absorbed iron (mg)
Fat (g)	Pantothenic acid (mg)	Magnesium (mg)
Vitamin A (μ g Retinol equivalents)	Vitamin B6 (mg)	Zinc (mg)
Vitamin C (mg)	Folic acid (μ g DFE)	
Vitamin B1 (mg)	Vitamin B12 (μ g)	

5.5.5 Set the local name of foods

When conducting the market surveys and dietary habit interviews, it is useful to include the local name of foods on the data collection sheets so that they can be identified easily by local data collectors. These local names will also be included in the analysis reports where appropriate.

1. Open the 'Assessment Summary' screen and click on the 'Set local name for food' link.
2. The screen shown in Figure 24 will pop up where the local and/or other names for the foods can be entered. The local names that are entered in this screen are automatically included in the market survey and dietary habit interview data collection sheets.
3. Click the 'Save/Continue' button to save without leaving this screen.
4. To save incomplete data and leave this screen, click the 'Save/Continue' button and then the 'Close' button.
5. Click 'Save/Close' when complete; the software will then return to the assessment summary screen.



Figure 24. A screen shot of the 'Set local name for food' screen in the Cost of the Diet software.

Hints and tips

- The local names for foods are included in the Bangladesh and West Africa food composition tables. These names are automatically used by the software. They can be edited to make them more locally appropriate by clicking on them and typing an alternative name.
- To enter symbolic text in the 'local' or 'other name' cell, either type this directly into the cell using the Alt plus keypad combination or copy and paste text from Notepad or Microsoft Word into the cells.

5.6 Data collection

5.6.1 Print the market survey and dietary habits interview data collection forms

1. Open the 'Assessment Summary' screen and click on the 'Print market survey data entry sheets' or 'Print dietary habits interview sheets' links. A new screen will pop up showing the data collection survey forms.
2. To print these sheets, click on the printer symbol '🖨️' in the top left hand corner of the screen. A standard Windows print screen should pop up where the print settings and properties can be changed before clicking 'OK'.

5.6.2 Enter market survey data

1. Open the 'Assessment Summary' screen and click on the 'Enter/edit market survey data' link.
2. The software will open the 'Market survey data entry summary' screen shown below, which shows what data have been entered for what market, food trader and season.

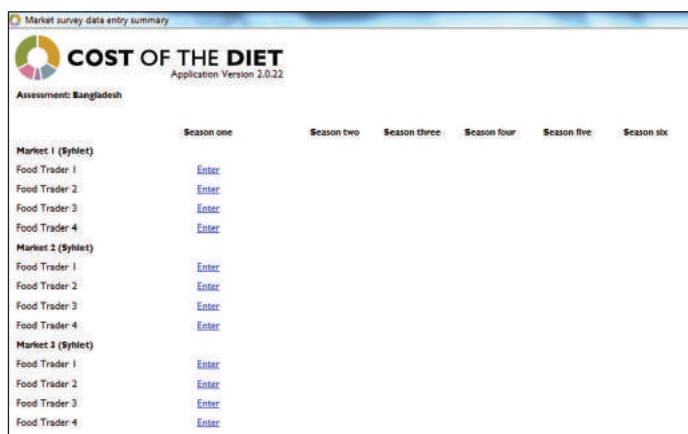


Figure 25. A screen shot of the market survey data entry options in the 'Market survey data entry summary' screen in the Cost of the Diet software.


- To enter data, select the link that corresponds with the market, food trader and season.
The data entry screen shown in Figure 26 should pop up:

Local Name	English Name	Price (GTQ)	Weight 1	Weight 2	Weight 3	Unit	Does the price or weight change across the seasons?
Grains and grain-based products							
Aja	Oats	12.00	1016	999	1001	g	<input checked="" type="checkbox"/>
Bajra, gota-dana	Millet, pearl, wholegrain, raw					g	<input type="checkbox"/>
Bekolo	Maize, white	10.00	1515	1491	1513	g	<input checked="" type="checkbox"/>
Bhutta, atta	Maize, flour, wholegrain, white					g	<input type="checkbox"/>
Bonruti, bun or roll	Bread, bun or roll					g	<input type="checkbox"/>
Chal, BR-26, siddha, kole chata	Rice, BR 26, parboiled, milled, raw					g	<input type="checkbox"/>
Dabo	Bread, wheat, white	1.10	106	108	106	g	<input checked="" type="checkbox"/>
Dagusa	Millet, finger					g	<input checked="" type="checkbox"/>
Gebis	Barley	10.00	1238	1252	1245	g	<input checked="" type="checkbox"/>
Injera	Teff, cooked	4.00	302	291	308	g	<input checked="" type="checkbox"/>
Jaab, gota	Barley, wholegrain, raw					g	<input type="checkbox"/>
Mashila	Sorghum	16.00	1501	1525	1510	g	<input checked="" type="checkbox"/>
Plain pulao	Pulao, plain					g	<input type="checkbox"/>
Ruz	Rice	4.00	331	349	325	g	<input checked="" type="checkbox"/>
Sinde	Wheat, whole, raw	14.00	1560	1548	1571	g	<input checked="" type="checkbox"/>
Teff	Teff, raw	22.00	1503	1492	1528	g	<input checked="" type="checkbox"/>
Yesinde Duket	Wheat, flour, white	13.00	986	993	990	g	<input checked="" type="checkbox"/>
Roots and tubers							
Dinich	Potato, english, raw	3.00	580	578	569	g	<input checked="" type="checkbox"/>
Keysir	Beet, root	5.50	614	603	647	g	<input checked="" type="checkbox"/>
Sikuar Dinich	Sweet potato, raw					g	<input type="checkbox"/>

Figure 26. A screen shot of a completed 'Enter market survey data' screen in the Cost of the Diet software.

- Before entering the price and weight data, the date of data entry should be set and the name of the people who collected and entered the market survey data should be entered in the 'Interviewer' box. To distinguish between these individuals use the abbreviations DC (data collector) and DE (data enterer) as shown in the screen shot above. This allows practitioners to identify who collected or entered the data in case errors or problems are found.
- Enter the price and weight data for foods written by the data collectors on the data collection forms into the corresponding cells as shown in Figure 26.
- The software will not allow data to be saved and accepted if a price has been entered without at least one weight and a weight without a price will also not be accepted. The software will highlight in red the cell that contains missing data.
- To export the data in this screen to Microsoft Excel, follow the steps described in section 5.9.6.
- Click the 'Save/Continue' button to save without leaving this screen.
- To save incomplete data and leave this screen, click the 'Save/Continue' button and then the 'Close' button. The software will return to the 'Market survey data entry summary' screen and the corresponding blue hyperlink for the market will change from 'Enter' to 'Review'.
- Once data entry is complete click 'Save/Accept'. The software will return to the 'Market survey data entry summary' screen and the corresponding blue hyperlink for the market will change from 'Enter' to 'Completed'. To return to the assessment summary screen click the 'Back' button.

Hint and tips

- If a food was not in season type NS in the price cell.
-  If a food was not available in the market, leave the price and weight cells blank.
- If weight data for liquids such as oil and milk have been collected in millilitres, change the unit from grams to millilitres, using the drop down menu button in the 'units' column. The software will automatically calculate the price per 100g for this food using the liquid to grams conversion factors, the results of which can be viewed in the 'Show market survey summary' screen (see section 5.6.4 for more information).
- The software has the ability to copy the data entered in the first season to the other seasons in the assessment. Use the check box in the 'Does the weight or price change across the seasons?' column as a visible reminder of what figures need to be updated in the other seasons as shown in Figure 26.

5.6.3 Copy market survey data to other seasons

1. If market survey data have been collected for more than one season the software gives the option to copy the data from the active season to the other seasons. The aim of this function is to save time during data entry. The software gives the user this option after data for the first season has been entered as shown in Figure 27:

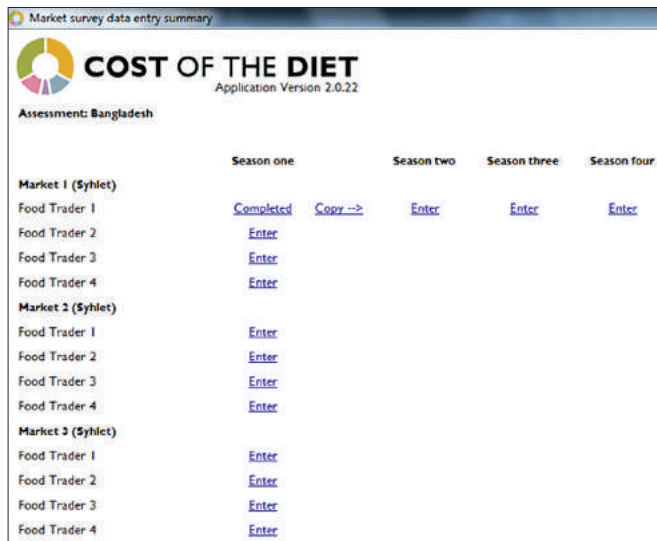


Figure 27. A screen shot of the 'Market survey data entry summary' screen in the Cost of the Diet software showing the 'copy data to seasons' function for Food Trader 1.

2. To copy the data from the active season to the other seasons, click on the blue 'Copy' hyperlink. Once confirmed, the blue hyperlinks for the other seasons will change from 'Enter' to 'Review'.
3. To complete data entry for the other seasons, follow the steps outlined in the previous section and click 'Save/Accept'. The software will return to the 'Market survey data entry summary' screen and the corresponding blue hyperlink for the market will change from 'Review' to 'Completed'.
4. If copying the data to all seasons is not appropriate, click on the 'Enter' links and enter the data in its entirety following the steps outlined in section 5.6.2. Once data entry is complete, click 'Save/Accept'. The software will return to the 'Market survey data entry summary' screen and the corresponding blue hyperlink for the market will change from 'Enter' to 'Completed'.
5. To export the data in this screen summary to Microsoft Excel, follow the steps described in section 5.9.6.

5.6.4 View the market survey results

1. Open the 'Assessment Summary' screen and click on the 'Show market survey summary' link. A pop up screen shown in Figure 28 will appear which gives the user the option to select what markets and seasons are required for viewing.

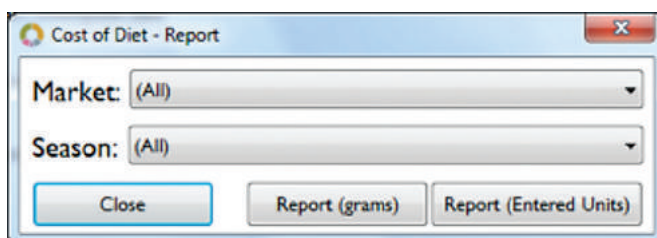


Figure 28. A screen shot showing the pop up screen that enables users to select the market and season market survey summary data that should be displayed by the Cost of the Diet software.

2. To view the data in grams select the 'Report (grams)' button from this pop up screen. Any foods that have been entered in millilitres will automatically be converted into grams using the millilitres to grams conversion factor.
3. To view the data in the units that were entered (so grams and millilitres if applicable) click on the 'Report (Entered Units)' button from this pop up screen.
4. The software will open the report summary screen showing the data that was requested. Please be patient: if there have been several market surveys over several seasons this report may take time to produce. These data can be printed and exported into Microsoft Excel and Word by following the steps outlined in the section 5.9.7 and 5.9.6.

5.6.5 Check the market survey data for errors

It is important that the prices and weights entered are checked against the printed market survey sheets to correct any errors. However the software can also help practitioners spot any potentially incorrect values.

1. Open the market survey data report for the market and season required for data checking as outlined in the previous section.
2. Any weights that are highlighted in yellow fall out of the 5th and 95th percentile validation (as shown in Figure 29) and should be reviewed by the Cost of the Diet practitioner as described in section 4.5.1.

MARKET SURVEY ANALYSIS SUMMARY

	Food Trader 1				Food Trader 2				
	Weight 1	Weight 2	Weight 3	Price (KES)	Price Per 100g	Weight 1	Weight 2	Weight 3	Price (KES)
Grains and grain-based products									
Rice, paddy	100g	1000g	100g	6.80	1.70	100g	100g	100g	7.00
Wheat flour, 85% extraction	100g	100g	100g	5.60	5.60	100g	100g	100g	6.00
Wheat, flour, local or hyv	100g	100g	100g	3.37	3.37	100g	100g	100g	3.00
Roots and tubers									
Potato	100g	102g	100g	3.60	3.58	100g	100g	100g	4.00
Sweet potato, orange, raw	95g	100g	95g	1.90	1.97	150g	125g	130g	2.50
Taro, a variety of, starch	100g	103g	100g	5.90	5.84	95g	100g	100g	5.90
Legumes, nuts & seeds									
Green gram, split, dried, raw	500g	500g	500g	8.50	1.70	500g	500g	500g	8.50
Lentil, peeled	500g	5000g	500g	10.50	0.53	500g	500g	500g	10.50
Lentil, whole	500g	500g	500g	15.90	3.18	500g	500g	500g	15.90
Meat and offal									
Liver	100g	1500g	100g	20.00	3.53	100g	100g	100g	20.00
Fish, seafood, amphibians and invertebrates									
Fish, cichlids, dried	100g	105g	100g	40.00	39.34	98g	100g	100g	40.00
Fish, dried, fresh water	100g	100g	100g	35.00	35.00	100g	100g	100g	35.00
Fish, small, fresh, fresh water	100g	95g	103g	7.00	7.05	5100g	5540g	4999g	350.00
Fish, snoutail, whole, dried	100g	100g	100g	20.00	20.00	100g	100g	100g	20.00

Figure 29. A screen shot of a market survey report that demonstrates the 5th and 95th percentile highlighting function in the Cost of the Diet software.

5.6.6 Enter dietary habits interview data

1. Open the 'Assessment summary' screen and click on the 'Enter/ edit dietary habits interview data' link.
2. The software will open the 'Dietary habits interview data entry summary' screen shown below:

Dietary habits interview data entry summary

COST OF THE DIET
Application Version 2.0.22

Assessment: Bangladesh

Village	Survey Date	Number of People
Village 1	N/A	N/A
Village 2	N/A	N/A
Village 3	N/A	N/A
Village 4	N/A	N/A

Figure 30. A screen shot of the 'Dietary habits interview data entry summary' screen in the Cost of the Diet software.

Local Name	English Name	Usually	Often	Rarely	Never	Total (#)
Aja	Oats	0	5	1	2	8
Bajra, gota-dana	Millet, pearl, wholegrain, raw	8	0	0	0	8
Bekolo	Maize, white	1	1	5	1	8
Bhutta, atta	Maize, flour, wholegrain, white	0	8	0	0	8
Bonruti, bun or roll	Bread, bun or roll	0	0	8	0	8
Chal, BR-26, siddha, kole chata	Rice, BR 26, parboiled, milled, raw	0	8	0	0	8
Dabo	Bread, wheat, white	3	3	1	1	8
Dagusa	Millet, finger	0	0	0	8	8
Gebis	Barley	1	6	1	0	8
Injera	Teff, cooked	8	0	0	0	8
Jaah, gota	Barley, wholegrain, raw	0	0	8	0	8
Mashila	Sorghum	0	0	4	4	8
Plain pulao	Pulao, plain	0	0	8	0	8
Ruz	Rice	0	6	1	1	8
Sinde	Wheat, whole, raw	3	3	1	1	8
Teff	Teff, raw	8	0	0	0	8
Yesinde Duket	Wheat, flour, white	3	3	1	1	8
Roots and tubers						
Dinich	Potato, english, raw	0	7	1	0	8
Keysir	Beet, root	0	3	4	1	8
Sikuar Dinich	Sweet potato, raw	0	1	4	3	8
Legumes, nuts and seeds						
Ater	Pea, dry	5	2	0	1	8
Bakela	Bean, white	7	1	0	0	8
Lewuz	Peanut, dried, shelled	0	0	5	3	8

Figure 31. A screen shot of a completed 'Enter dietary habits interview data' screen in the Cost of the Diet software.

- Click on the name of the village, shown as a blue hyperlink and a pop up screen (shown in Figure 31) will appear.
- Before any data are entered it is important that the number of participants who took part in the interview is entered in the 'Number of people' box. If this is not done first the software will not indicate when an incorrect total response rate has been entered.
- The total number of responses for each food as shown in the screen shot above should be entered. These data should be collated by the Cost of the Diet practitioner or team leader before the focus group discussions take place, as discussed in section 4.6.
- The total number of responses given for a food must add up to the number of participants entered in the 'Number of people' box. If this does not happen, the software will highlight in red the corresponding food's cell in the 'Total' column and it will not be possible to save the data without receiving an error message.
- To export the data in the screens shown in Figure 30 and 31 to Microsoft Excel, follow the steps described in section 5.9.6.
- Click the 'Save/Continue' button to save without leaving this screen.
- To save incomplete data and leave this screen, click the 'Save/Continue' button and then the 'Close' button.
- Click 'Save/Close' when complete, the software will return to the assessment summary screen.

Hints and tips

- In a standard Cost of the Diet assessment the dietary habits information is usually collected for the current year in one set of interviews rather than conducting interviews in every season. However it is possible to conduct interviews in every season and enter these data into the software by changing the active season in the 'Assessment Setup' screen. To change the active season, select the 'Add a season' link on the 'Assessment Summary' screen and use the grey triangles to change the order of the seasons so that the desired season is at the top and is shown as the 'active season' on the 'Assessment Summary' screen.

5.6.7 View the dietary habits interview results by village

1. Open the assessment summary screen and click on the 'Enter/edit dietary habits interview data' link.
2. The software will open the 'Dietary habits interview data entry summary' screen as shown in the previous section.
3. To view the summary results for each village click on the blue 'Report' hyperlink.
4. The software will open the summary report for that village which shows the responses for each category, the scores that determine the minimum and maximum constraints for a food, and the calculated minimum and maximum constraint for a food. Please be patient: if there is a long food list, this report may take time to produce.
5. For a reminder of how the minimum and maximum constraints are calculated by the software, see section 4.6.2.
6. These data can be printed and exported into Microsoft Excel and Word by following the steps outlined in section 5.9.7 and 5.9.6.

5.6.8 View the dietary habits interview results summary

1. Open the 'Assessment Summary' screen and select the blue 'Show dietary habits summary' hyperlink.
2. The software will open the consolidated dietary habits interview results report. This report summarises all of the village interview results and shows the percentage of respondents who gave each of the four possible answers (usually, often, rarely, never) for every food found in the market. This report also shows the final scores that determine the minimum and maximum constraints for a food and the final constraints for each food, which will be used in the food habits diet.
3. For a reminder of how the minimum and maximum constraints are calculated by the software, see section 4.6.2.
4. These data can be printed and exported into Microsoft Excel and Word by following the steps outlined in section 5.9.7 and 5.9.6.

5.7 Standard analyses

The standard analyses are the four diets that the software produces (as discussed in section 2.2), calculated using the results of the market survey and dietary habits interview, without changing the underlying data. **They should be presented in every Cost of the Diet report.** It might be necessary to change the minimum or maximum food frequency constraints, depending on the results of the focus group discussions.

The standard analyses can be accessed by clicking on the blue 'View' hyperlink next to the 'Standard Analysis' model in the assessment summary screen as shown in Figure 32.

It is recommended that the 'Refresh' button, shown next to the blue 'View' hyperlink in Figure 32 is selected after all the market survey and dietary interview data have been added. This will ensure that the software includes all of this information in its analysis. If any changes are made to the raw data, the 'Refresh' button must be selected to update the Cost of the Diet results.



Analysis Name	Foods	Family Members	Calculated Diets	Add New View / Refresh
Standard Analysis	72	6	4	View / Refresh

Figure 32. A screen shot of the 'Assessment Summary' screen, demonstrating where to access the 'Standard Analysis' in the Cost of the Diet software.

5.7.1 Add family or individuals

1. Open the 'Assessment Summary' screen and click on the blue 'View' hyperlink next to the 'Standard Analysis' model.
2. The software will open the 'Standard Analysis summary' screen that summarises the results for the four diets by the average cost, the nutrient specifications met and the number of foods and food groups selected. Click on the blue 'Edit family or individuals' hyperlink. The 'Add/edit Family or Individuals' pop up screen will appear as shown in Figure 33.

Figure 33. A screen shot of a completed 'Add/ Edit Family or Individuals' screen in the Cost of the Diet software.

3. To add a standard HEA/CotD family, as described in section 2.1.1.8, click on the drop down menu underneath the title 'Select a standard family'. Choose a family from the drop down menu and click on the blue 'Add Family' hyperlink. The composition of the standard family should be added to the bottom of the screen underneath the '0 Family Members' heading.
4. To add individuals or a family that is different from the HEA/CotD family to the software, select an individual from the first drop down menu underneath the title 'Select an individual' and click the blue 'Add to family' hyperlink. The individual should prepopulate at the bottom of the screen underneath the '0 Family Members' heading.
5. To add the additional specifications for pregnancy and lactation to an individual, select the individual as described in step 4 and click on the second drop down menu labelled 'PLW Requirements' and click the blue 'Add to family' hyperlink. The individual should prepopulate at the bottom of the screen underneath the '0 Family Members' heading.
6. Click the 'Save/Continue' button to save without leaving this screen.
7. To save an incomplete family and leave this screen, click the 'Save/Continue' button and then the 'Close' button.
8. Click 'Save/Close' when complete, the software will return to the 'Standard Analysis summary' screen and the cost of the four diets will be calculated and summarised.

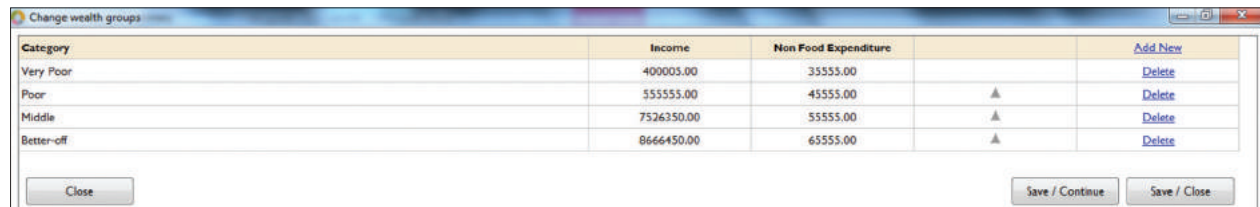
Hints and tips

- The software will not calculate the cost of the diets until individuals or families have been added to the assessment.
- The individuals or families added on this screen will be automatically copied into any 'what if' models that are created.
- To add more than one of the same individual, for example two children aged 12-23 months, change the number in the 'Number' cell (next to the description drop down menu) from 1 to 2.
- To add more than one of the same PLW specifications, for example two first trimester pregnancy uplifts, change the number in the 'Number' cell (next to the PLW specification drop down menu) from 1 to 2.
- Use the '+' sign to add different PLW specifications to the same person, for example a pregnant woman in her first trimester who is also in her 6th month of breastfeeding (lactation).

5.7.2 Define wealth groups and enter annual income and expenditure data

In order for the software to produce the affordability report as described in section 6.6 the wealth groups of the assessment area need to be defined and their annual income and essential non-food expenditure entered.

1. Open the 'Assessment Summary' screen and click on the blue 'View' hyperlink next to the 'Standard Analysis' model.
2. The software will open the 'Standard Analysis summary' screen that summarises the results for the four diets by the average cost, the nutrient specifications met and the number of foods and food groups selected. Click on the blue 'Edit wealth groups' hyperlink. The 'Change wealth groups' screen will appear as shown in Figure 34.



Category	Income	Non Food Expenditure		Add New
Very Poor	400003.00	35553.00		Delete
Poor	555553.00	45555.00	▲	Delete
Middle	7526350.00	55555.00	▲	Delete
Better-off	8666450.00	65555.00	▲	Delete

Figure 34. A screen shot of a completed 'Change wealth groups' screen in the Cost of the Diet software.

3. The software will automatically default to the four standard wealth groups that are defined by the HEA but these names are editable. Annual income and expenditure data should be entered into the relevant cells for each wealth group.
4. To add a new wealth group, click on the blue 'Add New' hyperlink. A new wealth group will appear at the bottom of the list where the name can be changed and the income and expenditure data, entered.
5. To remove a wealth group, click on the blue 'Delete' hyperlink. The wealth group will be removed from the list.
6. To export the data in this screen to Microsoft Excel, follow the steps described in section 5.9.6.
7. Click the 'Save/Continue' button to save without leaving this screen.
8. To save incomplete data entry and leave this screen, click the 'Save/Continue' button and then the 'Close' button.
9. Click 'Save/Close' when complete, the software will return to the standard analysis summary screen.

Hints and tips

- To change the order of the wealth groups, click on the grey triangles ▲.
- The wealth group information entered on this screen will be automatically copied into any 'what if' models that are created.

5.7.3 View the standard analysis results

1. Open the assessment summary screen and click on the blue 'View' hyperlink next to the 'Standard Analysis' model. The software will open the 'Standard Analysis summary' screen that summarises the results for the four diets to show the average cost, the nutrient specifications met and the number of foods and food groups selected.
2. To view the detailed results for a diet click on the corresponding blue 'View' hyperlink. The software will calculate the diet and open the 'Cost results' summary screen as shown in Figure 35.
3. This 'Cost results' screen shows the number of foods and food groups selected and their daily cost by season, by individual and the household. This screen also shows the annual, average monthly and average daily cost of the diet by individual and the household.
4. To export these results to Microsoft Excel, follow the steps described in section 5.9.6.

	Sheet (212 Days)			Orishma (153 Days)			Annual Cost	Average Daily Cost	Average Monthly Cost
	Daily Cost	No. of Foods	Food Groups	Daily Cost	No. of Foods	Food Groups			
1 x Child (either sex) 12-23 months	38.70	9	7	38.70	9	7	14 125.11	38.70	1 177.09
1 x Man, 30-59y, 50 kg, moderately active	138.37	6	6	138.37	6	6	50 503.42	138.37	4 208.62
1 x Woman, 30-59y, 45 kg, moderately active (1 x Lactation, 7-12 months)	150.05	5	5	150.05	5	5	54 769.39	150.05	4 564.12
1 x Woman, >60y, 45 kg, moderately active	133.88	7	6	133.88	7	6	48 867.30	133.88	4 072.28
Total	461.00	9	7	461.00	9	7	168 265.23	461.00	14 022.10

Figure 35. A screen shot of the 'Cost results' screen in the Cost of the Diet software.

Hints and tips

- If the daily costs are highlighted in green for an individual or the household, the nutrient specifications have been met by the diet.
- If the daily costs are highlighted in red for an individual or the household, the nutrient specifications have not been met by the diet.
- If a diet cannot be calculated the daily costs will be highlighted in red and an explanation of the problem will be given by the software. For more information refer to section 5.7.8.

5.7.4 View the price per 100g of foods

The price per 100g of foods for the standard analysis is taken from the consolidated results of the market survey. *These data can be edited but this is not recommended for the Standard analyses.*

1. Open the 'Assessment Summary' screen and click on the blue 'View' hyperlink next to the 'Standard Analysis' model. The software will open to the 'Standard analysis' summary screen that summarises the results for the four diets by the average cost, the nutrient specifications met and the number of foods and food groups selected.
2. Click on the corresponding blue 'View' hyperlink for a diet. The software will calculate the diet and open the 'Cost results' summary screen.
3. To view the price per 100g of the foods in the food list, click the '☰' menu button displayed in the daily and annual cost columns and select the 'Edit Prices...' option. The software will open the 'Change food price' screen, shown in Figure 36.

	Pre-Meher Price Per 100g	Meher Price Per 100g	Pre-Belz Price Per 100g	All Price Per 100g
Grains and grain-based products				
Aja (Oats)	1.10	1.15	1.07	0.97
Bajra, gota-dana (Millet, pearl, wholegrain, raw)	0.00	0.00	0.00	0.00
Bekolo (Maize, white)	0.70	0.72	0.66	0.61
Bhutta, atta (Maize, flour, wholegrain, white)	0.00	0.00	0.00	0.00
Bonruti, bun or roll (Bread, bun or roll)	0.00	0.00	0.00	0.00
Chal, BR-26, siddha, kole chata (Rice, BR 26, parboiled, milled, raw)	0.00	0.00	0.00	0.00
Dabo (Bread, wheat, white)	1.25	1.27	1.27	1.27
Dagusa (Millet, finger)	0.00	0.00	0.00	0.00
Gebis (Barley)	0.79	0.77	0.81	0.76
Injera (Teff, cooked)	1.12	1.12	1.04	1.00
Jaab, gota (Barley, wholegrain, raw)	0.00	0.00	0.00	0.00
Mashila (Sorghum)	1.06	1.04	1.00	0.95
Plain pulao (Pulao, plain)	0.00	0.00	0.00	0.00
Ruz (Rice)	1.64	1.63	1.59	1.51
Sinde (Wheat, whole, raw)	0.96	0.92	0.89	0.83
Teff (Teff, raw)	1.47	1.45	1.40	1.35
Yesinde Duket (Wheat, flour, white)	1.32	1.35	1.29	1.25
Roots and tubers				
Dinich (Potato, english, raw)	0.69	0.64	0.73	0.56
Keysir (Beet, root)	0.89	0.71	0.83	0.66
Sikuar Dinich (Sweet potato, raw)	0.93	0.84	0.90	0.77
Legumes, nuts and seeds				
Ater (Pea, dry)	1.01	1.00	0.98	0.91

Figure 36. A screen shot of the 'Change food price' screen for a household for four seasons in the Cost of the Diet software.

	Sheet (118 Days)			Grishmo (128 Days)			Annual Cost	Average Daily Cost	Average Monthly Cost
	Daily Cost	No. of Foods	Food Groups	Daily Cost	No. of Foods	Food Groups			
1 x Child (either sex) 12-23 months	16.79	8	7	16.79	8	7	6,127.35	16.79	510.61
1 x Child (either sex) 8-9 years	34.28	8	6	34.28	8	6	12,511.81	34.28	1,042.65
1 x Child (either sex) 10-11 years	52.36	8	6	52.36	8	6	19,111.79	52.36	1,592.65
1 x Child (either sex) 12-13 years	54.19	8	6	54.19	8	6	19,779.86	54.19	1,648.32
1 x Man, 30-59y, 50 kg, moderately active	50.08	8	6	50.08	8	6	18,278.47	50.08	1,523.21
1 x Woman, 30-59y, 45 kg, moderately active (1 x Lactation, 7-12 months)	53.37	8	6	53.37	8	6	19,479.84	53.37	1,623.32
1 x Woman, >60y, 45 kg, moderately active	52.21	8	6	52.21	8	6	19,058.20	52.21	1,588.18
Total	313.28	10	7	313.28	10	7	114,347.31	313.28	9,528.94

Figure 37. A screen shot of the 'Cost results' summary screen, illustrating the different functions of the menu buttons in the Cost of the Diet software.

- The type of price data that is summarised in the 'Edit Price' screen depends on what '☰' button is selected in the cost results summary table. For example the cost summary table shown in Figure 37 shows 3 menu buttons highlighted by a different coloured box.

The 'Change food price' screen shown by clicking on the menu button in the blue box displays the price per 100g for all foods for the child either sex aged 10-11 years in season Sheet only.

The 'Change food price' screen shown by clicking on the menu button in the red box displays the price per 100g of all foods for the household in the season Grishmo.

The 'Change food price' screen shown by clicking on the menu button in the orange box displays the price per 100g for all foods for the lactating woman who is 30-59 years of age, 45kg and moderately active for the year (so including both Sheet and Grishmo).

- To export the price data to Microsoft Excel, follow the steps described in section 5.9.6.

Hints and tips

- The word 'Multiple' in the 'All price per 100g column' indicates that the prices vary by season. If all the prices are the same in both seasons the price per 100g value would be given in this column.

5.7.5 View the default portion sizes for food

The default portion sizes used in Cost of the Diet software are described in section 2.1.1.3. *These data can be edited, but this is not recommended for the Standard analyses.*

- Open the 'Assessment Summary' screen and click on the blue 'View' hyperlink next to the 'Standard Analysis' model. The software will open the 'Standard Analysis summary' screen that summarises the results for the four diets showing their average cost, the nutrient specifications met, and the number of foods and food groups selected.
- Click on the corresponding blue 'View' hyperlink for a diet. The software will calculate the diet and then open the 'Cost results' summary screen.
- To view the standard portion sizes for the foods in the food list click the '☰' menu button displayed in the daily and annual cost columns and select the 'Edit Portions...' option. The software will open the 'Change food portion size and frequency' screen, shown in Figure 38 below.
- The type of portion size data that is summarised in the 'Change food portion size and frequency' screen depends on which '☰' button is selected in the 'Cost results' summary table. For example the 'Cost results' summary table in Figure 39 below shows 3 menu buttons highlighted in a different coloured box.

The 'Change food portion size and frequency' screen, shown by clicking on the menu button in the blue box, displays the standard portion size for all foods for the child either sex aged 10-11 years in season Sheet only.

The 'Change food portion size and frequency' screen, shown by clicking on the menu button in the red box displays the standard portion sizes for all foods summarised by each member of the household in the season Grishmo.

The 'Change food portion size and frequency' screen, shown by clicking on the menu button in the orange box, displays the standard portion size for all foods for the lactating woman who is 30-59 years of age, 45kg in weight, and moderately active for the year, so includes both the seasons Sheet and Grishmo.

- To export the portion size data to Microsoft Excel, follow the steps described in section 5.9.6.

Hints and tips

- The word 'Multiple' in the 'All standard portion size column' indicates that the portion sizes either vary by season or by individual depending on where in the cost results summary screen the '☰' button was selected. If all the standard portion sizes are the same, the portion size value in grams would be given in this column.

	12 years			1 x Female 2-3 years Belg			1 x Woman, 30-59y, 65 kg, moderately active Belg			1 x Man, 30-59y, 60 kg, light activity (1 x Lactation, 3-6 months) Belg			ALL		
	Maximum Constraint	Portion Size (g)	Minimum Constraint	Maximum Constraint	Portion Size (g)	Minimum Constraint	Maximum Constraint	Portion Size (g)	Minimum Constraint	Maximum Constraint	Standard Portion	Minimum Constraint	Maximum Constraint		
Grains and grain-based products															
Aja (Oats)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Bajra, gota-dana (Millet, pearl, wholegrain, raw)	21.00	72.00	0.00	21.00	179.00	0.00	21.00	172.00	0.00	21.00	55.00	0.00	21.00		
Bekolo (Maize, white)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Bhutta, atta (Maize, flour, wholegrain, white)	21.00	66.00	0.00	21.00	163.00	0.00	21.00	156.00	0.00	21.00	50.00	0.00	21.00		
Bonruti, bun or roll (Bread, bun or roll)	21.00	79.00	0.00	21.00	195.00	0.00	21.00	188.00	0.00	21.00	60.00	0.00	21.00		
Chal, BR-26, siddha, kole chata (Rice, BR 26,	21.00	79.00	0.00	21.00	195.00	0.00	21.00	188.00	0.00	21.00	60.00	0.00	21.00		
Dabo (Bread, wheat, white)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Dagusa (Millet, finger)	0.00	122.00	0.00	0.00	233.00	0.00	0.00	150.00	0.00	0.00	Multiple	0.00	0.00		
Gebis (Barley)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Injera (Teff, cooked)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Jaab, gota (Barley, wholegrain, raw)	21.00	72.00	0.00	21.00	179.00	0.00	21.00	172.00	0.00	21.00	55.00	0.00	21.00		
Mashila (Sorghum)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Plain pulao (Pulao, plain)	21.00	79.00	0.00	21.00	195.00	0.00	21.00	188.00	0.00	21.00	60.00	0.00	21.00		
Ruz (Rice)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Sinde (Wheat, whole, raw)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Teff (Teff, raw)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Yesinde Duket (Wheat, flour, white)	21.00	20.00	0.00	21.00	39.00	0.00	21.00	25.00	0.00	21.00	Multiple	0.00	21.00		
Roots and tubers															
Dinich (Potato, english, raw)	21.00	142.00	0.00	21.00	272.00	0.00	21.00	175.00	0.00	21.00	Multiple	0.00	21.00		
Keysir (Beet, root)	21.00	142.00	0.00	21.00	272.00	0.00	21.00	175.00	0.00	21.00	Multiple	0.00	21.00		

Figure 38. A screen shot of the 'Change food portion size and frequency' screen showing the portion sizes and the minimum and maximum constraints for a household in the Belg season in the Cost of the Diet software.

	Sheet (118 Days)			Grishmo (128 Days)			Annual Cost	Average Daily Cost	Average Monthly Cost
	Daily Cost	No. of Foods	Food Groups	Daily Cost	No. of Foods	Food Groups			
1 x Child (either sex) 12-23 months	16.79	8	7	16.79	8	7	6,127.35	16.79	510.61
1 x Child (either sex) 8-9 years	34.28	8	6	34.28	8	6	12,511.81	34.28	1,042.65
1 x Child (either sex) 10-11 years	52.36	8	6	52.36	8	6	19,111.79	52.36	1,592.65
1 x Child (either sex) 12-13 years	54.19	8	6	54.19	8	6	19,779.86	54.19	1,648.32
1 x Man, 30-59y, 50 kg, moderately active	50.08	8	6	50.08	8	6	18,278.47	50.08	1,523.21
1 x Woman, 30-59y, 45 kg, moderately active (1 x Lactation, 7-12 months)	53.37	8	6	53.37	8	6	19,479.84	53.37	1,623.32
1 x Woman, >60y, 45 kg, moderately active	52.21	8	6	52.21	8	6	19,058.20	52.21	1,588.18
Total	313.28	10	7	313.28	10	7	114,347.31	313.28	9,528.94

Figure 39. A screen shot of the 'Cost results' summary screen, demonstrating the different functions of the menu buttons in the Cost of the Diet software.

5.7.6 View and change the minimum and maximum frequency constraints for foods

The minimum and maximum constraints for foods for the standard analyses differ depending on the diet being analysed. For the energy only, macronutrient and nutritious diets, the minimum constraint is set at 0 and the maximum constraint is set at 21.

For the food habits nutritious diet, the minimum and maximum constraints are taken from the dietary habits' interviews and focus group discussions as described in section 4.6.2. Therefore, unlike the price per 100g and the portion sizes, it might be necessary to change the minimum constraints for foods before the food habits diet can be calculated.

1. Open the 'Assessment Summary' screen and click on the blue 'View' hyperlink next to the 'Standard analysis' model. The software will open the 'Standard Analysis summary' screen that summarises the results for the four diets by their average cost, the nutrient specifications met and the number of foods and food groups selected.
2. Click on the corresponding blue 'View' hyperlink for a diet. The software will calculate the diet and open the 'Cost results' summary screen.
3. To view the minimum and maximum constraints for the foods in the food list click the '≡' menu button displayed in the daily and annual cost columns and select the 'Edit Portions...' option. The software will open the 'Change food portion size and frequency' screen, shown in Figure 40 below:

	-13 years	1 x Female 2-3 years Belg		1 x Woman, 30-59y, 65 kg, moderately active Belg			1 x Man, 30-59y, 60 kg, light activity (1 x Lactation, 3-6 months) Belg			ALL			
	Maximum Constraint	Portion Size (g)	Minimum Constraint	Maximum Constraint	Portion Size (g)	Minimum Constraint	Maximum Constraint	Portion Size (g)	Minimum Constraint	Maximum Constraint	Standard Portion	Minimum Constraint	Maximum Constraint
Grains and grain-based products													
Aja (Oats)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00
Bajra, gota-dana (Millet, pearl, wholegrain, raw)	21.00	72.00	0.00	21.00	179.00	0.00	21.00	172.00	0.00	21.00	55.00	0.00	21.00
Bekolo (Maize, white)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00
Bhutta, atta (Maize, flour, wholegrain, white)	21.00	66.00	0.00	21.00	163.00	0.00	21.00	156.00	0.00	21.00	50.00	0.00	21.00
Bonnuts, bun or roll (Bread, bun or roll)	21.00	79.00	0.00	21.00	195.00	0.00	21.00	188.00	0.00	21.00	60.00	0.00	21.00
Chal, BR-26, siddha, kole chata (Rice, BR 26)	21.00	79.00	0.00	21.00	195.00	0.00	21.00	188.00	0.00	21.00	60.00	0.00	21.00
Dabo (Bread, wheat, white)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00
Dagusa (Millet, finger)	0.00	122.00	0.00	0.00	233.00	0.00	0.00	150.00	0.00	0.00	Multiple	0.00	0.00
Gebis (Barley)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00
Injera (Teff, cooked)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00
Jaab, gota (Barley, wholegrain, raw)	21.00	72.00	0.00	21.00	179.00	0.00	21.00	172.00	0.00	21.00	55.00	0.00	21.00
Mashila (Sorghum)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00
Plain pulao (Pulao, plain)	21.00	79.00	0.00	21.00	195.00	0.00	21.00	188.00	0.00	21.00	60.00	0.00	21.00
Ruz (Rice)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00
Sinde (Wheat, whole, raw)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00
Teff (Teff, raw)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00
Yesinde Duket (Wheat, flour, white)	21.00	20.00	0.00	21.00	39.00	0.00	21.00	25.00	0.00	21.00	Multiple	0.00	21.00
Roots and tubers													
Dinich (Potato, english, raw)	21.00	142.00	0.00	21.00	272.00	0.00	21.00	175.00	0.00	21.00	Multiple	0.00	21.00
Keysir (Beet, root)	21.00	142.00	0.00	21.00	272.00	0.00	21.00	175.00	0.00	21.00	Multiple	0.00	21.00

Figure 40. A screen shot of the 'Change food portion size and frequency' screen showing the portion sizes and the minimum and maximum constraints for a household in Belg season in the Cost of the Diet software.

4. The minimum and maximum constraints can be changed in the following ways:

- For a specific individual for a specific season
- For a specific individual for all seasons
- For all individuals for a specific season
- For all individuals for all seasons.

The type of minimum and maximum constraints data that is summarised in the 'Change food portion size and frequency' screen depends on what '≡' button is selected in the 'Cost results' summary table. For example the 'Cost results' summary table in Figure 41 below shows 3 menu buttons in a different coloured box.

	Sheet (118 Days)			Grishmo (128 Days)			Annual Cost	Average Daily Cost	Average Monthly Cost
	Daily Cost	No. of Foods	Food Groups	Daily Cost	No. of Foods	Food Groups			
1 x Child (either sex) 12-23 months	16.79	8	7	16.79	8	7	6,127.35	16.79	510.61
1 x Child (either sex) 8-9 years	34.28	8	6	34.28	8	6	12,511.81	34.28	1,042.65
1 x Child (either sex) 10-11 years	52.36	8	6	52.36	8	6	19,111.79	52.36	1,592.65
1 x Child (either sex) 12-13 years	54.19	8	6	54.19	8	6	19,779.86	54.19	1,648.32
1 x Man, 30-59y, 50 kg, moderately active	50.08	8	6	50.08	8	6	18,278.47	50.08	1,523.21
1 x Woman, 30-59y, 45 kg, moderately active (1 x Lactation, 7-12 months)	53.37	8	6	53.37	8	6	19,479.84	53.37	1,623.32
1 x Woman, >60y, 45 kg, moderately active	52.21	8	6	52.21	8	6	19,058.20	52.21	1,588.18
Total	313.28	10	7	313.28	10	7	114,347.31	313.28	9,528.94

Figure 41. A screen shot of the 'Cost results' summary screen, demonstrating the different functions of the menu buttons in the Cost of the Diet software.

4 The 'Change food portion size and frequency' screen which opens by clicking on the menu button in the blue box displays the minimum and maximum constraints for all foods for the child of either sex aged 10-11 years in season Sheet only.

The 'Change food portion size and frequency' screen shown by clicking on the menu button in the red box displays the minimum and maximum constraints for all foods summarised by each member of the household in the season Grishmo.

The 'Change food portion size and frequency' screen shown by clicking on the menu button in the orange box displays the minimum and maximum constraints for all foods for the lactating woman who is 30-59 years of age, 45kg and moderately active for the year, so for both Sheet and Grishmo.

To change the minimum or maximum constraints for a single season or for the year it is recommended that the menu button in the annual cost column for that individual is selected as shown in Figure 42 below.

	>13 years		1 x Child (either sex) 12-13 years Belg		1 x Child (either sex) 12-13 years Pre-Belg		1 x Child (either sex) 12-13 years Meher		ALL				
	Maximum Constraint	Portion Size (g)	Minimum Constraint	Maximum Constraint	Portion Size (g)	Minimum Constraint	Maximum Constraint	Portion Size (g)	Minimum Constraint	Maximum Constraint	Standard Portion	Minimum Constraint	Maximum Constraint
Grains and grain-based products													
Aja (Oats)	21.00	49.00	0.00	21.00	49.00	0.00	21.00	49.00	0.00	21.00	16.00	0.00	21.00
Bajra, gota-dana (Millet, pearl, wholegrain, raw)	21.00	166.00	0.00	21.00	166.00	0.00	21.00	166.00	0.00	21.00	55.00	0.00	21.00
Bekolo (Maize, white)	21.00	49.00	0.00	21.00	49.00	0.00	21.00	49.00	0.00	21.00	16.00	0.00	21.00
Bhutta, atta (Maize, flour, wholegrain, white)	21.00	151.00	0.00	21.00	151.00	0.00	21.00	151.00	0.00	21.00	50.00	0.00	21.00
Bonruti, bun or roll (Bread, bun or roll)	21.00	181.00	0.00	21.00	181.00	0.00	21.00	181.00	0.00	21.00	60.00	0.00	21.00
Chal, BR-26, siddha, kole chata (Rice, BR 26)	21.00	181.00	0.00	21.00	181.00	0.00	21.00	181.00	0.00	21.00	60.00	0.00	21.00
Dabo (Bread, wheat, white)	21.00	49.00	0.00	21.00	49.00	0.00	21.00	49.00	0.00	21.00	16.00	0.00	21.00
Dagusa (Millet, finger)	0.00	49.00	0.00	0.00	49.00	0.00	0.00	49.00	0.00	0.00	16.00	0.00	0.00
Gebis (Barley)	21.00	49.00	0.00	21.00	49.00	0.00	21.00	49.00	0.00	21.00	16.00	0.00	21.00
Injera (Teff, cooked)	21.00	49.00	0.00	21.00	49.00	0.00	21.00	49.00	0.00	21.00	16.00	0.00	21.00
Jaab, gota (Barley, wholegrain, raw)	21.00	166.00	0.00	21.00	166.00	0.00	21.00	166.00	0.00	21.00	55.00	0.00	21.00
Mashita (Sorghum)	21.00	49.00	0.00	21.00	49.00	0.00	21.00	49.00	0.00	21.00	16.00	0.00	21.00
Plain pulao (Pulao, plain)	21.00	181.00	0.00	21.00	181.00	0.00	21.00	181.00	0.00	21.00	60.00	0.00	21.00
Ruz (Rice)	21.00	49.00	0.00	21.00	49.00	0.00	21.00	49.00	0.00	21.00	16.00	0.00	21.00
Sinde (Wheat, whole, raw)	21.00	49.00	0.00	21.00	49.00	0.00	21.00	49.00	0.00	21.00	16.00	0.00	21.00
Teff (Teff, raw)	21.00	49.00	0.00	21.00	49.00	0.00	21.00	49.00	0.00	21.00	16.00	0.00	21.00
Yesinde Duket (Wheat, flour, white)	21.00	8.00	0.00	21.00	8.00	0.00	21.00	8.00	0.00	21.00	3.00	0.00	21.00
Roots and tubers													
Dinich (Potato, english, raw)	21.00	57.00	0.00	21.00	57.00	0.00	21.00	57.00	0.00	21.00	19.00	0.00	21.00
Keysir (Beet, root)	21.00	57.00	0.00	21.00	57.00	0.00	21.00	57.00	0.00	21.00	19.00	0.00	21.00
Sikuzar Dinich (Sweet potato, raw)	21.00	57.00	0.00	21.00	57.00	0.00	21.00	57.00	0.00	21.00	19.00	0.00	21.00

Figure 42. A screen shot of the 'Change food portion size and frequency' screen showing the portion sizes, minimum and maximum constraints for a child (either sex) aged 12-13 years for three seasons in the Cost of the Diet software.

- The weekly minimum and maximum constraints can be changed for each season separately by editing the number in the 'Minimum Constraint' or 'Maximum Constraint' columns for Belg, Pre-Belg or Meher seasons separately or, if they are the same for all seasons, they can be changed by editing the Minimum Constraint or Maximum Constraint in the 'ALL' column.
- To change the minimum or maximum constraints for the whole household and for a particular season, it is recommended that the '≡' button in the daily cost column for the specific season for the entire household (in the 'Total' row, as shown in Figure 41) is selected. Once selected, the new screen will allow the user to change the portion sizes for the preferred season, as shown in Figure 43.

	>13 years			1 x Female 2-3 years Belg			1 x Woman, 30-59y, 65 kg, moderately active Belg			1 x Man, 30-59y, 69 kg, light activity (1 x Lactation, 3-6 months) Belg			ALL		
	Maximum Constraint	Portion Size (g)	Minimum Constraint	Maximum Constraint	Portion Size (g)	Minimum Constraint	Maximum Constraint	Portion Size (g)	Minimum Constraint	Maximum Constraint	Standard Portion	Minimum Constraint	Maximum Constraint		
Grains and grain-based products															
Aja (Oats)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Bajra, gota-dana (Millet, pearl, wholegrain, raw)	21.00	72.00	0.00	21.00	179.00	0.00	21.00	172.00	0.00	21.00	55.00	0.00	21.00		
Bekolo (Maize, white)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Bhutta, atta (Maize, flour, wholegrain, white)	21.00	66.00	0.00	21.00	163.00	0.00	21.00	156.00	0.00	21.00	50.00	0.00	21.00		
Bonruti, bun or roll (Bread, bun or roll)	21.00	79.00	0.00	21.00	195.00	0.00	21.00	188.00	0.00	21.00	60.00	0.00	21.00		
Chal, BR-26, siddha, kole chata (Rice, BR 26)	21.00	79.00	0.00	21.00	195.00	0.00	21.00	188.00	0.00	21.00	60.00	0.00	21.00		
Dabo (Bread, wheat, white)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Dagusa (Millet, finger)	0.00	122.00	0.00	0.00	233.00	0.00	0.00	150.00	0.00	0.00	Multiple	0.00	0.00		
Gebis (Barley)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Injera (Teff, cooked)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Jaab, gota (Barley, wholegrain, raw)	21.00	72.00	0.00	21.00	179.00	0.00	21.00	172.00	0.00	21.00	55.00	0.00	21.00		
Mashila (Sorghum)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Plain pulao (Pulao, plain)	21.00	79.00	0.00	21.00	195.00	0.00	21.00	188.00	0.00	21.00	60.00	0.00	21.00		
Ruz (Rice)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Sinde (Wheat, whole, raw)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Teff (Teff, raw)	21.00	122.00	0.00	21.00	233.00	0.00	21.00	150.00	0.00	21.00	Multiple	0.00	21.00		
Yesinde Duket (Wheat, flour, white)	21.00	20.00	0.00	21.00	39.00	0.00	21.00	25.00	0.00	21.00	Multiple	0.00	21.00		
Roots and tubers															
Dinich (Potato, english, raw)	21.00	142.00	0.00	21.00	272.00	0.00	21.00	175.00	0.00	21.00	Multiple	0.00	21.00		
Keysir (Beet, root)	21.00	142.00	0.00	21.00	272.00	0.00	21.00	175.00	0.00	21.00	Multiple	0.00	21.00		

Figure 43. A screen shot of the 'Change food portion size and frequency' screen showing the portion sizes, minimum and maximum constraints for a household in Belg season in the Cost of the Diet software.

- The minimum and maximum constraints can be changed for the whole household for the season Belg by editing the number in the 'Minimum Constraint or Maximum Constraint' columns in the 'ALL' section.
- To change the minimum or maximum constraints for the whole household for the year it is recommended that the '≡' button in the 'Annual Cost' column for the household (in the 'Total' row, as shown in Figure 41) in the 'Cost results' summary screen is selected. Once selected, the new screen will allow the user to change the portion sizes for all seasons, as shown in Figure 44.
- The minimum and maximum constraints can be changed for the whole household for all seasons by editing the number in the 'Minimum Constraint' or 'Maximum Constraint' in the 'ALL' column.
- Click the 'Save/Continue' button to save the changes without leaving the 'Edit portion' screen.
- To save incomplete data entry and leave this screen, click the 'Save/Continue' button and then the 'Close' button.
- Click 'Save/Close' when finished; the software then recalculates the cost of the diet and will open the 'Cost results' summary screen.
- To export the portion size data to Microsoft Excel, follow the steps described in section 5.9.6.

Hints and tips

- For children aged 6-23 months the minimum and maximum constraints for breast milk are set at 7 for all diets.
- The word 'Multiple' in the 'ALL' columns indicates that the minimum and maximum constraints either vary by season or by individual depending on where in the cost results summary screen the '≡' button was selected. If the minimum or maximum constraints were the same for all seasons or individuals the values would be given in this column.

	>13 years	1 x Woman, 30-59y, 65 kg, moderately active Pre-Meher		1 x Child (either sex) 12-13 years Belg			1 x Woman, 30-59y, 65 kg, moderately active Belg			ALL			
	Maximum Constraint	Portion Size (g)	Minimum Constraint	Maximum Constraint	Portion Size (g)	Minimum Constraint	Maximum Constraint	Portion Size (g)	Minimum Constraint	Maximum Constraint	Standard Portion	Minimum Constraint	Maximum Constraint
Grains and grain-based products													
Aja (Oats)	21.00	233.00	0.00	21.00	49.00	0.00	21.00	233.00	0.00	21.00	Multiple	0.00	21.00
Baya, gora-dana (Millet, pearl, wholegrain, raw)	21.00	179.00	0.00	21.00	166.00	0.00	21.00	179.00	0.00	21.00	55.00	0.00	21.00
Bekolo (Maize, white)	21.00	233.00	0.00	21.00	49.00	0.00	21.00	233.00	0.00	21.00	Multiple	0.00	21.00
Bhutta, atta (Maize, flour, wholegrain, white)	21.00	163.00	0.00	21.00	151.00	0.00	21.00	163.00	0.00	21.00	50.00	0.00	21.00
Bonruti, bun or roll (Bread, bun or roll)	21.00	195.00	0.00	21.00	181.00	0.00	21.00	195.00	0.00	21.00	60.00	0.00	21.00
Chal, BR-26, siddha, kole chata (Rice, BR 26,	21.00	195.00	0.00	21.00	181.00	0.00	21.00	195.00	0.00	21.00	60.00	0.00	21.00
Dabo (Bread, wheat, white)	21.00	233.00	0.00	21.00	49.00	0.00	21.00	233.00	0.00	21.00	Multiple	0.00	21.00
Dagusa (Millet, finger)	0.00	233.00	0.00	0.00	49.00	0.00	0.00	233.00	0.00	0.00	Multiple	0.00	0.00
Gebis (Barley)	21.00	233.00	0.00	21.00	49.00	0.00	21.00	233.00	0.00	21.00	Multiple	0.00	21.00
Injera (Teff, cooked)	21.00	233.00	0.00	21.00	49.00	0.00	21.00	233.00	0.00	21.00	Multiple	0.00	21.00
Jaab, gora (Barley, wholegrain, raw)	21.00	179.00	0.00	21.00	166.00	0.00	21.00	179.00	0.00	21.00	55.00	0.00	21.00
Mashila (Sorghum)	21.00	233.00	0.00	21.00	49.00	0.00	21.00	233.00	0.00	21.00	Multiple	0.00	21.00
Plain pulao (Pulao, plain)	21.00	195.00	0.00	21.00	181.00	0.00	21.00	195.00	0.00	21.00	60.00	0.00	21.00
Ruz (Rice)	21.00	233.00	0.00	21.00	49.00	0.00	21.00	233.00	0.00	21.00	Multiple	0.00	21.00
Sinde (Wheat, whole, raw)	21.00	233.00	0.00	21.00	49.00	0.00	21.00	233.00	0.00	21.00	Multiple	0.00	21.00
Teff (Teff, raw)	21.00	233.00	0.00	21.00	49.00	0.00	21.00	233.00	0.00	21.00	Multiple	0.00	21.00
Yesinde Duket (Wheat, flour, white)	21.00	39.00	0.00	21.00	8.00	0.00	21.00	39.00	0.00	21.00	Multiple	0.00	21.00
Roots and tubers													
Dinich (Potato, english, raw)	21.00	272.00	0.00	21.00	57.00	0.00	21.00	272.00	0.00	21.00	Multiple	0.00	21.00
Keysir (Beet, root)	21.00	272.00	0.00	21.00	57.00	0.00	21.00	272.00	0.00	21.00	Multiple	0.00	21.00

Figure 44. A screen shot of the 'Change food portion size and frequency' screen showing the portion sizes, minimum and maximum constraints for a household for all seasons in the Cost of the Diet software.

5.7.7 Generate summary reports by individual or household, by day, week, season and year

The software produces standard reports for an individual or household, and by day, week, season and year to summarise the Cost of the Diet results in a variety of different ways. The graphs and figures from these reports should be interpreted as described in section 6 and be included and in the Cost of the Diet report as describe in the reporting guidelines (available on request).

The following reports can be produced by the software:

- Daily cost and composition of each diet
- Weekly cost and composition of each diet
- Percentage nutrient specifications met by each diet, by season
- Annual diet summary
- Cost of the food groups by week
- Affordability of the diets by wealth group
- Seasonal variation in the cost of the food habits diet.

1. To access these reports open the 'Assessment Summary' screen and click on the blue 'View' hyperlink next to the 'Standard Analysis' model. The software will open the 'Standard Analysis summary' screen that summarises the results for the four diets showing the average cost, the nutrient specifications met and the number of foods and food groups selected.
2. To view the detailed results for a diet click on the corresponding blue 'View' hyperlink. The software will calculate the diet and open the 'Cost results' summary screen.
3. To select the different reports click the '☰' menu button displayed in the daily and annual cost columns.
 - 3a. The daily and weekly cost and composition of the diets reports can be found by putting the cursor over the 'View details...' option in the menu and selecting either 'Daily' or 'Weekly'.
 - 3b. The other reports listed above can be found by putting the cursor over the 'Reports' option in the menu and selecting the relevant option.
4. Once selected the software will open these reports.
5. The type of data that are summarised in the reports depends on what '☰' button is selected in the 'Cost results' summary table. For example, the 'Cost results' summary table in Figure 45 below shows 3 menu buttons each highlighted in a different coloured box.

	Sheet (118 Days)			Grishmo (128 Days)			Annual Cost	Average Daily Cost	Average Monthly Cost
	Daily Cost	No. of Foods	Food Groups	Daily Cost	No. of Foods	Food Groups			
1 x Child (either sex) 12-23 months	16.79	8	7	16.79	8	7	6,127.35	16.79	510.61
1 x Child (either sex) 8-9 years	34.28	8	6	34.28	8	6	12,511.81	34.28	1,042.65
1 x Child (either sex) 10-11 years	52.36	8	6	52.36	8	6	19,111.79	52.36	1,592.65
1 x Child (either sex) 12-13 years	54.19	8	6	54.19	8	6	19,779.86	54.19	1,648.32
1 x Man, 30-59y, 50 kg, moderately active	50.08	8	6	50.08	8	6	18,278.47	50.08	1,523.21
1 x Woman, 30-59y, 45 kg, moderately active (1 x Lactation, 7-12 months)	53.37	8	6	53.37	8	6	19,479.84	53.37	1,623.32
1 x Woman, >60y, 45 kg, moderately active	52.21	8	6	52.21	8	6	19,058.20	52.21	1,588.18
Total	313.28	10	7	313.28	10	7	114,347.31	313.28	9,528.94

Figure 45. A screen shot of the 'Cost results' summary screen showing the different functions of the menu buttons in the Cost of the Diet software.

The report produced by clicking on the menu button in the blue box display the Cost of the Diet results for the child either sex aged 10-11 years in season Sheet only.

The report produced by clicking on the menu button in the red box displays the Cost of the Diet results for the total household (all individuals summarised together) in the season Grishmo.

The report produced by clicking on the menu button in the orange box displays the Cost of the Diet results for the lactating woman who is 30-59 years of age, 45kg and moderately active for the year (so including both Sheet and Grishmo).

- Each report can be exported into Microsoft Excel or Word as described section 5.9.6.

Hints and tips

- In the daily and weekly reports, if the cell of a nutrient is highlighted in red it means that the specification for this nutrient has not been met to 100%.
- In the daily and weekly reports, if the cell of a nutrient has been highlighted in yellow it means that the upper limit for this nutrient has been met.
- It is not possible to access the reports on the daily and weekly cost and composition of the diet by clicking on the '≡' in the annual cost column.
- The 'Annual Diet Summary' report can be produced for an individual and the household, but to ensure that all seasons are taken into account for the calculation, this report should be selected from the '≡' buttons in the annual cost column.
- The following reports can only be produced for the food habits nutritious diet:
 - 'Weekly Food Group Cost'
 - 'Seasonal Daily Cost'.
- The 'Diet Affordability' report can only be produced from the food habits diet cost results summary screen.
- The 'Diet Affordability' report can be produced for an individual and for the household but to ensure that all seasons are taken into account for the calculation, this report should be selected from the '≡' buttons in the annual cost column.
- The 'Seasonal Daily Cost' report can be produced by individual and for the household but to ensure that all seasons are taken into account for the calculation, this report should be selected from the '≡' buttons in the annual cost column.

5.7.8 When a nutritious diet cannot be calculated

There are several reasons why the software is not able to calculate a nutritious diet:

- I. Specific nutrient specifications are not met by 100%
 - a. Because there are not enough foods containing the nutrients in the food list
 - b. Because typical dietary habits restrict the amount of foods containing these nutrients,

This outcome will be identified by red cells in the 'Cost results' summary screen as shown in Figure 46 and by a red box around the cell of a nutrient in the daily or weekly reports as shown in Figure 47.

	Pro-Meher (41 Days)			Belg (304 Days)			Annual Cost	Average Daily Cost	Average Monthly Cost
	Daily Cost	No. of Foods	Food Groups	Daily Cost	No. of Foods	Food Groups			
1 x Child (either sex) 6-8 months	10.16	4	3	10.02	4	3	3 664.55	10.04	305.38
1 x Child (either sex) 3-4 years	31.59	11	5	31.93	11	5	11 632.74	31.87	969.40
1 x Child (either sex) 7-8 years	72.39	15	6	73.04	15	6	26 620.45	72.93	2 218.37
1 x Man, 30-59y, 65 kg, moderately active	45.99	10	5	45.58	10	5	16 661.99	45.65	1 388.50
1 x Woman, 30-59y, 50 kg, light activity (1 x Lactation, 3-6 months)	94.93	16	7	95.44	16	7	34 805.71	95.36	2 900.48
Total	255.06	18	8	256.01	19	8	93 385.45	255.85	7 782.12

Figure 46. A screen shot of the 'Cost results' summary screen demonstrating how the Cost of the Diet software flags the cost cells red when nutrient specifications have not been met by 100% for an individual or a household.

The percentage (%) of each nutrient target provided by the edible portion of foods selected by the software

Food Name	Energy	Protein	Fat	Vitamin A	Vitamin C	Vitamin B1	Vitamin B2	Niacin	Pantoic acid	Vitamin B6	Folic acid	Vitamin B12	Calcium	Iron	Magnesium	Zinc
Grains and grain-based products																
Bara, gora-dana (Pillet, pearl, wholegram, raw)	41.5	80.3	17.8	0.0	0.0	71.1	24.5	41.3	57.9	82.8	41.1	0.0	2.2	0.0	244.1	81.5
Fish, seafood, amphibians and invertebrates																
Faitha, shufki (Fish, anchovy, gageotic harfin)	10.5	152.1	4.7	1.1	0.0	10.8	30.1	44.3	8.8	28.0	5.9	110.3	31.3	22.6	44.9	0.0
Kata (Fish, catla, raw)	4.8	88.1	5.1	0.5	0.0	9.2	10.7	0.0	18.1	31.3	0.0	228.3	20.4	15.7	26.1	7.0
Vegetables and vegetable products																
Dasa (Amaranth, stem, raw)	1.8	3.0	0.3	4.8	90.7	1.5	27.4	0.0	16.9	0.0	0.0	0.0	8.2	11.8	0.0	9.6
Gajor (Carrot, raw)	1.2	2.2	0.3	27.1	1.6	2.9	5.6	6.1	4.8	8.8	3.2	0.0	0.8	1.0	8.8	0.4
Breast Milk:																
Breast milk	28.1	41.2	48.7	44.5	70.9	22.2	27.2	38.4	42.9	9.9	20.1	37.3	9.5	0.0	21.0	15.4
Total	100.8	349.9	94.9	100.8	183.2	118.8	145.5	158.2	154.4	188.8	188.4	395.9	72.5	254.1	389.8	114.3

Figure 47. A screen shot of the 'Daily' report demonstrating how the Cost of the Diet software flags nutrient cells when nutrient specifications have not been met by 100% or when an upper limit for a nutrient has been reached for an individual or a household.

2. Specifications for nutrients have not been met by 100% because the upper limit for a nutrient (such as energy) has been reached. This will be identified by a yellow box around the cell of a nutrient in the daily or weekly reports, as shown in Figure 47.
3. Specifications for nutrients have not been met because the maximum number of times a week that a food group can be included has been reached.
4. The software has been unable to calculate a diet because too many foods have been included by manipulating the minimum constraints, and the upper limits for energy or a vitamin or mineral have been exceeded.
5. The software has been unable to calculate a diet because there has been a conflict between the maximum food group constraints and the minimum food frequency constraints. For example if the maximum food group constraint for vegetables per week was set to 15 but the minimum constraints were set to force in 20 portions of vegetables a week.

Issues two to five will be indicated on the 'Cost results' summary screen as demonstrated in Figure 48.

When a nutritious diet isn't possible Food Habits Cost results			
Sheet (119 Days)			
	Daily Cost	No. of Foods	Food Groups
1 x Child (either sex) 12-23 months	≡	This diet could not be calculated because: an upper limit was reached, this will be either food weight or one of the nutrients	
1 x Child (either sex) 9-10 years	≡	This diet could not be calculated because: an upper limit was reached, this will be either food weight or one of the nutrients	
1 x Child (either sex) 11-12 years	≡	This diet could not be calculated because: an upper limit was reached, this will be either food weight or one of the nutrients	

Figure 48. A screen shot of the 'Cost results' summary screen showing the message that the Cost of the Diet software displays when a nutritious diet is not possible.

If a nutritious diet cannot be calculated, this is an important result that should be reported, particularly if there is an insufficient variety of food available to meet certain nutrient specifications or because the typical dietary habits prevent certain nutrient specifications from being met. In such circumstances it is recommended to change the underlying parameters to do 'What if' scenarios to improve the availability of foods, the dietary diversity and/or the typical dietary habits.

5.8 Advanced analysis: 'what if?' models

5.8.1 Introduction

'What if' modelling is the term used to describe the additional analysis that can be undertaken with the Cost of the Diet software to create hypothetical models of the impact of changing one or more underlying parameters. The type of 'what if' models to be calculated in a Cost of the Diet assessment will depend on the results of the standard analyses and the overall aim and objectives of the assessment. These are explained in more detail in section 6.7.

When creating a 'What if?' model, it is possible to make the following alterations to a diet:

- Add or remove foods or supplements from the food list
- Create new foods or supplements and add them to the food list
- Change the composition of the family or change individuals
- Change the nutrient specification settings for individuals or families
- Add or remove wealth groups, changing their definition and their annual income and expenditure data
- Change the food group maximum constraints
- Change the price per 100g of foods
- Change the standard portion sizes of foods
- Change the minimum and maximum food frequency constraints

These changes may have the following effects:

- Decrease or increase the cost of the diet
- Improve or worsen the quality of the diet
- Improve or worsen the diversity of the diet
- Improve or worsen the affordability of the diet.

The underlying parameters listed above can only be changed at certain levels within the software:

- At the model level, which changes the parameters for all of the diets within a model and;
- At the diet level, which changes the parameters for a specific diet within a model without affecting the other diets calculated for that model.

Any of the four diets created by the software can be used as the basis of a 'what if?' model. **However it is recommended that the food habits nutritious diet is used because this reflects typical dietary habits in the assessment area at the lowest cost.**

This section of the Guideline will describe the potential impact of making the changes listed above on the cost, composition, quality and affordability of the diet, as well as detailing how software these changes can be made in the software. This section should be referred to in conjunction with sections 6.7 to 6.10.

5.8.2 Add a new 'What if?' model

1. Open the 'Assessment Summary' screen and click on the blue 'Add new' hyperlink in the analysis section of the summary screen (next to the column 'Calculated diets').
2. The pop up box shown in Figure 49 will appear requesting a description of the model in the form of text. The software has a function to copy all of the underlying data from an existing model into a new model: the food list, price per 100g for food, portion sizes, minimum and maximum food frequency constraints, wealth group information, individuals or families, nutrient specification settings for individuals, and maximum food group constraints. To do this select the 'Copy From' tick box as shown in Figure 49 and select the model with the parameters to be copied.
3. The new model will appear in the 'Analysis' list in the assessment summary screen. Select the blue hyperlinked name of the model and the software will open the model's summary screen shown in Figure 50.

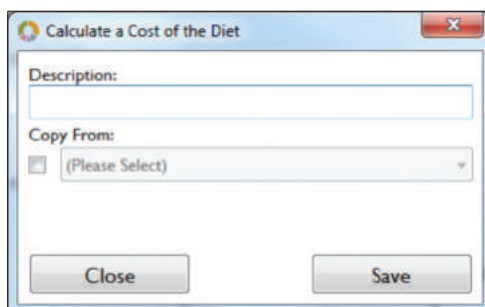


Figure 49. A screen shot of the pop up screen that shows when a new model is added in the Cost of the Diet software.

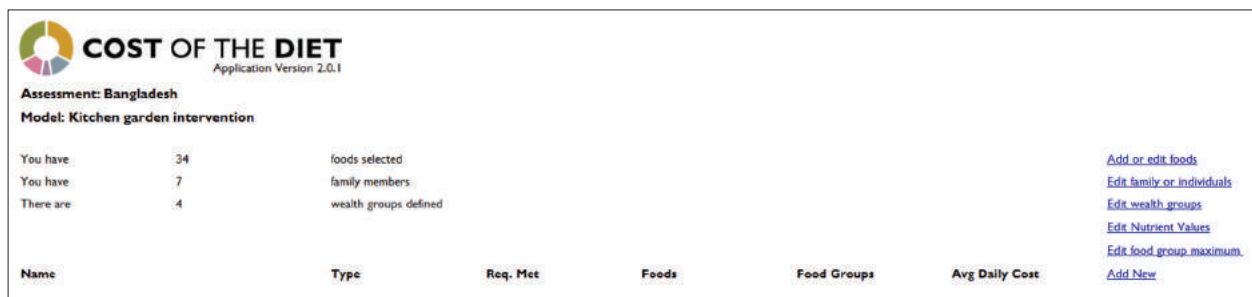


Figure 50. A screen shot of a summary screen for a model in the Cost of the Diet software.

5.8.3 Add a diet to the 'What if?' model

1. Open the 'Assessment Summary' screen and select the relevant model. The software will open the model's summary screen.
2. Click on the blue 'Add new' hyperlink (next to the average daily cost column).
3. A similar pop up box as described in section 5.8.2 will appear as shown in Figure 51 where the name or the description of the diet can be given. The software has the ability to copy all of the underlying data from a diet within a model to another diet within the same model. To do this, select the 'Copy From' tick box and select the diet to be copied. The diet type (energy only, macronutrient or the two nutritious diets) also needs to be selected from the drop down menu.
4. Once the details are complete and 'Save' is selected, the new diet for the model will appear in the diet list.

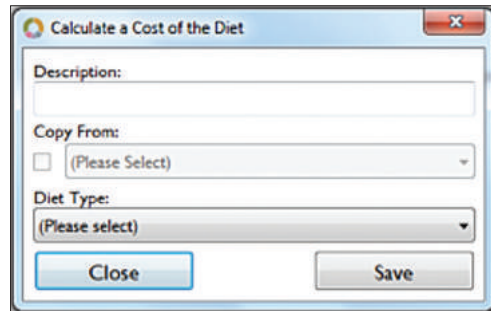


Figure 51. A screen shot of the pop up screen that shows when a new diet is added within a model in the Cost of the Diet software.

5.8.4 Change settings in a model

The model level essentially refers to the model's summary screen (shown above). There is no limit to how many diets can be added to this screen but when an underlying parameter is changed at this stage, it will be applied to all of the diets listed. Models at this level are useful to show the impact of changing one or a combination of parameters on the four basic diets that the software can create.

The parameters that can be changed and are applied at the model level are:

- The food list
- Individuals or family members
- Wealth group information
- Nutrient specification settings
- The food group maximum constraints.

5.8.4.1 Add or edit foods or supplements in the food list

Adding a new food or a supplement from the food composition database or creating a new food or supplement could be a useful way to estimate the potential impact of the following interventions:

- The impact of a supplement on the cost and quality of a diet;
 - The impact of introducing a new food on the cost and quality of a diet;
 - The impact of an intervention such as a kitchen garden on the cost, quality and affordability of a nutritious diet.
1. Open the relevant model summary screen and click on the blue 'Add or edit foods' hyperlink. The 'Select Foods' screen, described in section 5.5.3 will pop up.
 2. Add or remove foods or supplements from the food tables to the food list or create new foods or supplements and add these to the food list as described in sections 5.5.3 and 5.5.4.
 3. The results for the diet will not automatically change as the food's price, standard portion size and the minimum and maximum food frequency constraints will need to be entered for the food for the individuals or family members receiving the food. To do this, refer to sections 5.8.5.1, 5.8.5.2 and 5.8.5.3.

Hints and tips

- It is possible to add the same food twice to the food list for a 'What if?' model.

5.8.4.2 Edit family members or individuals

The software has the flexibility to change the individuals or family members in a model. This might be useful to:

- Estimate the impact of a 'What if?' model for particularly vulnerable individuals or groups of people;
 - Estimate the cost of the additional nutrient specifications for pregnancy and lactation;
 - Model the same diet for different household sizes and compositions.
1. Open the relevant model summary screen and click on the blue 'Edit family or individuals' hyperlink.
 2. The software will open the 'Add/Edit Family or Individuals' screen as described in section 5.7.1.
 3. Add or edit the family or individuals as desired, described in section 5.7.1.

5.8.4.3 Edit wealth group definitions and annual income and expenditure data

Increasing or decreasing the annual income and expenditure data for certain wealth groups is a useful way to:

- Estimate the impact of increasing income on the affordability of the diets, such as through cash for work or cash transfer programmes;
 - To estimate the impact of increasing expenditure on the affordability of the diets, perhaps as a result of a shock, for example.
1. Open the relevant model summary screen and click on the blue 'Edit wealth groups' hyperlink.
 2. The software will open the 'Change wealth groups' screen as described in section 5.7.2.
 3. Edit the definition of the wealth groups, their income and expenditure data as desired, described in section 5.7.2.

5.8.4.4 Change the nutrient specifications of individuals

As described in section 2.1.1.1, the specifications for vitamins and minerals are set at the 97.7th percentile to minimise the risk of deficiency, as recommended by the WHO and FAO. Version 2 of the Cost of the Diet software has the flexibility to change the percentile specifications for energy, protein and all the vitamins and minerals apart from pantothenic acid and magnesium from the 1st to 99th percentile for individuals aged 12 months and above.

This flexibility could be used to:

- Estimate the effect of altering specifications for all nutrients on the cost of a diet;
 - Estimate the cost of individual nutrients on the cost of the diet;
 - Estimate what percentage of nutrient specifications might be met by a cash transfer;
 - Estimate what percentage of nutrient specifications might be met by providing specific foods or by vouchers for foods.
1. Open the relevant model summary screen and click on the blue 'Edit nutrient values' hyperlink.
 2. The software will open the 'Change energy and nutrient settings' screen.
 3. The percentiles can be changed in the following ways:
 - For a specific individual for a specific nutrient;
 - For a specific individual for all nutrients;
 - For all individuals for a specific nutrient ;
 - For all individuals for all nutrients.

The type of change listed above made depends on where in the 'Change energy and nutrient settings' screen the percentiles are changed. Figure 52 demonstrates each option.

	1 x Child (either sex) 12-23 months		1 x Child (either sex) 7-6 years		1 x Child (either sex) 15-16 years		1 x Man, 30-59y, 50 kg, moderately active		1 x Woman, 30-59y, 45 kg, moderately active (1 x Lactation, 7-12 months)		All
Energy & Protein	Target	Percentile	Target	Percentile	Target	Percentile	Target	Percentile	Target	Percentile	Percentile
Energy Lower Limit	906.50	50.00	1 623.00	50.00	2 834.50	50.00	2 750.00	50.00	2 760.00	50.00	50.00
Protein	13.55	95.00	19.83	95.00	47.61	95.00	40.40	95.00	55.36	95.00	95.00
Fat	Target	Percentage	Target	Percentage	Target	Percentage	Target	Percentage	Target	Percentage	Percentage
Fat Lower Limit	30.22	30.00	45.08	25.00	78.74	25.00	61.11	20.00	61.33	20.00	Multiple
Fat Upper Limit	40.29	50.00	63.12	35.00	110.23	35.00	106.94	35.00	107.33	35.00	Multiple
Micronutrients	Target	Percentile	Target	Percentile	Target	Percentile	Target	Percentile	Target	Percentile	Percentile
Vitamin A (µg RE)	400.00	97.72	500.00	97.72	600.00	97.72	600.00	97.72	850.00	97.72	97.72
Vitamin C (mg)	30.00	97.72	35.00	97.72	40.00	97.72	45.00	97.72	70.00	97.72	97.72
Vitamin B1 (mg)	0.50	97.72	0.90	97.72	1.15	97.72	1.20	97.72	1.50	97.72	97.72
Vitamin B2 (mg)	0.50	97.72	0.90	97.72	1.15	97.72	1.30	97.72	1.60	97.72	97.72
Niacin (mg NE)	6.00	97.72	12.00	97.72	16.00	97.72	16.00	97.72	17.00	97.72	97.72
Vitamin B6 (mg)	0.50	97.72	1.00	97.72	1.25	97.72	1.30	97.72	2.00	97.72	97.72
Folic Acid (µg DFE)	150.00	97.72	300.00	97.72	400.00	97.72	400.00	97.72	500.00	97.72	97.72
Vitamin B12 (µg)	0.90	97.72	1.80	97.72	2.40	97.72	2.40	97.72	2.80	97.72	97.72
Calcium	500.00	97.72	700.00	97.72	1 300.00	97.72	1 000.00	97.72	1 000.00	97.72	97.72
Iron	0.58	97.72	0.89	97.72	3.10	97.72	1.37	97.72	2.94	97.72	97.72
Zinc bioavailability (moderate)	4.10	97.72	5.60	97.72	7.90	97.72	7.00	97.72	7.20	97.72	97.72
All		97.72		97.72		97.72		97.72		97.72	97.72
Non-editable micronutrients	Target		Target		Target		Target		Target		
Food Weight	1 354.01		2 109.90		3 684.85		3 575.00		2 990.00		
Vitamin A Upper Limit	977.00		1 016.00		2 637.00		3 333.00		3 333.00		
Niacin Upper Limit	244.00		248.00		607.00		848.00		848.00		
Vitamin C Upper Limit	1 628.00		1 129.00		868.00		942.00		942.00		
Pantothenic Acid	2.00		4.00		5.00		5.00		7.00		
Calcium Upper Limit	4 884.00		3 387.00		2 603.00		2 825.00		2 825.00		
Magnesium	60.00		100.00		225.00		260.00		270.00		
Iron Upper Limit	115.00		240.00		627.00		627.00		627.00		

Figure 52. A screen shot of the 'Change energy and nutrient settings' screen demonstrating the functions available in the Cost of the Diet software.

Changing the value in the black box will change the percentile of the energy specification for all individuals.

Changing the value in the red box will change the percentile of the specification for vitamin C for the child (either sex) aged 12-23 months only.

Changing the value in the blue box will change the percentile for all the adjustable micronutrients for the child (either sex) aged 15-16 years.

Changing the value in the green box will change the percentile for all adjustable micronutrients for all individuals.

4. Click the 'Save/Continue' button to save without leaving the screen.
5. To save incomplete data entry and leave this screen, click the 'Save/Continue' button and then the 'Close' button.
6. Click 'Save/Close' when finished. The software will recalculate the cost of the diet return to the model summary screen.
7. To export the nutrient specifications data to Microsoft Excel, follow the steps described in section 5.9.6.

5.8.4.5 Change the food group maximum constraints

The software has the flexibility to limit the number of times a week any given food group can be included in the diet. This flexibility is useful to model:

- The impact of removing a food group from the diet on its cost, quality and composition;
 - The impact of increasing the availability of a food group in the diet on its cost, quality and composition.
1. Open the relevant model summary screen and click on the blue 'Edit food group maximum portions' hyperlink.
 2. The software will open the 'Change food group maximum portions' screen shown in Figure 53.

Food Group	Maximum
Grains and grain-based products	105.00
Roots and tubers	105.00
Legumes, nuts and seeds	105.00
Meat and offal	105.00
Fish, seafood, amphibians and invertebrates	105.00
Eggs and egg products	105.00
Milk and milk products	105.00
Vegetables and vegetable products	105.00
Fruit and fruit products	105.00
Oils and fats	105.00
Sugars and confectionary	105.00
Herbs, spices and condiments	105.00
Beverages	105.00
Supplements and infant foods	105.00
Composite dishes	105.00
Breast Milk	105.00

Figure 53. A screen shot of the 'Change food group maximum portions' screen in the Cost of the Diet software.

3. To change the maximum food group constraints enter the desired constraint into the 'maximum' column.
4. Click the 'Save/Continue' button to save without leaving the screen.
5. To save incomplete data entry and leave this screen, click the 'Save/Continue' button and then the 'Close' button.
6. Click 'Save/Close' when complete, the software will recalculate the cost of the diet and return to the model summary screen.
7. To export the portion size data to Microsoft Excel, follow the steps described in section 5.9.6.

5.8.5 Change settings at a diet level

The diet level essentially refers to the underlying parameters that are editable from the 'Cost results' summary screen, which is:

- The price per 100g for foods
- The standard portion sizes for food
- The minimum and maximum food frequency constraints for food

These data can be changed for the individual diets within a model without altering any of the other diets in the specific model summary screen. For example if a user wanted to model a variety of prices for a food(s) for the same diet and compare the results, this level will enable this. The results can then be viewed and compared in the specific model summary screen.

5.8.5.1 Change the price per 100g for foods

1. Open the relevant model summary screen and click on the corresponding blue 'View' hyperlink next to the diet whose prices need altering. The software will calculate the diet and open the 'Cost results' summary screen.
2. To open the price per 100g pop up screen, follow the steps outlined in section 5.7.4.
3. To change the price per 100g, override the original data by clicking on the cell and typing over the existing numbers.
4. Click the 'Save/Continue' button to save without leaving the screen.
5. Click 'Save/Close' when finished; the software will recalculate the cost of the diet and return to the cost results summary screen.
6. To export the price data to Microsoft Excel, follow the steps described in section 5.9.6.

5.8.5.2 Change the standard portion sizes for food

The portion size of each food is an important parameter in the Cost of the Diet software and can have a large effect on the results. When large portion sizes are used, large amounts of a few foods are selected by the software so the diet will not be very diverse; when small portion sizes are used, small amounts of more foods are selected by the software so the diet becomes more diverse. Decreasing portion sizes of foods can be used to demonstrate the effect on the cost, quality and composition of the diet of increasing dietary diversity and create a diet that could be closer to actual dietary habits.

1. Open the relevant model summary screen and click on the corresponding blue 'View' hyperlink next to the diet for which portion sizes are to be altered. The software will re-calculate the diet and open the 'Cost results' summary screen.
2. To open the 'Change portion size and frequency' screen, follow the steps outlined in section 5.7.5.
3. The portion sizes can be changed in the following ways:
 - For a specific individual for a specific season
 - For a specific individual for all seasons
 - For all individuals for a specific season
 - For all individuals for all seasons.

The type of change listed above depends on where in the 'Cost results' summary screen the '☰' button is selected, as detailed in section 5.7.6.


4. If portion sizes are to be changed for an individual only, for a specific season or for a year, select the corresponding '☰' menu button and change the portion size for each food in the 'Standard portion (g)' column underneath the individual's description, not in the 'ALL' category. This will change the portion size specifically for that individual without affecting the portion sizes for other individuals in the household.
5. To change the portion sizes of foods for all the individuals for a specific season or year using data collected in the field for a child aged 1-3 years, select the corresponding '☰' button and change the data in the 'Standard portion (g)' column in the 'ALL' category. The software will automatically change the portion sizes for the other individuals by applying portion size scaling factors (section 2.1.1.3).
6. To change the portion sizes of foods for all the individuals for a specific season or year using data collected in the field for an individual who is not a child aged 1-3 years the method is slightly different.

To ensure that the scaling factors are applied to the correct standard portion size, the individual that the portion size data have been collected for must be included in the household. The corresponding '☰' button should be selected for that individual (depending on whether the portion sizes are to be changed for one season or for the year) and the portion size data should be entered in the 'Standard portion (g)' column underneath the individual's description, not in the 'ALL' category'.

When these portion sizes are entered, the values in the 'Standard portion (g)' in the 'ALL' category will change. The software has applied the scaling factors to calculate the standard portion size for the 1-3 year old child, which can now be applied to the other individuals in the household. To do this, the data in the 'standard portion (g)' in the 'ALL' category needs to be exported to Microsoft Excel (following the steps described in section 5.9.6) and entered into the 'Standard portion (g)' column in the 'ALL' category in the 'Change food group maximum portions' screen that displays all the household members for a specific season or the year. The software will use the portion size scaling factors to apply these portions sizes to the other members of the household.

7. Click the 'Save/Continue' button to save without leaving the screen.
8. Click 'Save/Close' when finished; the software will recalculate the cost of the diet and will return to the 'Cost results' summary screen.
9. To export the price data to Microsoft Excel, follow the steps described in section 5.9.6.

Hints and tips

- The portion sizes of foods within the 'Supplement and infant food' group are dosage specific and default to a value of 1g.  The practitioner should change this to what is recommended.
- The portion size for beverages has been set to 1g but users should change this to reflect the local context.

5.8.5.3 Change the minimum and maximum constraints for food

Changing the minimum and maximum constraints for food will affect the cost, composition and the diversity of the diet and could be used to model:

- The impact of reducing the number of times a food or foods are included in the diet on its cost, composition and quality.
 - The impact of forcing a specific food into the diet because of its cost, composition and quality.
1. To change the minimum and maximum constraints, please refer to section 5.7.6.

5.9 Miscellaneous

5.9.1 View the food composition table

There are two ways to get to the food composition table in the software:

1. By opening the 'Add/Edit food' screen and clicking on the 'View Food Database' button.
2. By opening the 'Assessment' homepage and clicking on the 'View Food Database' button.

Hints and tips

- To sort the food composition table click on the '↕' button next to the column heading that the food composition table should be sorted by.

5.9.2 View the nutrient specifications for individual's database

There are two ways to access the database of nutrient specifications for individuals:

1. By opening the 'Add/Edit Family or Individuals' screen and clicking on the 'View Nutrient Requirements' button.
2. By opening the 'Assessment' homepage and clicking on the 'View Nutrient Requirements' button.

5.9.3 Change the currency of the results to USD, GBP and EUR

The currency conversion factors embedded within the Cost of the Diet software are annual averages published by the World Bank of local currency units relative to the U.S. dollar. These rates have been determined by national authorities or in the legally sanctioned exchange market. **They do not reflect informal exchange rates.**

1. Open the 'Assessment Summary' screen and click on the blue 'View' hyperlink next to the model you want to open. The software will open the model's summary screen that displays the results for the diets by their average cost, the nutrient specifications met and the number of foods and food groups selected.
2. To view the detailed results for a diet click on the corresponding blue 'View' hyperlink. The software will calculate the diet and open the 'Cost results' summary screen.
3. In the top right hand corner of the 'Cost results' summary screen there is a drop down list of the following currency abbreviations: the local currency (selected in the 'Assessment Setup' screen), United States dollars (USD), Great Britain pounds (GBP) and Euros (EUR) as Figure 54 shows.

	Season one 1 (90 Days)			Season two 2 (91 Days)			Daily Cost	No. of Foods	Food Groups	Daily C
	Daily Cost	No. of Foods	Food Groups	Daily Cost	No. of Foods	Food Groups				
1 x Child (either sex) 12-23 months	16.06	4	4	16.06	4	4	16.06	4	4	
1 x Man, 30-59y, 50 kg, moderately active	84.17	4	3	84.17	4	3	84.17	4	3	
1 x Woman, 30-59y, 45 kg, moderately active (1 x Lactation, 7-12 months)	84.70	4	3	84.70	4	3	84.70	4	3	

Figure 54. A screen shot of the 'Cost results' summary screen showing the currency conversion functions in the Cost of the Diet software.

4. Select a currency and the cost results will be automatically converted to the new currency using the conversion factors embedded in the software.
5. To use a different conversion factors to the values embedded in the software, select the relevant currency from the drop down menu (the software will re-calculate the costs) and enter a new conversion factor in the 'Conversion Factor' box.
6. The software will ask if it should store the new factor in the database and, if desired, the 'Yes' option should be selected.
7. Once the currency is changed all of the cost results and reports will be recalculated.

5.9.4 Rename a model or a diet within a model

1. To rename a model, open the 'Assessment Summary' screen and click the blue 'Rename' hyperlink next to the model. The pop up box described in section 5.8.2 should appear enables to use to change the name.
2. To rename a particular diet within a model, open the 'Assessment Summary' screen and click the blue 'View' hyperlink next to the model in question. The software will open the model's summary screen. Click the blue 'Rename' hyperlink next to the diet that needs to be renamed. The pop up box described in section 5.8.3 should pop up which enables to use to change the name.

5.9.5 Delete a model or a diet within a model

1. To delete a model and all of the diets within this model, open the 'Assessment Summary' screen and click the blue 'Delete' hyperlink next to the model. It will be deleted and cannot be recovered.
2. To delete a particular diet within a model, open the 'Assessment Summary' screen and click the blue 'View' hyperlink next to the model in question. The software will open the model's summary screen. Click the blue 'Delete' hyperlink next to the diet. It will be deleted and cannot be recovered.

5.9.6 Export the data collection sheets, results and reports to Microsoft Excel and Word

There are two ways to export data sheets and results data from the Cost of the Diet software, depending on what underlying application package (either FastReport report generator or TMS Grid Pack matrix utilities) has been used to summarise the data.

5.9.6.1 Export data collection sheets, results and reports produced by the FastReport generator into Microsoft Excel or to Microsoft Word.


The following are produced by the FastReport report generator application:

- The market survey data collection form
- The dietary habits interview questionnaire
- The daily cost and composition of the diet report
- The weekly cost and composition of the diet report
- The percentage nutrient specifications met by the diets, by season report
- The annual diet summary report
- The cost of the food groups by week report
- The affordability of the diets by wealth group report
- The seasonal cost fluctuations of the food habits diet report.

These are simple to identify in the software because they use the same Windows menu bar at the top of the screen, as shown in Figure 55 below.



Figure 55. A screen shot showing the Windows menu bar that is displayed at the top of the reports that can be produced by the FastReport generator.

1. To export these sheets in a Microsoft Excel or Word format, click on the save symbol  in the top left hand corner of the screen and select either the 'Excel 97/2000/XP file' or 'RTF file' (rich text format file) options from the drop down menu.
2. The following pop up boxes will appear depending on which option is selected. Make sure that the tick boxes are selected, as shown in Figure 56 and click OK.

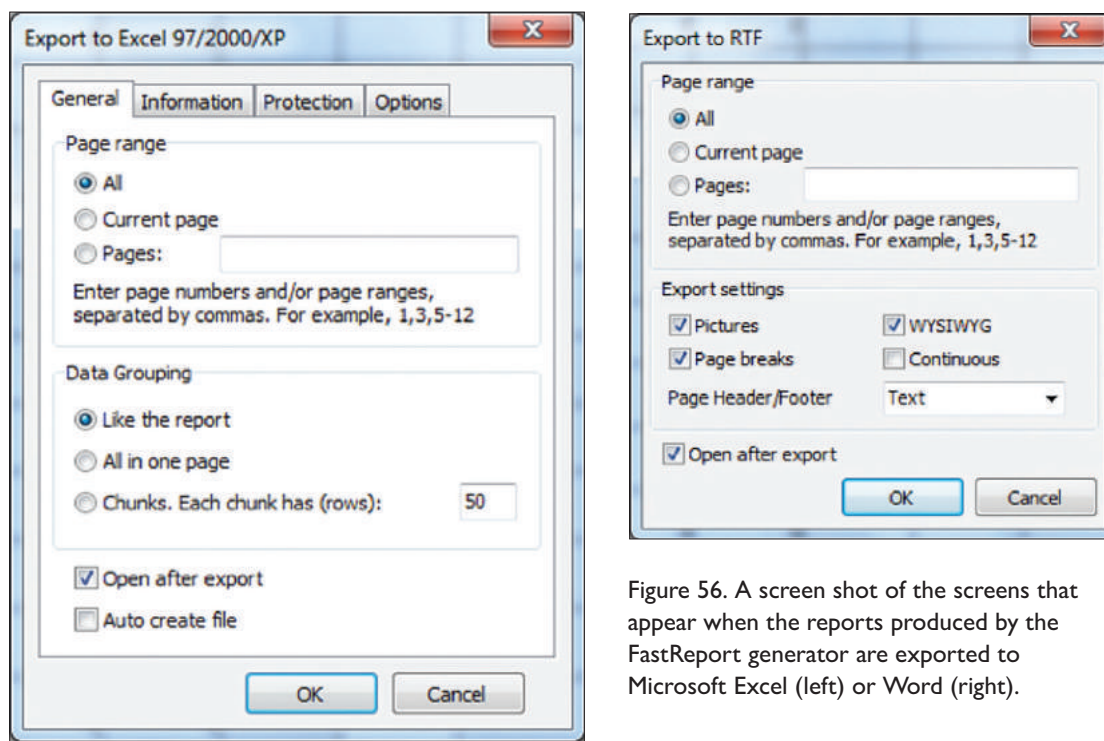


Figure 56. A screen shot of the screens that appear when the reports produced by the FastReport generator are exported to Microsoft Excel (left) or Word (right).

3. The software will open the standard Windows 'Save as' pop up screen where the file location and name can be selected and the document saved.
4. If the 'Open after export' tick boxes are selected (as shown in the screen shots above) the software will automatically open these documents in either Excel or Word or the default text editor (depending on which option has been selected) after the report has been saved.

5.9.6.2 Export the underlying databases and results produced by the TMS Grid Pack matrix utilities application into Microsoft Excel.

The method of data exporting outlined in this section is applicable to the following screens in the Cost of the Diet software:

- Assessment homepage
- Assessment summary
- Assessment setup
- Add a food to the local food list
- View food composition database
- Market survey data entry summary
- Dietary habits interview data entry summary
- Market survey data entry for a trader
- Dietary habits interview data entry for a village
- Standard analysis or model summary
- View nutrient requirements database
- Change wealth groups
- Change energy and nutrient settings
- Change food group maximum portions
- Cost results summary
- Change food portion size and frequency
- Change food price.

1. To extract the data from these screens click on the Cost of the Diet icon in the top left corner of the screen. A menu should appear with the option to 'Copy to Clipboard', as shown in Figure 57. Select this option, open Microsoft Excel or Word and click 'paste'.



Country of origin		Food groups			
	Food name (Local)	Food name (Scientific)	Country	Major food group	Minor food group
2074	Leaf, sesame, raw		Indonesia	Vegetables and vegetable	- Other vegetables
2076	Leaf, shrub (tiepok)		Senegal	Vegetables and vegetable	- Vitamin A rich vegetables
2078	Leaf, sorrel, raw		Indonesia	Vegetables and vegetable	- Vitamin A rich vegetables
2077	Leaf, singgrang		Senegal	Vegetables and vegetable	- Vitamin A rich vegetables
2073	Leaf, savannah bamboo, raw		Indonesia	Vegetables and vegetable	- Vitamin A rich vegetables
2073	Leaf, savannah bamboo, raw		Senegal	Vegetables and vegetable	- Other vegetables
3337	Taco with fava beans		Mexico	Composite dishes	Composite dishes
3339	Tamarind		Mexico	Fruit and fruit products	- Other fruit
2071	Leaf, roselle, raw		USDA	Vegetables and vegetable	- Other vegetables

Figure 57. A screen shot demonstrating the 'Copy to Clipboard' function for screens produced by the TMS Grid Pack matrix utilities application in the Cost of the Diet software.

5.9.7 Print the reports

The following reports can be printed directly from the Cost of the Diet software:

- The market survey data collection form
- The dietary habits interview questionnaire
- The daily cost and composition of the diet report
- The weekly cost and composition of the diet report
- The percentage nutrient specifications met by the diets, by season report
- The annual diet summary report
- The cost of the food groups by week report
- The affordability of the diets by wealth group report
- The seasonal cost fluctuations of the food habits diet report.

Some reports are bigger than others so different printer settings will need to be selected, as described in the steps outlined below.

1. When the above forms are produced the Windows menu bar is displayed, as shown in Figure 58.

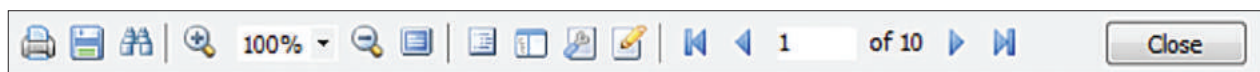



Figure 58. A screen shot showing the Windows menu bar that is displayed at the top of the reports produced by the FastReport report generator.

2. To print, click on the printer icon in the top left hand corner of the menu.
3. A standard Windows 'print set up'  pop up will appear as shown in Figure 59.
4. For the market survey and dietary interview data collection forms, the page settings do not need to be changed. These forms can be printed immediately by clicking on the 'OK' button.
5. The other reports are different because their dimensions change depending on how much data has been entered into the software and how many foods the software selects for the diets. To print, follow steps 1 to 3 but alter the print mode as shown in Figure 60 below to either 'scale' or 'split big pages' depending on the report size.
6. Alternatively it is possible to export all of the reports to either Microsoft Excel or Word as described in the previous section. Once exported, the tables and graphs can be edited or resized to fit onto the desired page size and printed.

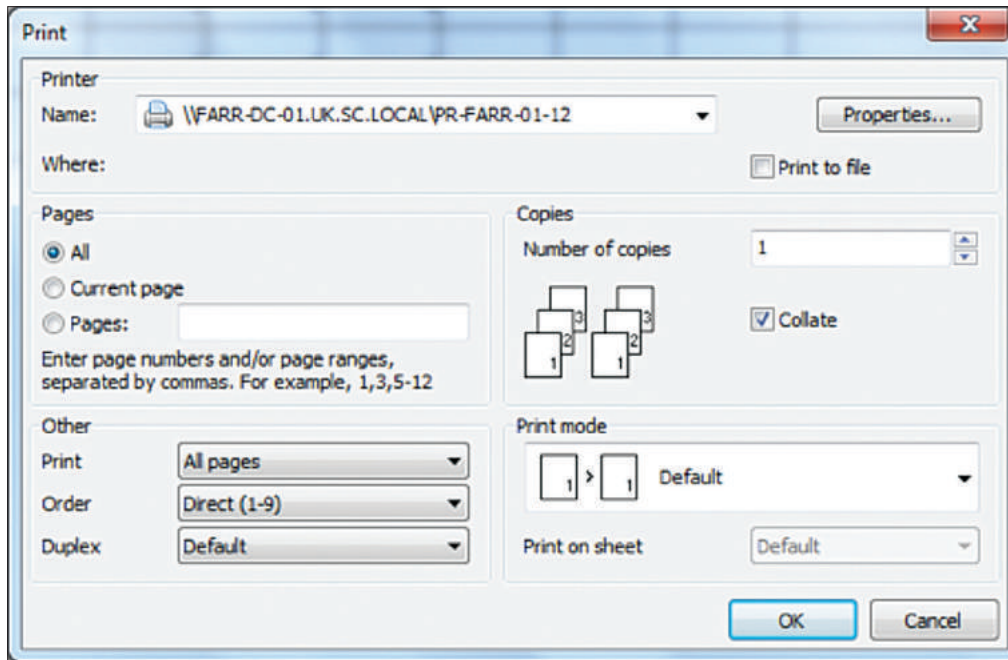


Figure 59. A screen shot demonstrating the options to select when printing the market survey or dietary interview data collection sheets from the Cost of the Diet software.

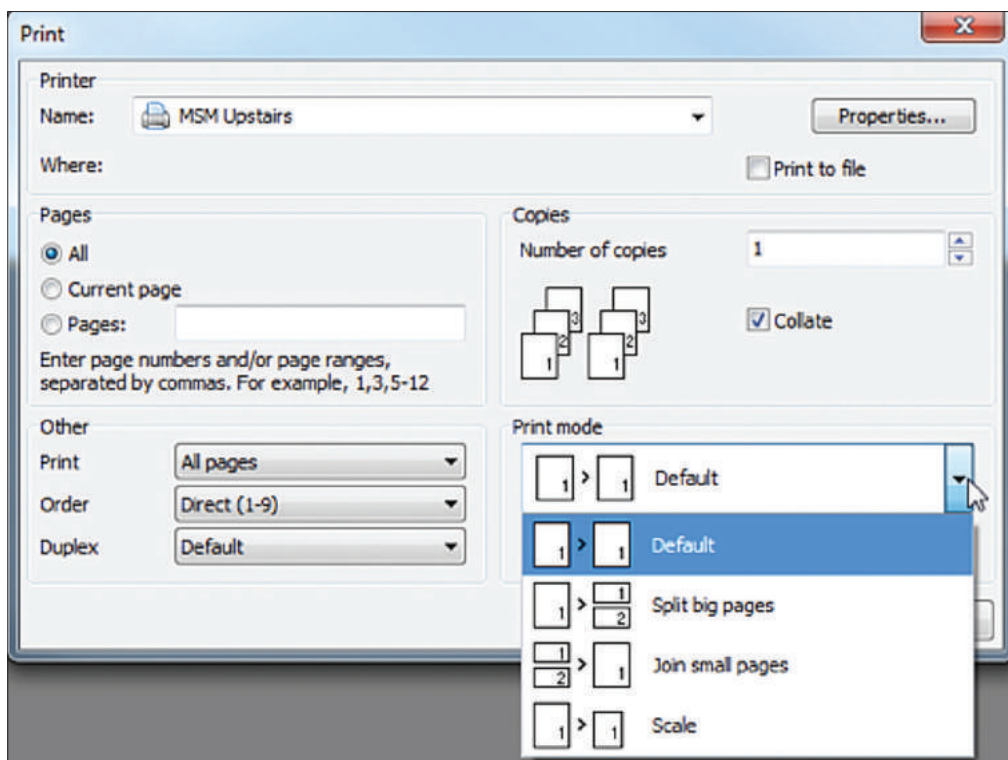


Figure 60. A screen shot demonstrating the options to select when printing the reports produced by the FastReport report generator.

5.9.8 Copy an assessment

Copying an assessment is a very useful function when you are conducting Cost of the Diet assessments in different areas but with a similar food list, for example, in the same region but in different livelihood zones. The software will only copy the assessment details and the food list, it will not copy any entered data or models.

1. Open the 'Assessments' homepage' and click on the 'Copy' link next to the assessment that needs to be copied as shown in Figure 61.



Figure 61. A screen shot of the 'Assessments' homepage screen showing the blue 'Copy' hyperlink.

2. A pop up screen shown in Figure 62 will appear prompting the user to enter a name for the copied assessment. Enter a name and click 'OK'.

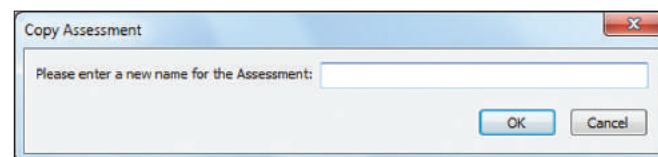


Figure 62. A screen shot of the pop up screen that enables users to change the name of the assessment that is being copied in the Cost of the Diet software.

3. The copied assessment should appear in the 'Assessments' homepage.

5.9.9 Delete an assessment

1. Open the 'Assessments' homepage and click on the 'Delete' link next to the assessment that needs to be deleted as shown in Figure 61 (above). It cannot be recovered.
2. Once confirmed the assessment will be removed from the 'Assessments' homepage.

5.9.10 Export an assessment

The export function enables users to send assessments to other users. This is an important function if there is an error with the software or a calculation is difficult to interpret. This function also copies all of the data, analysis and models from an assessment in contrast to the 'copy' function which only copies the assessment set-up details and the food list.

If a duplicate copy of a full assessment is necessary it is recommended that the assessment is exported and imported, and the name of the duplicate assessment changed to something different in the 'Assessment Setup' screen.

1. From the 'Assessments' homepage click on the assessment that needs exporting. The software will open the 'Assessment Summary' screen.
2. Click on the blue 'Export' hyperlink and save the Cost of the Diet assessment file, which has an extension '.cod'. This file can be sent to other users of the software to import.

5.9.11 Import an assessment

The import function enables users to import assessments sent by other users.

1. Open the software 'Assessments' homepage and click on the 'Import' button in the bottom right hand corner of the screen.
2. Select the Cost of the Diet assessment file (.cod file) to import and click 'open'.
3. The assessment should appear in the 'Assessments' homepage screen.

5.9.12 Access the about screen

1. The about screen can be accessed by double clicking the large Cost of the Diet logo in the top left hand corner of the 'Assessments' homepage screen.
2. The splash screen will appear with text that scrolls through the acknowledgements, details of the software application and underlying databases, important contact information and the licencing agreement.

6.

INTERPRETING THE COST OF THE DIET RESULTS AND GENERATING 'WHAT IF?' MODELS

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This section of the Guidelines describes how practitioners should interpret the following results:

- The differences in cost between the four diets
- The composition of the diets and the foods that provide essential nutrients
- The nutrient specifications that have or haven't been met by the diet
- The seasonal differences in the cost of the diets
- The contribution that each food group makes to the cost of the diet and why
- The affordability of the diets for different wealth groups.

This section will also explain the variety of ways that the Cost of the Diet software could be used to produce 'What if?' models. For information about how a Cost of the Diet report can be structured, please refer to the Cost of the Diet reporting guidelines.

6.1 Interpreting the difference in cost between the standard diets

The Cost of the Diet software estimates the following costs for each of the four standard diets:

- The daily cost of the diet by season for an individual or household
- The average daily cost of the diet for an individual or household
- The average monthly cost of the diet for an individual or household
- The annual cost of the diet for an individual or household
- The cost of the edible daily amount of each food selected by the software
- The cost of the edible weekly amount of each food selected by the software.

Section 2.2 describes how the four diets build upon one another incrementally, refining the nutrient targets that need to be met and placing restrictions on the frequency with which foods are eaten to create a mixture of foods that is more typical of a diet. **The cost of these diets usually increases as additional nutrient targets are set and met, and constraints are imposed on the frequency with which foods are eaten.** For example, the energy only diet should be the least expensive diet because the software only needs to meet the targets for energy. The food habits diet should be the most expensive diet because all nutrient targets need to be met and constraints are imposed on the amounts and frequency with which foods are consumed to create a mixture that is similar to typical food habits in the location of the assessment.

Sometimes the food habits nutritious diet is less expensive than the nutritious diet. In such an instance the software is not usually able to calculate a nutritious diet when typical dietary habits are imposed. **This is an important finding as it suggests that local food habits, influenced by economic poverty, food taboos or food preferences, may affect the inclusion of nutritious foods in the diet.** The focus group discussions and the affordability analysis will provide useful contextual information about why households practice these food habits and should therefore be used to explain the cost results.

6.2 Interpreting the composition of the diets

For each diet the software produces a daily, weekly and annual composition, which includes the quantity of each food selected and the percentage of every micronutrient that each food provides. For example, Figure 63 shows that dried loitta fish is an inexpensive and rich source of protein, vitamin B2, niacin, pantothenic acid, vitamin B12, calcium, iron, magnesium and zinc, and provide the highest proportion of these nutrients in this diet. Lentils have been selected by the software as an inexpensive source of vitamin B1, vitamin B6 and folic acid, and provide most of these nutrients in the diet. The way in which these results have been described can be applied to the weekly and the annual diet composition.

The percentage (%) of each nutrient target provided by the edible portion of foods selected by the software																
Food Name	Energy	Protein	Fat	Vitamin A	Vitamin C	Vitamin B1	Vitamin B2	Niacin	Pantothenic acid	Vitamin B6	Folic acid	Vitamin B12	Calcium	Iron	Magnesium	Zinc
Grains and grain-based products																
Wheat flour (white) (Wheat, flour, local)	2.6	6.5	0.6	0.0	0.0	5.5	2.8	11.0	3.1	4.0	1.4	0.0	0.1	2.2	12.0	7.6
Roots and tubers																
Potato (Potato)	0.5	0.7	0.0	0.0	3.3	1.2	0.2	1.6	1.3	2.7	0.3	0.0	0.0	0.2	1.5	0.5
Legumes, nuts & seeds																
Lentil (Lentil, peeled)	20.5	98.5	3.2	0.4	15.7	60.4	24.2	67.1	51.2	53.0	188.2	0.0	1.8	44.0	72.5	79.5
Motor kolai (dried pea) (Lentil, whole)	4.9	23.7	0.8	0.1	3.8	14.5	5.8	16.1	12.3	12.7	45.2	0.0	0.4	10.6	17.4	19.1
Meat and offal																
Liver, mutton (Liver)	0.1	1.2	0.2	59.8	0.6	0.3	5.7	2.1	2.1	0.7	1.4	90.3	0.0	2.1	0.2	1.7
Fish, seafood, amphibians and invertebrates																
Buchi (dried) (Fish, spottail, whole)	0.8	8.3	0.9	0.0	0.0	0.5	1.2	6.8	1.6	1.6	0.4	27.4	2.7	2.2	3.7	4.1
Loitta (dried) (Fish, dried, fresh water)	25.4	274.7	30.9	0.0	0.0	15.1	39.4	226.0	52.6	52.0	12.5	904.0	89.7	71.7	121.2	135.6
Vegetables and vegetable products																
Amaranth (Leaf, amaranth, raw)	0.8	4.8	0.2	17.5	43.8	1.6	13.0	3.0	1.5	6.6	9.5	0.0	0.8	9.6	21.7	5.1
Leaf, fenugreek (Leaf, fenugreek)	0.6	3.7	0.1	14.8	25.2	2.9	5.9	3.2	1.8	14.5	9.8	0.0	3.5	3.8	11.4	2.2
Oils and fats																
Mutton fat (Fat, mutton)	26.0	0.0	125.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sugars and confectionary																
Sugar, refined (Sugar, refined)	15.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0
Breast Milk																
(Breast milk)	2.7	2.7	7.1	7.5	8.0	1.8	2.8	2.8	3.4	0.7	2.1	4.1	0.8	0.0	1.7	1.7
Total	100.0	424.8	169.5	100.0	100.4	103.6	102.6	339.8	131.1	148.3	270.6	1,025.7	100.0	146.6	263.2	257.2

Figure 63. An example of the diet composition table produced by the daily or weekly reports showing the foods selected by the software for a diet and the percentage nutrients that are provided by each food.

These results provide important information regarding locally available, inexpensive foods that are rich sources of essential micronutrients. This information could be important for nutrition advocacy, as well as to design nutrition, food security and social protection programmes that aim to improve the quality of local diets.

6.3 Interpreting the nutrient targets that have or haven't been met

The aim of the software analysis is to meet the energy and nutrient targets, depending on the diet specified, using the foods on the food list at the lowest possible cost with the specified portion size and food frequency constraints. The nutrients targets that should be met for each diet are explained in more detail in section 2.2 but are summarised below:

- Energy only diet – energy targets met only;
- Macronutrient diet – energy, fat and protein targets met only;

- Nutritious diet – energy, fat and protein and micronutrients targets met without food frequency constraints;
- Food habits nutritious diet – energy, fat and protein targets and micronutrients targets met with food frequency constraints.

On opening the cost results summary screen in the software the cost cell will show a red background if nutrient specifications have been met by less than 99.9%, as shown in Figure 64 below.

Sometimes the software can only meet specifications for nutrient by 100%, as shown in Figure 65 below. In this instance the software has found a solution but the nutrients whose specification have been met only by 100% (vitamin A, pantothenic acid, folic acid and calcium) are the hardest for the software to meet using locally available foods.

	Season 1 (90 Days)			Season 2 (183 Days)		
	Daily Cost	No. of Foods	Food Groups	Daily Cost	No. of Foods	Food Groups
I x Child (either sex) 12-23 months	47.06	7	7	47.06	7	7
I x Child (either sex) 9-10 years	110.61	7	5	110.61	7	5
I x Child (either sex) 11-12 years	153.25	6	5	153.25	6	5
I x Man, 30-59y, 50 kg, moderately active	148.81	7	5	148.81	7	5
I x Woman, 30-59y, 45 kg, moderately active (I x Lactation, 7-12 months)	1,168.89	9	3	1,168.89	9	3
I x Woman, >60y, 45 kg, moderately active	151.26	6	5	151.26	6	5
Total	1,779.88	18	10	1,779.88	18	10

Figure 64. A screen shot of the 'Cost results' summary screen showing how the Cost of the Diet software flags the cost cells with a red background when nutrient specifications have not been met by 100% for an individual or a household.

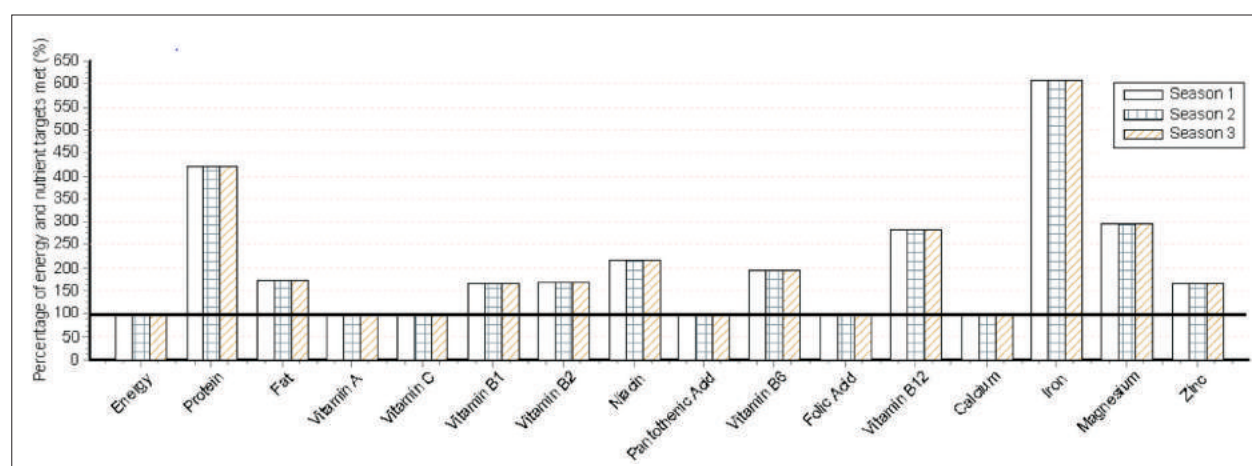


Figure 65. An example of the 'Percentage nutrient specifications' graph which shows the percentage of the nutrients that have been met for a diet calculated by the Cost of the Diet software.

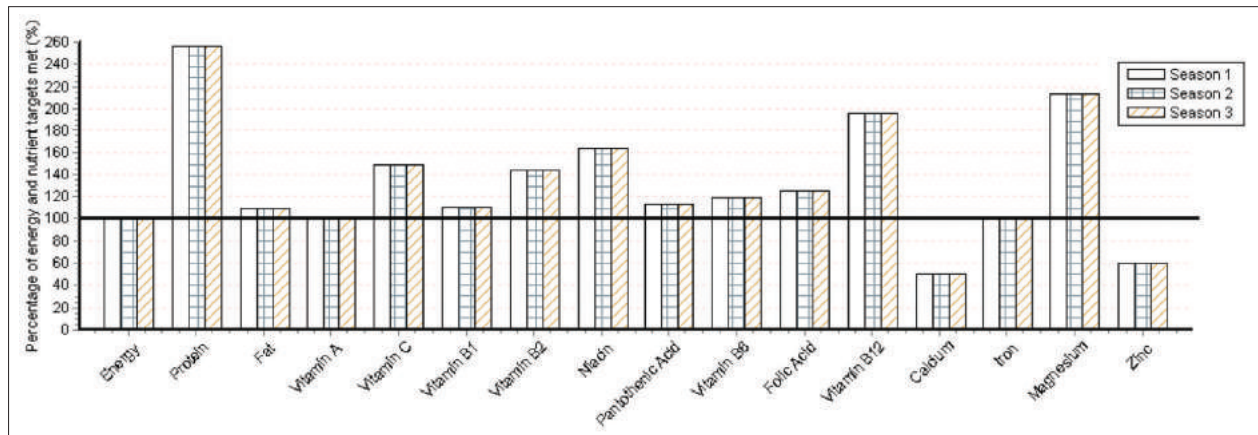


Figure 66. An example of the 'Percentage nutrient specifications' graph, which shows when nutrients have not been met by 100% for a diet calculated by the Cost of the Diet software.

Sometimes the software cannot calculate a diet that meets one or more nutrient specification targets, as shown in Figure 66.

In this instance the specifications for calcium and zinc have not been met for the child aged 6-8 months. There are three possible reasons for this:

- There are not foods available in the market to provide these nutrients in sufficient quantities;
- Typical dietary habits influenced by economic poverty, food taboos or food preferences restrict the amounts of foods containing these nutrients to be included in the diet;
- A combination of both availability and typical dietary habits;
- The upper limit for energy or one or more specific nutrients has been met before all the nutrient specifications can be met.

If food availability is the problem the specification for a particular nutrient would not be met by 100% in the nutritious diet. In this diet, there are no food frequency restrictions: the software is allowed to include any combination of foods for up to three meals a day. If nutrient targets cannot be met by this diet, then there are not enough foods containing these nutrients available in the assessment area.

If the target for a particular nutrient is met by 100% or more in the nutritious diet but is met by less than 100% in the food habits diet, then this indicates that typical dietary habits are restricting the amount of foods that contain this nutrient that the software can include. The reason for this could be because of general food preferences or food taboos, which have been identified during the focus group discussions, or because households cannot afford to buy the foods, which will be identified in the affordability analysis.

If both availability and typical dietary habits are issues, the targets for a nutrient will not be met in either the nutritious or food habits diet. If an upper limit for energy or a nutrient has been met, the software will flag the nutrient with a yellow boarder in the daily or weekly report.

Once the reason has been identified, potential interventions that aim to increase the consumption of foods that contain the limiting nutrient should be recommended. Such an intervention could be modelled using the Cost of the Diet software, as explained in section 6.7.

6.4 Interpreting the seasonal fluctuations in the cost of the food habits diet

The cost of the diet software can analyse the daily cost of the four standard diets for up to six seasons or periods in a year. This seasonal cost data can provide useful information about the times of the year when households may be most vulnerable to high food prices. **This is especially important for households who rely on the market to meet of their needs for food.** This information is important to inform nutrition advocacy, to understand the local context of a programme, and to inform the timing of social protection interventions such as food vouchers or cash transfers.

The seasonal cost results should be compared with a seasonal calendar for the assessment area, if available, to see if the periods when the cost of the diet is highest and lowest coincide with the lean and harvest seasons.

The Cost of the Diet software can produce a graph to show the daily cost of the food habits diet by season. Ideally, this graph should show realistic changes in the cost of the diet over the year, perhaps with the highest and lowest costs coinciding with the harvest and lean period. This is demonstrated in Figure 67.

Sometimes the price per season does not vary significantly, as shown in Figure 68.

In this instance there might not be a large seasonal variation in the price of foods in the assessment area, so these results are to be expected. However, if the variation is unexpected and retrospective market survey data have been collected, these results could indicate that the data are of poor quality perhaps because the recall of prices by traders was poor.

Sometimes the seasonal fluctuations may not make sense when compared with the seasonal calendar. For example the harvest period might be when the cost of the diet is highest as opposed to the lowest, which is normally the case. Again if retrospective market survey data have been collected it is likely that the quality of data may be poor.

It is important to note that these results only capture changes in food prices by season: they do not capture changes in income or expenditure and subsequent affordability. These factors must be taken into consideration when considering the affordability of a nutritious diet by season.

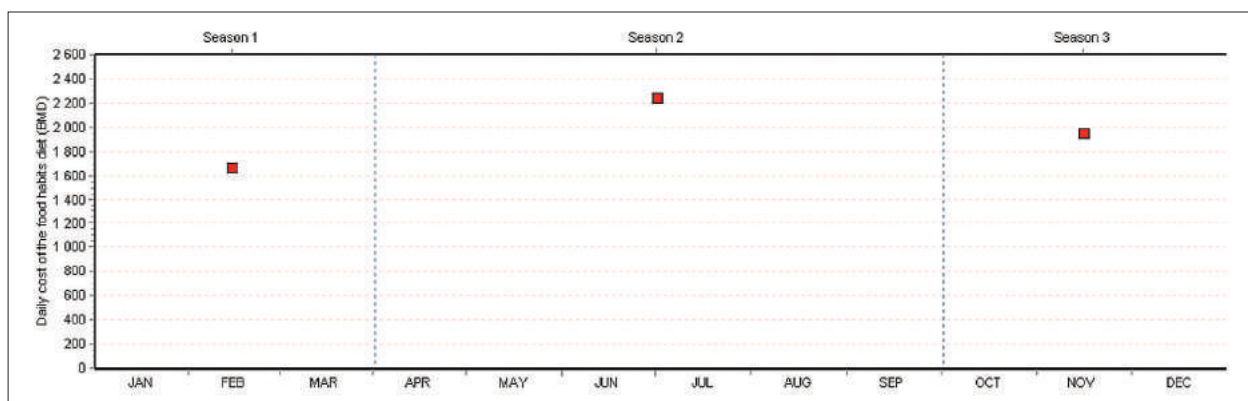


Figure 67. An example of the 'Seasonal daily cost' graph showing large differences in the cost of a food habits diet by season.

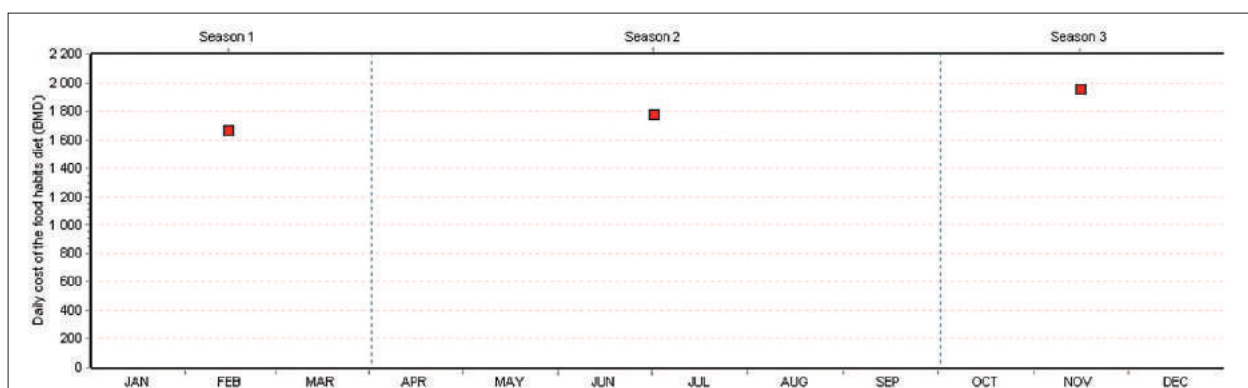


Figure 68. An example of the 'Seasonal daily cost' graph showing small differences in the cost of a food habits diet by season.

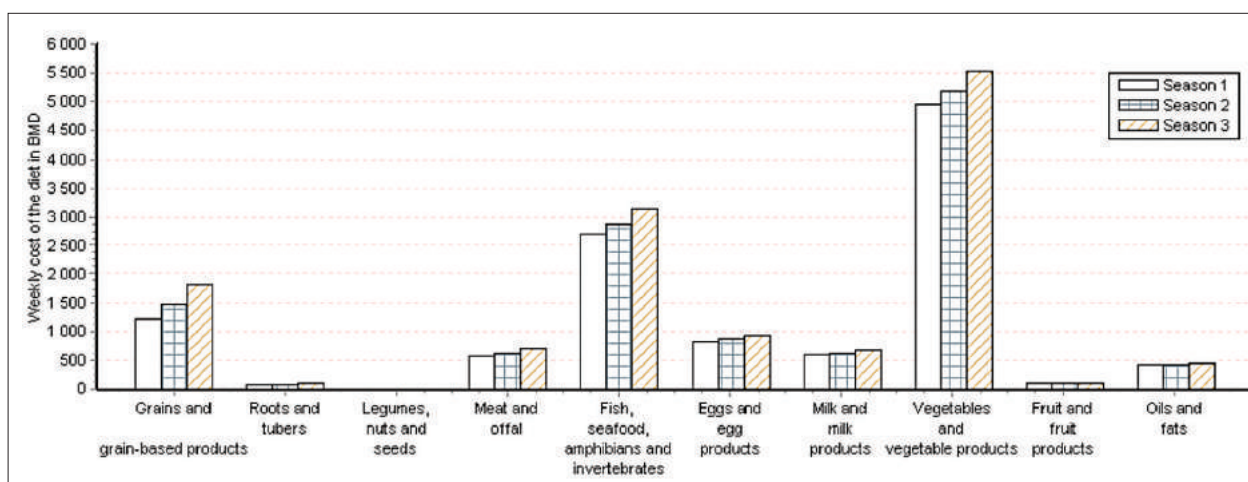


Figure 69. An example of the 'Weekly food group cost' graph for a food habits diet calculated by the Cost of the Diet software.

6.5 Interpreting the cost contribution that the food groups make to the food habits diet

Identifying the food groups that contribute the most to the cost of a food habits diet is another useful way of emphasising the cost, nutrient targets and composition results for this diet. A food group that is contributing the most to the cost of the food habits diet is likely to be the main (and least expensive) source of a nutrient whose target has been met by 100% or less. Interpreting these results should therefore be done with the diet composition data.

For example, Figure 69 shows that vegetable products and fish were contributing the most to the cost of the food

habits diet. This is because vegetables provided the majority of vitamin A, vitamin C, folic acid and iron whilst dried and fresh fish provided an important source of vitamin B12, calcium and zinc. To meet the targets for these nutrients, these foods were included in the diet in large quantities and therefore contribute the most to the cost of the food habits diet.

This information could be used for nutrition advocacy and the design of nutrition and food security programmes which aim to improve the availability and economic access of nutritious foods for poor households or vulnerable individuals.

6.6 Interpreting the affordability analysis

The Cost of the Diet software estimates the affordability of the energy only diet, nutritious diet, food habits diet and essential non-food expenditure by comparing these data with the annual income figure. It can do this for an unlimited number of wealth groups provided there are data, but normally a Cost of the Diet assessment will estimate the affordability for very poor, poor, middle and better off wealth groups. This analysis enables the user to estimate the following:

- The affordability of the diets and non-food expenditure by wealth group;
- The percentage of households that are likely to be most in need of economic support (if data on the percentage breakdown of the assessment area's population by wealth group is available) and;
- The size of the gap between how much income a household is likely to have and the money they would need to purchase the diets and essential non-food expenditure.

The software expresses the cost of the three diets and non-food expenditure as a percentage of income and displays this as a bar chart, an example of which is shown in Figure 70.

The results in Figure 70 show that the middle and better-off wealth groups can afford a nutritious diet plus expenditure on non-food items such as healthcare, clothes, schooling and soap. However, very poor and poor households cannot. The affordability gap expressed as a percentage of income is 65% and 25% for very poor and poor households respectively. The additional amount of money that very poor and poor households require a year to be able to afford a nutritious diet plus non-food items is approximately 74,960 BDT and 50,330 BDT respectively.

This information could be used for nutrition advocacy and to influence the design of social protection programmes which aim to increase income and therefore economic access to nutritious foods for those households who cannot currently afford both a nutritious diet and essential non-food items.

However, there are limitations to assessing affordability:

- Total income does not represent the actual income that can be spent on the diet by the household;
- The proportion of household income that should be spent on food will differ according to the costs of essential non-food specifications.

6.7 Generating 'What if?' models

As mentioned in section 5.8, the Cost of the Diet software has substantial adaptability to enable users to change the following:

- Add or delete foods and/or supplements from the diet
- Create new foods and/or supplements and add them to the diet
- Change the selection of individuals or groups to create households
- Change the energy and nutrient specifications for specific individuals or groups
- Add or delete wealth groups, change their definition, and their annual income and annual non-food expenditure
- Change the food group maximum constraints
- Change the price per 100g of foods
- Change the standard portion sizes for foods
- Change the minimum and maximum food frequency constraints for foods

The details of how to change these parameters can be found in the software Guidelines in section 5.8. It is recommended that 'what if?' modelling is done using the food habits diet. These changes may have the following impact:

- Decrease or increase the cost of the diet
- Improve or worsen the quality of the diet
- Improve or worsen the dietary diversity of the diet
- Improve or worsen the affordability of the diet

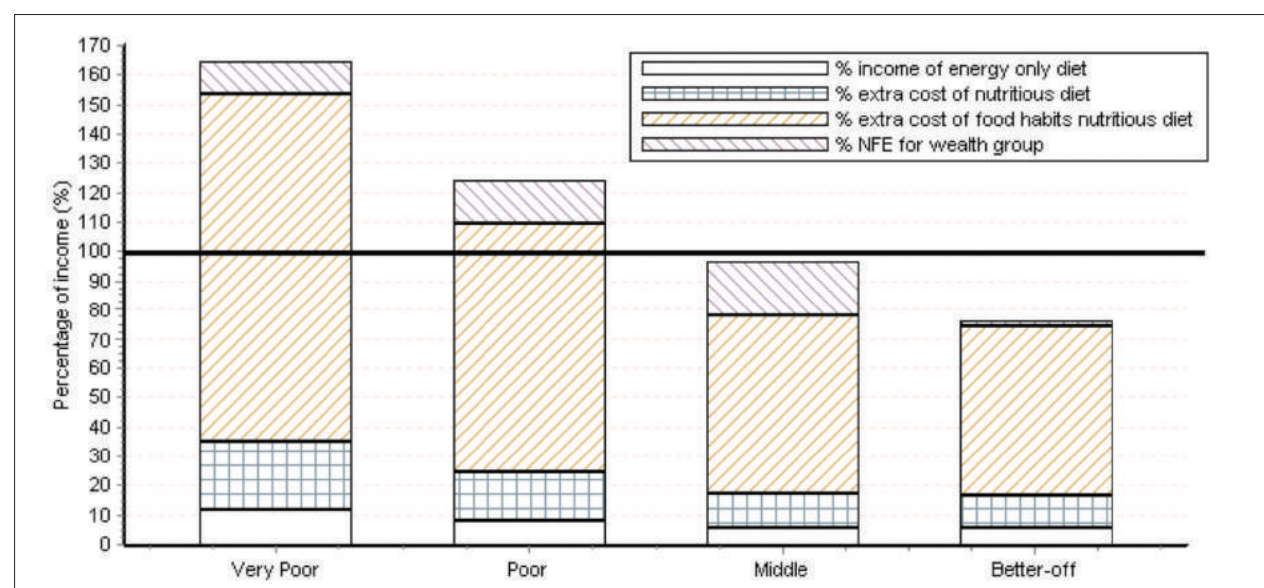


Figure 70. An example of the 'Diet affordability' graph for four wealth groups produced by the Cost of the Diet software.

Changing these parameters can enable users to model the following:

- The potential effect of new or existing nutrition interventions on the cost, quality, composition and affordability of a nutritious diet for specific individuals or the household as a whole;
- The potential effect of new or existing food security interventions on the cost, quality, composition and affordability of a nutritious diet for specific individuals or the household as a whole;
- The potential effect of new or existing social protection interventions on the cost, quality, composition and affordability of a nutritious diet for specific individuals or the household as a whole;
- The potential effect of changing the nutrient specifications for specific individuals or households on the cost, quality, composition and affordability of a nutritious diet;
- The potential effect of a sudden shock on the cost, quality, composition and affordability of a nutritious diet.
- The potential effect of current infant and young child feeding practices on the cost, quality, composition and affordability of a nutritious diet.

6.8 Interventions that improve the affordability of the diet

The following programme interventions could improve the affordability of a nutritious diet by increasing the income of an individual or household:

- Cash for work
- Cash transfers
- Food vouchers
- Livestock rearing
- Kitchen gardening or small holdings.

When modelling these interventions it is important to consider the following questions:

- Who is the target group? E.g. those who cannot afford a nutritious diet
- What is being sold or given? E.g. eggs, milk, meat, firewood, coal, cash
- How much is the product being sold for or how much cash is being given? E.g. 3 kg meat per week, 5 USD per household a month
- How long is the intervention going to last for and when? E.g. 3 months over the hungry season.

6.8.1 How to model cash for work, cash transfer and food voucher interventions

For interventions that involve cash for work, cash transfers or food vouchers, if the amount of money that will be given per household or individual is known then this can be added to the wealth group's annual income figure as described in section 5.8.4.3. The affordability report can be run to see what impact this additional income has on improving the affordability of a nutritious diet and non-food expenditure. If the amount of cash is not known, the affordability analysis could be used to inform the size of the transfer, based upon the affordability gap.

Alternatively, if the money is to be used to improve nutrition outcomes, the nutrient specifications settings could be changed (as described in section 5.8.4.4) to decide how much money households or individuals would need to buy a certain percentage of their recommended nutrient intake using local foods e.g. 50% of energy and 80% of micronutrients. Once these settings are changed, the food habits diet could be run again to calculate the daily cost of the diet for the specified individuals or households to meet these targets using local foods.

It may be recommended that the foods purchasable using a voucher are foods identified by the Cost of the Diet software as the least expensive sources of essential micronutrients.

6.8.2 How to model livestock, fishing or kitchen garden interventions as an income generating activity

If the Cost of the Diet software results show a need to increase the availability of animal or vegetable foods in the diet, a livestock, fishing or kitchen garden intervention in which households rear animals or grow foods could be recommended, depending on the local context. Livestock, fishing and kitchen garden interventions could potentially have a dual impact if enough of the food was produced to enable some to be sold to generate income and some to be consumed by the household. This section describes how to model the impact of these interventions on the affordability of a nutritious diet.

Once the questions outlined in section 6.8 have been answered, the amount of money produced by the intervention can be added to the annual income of the target wealth groups.

For example it could be assumed that a poultry intervention will enable the beneficiaries to sell 21 eggs a week for 45 weeks in a year. To calculate the additional income that this could generate, the average price of an egg (from the market survey) should be multiplied by 21 to give a weekly income. This figure should then be multiplied by 45 to give the potential annual income. This overall figure should then be added to the income of the wealth groups that the intervention targets as described in section 5.8.4.3.

6.9 Interventions that improve the quality and lower the cost of the diet

The following programme interventions could improve the quality and lower the cost of a nutritious diet by increasing the availability of a food or nutrient in the diet:

- Livestock rearing
- Kitchen garden or small holdings
- Food voucher
- Fortified food distribution
- Supplement distribution

The following sections explain how to model these interventions.

6.9.1 How to model the impact of livestock, fishing, kitchen garden and food voucher intervention on the cost and quality of a nutritious diet

It is possible to model the impact of consuming a proportion of the products from a livestock, fishing or kitchen garden intervention and the impact of consuming the foods purchased with a food commodity voucher on the cost, quality and composition of a nutritious diet using the Cost of the Diet software. When developing these models it is useful to consider the following questions:

- Who is the target group, households and/or individuals? E.g. those who cannot afford a nutritious diet or whose nutrient specifications cannot be met to 100%.
- What foods does the intervention include? E.g. those included in the nutritious diet by the software.
- How many times a week will the household or specified individuals eat the food resulting from the intervention.
- What seasons will the foods be available to eat? This information can be taken from the market survey results.

To model this in the software, the foods identified would need to be added to the food list (even if they are all already there) at no or '0' cost (section 5.8.4.1 and 5.8.5.1) to specify that these would be free as a result of the intervention. Alternatively a cost can be entered if the model takes into account the cost of any inputs. The portion sizes for each individual in the household during the specified seasons would need to be set for these foods (section 5.8.5.2). Finally the minimum and maximum constraints would need to be set to reflect the number of times that the food is to be consumed each week during each season (section 5.8.5.3). A food habits nutritious diet can then be calculated by the software, which will include a portion of these foods at zero cost.

If the methods described in this section and section 6.8.2 were combined the results would show the impact of these interventions on the cost, quality, composition and affordability of a food habits diet.

6.9.2 How to model the impact of intervention to fortify foods or provide supplements on the cost and quality of a nutritious diet

The effect of adding fortified foods or novel supplements to the diet can be examined using the Cost of the Diet software. When developing these models it is useful to consider the following questions:

- Who is the target group? E.g. the household or individuals whose nutrient specifications could not be met by 100% by the software.
- What is the potential deficiency? E.g. what nutrients could not be met to 100% by the software for a nutritious diet?
- What supplement or fortified food would provide these nutrients?
- What is the dosage (portion size) and how often would this be given?

The steps to model the impact of these interventions are the same as outlined in the previous section but if the food or supplement is not included in the food composition table database, it will need to be added to the database using the steps outlined in section 5.5.4.

6.10 Other models that could be modelled using the Cost of the Diet software

This section describes other models using the Cost of the Diet software and the questions that should be considered before doing so:

- Modelling the impact of changing the nutrient settings for individuals or household on the cost, quality, composition and affordability of a nutritious diet.
- Modelling the impact of a shock on the cost, quality, composition and affordability of a nutritious diet.
- Modelling the impact of suboptimal breastfeeding practices on the cost, quality, composition and affordability of a nutritious diet.
- Modelling the impact of a nutrition education or a behavior change communication intervention on the cost, quality, composition and affordability of a nutritious diet

6.10.1 Changing the nutrient settings for households or individuals

The ability to alter the nutrient specifications for individuals or households is a very powerful feature of version 2 of the Cost of the Diet tool. As mentioned in section 2.1.1.1 the specifications for micronutrients are set at the 97.725th percentile of requirements to minimise the risk of deficiency. Analysis suggests that this linearly then exponentially increases the cost of the diet estimated by the software. Lowering the specifications to the 80th percentile may offer a more realistic and achievable cost, diet and affordability estimation, which could be used for programme design.

The specifications for energy, protein and micronutrients (apart from magnesium and pantothenic acid) can be adjusted continuously between the 1st and 99th percentile for all individuals from 12 months of age. It can be set even lower or higher than this but the values are extreme. Alternatively, if the amounts of the nutrients are known, these can be set as the target.

The percentage of energy from fat can be adjusted between 1% and 99% for all individuals from 12 months of age. Alternatively, if the amount of fat is known, this can be set as the target.

The specification for energy can be changed from the 1st to the 99th percentile for children aged less than 12 months. Alternatively, if the amount of energy is known, this can be set as the target.

These functions could be used to:

- Model the impact of an increase in energy after an illness on the cost and composition of the diet.
- Identify the nutrients that are influencing the cost of the diet the most in the assessment area.
- Reduce the micronutrient specifications settings to something more realistic for programme design.

When developing these models it is useful to consider the following questions:

- What nutrients need changing?
- What specification should be set for the nutrients?
- For whom should the specifications be changed?

To change these settings in the software, refer to section 5.8.4.4. The nutrients that influence the cost of the diet the most are likely to be those that the software has met by 100% or less. Incrementally decreasing the specifications for these nutrients and comparing the cost, quality, composition and affordability of the diet could offer an insight into the impact that these nutrients have on the cost.

6.10.2 Modelling the impact of a shock

The modelling function of the Cost of the Diet software could be used to examine the potential impact of a shock on the cost, quality, composition and affordability of a nutritious diet. When developing these models it is useful to consider the following questions:

- What is the shock? E.g. drought, floods
- Who does it affect? E.g. wealth groups, households, individuals
- What is affected by the shock? E.g. food prices, dietary habits, income
- How long does the effect of the shock last?
- What time of year or in what season does the shock occur?

The potential impact of the shock will determine which parameters are changed. For example if income decreases this will be changed in the 'add/edit wealth group screen' (section 5.8.4.3). If food prices increase by 10% for example, the price of the foods in the food list will need

to be changed (section 5.8.5.1). If the staple food is no longer available and dietary habits change, then the food, portion sizes, and minimum and maximum constraints will need to be changed (sections 5.8.4.1, 5.8.5.2 and 5.8.5.3).

6.10.3 Modelling the impact of current infant and young child feeding practices

As described in section 2.1.1.1, there are data on boys, girls and children of either sex aged 1–23 months embedded in the software. It is therefore possible to estimate the potential impact of suboptimal infant and young child feeding practices, such as:

- Not exclusively breastfeeding a child;
- Replacing all or a percentage of breast milk with an alternative such as animal milk, water or milk made using milk powder;
- Excluding foods or certain food groups from the diet;
- Giving infrequent meals.

When developing these models it is useful to consider the following questions:

- What are the current practices? E.g. exclusive breastfeeding for 3 months; giving cow's milk instead of breast milk; infrequent feeding; excluding certain foods or food groups.
- What age of child is affected?

The type of practice will determine the way in which the parameters are changed. For example the portion size for breast milk may need to be changed (section 5.8.5.2) and the portion size and the number of times certain foods or food groups are included in the diet may also need to be changed (sections 5.8.5.2, 5.8.4.5 and 5.8.5.3).

6.10.4 Modelling the impact of a nutrition education or a behaviour change communication intervention

As well as modelling potentially harmful dietary habits the Cost of the Diet software can be used to examine potentially positive changes in the diet as a result of a nutrition education or a behaviour change communication. This could include improving general dietary diversity, specifically including more of a certain food or food group in the diet, or introducing a new food to the diet. When developing these models it is useful to consider the following questions:

- Who is the target for the intervention? E.g. household, individual;
- What foods or food groups are targeted? E.g. those that have been identified as being nutritious by the software but are not consumed by the target group;
- How will the behaviour change?

Depending on the intervention, foods may need to be added to the food list (section 5.8.4.1) their portion size may need to be increased (section 5.8.5.2) and their frequency within the diet might need to be increased (section 5.8.5.3).



7.

HOW TO USE THE COST OF THE DIET RESULTS

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As the previous sections of this guide have demonstrated, a Cost of the Diet assessment produces a large amount of data. The flexibility of the software to change the underlying parameters increases the potential to do interesting analyses, particularly regarding food availability and economic access to nutritious foods. Furthermore, the underlying food and nutrient databases are source of useful information.

Using examples from previous Cost of the Diet assessments undertaken by Save the Children, this section aims to describe how the results of the Cost of the Diet could be used to:

- Inform nutrition, food security, livelihoods and social protection programmes;

- Inform and influence nutrition and food security related policy and advocacy processes and debates at a national and global level;
- As an early warning indicator within food security and nutrition early warning systems.

This is not exhaustive. It is likely that there are other ways that this tool could be used and Save the Children would be interested in learning from the experiences of other practitioners. If you'd like to share them please email cotd@savethechildren.org.uk and they may be included in the bi-annual bulletins on the method.

Figure 71 summarises the ways in which the Cost of the Diet could be used to inform programme design, advocacy and early warning surveillance.

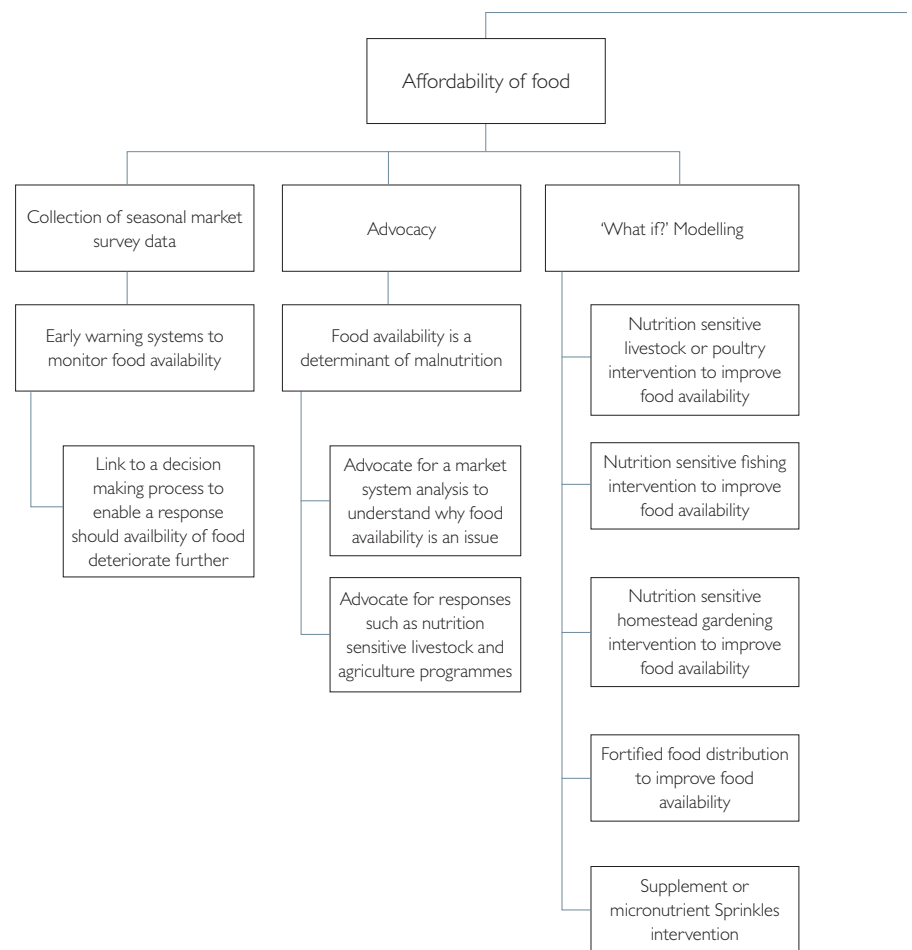



Figure 71. summarises the ways in which the Cost of the Diet could be used to inform programme design, advocacy and early warning surveillance.

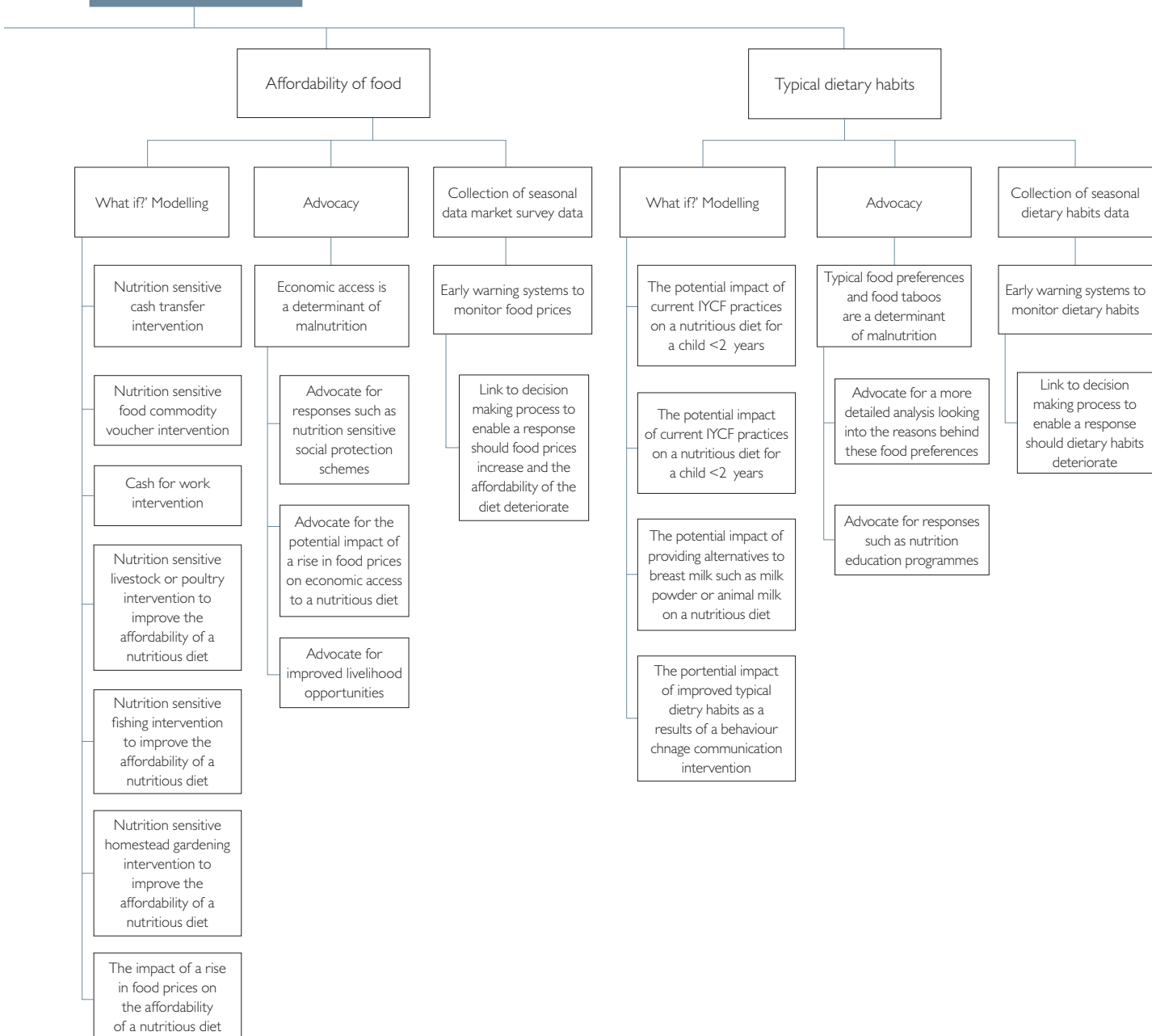
7.1 Using the Cost of the Diet results to inform nutrition, food security, livelihoods and social protection programmes

A Cost of the Diet assessment provides useful contextual information on the potential barriers to consuming a nutritious diet by households in a programme area as well as identifying foods that could provide specific micronutrients if their consumption was increased.

 The ability to model the impact of potential interventions on the cost, quality, composition and affordability of a diet also makes it a useful tool to help with programme design. Section 6 gives some examples of how different interventions could be modelled and describes how the results could be interpreted. A Cost of the Diet assessment could be used to:

- Analyse whether availability, affordability and/or local beliefs are barriers to households consuming a nutritious diet;
- Identify inexpensive nutritious foods;
- Identify nutrients that are the most costly to meet specifications, using local foods;
- Assess which wealth groups may not be able to afford a nutritious diet;
- Identify periods during the year when households are most vulnerable to changes in food prices and therefore the times when interventions may have the biggest impact;

Cost of the Diet assessment findings



- Assess the potential effect of current infant and young child feeding practices, such as not exclusively breast feeding on children under the age of 2 years;
- Assess the potential effect of nutrition interventions on the cost, quality, composition and affordability of a nutritious diet for certain individuals or for a household as a whole;
- Estimate the potential effect of new or existing food security interventions on the cost, quality, composition and affordability of a nutritious diet for certain individuals or a household as a whole;
- Estimate the potential effect of new or existing social protection interventions on the cost, quality, composition and affordability of a nutritious diet for certain individuals or a household as a whole;
- Examine the potential effect of changing the nutrient specifications for households or individuals on the cost, quality, composition and affordability of a nutritious diet;
- Assess the potential effect of a sudden shock on the cost, quality, composition and affordability of a nutritious diet.

The following case-studies provide examples of how Save the Children has used Cost of the Diet assessments to inform nutrition, food security, livelihoods and social protection programmes purposes.

7.1.1 Myanmar 2013: design of a cash for work and maternity cash transfer programme and supportive nutrition education messages

In 2013 Save the Children conducted a Cost of the Diet assessment in three livelihood zones in Myanmar to inform the design of certain elements of a programme in Rakhine state. The programme aims to improve the livelihoods of communities that were badly affected by cyclone Giri. The programme aims to deliver a comprehensive package of mutually-reinforcing interventions to improve nutrition, livelihoods and food security with a focus on the cross-cutting principles of integration, community-based planning, innovation, government engagement, and inclusion.

Using the Cost of the Diet affordability analysis, a decision was made on the amount of money for the cash for work and maternity cash components of the programme, the duration for which the money would be given, and the identity of the target households. The maternity cash transfer in particular aimed to improve the health and nutrition of mothers and their children during the critical window of the first 1,000 days from conception until 24 months of age.

Furthermore, in conjunction with a qualitative investigation of infant and young child feeding practices, behaviour change communication messages were developed which emphasised the importance of breastfeeding as recommended by the WHO, but also to increase the diversity of the diet of children aged 6-23 months and of pregnant and lactating women using the least expensive, most nutritious foods identified during the Cost of the Diet assessment.

7.1.2 Bangladesh 2013: a new, multi-sectoral programme

In 2013 Save the Children conducted a Cost of the Diet assessment in the agricultural plains livelihood zone of Sylhet to help inform the design of a new, five year multi-sectoral project which aims to reduce the incidence of stunting in two districts of Sylhet Division. The programme aims to improve the nutrition of pregnant and lactating mothers and children under two years by nutrition sensitive interventions, by providing opportunities for sustainable food security and livelihoods, and by behaviour change communications for better nutrition practices.

The results of the Cost of the Diet assessment were used in conjunction with an HEA to inform the design of the homestead food production and nutrition education components of the programme. The results will be used to identify the most nutritious foods to grow that are liked by households and to estimate the amount required to make a significant contribution to dietary intake.

The Cost of the Diet results will be used to develop the behaviour change communication strategy to increase the diversity of the diet of children aged 6-23 months and of pregnant and lactating women using the least inexpensive, most nutritious foods identified during the Cost of the Diet assessment.

7.2 Using the Cost of the Diet results to inform advocacy

The results of a Cost of the Diet assessment could be used to strengthen the evidence of the impact of various nutrition and food security issues, for example:

- Highlighting food availability, food taboos, economic access or a combination of both as barriers to households consuming a nutritious diet;
- Inexpensive dietary sources of essential micronutrients;
- The need to increase food availability specific to certain micronutrients;
- The impact of suboptimal breastfeeding practices on the cost and quality of a diet for a child aged 1-24 months;
- Highlighting what periods of the year households maybe the most vulnerable to high food prices;
- The potential impact of current social protection programmes in relation to nutrition outcomes on poor households;
- The need for social protection programmes linked to nutrition and what these could entail;
- The impact of shocks such as food price rises on the cost and affordability of a nutritious diet for poor households.

The results of a Cost of the Diet assessment could be shared in national and international policy debates and meetings to ensure appropriate responses are taken.

Box 8 : Cost of diet analysis in Khulna district

The prevalence of wasting and stunting in Khulna stand at 13% and 33% respectively posing serious public health concern. Four market surveys and dietary pattern surveys and focus group discussions were used as key methods to assess market price, seasonal availability, and consumption patterns of all local foods. A cost of diet analysis carried out during December 2011 – November 2012, helped estimate the cost of three theoretical diets using software for a poor household of four members. Analysis showed that a nutritious diet based upon typical food habits is three times more expensive than a diet that only meets energy requirements and that a nutritious diet is more expensive in urban than rural livelihood zones. Requirements for fat, vitamin B12, pantothenic acid, iron and calcium are difficult to meet and in a nutritious diet, green leafy vegetables, papaya, cow's milk and dried fish contribute to majority of the essential macronutrients for both zones.

Source: Save the Children, UK 2013. A cost of diet analysis in the fish cultivation and urban livelihood zones of Khulna.

Figure 72. The narrative used to describe the Cost of the Diet results in Khulna, Bangladesh in the 2014 monitoring report for the country's National Food Policy Plan of Action and Country Investment Plan.

The results could also be used in coordination with other NGOs, key donors and governments, to raise awareness on the issues listed and to begin to share perspectives on the vulnerability of a country, the impact of these issues and the steps that could be taken to mitigate these issues.

The following case-studies provide examples of how Save the Children has used Cost of the Diet assessments to inform advocacy.

7.2.1. Bangladesh 2012 and 2013: highlighting the potential impact of current social protection programmes on nutrition outcomes

The results of Cost of the Diet assessments in two divisions of Bangladesh, Sylhet and Khulna, showed that the national Maternity and Lactating Women's Allowance of \$4 a month was too small to bridge the affordability gap for a nutritious diet and essential non-food expenditure. The national Vulnerable Group Development rice transfer scheme, which provides poor households with 30 kg of rice a month was shown to have a greater potential impact on the affordability of a nutritious diet, but the rice transfer was monetised in the model and there is no guarantee that the income released by providing rice would be spent on purchasing nutritious food, or that this food would be distributed equitably within the household.

Both of these schemes have the potential to affect the nutritional status of the household but the Cost of the Diet results indicated that this impact might currently be limited. Save the Children International in Bangladesh used these results in a report called 'How can social protection better respond to child poverty in Bangladesh?' which outlined their position on the current social protection systems in Bangladesh as well as inform the development of the National Social Protection Strategy reform process.

7.2.2 Bangladesh 2014: Bangladesh National Food Policy Plan of Action and Country Investment Plan, monitoring report

In 2012 a Cost of the Diet assessment was undertaken in the fish cultivation livelihood zone of Khulna, Bangladesh. The results of this assessment were used in a 2014 monitoring report for the country's National Food Policy Plan of Action and Country Investment Plan, which records the country's progress towards the National Food Policy targets adopted in 2008. The analysis of the Cost of the Diet data was used to offer a practical example of how economic factors shape poor households' food choices and potentially influences nutrient adequacy and nutritional status, as shown in Figure 72.

7.2.3. Myanmar 2013: Advocating for a national maternity cash transfer

As part of a programme in Rakhine State, Save the Children International in Myanmar are doing a randomised controlled trial to estimate the effect of the maternity cash transfer and the behaviour change communication messages on the anthropometric outcomes of infants. If successful, the results will be used to advocate for the scale up of this approach as part of the National Social Protection Policy.

7.2.4. Save the Children UK global report 2012: A high price to pay, the impact of rising and volatile food prices on children's nutrition and food security

In 2012 Save the Children published a report summarising the impact that rising and volatile food prices have on nutrition and food security for vulnerable households. The report produced a series of recommendations to developing country governments, G20 governments and the European Union to address this impact. The results of five Cost of the Diet studies in Kenya, Rwanda, Nigeria and Pakistan were summarised as shown in Figure 73 and used to emphasise the affordability gap between incomes and the cost of a food habits diet in the different locations.

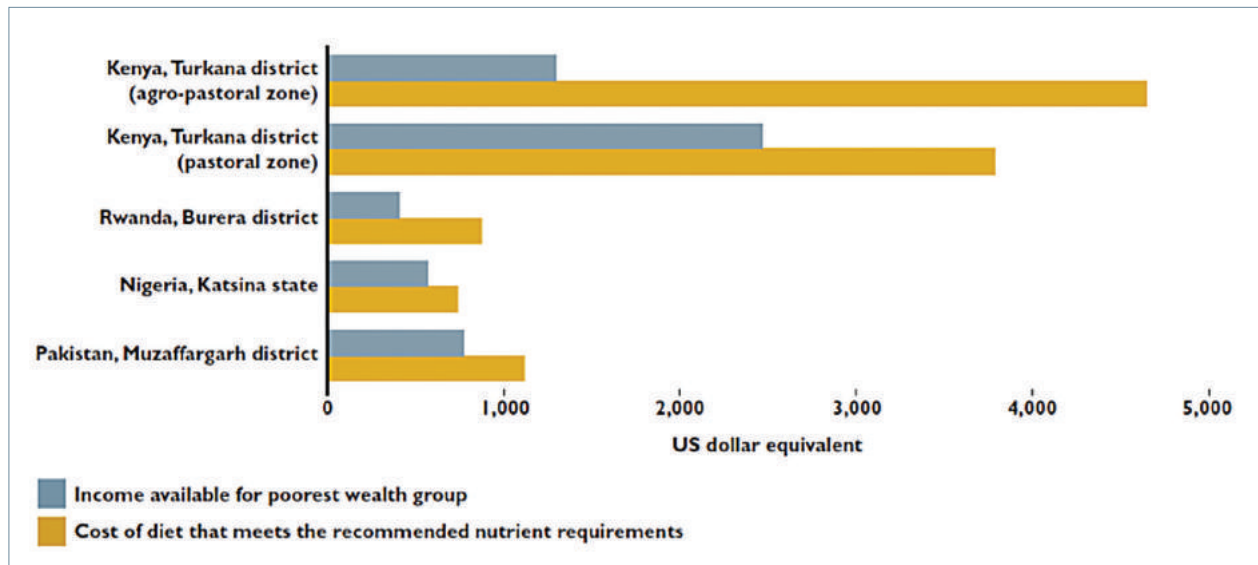


Figure 73. The figure summarising the results of five Cost of the Diet studies, used in the 'A high price to pay' report by Save the Children UK.

7.3 Using the Cost of the Diet tool as an early warning indicator within food security and nutrition early warning systems

Monthly or seasonal market surveys could be used to monitor changes in the cost of a nutritious diet for a typical household over time. To improve the ease and speed of data collection, the original food list needs to be modified so that only data are collected on the key foods consumed by the household and identified by the software.

At this time, Save the Children are currently collecting regular market survey data in Rakhine State in Myanmar but have yet to collect these data for a long enough period of time to look at trends over time.

ANNEXES



Save the Children UK

Linear Optimisation Equations for the Cost of the Diet Software

Allieri, T and Deptford, A

October 2014

1 Introduction

The Cost of the Diet tool is a method and bespoke software developed by Save the Children UK to estimate the amount and combination of local foods that are needed to provide individuals or a family with foods to meet their average needs for energy and their recommended intakes of protein, fat and micronutrients. The method was developed as a response to research undertaken by Save the Children which demonstrated that the impact of traditional nutrition education programmes may be limited because of the economic constraints facing many households in low income countries.

The price and seasonal availability of all foods found in local markets in a specified livelihood, ecological or agricultural zone¹ are collected by a market survey of local traders. Interviews and focus group discussions are held with local women to understand typical dietary habits and the typical household size. This information is entered into the Cost of the Diet software which applies linear programming² routines generated by an open access linear programming solver³ to create a hypothetical mixture of locally available foods that meet recommended energy and nutrient requirements whilst minimising the cost of the diet.

The software can calculate the lowest cost of four standard, theoretical diets :

- A diet that meets only recommended average energy requirements, called an energy only diet ;
- A diet that meets recommended intakes for energy, protein and fat, called a macro-nutrient diet ;
- A diet that meets recommended intakes for energy, protein, fat and 11 micronutrients, called a nutritious diet ;
- A diet that meets recommended intakes for energy, protein, fat and 11 micronutrients based upon typical dietary habits of households in the assessment site, called a food habits nutritious diet.

Two standard databases and three sets of locally specific data form the basis of the calculation. The first standard database is a food composition table which contains nutrient data on 3,580 foods and supplements derived from four main food tables : the Worldfood Dietary Assessment System published by the Food and Agriculture Organization (FAO) which

1. An area within which people share broadly the same pattern of livelihood or the ecosystem and agricultural environment is broadly homogenous.

2. A mathematical technique used for maximising or minimising a linear function of several variables, such as output or cost.

3. lp solve version 5.5.2.0

contains data on foods from six countries Egypt, Kenya, India, Indonesia, Mexico and Senegal; a table of foods published by the United States Department of Agriculture (USDA); a table of foods from West Africa; and a table of foods from Bangladesh published by the University of Dhaka. The foods are categorised into one of by one of fifteen food groups.

The second standard database contains the World Health Organization's (WHO) recommended average intake of energy and the recommended intake of micronutrients for 237 individuals : for girls, boys and children either sex aged between 1-6 months; aged 6-8, 9-11 and 12-23 months; by year of age for children between 2-18 years; for men aged 18-29, 30-59 or 60+ years with a body weight of between 50 and 90kg for three levels of physical activity (light moderate and vigorous); and for women aged 18-29, 30-59 or 60+ years with a body weight of between 45 and 85kg for three levels of physical activity (light moderate and vigorous). There are also data for the additional energy and nutrients specified by the WHO for three stages each of pregnancy or lactation.

Using these two databases, the programme determines the least expensive diet when provided with :

- The price of locally available foods per 100g;
- The specification of individuals or household members for whom the diet is required;
- The maximum amount of each food that each individual can consume in order for the amounts recommended by the programme to remain realistic specified as portion sizes in grams/meal
- The minimum and maximum number of times a food item may be consumed per week

The programme applies the following assumptions :

- The energy provided by the diet must meet, but not exceed, the total energy requirements of the specified individual. For instance, if an average child aged 12-23 months requires 894 kcals of energy a day, the solver will identify a diet providing 894 kcals.
- The nutrient content of the diet must not be less than the nutrient specifications for each individual. For example, if a given child aged 9-11 months requires 54.0 mg of magnesium and 4.1 mg of zinc, then the solver will aim to meet these amounts from the diet.
- The solver should not exceed the upper limits specified for energy, vitamin A, vitamin C, niacin, calcium and iron for each given individual. This will prevent a diet being generated that could lead to an excess of energy or these nutrients.
- The amount and frequency with which different foods can be selected must fall between specified minimum and maximum value based upon portion size data and consumption frequency.
- The overall quantity of food included in the diet for a specified individual must not exceed a total weight.

2 Overview of the Linear Programming model

Linear programming in this context is a mathematical optimisation tool which uses an objective function to minimise the cost of a diet whilst satisfying the following constraints for :

- Energy
- Nutrients
- Portion sizes (the amount of each food that can be included in the diet)

- Food frequency (the number of times a food and food groups can be included in the diet per week)
- Total food weight (the total quantity in grams of food that can be included in the diet for an individual)

The programme will either establish a feasible solution, which means that all the linear constraints listed above are adhered to, or an un-feasible solution which means that a solution which respects all of these constraints does not exist and the closest values are presented.

The equations for the cost optimisation and the five constraints listed above are described in detail in the sections to follow. For all following mathematical equations :

- X_{ij} represents the weight (in grams) of food item 'i' in food group 'j'.
- The mathematical symbol $\sum_{i=1}^r$ is the sum of all items across all subscript 'i' from 1 to r.
For example, $\sum_{i=1}^3 A_i = A_1 + A_2 + A_3$.
- The mathematical symbol $\sum_{i=1}^r \sum_{j=1}^n$ represents the sum over all subscript 'j' from 1 to n and all subscript 'i' from 1 to r.

For example : $\sum_{i=1}^2 \sum_{j=1}^3 A_{ij} = \sum_{i=1}^2 A_{i1} + A_{i2} + A_{i3} = \overbrace{A_{11} + A_{12} + A_{13}}^{i=1} + \overbrace{A_{21} + A_{22} + A_{23}}^{i=2}$.
Swapping the \sum places does not affect the final answer.

- For X_{ij} defined as above, $\sum_{i=1}^r \sum_{j=1}^n X_{ij}$ represents the sum of all weights of all food items 'i' over all food groups 'j'.

2.1 Cost Optimisation

The most important function of the linear programming routine is to minimise the total cost of the diet for each individual or household members. The mathematical formula for this function is :

$$\sum_{i=1}^{r_j} \sum_{j=1}^n X_{ij} \times \text{cost}_{ij}$$

where :

- cost_{ij} is the cost of food item 'i' in food group 'j'.

The solver is set to minimise the above expression, which represents the sum of cost for the corresponding amount of each food.

2.2 Energy constraints

The energy constraints are used to select locally available foods for a diet that provides the WHO estimated average requirements for energy per day, for each specified individual. The software should not create a diet that exceeds or falls below this requirement. The mathematical formula for this function is :

$$\sum_{i=1}^{r_j} \sum_{j=1}^n X_{ij} \times \text{energy}_{ij} = \text{denenergy}$$

where

- denenergy is the desired total dietary energy content.

- ii) energy_{ij} is the energy content of food item 'i' in food group 'j'.

2.3 Nutritional constraints

The nutritional constraints are used to select locally available foods for a diet that provides the recommended intake of protein, fat and 13 micronutrients specified by the WHO. These specifications are described as 'desired' nutrient requirements. The software is allowed to exceed these requirements if necessary but it should not exceed the specific upper limits imposed for vitamin A, niacin, vitamin C, calcium and iron. The mathematical formulae for the constraints are :

$$\sum_{i=1}^{r_j} \sum_{j=1}^n X_{ij} \times \text{nut}_{ijn} \geq \text{dnut}_n \quad n \in N$$

$$\sum_{i=1}^{r_j} \sum_{j=1}^n X_{ij} \times \text{nut}_{ijn} \leq \text{unut}_n \quad n \in N$$

where :

- i) N is the set of nutrients we are interested in.
- ii) $n \in N$ is the nutrient 'n' within the set of nutrients ' N '.
- iii) dnut_n is the desired nutrient requirement for all nutrients 'n' of interest in N .
- iv) unut_n is the upper limit for nutrient requirement for all nutrients 'n' of interest in N .
- v) nut_{ijn} is the nutrient 'n' content per gram of food item 'i' in food group 'j'.

2.4 Portion size constraints

The amount of any single food that can be consumed at any one meal is limited by applying a portion size. These have been developed to try to create a balance between dietary diversity and moderate amounts of food and are based on a recommended maximum energy intake of 50 percent from carbohydrate foods, 30 percent from fats, 10 percent from fruit and vegetables and 10 percent from protein foods. A 'standard' portion size has been calculated for each food based upon the above criteria for a child aged 1-3 years. This weight of food is then multiplied by a factor that is calculated by dividing 2 standard deviations above the average energy requirement for a given individual by the average energy requirement of the child aged 1-3 years :

$$\text{Portion size scaling factor} = \frac{\text{Mean} + 2 \text{ SD energy requirement of individual}}{\text{Mean energy requirement of child 1-3 years}}$$

$$\text{Portion size for individuals (g)} = \text{Portion size for 1-3 y child} \times \text{scaling factor}$$

2.5 Food frequency constraints

The number of times per week a portion of food can be included in a diet is limited by applying minimum and maximum food frequency constraints. For example, if the minimum constraint for chicken egg is set at 7 and the maximum is set at 14 this means that the software must include chicken egg in the diet no less than 7 times a week (once a day) but no more than 14 times a week (twice a day).

Using these constraints and the portion size (g/meal) information for a food, the software calculates the minimum and maximum weekly amount of each food (in grams) which can be selected for a diet by multiplying the portion size by the weekly frequency :

Maximum weekly amount (g) = average portion size (g) × frequency eaten per week

The mathematical formulae for the constraints are :

$$\begin{aligned} X_{ij} &\geq \min_{ij} & i = 1, 2, \dots, r_j & j = 1, 2, \dots, n \\ X_{ij} &\leq \max_{ij} & i = 1, 2, \dots, r_j & j = 1, 2, \dots, n \end{aligned}$$

where :

- i) \min_{ij} is the minimum portion size of food item 'i' in food group 'j'.
- ii) \max_{ij} is the maximum portion size of food item 'i' in food group 'j'.

2.6 Food group frequency constraints

The number of times per week a food from any given food group can be included in the diet is limited by applying a maximum food group constraint. This enables the user to adjust the frequency with which each food group can be consumed in a week. For all diets the maximum frequency is set at a default value of 105 times per week for all food groups. This gives the software the option to include up to 5 foods from a food group for 3 meals a day, 7 days a week. The mathematical formula for this function is :

$$\sum_{j \in S(s)} \sum_{i=1}^{r_j} \frac{X_{ij}}{av_{ij}} \leq fgmax_s$$

where :

- i) av_{ij} is the weight (in grams) of an average portion size of the specified food item 'i' in food group 'j'.
- ii) $S(s)$ is the food group 's' within the set of food groups S .
- iii) $fgmax_s$ is the maximum number of servings in the food group 's'.

2.7 Total food weight constraint

The total quantity of food (in grams) that the software can include in a diet is limited by applying a total food weight constraint. To calculate this weight an upper limit has been based on the amount of food required to provide energy that is two standard deviations above the average energy requirement for each individual specified in the software, divided by the value for a low energy density diet which is 1 Kcal/g :

$$TFW = \frac{2 \text{ SD above energy requirement of individual}}{1 \text{ Kcal/g}}$$

The mathematical formula for this constraint is :

$$\sum_{i=1}^{r_j} \sum_{j=1}^n X_{ij} \leq TFW$$

where 'TFW' is the total food weight.

3 Conclusion

This documents aims to summarise the calculations that the Cost of the Diet software does, when estimating the cost, quality and composition of a diet. A major new development in version 2 of the Cost of the Diet method and software is the ability to change with ease the underlying constraints discussed in this document. This will enable users to generate What if? models to estimate the potential impact of changing constraints on the cost, composition, quality and affordability of a diet. These results could be used to inform and influence policies and programmes for both nutrition and food security and can contribute to both advocacy and debates at local, national and global levels.

Annex 2. The values of percentiles equivalent to standard deviations and vice versa, which can be applied to investigate the effect of the WHO specifications on the cost of the diet.

Percentile	S.D.	Percentile	S.D.
0.0000286	-5.000	50.0000	0.000
0.0001	-4.753	55.0000	0.126
0.0032	-4.000	60.0000	0.253
0.0100	-3.719	65.0000	0.385
0.1000	-3.090	70.0000	0.524
0.1350	-3.000	75.0000	0.674
1.0000	-2.326	80.0000	0.842
2.0000	-2.054	81.0000	0.878
2.2750	-2.000	82.0000	0.915
3.0000	-1.881	83.0000	0.954
4.0000	-1.751	84.0000	0.994
5.0000	-1.645	84.1345	1.000
6.0000	-1.555	85.0000	1.036
7.0000	-1.476	86.0000	1.080
8.0000	-1.405	87.0000	1.126
9.0000	-1.341	88.0000	1.175
10.0000	-1.282	89.0000	1.227
11.0000	-1.227	90.0000	1.282
12.0000	-1.175	91.0000	1.341
13.0000	-1.126	92.0000	1.405
14.0000	-1.080	93.0000	1.476
15.0000	-1.036	94.0000	1.555
15.8655	-1.000	95.0000	1.645
16.0000	-0.994	96.0000	1.751
17.0000	-0.954	97.0000	1.881
18.0000	-0.915	97.7250	2.000
19.0000	-0.878	98.0000	2.054
20.0000	-0.842	99.0000	2.326
25.0000	-0.674	99.8650	3.000
30.0000	-0.524	99.9000	3.090
35.0000	-0.385	99.9900	3.719
40.0000	-0.253	99.9968	4.000
45.0000	-0.126	99.9999	4.753
50.0000	0.000	99.9999714	5.000

Annex 3. The major and minor classification of food groups in the Cost of the Diet software, with some examples of sub-groups.

Major food group	Minor food group	Food sub-group
Grains and grain-based products	Cereal grains	Barley Buckwheat Fonio Maize Millet Oats Quinoa Rice Rye Semolina Sorghum Spelt Teff Triticale Wheat
	Grain flours Breads Pasta Noodles	
Roots and tubers	Roots	White roots Orange roots
	Tubers	White tubers Orange tubers
Legumes, nuts and seeds	Legumes	Beans and peas Lentils
	Nuts and seeds	Nuts Seeds
Meat and offal	Meat (flesh foods)	Red meat Wild game White meat
	Offal	
Fish, seafood, amphibians and invertebrates	Fish (marine or freshwater) Seafood Amphibians Insects	
Eggs and egg products		

Major food group	Minor food group	Food sub-group
Milk and milk products	Milk Dairy products	Cheese Cream Milk powder Yoghurt
Vegetables and vegetable products	Vitamin A rich vegetables Other vegetables	Yellow or orange vegetables Green leafy vegetables
Fruit and fruit products	Citrus fruits Yellow or orange fruit Other fruit	
Oils and fats	Oils Fats	
Sugars and confectionary	Sugar Honey Confectionary	
Herbs, spices and condiments	Spices Herbs Condiments Flavourings Salt	
Beverages	Tea, coffee and plant extracts Sodas Alcoholic drinks	
Supplements and infant foods	Therapeutic milks Ready to use foods Infant foods Micronutrients	RUTF RUSF Micronutrient powders Fortified foods
Composite dishes		

Annex 4. The bioavailability conversion factors for iron applied to foods groups in the Cost of the Diet software

Food	Percentage absorption	Factor applied to food	Justification/ explanation	Reference
Meat, fish, poultry and eggs	25%	0.25	The average absorption of haem iron from meat containing meals is about 25%. The absorption of haem iron can vary from about 40% during iron deficiency to about 10% during iron repletion.	34
				4
			Regarding including fish and poultry within 'meat': 'In weighing the evidence, the Panel took into account that there is generally good agreement on the enhancing effect of meat or fish on non haem iron absorption and that the studies provided showed that the addition of meat (from beef, pork, lamb or chicken) or fish to a meal enhances the absorption of non haem iron from the diet.'	35
Milk	11.75%	11.75	The percentage of iron availability in adults from cow's milk ranged between 4%, 9%, 19.5% (the midpoint between 4 and 19.5 has therefore been applied)	36
Plant foods	5%	0.05	Unable to find a specific absorption factor: Non-haem iron in cereals, vegetables, fruits, roots, pulses and beans forms the main part of dietary iron. The absorption is very much influenced by the individual iron status	34
			The WHO/FAO recommends 5% bioavailability for iron in a plant based diet, hence why we have used 5%	4
Fats and oils	25% for animal based fats/oils	0.25	The WHO/FAO recommends 5% bioavailability for iron in a plant based diet, hence why we have used 5%	4
	5% food plant based fats/oils	0.05		
Fortificant or supplemental iron	2% for elemental iron	0.02	As recommended by the World Food Programme	
	7% for Fe EDTA, Fe fumarate or Fe sulfate	0.07		
	5% for other iron fortificants or if form unknown	0.05		

Annex 5. The bioavailability conversion factors for calcium applied to foods groups in the Cost of the Diet software

Food	Percentage absorption	Factor applied to food	Justification/ explanation	Reference
Milk	32%	0.32		37
Grains, beans, roots and tubers	24%	0.24	Average of pinto, red and white taken	37
Other fruit and vegetables	48%	0.48	Average of bok choy, broccoli, Chinese cabbage, flower leaves, Chinese mustard greens and kale	37
High oxalate vegetables and fruit	5%	0.05		38
				39
All other foods	32%	0.32	As with the old software, very little research to suggest another option	
Fortificant or supplemental calcium	30%	0.30	As recommended by WFP	

Annex 6. The default portion sizes by food group included in the Cost of the Diet software

Food group	Portion size (g/meal)	Food group	Portion size (g/meal)
Grains and grain-based products	60	Insects	10
Cereal grains	60	Eggs and egg products	40
Barley	55	Milk and milk products	15
Buckwheat	50	Milk	100
Fonio	65	Dairy products	10
Maize	65	Cheese	10
Millet	55	Cream	10
Oats	65	Yoghurt	45
Quinoa	70	Milk powder	13
Rice	60	Vegetables and vegetable products	75
Rye	50	Vitamin A rich vegetables	95
Semolina	50	Yellow or orange vegetables	100
Sorghum	60	Green leafy vegetables	95
Spelt	75	Other vegetables	65
Teff	75	Fruit and fruit products	40
Triticale	50	Yellow or orange fruit	55
Wheat	55	Other fruit	30
Grain flours	50	Citrus fruits	35
Breads	60	Oils and fats	10
Pasta	60	Oils	10
Noodles	65	Fats	10
Roots and tubers	70	Sugars and confectionary	10
Roots	95	Sugar	6
White roots	90	Honey	6
Orange roots	70	Confectionary	15
Tubers	65	Herbs and spices	1
White tubers	60	Spices	1
Orange tubers	80	Herbs	1
Legumes, nuts & seeds	10	Condiments	5
Legumes	20	Flavourings	1
Beans and peas	20	Salt	0.5
Lentils	15	Beverages	1
Nuts and seeds	5	Tea, coffee and plant extracts	1
Nuts	5	Sodas	1
Seeds	10	Alcoholic drinks	1
Meat and offal	20	Supplements and infant foods	1
Meat (flesh foods)	15	Therapeutic milks	1
Red meat	15	Ready to use foods	1
Wild game	20	RUTF	1
White meat	15	RUSF	1
Offal	25	Infant foods	1
Fish, seafood, amphibians and invertebrates	25	Micronutrients	1
Fish (marine or freshwater)	25	Micronutrient powders	1
Seafood	30	Fortified foods	1
Amphibians	50	Composite dishes	100

Annex 7. Database of standard portion sizes which have been calculated using a combination of the European Food Safety Authority's Comprehensive European Food Consumption Database and a review of portion data by Save the Children.

Mean value for children	Food group name aged 1-3 years (g/meal)	Comments
Cereals	95	Taken from analysis on the European food portion size database
Vegetables	67	Taken from analysis on the European food portion size database
Roots and tubers	52	Taken from analysis on the European food portion size database
Legumes	73	Taken from the average of the data from Save the Children's database from 9 data points
Fruit	88	Taken from analysis on the European food portion size database
Meat	46	Taken from analysis on the European food portion size database
Fish	53	Taken from the average of the data from Save the Children's database from 16 data points
Milk	199	Taken from analysis on the European food portion size database
Eggs	47	Taken from the average of the data from Save the Children's database from 15 data points
Sugar	15	Taken from analysis on the European food portion size database
Fat	12	Taken from analysis on the European food portion size database
Fruit or vegetable juices	90	Taken from analysis on the European food portion size database
Non-alcoholic beverages	37	Taken from analysis on the European food portion size database
Herbs and spices	5	Taken from analysis on the European food portion size database
Infant foods	96	Taken from analysis on the European food portion size database
Composite dishes	15	Taken from analysis on the European food portion size database
Snacks	17	Taken from analysis on the European food portion size database
Yoghurt	100	Taken from analysis on the European food portion size database
Breads	43	Taken from analysis on the European food portion size database
Cheese	14	Taken from analysis on the European food portion size database
Citrus fruits	5	Taken from analysis on the European food portion size database

Annex 8. Family members chosen from the WHO database of average energy specification used to create the 'Rest of the World' HEA/CotD standard families.

Household member	Kcal/day	Number of family members						
		4	5	6	7	8	9	10
		Individuals	Individuals	Individuals	Individuals	Individuals	Individuals	Individuals
Woman is lactating	460	×	×	×	×	×	×	×
Baby (either sex) 12-23 months	894		×	×	×	×	×	×
Child (either sex) 4-5 years	1,300							×
Child (either sex) 5-6 years	1,400						×	
Child (either sex) 6-7 years	1,500					×		×
Child (either sex) 7-8 years	1,625				×		×	
Child (either sex) 8-9 years	1,763			×		×		×
Child (either sex) 9-10 years	1,913		×		×		×	
Child (either sex) 10-11 years	2,075	×		×		×		×
Child (either sex) 11-12 years	2,250		×		×		×	
Child (either sex) 12-13 years	2,413			×		×		×
Child (either sex) 13-14 years	2,575				×		×	
Child (either sex) 14-15 years	2,725					×		×
Child (either sex) 15-16 years	2,838						×	
Child (either sex) 16-17 years	2,913							×
Man, 30-59y, 50 kg, moderately active	2,750	×	×	×	×	×	×	×
Woman, 30-59y, 45 kg, moderately active	2,300	×	×	×	×	×	×	×
Total average energy specification		8,437	10,524	12,612	14,724	16,837	18,962	21,037

Annex 9. Family members chosen from the WHO database of average energy specification used to create the 'Asia' HEA/CotD standard families.

Household member	Kcal/day	Number of family members						
		4	5	6	7	8	9	10
		Individuals	Individuals	Individuals	Individuals	Individuals	Individuals	Individuals
Woman is lactating	460	×	×	×	×	×	×	×
Baby (either sex) 12-23 months	894	×	×	×	×	×	×	×
Child (either sex) 5-6 years	1,400							×
Child (either sex) 6-7 years	1,500						×	
Child (either sex) 7-8 years	1,625					×		×
Child (either sex) 8-9 years	1,763				×		×	
Child (either sex) 9-10 years	1,913			×		×		×
Child (either sex) 10-11 years	2,075		×		×		×	
Child (either sex) 11-12 years	2,250			×		×		×
Child (either sex) 12-13 years	2,413				×		×	
Child (either sex) 13-14 years	2,575					×		×
Child (either sex) 14-15 years	2,725						×	
Child (either sex) 15-16 years	2,838							×
Man, 30-59y, 50 kg, moderately active	2,750	×	×	×	×	×	×	×
Woman, 30-59y, 45 kg, moderately active	2,300	×	×	×	×	×	×	×
Woman, >60y, 45 kg, moderately active	2,050	×	×	×	×	×	×	×
Total average energy specification		8,454	10,487	12,574	14,662	16,774	18,887	21,037

Annex 10. Example of a Cost of the Diet data collector training schedule

When		Activity	Where
Day 1	Morning	Introductions, team building exercises and setting the rules of the training	Training centre
		Introduction to the Cost of the Diet and study objectives	
		Explain the food list	
	Afternoon	Compile the food list	
Discuss the seasons, typical household size and the village and market survey sites that have been selected			
Day 2	Morning	How to conduct a market survey (presentation)	Training centre
		Market survey role play	
	Afternoon	How to conduct interviews and focus group discussions (presentation)	
		Interview and focus group discussion role play	
Day 3	Morning	Travel to Market Field Trial	Field
		Field Trial: Practice Data Collection	
	Afternoon	Checking and consolidating data / revising food list	Training centre
		Feedback and questions	
		Food list revision	

Annex 11. The equipment needed for data collection

It is important to use a precise and accurate scale to weigh foods in the market (and possibly during the food consumption interviews, to estimate portion sizes). To weigh small foods under the weight of 5kg we suggest purchasing Tanita KD-400SV scales because they are easy to carry, precise (to 1g) and easy to use. For food items above 1kg we advise purchasing a set of hanging (Salter) scales.

The equipment required during the training and data collection is listed below:

One per data collector for training:

- Pen
- Pencil and pencil sharpener
- Eraser
- Notebook
- Handouts

For training room:

- Stapler
- Staples
- Ream of flip chart paper
- Box of marker pens
- Flip chart stand
- Long table for photocopies and other resource materials
- Box of marker pens
- Blue tack or scotch tape
- LCD projector
- Ream of A4 paper
- Access to a printer

One per field team (market survey):

- Spare pencils
- Spare Rubbers
- Ruler
- Tanita KD-400SV scales (1)
- Salter/spring scales (1)
- 5 L measuring jug (1)
- Clip board (2)
- Market survey data collection forms
- Letter/ document describing the objectives of the assessment and how the information will be used
- Petty cash to purchase food items
- Equipment backpack (1)

One per field team (interview and FGD):

- Spare pencils
- Tanita KD-400SV scales (1)
- 5 L measuring jug (1)
- Clip board
- Letter/ document describing the objectives of the assessment and how the information will be used
- Equipment backpack (1)

REFERENCES

- 1 WHO/FAO (2001). Human energy specifications. Geneva: World Health Organization.
- 2 WHO/FAO (2007). Protein and amino acid specifications in human nutrition. Geneva: World Health Organization.
- 3 WHO/FAO (2008). Fats and Fatty Acids in Human Nutrition. Geneva: World Health Organization.
- 4 WHO/FAO (2004). Vitamin and Mineral Requirements for Human Nutrition. Geneva: World Health Organization.
- 5 FAO/WHO (2006). Guidelines on Food Fortification with Micronutrients.
- 6 Institute of Medicine (2001). Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. Last accessed on 18th June 2014 at: <http://www.iom.edu/Reports/2001/Dietary-Reference-Intakes-for-Vitamin-A-Vitamin-K-Arsenic-Boron-Chromium-Copper-Iodine-Iron-Manganese-Molybdenum-Nickel-Silicon-Vanadium-and-Zinc.aspx>
- 7 FAO/WHO (2001). Human Vitamin and Mineral Requirements. Report of a joint FAO/WHO expert consultation. Bangkok, Thailand. Rome: FAO.
- 8 European Commission (2002). Tolerable upper intake levels for vitamins and minerals. Last accessed on the 18th June 2014 at: http://ec.europa.eu/food/fs/sc/scf/out80_en.html
- 9 Bunch, S, Calloway, D and Murphy, S. (1992). WorldFood dietary assessment system. Last accessed on 2nd May 2014 at: http://www.fao.org/fileadmin/templates/food_composition/documents/WORLDFOOD_DIETARY_ASSESSMENT_SYSTEM__2_.pdf
- 10 NDL/FNIC (2014). USDA National Nutrient Database for Standard Reference. Last accessed on the 2nd May 2014 at: <https://fnic.nal.usda.gov/food-composition>
- 11 FAO (2012). West African Food Composition Table. Last accessed on the 2nd May 2014 at: <http://www.fao.org/docrep/015/i2698b/i2698b00.pdf>
- 12 Shaheen, N. Rahim, A. Mohiduzzaman, M. et al. (2013) Food Composition Table for Bangladesh. Dhaka: Institute of Nutrition and Food Science, University of Dhaka.
- 13 De Pee, S. and Bloem, M. (2009). Current and potential role of specially formulated foods and food supplements for preventing malnutrition among 6- to 23-month-old. Food and Nutrition Bulletin. Vol. 30(3), pp. 434-463.
- 14 WFP (2014). Specifications. Last accessed on the 2nd May 2014 at: <http://foodqualityandsafety.wfp.org/en/specifications>
- 15 WHO (2011). Use of micronutrient powders for home fortification of food consumed by infants and children 6-23 months of age. Last accessed on the 2nd May 2014 at: http://whqlibdoc.who.int/publications/2011/9789241502047_eng.pdf
- 16 UNICEF (2012). RUTF product Specifications. Last accessed on 2nd May 2014 at: p://www.unicef.org/supply/files/5_Common_RUTF_Specifications_and_Labelling.pdf
- 17 USAID (2014). Commodity Reference Guide Fact Sheets. Last accessed on the 2nd May 2014 at: <http://www.usaid.gov/what-we-do/agriculture-and-food-security/food-assistance/resources/implementation-tools/commodity>
- 18 EC/FAO (2013). Guidelines for Measuring Household and Individual Dietary Diversity. Last accessed on 19th June 2014 at: <http://www.fao.org/docrep/014/i1983e/i1983e00.pdf>.
- 19 WFP (2008). Food consumption analysis. Calculation and use of the food consumption score in food security analysis. Last accessed 19th June 2014 at: http://documents.wfp.org/stellent/groups/public/documents/manual_guide_proced/wfp197216.pdf.
- 20 European Food Safety Authority (2011). Use of the EFSA Comprehensive European Food Consumption Database in Exposure Assessment. EFSA Journal. Vol. 9(3).

- 21 National Health Service (2013). Salt: the facts. Last accessed 19th June 2014 at: <http://www.nhs.uk/Livewell/Goodfood/Pages/salt.aspx>
- 22 Nishida, C. Uauy, R. Kumanyika, S. et al., (2004). WHO/FAO The Joint WHO/FAO Expert Consultation on diet, nutrition and the prevention of chronic diseases: process, product and policy implications. *Public Health Nutrition*. Vol. 7(1A). pp 245–250.
- 23 Kathryn G. Dewey, Roberta J. Cohen, and Nigel C. Rollins (2004) Feeding of nonbreastfed children from 6 to 24 months of age in developing countries. *Food and Nutrition Bulletin*. Vol. 25(4).
- 24 Wrieden, W. Longbottom, P. Adamson, A. et al., (2008) Estimation of typical food portion sizes for children of different ages in Great Britain. *British Journal of Nutrition*. Vol. 99(6), pp. 1344–1353.
- 25 Lyons, J. and Giltinan, M. (2013) The Irish food portion sizes database. First Edition. Data compiled by the Irish Universities Nutrition Alliance (IUNA) at University College Cork (UCC), Ireland.
- 26 WHO (2005) Guiding principles for feeding non-breastfed children 6-24 months of age.
- 27 Steyn, N. (2003) Secondary data analyses of dietary surveys undertaken in South Africa to determine usual food consumption of the population. *Public Health Nutrition*. Vol. 6(7), pp. 631-44.
- 28 Lukmanji, Z. Hertzmark, E. Mlingi, N. et al., (2008) Tanzania Food Composition Tables. Muhimbili University of Health and Allied Sciences, Tanzania Food and Nutrition Centre (TFNC) and Harvard School of Public Health (HSPH).
- 29 Fox, M. Reidy, K. Karwe, V et al., (2006) Average Portions of Foods Commonly Eaten by Infants and Toddlers in the United States. *Journal of the American Dietetic Association*. Vol. 106(1), pp. 66-76.
- 30 WHO (2002). Complementary feeding: report of the global consultation, and summary of guiding principles for complementary feeding of the breastfed child. Geneva.
- 31 Pan American Health Organization (2013). ProPAN: Process for the Promotion of Child Feeding. 2. ed. Washington, D.C.
- 32 FAO/INFOODS (2012). FAO/INFOODS Density Database Version 2.0. FAO, Rome.
- 33 Save the Children UK (2008). The Practitioners' Guide to the Household Economy Approach. Last accessed 19th June 2014 at: http://www.savethechildren.org.uk/sites/default/files/docs/The_Practitioners_Guide_to_HEA_1.pdf
- 34 Hallberg, L. and Asp, N. (1996). Iron nutrition in health and disease. Londres.
- 35 European Food Safety Authority (2011). Scientific opinion on the substantiation of health claims related to meat or fish and the improvement of non haem iron absorption (ID 1223) pursuant to Article 13(1) of Regulation (EC) No 1924/2006. Last accessed 19th June 2014 at: <http://www.efsa.europa.eu/en/efsajournal/doc/2040.pdf>
- 36 Ekmekcioglu, C. (2000). Intestinal bioavailability of minerals and trace elements from milk and beverages in humans. *Nahrung*. Vol. 44(6), pp. 390-397.
- 37 Weaver, C. Proulx, W. and Heaney, R. (1999). Choices for achieving adequate dietary calcium with a vegetarian diet. *American Journal of Clinical Nutrition*. Vol. 70(3), pp. 543-548.
- 38 Noonan, A. and Savage, G. (1999). Oxalate content of foods and its effect on humans. *Asia Pacific Journal of Clinical Nutrition*. Vol. 8(1), pp. 64-74.
- 39 Leonardo M. Canessa, M.D. (2005). Oxalate content of foods. The Children's Medical Centre. Last accessed 19th June 2014 at: http://www.childrensdayton.org/cms/resource_library/nephrology_files/5f5dec8807c77c52/lithiasis__oxalate_and_diet.pdf



COST OF THE DIET

The *Cost of the Diet* is an innovative method and software developed by Save the Children to understand better the extent to which poverty affects food intake and nutritional status. The method was developed in response to research undertaken by Save the Children which demonstrated that the impact on people's diets of traditional nutrition education programmes may be limited more by poverty than by a lack of knowledge.

The *Cost of the Diet* software estimates the amount, combination and cost of local foods that are needed to provide individuals or families with their average needs for energy and their recommended intakes of protein, fat and micronutrients. An assessment can provide valuable contextual data about access by poor households to nutritious foods and could be used to inform programme design, develop policies, create advocacy messages and contribute to early warning systems.

This guide provides a *Cost of the Diet* practitioner with the information required to run a full *Cost of the Diet* assessment. The guide is for nutrition and food security personnel with experience in leading field work and in quantitative data analysis.

More information can be found at: www.savethechildren.org.uk/costofthediet



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