COST OF DIET ASSESSMENT

MORRUMBALA REGION

MOZAMBIQUE

June, 2010

Save the Children UK methodology

ANSA supported Save the Children to carry out the field work and produced the Cost of the Diet report.

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Abbreviations

CoD	Cost Of Diet
FAO	Food and Agricultural Organisation (United Nations)
FFQ	Food Frequency Questionnaire
HEA	Household Economic Analysis
MT	Meticais (Mozambican currency)
Nia equiv	Niacin Equivalent
RE	Retinol Equivalent
WHO	World Health Organisation (United Nations)

Summary

Morrumbala is one of the Districts located in Zambezi River Valley (16 b) and River Shore (16 a) food economy zones.

Although the zones are not prone to food shortages in terms of availability, many households suffer from food insecurity from December to March. Poor households never have enough food stocks to last the year. Purchasing food constitutes an economic hardship for poor households. In the hunger season some the families supplement the diet with wild foods.

Livestock's holdings are remarkably small. Goats and pigs are the main animals owned; cattle are very rare. Income sources for "poor" household are limited, as there are few work opportunities outside of the growing season. The average income of a poor family is 5.000,00 MT per year. According to HEA poor households spend around 60% of their income on purchasing food (staple and non staple food).

All these factors combined lead to high levels of chronic malnutrition among children under 5 years.

A study was carried out using the Cost of Diet methodology (CoD) in order to enable Save the Children to have sufficient evidence to advocate for, plan and implement programmes to improve the nutrition status of vulnerable groups, with an emphasis on children and mothers.

The CoD is an assessment and analysis tool, a linear programming model built into Microsoft Excel which can identify the gap between income or food expenditure and the lowest cost of a diet that meets all the energy and nutrient requirements of a household.

The results show that the quality of the diet currently eaten was not sufficient to meet all nutrient requirements. For 12-23 month old children, riboflavin (vitamin B2), calcium, iron and zinc requirements were not met in both seasons (harvest and hunger season), and the pantothenic acid requirement could not be met in the hunger season. The adult diet is also not meeting requirements for fats and the same micronutrients referred to in the infant diet. .

Increasing the consumption of the amounts of the food items that are currently consumed by the population will not improve the quality of the diet sufficiently; that means that other foods and other ways of intervention need to be explored to improve the nutritional quality of the actual diet.

Several products, such as beans, chicken, eggs, and goat milk, were introduced into the analystical model of the diet, separately and in combination. Goat milk was the only one, that when introduced into the dietmet the majority of the nutrient requirements. In the diet for 12-23 months old infants the iron requirement was still not met after the introduction of goats milk, iron intake was, however, improved. . For the other food items, when introduced intothe diet separately, no improvement was registeredin the quality of the diet, and the cost of the dietincreased significantly.

When adding beans and eggs to the diet at the same time, nutrient requirement for children aged 12-23 months old did not change sufficiently, especially in the case of iron requirements (53.6%-60.2%), zinc (78.1%-78.5%) and calcium (66.6%-75.7%). However, for all other household members the introduction of these two elements solved all deficiences throughout the year (for both the hungry and the harvest seasons). . With this option, the cost of the diet increased significantly, from 17.037,00 MT per year to 28.582,00 MTper year.

Taking in account that even after including goat milk on the diet, iron requirement for the 12-23 months old children still not meet, and anaemia is considered a health problem in Mozambique, a short-term option to be is the supplementation with micronutrient sachets (sprinkles).

When goat milk and “sprinkles” are added to the diet, all nutrient requirements are met, for both groups (12-23 months old and the rest of the family), and the cost of the diet reduces significantly, from 17.037,60 MT to 13.665,24 Mt.

Another form of improving the quality of the diet quality would be to increase income in the households. This could be, for the poorest and most vulnerable households, through cash transfers, whereby the households use increased income to improve the diet.

Based on the analyse carried out the following recommendations will contribute to providing the cheapest diet that satisfies the nutrient requirements of infants from 12-23 months of age and the other family members. : promote chicken production to enable families to have more access to eggs, which together with beans will respond to all nutrient need for the family; promote goat production (and the consumption of goat milk) to ensure milk availability which added to the actual diet will respond to almost all the nutrient needs for both groups, except iron for the 12-23 months old; Supplementation with micronutrients sprinkles together with the goat milk, to fulfil the iron requirement for the 12-23 months old; lastly, increase the purchasing power of the most vulnerable families by providing a cash transfer.

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1. Introduction

1.1 Background

Save the Children organizations have worked in Mozambique since 1984. SC as a unified presence is currently implementing programs in five provinces: Gaza and Nampula, Zambezia, and Sofala and Manica. SCuses a community-based approach, mainly focused programmatically on improving and increasing health and nutrition, education, and food security for children, in particular those orphaned from, and vulnerable to, HIV/AIDS. SC works through local governmental and civil society partners.

Save the Children is operational in six districts (Morrumbala, Mopeia, Inhassunge, Namacurra, Nicoadala and Quelimane) in Zambezia Province. In Mopeia and Morrumbala, Save the Children is implementing activities directly with the communities and in the other four districts is working with and through partners.

- The districts of Morrumbala and Mopeia in the central province of Zambezia have high levels of underlying, chronic vulnerability, and have some of the highest malnutrition rates in the country. The majority of the households in the districts are self sufficient farmers, with limited agricultural sources of income (60%). A further 12% of households are cereal farmers who depend on cereal for own consumption and for sale for income. The districts have a moderate risk for cyclones and droughts, and a higher risk of flooding from the Zambezi river.

The high dependence on rain-fed agriculture makes the food economy of the two districts vulnerable to climatic variations. Added to this the rates of HIV/AIDS are increasing in the area which will have an impact on livelihoods in the future.

Morrumbala is one of the Districts located in Zambezi River Valley (16 b) and River Shore (16 a) food economy zones. These zones have considerable natural resources. One of the areas (16 b) has extensive land with a low population density reasonable good rainfall, many rivers and a vast forest reserves. Other area (16a) has similar conditions however they have an added benefit of rich fishing, and the opportunity for dry season cultivation.

In this area they have only one rainy season from November until March. There is no shortage of arable land or of grazing /browsing land for livestock. The main rivers contain small islands. The islands and the immediate riverbanks are fertile and support two crop seasons.

The main agricultural season in both zones starts in November and the harvest are from March/ April until June/July. Agricultural is carried out on the riverbanks and islands and in the drier land. Cultivation is almost entirely by hand-hoe, there are few tractors or cattle for ploughing. The main food crops are maize, cassava, sweet potato, millet, sorghum, rice (in some areas), beans, cowpeas, groundnuts, sesame. The crops that grow for sale are maize, groundnut, sesame, cotton, and vegetables special tomatoes and onions in the dry season.

Livestock's holdings are remarkably small. Goats and pigs are the main animals owned and cattle are very rare.

Although the zones are not prone to food shortages (in terms of availability), many households suffer from food insecurity from December to March. Poor households never have enough food stocks to last the year. Food prices especially in the hungry season constitute a strain on the household economy for the poorest households. . In the hunger season some families supplement the diet with wild foods.

In the areas near the rivers the opportunity to plant twice a year, and to fish in the river, turns the households more resilient to food insecurity.

As the result of agricultural campaign 2008/2009, the food security situation in general is good, however in Morrumbala District some of the localities, such as Chire and Megaza, are suffering from food insecurity due the fact that rainfall started late during the aforementioned agricultural campaign.

The reasons for the high levels of chronic vulnerability (and as a consequence high levels of child malnutrition) in Zambezia province can be summarized as due to; over dependence of families in risk to rain-fed agriculture; lack of technical support for agricultural development; lack of alternative off farm income sources; lack of access and use of health facilities and poor sanitary conditions; lack of community awareness and familiarity with other agricultural techniques and sources of good nutrition; an increase in the rates of HIV/AIDS; and a recent history of social disruption due to the 17 year war waged from the late 1970s to 1992.

Taking into consideration that higher levels of malnutrition in Zambezia Province are due several factors such as; food intake, food habits and practices, and disease, the following analysis will highlight whether economic access to food is one of the causes that had an impact on malnutrition.

1.2 Health and Nutrition Indicators

There is no health and nutrition information available specifically for Morrumbala District. The only indicators available at District level are growth faltering (4.8%, 2009) and Low birth weight (10.9%, 2009) which are the nutrition indicators of the nutrition surveillance from Ministry of Health. Growth faltering is in the normal range however low birth weight is above the cut off which is 7%Table 1 presents the health and nutrition information for Zambezia Province.

Table 1: Indicators for health and nutrition (Under 5 years old) and nutrition indicators

Indicators	DHS-Zambezia	DHS-National	Mics-Zambezia	Mics-National
Infant Mortality	89 /1000	101/1000	No information	93/1000
<5 Mortality	123/1000	153/1000	No information	138/1000
Stunting (H/A)	47.3%	41%	46%	43.7%
Wasting (W/H)	5.2%	4%	4.9%	4.2%
Underweight (W/A)	26.9%	23.7%	20.6%	17.5%
Low Birth Weight	No information	No information	15.6%	15.2%
Breastfeeding in the 1st hour	65.6%	64.7%	65.7%	63.1%
Exclusive Breastfeeding	No information	30%	46.8%	37%
Adequate Complementary feeding and continue BF (6-9M)	No information	79.4%	79.5%	83.6%
Diarrhoea (< 5y)	5.9%	14.1%	16.5%	17.6%

Mozambique has a very high rate of chronic malnutrition (43.7%).Compared with national rate chronic malnutrition in Zambezia (46%) is slightly higher although the difference is not significant. **1.3 Objectives**

General Objective:

To obtain information on the cost of the diet in Morrumbala households to enable Save the Children to advocate, plan and implement programmes for improving nutrition status of vulnerable groups, specifically children and mothers.

Specific Objectives:

1. To understand the impact of the Cost of the Diet on child nutrition status in Morrumbala district; and relate this to the causal analyse framework

2. Propose alternative diets based on seasonal availability and access to food.

3. Design and propose alternative programs taking in consideration the food availability, cost of food and purchasing power of the households

2. Methodology

The CoD is an assessment and analytical tool, a linear programming model built into Microsoft Excel which can identify the gap between income or food expenditure and the lowest cost of a diet that meets all the energy and nutrient requirements of a household.

In order to use the CoD programme a list of locally available foods is required (foods available in the markets used by the poorest households), and the seasonal variation in availability and cost of these food items. The programme uses the food list combined with information detailing a family's food consumption patterns to calculate the cost of a diet to meet the energy and nutrient requirements of a user defined household. The CoD programme minimises the overall cost of the diets selected; thereby producing results which show the lowest cost of a diet which meets all the micro and macro nutrient requirements of the household.

The diets selected have to respect user defined 'constraints'. These constraints are food pattern descriptions which are used for a variety of purposes:

- to ensure that sufficient breast milk is included into the diet of a breastfed child,
- to prevent the results from including quantities of foods which could not be feasibly consumed; 1 kg of spinach per day for a 12 – 23 month old for example, or
- to prevent food items from being included into the diet more frequently than could be expected to be eaten, for example eggs 3 times per day.

The results from the CoD program are then reviewed alongside income data collected during the HEA assessment in order to be able to better understand and make estimations regarding the capacity of a household to afford a sufficiently nutritious diet.

The CoD tool has been developed to allow 2 levels of analysis, Tier 1 and Tier 2. The results of Tier 1 analysis can be used for developing advocacy messages around availability, cost and affordability, as the food pattern constraints are less specific than in Tier 2 analysis, and only restrict the portion size of each food allowed in such a way that the lowest cost nutritious diet calculated might be a diet which includes quantities of a food that cannot be feasible consumed by the members of the household (such as 4 kg of spinach per person per day). Tier 2 analyses requires more detailed data on food portion sizes, and reflects the dietary patterns of the local population. The next paragraph provides more details on Tier 2 analysis, as this study was done with Tier 2 analysis.

2.1 Tier 2 Analysis

Tier 2 analysis requires more detailed data concerning food portion sizes, frequency with which different food items are consumed, and the regularity with which foods from different food groups are consumed, in order to inform the user defined food pattern constraints. This enables the selection of a diet which more appropriately reflects the dietary patterns of the local population, and therefore gives more realistic results; i.e. the lowest cost of a diet which meets requirements *and* can be consumed as part of a usual diet in Morrumbala. The results of Tier 2 analysis can also be used for advocacy purposes, as well as being used for helping to design programme interventions. Different scenarios can be modelled using Tier 2 in order to explore the impact on

cost and diet quality that an intervention such as supplementation, food rations, or behaviour change might have.

The results of Tier 2 can show either one of the following two scenarios:

1. The lowest cost of a diet which meets all the requirements for all members of the household

Or

2. The lowest cost of a diet which doesn't meet all the requirements. The cost would be based on the best possible diet that can be selected from the foods available when the portion size and frequencies are constrained by realistic or current eating patterns.

If the results fall under scenario 2 this would indicate that there are potential patterns of nutrient deficiency within the population, or that adequate intakes of certain micronutrients may be difficult to achieve from a locally available diet. This would inform the direction of any planned programme intervention to look, not only at access in terms of affordability, but also availability of nutrient dense foods, at the individual and household level.

The CoD programme can then be used to model the impact of potential interventions such as supplementation or increased consumption of certain foods in order to explore the impact this would have on diet cost and quality.

Two databases are used within the programme:

- A database of nutrient and energy requirements based on age, sex and activity level taken from WHO/FAO 2004 nutrient requirements database. [WHO/FAO 2004]
- A database of nutrient and energy content of food items taken from the FAO food composition database.

A focus on 12 – 23 month old children

The CoD methodology has a special focus on the 12-23month old children. Before the age of 2 children are vulnerable to the long term effects of under-nutrition yet this is also the time where catch up growth is possible and therefore if a population is experiencing food insecurity and malnutrition targeting children under the age of 2 years and improving their nutritional status will have a long term effect on the future health and well being of the population. The needs of the 12-23month olds are unique as they transition from breast milk to complementary foods. Continued breast feeding is still recommended but as they grow up and start to eat the same foods as the rest of the family their requirements for a diverse and micronutrient rich diet are higher, relatively than older members of the family.

2.2 Training

It was not possible for the CoD Adviser to train all members of the team in Morrumbala. Instead, three people received training in Maputo, and conducted further training to all other members of the team.

The training conducted both in Maputo and Morrumbala included:

- Introduction to CoD
- Identifying markets
- Development of food list and wild foods
- What data to collect and how to fill the forms
- Weighing exercise (how to use the scales)
- Pilot data collection on a market not included in the assessment
- Finalisation of food list
- Household composition and seasonality

2.3 Retrospective data collection

The data for this Cost of Diet survey was collected for the preceding year, so from March 2009 till February 2010. Data collection was carried out in February 2010.

2.4 Choosing location

The sampling for the CoD assessment builds upon the sampling that was done for the HEA assessment, and takes place in the same livelihood zone, using the same villages as the HEA carried out in 2009.
HEA define livelihood zones, as zones which have the same agro ecological characterises and livelihoods. Research done by FEWS NET found that zone 16, although showing the same poverty patterns has differences in vulnerability and opportunity for the strip along the shore and for village a few Kilometers away, therefore the zone16 is divided in two zones, 16 a and 16 b, in the Zambezi Riverine livelihood Zone. Morrumbala is one of the Districts located in Zambezi River Valley (16 b) and River Shore (16 a).

Market and Site Selection

The four villages used for the HEA were: Chiripalua, Ndambuenda, Cachote and Sabe. For each of these villages the main markets were identified, these markets were visited to collect information on weight and price of foods sold in the market (see Table 2.1)

The interviews conducted to collect the food frequency data took place in the four aforementionedvillages. A minimum of 30 households is required for the food frequency data, and a minimum of eight interviews per village were conducted.

Table 2.1 – Villages and markets identified to visit for CoD data collection

Village	**Market**
Chiripalua	Chiripalua
Ndambuenda	Ndambuenda
Cachote	Cachote
Sabe	Sabe
	Pinda

2.5 Development of Food List and Units

A small food list was available from previous assessments, and this list was used as the basis for the more extensive list. During the training, all foods available in the markets for the past 12 months were added to the list, together with the units in which the foods were sold.

All foods produced in the area and available wild foods were also listed, together with the frequency with which they are collected and the approximate amounts which can be feasibly collected per household. During the pilot and in the feedback session afterwards, the food list was finalised. Any foods identified later on were added to an additional list, together with price and weight data. These foods were included in the final food list as entered into the CoD database. The final Food List, as entered in the database, is shown in Annex I, including the frequencies in which the different foods are consumed (see also session 2.8).

Problems during the compilation of the food list

As the Cost of Diet data collection took place during the last month of the Hunger season, when very few foods are available from own consumption or on the market, it was difficult to make a complete list of all foods available throughout the year, and impossible to verify this in the markets. In Morrumbala the market system is not very well developed and not many ‘professional’ or regular traders were present. Many of the ‘traders’ are people that have produced(small) surplus, or are in

need of some cash, and thus cannot give any price information on other food items. Food produced by the people themselves was put in as missing data at zero (not purchased on the market but available at no costs – see also Discussion point about the costs of producing a certain food).

On the original Food List compiled by the field team, many wild foods were included, as they are frequently collected by the people in the area. However, for some of the foods the name in English was unknown (and there was no Portuguese translation),no alternative could be found to be added to the final Food List. These foods were therefore excluded. Table 2.2 describes, per food item, the decision taken on inclusion or otherwise in the data base. In the starting Food List many different types of meat were included in both fresh and dried form, such as hippopotamus, crocodile, monkey, and gazelle. As these meats are only consumed occasionally, and it is known that people in the area hardly consume any meat throughout the year [HEA2008], these meats have not been included in the final Food List.

Most families eat leafy vegetable twice a day throughout the year. This can be the greens they are growing (ex. pumpkin leaves), or wild leaves. It was not possible to collect weight and/or price data on all different leaves, so it was decided to enter all these leaves together as 'dark green leaves', available throughout the year at no costs (see also Table 2.2).

Table 2.2 – Wild foods in Morrumbala district and their inclusion/exclusion from the final Food List

Wild Food	English translation	Type of food	Decision taken
Maçanica	?	Wild fruit	Not included
Massala	?	Wild fruit	Not included
Malembé (ata silvestre)	?	Wild fruit	Not included
Folha de lune (silvestre)	… leaves	Wild leaves/vegetable	Included as dark green leaves
Folha de cacana	Leaves from kinine plant	Wild leaves/vegetable	Included as dark green leaves
Folha de moringa (sangoa)	… leaves	Wild leaves/vegetable	Included as dark green leaves
Nenufar (nhica)	Lotus (?)	Wild food (root/tuber)	Not included
Rizoma	?	Wild food (root/tuber)	Not included
Minhanha (raiz silvestre)	?	Wild food (root/tuber)	Not included

For several foods in the Food List the data collected could not be used, because, for example, the price was collected per unit sold, but the weights collected for this food item were different units. For some other items only price data was collected, as traders remembered the prices throughout the year, but the item was not available in the market to be weighed. According to the field team, these items would only be consumed by poor people if they had grown the food item themselves owing the food themselves; they would never spent money on the market to buy these products (certain fruits, pulses and cereals)
A couple of items were added later to the food list (lemon, fried cake,), but no data were collected for these items.

2.6 Seasonality

According to the Household Economy Approach (HEA) assessment the main production season in the area starts in November, with harvest in March/April to June/July as showed on the Figure 2.1 bellow. That means that the hunger season is registered from October to February. After the harvest season some of the crops are sold, , mainly cereals and beans. This occurs between May and September.

	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Rainy Seasons									Rains			
											Flooding risk	
Land preparation												

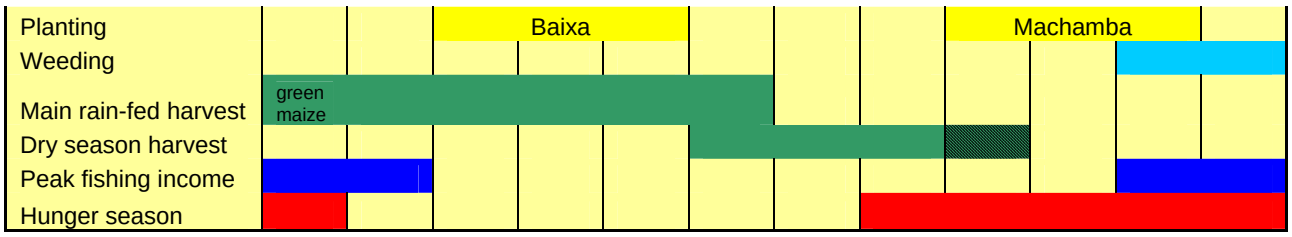
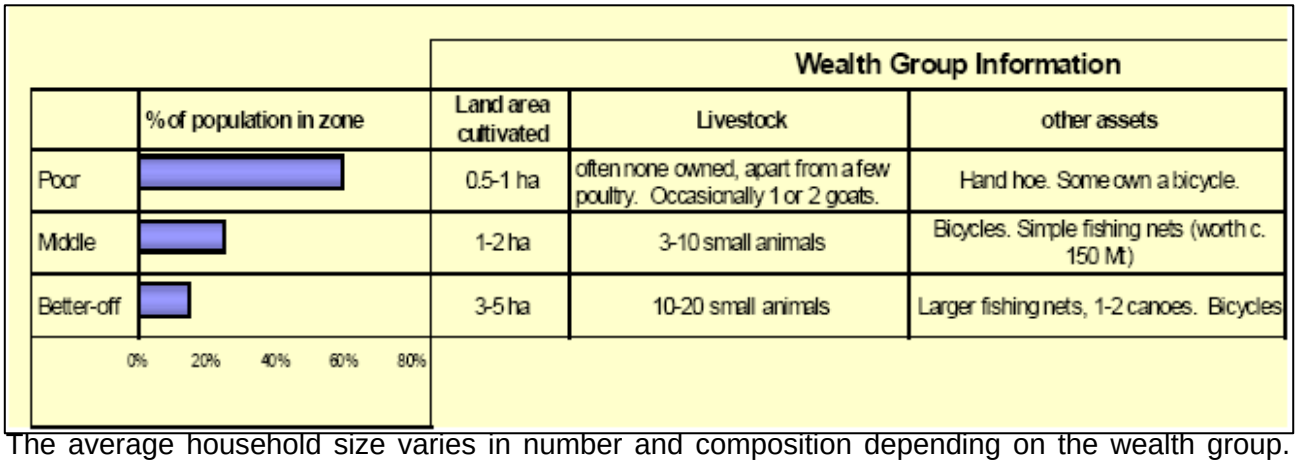


Figure 2.1 – Seasonal Calendar for Morrumbala district [HEA 2008]

The information of the study was collected based on agricultural calendar, more concretely in terms of hunger and harvest periods.

2.7 Household size and definition of wealth group

For this Cost of Diet survey, the wealth groups identified in the HEA in 2008 were used (see Figure 2.2).



The average household size varies in number and composition depending on the wealth group. During the training the team decided on an average composition of poor family's household. The results are given in Table 2.3.

Table 2.3 – 'Average' household composition as identified in the CoD training

Child 12-23 months old	1
Child 3-4 years old	1
Child 7-8 years old	1
Child 10-11 years old	1
Child 14-17 years old	1
Adult female 30-59 yrs old, moderately active, lactating	1
Adult male 30-59 yrs old, moderately active	1
Total in household	**7**

2.8 Data Collection and consolidation

The following data was collected for the analysis:

1. Market data
- The weight of a food item as it is sold
- The price of a food item as it is sold

2. Food consumption pattern data
- The number of times per week and per day each food item is consumed by 12 – 23 months old and by the other members of the family
- Frequency with which any food items from within a food group are consumed by 12 – 23month olds and the rest of the family

During the training it became already very clear that the patterns for children under two and the rest of the family varies considerably, so it was then decided to conduct the food frequency questionnaire for both groups; pregnant/lactating mothers were not interviewed separately due to time constraints.

The data was collected, and at the end of the day was discussed with the teams. After this discussion the constraints during the field workday were discussed with the international consultant and decision was taken based on that discussion.

Foods included as raw ingredients; meals were not included.

The weight of the local unit of each food item (e.g. kg, pile) was consolidated, outliers removed and averaged in order to establish a weight in grams per local unit. Then the price per 100g of each food item was calculated in meticais (MT; local Mozambican currency).

In the region food price do not vary significantly as availability fluctuates, the changes occur in the amount of food sold. In order to try to capture this, the number of items sold in a pile or the changing size of the pile was recorded.

A lower and upper limit for the number of times any food item from a food group can be included into the diet was established by selecting the 10^{th} and 90^{th} percentile of the total range of frequency from the data that was collected. The foods are grouped by food type and in order, to reflect the way in which the foods are eaten.

In order to establish a maximum frequency with which any food item could be included into the diet, the 95^{th} percentile of the maximum times a food item was consumed (taken from the data collected) was used as the upper limit. All lower frequency limits were set at zero, meaning the minimum amount of times a food could be selected is zero. The limits are set at these percentiles rather than the average times consumed to avoid the upper limits acting as barriers to the optimal diet. They are used to guide the selection of food items to represent what could feasibly be consumed by a household rather than to represent exactly what is consumed.

The portion sizes that are used in the Tier 2 analysis are generic portion sizes that have been collated from a range of secondary and unpublished data, largely from Indonesia, as portion sizes for Mozambique are not available. The portion size data for 12 – 23 month year olds is used as the basis; these are scaled up as a proportion of energy requirements for all other family members.

The proportion sizes are quantities that can reasonably be consumed during a meal by a 12-23 month old child; and larger for older family members. The used generic portion sizes are mentioned in Annex II.

2.9 Income Data

The income data used was collected during the HEA assessment and are for the reference 12 month from March 2006 – March 2008.

Income
Table 2.4 gives an overview of the income figures that are used in the calculations of affordability. The annual household income is the total income taken from the HEA results, and refers to data from 2006-2008. No information was available to update this data in 2010, so the original 2008 data was used. However, it is reasonable to assume figures may have changed since data collection.

As mentioned, most households consume food which they do not purchase but produce themselves. The cost of this production is accounted for in the expenditure pattern as 'inputs'; for the poor this is about 2% of the total annual income, or an estimated 80-120 meticais, which should be added to the total amount of income spent on food (Figure 2.3).

During the training of the data collection, the field team carried out an exercise to estimate the costs of producing maize (see below). Their estimation was higher than the 'inputs' in the HEA, as they included the 'lost' labour opportunity in the costs of producing own food. However, the costs of labour are not actual costs, so they are not included in the calculation of the actual amount of income spent on food, but the cost of seed is included. . Calculations have only been done for the poor wealth group. Costs are different for the other groups, for example they could buy in bulk. Expenditure pattern for different wealth groups are different.

Calculation of the costs of producing maize by the field team:
A quarter of a hectare of land produces 200-250 kg of maize. The cultivations costs for growing maize are about 650MT (10kg of seeds cost 375 MT and the labour costs 275MT). According to the HEA 2008 poor people own ½ - 1 hectare of land, so the costs would be 1300MT for producing 400-500kg of maize on ½ hectare, or double if they own 1 hectare of land.

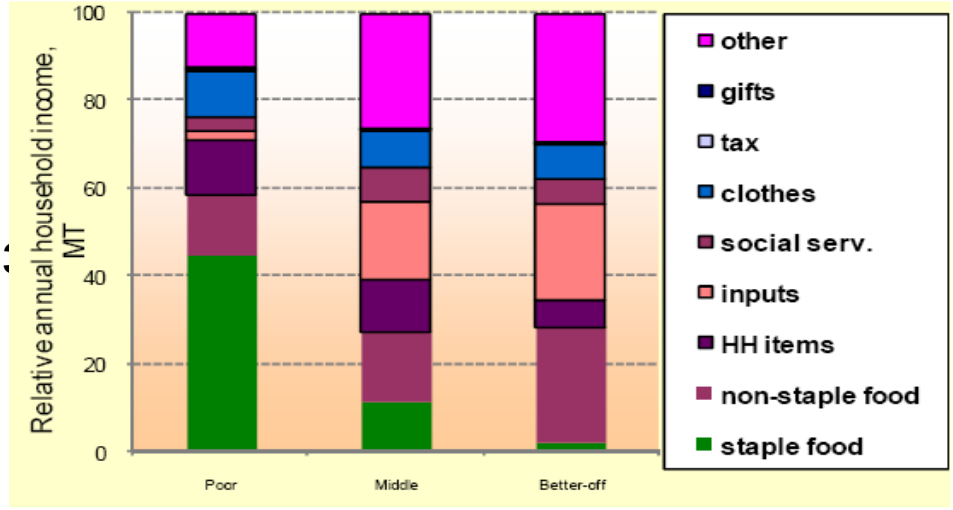
Table 2.4 – Overview of HEA results and income figures used

	Poor	Middle	Better-off
Annual household income in 2006/08 (MT)	4,000-6,000	5,500-11,000	20,000-50,000
% of income spent on food	60%	30%	30%
Amount available for food (MT)	2,800-4,200	2,200-4,400	7,000-17,500
Amount spent on inputs (MT) for ½-1 ha *	750-1500		
Total amount spent on food (MT)	3550-5700		

* Estimation based on estimations from the field team

According to HEA poor households spend around 60% of their income on purchasing food (staple and non staple food) as can be seen in the Figure 2.3 below. While the better-off only spend half of what the poor households spend.

Figure 2.3 – Annual household expenditure as a percentage of income



3.1 Tier 2 Analysis

The tier 2 analyses the frequency with which different foods could be consumed, the portion sizes are restricted to appropriately reflect the way in which they are eaten by people in Morrumbala district. The objective of the analysis is to find the cheapest diet that can meet all micro- and macronutrient requirements whilst still reflecting the patterns in which foods are currently being consumed.

The final Food List, including the frequency with which the different foods are consumed is shown in Annex I.

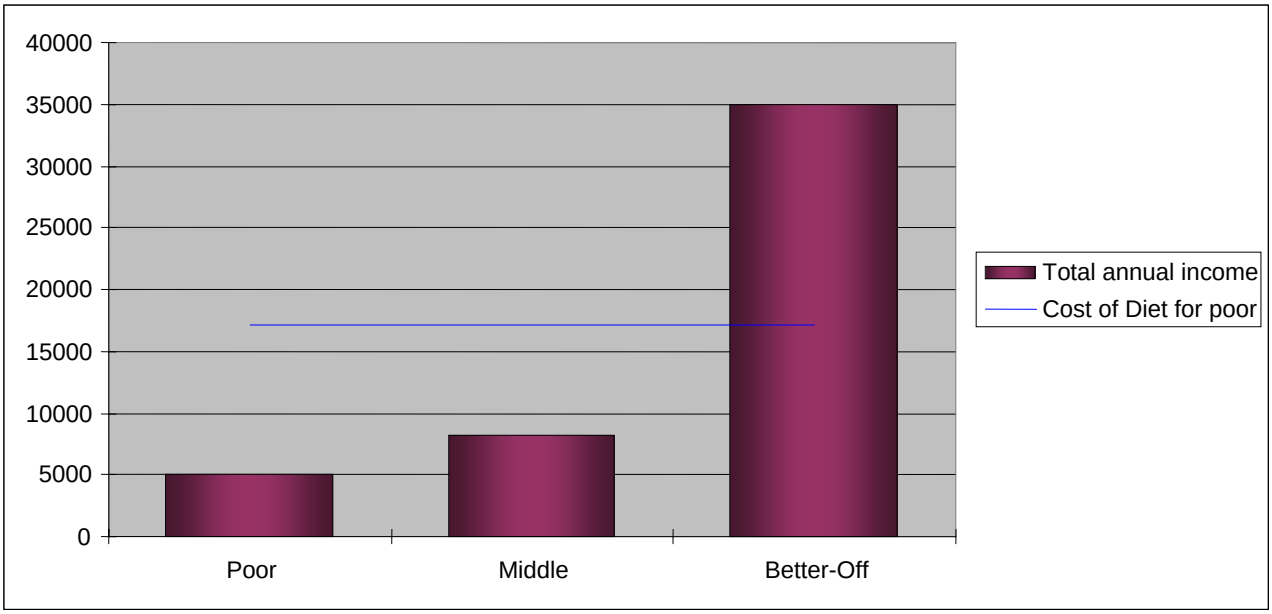


Figure 3.1 – The Cost of the Diet for poor people, compared to the average annual incomes for all three wealth groups

As is shown clearly in Figure 3.1, the lowest cost of the diet that meets (nearly) all nutrient requirements is not achievable by either poor or middle income households. It should be noted that the Cost of the Diet for the other wealth groups (middle and better-off) may be different to the cost for the poor households as they earn more and/or produce more and will buy different products and/or amounts (products purchased in bulk are usually cheaper).

Poor people, even if they would spend 100% of their income on food, have less than half the amount needed for the cheapest diet that meets all nutrient requirements. Their average annual income is 5.000,00 meticais (4000-6000MT – HEA2008), and the lowest cost diet costs 17.037,06 MT annually. On average, poor people spend about 4,625 MT on food (see calculations in session 2.9). This means the actual gap between money available for food and a nutritious diet is wide.

In terms of the cost of the diet, seasonality does not have much influence. The difference between the two seasons was small; there are slightly higher daily costs of diet in season 1, the harvest season (see Figure 3.2).

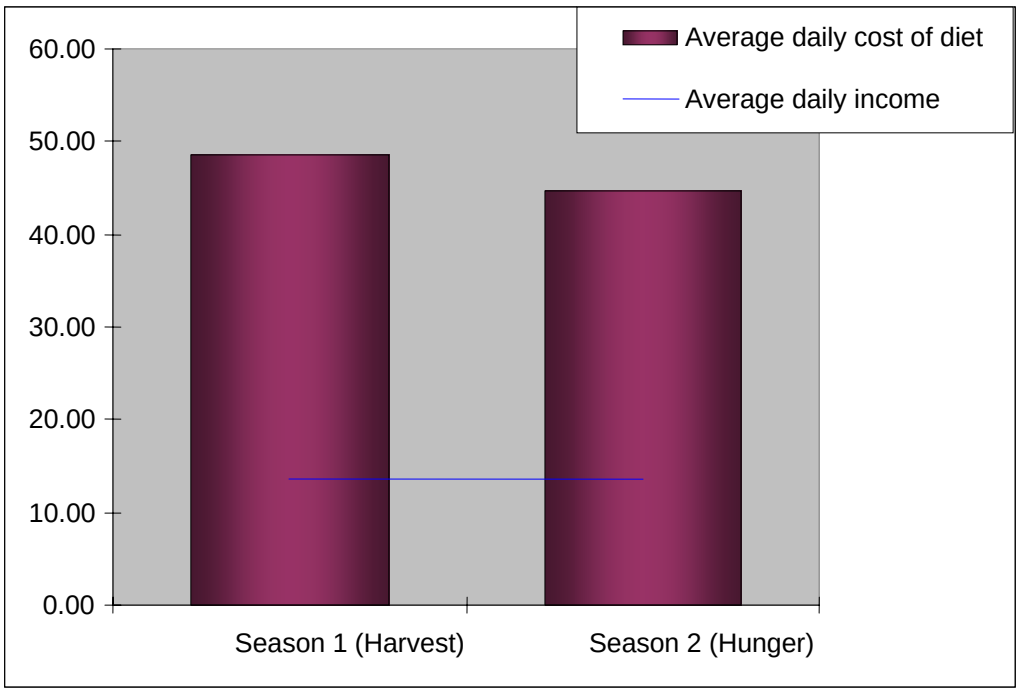


Figure 3.2 – The average daily cost of the diet per season compared to the average daily income (according to HEA2008)

The lowest cost diet practiced by the poorest households does not meet all nutrient requirements, as is shown in Figure 3.3 for children aged 12 to 23 months and in Figure 3.4 for the rest of the family. For 12-23 month old children, riboflavin (vitamin B2), calcium, iron and zinc requirements were not met in both seasons, and the pantothenic acid requirement could not be met in the hunger season (season 2).

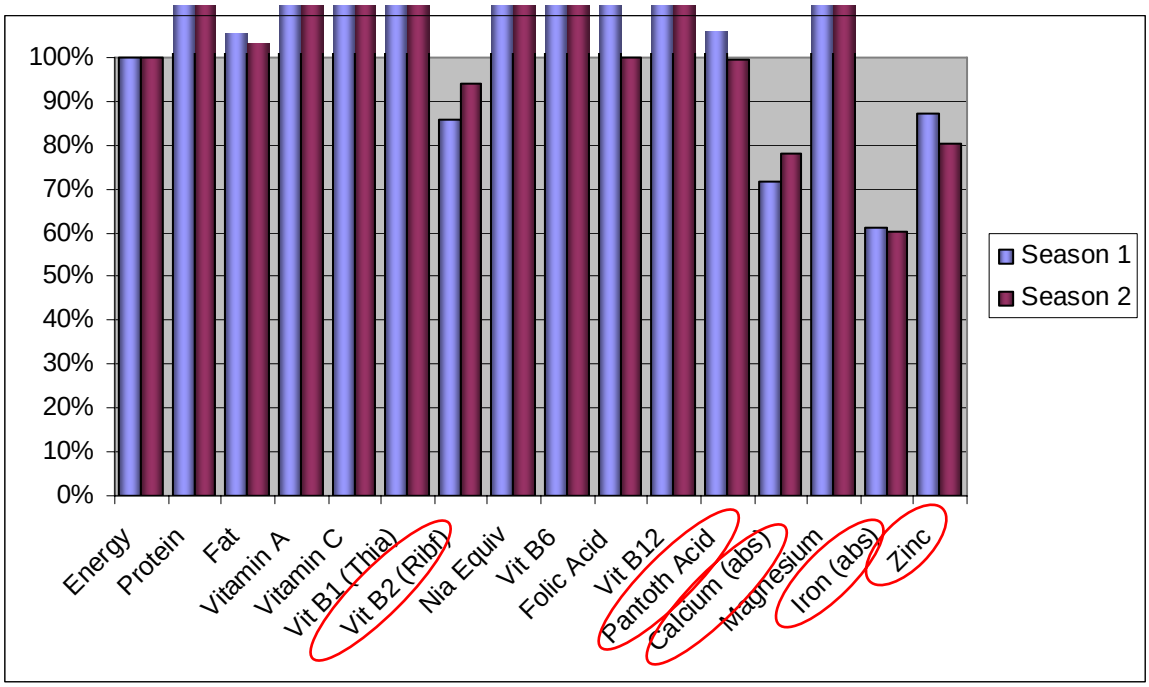


Figure 3.3 – Percentages of nutrient requirements met per nutrient for 12-23 month old children from the poor wealth group by season

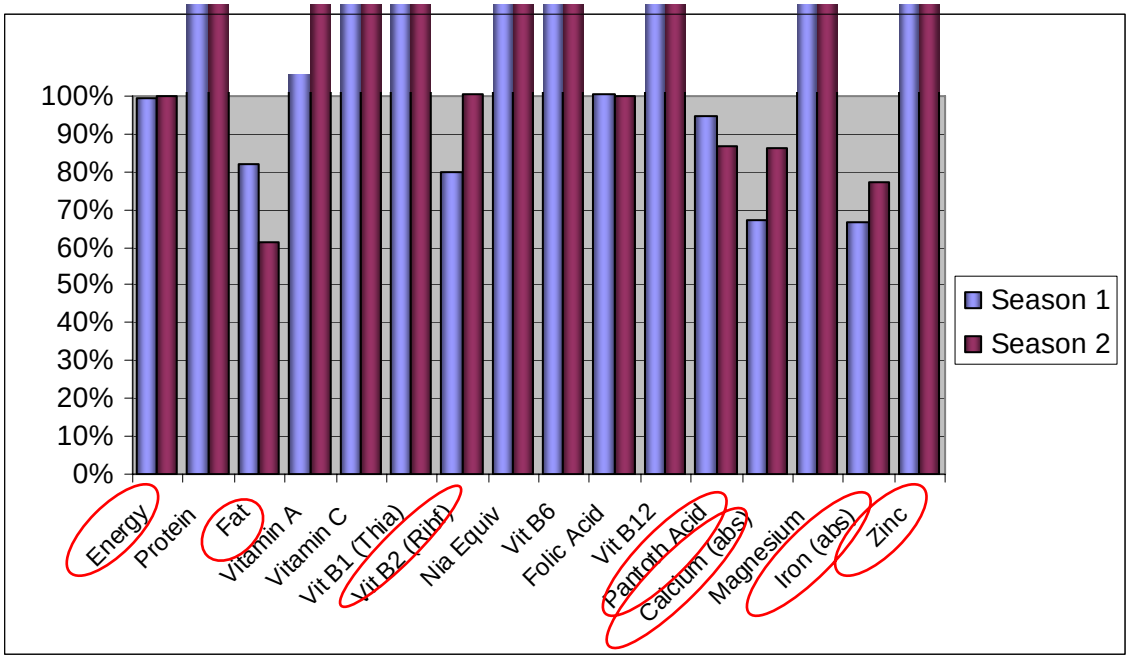


Figure 3.4 – Percentages of nutrient requirements met per nutrient for the rest of the family (all members of the family older than 2 years) from the poor wealth group by season

The percentages met are indicated in Table 3.1 for both children aged 12 to 23 months and the rest of the family.

Table 3.1 – Percentages of nutrients consumed by recommended amounts for children aged 12-23 months in the poor wealth group in Morrumbala district

	Harvest season (S1)		**Hunger season (S2)**	
	12-23m	**Rest family**	**12-23m**	**Rest family**
Energy	100% met	99.7%	100% met	100% met
Fat	100% met	81.7%	100% met	61.3%
Riboflavin	85.9%	80.0	94.0%	100% met
Pantothenic acid	100% met	94.5	99.8%	86.6
Calcium	71.8%	67.4	77.9%	86.1
Iron	61.4%	66.8	60.2%	77.0
Zinc	87.0%	100% met	80.2%	100% met

Table 3.2 shows the food items that have been selected for the lowest cost diet, and the amount that should be consumed per day, for both seasons, for children of 12 to 23 months old. The differences are caused by seasonal availability of many food items, and changes in the food prices throughout the year.

Table 3.2 – Food items selected for the lowest cost diet for children 12-23 months old by season

Food item	**Harvest season**	**Hunger season**
	Gram/day	**Gram/day**
Breast milk	532	532
Rice, white	10	-
Spaghetti	5	-
Cowpeas, fresh	-	10
Cowpeas, dried	21	-
Bambara groundnut, dried	4	4
Sesame seeds	5	8
Carrot	4	-
Kale	28	-
Dark green leaves	-	30

Food item	Harvest season	Hunger season
Oil	5	3
Fish, sweet water, dried	6	6
Cassava, fresh	36	-
Cassava flour	-	33
Flour of maize and cassava	59	69
Sweet potato, white	15	11
Sweet potato, orange	10	14
Banana, green/unripe	3	-
Banana, ripe	24	-
Mango, ripe	-	36
Papaya, ripe	18	18
Papaya, unripe	3	3
Tangerine	1	-
Guava	4	4
Watermelon	18	-
Baobab	-	6

Table 3.3 shows the food items included in the lowest cost diet per season for the rest of the family.

Table 3.3 – Food items selected in the lowest cost diet for the rest of the family by season

Food item	Harvest season	Hunger season
	Gram/day	Gram/day
	Per family *	Per family *
Rice, white	246	-
Spaghetti	123	-
Cowpeas, fresh	-	110
Pigeon peas, fresh	164	-
Bambara groundnut, dried	102	102
Peanuts dried	450	-
Sesame seeds	-	128
Carrot	85	-
Kale	666	-
Dark green leaves	-	717
Vegetable oil	119	119
Fish dried	137	137
Cassava flour	853	785
Mixed flour	1413	1649
Sweet potato, white	597	256
Sweet potato, orange	-	341
Banana unripe	72	-
Banana ripe	573	573
Mango ripe	-	303
Papaya ripe	430	430
Papaya unripe	72	64
Tangerine	17	-
Guava	85	85
Baobab	-	154
Watermelon	430	-

* NB these are the totals for all family members of 2 years old and above, but requirements per individual in this 'rest of the family' group are different (e.g. a 4-year old has different nutritional requirements than a 35-year old male adult)

3.2 Tier 2 analysis with maximum frequency of 3 times per day

As the results of the analysis have clearly shown the quality of the diet currently eaten is not sufficient to meet all nutrient requirements. The first step in trying to improve the diet so all nutrient requirements could be met, is to increase the frequency of the foods that are currently consumed.

In order to see if this would improve the quality of the diet the CoD programme was run without limiting the food frequency constraints, so all foods would be available three times a day, seven days a week (so 21 times). The portion sizes used were still restricted to the estimated portion sizes, so the foods included could feasibly be consumed. . The foods that were selected in the lowest cost diet are shown in Table 3.4, for both children aged 12-23 months and the rest of the family, and for both seasons.

Table 3.4 – Food items selected in the lowest cost diet calculated without food frequency constraints* for both children aged 12-23 months and the rest of the family by season

Food item	Harvest season		Hunger season	
	Gram/day		Gram/day	
	Child 12-23 m	Rest of Family†	Child 12-23 m	Rest of Family†
Breast milk	532	-	532	-
Rice	10	-	-	-
Spaghetti	5	-	-	-
Cowpeas, fresh	-	-	10	39
Cowpeas, dried	21	-	-	-
Pigeon peas, fresh	-	494	-	-
Bambara groundnut, dried	4	34	4	154

Food item	Harvest season		Hunger season	
Sesame seed	5	188	8	138
Carrot	4	85	-	-
Green cabbage	-	59	-	-
Kale	28	607	-	-
Dark green leaves	-	-	30	717
Vegetable oil	5	239	3	239
Dried fish	6	137	6	137
Cassava fresh	36	-	-	-
Cassava flour	-	-	33	177
Mixed flour	59	1649	69	1649
Sweet potato white	15	1195	11	1002
Sweet potato orange	10	341	14	341
Banana unripe	3	-	-	-
Banana ripe	24	573	-	-
Coconut	-	68	-	68
Mango ripe	-	-	36	-
Papaya ripe	18	573	18	573
Papaya unripe	3	72	3	72
Tangerine	1	-	-	17
Guava	4	256	4	256
Baobab	-	-	6	154
Watermelon	18	-	-	-

* Without food frequency constraints = foods available 3 times per day, 7 days per week
† NB these are the totals for all family members of 2 years old and above, but requirements per individual in this 'rest of the family' group are different (e.g. a 4-year old has different nutritional requirements than a 35-year old male adult)

For 12-23 month old children there is no difference at all between the lowest cost diet with or without food frequency constraints, but for the rest of the family, the diet does change, including fewer and slightly different food items (fewer cereals, more cowpeas, fewer fruits, more oil, etc). The diet without constraints is a better match for the nutrient requirements, as is shown in Table 3.5: fat and energy requirements are met, riboflavin, calcium and iron requirements are improved but not completely met, Pantothenic acid requirements are still less met.

Table 3.5 – Difference in nutrient deficiencies between the Cost of Diet calculated according to food frequency constraints and without these constraints*

Nutrient	Children 12-23 months old				Rest of family			
	With FFQ constraints		Without constraints		With FFQ constraints		Without constraints	
	S1	S2	S1	S2	S1	S2	S1	S2
Energy	100.0%	100.0%	100.0%	100.0%	99.7%	100.0%	100.0%	100.0%
Fat	105.5%	103.1%	105.5%	103.1%	81.7%	61.3%	98.6%	94.6%
Vit B2 (riboflavin)	85.9%	94.0%	85.9%	94.0%	80.0%	100.4%	102.7%	93.7%
Pantothenic acid	105.8%	99.8%	105.8%	99.8%	94.5%	86.6%	79.5%	79.1%
Calcium	71.8%	77.9%	71.8%	77.9%	67.4%	86.1%	92.1%	86.0%
Iron	61.4%	60.2%	61.4%	60.2%	66.8%	77.0%	81.0%	76.8%
Zinc	87.0%	80.2%	87.0%	80.2%	144.5%	141.2%	170.6%	148.0%

S1 = season 1 = harvest season; S2 = season 2 = hunger season
* Without food frequency constraints = foods available 3 times per day, 7 days per week

Although there is some improvement with the imputed changes, total nutrition requirements are still not met, and the annual cost of the diet increased considerably: from 17.037,60 MT to 20.236 MT, thus widening the gap between income and affordability of a nutritious diet.

This shows that an increase in consumption of the amounts of the food items that the population are currently consuming does not improve the quality of the diet sufficiently, and that other foods and other ways of intervention need to be explored, for example inclusion of food items not usually consumed by poor people.

3.3 Scenario Modelling

As the results above show, the lowest cost diet (following the current eating patterns of the poor population in the area) is not providing all nutrients in sufficient amounts. To see how these potential problems (of nutrient deficiencies) could be avoided, a range of different scenarios were run via the Cost of Diet software, including adding foods items to the diet. The following scenarios show some potential food-based interventions which could improve dietary quality for the poorest households.

The results show the potential impact and are not absolute recommendations. Neither are these the only possible solutions. Any intervention should be structured within a long-term sustainable programme which has been well researched in collaboration with the local community.

The nutrient requirements not reached at 100% of the daily recommended amount do not vary significantly between children aged 12-23 months and the rest of the family, with the exception of the children under two, who do not consume sufficient zinc, and the rest of the family that does not eat enough fat (see table 3.5 in the previous paragraph).

Several different food items were introduced into the diet currently consumed by the household, to see if these items would improve the diet, and ensure that the nutrient requirements of both children aged 12-23 months and the rest of the family were met. Food items were first included separately, and then in different combinations.

As most of the nutrients lacking in the diet can be found in foods of animal origin, several products of animal origin were introduced into the diet: chicken, eggs, goat milk. Beans were also added as they contain some the nutrients that were lacking in the diet. . The results of these models and some other possible scenarios are described below.

Scenario 1 – Adding goat milk to the diet

With the introduction of goat milk into the diet (at least 2 servings per week), all nutrient requirements are met, except iron where the level of deficiency reduces (see Table 3.6). The actual total costs of the diet reduces, as it is assumed that the goat milk comes from goats owned by the family., (Table 3.7). Although keeping goats has costs to the family (additional foods, medical care, etc),goats provide benefits to the household in terms of income and as a potential source of meat. It was decided (for the purpose of the analysis) that the cost of "milking" was not additional to the existing costs for the goat, and were therefore not added to the cost of the diet in the simulation analysis.

Table 3.6 – Percentages of nutrient requirements met per nutrient for 12-23 month old and the rest of the family from the poor wealth group for the original lowest cost diet, compared to the lowest cost diet including goat milk by season

	12 -23 months old				Rest of Family			
Nutrient	**% met with Tier 2**		**% met introducing goat milk**		**% met with Tier 2**		**% met introducing goat milk**	
	S1	**S2**	**S1**	**S2**	**S1**	**S2**	**S1**	**S2**
Energy	100.0%	100.0%	100.0%	100.0%	99.7%	100.0%	100.0%	100.0%
Fat	105.5%	103.1%	112.7%	116.6%	81.7%	61.3%	100.0%	100.0%
Vit B2 (riboflavin)	85.9%	94.0%	117.0%	123.2%	80.0%	100.4%	143.8%	136.5%
Pantothenic acid	105.8%	99.8%	113.0%	111.0%	94.5%	86.6%	100.0%	100.0%
Calcium	71.8%	77.9%	104.8%	124.3%	67.4%	86.1%	142.8%	141.6%
Iron	61.4%	60.2%	77.5%	68.9%	66.8%	77.0%	98.0%	94.3%
Zinc	87.0%	80.2%	100.0%	100.0%	144.5%	141.2%	176.9%	167.3%

Table 3.7 – the actual costs of the original lowest cost diet compared to the lowest cost diet including goat milk, in Meticais

	Cost of Diet Tier 2			Cost of Diet including goat milk		
	S1	**S2**	**Annual cost**	**S1**	**S2**	**Annual cost**
12-23 months old	1.75	1.44	586.05	0.99	1.82	503.91
Rest of family	46.89	43.20	16487.55	31.33	43.17	13447.94
Total/day	48.64	44.64		32.32	44.99	
Total	9484.80	7588.80	17037.60	6303.02	7648.83	13951.85

S1 = season 1 = harvest season; S2 = season 2 = hunger season

Scenario 2 – Adding beans, chicken and/or eggs to the diet

When introducing beans, eggs or chicken separately to the dietthe improvements to the diet were not significant. In particular, iron consumption did not improve and continued to be less than 62% of the required daily amount for children under two; and for the rest of the family it remained less than 89% (Table 3.8). Thus adding either beans (lima beans and kidney beans at least twice a week), eggs (3-7 times or 7-14 times per week) or chicken (at least 3 times per week) did not solve micro-nutrient deficiencies. .

Table 3.8 – Iron status, resulting from the different scenarios, for both ages groups, during the two seasons.

	3-7 eggs	**7-14 eggs**	**chicken**	**Beans**	**Beans + eggs**
Season 1	Iron	Iron	Iron	Iron	Iron
12-23 M	61.4%	61.5%	59.6%	53.6%	53.6%
rest of family	73.1%	89.0%	72.5%	100.0%	100.0%
Season 2	Iron	Iron	Iron	Iron	Iron
12-23 M	60.2%	63.6%	61.9%	60.2%	60.2%
rest of family	80.0%	86.2%	79.4%	100.0%	100.0%

S1 = season 1 = harvest season; S2 = season 2 = hunger season

When adding both beans (lima beans and kidney beans for at least twice a week) and eggs (3-7 times per week)to the diet, nutrient requirement for children aged 12-23 months old did not change sufficiently; iron (53.6%-60.2%), zinc (78.1%-78.5%) and calcium (66.6%-75.7%) stayed far below the required quantities. However, for the rest of the family, all deficiencies were solved for both seasons. Although adding beans and eggs to the diet is an achievable solution as both already constitute part of the normal diet (just less often/lower quantities), the cost of the diet increases significantly, from 17.037,00 MT to 28.582,00 MT. The increase in the cost of the diet is due to the high price of eggs, and it will have a significant impact on the “poor” household income, as these households currently spend60% of total income on food (staple and non-staple food). If people own enough chickens to produce the eggs this will automatically reduce prices, as the analysis could calculate the opportunity cost of consuming eggs rather than producing chickens; potentially lower than the market cost of eggs

Scenario 3 – Adding a cash transfer to the annual income

In Save the Children programming, a cash transfer is defined as predictable, regular transfers of cash to individuals or households by governments for the purposes of addressing poverty, vulnerability and children’s development [SCUK 2009]. Evidence from a wide variety of cash transfer programmes in Latin America and sub-Saharan Africa shows beneficial effects of the programmes on households’ access to food. Measured against a range of indicators – including calorie consumption, average numbers of meals and budget expenditure – families use cash to

increase their food intake. Crucially for child survival, participants in cash transfer programmes improve the diversity of their diets, increasing their intake of animal protein, fats, fruits and vegetables [SCUK 2009].

In Mozambique the national poverty line has been set at 8.50 meticaís per person per day (= 3.102,50 MT per person per year). This means that for an average family of 7 persons the poverty line is 59.50 MT per day, or 21.717,50 MT per year. With a minimum income at the poverty line, a household would be able to afford the lowest cost nutritious diet (17.037,60 MT), and have sufficient money for non-food purchases, as well as potential savings for extra assets such as fishing nets. The lowest cost diet including goat milk was even cheaper (13.951.85MT), leaving more money for non-food items and possible savings.

The HEA 2008 estimated the average income of a poor family at 4000-6000 Mt per year (all calculations below have been done with the average of 5000Mt per household per year), leaving a gap of 16.717,50 MT between the poverty line and actually earned income of poor households in Morrumbala.

Economic growth and development programmes in the country aim to increase the income of households, reducing the incidence of poverty. In the rural areas government policy is particularly concerned with raising the productivity of farmers (agricultural and livestock) to increase household income through productive and sustainable measures. There is growing evidence that a percentage of extremely poor households are unable to take advantage of growth driven initiatives; either due to; lack of labour in the household; ill health; demographic composition of the household (elderly headed or child headed households); and gender barriers – women are more likely to be under educated and not able to take advantage of potential economic possibilities. The situation is further aggravated by the number of natural disasters that the rural areas face with devastating impacts on livelihoods, and the impact of HIV and AIDS, which reduces the productivity of households and increases household expenditure.

For extremely vulnerable households a cash transfer to cover this gap would be almost 1.400 MT per household per month (1.393,20 MT; about 40.4 US$[1]). The cash transfer could take the form of cash for work programmes (public works) for the economically active members of the households, or an unconditional transfer for households where there are no economically active members (elderly headed or child headed households, people living with disability). Percentage-wise, this is slightly higher than in other cash transfer programmes (the average is a contribution of 20-30% of household income or poverty line), but money-wise this falls within the range of examples mentioned in the Lasting Benefits report (discussing the role of cash transfers in tackling child mortality) by Save the Children UK [SCUK 2009].

The international poverty line of 1 US dollar per person per day is much less likely to be within reach of a cash transfer programme, as it would cost 90,115MT (~2.555 US$) per household per year, or a monthly transfer of 7.093 MT (201 US$).

The above calculations show that a cash transfer of less than 40 US dollars per family per month would allow these families to reach an income at the national Mozambican poverty line of 8.50 MT per person per day, and that having an income at the national poverty line would allow families to consume a nutritiously adequate diet for the whole family.

Scenario 4 – Adding micronutrients to the diet for children under two

Under Scenario 1 it showed that by adding goat milk to the diet, all nutrient requirements were met, except iron. Despite adding other foods to the diet, such as chicken, eggs and pulses, the percentage of the iron requirements still to be met did not improve.

[1] Currency rate of Standard Bank www.standardbank.co.mz on 11 June 2010: 1 US$ = 34.629 meticais

As only 77.5% of the daily iron requirements were met for children aged 12-23 months, anaemia will continue be a problem in this age group. If anaemia is indeed a problem in the area, as is in the rest of the country (national average is 74% of anaemia in 6-59 months age children), one short-term option for improving the nutrient intake of this age group would be to distribute a micronutrient sachet; a home fortification strategy whereby a combination of micronutrients is sprinkled on to the child's food before consumption.

For this modelling, the formulation tested was a special formula to battle anaemia, as a multi-micronutrient supplement is not required (all other nutritional requirements were met by adding goat milk to the diet). The composition of the supplement is shown in Figure 3.5 below.

Figure 3.5 – Composition of Nutritional Anaemia Formulation Sprinkles

Composition of Nutritional Anemia Formulation Sprinkles

Micronutrient	Amount
Iron	*12.5 mg*
Zinc	*5 mg*
Folic Acid	*160 µg*
Vitamin A	*300 µg RE*
Vitamin C	*30 mg*

Source: Sprinkles Global Health Initiative

When both goat milk and the 'anti-anaemia' supplement are added to the diet, all nutrient requirements for 12-23 month old children are met, and the cost of the diet for this group reduces significantly, as shown in Table 3.8!

Table 3.9 – Cost of the Diet compared with the cost of the diet including goat milk and a supplement for children aged 12-23 months, in Meticais

	Cost of Diet Tier 2			Cost of Diet including goat milk and supplement *		
	Harvest season	Hunger season	Annual cost	Harvest season	Hunger season	Annual cost
12-23 months old	1.75	1.44	586.05	0.28	0.95	216.99
Rest of family	46.89	43.20	16487.55	31.33	43.17	13448.25
Total/day	48.64	44.64		31.61	44.12	
Total	9484.80	7588.80	17037.60	6164.32	7500.92	13665.24

NB the supplement is only for 12-23 month old; for the rest of the family only goat milk was added!

4. Conclusion

Using the HEA analysis, 60-70% of the population of River Zone of Morrumbala district are classified as “poor”, with 0.25-1 ha of cultivated land (during the dry season this decrease to 0.1-0.25 ha), few animals (normally of small animals, such as chickens, pigs and goats), and few assets (0-1 bicycle) and tools (owning only a hand hoe) [2].

The livelihood of the majority of households is based on agriculture. Land is still abundant, but many poor households suffer from food insecurity from December to March. Poor households never have enough food stocks to last the year and therefore purchase food during the hungry season. The poorest households supplement their diets, in significant quantities, with wild foods (roots).

Income source for those “poor” household are limited, as there are few work opportunities outside the growing season. The average income of a poor family is 5.000,00 MT. According to HEA the poor households spend around 60% of their income on purchasing food (staple and non staple food).

The cost of the diet analyse found that , even if the poorest households ,spend 100% of their income on food they will have less than half the amount needed for the cheapest diet that meets all the nutrient requirements. Their average annual income is 5.000,00 Mts (4000-6000MT–HEA2008), and the lowest cost diet costs annually 17.037,60 MT. It is clear that the lowest cost of the diet that meets (nearly) all nutrient requirements is attainable for the poorest households. . There is only a small difference between the two seasons, with slightly higher costs in the harvest season.

The lowest cost diet does not meet all nutrient requirements for children aged 12 to 23 months and for the rest of the family. For 12-23 month old children, riboflavin (vitamin B2), calcium, iron and zinc requirements were not met in both seasons, and the pantothenic acid requirement is not be met in the hunger season. For adults, requirements of the same micronutrients and fat were not met. .

The results showed that the quality of the diet currently eaten was not sufficient to meet all nutrient requirements. The first step in trying to improve the diet so all nutrient requirements could be met, was to increase the frequency of the foods that are currently consumed. ,

The CoD programme was run without limiting food frequency; all foods could be consumed three times a day, seven days a week; portion sizes used were still restricted to estimated portion sizes. The results show that for 12-23 month old children there is no difference at all, but for the rest of the family, the diet does change, meeting more of the nutrient requirements (fat and energy requirements are met, riboflavin, calcium and iron requirements are improved, but not completely met, and there are still pantothenic acid requirements that are not met). Although there are improvements in the diet, as can be seen all the nutritional requirements are still not met. In addition, the annual cost of the diet increased considerably from 17.037,60 MT to 20.236,00 MT, increasing the gap between income and affordability of nutritious food items.

This shows that an increase in consumption of the amounts of the food items that the population are actually eating does not improve the quality of the diet sufficiently, and that other foods and other ways of intervention need to be explored, for example inclusion of food items not usually consumed by poor people.

Most of the nutrients in deficit can be found in foods of animal origin, so several products such as eggs, chicken, goat milk, and beans, were introduced into the diet, separately and in combination.

[2] Save The children, How do People Survive in Morrumbala? An economic analysis of how household coped with the 2005 poor rain in the revering areas of Morrumbala district, March 2007

Goat milk was the only one, that when introduced into the diet, met the majority of nutrient requirement for both groups, with the exception of iron for the 12-23 months group. Improvements were seen in iron consumption but these were not sufficient to meet requirements. The actual cost of the diet fell to 13.951,85 Mts (the assumption was that goats milk had no cost implications to the household).

For the other food items, when analysed separately, no improvement was registered in the diet, and the diet cost increased significantly. However, when beans were combined with eggs all deficiencies were solved for both seasons for the family members, with the exception of the children aged 12-23 months. The 12-23 month old children were still not meeting requirements in the micro-nutrients of iron, zinc and calcium. The cost of adding a combination of beans and eggs to the diet is high (28.582,00 Mts) and would not be affordable for the poorest households. It should also be noted that adding these foods does not fully response to the nutrient requirement of the 12-23 month old infants.

Economic growth and development programmes in the country aim to increase the income of households, reducing the incidence of poverty, however, there is growing evidence that a percentage of extremely poor households are unable to take advantage of growth driven initiatives.
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In Mozambique the national poverty line has been set at 8.50 Mt per person per day. This means that for an average family of 7 persons the poverty line is 59.50 MT per day, or 21.717,50 MT per year. With a minimum income at the poverty line, a household would be able to afford the lowest cost nutritious diet, which cost 17.037,60 MT. The HEA 2008 estimated the average income of a poor family at 5.000,00 Mt per year, leaving a gap of 16.717,50 MT between the poverty line and actually earned income of poor households in Morrumbala. A cash transfer to cover this gap would be almost 1.400 MT per household per month (1.393,20 MT, around 40.4 USD) [3] and have the potential to consume a nutritiously adequate diet. The cash transfer could take the form of cash for work programmes (public works) for the economically active members of the households, or an unconditional transfer for households where there are no economically active members (elderly headed or child headed households, people living with disability)

Taking into account that the main nutrients lacking in the actual diet are micronutrients, and that even after including goat milk on the diet, iron requirement for the 12-23 months old still not meet, and anaemia is considered a health problem in Mozambique, the other short-term solution for consideration, would be to supplement the infant diet with micronutrient sachet (sprinkles), that can be added to the child's food before eating.

When goat milk and "sprinkles" are added to the diet, all nutrient requirements are met for both groups, and the cost of the diet reduces significantly to 13.665,24 Mt annually.

[3] Currency rate of Standard Bank www.standardbank.co.mz on 11 June 2010: 1 US$ = 34.629 meticais

5. Recommendations

According with the results of the cost of the diet, the “poor” families in Morrumbala district do not meet their nutrition requirements. Even if they would use all their annual income they wouldn’t be able to reach 100% of their nutrients needs.

Although Morrumbala district is considered as a productive area, the “poor” household are not producing enough for consumption along the year, due to lack of agricultural inputs and labour, and the quality of the diet is not sufficient to respond the need. To add, they do not have capacity to purchase other food items, as they have limited income sources.

Based on analyse done, same recommendations can be drawn, as possibilities to overcome the identified constrains.

Taking in account that the diet did not improve by increasing the frequency consumption of foods currently eaten separately, beans and eggs were combined and the results shows that, although the diet became more costly, all nutrient requirement were meet for the rest of the family but not for the 12-23 months old group. However, to add more eggs on the diet is costly and most of the poor household will not afford it, unless if eggs are more accessible. A way to make eggs more accessible to families is trough promoting chicken production. But, it will so be needed a nutrition education program to promote eggs and chicken meat consumption, as well as the balance diet concept.

Then, CoD program was also running including food items which are not normally consumed by the “poor” people, as goat milk. By including goat milk in the diet, almost all the nutrients requirement, for both ages groups, are meet, except iron on the 12-23 months old group, and the total diet cost would reduce significantly. But, on other hand, goat milk is not part of the diet habits of this population.

To implement this recommendation, a first step will be to increase the goat production, and then advocate for create awareness for milk and meat consumption. This can be considered as a long-term intervention, considering that changing food habit takes time and is costly. Among Save the Children programmes, goat production could be included on the food security program (livelihood program) as a micro-project, where a family would get a pair of goat, and after reproducing the family should give to another family, and so on. Or Save could advocate among others partners working in Morrumbala to promote goat production and consumption.

To meet iron requirement, which had only improved by the inclusion of goat milk on the diet but not fulfil in 100%, was considered a supplementation of the 12-23 months olds with sprinkles (composition: iron, zinc, folic acid, vitamin A and C). These results could be presented to Ministry of Health (MoH), as a way to advocate for them to include sprinkles on their existent micronutrients supplementation program.

Other way to improve the diets is through increasing the purchasing power of the families. The analysis done had considered an increase of the annual income to a level of the national poverty line. The gap existent between the actual income and the poverty line is of 16.717,50 Mts annually. The proposed recommendation is to give monthly to “poor” families a cash transfer of around 40 USD. This could be done using food stamps to insure that families do expend the money on food and not in other non-food items. To implement such a program, it is important to be created inclusion and exit criteria’s.

This could also be implemented as a “pilot” in coordination with INAS (National Institute for Social Affaire) inside of the actual program called “Subsídio de Alimentos” (food subsidy), as a way to advocate among INAS to increase the actual amount given to vulnerable people, to meet the real need of those vulnerable families.

Apart of MoH and INAS, these results could also be presented and disseminated among all others stakeholders, including those operating in Zambezia province and Morrumbala District.

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Annexes

Annex I – Food List and frequencies in which each food is consumed

	CHILDREN 12-23m		REST OF FAMILY	
	FINAL FREQUENCY		FINAL FREQUENCY	
	for food group total		*for food group total*	
FOODS – ENGLISH	***min***	***max***	***min***	***max***
	7	21	7	21
White Rice	2		3	
White maize flour	21		21	
White maize grains, raw	1		4	
Sorghum flour	11		10	
Millet flour	7		6	
Spaghetti	1		2	
Glucose biscuit	0		0	
PULSES, SEEDS AND NUTS	0	14	0	14
Kidneybeans dried raw	1		1	
Lima bean, dried	1		1	
Cowpea green/raw	14		14	
Cowpea dried	14		14	
Pigeon pea fresh	14		14	
Pigeon pea dried	14		14	
Bambara groundnut fresh	1		3	
Bambara groundnut dried	2		3	
Peanuts fresh with shell	0		0	
Dried peanut, no shell	14		14	
Cashew nut	1		4	
Watermelon seeds, powdered	0		0	
Cucumber seeds, powdered	6		6	
Pumpkin seeds, powdered	2		2	
Sesame seeds, powdered	7		6	
VEGETABLES	0	14	7	14
Green maize (unripe)	13		21	
Pumpkin	11		11	
Lady's finger / okra	11		14	
Carrot	1		1	
Cucumber	6		7	
Cabbage	3		5	
Tomato	17		17	
Kale	17		17	
Lettuce	3		3	
Pumpkin leaves	14		14	
Cowpea leaves	14		14	
Cassava leaves	4		4	
Sweet potato leaves	0		1	
Okra leaves	4		7	
Yam leaves	4		4	
Amaranth leaves	2		4	
Leaves (wild food)	1		1	
Leaves from kinine plant	0		0	
Drumstick tree leaves	1		4	

Onion	14		14	
Garlic	14		14	
Green (bell) pepper	1		1	
Chillies	0		17	
FATS	0	7	0	14
Oil vegetable	14		14	
Margerine	0		0	
DAIRY	0	0	0	0
Goat milk	0		0	
MEAT, POULTRY, FISH AND EGGS	0	4	1	4
Fish big sweet water fresh	6		6	
Fish big sweet water dried	5		6	
Fish small sweet water fresh	8		7	
Fish small sweet water dried	5		6	
Fish small, sea, dried	0		0	
Goat meat	3		4	
Chicken fresh	4		4	
Insects fresh, termite/big ant	8		8	
Grasshopper	1		1	
Larves dried	0		1	
Eggs chicken	4		4	
ROOTS AND TUBERS	0	18	2	18
Cassava	10		11	
Cassava flour	10		10	
Flour of maize and cassava	21		21	
Yam fresh	1		1	
Sweet potato white	21		21	
Sweet potato orange	4		4	
FRUIT	0	14	1	14
Banana green (unripe)	1		2	
Banana ripe	4		4	
Coconut meat	0		2	
Mango ripe	24		21	
Mango green/unripe	3		4	
Papaya, ripe	3		4	
Papaya green/unripe	1		1	
Orange	2		5	
Tangerine	13		12	
Pineapple	3		4	
Guyava	1		3	
Avocado pear	0		0	
Watermelon	3		7	
Baobab	3		3	
Sugar cane	13		21	
Lemon	0		0	
OTHER	0	7	0	4
Honey	1		21	
Condensed milk, sweetened	2		21	
Sugar (brown)	7		18	
Cake	0		18	
Salt (non-iodised)	0		18	

Annex II – Generic portion sizes for 12-23 month old children

Source: unpublished data

All other portion sizes are based on these portion sizes. For example, goat's milk has received the same portion size as cow's milk (136 gram).

Annex II – Generic portion sizes for 12-23 month old children

Source: unpublished data

All other portion sizes are based on these portion sizes. For example, goat's milk has received the same portion size as cow's milk (136 gram).

Food Type	Generic Portion Size (g)
All cereals/grains	36
All flour	23
All meat	15
All offal	8
All pulses and seeds	15
All bread	28
All soft fruit	42
Unripe fruits (banana and papaya)	21
All fats/oils/butter	5
All berries / small/soft fruits	25
All fish	10
All leafy vegetables	15
Large root vegetable	25
Soft vegetables	10
Condiment vegetable	5
Citric fruits	5
Tofu	41
Paste / sauce	5
Cows milk	136
Eggs	20
All cakes	21
All biscuits	11
Coconut milk	5
All spices	1
Salt	0.3