The Minimum Cost of a Healthy Diet

Findings from piloting a new methodology in four study locations

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Acronyms

DHS	Demographic and Health Survey
EU	European Union
FAO	Food and Agriculture Organization (United Nations)
GNI	Gross National Income
ha	Hectare
HEA	Household Economy Approach
IFPRI	International Food Poverty Research Institute
kcals	Kilocalories
MDG	Millennium Development Goal
mg	Milligram
ml	Millilitre
NGO	Non-governmental organisation
PSNP	Productive Safety Net Programme (Ethiopia)
RDRS	Rangpur Dinajpur Rehabilitation Services
SD	Standard deviation
Tsh	Tanzanian shillings
WHO	World Health Organization

Glossary of terms

Cash transfer programmes
Schemes in which beneficiary families receive direct cash payments compared to more traditional forms of aid such as food items. Advantages of cash schemes include the greater flexibility and choice provided to the recipients.

Food security
Food security means secure access for all people at all times to sufficient quality and quantity of food in order to lead a healthy and active life, without human and children's rights being compromised.

Household Economy Approach
An approach which quantitatively describes the economy of a defined population based on fieldwork to collect information to determine the dimensions of local household income, and analyses the potential outcomes of a shock or stress on the ability of local households to maintain their food and non-food consumption.

Livelihood
This comprises the capabilities, assets (both material and social) and activities required for someone’s means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base or interfering with the protection and fulfilment of other human rights.

Malnutrition
Three types of malnutrition are commonly distinguished:
1. Low weight-for-height or wasting - when a child is thin for his or her height, but not necessarily short for his or her age. Also known as acute malnutrition, this carries an immediate increased risk of morbidity and mortality.
2. Low height-for-age or stunting - when a child is short for his or her age, but not necessarily thin. Also known as chronic malnutrition, this carries long-term developmental risks.
3. Low weight-for-age or underweight - when a child can be either thin or short for his or her age. This reflects a combination of chronic and acute malnutrition.

Stunting
See definition on malnutrition.

Underweight
See definition on malnutrition.

Executive Summary

Tackling chronic malnutrition effectively, and in particular improving the diet of children in the critical period up to the age of two years, remains a major challenge to the international community. Recent years have seen nutrition policy-makers focus heavily on addressing non-food related causes of malnutrition in developing countries (health status and caring practices), rather than tackling food insecurity. Furthermore, progress made in measuring food insecurity has largely involved measuring access to food energy, rather than aspects of dietary quality.

Whilst there has also been progress in the measurement of children's diets, few tools have been available to date to examine whether communities are able to secure enough resources to feed their children properly with the *quality* of diet necessary to ensure healthy growth and development. In the context of growing momentum behind the development of social protection schemes, and in particular those centred around regular cash transfers in low-income countries, an understanding of the minimum cost of a healthy diet could help policy-makers determine how to achieve the best nutritional outcomes for children and families with these programmes.

In 2006, Save the Children initiated a pilot research programme to quantify the extent to which households could afford to feed their children under the age of 2, and a whole family of 5 people, with a diet meeting minimum requirements of macro and micronutrients. This involved expanding and refining some existing linear programming software (originally developed by WHO) for the analysis, and initiating data collection in selected communities in four countries - Bangladesh, Myanmar, Ethiopia and Tanzania - to trial the methodology and develop case study examples. This report presents the findings relating to the cost and affordability of the cheapest possible diet in the four study locations.

Work of this kind has not been conducted in the developing world, and the approach taken here was ground-breaking by: (i) attempting to determine the minimum cost and affordability of a diet for the *whole family* rather than just an individual child, (ii) taking into account seasonal variation in prices an availability of food and (iii) including costs and availability of food at the local level.

The specific research objectives were as follows:
(i) to develop a methodology for estimating the cost of the diet for the family;
(ii) to determine the minimum cost of a healthy diet by season in four locations;
(iii) to determine the affordability of a healthy diet by household type and season in four locations.

Background data on the study areas is presented from studies previously conducted by Save the Children in the study locations to contextualise the results of the analysis.

This report outlines the methodology and tool used for the modelling, assumptions built into the analysis, and highlights some of the limitations of the methodology used. Before this method can be used on larger populations and by governments, NGOs, donors and others, there are a number of ways in which it needs to be developed: the software needs to be refined further, the methods for determining affordability need to be consolidated and streamlined, and agreement on the parameters of different diet types (physiological, environmental and cultural) need to be reviewed.

However, the initial findings indicate that there is a substantial shortfall in household's ability to feed their children adequately in the four countries of the study. Diets in

Ethiopia and Myanmar cost more than a dollar a day (US $1.27 and US $1.15 respectively); in Tanzania and Bangladesh, they cost 72 cents and 91 cents respectively. In practice, the minimum cost of a healthy diet is likely to be higher than the results presented in this report due to environmental and cultural factors which mean the diet costed is unlikely to be practically consumable.

However, even with the conservative estimates presented, the diet remains unaffordable for large proportions of the population in all four study locations. While it is technically affordable in Myanmar and Tanzania, it remains unaffordable for a significant proportion of the population in Bangladesh and Ethiopia. Once estimates take into account basic non-food items needed for households to maintain a minimum standard of living, a healthy diet would become unaffordable for the majority of the population in all four locations.

In all the study locations, large proportions of children do not receive the frequency of feeding and dietary diversity they need. The findings also point to marked seasonal variation in costs, which has important implications for the cash flow of poor families who may not have a steady income through the year.

This research points to the need for much greater attention to tackling the economic causes of malnutrition in strategies to achieve MDG1. Particular attention needs to be paid to ensuring that the poorest, who face the constraints most profoundly, are reached and that the significant effects of seasonality are taken into account. The findings of this report point to a specific role for cash-based social protection programmes which could offer a particular intervention opportunity to help overcome economic constraints during crucial periods in a child's development. The findings also point to an increased role for micronutrient supplementation and fortification policies.

Backed by these and other research findings, Save the Children UK continues to call on:

- National governments and the international donor community to recognise that poverty is a critical cause of chronic malnutrition, and to therefore design accordingly interventions to address the economic constraints that limit poor people's access to food.
- The international donor community to prioritise social protection programmes, including regular cash benefits to the poor, towards eradicating severe poverty and hunger.
- Donors to pledge support to low-income countries wishing to implement programmes providing direct cash benefits to the poor, by putting in place innovative mechanisms for channelling long-term, predictable aid.
- Richer countries to fulfil their commitment to increase (untied) aid to meet the 0.7 per cent of GNI target by 2010.

Introduction

Malnutrition rates remain at unacceptably high levels in many parts of the world, with an overall global estimate of 1 out of 4 children being malnourished. An estimated 146 million children under the age of five are underweight and 170 million stunted (UNICEF, 2006). In 2000, world leaders took a big step forwards in the fight to tackle malnutrition when they promised to eradicate hunger. The first Millennium Development Goal (MDG1) to which they committed includes indicators for: a) reducing the proportion of the world's population living on less than a dollar a day and b) reducing the proportion of the under-five population which is underweight. At that time, 29 per cent of children in the developing world were malnourished (underweight).[1] Today, in 2007, halfway through the period covered by the promise, 27 per cent of children are malnourished.[2] Estimates based on current trends show that by 2015 there will be more malnourished children than there are today in 32 countries in the world. Rates of reduction in malnutrition are particularly off-track in sub-Saharan Africa, and while these rates are faster in South Asia, the numbers of children with malnutrition are greatest there.[3]

Malnutrition is the single biggest contributor to child mortality. Children who do not reach their optimum height or consistently experience bouts of weight loss during childhood are affected in the long term in numerous ways: they do not reach their optimum size as adults (and so may have less physical capacity for work), their brains are affected (resulting in lower IQs) and they are at greater risk of infection (which kills many children during their early years).

In some cases, malnutrition can contribute to other debilitating conditions. For instance, for children with HIV/AIDS, malnutrition can be particularly profound, as opportunistic infections interact with poor nutritional status in a vicious cycle. Women who have low body weight give birth to small babies, perpetuating the inter-generational cycle of malnutrition. In addition, a diet which is inadequate in particular micronutrients can have very specific impacts on children: lack of iron, for example, affects children's performance in school, lack of iodine can result in goiter and ultimately cretinism, and lack of Vitamin A can result in blindness.

The long-term consequences of chronic malnutrition are far-reaching. A recent multi-country study showed that for every 10% increase in stunting, the proportion of children reaching the final grade of school dropped by almost 8%. The same study showed that each year of schooling increases wages earned by almost 10%.[4]

Scientific evidence points to the fact that beyond the age of 24-36 months, the effects of chronic malnutrition are irreversible. This means that strategies which aim to reduce malnutrition and break the intergenerational transmission of poverty and malnutrition must reach children during their first two years of life.

The immediate causes of malnutrition are the combined effects of disease and inadequate dietary intake. The underlying causes of disease and inadequate dietary intake vary from country to country. A study by the International Food Poverty Research Institute (IFPRI) analysed data from 63 countries based on country fixed-effects multivariate regression, and identified four "underlying" determinants as key

[1] UNICEF (2001), *The State of the World's Children*, UNICEF, NY, NY; data refers to the period 1995-2000.
[2] UNICEF (2007), *The State of the World's Children*, UNICEF, NY, NY; data refers to the period 1996-2005.
[3] UNICEF (2006), *Progress for Children: A Report Card on Nutrition (No. 4)*, UNICEF, NY, NY.
[4] Grantham-McGregor, S. et al (2007), 'Child Development in Developing Countries: Developing Potential in the First 5 Years for Children in Developing Countries', The Lancet, Vol. 369, No. 9555: 60-70.

factors: health environments, women's education, women's relative status, and per capita food availability, along with two other important "basic" determinants: per capita national incomes and democracy.[5] The study was unable to consider the effects of household level food security or poverty (i.e. *access* to food and income rather than per capita measures) on child malnutrition due to insufficient data.

While food insecurity is acknowledged as a cause of malnutrition, the exact relationship between the two is not well understood. This is partly because of the difficulties associated with measuring the food-related causes of malnutrition. Two key approaches are currently used: 1) the measurement of household food access (through a variety of quantitative and qualitative approaches), and 2) the measurement of feeding patterns of young children (primarily through questionnaire-based approaches).

National datasets which measure food access are few and far between. Recent years, however, have seen the development of a considerable body of work on the measurement of food insecurity on a smaller scale. The major limitation of this work is that it has focused largely on measuring access to food energy (kilocalories) rather than access to a quality diet (i.e. including protein, fat and micronutrients).

With the measurement of feeding patterns of young children, it is generally recognised that measuring the dietary intake of individual children is practically impossible at scale, and also methodologically undesirable due to the considerable reporting bias that occurs. The most widely accepted approach for measuring feeding patterns in the developing world is the 24-hour recall method, which applies a standard questionnaire to investigate the frequency and diversity of feeding. Frequency and diversity are used as proxies for the quantity and quality of the diet, and scores are developed for them to compare real and recommended practices.[6]

There are some key problems with this approach. Children often eat a portion of food taken from the family pot, and so while a child may have consumed for instance fish or oil in the last 24 hours, the quantity may in fact be negligible if, say, one small fish was used for the entire family's meal. There is therefore a risk that diversity becomes a very inadequate proxy for dietary quality. The second problem is that this approach assumes that the quality of the diet can be measured and therefore compared in a standardised way. Given that there is no single optimal diet, and that this will vary from one location to another, there is reason to question this assumption. Measures of dietary diversity and frequency have demonstrable value for monitoring the impact of interventions and measuring change in the same place over time, but new methods are needed for measuring the quality of the diet in a manner which allows comparison with nutritional requirements and across countries.

Perhaps partly as a result of these measurement difficulties, the last 10 to15 years have seen a heavy focus by the nutrition community on addressing the non-food related causes of malnutrition in developing countries, particularly related to caring practices and health status. The World Bank, the biggest donor for nutrition projects, recently published a strategy document[7] on nutrition which states:

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[5] Smith, L. and Haddad, L. (2000), *Explaining Child Malnutrition in Developing Countries: A Cross-Country Analysis*, Research Report No. 111, International Food Policy Research Institute (IFPRI), Washington, DC.

[6] For example, Ruel, M. and Arimond, M. (2003), *Measuring Childcare Practices: Approaches, Indicators and Implications for Programs*, Food Policy Review No. 6, International Food Policy Research Institute (IFPRI), Washington, DC.

[7] World Bank (2006), *Repositioning Nutrition as Central to Development: A Strategy for Large Scale Action*, World Bank, Washington, DC.

> *"Myth 1: Malnutrition is primarily a matter of inadequate food intake. Not so. Food is of course important. But most serious malnutrition is caused by bad sanitation and disease, leading to diarrhea, especially among young children. Women's status and women's education play big parts in improving nutrition. Improving care of young children is vital."*

Whilst it is true that it is not only a poor diet which causes malnutrition, this quote reflects the current emphasis away from tackling food insecurity, and towards tackling health and care. Furthermore, while considerable expertise has been established on the best strategies for achieving behavioural change, the economic constraints on caregiver's behaviour have often been poorly understood and not accounted for in project design. This focus has resulted in surprisingly few examples of large-scale nutrition projects which have successfully improved the quality of the diet of young children, particularly in terms of improved complementary feeding, and also demonstrated reductions in chronic malnutrition (stunting).[8]

New approaches for tackling child hunger are now emerging. For example, the 2005 EU Africa Strategy committed its member states to lifting 8 million chronically food insecure people away from emergency relief and placing them under safety nets by 2009. This is leading to the design, programming and implementation of social protection programmes, including regular cash transfers, in favour of the poor to protect children from malnutrition and, more generally, to help lift families out of poverty. This focus is only likely to increase as more evidence on the nutritional impact of these programmes is published. As yet, however, there are no tools available to determine how big cash transfers should be and what type of social protection measures or package would be required in order to achieve specific nutritional objectives.

The findings presented in this paper are the results of piloting a new method for estimating the cost and affordability of the diet in four study locations (villages in Bangladesh, Ethiopia, Myanmar and Tanzania). This method offers a stronger approach to those currently used by measuring access to a diet which meets dietary energy and quality standards. While work of this kind has been undertaken in developed countries for many years, it has not been widely conducted in the developing world. This work has been groundbreaking in 3 major ways:

1) To our knowledge, it is the first time that an attempt has been made to determine the minimum cost of a healthy diet for the whole family. To date, attempts have been made to use linear programming to calculate the cost of the diet for an individual child. However, in order to provide information which will inform strategies for tackling malnutrition, it is necessary to cost the child's diet alongside those of other family members, otherwise conclusions about affordability are purely theoretical. Furthermore, the method allows investigation into the cost of the diet for other nutritionally at-risk individuals, such as pregnant women and adolescent girls.
2) It would appear that seasonal variation in prices and availability of food has been taken into account for the first time in the costing of the diet.
3) To our knowledge, it is the first time that the costs and availability of food at the local level, in villages which may not be well connected to markets, have been included. Previous work has mainly concentrated on data from capital cities.

The research objectives were as follows:

[8] See, for example, Hossain, M., Duffield, A. & Taylor, A. (2005), 'An Evaluation of the Impact of a US $60 million Nutrition Programme in Bangladesh', *Health Policy and Planning*, Vol. 20, No. 1: 35–40.

1) To develop a methodology for estimating the cost of the diet for a family.
2) To determine the minimum cost of a healthy diet by season in four locations.
3) To determine the affordability of a healthy diet by household type and season in four locations.

Methods

The cost of the diet

A diet is considered acceptable for an individual when it covers both the micro- and macronutrient requirements.[9]

The cost of the cheapest adequate diet was calculated using a linear programming tool and a spreadsheet model built in Microsoft Excel 2000. The original software was developed by WHO (http://www.nutrisurvey.de/lp/lp.htm) and was expanded by Save the Children so that it could estimate the cost of diets for all family members, not just young children. Linear programming is a classical mathematical tool used to solve problems such as, in this case, the estimation of the minimum cost of a diet subject to multiple nutritional and acceptability constraints. The model calculates the cheapest adequate diet using two standard databases and three sets of locally specific data. The food composition database built into the programme was established by the Food and Agriculture Organization (FAO), while individual nutrient requirements were based on WHO recommendations. Guided by these standards, the programme is able to determine the cheapest adequate diet when provided with:

- a list of locally available foodstuffs and prices per season;
- the household composition in terms of number and characteristics of household members for whom the diet is required;
- the maximum amount of each food that various household members can consume in order for amounts recommended by the programme to remain realistic.

The programme has the following assumptions built into the analysis:

• The energy provided by the diet must meet the total energy requirements of all the individuals. For instance, if there are 2 children in the 12-23 month age group, each with an energy requirement of 894 kcals, then the solver will look for a total diet providing 1788 kcals.

• The nutritional content provided by the diet (protein, fat, calcium, etc.) must not be less than the nutritional requirements across all the individual(s) covered. These are calculated from the quantity (in grams) of each food item in the diet, and the nutritional content provided by each gram. For example, if there are 2 children in the 9-11 month age group, each with a nutritional requirement of 54.0 mg of magnesium and 4.1 mg of zinc, then the solver will look for a total diet providing 108.0 mg of magnesium and 8.2 mg of zinc.

In this report, only the lowest cost physiologically acceptable diets are presented. It would probably be unreasonable to expect households to actually practice these diets for two key reasons:

a) There may be environmental constraints which prevent them from being feasible. For example, a family may be expected to collect 4 kg of wild green leaves per day in order to provide the cheapest possible source of nutrients. However, this may not be possible in practice if the source of food is not as abundant as required.
b) There may be cultural constraints which prevent them from being acceptable. Furthermore, diets which differ dramatically between parents and children may not be practical, as mothers may not be able to undertake separate food preparation processes because of fuel and time constraints.

[9] According to WHO standards.

Ensuring that the diets are both environmentally and culturally feasible requires an additional set of assumptions to be built into the data analysis, and also means an increase in the cost of the diet. While environmental and cultural diets were prepared for the four countries, they are not presented in this paper.

1. Seasonal food availability and price

The number of seasons in each location was determined from secondary sources (such as HEA reports) and discussion with key informants from the community and also local merchants (for information on prices).

For Bangladesh, the year was divided into four seasons: winter from mid-November to mid-March, summer from mid-March to mid-June, the rainy season from mid-June to mid-September, and the lean season from mid-September to mid-November. Data on food availability and prices were collected between September and December 2006 and referred to the period April 2005–March 2006.

For Ethiopia, the year was divided into four seasons: two rainy seasons pre-harvest when cereal prices are generally higher, and two post-harvest seasons when prices are correspondingly lower. The high cereal price seasons were taken to be August-October (season 2, pre-*Meher*) and January-May (season 4, pre-*Belg*), and the low cereal price seasons June-July (season 1, *Belg*) and November-December (season 3, *Meher*). Data on food availability and prices were collected during the period June 2006–February 2007 and referred to the period June 2005-May 2006.

For Myanmar, the year was divided into three seasons: winter from November to February, summer from March to May and the rainy season from June to October. Data on food availability and prices were collected during November-December 2006 and referred to the period November 2005-October 2006.

For Tanzania, the year was divided into two broad seasons:[10] the period prior to harvest during which prices are high, and the comparatively cheaper post-harvest period. The 'high price season' extends roughly over a five-month period from December to April, with the remainder of the year making up the 'low price season'. Data on food availability and prices were collected in March 2006 and July/August 2006. March prices represented the 'high price season' extending from December 2005 to April 2006, and July/August prices represented the 'low price season' from May to November 2006.

Training of data collectors

The first part of the training included reviewing nutrition concepts and theories (including the types and causes of malnutrition, feeding recommendations for children under the age of two, an overview of food security, etc.). This was followed by a review of secondary data to identify data collection needs. Trainees were actively involved in tailoring the data collection formats to the local context, to ensure familiarity with them. The data collection techniques (a combination of questionnaire and participatory interviews) were then discussed and standardised amongst team members. A strong emphasis was placed on ensuring quality data through cross-checking and various forms of triangulation. Data was consolidated periodically throughout the collection process to ensure that information gaps and inconsistencies were identified and filled.

[10] The year could have been further sub-divided into four seasons i.e. two main seasons and two transition periods.

2. Household composition

All the data presented in this report relate to a 5-person household consisting of:

- A child (of either sex) aged 12-23 months
- A child (of either sex) aged 3-4 years
- A child (of either sex) aged 7-8 years
- A man aged 30-59 years, weighing 50 kg and vigorously active
- A woman aged 30-59 years, breastfeeding, weighing 45 kg and vigorously active

The decision on the household composition was arbitrary, but deliberately included a child under 24 months of age to comply with the overall purpose of the research.

The decision to use a household size of 5 members was based on the typical size of households across different wealth groups in the study area (see Table 1).

Table 1: Household sizes in study areas

	Source of data	Household size
Bangladesh	Exhaustive household economic survey in one village[11]	Average across all wealth groups was 4.7
Ethiopia	Updated Household Economy Approach (HEA) Baseline for South Wollo Highland Belg Zone[12]	Varied from 3-8 members in different wealth groups; the only common size in all wealth groups was 5
Myanmar	Household Economy Approach Baseline in Kangyidaunt Township[13]	Average across all wealth groups was 5-6
Tanzania	Household Economy Approach Baseline 2003,[14] Study of the poorest households 2006,[15] Dietary survey[16]	Average across all wealth groups according to the census conducted for the study of the poorest households was 4; the 2003 HEA presented a typical size of 6.

3. Maximum amount thresholds

Maximum amounts of each food and food types for different age groups were determined as a maximum percentage of the daily energy requirement (shown in Table 2). For example, the energy contribution made by leafy vegetables cannot exceed 5% of the nutritional requirement. The thresholds were agreed through consultation with experts at University College London, WHO and the University of California, Davis, but have not been internationally agreed; it is also not yet clear whether these thresholds should be standardised across countries.

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[11] Seaman, J. et al (2005), 'A Study of the Relationship between Household Economy and Nutritional Status in a Village in Kurigram, Bangladesh', Save the Children UK, unpublished report.

[12] Save the Children (2006), *Amhara Regional State, South Wollo Highland Belg Zone Livelihood Profile*, Save the Children UK.

[13] Save the Children (2007), *Household Economy Assessment of Kangyidaunt Township, Ayeyarwaddy Division, Myanmar*, Save the Children UK.

[14] Save the Children (2003), *Livelihoods of Lindi Rural District: A Household Economy Assessment in Southern Tanzania*, Save the Children UK.

[15] Save the Children (2007), *Tackling Extreme Poverty: The Role of Cash Transfers and Complementary Social Protection Measures*, Save the Children Tanzania.

[16] Save the Children (2007), *Tackling Chronic Malnutrition: What Would it Take to be Able to Afford a Quality Diet? An Example from Lindi Rural District*, Tanzania, Save the Children UK.

Table 2: List of maximum percentages of energy requirement

Staples	100
Dairy	100
Fats	30
Fish	20
Fruit	8
Leafy vegetable	5
Pulses	50
Meat	20
Eggs	20

The amount of breastmilk for a child of 12-23 months used was 549 ml, based on average intakes of breastmilk.[17]

The affordability of the diet

The affordability of the diet was judged using a variety of related methods depending on the data available in each study area.

In Bangladesh, income data were gathered through an economic survey which included all households in the selected village. This was conducted in January 2005, with the data referring to the period January–December 2004. The survey design was based on the analytical framework adopted by Household Economy Approach[18] and is described in detail in Seaman et al (2005).[19] The 2004 income distribution was adjusted to 2006 prices using published inflation rates, specific to food prices, from the Central Bank of Bangladesh. These figures were 7.90% for 2004-5 and 7.76% for 2005-6. The cash equivalent of the food produced was determined by multiplying the amounts produced (as presented in the HEA/IHEA/IHM databases) by 2006 food prices.

In Ethiopia, a household economy assessment was carried out in 2006 with the data gathered relating to the year July 2004-June 2005. Comparison with price data collected for this study (i.e. the period June 2005-May 2006) indicated that there had been no inflation in the food prices, so no adjustment was necessary. The cash equivalent of the food produced and consumed was determined by multiplying the amounts by 2005-6 food prices.

In Myanmar, a household economy assessment was conducted in Kangyidaunt Township as part of a training exercise in 2006. This referred to the period April 2003-March 2004. These data were adjusted for inflation at 35% per year (a figure provided by Save the Children's micro-credit programme) and food income was converted into a cash equivalent at 2005-6 prices.

In Tanzania, a household economy analysis relating to the year March 2002-February 2003 described typical 'better-off', 'middle' and 'poor' households. In 2006, a more in-depth HEA study (referring to the period April 2004-March 2005) was

[17] WHO (1998), *Complementary Feeding of Young Children: A Review of Current Scientific Knowledge*, WHO, Geneva. Available at: http://www.who.int/child-adolescent-health/publications/NUTRITION/WHO_NUT_98.1.htm - see Chapter 3, Table 7, p. 47.
[18] Seaman, J. et al (2002), *The Household Economy Approach: A Resource Manual for Practitioners*, Save the Children UK, London.
[19] Seaman, J. et al (2005) - see footnote 11.

conducted which refined the 2003 results and provided a detailed picture of common household profiles within the 'very poor' and 'extremely poor' categories. The cash equivalent of the food produced and consumed was determined by multiplying the amounts by 2005-6 food prices. The inflation measures used to adjust the total income estimates for the poor, middle and better-off households are shown in Table 3.

Table 3: Inflation rates[20] used to adjust income estimates in Tanzania

2006	6.20%
2005	4.50%
2004	4.10%
2003	4.40%

Household size
Where the typical household size in a particular wealth group was not 5, household cash and food income was adjusted as necessary to a household size of 5.

Error ranges
5% error ranges were calculated for the HEA estimates of food and cash income for Tanzania and Ethiopia. A 10% error range was used for Myanmar as the team which conducted the HEA assessment included some trainees. Ranges were not estimated for Bangladesh because individual households were observed.

Exchange rates
Prices were converted into British pounds and US dollars using historical exchange rates for the mid-point of each season over the time period to which the data relate. For example, for Bangladesh the price data were collected for the period April 2005-March 2006. The exchange rate for January 15 2006, the mid-point of the winter season which runs from mid-November to mid-March, was multiplied by 4 (months), added to the mid point for each other season multiplied by the duration of the season, and the total was divided by 12 months to provide the average annual exchange rate. Historical exchange rates were obtained from http://www.oanda.com/.

For Myanmar, where official exchange rates vary considerably from the reality and an exchange rate of 1140 kyat to 1 USD was used.

[20] Official government statistics.

Methodological limitations

Cost of the diet estimation

1. The database has a limited number of food items (1717), so it was not always possible to find the exact food from the study areas. In these circumstances, the same food from the closest country on the database was chosen.

2. Some wild foods are not available on the database, so for these the closest item on the system was chosen (e.g. sour orange was chosen to represent tringos in Ethiopia).

3. An arbitrary decision had to be made on the household demographic profile to use in the analysis, as in reality every household will have a slightly different composition.

4. The maximum percentages of the energy requirements (Table 2) are based on the advice of experts. Adjustments to these could have an impact on the cost of the diet.

   In order to estimate the potential impact of these limitations on the results, we re-ran the data analysis for the low price season in Tanzania with the following adjustments:
   a) we chose a different country source for the food (rather than the closest country to the study country) - diet 2
   b) we used a household profile with members of the same age, but where adult members instead had medium physical activity levels - diet 3
   c) we used a household profile with older children – aged 12-24 months, 12-13 years and 16-17 years – diet 4
   d) we used a household profile with younger children – aged 12-24 months, 2-3 years and 3-4 years - diet 5
   e) we used a combination of b) and d) above as this was likely to result in the cheapest diet – diet 6
   f) we adjusted the maximum amount of kcals which could be obtained from leafy vegetables to 10% (from 5%) – diet 7

These adjustments resulted in the costs for the family diet during the low price season in Tanzania shown in Table 4.

Using data from Table 4, the highest value (876 Tsh) is 124% of the value for Diet 1 (708 Tsh), and the lowest value (628 Tsh) is 88% of the value for Diet 1. For this reason, ranges 25% above and 15% below the value found are presented in this report.

Table 4: Costs for the family diet, Tanzania low price season

	Country source of food	Adult physical activity levels	Age of children	Maximum amount of kcals from different food groups	Daily cost of family diet (Tsh)
Diet 1	Country closest to study country	High	12-23 months, 3-4 years, 7-8 years	As in Table 2	707.5
Diet 2	The first country on the list which was not closest to the study country	High	12-23 months, 3-4 years, 7-8 years	As in Table 2	659.6
Diet 3	Country closest to study country	Medium	12-23 months, 3-4 years, 7-8 years	As in Table 2	717.8
Diet 4	Country closest to study country	High	12-24 months, 12-13 years, 16-17 years	As in Table 2	875.8
Diet 5	Country closest to study country	High	12-24 months, 2-3 years, 3-4 years	As in Table 2	645.6
Diet 6	Country closest to study country	Medium	12-24 months, 2-3 years, 3-4 years	As in Table 2	628.1
Diet 7	Country closest to study country	High	12-23 months, 3-4 years, 7-8 years	As in Table 2 but increased to 10% for leafy vegetables	677.4

Affordability estimations

5. Several related but different methods were used to collect the income data. In Bangladesh, data were collected for individual households across the wealth spectrum. In Ethiopia and Myanmar, the Household Economy Approach (HEA) was used to collect data for typical households representing the primary wealth groups. This approach, which is standardised and widely used, estimates income in the form of food (crops, livestock products, wild foods, payments-in-kind, etc.) and as cash (crop and other production sales, employment, etc.) for typical households representing locally defined wealth groups (e.g. 'poor', 'middle' and 'better-off'). In Tanzania, income data for 'poor', 'middle' and 'better-off' groups came from using HEA, while that for 'extremely poor' and 'very poor' profiles came from individual household interviews.

   HEA wealth groups are defined by household assets (including labour). Under conditions where assets can be exploited effectively, this would be expected to be a good proxy for direct income estimates. To date, this assumption has only been tested formally in one location[21] and informally in Salima District, Malawi. In both cases, the HEA and direct income estimates were reasonably consistent.

[21] Seaman, J. et al (2006), *Extending the HEA to Support the Design of Cash Transfer Projects in Zambia*, Regional Hunger and Vulnerability Project (RHVP), Johannesburg.

6. The proportion of a population that cannot afford a given diet cannot be calculated precisely from the HEA figures for the percentage of a population in a particular wealth group. If, for example, 50% of a population are in the 'poor' group with an average total income of 200, and the cost of an adequate diet is 300, then it does not necessarily mean that 50% of the population cannot afford the diet. The 200 represents the average income of the group, and the variability of income within it (e.g. 150-250) has to be taken into account. However, we can state that "a poor family with an average income would not be able to afford the recommended diet".

7. As described above, the income data for comparison with the cost data is required for the same year. To avoid costly data collection exercises, we made inflation adjustments to existing datasets. However, using inflation as a proxy for changes in income may be very imprecise. Inflation is a measure based on changes in the purchasing price of a basket of commonly bought goods and services. For it to be an accurate proxy of changes in income, the following conditions need to be met:
   (a) price changes in the markets used to measure inflation are similar to those for markets in the study area;
   (b) prices for the goods and services that people sell to earn income keep close pace with the prices for goods and services that they buy, and
   (c) the amounts of goods and services that people sell have not changed in the period since the baseline data was collected.

   Situations in which these conditions may not be met include, for example:
   (a) if the study area is any more or less remote, or its markets are more or less competitive and integrated compared to where the inflation rate was measured, the local level of inflation may actually be quite different;
   (b) incomes in rural developing countries are generally not index-linked to inflation, and the price of labour, crops and livestock etc. may be influenced by forces other than the overall inflation rate;
   (c) depending on the type of year and various other factors, the amount of goods and services that people sell may have changed quite a bit from the baseline year, irrespective of changes in the price.

8. All households need some non-food goods e.g. minimal clothing, matches, etc. and will if necessary forego food to obtain these. The affordability of a diet therefore depends on an assumed package of non-food goods. Realistically, the best way to do this is to simulate a basket (soap, clothing, fuel, school fees, etc.) which represents a basic acceptable standard of living (this requires a reasonable list of locally-relevant goods and current price data for them). An estimate of the affordability of a diet which does not make allowance for non-food needs is not very meaningful.

Due to these limitations, the following steps have been taken:

a) The results are presented as estimates with ranges (to address limitations 1, 4 and 6)
b) It is clearly shown in the discussion that non-food needs are not included and that this has an impact on the affordability of the diet.
c) Error ranges were calculated for the annual HEA estimates of food and cash income.

Background to the study areas

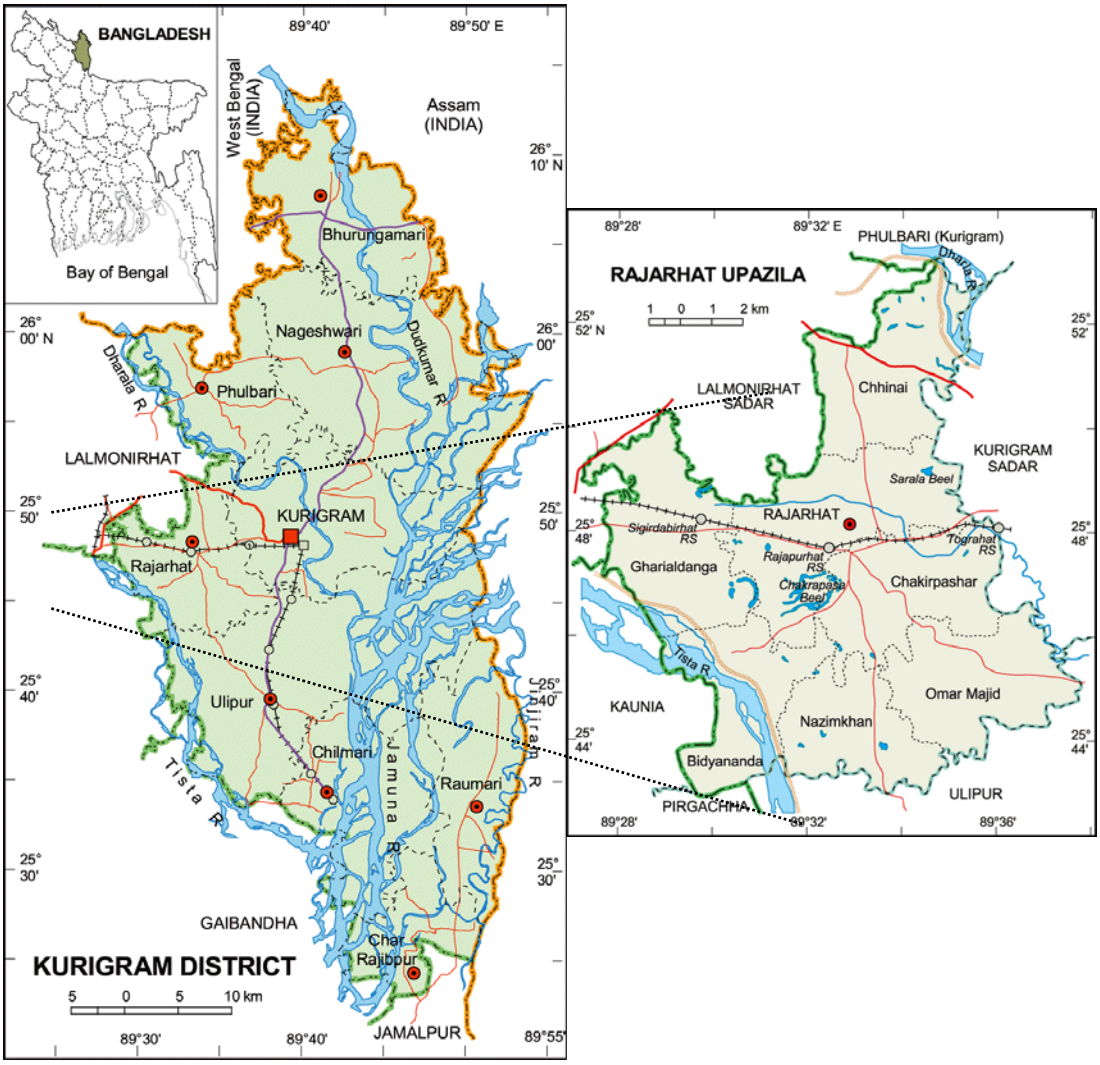
The data presented in this section come from background studies which Save the Children had previously conducted in the study locations, rather than from the cost of diet research pilot. Sources are cited throughout.

Bangladesh

Study location and map

The study was conducted in Rajarhat Upazila, Kurigram District, approximately 15 km from Kurigram town in Rajshahi Division in North East Bangladesh (see Figure 1). Most of the data collection was carried out in an upland agricultural village. The village was selected by RDRS Bangladesh (Rangpur Dinajpur Rehabilitation Services), a national NGO which has been working in the village for the last 8 years, based on the following required criteria set by Save the Children UK: an upland village, reasonably typical for the area and of a manageable size, given the period available for the study.

Figure 1: Map of Rajarhat Upazila, Kurigram District, Bangladesh



Source: www.bangladesh.gov.bd

Overview of agro-ecological zone

Kurigram District exhibits both *char* land (sand bar) and upland areas. Agriculture forms the heart of the economy. The main crops grown are: paddy, jute, wheat, potato, corn, chilli, peanut, bamboo, betel nut, betel leaf, pulses and vegetables. Flood and river erosion are the two most common natural disasters threatening the livelihoods of poor people living in this area.

Sources of food and income

Cash income is chiefly obtained from employment (mostly agricultural day labour, rickshaw-pulling and other unskilled/semi-skilled labour) and crop (largely rice) sales. The sale of livestock products and gifts of cash (from kin, education stipends) make only a small contribution. Food income comes chiefly from domestic production (mostly rice), although food is also obtained from labour payment-in-kind i.e. as meals, and in small amounts from livestock products, wild foods and gifts.

Overview of the diet

Household diets chiefly consist of rice and dahl and (mainly leafy) vegetables. Meat, fish and eggs obtained from production and purchase are only consumed in small quantities. A minority of households produce and consume milk (14%) and purchase small amounts of wheat (9%). Virtually all households purchase oil, sugar, spices, vegetables and potatoes.

The proportion of the household diet obtained from high value foods (milk, meat, fish and eggs) is very low but increases with income. At all income levels, most dietary protein is obtained from rice. Dietary energy density is very low: oil makes up only 3.2% of nominal dietary energy for the poorest income decile and 6.1% for the richest. Sugar supplies 1.1% of dietary energy for the poorest decile and 1.8% for the richest.

Rates of malnutrition

An exhaustive survey of the study village gave the rates of malnutrition shown in Table 5.

Table 5: Anthropometric results for children aged 6-59 months in Kurigram District, Bangladesh, January 2005 (n=82)

	Proportion <-2 *z*-scores
Weight-for-height	12.5%
Weight-for-age	51.2%
Height-for-age	46.9%

A representative survey (n=3,833) conducted in Rajarhat Upazila and neighbouring Kurigram Upazila in December 2005 showed that low weight-for-age occurred in almost 46% of the children, with 38% exhibiting low height-for-age, and 12% low weight-for-height.

Diversity and frequency of young child feeding[22]

The majority (97%) of children aged 0-23 months were breastfed in the 24-hour period prior to the survey in Kurigram and Rajarhat Upazilas. Less than 70% of newborns were exclusively breastfed, with the rate decreasing considerably every month thereafter, dropping dramatically to 30% for children aged 3 months and 10% for children aged 5 months. Not only were many children exclusively breastfeeding for too short a period, if at all, but other older children are simultaneously experiencing the opposite problem – they do not receive anything other than breastmilk and water even though they should be receiving additional foods. For example, at 6 months of age, approximately 30% of children received only breastmilk and water in the 24-hour period to the interview, with this proportion dropping to less than 10% for children from the age of 7 months.

Only about 60% of children aged from 6 to 8 months receive appropriately diverse diets (Figure 2). This proportion increases by approximately 10% for each age category, to almost 70% and 80% for the 9-11 and 12-23 month olds respectively. Feeding frequency, however, remains relatively constant across the 6-23 month age range with roughly two-thirds of children receiving the appropriate number of meals per day for their age.

[22] There are no internationally accepted guidelines on how many different types of food children should eat. It is possible to have a complete diet by judiciously mixing together just a few types of food. However, it is generally considered good to have as varied a diet as possible so as to obtain different nutrients. A 2002 paper by Arimond & Ruel (Arimond, M. & Ruel, M. T. (2002), *Summary Indicators for Infant and Child Feeding Practices: An Example from the Ethiopia Demographic and Health Survey 2000*, Academy for Educational Development, Food and Nutrition Technical Assistance (FANTA) Project, Washington, DC) has described the following norms (see Table A) for Ethiopian children aged 0-36 months. Despite the fact that this classification was applied to Ethiopian children, it has value when applied more generally and is used throughout this report when referring to diversity and frequency.

Table A: Norms of dietary frequency and diversity for children aged 0-36 months in Ethiopia (adapted from Arimond & Ruel, 2002)

Age group (months)	Diversity of foods	Frequency of feeding
0-5	Breastmilk only	On demand
6-8	Breastmilk + at least 2 other foods	At least 2 times a day
9-11	Breastmilk + at least 3 other foods	At least 3 times a day
12-36	Breastmilk + at least 4 other foods	At least 4 times a day

Note that, in this analysis, we have taken the lowest limit for the feeding frequency at each age. For example, among the 6-8 month age group, the recommendations are that children are fed solid or mushy foods 2-3 times a day (in addition to breastmilk), so we have taken a cut-off of 2 meals as adequate. More recent recommendations put forward by Arimond & Ruel in 2003 (Arimond, M. & Ruel, M. T. (2003), *Generating Indicators of Appropriate Feeding of Children 6 through 23 Months from the KPC 2000+*, Academy for Educational Development, Food and Nutrition Technical Assistance (FANTA) Project, Washington, DC) also suggest that children may eat snacks between meals, but these have not been especially accounted for in this analysis. This means that we are defining "acceptable frequency" and "acceptable diversity" at their lowest limits.

Figure 2: Appropriately diverse diets and feeding frequency by age, children aged 0-23 months, Kurigram, Bangladesh

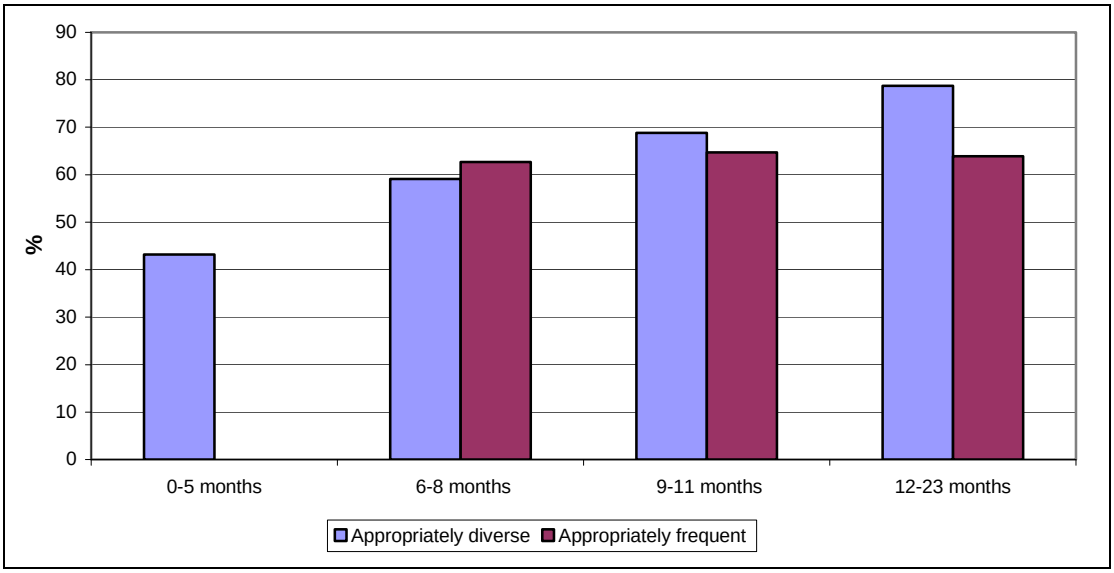


Table 6 shows feeding practices broken down by wealth decile for children aged 6-23 months. In general, there is a trend towards more appropriate practices both in terms of dietary diversity and feeding frequency as wealth increases. This trend is statistically significant between wealth and dietary diversity, but not between wealth and feeding frequency.

Table 6: Appropriate feeding practices and wealth decile, children aged 0-23 months, Kurigram, Bangladesh

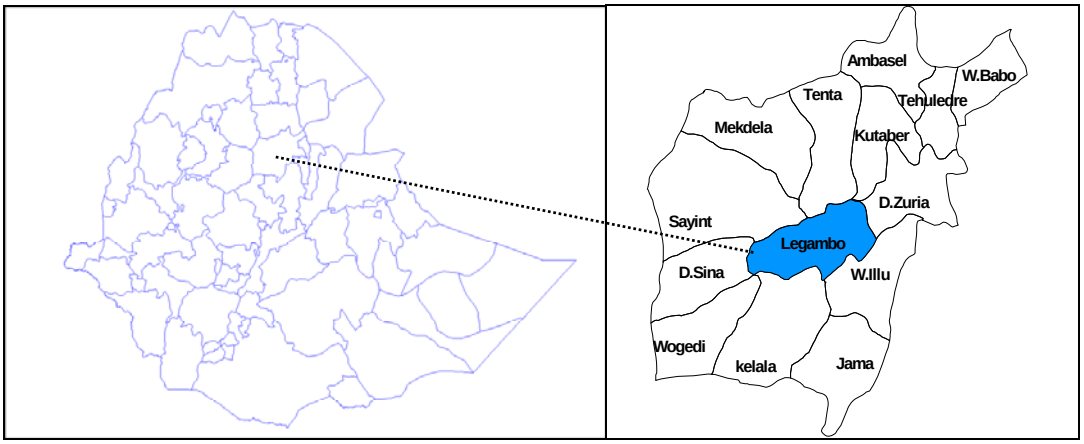
	Percent of Children Appropriate Diversity	*Percent of Children Appropriate Frequency*
1st decile	68.8%	59.5%
2nd decile	66.4%	64.2%
3rd decile	70.9%	62.2%
4th decile	66.1%	65.1%
5th decile	69.0%	60.7%
6th decile	78.0%	67.9%
7th decile	79.1%	60.3%
8th decile	75.2%	63.8%
9th decile	77.4%	66.1%
10th decile	79.7%	69.0%
N	1257	1188
X^2	16.753	4.942
P	0.053	n/s

Ethiopia

Location and map

The study was conducted in the highland areas of Legambo *woreda* within the South Wollo Administrative Zone in Amhara Region[23] in the North East Highlands (see Figure 3).

Figure 3: Map of Legambo *woreda* in South Wollo Administrative Zone, Ethiopia



Overview of agro-ecological zone

The majority of the population is rural and livelihoods in this zone are characterised by agriculture and seasonal labour migration supplemented by animal husbandry. Legambo is mountainous, within an altitude of 1,700 to 4,000 metres above sea level.

There are two rainy periods in the year: the *Belg* and the *Meher*. The short *Belg* rains fall in January/February and until the harvest in June/July is the most important productive period. The longer *Meher* rain falls between June and September, but given both the tendency of the soil to become waterlogged and the risk of frost during this period, the harvest in November/December is relatively minor.

The main crops grown are barley, wheat and pulses. Crop production is limited by poor yields and small land holdings. Livestock owned include shoats, cattle, horses and some pack animals. The soil is thick vertisol which requires either animal or mechanised traction, and many households therefore use either oxen or horses to plough their fields.

South Wollo zone is considered to be chronically food insecure as a result of the repeated failure of the *Belg* rains, which results in high livestock mortality and gradual erosion of livelihoods. Within this zone, Legambo is considered one of the most food insecure *woredas*.[24] Even in a normal year, many households are unable to rely on

[23] For further information, see the following two reports:
(i) Save the Children (2006), *Amhara Regional State, South Wollo Highland Belg Zone Livelihood Profile*, Save the Children UK; the information in this report used the reference year July 2004–June 2005 as this was considered by local communities to be relatively normal within the context of recent years.
(ii) Save the Children UK (2005), *Baseline Nutritional Assessment for the Legambo Caring Practices and Chronic Malnutrition Programme*, Save the Children UK.

[24] Mathys, E. (1999), *Assessment of the Impact of Food Aid on Household Economies of North Wollo, South Wollo and East Hararghe, Ethiopia*, Save the Children UK.

crop production alone, so the poor and very poor households enter into contractual arrangements (*yerbee*) with the better-off households for access to land and animals.

The area does not have adequate roads, health services, veterinary services, schools or safe water. Many of the roads are poor and some communities can only be reached on foot or by mule, particularly in the rainy season.

This area has recently been targeted under the Government of Ethiopia's Productive Safety Net Programme (PSNP) and many households have received cash payments.[25] For the past five years, Save the Children UK has run cash transfer programmes in Wollo.

Key sources of income and food

Wealth in South Wollo highland zone is determined by access to land for cultivation, animal holdings (in particular oxen) and household labour capacity. The updated household economy assessment in 2006 described four wealth groups, the key characteristics of which are shown in Table 7.

Table 7: Profile of households and key economic characteristics, South Wollo Highland *Belg* Zone, Ethiopia

Wealth group	% of population	Household profile	Characteristics	
'Better-off'	15-25	6-8 people	*Land*	Own 1-1.25 ha, and rent 0.5 ha from 'poor' households
			Livestock	2-4 cattle (including 1-2 milking cows and 2 oxen), 1 mule, 1 donkey, 1-3 horses, 15-25 shoats, 5 hens
'Middle'	30-40	5-7 people	*Land*	Own 1-1.25 ha
			Livestock	1-3 cattle (including 1 milking cow and 1 ox), 1 donkey, 1 horse, 10-15 shoats, 4 hens
'Poor'	20-30	4-6 people	*Land*	Own 1-1.25 ha of which 0.5 ha rented out to 'better-of' households as they do not have oxen for ploughing
			Livestock	0-1 donkey, 0-1 horse, 5-10 shoats, 4 hens
'Very poor'	15-25	3-5 people	*Land*	No land owned, but rent 0.5 ha
			Livestock	0-1 donkey, 1-2 horses, 1-5 shoats, 3 hens

The households classified as 'very poor' include those recently married who are able to work but only have a couple of young children. Such households, reportedly more typical within this wealth group, are not constrained by household labour capacity.

Just under half of the households in this *woreda* (the 'poor and the 'very poor') earned between half and three-quarters of their annual household cash income through a combination of local labour, the government's PSNP and remittances from seasonal migration.[26]

[25] In 2004-5, this was 30 birr per person per month for up to 4 members in a household for 6 months of the year (Save the Children 2006, see footnote 12).

[26] Save the Children UK (2006) (see footnote 12) updated HEA profile based on the July 2004–June 2005 agricultural year.

Overview of the diet

A typical meal in Legambo (for lunch or supper) consists of a staple with a sauce. The traditional staple is *injera*, which in Legambo *woreda* is made from a combination of wheat, barley or sorghum flour depending on the price, on what is available and on personal preference. Other staples, for example *Kita* or *Dabo*, are also made from wheat, maize or barley flour. In 2004-5, all households produced some barley in the *Belg* and *Meher* seasons, and purchased maize and sorghum. In addition, households except the 'very poor' produced a local cereal known as ***selale*** *(*wild oats).

The sauce to accompany the staple usually consists of locally made ghee or vegetable oil with green leaves (kale, cabbage or wild samma) or pulses (fava beans, lentils or vetch). In 2004-5, all households produced lentils (for both sale and consumption) and purchased beans/vetch.

There is a high prevalence of people with lathyrism (paralysis) in Legambo[27] due to the consumption of vetch, especially during times of drought, which requires special preparation to remove its toxicity.

Rates of malnutrition

Rates of malnutrition among children aged 6-36 months in Legambo *woreda* are shown in Table 8.[28]

Table 8: Anthropometric results for children aged 6-36 months in Legambo[29] South Wollo District, Ethiopia, October 2004 (n = 4,326)

	Proportion <-2 *z*-scores
Weight-for-height	19.1 %
Weight-for-age	61.9 %
Height-for-age	54.0 %

Diversity and frequency of feeding

The rate of breastfeeding is high (over 80% of mothers reported breastfeeding children who were 18 months old), although by 3 and 5 months only 80% and 60% respectively are exclusively breastfed. Poorer mothers are more likely to exclusively breastfeed, as the better-off are reportedly more likely to be able to afford extra foods and have access to cow's milk (and some mothers believe that children aged 4-5 months need more than just breastmilk).[30]

The same survey found that children under 6 months are breastfed on demand and mainly receive only breastmilk (and maybe a little water), meaning their diets are fairly adequate in terms of both quality and quantity. However, at 6 months of age both dietary diversity and feeding frequency are insufficient compared to recommended practices. Only 40% of children are fed sufficiently frequently and just 20% are fed appropriately diverse diets after 6 months of age (Figure 4). Even though only a few children beyond 6 months received an appropriately diverse diet,

[27] Haimanot, R. T., Feleke, A. and Lambein, F. (2005), 'Is Lathyrism Still Endemic in Northern Ethiopia? The Case of Legambo Woreda (District) in the South Wollo Zone, Amhara National Regional State', *Ethiopian Journal of Health Development*, Vol. 19, Part 3: 230-6.

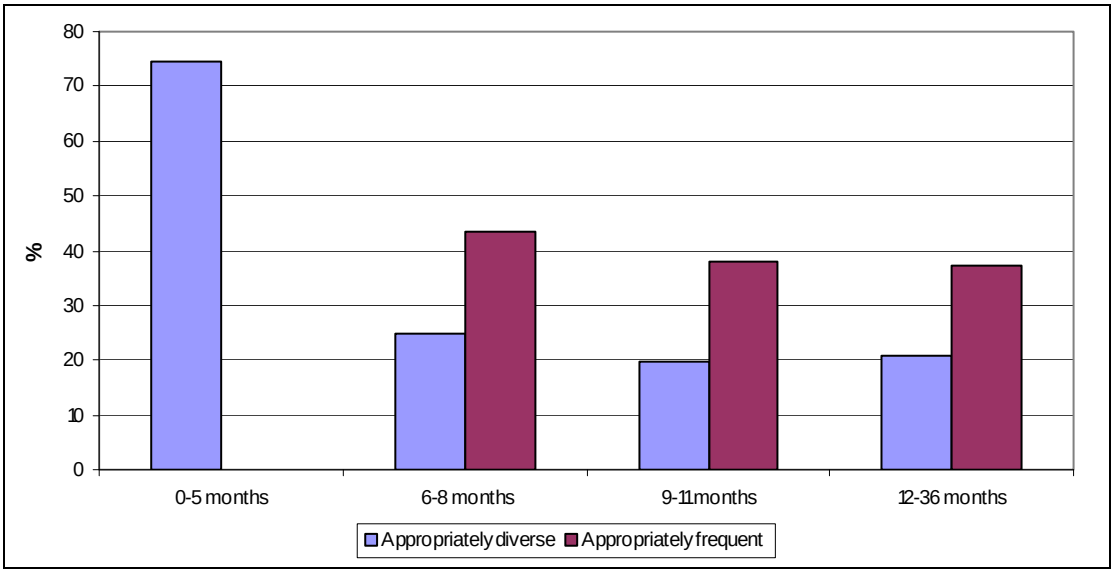
[28] The data for the Legambo survey was collected 4 months after the main (*Belg)* harvest in 2004, when malnutrition would not be expected to be at its peak (Save the Children, 2005 – see footnote 23).

[29] Save the Children (2005) - see footnote 23.

[30] *ibid.*

there is a link with wealth (31% of children from more wealthy households compared to 12% from the poorest). Fruit and vegetables are more likely to be given to older (13-36 month old) than younger (6-12 month old) children.

Figure 4: Appropriately diverse diets and feeding frequency by age, children aged 0-36 months, Legambo, Ethiopia



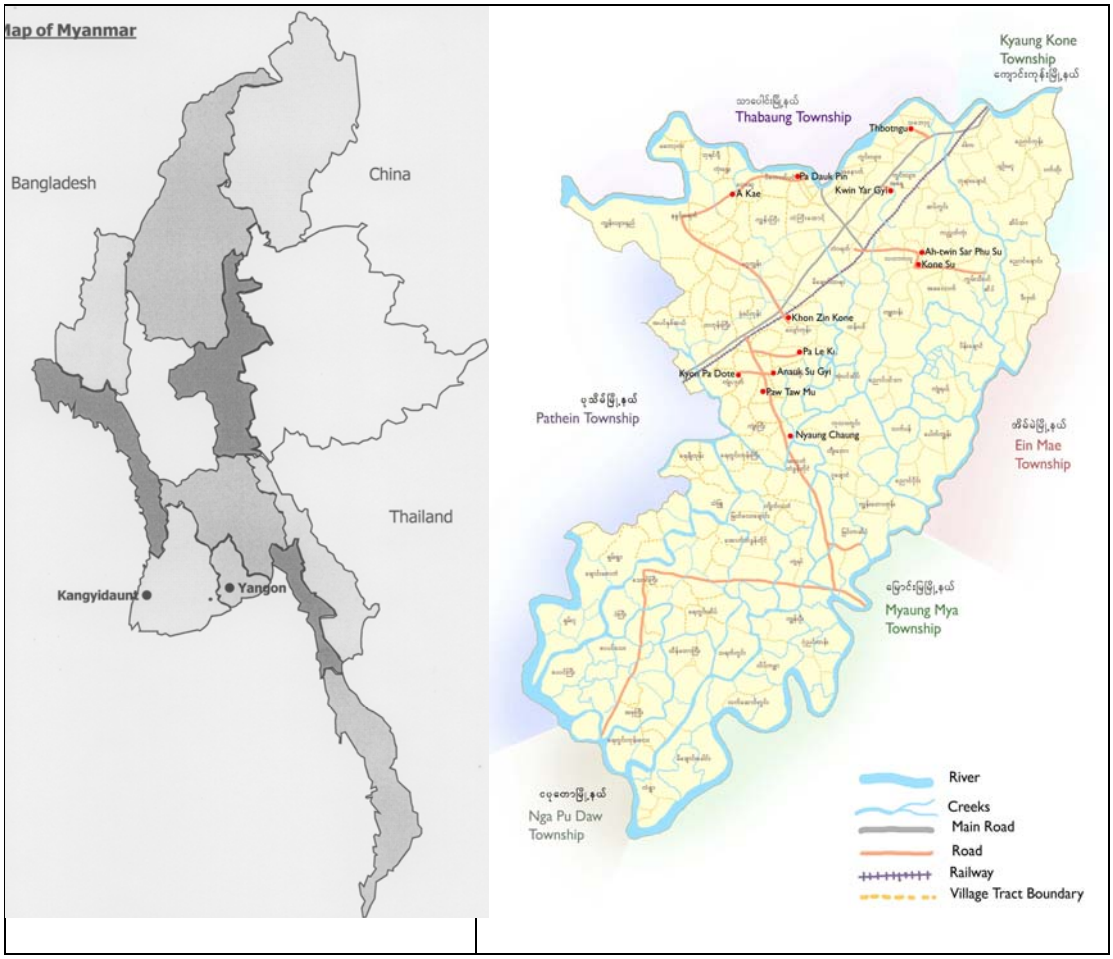
Foods considered suitable by mothers for young children include cow's milk, egg and porridge prepared from wheat and oat with ghee, but are often not provided because of financial constraints. No food taboos were reported for younger children, but they are generally not given meat and *kolo* (roast corn), as these are considered difficult for them to swallow, or too rich for them.

Myanmar

Location and map

The study was conducted in Kangyidaunt Township situated in the Ayeyarwaddy Division in the southeastern part of the country (see Figure 5).

Figure 5: Map of Kangyidaunt Township, Myanmar



Overview of agro-ecological zone

The study area is part of the 'delta agricultural' livelihood zone where the economy is dominated by rice production and trade. The major constraints to livelihoods in this zone are pressure on land, floods leading to poor crop production, inflation and rising prices, lack of alternatives to agriculture and government policy on rice. Ownership of land is by far the primary determinant of wealth in the zone. The HEA identified 4 typical wealth groups according to the size of landholdings, the key characteristics of which are shown in Table 9.

Table 9: Household profiles and key economic characteristics, Kangyidaunt Township, Myanmar

Household profile/ Wealth group	Proportion of households (%)	Characteristics	
Largest land owners or 'better-off'	5-10	*Land*	16-25 acres
		Livestock	4-6 cows, 2-3 pigs, 3-15 poultry
Middle land owners or 'middle'	20-30	*Land*	6-15 acres
		Livestock	2-6 cows, 1-2 pigs, 6-10 poultry
Small land owners or 'poor'	10-25	*Land*	1-5 acres
		Livestock	1 pig owned, 4-8 poultry
'Landless labourers' or 'very poor'	45-55	*Land*	0 acres
		Livestock	0-1 pig borrowed, 0-2 poultry

A typical household is composed of 5 to 6 members.

Table 9 shows a clear disparity of wealth within communities of Kangyidaunt Township. A significant proportion of the population (the 'landless labourers' group representing around half the households) does not own any land.

Key sources of income and food

More detailed investigation into the household economy revealed that 'landless labourers' are heavily dependent on the local labour market for work, as three-quarters of their cash income came from contract labour during the baseline year.

Even though 'poor' households own a small plot of land, their annual cash income and livelihood activities are similar to those of the 'landless labourers'. The main differences between the two groups lie in their food sources (see below) and in their vulnerability to shocks. 'Poor' households still have a plot of land to sublet in the face of hardship whereas the 'landless labourers' cannot resort to this strategy.

'Middle' and 'better-off' households earned most (about 80%) of their cash income through the sale of their own crop production. These two groups also consume their own crops and this covered practically all the minimum energy requirements[31] for both during the baseline year.

At the other end of the wealth spectrum, the contribution of crop production to food intake was marginal for 'landless labourers', and provided about half the minimum energy requirements for 'poor' households.

Overview of the diet

Rice is essential to the typical diet in the area, providing at least 80% of the energy consumed by all wealth groups. Curry is also a common dish, prepared with meat (pork, chicken or beef), fish, potato or egg and ingredients such as salt, garlic, oil, red chilli, onion and saffron. Rice is also eaten with green leaves or vegetables (raw, fried or boiled) such as watercress, gourd, cabbage, roselle and radish leaves. Mango, banana and coconut are common fruits in the area.

[31] 2,100 Kcal/person/day.

Rates of malnutrition

The area exhibits a high prevalence of global acute malnutrition (13.1%) compared with other Asian contexts. Rates of malnutrition for children aged 0-36 months are shown in Table 10).

Table 10: Anthropometric results for children aged 0-36 months in Kangyidaunt Township, Myanmar, January 2007 (n = 410)

	Proportion <-2 ***z***-scores
Weight-for-height	8.7 %
Weight-for-age	39.7 %
Height-for-age	41.1 %

The rate of breastfeeding initially starts at 100% and drops to 93% in the 2-3 month old age group. From the age of 20 months onwards, the rate of breastfeeding gradually declines. The rate of exclusive breastfeeding amongst children under 6 months of age is low at 42%. The remaining 58% of the children are introduced to food and other drinks before the age of 6 months. During the first three days of delivery, mothers provide water, honey, rice and locally available vitamins such as baby vita and other herbal powders, assuming that these will help the child's growth.

In focus group discussions, it became evident that mothers introduce rice early, from seven days to one month after birth, as they assume it makes children grow faster and healthier. This does not appear to be linked to wealth. However, a common problem indicated by the focus groups is that poor mothers have to leave their children at home with younger siblings, grandmothers or other carers while they go to work to earn income to support their families. Nearly 70% of the households are 'poor' or 'very poor' and largely dependent on daily labour in farm-related activities in or outside their village, so the early introduction of rice sieved with cloth or food pre-chewed food by a mother or grandmother is common whilst the mother is away working.

Diversity and frequency of feeding

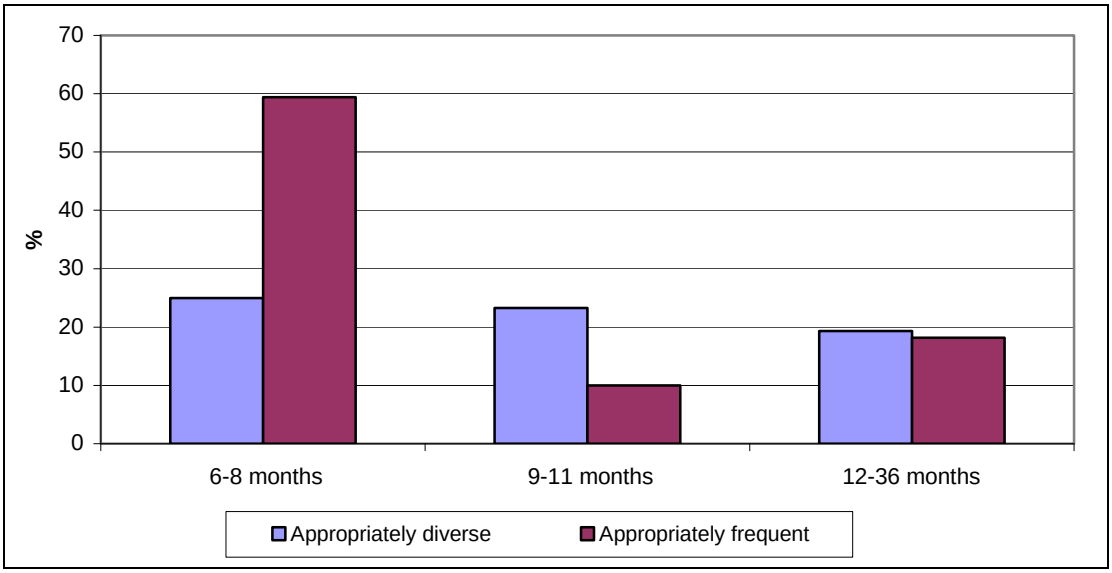
There are two problems with the timing of introduction of complementary foods: it is either introduced very early, or late after 6 months of age. Regardless of wealth group, rice is the first food introduced, either sieved through a cloth or pre-chewed by mothers. The next foods given and the general composition of the infant's diet thereafter tends to be influenced by availability, what the family can afford and beliefs about the properties of particular foods, rather than any clear idea of certain foods being suitable at different stages.

The frequency of feeding is very low according to recommended practice, particularly with children older than 9 months of age. Only 10% of children in the 9-11 month age group and 18% in the 12-36 month age group are fed frequently enough for their age (see Figure 6). The main reason for limiting the frequency of meals stems from the belief that young children can only digest a small amount of food, and would otherwise get indigestion.

Very low levels (around 20%) of appropriate dietary diversity are seen in all children aged 6-36 months (Figure 6). Many mothers believe that children aged less than 12 months should not be given pork, fruit (except bananas) or vegetables, as consuming these foods causes indigestion and illness. Dietary diversity is also significantly related to wealth, although frequency of feeding and wealth status and are not

related. In this analysis, households in the ‘better-off’ and ‘middle’ wealth groups are combined, as are those in the ‘poor’ and ‘very poor’ wealth groups. This is based on some similarity in income and expenditure levels identified during the household economy assessment.

Figure 6: Appropriately diverse diets and feeding frequency by age, children aged 0-36 months, Kangyidaunt Township, Myanmar

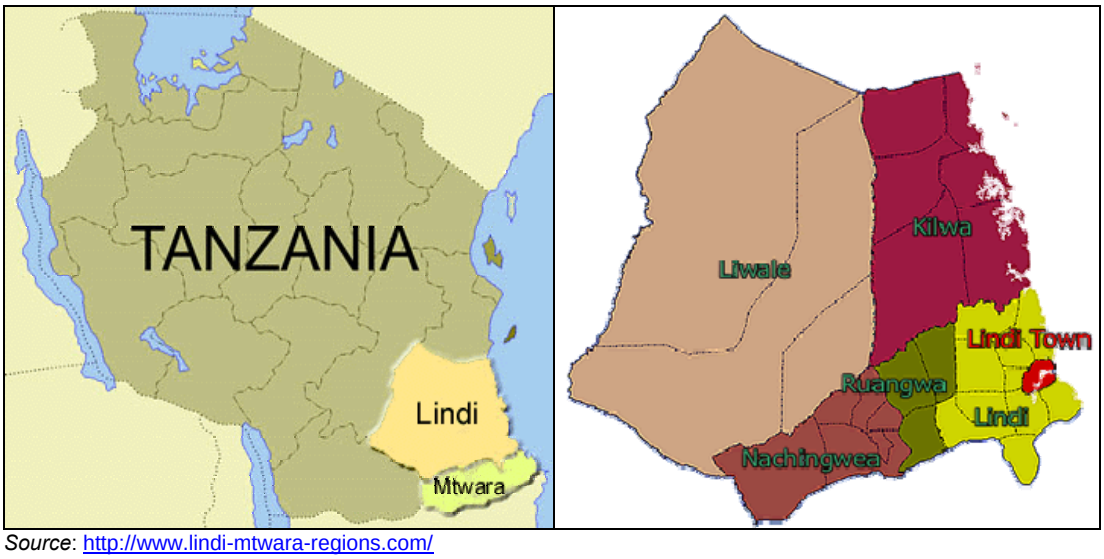


Tanzania

Location and map

The study was conducted in Lindi Rural District in Lindi Region in southeastern Tanzania (see Figure 7). Lindi Rural District has 4 livelihood zones, with this study focusing on one, the agricultural zone, which hosts the majority (65%) of the district population. For the study of the poorest households, three villages were selected carefully by the study team to capture a range of village types (reflecting, for example, differences in road/market accessibility, and both coconut- and cashew-growing areas), whilst excluding very small and very large villages, and any economically 'unusual' villages. Once the villages were chosen, two sub-villages were selected randomly from each.

Figure 7: Map of Lindi Rural District/Region, Tanzania



Source: http://www.lindi-mtwara-regions.com/

Overview of livelihood zone

With a rainy season from about December to April and deep fertile soil, the area produces cashew nuts, coconuts and sesame as the main cash crops, and maize, sorghum, cassava, rice and pulses (pigeon peas and cowpeas) as the main food crops. However, Lindi Rural District is one of the poorest areas in Tanzania: Lindi Region ranks second to last according to both the Basic Needs Poverty Line[32] and the Food Poverty Line.

Wealth and poverty at household level are determined by several factors: labour power, the ratio of active members to dependants, access to land, and coconut and cashew nut tree ownership. The Household Economy Analysis (HEA) in 2003 described typical 'better-off', 'middle' and 'poor' households. The 2006 study of the very poor[33] refined the 2003 results and provided a detailed picture of common household profiles within the 'very poor' and 'extremely poor' categories. The key characteristics of these wealth groups are shown in Table 11.

[32] From the Tanzanian Household Budget Survey (HBS), conducted in 2000/1 by the National Bureau of Statistics, the largest-ever household budget survey in Tanzania covering more than 22,000 households across all 20 regions of the Tanzanian Mainland. See http://www.tanzania.go.tz/hbs/HomePage_HBS.html.

[33] See Save the Children 2007 (see footnote 15) for further information on the methodology and results.

Table 11: Household profiles and key economic characteristics, Lindi Rural District, Tanzania

Household profile/ Wealth group	Proportion of households (%)	Characteristics
'Better-off'	8	4+ acres of land 50-200 trees
'Middle'	23	2-4 acres 20-50 trees
'Poor'	35	1-2 acres of land 5-20 trees
'Very poor'	27	≤ 1.5 acres 0–10 trees
'Extremely poor'	8	< 1 acre 0–5 trees

Key sources of income and food

At the bottom of the wealth spectrum ('very poor' and 'extremely poor' groups), labour is the main constraining factor. Despite the lack of labour power, the main source of cash income for these groups remains agricultural labour. At the other end, 'middle' and 'better-off' households earn most of their income from the sale of their own crop production.

Overview of the diet

A typical meal (lunch or dinner) has two elements: the staple food and the sauce. The traditional staple dish is *ugali*, a stiff porridge made of cereal (mainly maize) or cassava flour. Households might also consume wild roots (*mingoko*, seasonally available), sorghum (common) and rice (which can be considered a 'luxury' staple). The staple is traditionally served with a sauce or stew. Sauces can be classified into four main types according to their core item: green leaves, fish, pulses or meat. The choice of staple and stew depends on individual preference and, more often, on seasonal availability and purchasing power. Cereal porridge or boiled cassava are common for breakfast.

Rates of malnutrition

Lindi Region has the highest prevalence of stunting and anaemia in the country. Rates of malnutrition for children aged 0-59 months are shown in Table 12.

Table 12: Anthropometric results for children aged 0-59 months in Lindi Region, Tanzania (DHS, 2004-5) (n=137)

Weight-for-height	137	2.6 %
Weight-for-age	137	23.4 %
Height-for-age	137	54.0 %

Diversity and frequency of feeding

The majority of children below two years of age are breastfed. Food frequency and diversity surveys (using exhaustive sampling) conducted in 2006 in March (pre-harvest) and July (post-harvest) reported respectively that 95.9% and 88.8% of children aged 6-23 months were breastfed in the 24-hour period prior to data collection.

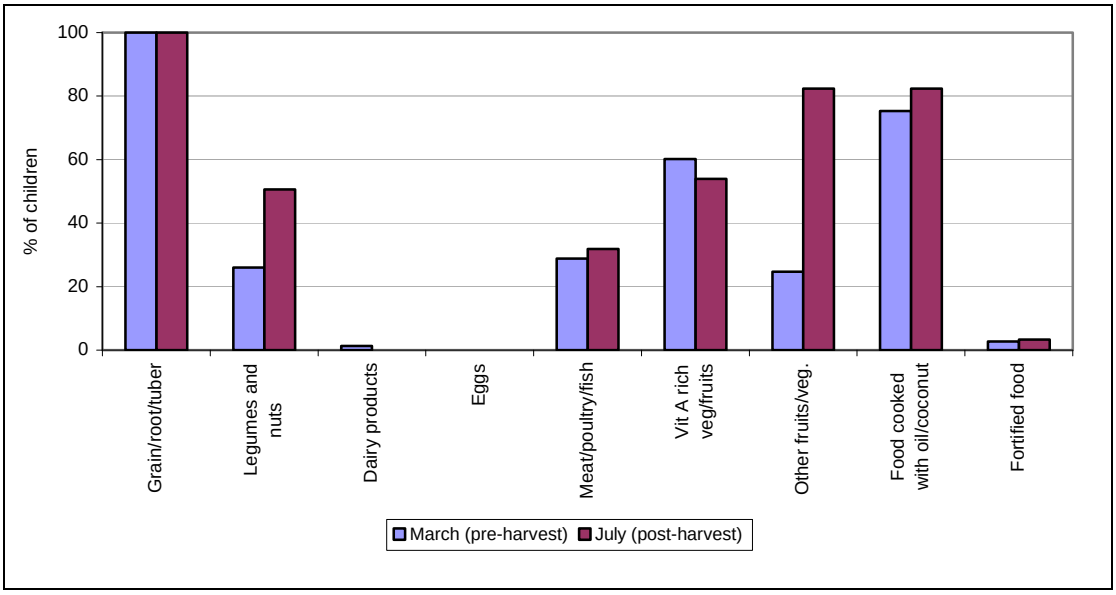
The types of complementary food given to children are shown in Figure 8. No egg consumption was recorded and dairy products hardly featured in the diet over the 24

hours prior to the survey. Less than a third of children consumed any meat, poultry, or fish in the same period.

The study highlighted that children's diet is influenced by seasonality, wealth and age. Unsurprisingly, the diet tends to be better immediately after the harvest (July) than during the pre-harvest (March) period, in the following ways:

- more children are fed other fruit/vegetables (e.g. oranges)[34] and legumes/nuts (e.g. cowpeas and pigeon peas).[35]
- overall, frequency of feeding is better than before the harvest, with a larger proportion of children fed sufficiently frequently (43.8% and 73.6% of children had appropriate feeding frequency pre- and post-harvest respectively).
- overall, dietary diversity is better, as more children consume more food groups (52.1% and 92.3% of children benefited from appropriate dietary diversity pre- and post-harvest respectively).

Figure 8: Proportion of children consuming various food groups in the 24-hour prior to the survey by season, Lindi Region, Tanzania



The proportion of children fed sufficiently frequently decreases with age as children require complementary food more often. For example, 90.0% of 6-9 month-olds are fed sufficiently frequently compared to only 22.5% of 12–23 month-olds, at pre-harvest time.

Feeding frequency is also influenced by wealth status: the proportion of children fed sufficiently frequently is higher amongst 'middle' and 'better-off' households (100.0%) compared with the poorer categories (65.2%) at post-harvest time. This might be linked to amounts of time available for feeding, as poor mothers might be more involved in labour activities. They might also be less able to benefit from the improved food availability after the harvest. The difference in feeding frequency between the two broad wealth categories before the harvest is not statistically significant. It might be that the seasonal hardship takes precedence over the wealth differential in influencing feeding frequency, as even 'middle' and 'better-off' mothers

[34] 24.7% and 82.4% of children consumed fruits/vegetables in the 24-hour period prior to the survey at pre-harvest and post-harvest times respectively.
[35] 26.0% and 50.6% of children consumed legumes/nuts in the 24-hour period prior to the survey at pre-harvest and post-harvest times respectively.

have to spend time away from their children to undertake productive activities. Dietary diversity is greater among ‘middle’ and ‘better-off ’ households compared to the poorer groups, but the difference is not statistically significant.

Results

Number of food items available

The number of food items available varied considerably between countries, and also in small numbers between seasons. Bangladesh had 61-65 items available, Ethiopia had 21-26 items, Myanmar 48-51 items and Tanzania 33 items. Additional items are often fruits, which can make a substantial difference to the cost and actual diets.

Cost and affordability of diet: Bangladesh

Table 13 shows that:

1) The total average daily cost of the diet for the family is 61 taka (error range 52-76 taka) (or 91 US cents/51 GB pence), although the actual price varies by season. The lean and rainy seasons are the most expensive, when prices are 71 and 67 taka respectively.
2) For the child under 24 months of age, the diet relies heavily on taro in winter, rice and cowpeas in the lean season, and rice and wheat flour in summer. In all seasons, green leaves (including amaranth, jute, radish and spinach) provide an important contribution to the diet. None of these green leaves are actually freely available, but they represent a cheap source of micronutrients.

Figure 9 shows that:

3) 79% of households cannot afford the lower range of the cheapest diet, and 89% cannot afford the upper range.
4) A daily labourer in Bangladesh is typically paid 50-60 taka per day. Although this could just about pay for the average cost of the diet, it would leave no money available for other spending and also assumes that labour opportunities are available every day. Moreover, it does not cover the cost of the diet for about 5 months of the year (during the lean and rainy seasons).

Figure 9: Affordability of cheapest diet, Kurigram District, Bangladesh

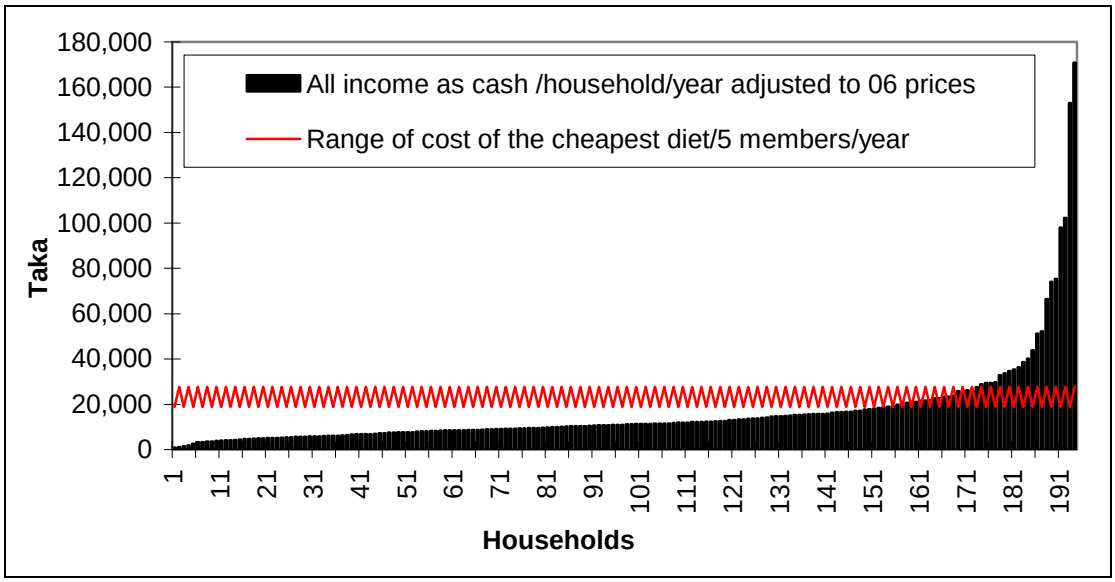


Table 13: Results for Bangladesh

	CHILD <24 MONTHS					WHOLE FAMILY OF 5				
	Winter	Lean	Summer	Rainy	Average daily amount (g)	Winter	Lean	Summer	Rainy	Average daily amount (g)
AMARANTH, RED (INDONESIA)	0	92	101	0	41	0	1,321	713	0	400
BREAST MILK	549	549	549	549	549	549	549	549	549	549
CINNAMON (MEXICO)	0	0	0	0	0	0	15	0	0	3
COWPEA (INDIA)	109	139	0	81	79	109	885	0	81	204
EGG, DUCK (INDONESIA)	0	0	0	0	0	137	0	0	0	45
FISH, SMALL, FRESH, FRESH WATER (MEXICO)	0	0	0	0	0	0	296	0	287	122
GOURD, BOTTLE (INDIA)	0	0	0	48	12	0	0	0	48	12
LEAF, JUTE, FRESH-EP (SENEGAL)	80	0	0	0	26	1,308	0	0	642	592
MILK, BUFFALO (INDIA)	0	0	0	0	0	0	0	1,717	0	433
MILK, COW (INDIA)	0	0	0	0	0	130	257	0	310	164
MOLASSES, CANE SUGAR (EGYPT)	0	0	0	0	0	24	0	0	0	8
PALM OIL, LOCAL (SENEGAL)	0	0	0	0	0	0	271	0	0	45
PEANUT (INDIA/ROASTED)	0	14	0	0	2	0	14	0	0	2
RADISH, WHITE, ROOT AND LEAVES, RAW (EGYPT)	89	0	0	0	29	89	0	0	0	29
RICE, WHITE, MILLED (INDONESIA)	0	72	39	94	45	757	1,450	1,300	1,278	1,141
SOYBEAN OIL (INDIA)	7	0	6	7	6	316	0	178	279	219
SPINACH (EGYPT)	0	0	0	195	49	0	0	1,268	1,401	673
TARO (EGYPT)	405	0	0	0	133	4,122	0	0	0	1,355
TARO-LIKE TUBER, LARGE (INDONESIA)	0	0	0	0	0	0	0	0	1,005	253
WHEAT, FLOUR, LOCAL OR HYV (INDIA)	0	0	90	0	23	0	0	346	0	87
DAILY COST IN TAKA	4	4	3	4	4	53	71	56	67	61
range	*3-5*	*4-5*	*2-4*	*3-5*	*3-5*	*45-67*	*61-89*	*48-70*	*57-84*	*52-76*
DAILY COST IN GB £	0.03	0.04	0.02	0.03	0.03	0.44	0.59	0.47	0.56	0.51
range	*0.03-0.04*	*0.03-0.05*	*0.02-0.03*	*0.03-0.04*	*0.03-0.04*	*0.38-0.56*	*0.51-0.74*	*0.40-0.59*	*0.48-0.70*	*0.43-0.63*
DAILY COST IN US $	0.06	0.07	0.04	0.06	0.06	0.80	1.07	0.85	1.01	0.91
range	*0.05-0.07*	*0.06-0.08*	*0.04-0.05*	*0.05-0.07*	*0.05-0.07*	*0.68-1.00*	*0.91-1.34*	*0.72-1.06*	*0.86-1.26*	*0.77-1.14*
ANNUAL COST TAKA	1,338					22,118				
range	*1,137-1,673*					*18,800-27,647*				
ANNUAL COST IN GB £	11.16					184.45				
range	*9.49-13.95*					*156.78-230.56*				
ANNUAL COST IN US $	20.12					332.53				
range	*17.10-25.15*					*282.65-415.66*				

Table 14: Results for Ethiopia

	CHILD <24 MONTHS					WHOLE FAMILY OF 5				
	Season 1 (*Belg*)	Season 2 (pre-*Meher*)	Season 3 (*Meher*)	Season 4 (pre-*Belg*)	Average daily amount (g)	Season 1 (*Belg*)	Season 2 (pre-*Meher*)	Season 3 (*Meher*)	Season 4 (pre-*Belg*)	Average daily amount (g)
BARLEY (EGYPT)	0	0	0	0	0	0	320	202	0	114
BEAN, KIDNEY, DRIED, RAW (KENYA)	90	109	108	49	81	990	596	1,503	49	587
BREAST MILK	549	549	549	549	549	549	549	549	549	549
CARROT, ORANGE (EGYPT)	29	0	0	0	5	29	0	0	0	5
CHILI, GREEN (KENYA)	0	0	1	0	0	0	0	96	51	37
EGG, CHICKEN (INDONESIA)	3	0	66	49	32	337	0	1,351	884	648
GREENS, WILD (MEXICO)	224	268	0	0	105	3,255	3,299	0	0	1,375
KALE, RAW (KENYA)	0	0	0	8	3	0	0	0	213	88
LAMB (EGYPT)	0	0	0	0	0	407	767	0	0	261
LINSEED SEEDS	0	17	0	42	22	0	576	0	899	517
PEA, DRY (EGYPT)	0	0	0	0	0	0	0	0	0	0
PEPPER, BLACK, SPICE (SENEGAL)	0	0	29	27	16	0	0	351	321	191
POTATO, ENGLISH, RAW (KENYA)	0	54	0	0	14	0	2,017	0	0	508
SORGHUM (EGYPT)	45	0	0	0	8	937	0	0	711	451
VEGETABLE OIL (INDONESIA)	5	0	0	0	1	194	0	115	0	52
DAILY COST IN BIRR	0.4	0.4	0.7	0.7	0.6	9.6	10.1	13.8	10.5	10.8
range	*0.3-0.5*	*0.3-0.5*	*0.6-0.9*	*0.6-0.8*	*0.5-0.7*	*8.2-12.0*	*9.6-12.6*	*11.8-17.3*	*8.9-13.1*	*9.2-13.5*
DAILY COST IN GB £	0.03	0.03	0.05	0.04	0.04	0.64	0.67	0.92	0.70	0.72
range	*0.02-0.03*	*0.02-0.03*	*0.04-0.06*	*0.04-0.06*	*0.03-0.05*	*0.54-0.80*	*0.57-0.94*	*0.78-1.15*	*0.58-0.87*	*0.61-0.90*
DAILY COST IN US $	0.04	0.05	0.09	0.08	0.07	1.13	1.19	1.63	1.23	1.27
range	*0.04-0.06*	*0.04-0.06*	*0.07-0.11*	*0.07-0.10*	*0.06-0.08*	*0.96-1.41*	*1.01-1.49*	*1.39-2.04*	*1.05-1.54*	*1.08-1.59*
ANNUAL COST BIRR	206.3					3,940.9				
range	*175-257*					*3,351-4,327*				
ANNUAL COST IN GB £	13.71					261.82				
range	*11.65-17.13*					*222.55-327.28*				
ANNUAL COST IN US $	24.29					464.01				
	20.65-30.36					*394.5-530.15*				

Cost and affordability of diet: Ethiopia

1) The results shown in Table 14 are based on an assumption that milk is not available. This is not available for purchase on the market at any point in the year, so any milk that is available comes directly from the family's livestock and is therefore free of charge. Poor and very poor households do not own milking animals. Although some of these households enter into contractual agreements with the better-off whereby they provide grazing land for a heifer and benefit in turn from the milk, the household economy assessment (2006) does not indicate that this is typical for households within these wealth groups.[36] Therefore, for simplicity in this analysis, typical poor and very poor households have been assumed not to have access to milk.
2) The total average daily cost of the diet for the family is 10.8 birr (error range 9.2-13.5 birr) (or US $1.27/72 GB pence), although the actual price varies considerably by season. Season 3 (*Meher*) is considerably more expensive than the other seasons. The child's diet costs approximately 0.4 birr per day in the first two seasons (*Belg* and pre-*Meher*) and rises to 0.7 birr in the subsequent two seasons. If milk is assumed to be freely available, the cost of the child's diet decreases by approximately 80% and the whole family diet by 85-90%.
3) Diets during seasons 1 and 2 (*Belg* and pre-*Meher*) were very dependent on wild greens which can be collected free of charge. These greens are not available in the other two seasons contributing to the increased cost of the diet during these periods.

The food and cash income for each wealth group is shown in Table 15.

Table 15: Food and cash income for each wealth group, Ethiopia

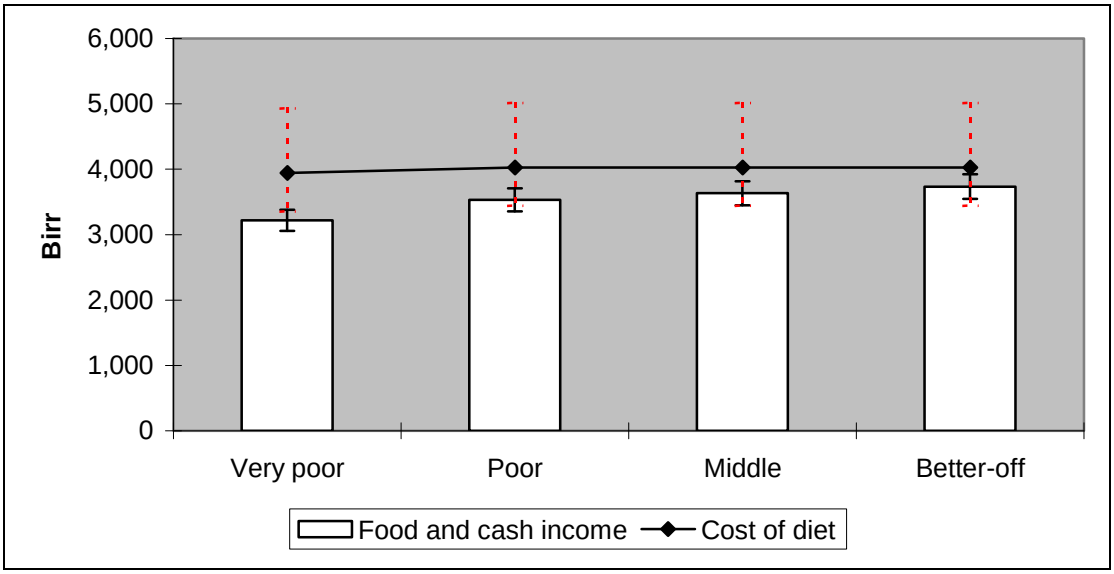
Wealth group	% of households	Annual food and cash income in birr (error range 5%)	Annual cost of diet for family in birr (error range)
'Better-off'	15-25	3,734 (3,548-3,921)	3,940 (3,351-4,327)
'Middle'	30-40	3,632 (3,450-3,814)	
'Poor'	20-30	3,533 (3,357-3,710)	
'Very poor'	15-25	3,219 (3,058-3,380)	

Table 15 and Figure 10 show that:

4) The 'very poor', making up 15-25% of the population, cannot afford the healthy diet. It is likely that a further 10% of the population, the lower part of the poor group, also cannot afford the diet.
5) All wealth groups cannot afford the mid-point of the cost of the diet, although as the 'middle' and 'better-off' households will have some access to milk, they are more likely to be able to afford a healthy diet.
6) The typical rate for a day of contract labour is 7.5 birr and the cost of the diet for a family of five is 10.8 birr. A day's labour can therefore pay for 69% of the cost of the healthy diet.

[36] Milk does not feature either as payment-in-kind nor as own livestock products for poor and very poor households. Also, it is not commonly sold on the market. The sale of livestock products, however, *does* seem to contribute to household income (roughly <5% for very poor and 15-20% for poor households in 2004-5, according to the HEA data). This might be earned through the sale of shoats. Alternatively, if such households have access to milk, they might prefer to transform it into ghee to sell.

Figure 10: Affordability of cheapest diet, Legambo *woreda*, Ethiopia



Cost and affordability of diet: Myanmar

Table 16 shows that:

1) The total average daily cost of the diet for the family is 1,306 kyat (error range 1,110-1,633 kyat) (US $1.15/62 GB pence), although the actual price varies by season. The rainy season is considerably more expensive than the other two.
2) For the child under 24 months of age, during winter and summer, green leaves (pumpkin or tamarind leaves) along with rice are key components of the diet. In the rainy season, cowpeas become particularly important.

The food and cash income for each wealth group adjusted to 2006 prices is shown in Table 17.

Table 17: Food and cash income for each wealth group, Myanmar

Wealth group	% of households	Annual food and cash income in kyat (error range 10%)	Annual cost of diet for family in kyat (error range)
'Better-off'	5–10	3,283,875 (2,955,488–3,612,263)	476,732 (405,222-595,915)
'Middle'	20–30	1,879,910 (1,683,819–2,058,001)	
'Poor'	10–25	656,816 (591,135–722,498)	
'Very poor' (landless labourers)	45–55	450,846 (405,761–495,930)	

Table 17 and Figure 11 show that:

3) The cost of the diet approximates the value of the combined food and cash income of the very poor, who make up approximately half the population. While this means that it is theoretically affordable, as soon as any income is spent on essential items other than food it quickly becomes unaffordable.

4) The typical rate for a day of contract labour is 650 kyat and the cost of the diet for a family of five is 1306 kyat. A day's labour can therefore pay for 50% of the cost of the healthy diet.

Figure 11: Affordability of cheapest diet, Kangyidaunt Township, Myanmar

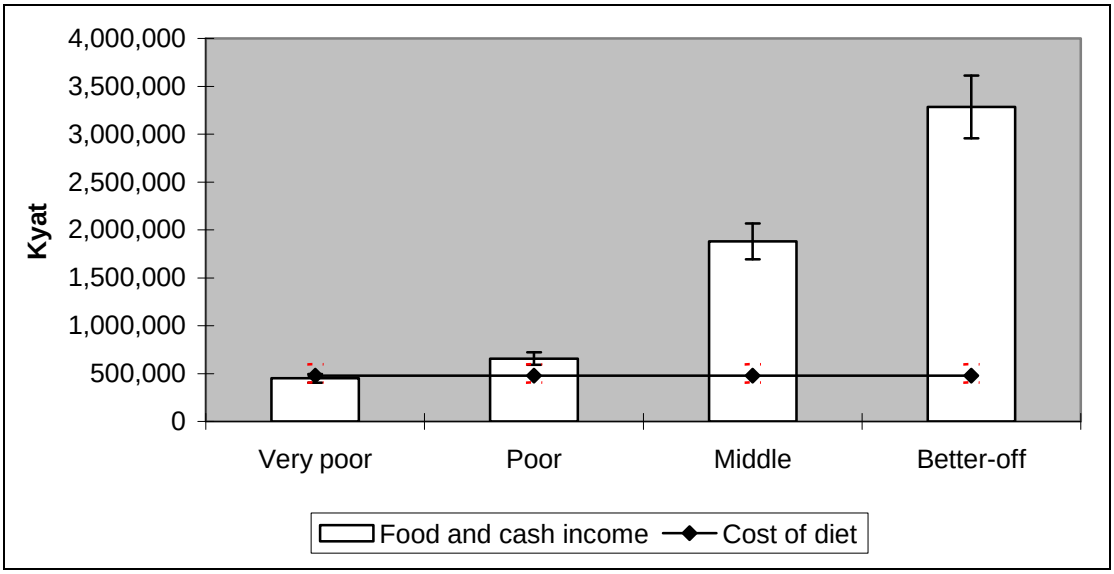


Table 16: Results for Myanmar

	CHILD <24 MONTHS				WHOLE FAMILY OF 5			
	Winter	Summer	Rainy	Average daily amount (g)	Winter	Summer	Rainy	Average daily amount (g)
BEAN, KIDNEY (INDIA)	87	0	0	29	429	0	0	141
BEEF (INDONESIA)	0	0	18	8	0	0	18	8
BREAST MILK	549	549	549	549	549	549	549	549
COCONUT, GRATED W/MILK SQUEEZED OUT (INDONESIA)	0	0	20	8	0	0	211	88
COWPEA (INDIA)	0	89	94	62	0	310	152	142
FISH PASTE, RED, FERMENTED (INDONESIA)	0	0	0	0	0	0	254	107
FISH, ANCHOVY, DRIED (TERI NASI) (INDONESIA)	23	7		9	88	164		70
LEAF, HORSERADISH TREE, RAW (INDONESIA)	0	0	21	9	201	197	94	155
LEAF, PUMPKIN (KENYA)	223	0	0	73	961	0	0	316
MELON, AVERAGE (MEXICO)	60	0	0	20	60	0	162	88
MILK, COW (INDIA)	0	0	0	0	0	0	130	55
PEANUT (INDIA)	10	13	0	6	585	568	436	518
RICE (EGYPT)	64	81	73	72	1,372	1,386	1,463	1,414
TAMARIND, FRESH LEAVES (SENEGAL)	0	298	0	75	0	2,539	0	640
WATERCRESS, RAW (INDONESIA)	0	0	86	36	504	0	1,197	667
DAILY COST KYAT	78	73	97	85	1,224	1,168	1,453	1,306
range	*66-97*	*62-92*	*83-122*	*72-106*	*1,040-1,530*	*993-1,461*	*1,235-1,817*	*1,110-1,633*
DAILY COST IN GB £	0.04	0.03	0.05	0.04	0.58	0.56	0.69	0.62
range	*0.03-0.05*	*0.03-0.04*	*0.04-0.06*	*0.03-0.05*	*0.50-0.73*	*0.47-0.70*	*0.59-0.87*	*0.53-0.78*
DAILY COST IN US $	0.07	0.06	0.09	0.07	1.07	1.02	1.27	1.15
range	*0.06-0.09*	*0.05-0.08*	*0.07-0.11*	*0.06-0.09*	*0.91-1.34*	*0.87-1.28*	*1.08-1.59*	*0.97-1.43*
ANNUAL COST KYAT	30,947				476,732			
range	26,305-38,684				*405,222-595,915*			
ANNUAL COST IN GB £	14.76				227.30			
range	*12.54-18.44*				*193.21-284.13*			
ANNUAL COST IN US $	27.14				418.09			
range	*23.07-33.93*				*355.38-522.62*			

Table 18: Results for Tanzania

	CHILD < 24 MONTHS			WHOLE FAMILY OF 5		
	Low price season	High price season	Average daily amount (g)	Low price season	High price season	Average daily amount (g)
BREAST MILK	549	549	549	549	549	549
CASSAVA, DRIED, FLOUR (INDONESIA)	0	52	21	0	52	21
COCONUT, GRATED (INDONESIA)	0	40	17	411	451	428
COWPEA (EGYPT)	0	0	0	0	0	0
FISH, ANCHOVY, DRIED (TERI NASI) (INDONESIA)	0	0	0	0	66	27
FISH, ANCHOVY, DRIED (TERI TAWAR) (INDONESIA)	0	0	0	66	0	39
LEAF, CASSAVA (KENYA)	121	121	121	1,350	121	841
LEAF, COWPEA, FRESH-EP (SENEGAL)	0	0	0	0	1,229	508
PEANUT (EGYPT)	0	0	0	70	628	301
PIGEON PEAS, RAW (KENYA)	0	81	34	0	81	34
SESAME SEED (EGYPT)	28	0	16	358	0	210
SORGHUM, COUSCOUS (SENEGAL)	101	0	59	1,774	1,673	1,732
DAILY COST IN Tsh	29	43	35	708	1,107	873
range	*25-37*	*36-53*	*30-44*	*601-884*	*941-1,384*	*742-1,091*
DAILY COST IN GB £	0.01	0.02	0.02	0.33	0.51	0.40
range	*0.01-0.02*	*0.02-0.02*	*0.01-0.02*	*0.28-0.41*	*0.44-0.64*	*0.34-0.50*
DAILY COST IN US $	0.02	0.04	0.03	0.59	0.92	0.72
range	*0.02-0.03*	*0.03-0.04*	*0.02-0.04*	*0.50-0.73*	*0.78-1.15*	*0.61-0.90*
ANNUAL COST Tsh	12,711			318,637		
range	*10,805-15,889*			*270,841-398,296*		
ANNUAL COST IN GB £	5.88			147.37		
range	*5.00-7.35*			*125.26-184.21*		
ANNUAL COST IN US $	10.53			263.94		
range	*8.95-13.16*			*224.35-329.92*		

Cost and affordability of diet: Tanzania

Table 18 shows that:

1) The total average daily cost of the diet for the family is 873 Tsh (error range 742-1,091 Tsh) (or 72 US cents/40 GB pence), although the actual price varies by season.
2) The cheapest diet relies on sorghum and cassava as the staples and is heavily reliant on freely available green leaves (cowpea and cassava leaves). In fact, the family diet requires approximately 1.5 kg of these leaves to be consumed each day. In practice, there may be limits as to whether this quantity could be collected on a daily basis.
3) The diet relies on peanuts in the high price season, and sesame in the low price season, as sources of fat and B vitamins. In practice, sesame seeds are not eaten except in times of acute shortage.
4) Fat in the high price season, and Vitamin B12 and Pantothenic acid in the low price season, were the most limiting nutrients in the diet, notably for older family members.

The food and cash income for each wealth group adjusted to 2006 prices is shown in Table 19.

Table 19: Food and cash income for each wealth group, Tanzania

Wealth group	% of households	Annual food and cash income[37] in Tsh (error range 5%)	Annual cost of diet for family in Tsh (error range)
'Better-off'	8	1,657,000 (1,574,150-1,739,850)	318,637 (270,841-398,296)
'Middle'	23	951,000 (903,450-998,550)	
'Poor'	35	360,000 (342,000-378,000)	
'Extremely and very poor'	35	297,000 (282,150-311,850)	

5) Figure 12 shows that the upper range of the cost of the diet is unaffordable by 'the extremely and very poor' and 'the poor', who together make up 70% of the population. The lower range is affordable by both groups. While this means that it is theoretically affordable, as soon as any income is spent on essential items other than food it quickly becomes unaffordable. Essential non-food costs are shown in Table 20 and amount to 16% of median household income.
6) The typical rate for a day of contract labour is 750 Tsh and the cost of the diet for a family of five is 873 Tsh. A day's labour can therefore pay for 100% of the cost of the healthy diet.

[37] Income relates to a couple with 3 dependents.

Figure 12: Affordability of cheapest diet, Lindi district, Tanzania

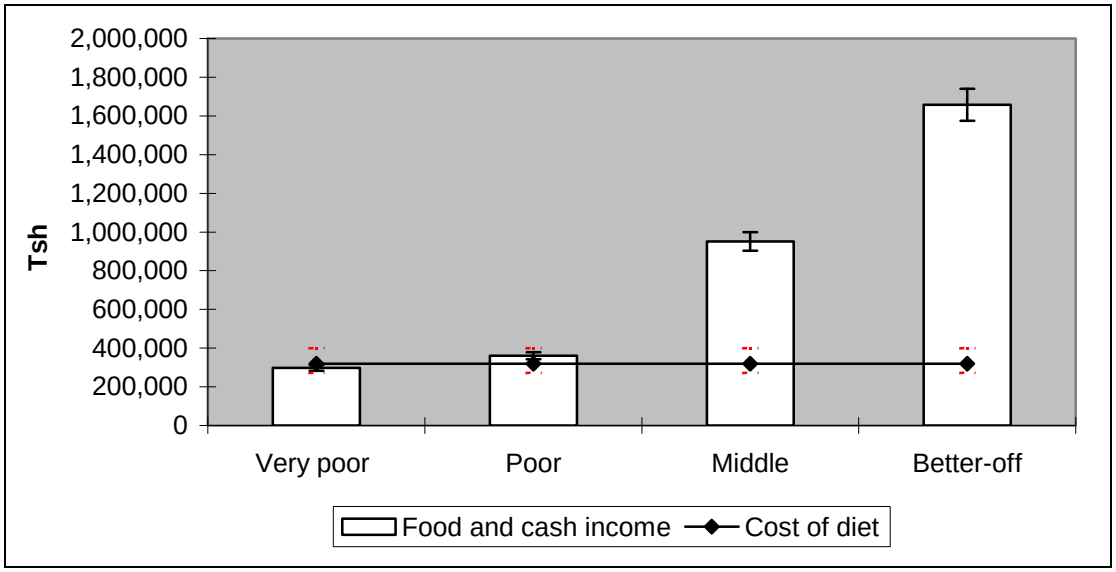


Table 20: Estimated cost of essential non-food items for Tanzania

Item	Estimated cost (Tsh)
Fuel (paraffin/kerosene)	8,320
Festival costs/social contribution	2,000
Coconut oil/lotion	2,800
Utensils and sundries, tools, sleeping material	6,750
Medical costs	2,250
Matches	6,240
Household repair	
Soap, washing	7,500
Clothes	11,000
Bidi/pan	
Primary school	10,000
Total	**56,860**
% median household income	**16%**

Discussion

Cost and affordability

The results presented in this report refer to the minimum cost of a healthy diet meeting all the nutritional requirements of household members. It should be noted from the outset that in practice this diet is unlikely to be consumable by households in the locations studied for the following reasons:

a) Environmental factors: Diets in Ethiopia, Myanmar (in winter and summer) and Tanzania rely very heavily on the collection of freely available green leaves. However, it is unlikely in practice that these could be collected in the quantities required by the cheapest diets.
b) Cultural factors: In Ethiopia, the diet requires enormous quantities of black pepper in seasons 3 and 4 which are unlikely to be consumable, in particular for young children. Also, in season 2 the primary staple is potatoes, and this is unlikely to be culturally acceptable there. In Bangladesh, the winter diet requires young children to be fed primarily on taro with no rice in the diet, which is also not likely to be culturally acceptable. In Tanzania, the diet throughout the year is primarily reliant on one staple, sorghum, which would entail an incredibly monotonous diet which might not be accepted.

For these reasons, in practice the minimum cost of the diet is likely to be higher than the results presented in this report. Even with these conservative estimates of the cost of the diet, it remains unaffordable for large proportions of the population in all four study locations. While the diet is technically affordable in Myanmar and Tanzania, it remains unaffordable for a significant proportion of the population in both Bangladesh and Ethiopia. Interestingly, Bangladesh is arguably the country where the income data is most accurate as it has been measured on a per household basis, and yet it is the country showing the highest proportion of the population which cannot afford the diet.

The findings also point to marked seasonal variation in costs. This has important implications for the cash flow of poor families who may not have a steady income throughout the year. However, for all countries, the affordability estimates do not take into account basic non-food costs that households need to maintain a minimum standard of living. The estimated cost of essential non-food items for Tanzania is shown in Table 20. If similar proportions of income were needed for basic non-food costs in the other three study locations, a healthy diet would become unaffordable for the majority of the population.

Absolute costs

The World Bank uses reference lines set at US $1 and $2 per capita per day when estimating poverty worldwide. Diets in Ethiopia and Myanmar cost more than a dollar a day for the family. In Tanzania and Bangladesh, they cost 72 cents and 91 cents respectively. As described above, in order to determine the minimum living costs, a basic basket of non-food items must also be factored in.

The Ethiopia Productive Safety Net Programme pays 30 birr per person per month, for up to 4 household members for 7 months of the year. Over the year, this averages 2.3 birr per household of five per day. The family diet costs 11 birr per household per day. The cash payment made through the PSNP therefore pays for about 20% of the cost of the healthy diet. If the same data are reviewed for the 7-month period of payment only, the PSNP pays 3.9 birr per day, thereby allowing families to afford 35% of the cost necessary to secure a healthy diet.

Comparing real and model diets

In all study locations, large proportions of children do not receive the frequency of feeding and dietary diversity they need. The situation is worst in Ethiopia, where only 20% of children received the dietary diversity required.

In Bangladesh, in spite of the large section of the population who cannot afford a quality diet, a relatively high proportion of children did receive a diet of adequate quality, although there was significant deterioration in quality by income decile. This apparent inconsistency may reflect the inadequacy of the existing tools for measuring dietary diversity in young children.

Tanzania is the only country for which seasonal data on dietary diversity was available, and feeding frequency shows a marked difference before and after the harvest. These findings are reflected in the big seasonal variation in the cost of the diet. After the harvest, approximately three-quarters of children received the appropriate feeding frequency compared to less than half beforehand. Dietary diversity is also adequate for 92% of children post-harvest compared to only 52% pre-harvest. After the harvest, the cost of the diet drops by 36%. There may of course also be other reasons to account for increased frequency, including the amount of time available for feeding children.

Compared with rates of malnutrition

Rates of chronic malnutrition are high in all study locations, ranging between 38% and 54%; levels of acute malnutrition vary between 3% and 19%. Given the findings from this research, it may be reasonable to expect rates of malnutrition to be even higher. However, it is possible that households are protecting their children and channelling a disproportionate amount of resources to them. In addition, it may be that diets deficient in certain micronutrients may not be manifest in anthropometric changes but other clinical and sub-clinical changes. Furthermore, for statistical reasons, when there is a shift of the overall weight-for-age distribution without an increase of standard deviation (SD), it is most likely that all children, including those above the traditional cut-off of -2 SD, are malnourished and below the weight that they should be.[38]

Implications for policies to tackle malnutrition

The findings from this report indicate that strategies to tackle malnutrition, and aimed at improving complementary feeding of young children in particular, need to take into account the affordability of the diet which meets nutritional requirements. Education campaigns which fail to tackle the economic constraints on families may achieve small gains, but are unlikely to be able to eradicate stunting or optimise complementary feeding. Equally, however, strategies which focus on economic constraints alone and fail to take into account other causes of malnutrition will not address the entire problem.

Tackling the economic constraints of malnutrition poses particular challenges for the nutrition community, and particular attention needs to be paid to ensuring that the poorest, who face the constraints most profoundly, are reached and that the significant effects of seasonality are taken into account. Social protection programmes which include a cash transfer component

[38] See Golden, M. H. N. & Grellety, Y. (2002), 'Annex 6: Population Nutritional Status During Famine', Working Session Paper, Food and Nutrition Technical Assistance Project (FANTA) Standardized Monitoring and Assessment of Relief and Transitions (SMART) Workshop, July 2002, available at: http://www.fantaproject.org/downloads/pdfs/smartA6_02.pdf; Yip, R. & Scanlon, K. (1994), 'The Burden of Malnutrition: A Population Perspective', *The Journal of Nutrition*, Vol. 124, No. 10 Suppl.: 2043S-2046S; Rose, G. (2001), 'Sick Individuals and Sick Populations', *International Journal of Epidemiology*, Vol. 30, No. 3: 427-32.

may offer a particular intervention opportunity to help overcome economic constraints during crucial periods in a child's development. Indeed, evidence from countries other than those included in the study shows that these programmes can have dramatic impacts on stunting.[39]

These research findings also point to an increased role for micronutrient supplementation and fortification. Home fortification may be particularly relevant where health systems are not able to deliver supplementation in a systematic manner.

Future research

The methodology section of this report indicates that there are a number of ways in which this method needs to be developed before it can be used on larger populations and by governments, NGOs, donors and others. The software needs to be refined further, the methods for determining affordability need to be consolidated and streamlined, and agreement on the parameters of different diet types (physiological, environmental and cultural) needs to be reviewed. Save the Children UK intends to publish a paper describing the methods adopted so far, in order to subject the work to wider academic scrutiny. In addition, we have submitted a proposal to the EC for funding to take the method further and apply it more widely, including in the monitoring and evaluation of ongoing social protection programmes.

[39] Sridhar, D. and Duffield, A. (2006), *A Review of the Impact of Cash Transfer Programmes on Child Nutritional Status and some Implications for Save the Children UK Programmes*, Save the Children UK, London.

Conclusion

This report presents the findings from piloting a new method to evaluate the cost and affordability of the diet, with a particular focus on young children. The method needs to be refined and developed further, but the initial findings indicate that there is a substantial shortfall in household's ability to feed their children adequately in the four countries of the study. These findings point to the need for far greater attention on tackling the economic causes of malnutrition in strategies to achieve MDG1, and may point to a specific role for cash-based social protection services.

Backed by these and other research findings, Save the Children UK continues to call on:

- National governments and the international donor community to recognise that poverty is a critical cause of chronic malnutrition, and to therefore design accordingly interventions to address the economic constraints that limit poor people's access to food.
- The international donor community to prioritise social protection programmes, including regular cash benefits to the poor, towards eradicating severe poverty and hunger.
- Donors to pledge support to low-income countries wishing to implement programmes providing direct cash benefits to the poor, by putting in place innovative mechanisms for channelling long-term, predictable aid.
- Richer countries to fulfil their commitment to increase (untied) aid to meet the 0.7 per cent of GNI target by 2010.