

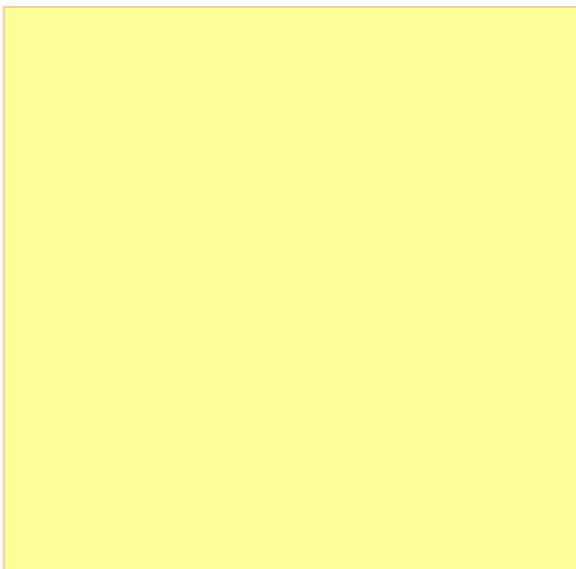
Nutrition and Food Security Assessment in Sri Lanka

2009

SRI LANKA

NUTRITION
AND
FOOD SECURITY
SURVEY

REPORT



Nutrition and Food Security Assessment in Sri Lanka 2009

Medical Research Institute
P. O. Box
Colombo, Sri Lanka

In collaboration with UNICEF and World Food Programme

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LIST OF ABBREVIATIONS

ARI	Acute Respiratory Infection
BMI	Body Mass Index
BP	
dl	Drop per litter
ECCD	Early Childhood Care and Development
ECD	Early Childhood Development
FGD	Focus Group Discussion
GN	Grama SevaNiladari
GRS	Growth Reference Standard
HAZ	Height-for-age Z score
Hb	Hemoglobin concentration
HEB	
IDP	
IYCF	Infant and Young Child Feeding
LBW	Low Birth Weight
LRI	Lower-tract Respiratory Infection
MDG	Millennium Development Goal
MOH	Ministry of Health
MoHN	Ministry of HealthCare and Nutrition
MRI	Medical Research Institute
MUAC	Mid Upper Arm Circumference
NCHS	National Child Health Statistics
NGO	Non Government Organization
ORS	Oral Rehydration Solution
ORT	Oral Rehydration Therapy
PHI	Public Health Inspector
PHM	Public Health Midwife
RDHS	Regional Director of Health Services
SD	Standard Deviation
SRL	Sri Lanka
UNICEF	United Nations Children's Fund
URI	Upper-tract Respiratory Infection
WAZ	Weight-for-age Z score
WFP	World Food Program
WHM	Weight-for-height Median
WHO	World Health Organization
WHZ	Weight-for-height Z score

PREFACE

MESSAGE FROM UNICEF REPRESENTATIVES

MESSAGE FROM WFP REPRESENTATIVES

ACKNOWLEDGEMENTS

This Nutrition and Food Security Assessment Survey has been conducted in collaboration between several partners.

Many people have contributed to the realisation of the study and it is our desire to express our deep gratitude to all, while it is, unfortunately, impossible to name them all.

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TABLE OF CONTENTS

PREFACE	IV
ACKNOWLEDGEMENTS	V
RESEARCH TEAM	VIII
TABLE OF CONTENTS	IX
LIST OF TABLES	XII
LIST OF FIGURES	XVI
EXECUTIVE SUMMARY	XVII
CHAPTER 1	1
INTRODUCTION	1
1.1 BACKGROUND	1
<i>Impact framework</i>	3
<i>Food price increases</i>	4
1.2. RATIONALE	6
1.3 OBJECTIVES	6
CHAPTER 2	8
METHODS	8
2.1 SURVEY DESIGN	8
2.2 SAMPLING PROCEDURE	8
2.2.1 <i>Sample size</i>	8
2.2.2 <i>Sample frame and cluster selection</i>	10
2.2.3 <i>Selection of households</i>	10
2.3 DATA COLLECTION	11
2.3.1 <i>Composition of the survey teams</i>	11
2.3.2 <i>Training of survey teams</i>	11
2.3.3 <i>Field logistics</i>	11
2.3.4 <i>Methods of data collection</i>	12
2.3.4.1 Household survey	12
2.3.4.2 <i>Key informant interviews, community interviews, market surveys</i>	13
2.3.5. <i>Supervision and quality assurance</i>	14
2.4 DATA PROCESSING AND ANALYSIS	14
2.5 ETHICAL CONSIDERATIONS	14
CHAPTER 3	15
DESCRIPTION OF STUDY POPULATION	15
3.1 DESCRIPTION OF THE SAMPLE	15
3.2 HOUSEHOLD CHARACTERISTICS	16
3.2.1 <i>Household composition</i>	16
3.2.2 <i>Educational attainment and occupation</i>	16
3.2.3 <i>Housing characteristics</i>	18
3.2.4 <i>Household possessions</i>	18
3.2.5 <i>Income and wealth index</i>	19
CHAPTER 4	21
NUTRITIONAL STATUS	21
4.1 NUTRITIONAL STATUS OF CHILDREN	21
4.1.1 <i>Prevalence of malnutrition</i>	21
4.1. 2. <i>Anaemia in children</i>	25
4.1.3. <i>Birth weight</i>	26
4.2 NUTRITIONAL STATUS OF WOMEN OF 15-49 YEARS	27

4.2.1 Non pregnant women (using Body Mass Index).....	27
4.2.2. Pregnant women	28
4.2.3 Anaemia in women.....	29
CHAPTER 5.....	32
CHILDHOOD ILLNESSES	32
5.1 RESPIRATORY ILLNESS.....	32
5.2 DIARRHOEA.....	32
CHAPTER 6.....	34
DIETARY INTAKE AND FEEDING PRACTICES	34
6.1 FOOD CONSUMPTION	34
6.2. DIETARY DIVERSITY.....	36
6.2.1. Individual dietary diversity score for children aged 6-59 months	36
6.2.2. Dietary Diversity Score for children aged 6-23 months	38
6.3. MINIMUM MEAL FREQUENCY	39
6.4. MINIMUM ACCEPTABLE DIET	40
6.5. INFANT AND YOUNG CHILD FEEDING PRACTICES	40
6.5.1. Breastfeeding practices.....	41
6.5.2 Complementary feeding and bottle-feeding practices	42
CHAPTER 7.....	44
CARE PRACTICES.....	44
7.1 EARLY CHILDHOOD DEVELOPMENT.....	44
7.1.1 Promoting early learning at household level	44
7.1.2. Items used by the child for playing.....	45
7.3. EARLY CHILDHOOD EDUCATION.....	46
7.4. SCHOOL ENROLLMENT	47
7.5. CHILD LABOUR	48
CHAPTER 8.....	50
UTILIZATION OF SERVICES PROVIDED BY HEALTH AND OTHER SECTORS.....	50
8.1 USE OF HEALTH SERVICES BY CHILDREN	50
8.1.1 Child Welfare Clinic.....	50
8.1.2 Vitamin A supplementation for children	51
8.1.3 Source of medical care for common childhood illnesses	52
8.2 FOOD AND NUTRIENT SUPPLEMENTATION FOR WOMEN	53
8.2.1 Pregnant mothers.....	54
8.2.2. Lactating mothers	55
8.3 SAMURDHI BENEFICIARIES.....	56
CHAPTER 9.....	58
WATER AND SANITATION	58
9.1 USE OF IMPROVED WATER SOURCES	58
9.2 HOUSEHOLD WATER TREATMENT	59
9.3 TIME TO SOURCE OF WATER	60
9.4. PERSON COLLECTING WATER	61
9.5. USE OF SANITARY MEANS OF EXCRETA DISPOSAL	62
9.6. USE OF IMPROVED WATER SOURCES AND SANITARY MEANS OF EXCRETA DISPOSAL	63
CHAPTER 10.....	65
FOOD SECURITY AND COPING STRATEGIES	65
10.1 FOOD UTILIZATION	65
10.1.1 Meal frequency.....	65
10.1.2. Household food consumption.....	66
10.1.3. Household dietary diversity	69
10.2. FOOD ACCESS AT HOUSEHOLD LEVEL	70

10.2.1. Food sources	71
10.2.2 Expenditure on food and other goods and services	71
10.3. FOOD AVAILABILITY AT HOUSEHOLD LEVEL	73
10.3.1 Adequate household food provisioning	74
10.3.2. Food aid	76
10.4 FOOD PRICES.....	77
10.5. COPING STRATEGIES	78
10.6. FOOD INSECURITY.....	81
10.6.1 Household food consumption adequacy score (HFCAS).....	82
CHAPTER 11.....	86
FACTORS ASSOCIATED WITH MALNUTRITION IN CHILDREN.....	86
11.1 BASIC CAUSES.....	86
11.1.1 Socio-demographic factors	86
11.1.2 Economic status	87
11.2 UNDERLYING CAUSES.....	88
11.2.1 Household food insecurity.....	88
11.2.2 Care practices	89
ENVIRONMENTAL SANITATION	90
11.3 IMMEDIATE CAUSES.....	91
Childhood illnesses.....	91
11. 4 OTHER CAUSES.....	91
11.4.1 Biological causes.....	91
11. 4.2 Maternal nutrition	92
11.5 MULTIVARIABLE ANALYSIS FOR THE FACTORS ASSOCIATED WITH MALNUTRITION IN CHILDREN AGED 6-59 MONTHS.....	93
11.5.1. Factors associated with stunting.....	93
11.5.2. Factors associated with wasting	93
11.5.3 Factors associated with underweight.....	95
11.5.4 Factors associated with anaemia in children.....	95
CHAPTER 12.....	98
FACTORS ASSOCIATED WITH NUTRITIONAL STATUS OF WOMEN	98
12.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS.....	98
12.2 FOOD INSECURITY	100
12.3 MULTIVARIABLE ANALYSIS FOR THE FACTORS ASSOCIATED WITH MALNUTRITION IN NON-PREGNANT WOMEN	101
12.3.1 Factors associated with thinness.....	101
12.3.2 Factors associated with overweight/obesity.....	101
12.3.3 Factors associated with anaemia	102
CHAPTER 13.....	104
DISCUSSION.....	104
CHAPTER 14.....	107
CONCLUSIONS AND RECOMMENDATIONS.....	107
CONCLUSIONS.....	107
RECOMMENDATIONS	108

LIST OF TABLES

CHAPTER 3

Table 3.1	Distribution of households by sector and district.....	13
Table 3.2	The number of total individuals, women 15-49 years, and children aged less than 5 years, 2.0-4.9 years and 5.0-14.9 years, by sector and district.....	14
Table 3.3	Distribution of households by household headship, size, education level, and occupation by district	15
Table 3.4	Distribution of households by housing characteristics, by district.....	17
Table 3.5	Percent of households with household possessions and ownership of livestock and land, by district	18
Table 3.6	Distribution of households according to income and wealth index, by district.....	19

CHAPTER 4

Table 4.1	Prevalence of malnutrition: stunting, wasting, overweight and underweight by background characteristics	22
Table 4.2	Prevalence of anaemia among children 6-59 months of age by background characteristics	27
Table 4.3	Prevalence of low birth weight, and mean birth weight among children born in the 5 years preceding the survey, by background characteristics	28
Table 4.4	Distribution of non-pregnant women 15-49 years by BMI levels, by background characteristics	30
Table 4.5	Distribution of pregnant women by their nutritional status and background characteristics.....	32
Table 4.6	Prevalence of Anaemia, among (i) pregnant women, (ii). lactating women and (iii). All non-pregnant women by background characteristics.....	34

CHAPTER 5

Table 5.1	Percentage of under-5 children who reported symptoms of respiratory illness and diarrhoea by background characteristics	37
-----------	---	----

CHAPTER 6

Table 6.1	Percentage of children aged 6-59 months, who were given food items belonging to the different food groups, on the day preceding the interview, by background characteristics	40
Table 6.2	Individual dietary diversity score in children (IDDS) according to background characteristics fro children 6 – 59 months.....	42
Table 6.3	Minimum meal frequency, dietary diversity, and minimum acceptable diet in children 6-23 months, by background characteristics.....	44
Table 6.4	Infant and young child feeding practices by background characteristics.	47

CHAPTER 7

Table 7.1	Participation of adult members in early learning activities of children aged 2 to 5 years, and percentage of under 5 children cared for by a child <10 years, by background characteristics.....	49
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Table 7.2	Use of different types of play items by children under 5 years of age, according to background characteristics	51
Table 7.3	Percentage of children aged 36-59 months who were attending an early childhood education programme, by background characteristics	53
Table 7.4	Percentage of children 5-10 years of age attending Primary School, by background characteristics.....	54
Table 7.5	Percentage of children aged 5-14 years who are involved in child labour activities, and mean hours per week, by background characteristics	56

CHAPTER 8

Table 8.1	Use of facilities available at Child Welfare Clinics by children less than 5 years of age by background characteristics	57
Table 8.2	Percentage distribution of children who received Vitamin A mega dose supplement at 9, 18 and 36 months, by background characteristics.....	59
Table 8.3	Source of care provider for children who had diarrhoea or respiratory illness during 2 weeks preceding survey, by background characteristics.....	60
Table 8.4	Percent of pregnant mothers who attended antenatal clinics, and who received “poshana malla”, “thriposha” and Iron tablets, by background characteristics...	62
Table 8.5	Percentage of lactating mothers who received “thriposha” and Vitamin A by background characteristics	62
Table 8.6	“Samurdhi” beneficiaries” among women 15-49 years by background characteristics.....	64

CHAPTER 9

Table 9.1	Distribution of households according to the main source of drinking water and households with improved source of water, by background characteristics.....	65
Table 9.2	Distribution of households according to methods used for ‘making drinking water safe’, by background characteristics.....	67
Table 9.3	Distribution of households according to time spent to collect drinking water (to and from the source), by background characteristics.	68
Table 9.4	Distribution of households according to the person collecting water used in the household, by background characteristics.....	69
Table 9.5	Distribution of households according to the availability of sanitary means of excreta disposal , by background characteristics.....	70
Table 9.6	Distribution of households using both improved drinking water sources and sanitary means of excreta disposal, by background characteristics	71

CHAPTER 10

Table 10.1	Percentage of household members who consume three or more main meals a day by background characteristics.....	73
Table 10.2	Types of food consumed by households during the 24 hours preceding the survey, by background characteristics.....	74
Table 10.3	Foods consumed by households for at least 5 days during the week preceding the survey, by background characteristics	76
Table 10.4	Household dietary diversity score (HDDS) according to background characteristics.....	77
Table 10.5	Distribution of households by the main source through which different food	79

	groups were available.....	
Table 10.6.	Percentage of monthly household expenditure on major expenditure items, by background characteristics	80
Table 10.7	Percentage of expenditure on broad food groups, by background characteristics.....	81
Table 10.8	Percentage of households with ‘inadequate food’ within the previous 12 months, and months of adequate household food provisioning (MAHFP) by background characteristics.....	83
Table 10.9	Distribution of households by availability of food stocks, by background characteristics	84
Table 10.10	Average number of times a household received food aid in the last 6 months, by background characteristics	85
Table 10.11	Average unit prices for different food items by sector and district.....	87
Table 10.12	Percentage of households that adopted different coping strategies during the previous 30 days, with its frequency.....	89
Table 10.13	Food-related coping strategies adopted during the 30 days preceding the survey, by background characteristics	90
Table 10.14	Distribution of households by reasons for taking loans, by background characteristics	91
Table 10.15	Household Food Consumption Adequacy Score (HFCAS) and distribution of households by food consumption category, by background characteristics	93
Table 10.16	Results of the Cross-tabulation of food access categories and food consumption categories	95
Table 10.17	Distribution of households by food insecurity levels, by background characteristics.....	97

CHAPTER 11

Table 11.1	Prevalence of stunting, wasting, underweight and anaemia by basic causes.....	98
Table 11.2	Prevalence of stunting, wasting, underweight and anaemia by indicators of economic status.....	100
Table 11.3	Prevalence of stunting, wasting, underweight and anaemia according to dimensions of food security.....	102
Table 11.4	Prevalence of stunting, wasting, underweight and anaemia according to infant feeding, early childhood care practices	103
Table 11.5	Prevalence of stunting, wasting, underweight and anaemia according to household availability of water and latrines.....	105
Table 11.6	Prevalence of stunting, wasting, underweight and anaemia according to prevalence of diarrhoea and symptoms of respiratory illness.....	107
Table 11.7	Prevalence of stunting, wasting, underweight and anaemia by biological characteristics.....	108
Table 11.8	Prevalence of stunting, wasting, underweight and anaemia according to maternal BMI and Anaemia.....	109
Table 11.9	Factors associated with stunting and wasting in children aged 6-59 months.....	110
Table 11.10	Factors associated with underweight and anaemia in children aged 6-59 months.....	113

CHAPTER 12

Table 12.1	Prevalence (95%) of thin, normal, overweight/obese and anaemia in non-pregnant women by background characteristics.....	117
Table 12.2	Prevalence (95%) of thin, normal, overweight/obese and anaemia in non-pregnant women by indicators of food insecurity.....	120
Table 12.3	Factors associated with thinness, overweight/obesity and anaemia in non-pregnant women	123

LIST OF FIGURES

Figure 1:	Trends in under nutrition among under-five children in Sri Lanka.....	1
Figure 2:	Global malnutrition (Median <-2SD) among under-five children, by district.....	2
Figure 3:	UNICEF framework of the relations between basic, underlying, intermediate and immediate causes of maternal and child under-nutrition.....	3
Figure 4:	Map of Sri Lanka showing districts included in the study.....	8
Figure 5:	Map of the Sri Lanka showing the GN divisions included in the study.....	9
Figure 6:	Percentage of Height for Age distribution.....	24
Figure 7:	Map of Sri Lanka showing Percentage of Weight for Age Distribution.....	25
Figure 8:	Map of Sri Lanka Percentage of Weight for Height Distribution.....	26

EXECUTIVE SUMMARY

Maternal and child under-nutrition remains a major public health problem in Sri Lanka, despite improvements in many health indicators. According to the most recent Sri Lanka Demographic and Health Survey 2006/07, nearly 17 percent of babies were born with low birth weight (weight less than 2.5 kg), while the prevalence of acute malnutrition (wasting), chronic malnutrition (stunting) and underweight were 15, 18 and 22 percent respectively, among under-five children.

Mapping the most vulnerable populations in terms of the prevalence of under nutrition will assist in identifying interventions and targeting mechanisms. This study aims to provide such information on the nutritional status of mothers and children and associated factors with special emphasis on food security.

A household survey was carried out in nine districts of Sri Lanka, one district randomly selected from each province. Each district constituted one study area, except the Colombo district which had two study areas: the Colombo Municipal Council area and other areas in the district. Data collection was done using an interviewer administered questionnaire and complemented with community interviews, key informant interviews, and market surveys. The estimated sample size per district was 617 households totaling to 6170 households in 10 study areas. A multistage cluster sampling method based on the probability proportional to size technique was used to identify 30 clusters per district, each cluster located in a *Grama Niladhari* division. A systematic random sampling technique was used within each cluster to identify 21 households.

The household survey included administration of a pre-tested questionnaire to the head of the household, assessment of the nutritional status of all children aged 0 to 59 months and their mothers using anthropometric indicators. Measurement of haemoglobin levels was carried out on all children aged 6-59 months, pregnant women and non-pregnant women aged 15-49 years. One key informant interview and a small group interview was carried out in one out of every three clusters in each district. Market surveys were conducted by team leaders in each of the 30 clusters to obtain information on prices of selected food items, at the local level.

Of the 6071 households, 25.0 percent were in the urban sector with the percentages in the rural and estate sectors being 69.4 and 5.6 respectively. Of the 27,862 residents in the selected households, 27.3 percent were women aged between 15 and 49 years, 10 percent were children aged less than 5 years, and 17 percent those aged between 5.0 and 14.9 years.

Assessment of nutritional status indicated that the prevalence of stunting, wasting and underweight among children aged 0-59 months were 19.2 percent, 11.7 percent and 21.6 percent respectively (using WHO growth standards). Severe stunting was seen among 4.6 percent, with the comparable figures for severe wasting and severe underweight being 1.9 and 3.9 percent respectively. Percentage of overweight children was 0.9 percent. Assessment of haemoglobin levels of children aged between 6 and 59 months showed that 25.2 percent were anaemic. The prevalence of low birth weight among children born during the 5 years preceding the survey was 18.1 percent with a mean birth weight of 2.890 ± 0.51 kilogrammes.

Of the women aged 15-49 years who had a child under 5 years and not pregnant at the time of the survey, 17.0 percent had BMI less than 18.5 (thin), 22.8 percent with values between 25 and 29 (overweight) and 6.6 percent with BMI values 30 or above (obese). The prevalence of anaemia was 16.2 percent among pregnant women, 19.6 percent among lactating women, and 21.7 percent among non-pregnant and non-lactating women.

Almost all children were 'ever breastfed' of whom 92.3 percent were breast fed within one hour and 98.7 percent within one day after birth. Percentage of children 6-8 months who were given solid or semi solid foods in addition to breast milk was 91.6 percent. Of the children aged 0-23 months, 34.2 percent were bottle fed. Over 90 percent of the children aged 6-59 months were given grains/roots/tubers and dairy products, while 60 to 80 percent were given a wide range of food items including fruits and vegetables, meat fish/ poultry and organ meats. Proportions of children who received eggs (31.0 percent) or food cooked with oil or fat were low (45.2 percent). The percentage of children with minimum dietary diversity (4 or more food groups) was 72.9 with value being lower in the estate sector (46.6 percent).

Of the children aged less than 5 years, 17 percent reported symptoms related to respiratory illness during the previous 2 weeks while 7.0 percent reported having diarrhoea. Participation of adults in activities that promoted early childhood learning was high, 89.0 percent. Among children aged 5-14 years, 9.1 percent were engaged in child labour within the previous week.

Almost 95 percent of children had received care at a Child Welfare Clinic. Of the children above 9 months of age, 88.3 percent had received a mega dose of vitamin A at 9 months, and only 67.9 percent of children aged 36 months and over, have completed all 3 doses.

Of the pregnant women who attended antenatal clinics, the percentage who received *thripasha* and *poshana malla* were 77.3 and 23.9 respectively. Iron tablets were received by 98.1 percent, and of them, only 82.1 percent reported to have taken the tablets daily. Of the lactating mothers with a child under 6 months of age, 80.0 percent had received Vitamin A megadose, and 72.4 percent had received "thripasha".

Food consumption patterns indicated that almost all households consumed cereals/roots/tubers, sugar and coconut. Consumption rate of fish or meat was 78 percent, and showed a marked variation across sectors, wealth categories and income. A lower consumption rate was seen in the estate sector and in households with lower income and poorer wealth. The consumption of eggs was as low as 25 percent across all strata.

Of the total household monthly income, 37.9 percent was spent on food and 43.6 percent on productive assets. Percent expenditure on food was high among those with lower maternal education, household income and lower wealth quintiles. Nearly a third of the households had taken loans, mostly to purchase food and for income generation activities.

Approximately 32 percent of the households "did not have enough food" at least once during previous 12 months. In such situations, a majority relied on less preferred food (87.6 percent) and purchased food on credit (81.0 percent). Between 55-60 percent had borrowed food or reduced meal size. The main non-food coping strategies were: borrowing money from relatives/ neighbours, pawning jewellery and using savings. According to WFP food insecurity classification, 0.5 percent of

the households were 'severely food insecure', 11.8 percent 'moderately food insecure' and 87.6 percent 'food secure'.

The analyses of associations in respect of child malnutrition were based on the conceptual framework described by UNICEF, that identifies basic, underlying and immediate causes. Stunting and underweight rates were significantly higher in the estate sector than the urban and rural, but the rates of wasting and anaemia were not different between sectors. The prevalence of stunting was high in the districts of Nuwara Eliya, and Badulla, and wasting, high in the district of Colombo, underweight in Nuwara Eliya and Ratnapura and anaemia in Jaffna. In general, the increasing level of maternal and paternal education were associated with lower prevalence of stunting and underweight. Increasing family size and number of children under 5 years, were predictive of higher level of stunting.

Significant declining trends were observed in the prevalence of stunting, wasting, underweight and anaemia with increasing wealth quintiles. Increasing monthly household income was significantly associated with lower rates of stunting and underweight.

Higher prevalence of under nutrition was significantly associated with: an increase in the expenditure on food as a percentage of total household expenditure, households with a lower dietary diversity score, and in households that adopted one or more food related coping strategies.

Though not significant, higher prevalence of wasting, underweight and anaemia were seen among children in the food insecure households. An upward trend in all three anthropometric indicators were seen with increasing duration of food inadequacy. Dietary diversity score of young children (6-23 months) was significantly lower among stunted children.

Children who visited child welfare clinics (CWC) reported a significantly higher prevalence of underweight, and higher, but non-significant, prevalence of stunting and wasting. Children of mothers who received advice on growth, nutrition and early childhood development at CWC had a significantly lower level of stunting. Having received vitamin A mega dose at least once was linked with a lower prevalence of anaemia but was not related to any of the other indicators.

Prevalence of stunting was significantly higher during the fourth year of life, compared to infancy, and the prevalence of wasting and underweight was higher from 2nd to 5th years of life. In contrast, the prevalence of anemia showed a significant decline with increasing age. There were no sex difference in the prevalence of stunting, wasting and underweight even though the prevalence of anaemia was marginally higher in males. Children with low birth weight were found to have significantly higher prevalence of stunting, wasting and underweight, the rates been more than double of those with normal birth weight.

Multiple logistic regression analysis was used to determine the factors associated with undernutrition in children aged 6-59 months and non-pregnant women aged 15-49 years. Findings of the multivariable analysis supported findings of the bivariate analyses.

The study identified the wide range of issues relevant to the problems of under nutrition, hence, there is a need to develop a cohesive multi-sectoral programme with a special focus on food security. Such plans and programmes need to be developed, implemented and monitored at sub national levels.

Individuals to be targeted as beneficiaries of food supplementation / poverty alleviation programmes have to be identified on strictly defined criteria. Creation of awareness among public to strengthen behavior modification to improve positive care practices including dietary diversity should be a key intervention to promote nutritional status among women and children. Attention should be paid to develop and implement specific interventions aimed at reduction of low birth weight.

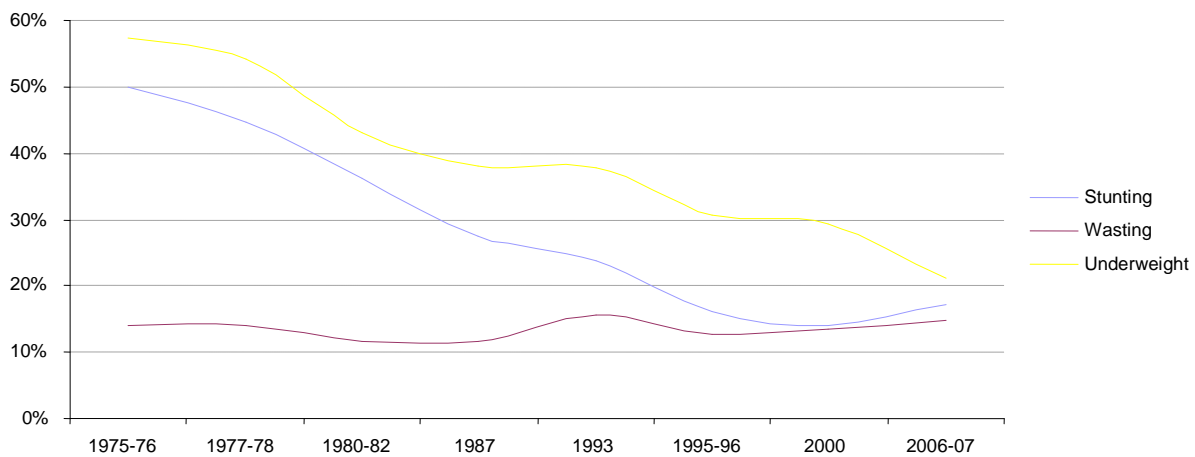
Chapter 1

Introduction

1.1 Background

Maternal and child under-nutrition remains a major public health problem in Sri Lanka, despite improvements in health indicators. In Sri Lanka, assessments of nutritional status has been carried out periodically as a part of the Demographic and Health Survey (DHS) conducted by the Department of Census and Statistics. According to the most recent 2006/07 DHS survey, nearly 17 percent of babies were born with low birth weight (weight less than 2.5 kg), while the prevalence of acute under nutrition (wasting), chronic under nutrition (stunting) and underweight among under-five children was at 15, 18 and 22 percent, respectively.¹ Although still high, prevalence of stunting and underweight have been brought down considerably within recent decades. However, wasting remains at a level today, which has been relatively unchanged for the last 30 years, as depicted in figure 1 below.

Figure 1: Trends in under nutrition among under-five children in Sri Lanka



Source: MRI database and DHS 1989, 2001, 2006/07

CHECK YEARS

A challenge in reducing under nutrition in Sri Lanka has been the wide differences observed in its prevalence, both geographically and across income segments of the population. Prevalence of stunting ranged from 8 to 41 percent between the 20 districts surveyed in the 2006/07 DHS. Wasting similarly differed between districts, although not in any clear correlation with stunting, as depicted in figure 2. A high level of stunting in one area does not necessarily correlate with a high level of wasting in the same area.

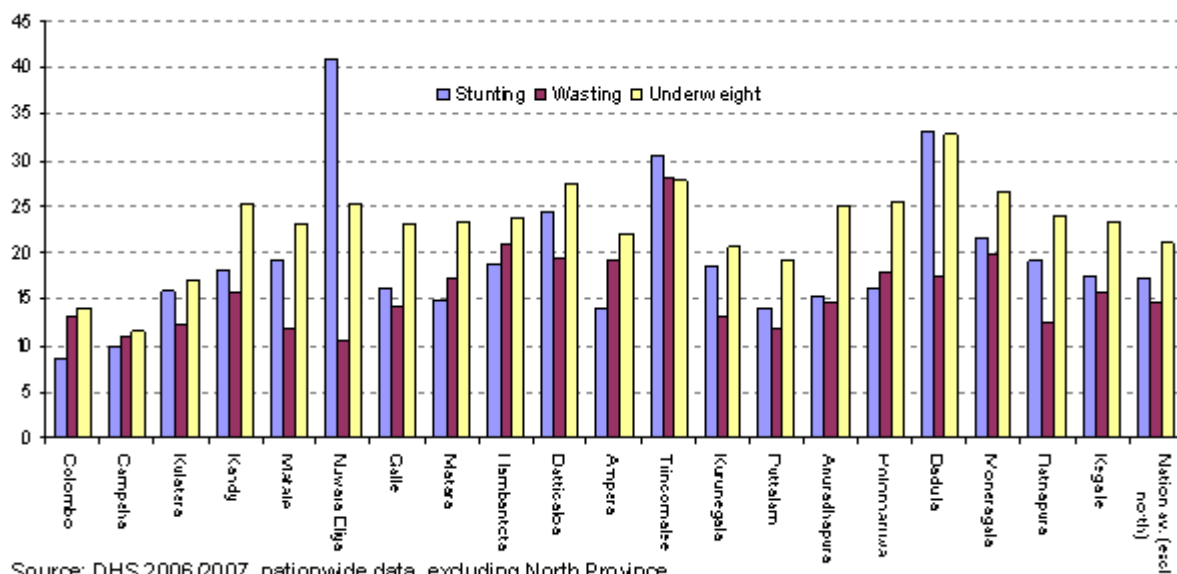
Over the past decades, a wide range of nutrition interventions have been carried out, some of them aimed at providing direct food assistance and others at food supplementation. In addition, food

¹Department of Census and Statistics and Ministry of Healthcare and Nutrition 2009. Sri Lanka Demographic and Health Survey 2006-07, Colombo Sri Lanka..

subsidies and poverty alleviation programs have been implemented. The current poverty alleviation initiative is the ‘Samurdhi’ programme which provides an income supplement of Rs. 500 – 1000 depending on the family size and poverty level.

‘Thriposha’ programme is the main targeted food supplementation programme implemented through the state health services, where a pre cooked food to supplement energy, protein and micronutrients is provided to pregnant and lactating women up to 6 months after delivery, infants aged 6 -11 months and pre school children who show growth faltering. Many of the other programmes are limited to selected areas, for example, the World Food Programme (WFP) being limited to areas identified through vulnerability mapping, distribution of a ‘poshana malla’, introduced in a limited number of Divisional Secretary (DS) divisions where a package containing nutritious food is distributed to pregnant and lactating mothers from low income families.. Provision of a glass of milk for children in the age group 6-59 months in low income families, is another supplementation programme provided by the state.

Figure 2: Global malnutrition (Median <-2SD) among under-five children, by district



Source: DHS 2006/2007, nationwide data, excluding North Province

Recent evaluations of existing ‘Thriposha ‘and ‘Samurdhi ‘programmes indicate that ineffective targeting may be undermining their efficacy.^{2,3} To better understand how interventions may be effectively targeted, a number of studies have aimed to ascertain the causes of under nutrition in Sri Lanka.

In addition to programmes aimed at improving food availability through direct and indirect measures, a package of health related interventions have been implemented through the health system, to enhance physiological utilization . These include services ranging from maternal care during pregnancy and lactation to promotion of breast feeding and complementary feeding practices, growth monitoring, immunization, nutrition education and activities aimed at reduction of diarrhoeal diseases and respiratory tract infections..

² Silva, K. D. R. R., 2008. Report on evaluation of Thriposha food supplementation programme. Colombo: Wayamba University of Sri Lanka.

³ Glinskaya, E., 2000. An empirical evaluation of Samurdhi Programme. Background Paper for Sri Lanka Poverty Assessment 2002, Report No 22-535-CE. Washington, DC: World Bank.

Observable inter-district differences indicate that causes of under nutrition may vary significantly at the district level, either because districts are affected differently or because household coping mechanisms vary. Another recent study, focusing on infant and young child feeding, illustrates how differences in feeding practices throughout the country may also explain variations in nutritional status indicators⁴. Further mapping of causes of under nutrition and household coping mechanisms is needed to help target interventions specifically to the challenges faced in individual areas.

According to the World Bank (2007)⁵ the incidence of stunting and underweight has been decreasing, the rates of decline have been greatest among households in Colombo and other urban areas of Western Province. These are the areas in which greater part of the country's wealth and economic activity is concentrated. Poverty is concentrated in rural areas, however, where over 70 percent of the population resides. As a result, nutrition inequities are on the rise. In 1993, a child from the poorest household was 2.8 times more likely to be underweight than a child from the richest household. By 2000, this ratio had increased to 4.1,⁶ thus indicating that the poorest households are increasingly lagging behind in efforts to prevent and remedy under nutrition.

Impact framework

The complexity of the factors that influence nutritional status has been depicted in the causal analysis framework presented by UNICEF. This framework, depicted in figure 3, identifies immediate, underlying and basic causes. The immediate causes of malnutrition are inadequate food intake and/or disease, while underlying causes include household food insecurity, inadequate care for children and mothers, and a poor health and health care environment. Each of these, in turn, can be explained by household poverty, where effects such as unemployment, depreciating assets – and increasing food and fuel prices – might be felt.

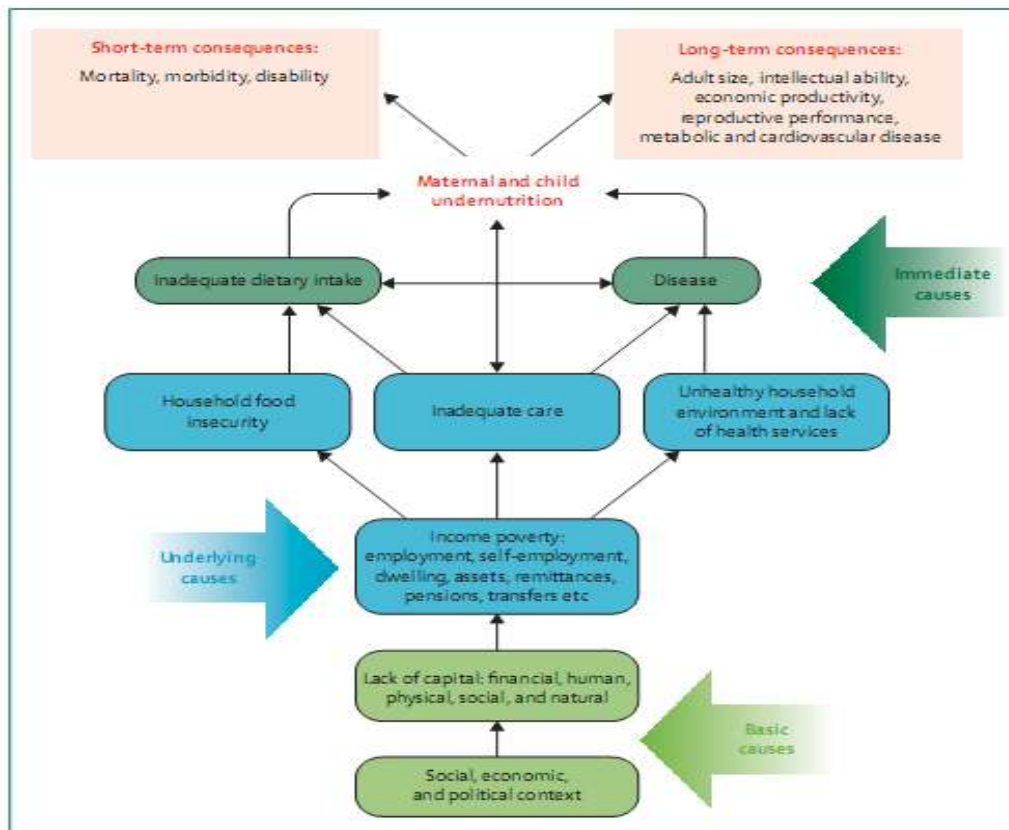
Figure 3: UNICEF framework of the relations between basic, underlying, intermediate and immediate causes of maternal and child under-nutrition.⁷ **REPLACE WITH UNICEF - change reference**

⁴ Aga Khan University, UNICEF, & Sri Lanka Ministry of Healthcare and Nutrition, 2008. Anthropological study on the determinants of child under-nutrition in Sri Lanka. Draft report. Colombo: UNICEF Sri Lanka.

⁵ **World Bank (2007) Poverty assessment**

⁶ World Bank, 2007. Malnutrition in Sri Lanka: Scale, scope, causes and potential response. Washington DC: World Bank.

⁷ Black, R. E., Allen, L. H., Bhutta, Z. A., Caulfield, L. E., Onis, M., Ezzati, M., Mathers, C., & Rivera, J. (2008). Maternal and child undernutrition: Global and regional exposures and health consequences. *The Lancet*, 371, 243-260.



Based on nationwide 2000 DHS data, the World Bank (2007) assessed the potential causal factors using advanced regression models⁶. The findings indicate that low birth weight is a key determinant of child underweight. Among the intermediate variables; household wealth status was the most important variable. The analysis presented in the MDG Report⁸ is consistent with this observation, the presence of an inverse relationship between household per capita expenditure and the probability of being underweight..

Income poverty and related factors are important underlying causes of under nutrition through many pathways. One of the key ways in which income poverty could influence nutritional status is through its impact on household food security which in turn is strongly influenced by food prices. Care giving and health care practices may also suffer as prices increase. For example, higher prices may lead to increased burden on caregivers, some of whom may have to work harder to cope, leading to less time and attention devoted to fundamental child care such as breastfeeding. Similarly, price increases may detract from resources or income otherwise made available to health care practices and services, e.g. medical expenses, which in turn may lead to worsened child undernutrition.

Food price increases

Impact of food price increases on the food security of the household particularly affects the poor who are at risk when they are not shielded from price increases. Higher food prices may lead poor households to limit their food consumption and shift to less nutritious diets, with negative effects on health and nutrition. The poorest 20 percent of the Sri Lankan population have a household income of

⁸ Department of Census and Statistics. MDG REPORT

around US\$ 2.00 per day, and spend around 60 percent thereof (\$1.20) on food.⁹ For these households, a 50 percent increase in food prices, assuming no change in consumption, would increase food expenses to US\$1.80, thus reducing income for non-food expenses to one fourth of what it was before.

Households will respond to price increases in different ways, and the coping mechanisms employed by households are likely to moderate the negative effects. Such coping mechanisms focus on rectifying the imbalance between income and expenditure and may vary widely from those aimed at reducing expenses, increase earnings, increase access to finances, or increase own production. Thus, modifications of the behaviours that are linked to the different coping mechanisms vary between households and would influence health and nutritional status in different ways.

The global increase in food and fuel prices over the last five years, with a dramatic peak in 2008, presented such a challenge. Considering the food prices at the global level, there was doubling of the price of cereals and dairy prices, from 2003 to 2008 while some individual food items experienced even greater increases. Whole market prices of rice and milk powder, for example – common staple foods in Sri Lanka – increased by 247 and 201 percent, respectively, from 2003 to 2008.¹⁰

While 2009 has seen a significant drops in both food and fuel prices, considerable concern has been raised among policymakers over how price increases may have already increased poverty and under nutrition. The World Bank predicts that the food and fuel price crisis can undermine years of progress on the MDGs, pushing more households into poverty and forcing those already struggling with daily needs to cut back further on food or other expenses.¹¹

In Sri Lanka, regular data on food prices are collected by the Department of Census and Statistics, but only in the Colombo area. Data indicates that the cost of some food items have increased quite dramatically over the last year and a half.¹² ‘Samba’ and red rice, for example, have increased by 37 percent over a six month period, and dhal, sugar, dried fish, and pork have peaked with 80, 46, 36 and 74 percent price increases, respectively, over a year and a half. .

In Sri Lanka, general inflation has been high in recent years, with an average inflation of 10.9 percent per year from 2002 to 2008¹³. Thus, some food price inflation might be a result of general inflation. However, the particularly high price increases in some food items, as those mentioned above, would seem to indicate that the Colombo market may have been affected by global food price increases. Further data is needed to assess to what extent global price increases have impacted local markets, and whether observed food price increases are consistent with general inflation or a result of food shortages.

A comprehensive assessment of the factors influencing nutritional status with a focus on the role played by food insecurity and related issues is likely to yield useful information on planning ‘broad

⁹ Department of Census and Statistics, 2008. Household Income and Expenditure Survey 2006-07, Colombo.

¹⁰ Food and Agricultural Organization (FAO).

¹¹ World Bank, 2008. Rising food and fuel prices: Addressing the risks to future generations. Washington, DC: World Bank.

¹² Department of Census and Statistics, www.statistics.gov.lk

¹³ Department of Census and Statistics , GDP implicit price deflator,

based' interventions, taking into consideration, the implementation and effectiveness of the on going nutrition interventions.

In view of the importance of food prices on food security which specially influence the low income groups, it is necessary to consider the new challenges posed to policy makers in making decisions related to nutrition interventions.

1.2. Rationale

In Sri Lanka, there is a persistent high prevalence of under nutrition among children , despite good indicators related to areas of maternal and child health. In view of the wide range of factors that influence nutritional status, conducting a comprehensive study where information on basic, underlying and immediate causes are available can be considered a need at the present time. Such a study is likely to provide evidence that will assist the policy makers to make decisions regarding action to be taken to have a positive impact on the current nutrition situation. Observations regarding the inter district, inter sectoral differences and the influence of income on nutritional status that have been reported needs to be studied in depth to assess the changes that are likely to have an effect due to recent global economic scenario.

In response to these challenges, this study was conducted to provide data from a household survey, supplemented by information from in-depth interview data, to assess the nutrition and food security situation in 9 districts in the country, one district from each of the 9 provinces. The surveys will provide urgently needed information that will help the Ministry of Health, other ministries and all other stakeholders, to map the most vulnerable populations and identify interventions , targeting mechanisms, and serve as a baseline which can be compared with subsequent data collection. .

1.3 Objectives

The general objective of the study were to identify the most vulnerable populations in relation to their nutritional status

The specific objectives were as follows:

1. To determine the :

1.1. prevalence of global and severe acute undernutrition and chronic undernutrition among children aged 0-59 months

1.2. prevalence of low BMI among adult women (15-49) and mothers of under-five children

1.3. pattern of infant and young child feeding practices, including the specific complementary feeding practices for children 6-59 months

1.4. prevalence of diarrhoea, and symptoms of respiratory illness among children aged 0-59 months in the two weeks preceding the survey

2. To estimate the:

2.1. proportion of children who received vitamin A supplementation at regular intervals

2.3. proportion of children who reported "illness" during the preceding 2 weeks by source of treatment

2.4. proportion of families who had 'quality' food and 3 meal a day in last 24 hours

2.5. Proportion of households with sanitary latrines

2.6. Proportion of households with access to safe water

3. To describe food security dynamics and relative levels of food insecurity in the selected districts
4. To estimate coverage of food supplementation programmes

Chapter 2

Methods

A cross sectional household survey, representing all nine provinces of Sri Lanka was carried out using multiple method of data collection.

2.1 Survey design

One district was randomly selected from each of Sri Lanka's nine provinces in order to represent each province. Data collection at household level was done using an interviewer administered questionnaire and complemented with community interviews, key informant interviews and market surveys.

The districts included in the study are as follows:

1. **Northern Province:** Jaffna.
2. **Eastern Province:** Trincomalee.
3. **Western Province:** (i) **Colombo Municipal Council (MC) area** (ii) **other areas in Colombo district**
4. **North Western Province:** Kurunegala
5. **North Central Province:** Anuradhapura
6. **Central Province:** Nuwara Eliya.
7. **Uva Province:** Badulla
8. **Sabaragmuwa Province:** Ratnapura.
9. **Southern Province:** Hambantota.

The study was carried out during the period , January to April 2009.

Map of Sri Lanka showing the districts is given in Figure 3.

2.2 Sampling procedure

2.2.1 Sample size

The main target variable was considered as acute under nutrition (wasting) of under-five children (0-59 months), hence the sample size was calculated on the basis of this group. Assuming an expected acute under nutrition prevalence of 15 percent, based on the latest available 2006/07 DHS data, with a 5.6 percent precision and a design effect of 1.5, a total of 234 under-five children had to be included. Assuming a non response rate of 5 %, a total of 247 under five children had to be recruited per district. This required inclusion of a total of 617 households per district, assuming that only 0.4 under-five children would be present in an average household.

Target group and indicator	Estimated prevalence	Design effect	Desired Precision	Sample size	5% non-response rate	Households necessary
Children age 0-59 months (acute malnutrition wasting)	15%	1.5	±5.6%	234	247	617

Figure 4: Map of Sri Lanka showing districts included in the study

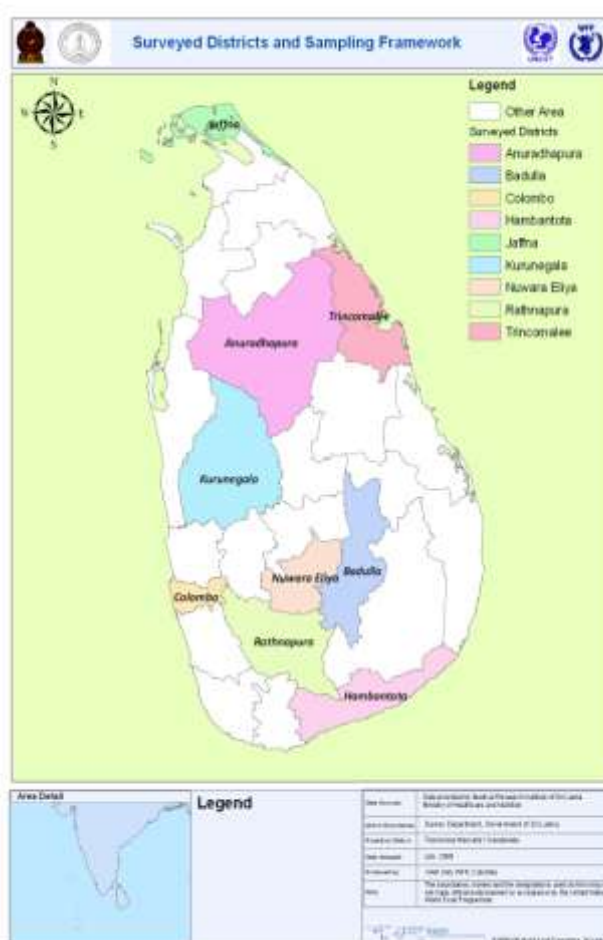
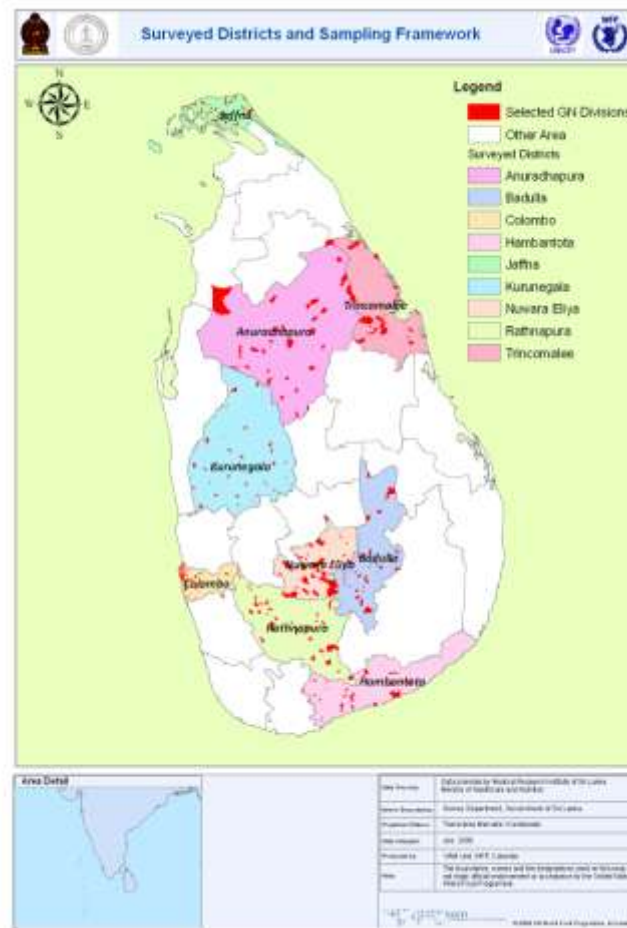


Figure 5: Map of the Sri Lanka showing the GN divisions included in the study **SHIFT THIS MAP**



2.2.2 Sample frame and cluster selection

The sample frame used for selection of clusters was the most recently available population data – the 2001 census from the Sri Lanka Department of Census and Statistics. Clusters were defined at the level of a Grama Niladhari (GN) division, which is the smallest administrative unit in Sri Lanka.

The 'probability proportional to size' technique was used to identify the clusters to be included in the study. Sampling interval was calculated based on the population data. The first cluster was identified randomly, followed by identification of a total of 30 clusters per district, using the sampling interval.

The map showing the Grama Niladhari divisions included in the study is given in Figure 4.

2.2.3 Selection of households

A household was defined as persons routinely sharing food from the same cooking pot and living in the same compound or physical location. Members of a household need not necessarily be relatives by blood or marriage.

In selecting the households within a cluster, survey teams visited the selected location and a list of households was obtained from the Grama Niladhari (or, in his absence, the local midwife or other official representative). The households included in the list were divided into groups of approximately 63 and after randomly selecting one of group, every third household within that group was selected for the interview, thus enabling the inclusion of 21 households per cluster.

All selected households were included in the survey, irrespective of whether there was a child under five. Each household was visited at least three times in an effort to identify missing household members, unless security or logistical constraints did not enable the team to do so. If there was reliable information of the non availability of household members during the study period, the household was replaced by another, from the same cluster..

2.3 Data collection

2.3.1 Composition of the survey teams

Each survey team included three interviewers and one team leader. A majority of the interviewers were newly graduated students. The same interviewers were used throughout the study. In predominantly Tamil speaking areas (Northern and Eastern Provinces and some areas in the estate sector), interviewers fluent in the Tamil language were recruited.

In addition to the Team leaders, a Coordinator was recruited one per each district, to take the overall responsibility for the conduct of the survey. Team leaders and team coordinators were predominantly trained staff from Medical Research Institute (MRI) with experience from past surveys.

2.3.2 Training of survey teams



The Medical research Institute (MRI) conducted the training of interviewers over a four-day period. Interviewers were trained in basic nutrition, interview techniques, use of the questionnaires, and data collection and record keeping. Team leaders and coordinators were additionally trained in editing of questionnaires at the field level and in quality assurance techniques. Team leaders, who conducted the anthropometric measurements, were recruited from MRI's pool of Public Health Inspectors, and had both training and experience in appropriate measurement

techniques. All interviewers were given an opportunity of actually administering the questionnaire at the field level prior to leaving for field work. .

2.3.3. Field logistics

The three interviewers from the survey team conducted all interviews, averaging seven interviews each, per day. The team leader was responsible for selection of households. In each district, three survey teams were present for a period of approximately 10 days, thus enabling them to complete the

interviews in the cluster. The Co-ordinator responsible for each district supervised the team leaders and the survey teams during this period.

2.3.4. Methods of data collection

2.3.4.1 Household survey

The household survey included several components.



Administration of the questionnaire : The pre tested questionnaire was administered to the head of the household by a trained interviewer. Where possible, mothers were interviewed to obtain information on child care practices and maternal nutrition. The minimum age of respondents was 15 years. Where respondents felt they could not provide accurate information, houses were revisited.

Household members were interviewed within the confines of their house. Under some circumstances, the household members were requested to convene at a central location such as a school, where all interviews would be conducted. Attention was paid to ensure privacy.

Anthropometric assessments: All children aged 0 to 59 months, along with their mothers and any pregnant women within the household, were selected for measurement. All measurements were conducted by team leaders, and standardized procedures for measuring the height/length, weight were used¹⁴ (WHO,1995).

Anthropometric measurements were made using UNISCALES and UNICEF measuring boards. For pregnant women, Mid Upper Arm Circumference (MUAC) was measured. Presence / absence of oedema was observed using standard procedure.



Measurement of haemoglobin levels was carried out for all selected individuals, except children less than six months of age using hemocue method, using capillary blood.



2.3.4.2. Key informant interviews, community interviews, market surveys

Market surveys were conducted by team leaders in each of the 30 clusters to obtain information on prices of selected food items, at the local level. Team leaders would visit local stores or markets using a pre-designed market survey sheet. Information would be obtained on prices on the day of the visit as well as six months ago. The highest and lowest prices in the local market for a given food item was obtained to get a reliable estimate of the price level.



The Coordinator conducted **in depth interviews with key informants and small community groups**, in one of three clusters. The purpose of these interviews was to acquire in-depth information to support the data from the household questionnaire. Interviews followed a pre-designed structured interview guideline and were conducted in the local language, with locally hired translators if necessary. Notes were taken in Sinhala and Tamil, as appropriate, and transcription was done by the team coordinator as soon as possible and reported and translated into English.

Key informant interviews were conducted with one or two members, purposively selected. Key informants interviewed included Grama Niladharis (village headmen), Public Health Midwives, Divisional Secretaries, and Plantation Welfare Directors. Community interviews were conducted with a group of people (4-6) selected from the community. Some of the groups included were: plantation tea pluckers, agricultural workers, school teachers, pregnant women, young mothers, labourers, and adolescents.

2.3.5.. Supervision and quality assurance

Constant supervision and monitoring of all field activities was attempted. Team leaders monitored interviewers, while team coordinators monitored team leaders as well as the interviewers.

Routine field-editing of all questionnaires was conducted by the team leaders. At the end of each day, team leaders would go through the questionnaires to identify mistakes, and were corrected as appropriate. The Team coordinators would checked a random sample of ten percent of the questionnaires to ensure quality of the information collected.

2.4 Data processing and analysis

EPI Info 6.0 software package was used for data management and entry. The entry screens employed range and consistency checks and skips to minimize entry of erroneous data. Special arrangements were made to enforce referential integrity of the database so that all data tables related to each other without problem.

Data cleaning was carried out in MS Access by sorting records to filter out extreme values and SQL queries to check logical errors. Consistency checks were performed to detect and correct data entry errors.

Data analysis was conducted in Anthro and SPSS. Anthro was used to calculate nutrition z-scores for children based on the anthropometric measurements, using WHO standards as the reference value¹⁴(REF).

2.5 Ethical considerations

Ethics clearance was obtained from the Ethics Review Committee of the MRI, Ministry of Health .

Data collected was recorded on paper questionnaires. Original documents were kept in secure locations in the field, to which only members of the survey team had access, ensuring confidentiality. Participants were informed of the purpose of the study and that they could refuse at any time to have their children measured. Informed consent was obtained 'in writing, prior to assessment of hemoglobin levels.

¹⁴ WHO standards

Chapter 3

Description of Study Population

This chapter provides information on socio-demographic and housing characteristics of the population included in the survey from 9 districts and Colombo Municipal Council (CMC) area.

3.1 Description of the sample

A total of 6071 households from the 9 districts and the CMC area were included in the survey. As shown in Table 3.1, 69.4 percent of the households were in the rural sector, 25.0 percent in the urban sector and 5.6 percent in the estate sector. Three of the 9 districts, namely Nuwara Eliya, Badulla and Ratnapura, had estate populations amounting to 44.9, 9.7 and 3.4 percent of the households respectively.

Table 3.1 Distribution of households by sector and district

District	Sector						number of households
	Urban		Rural		Estate		
	No.	%	No.	%	No.	%	
Anuradhapura	42	7.0	559	93.0	0	0.0	601
Badulla	66	10.5	500	79.7	61	9.7	627
Colombo	480	76.7	146	23.3	0	0.0	626
Colombo MC	607	100.0	0	0.0	0	0.0	607
Hambantota	21	3.5	587	96.5	0	0.0	608
Jaffna	90	14.7	523	85.3	0	0.0	613
Kurunegala	70	11.1	561	88.9	0	0.0	631
Nuwaraeliya	48	8.4	268	46.7	258	44.9	574**
Ratnapura	21	3.4	582	93.3	21	3.4	624
Trincomalee	75	13.4	485	86.6	0	0.0	560*
Total	1520	25.0	4211	69.4	340	5.6	6071

*In Trincomalee district, only 28 clusters were included (Pullmudai, Mahindapurum – not included) and in one cluster, Jayanagar only 10 households were included.

**In NuwaraEliya district – in some clusters, the required number of households could not be included.

As shown in Table 3.2, of the total 27,862 individuals who were usually resident in the selected households, 7604 (27.3 percent) were women aged between 15.0 and 49.9 years. Seventeen percent (n=4799) of the total population were children aged between 5.0 and 14.9 years, and 10.3 percent (n=2865) were children aged less than 5 years. The proportions of the population aged less than 5 years in the urban, rural and estate sectors were 9.4, 10.2 and 15.2 percent respectively. There were 1660 children aged between 2.0-4.9 years, 6.0 percent of the total population.

Table 3.2 The number of total individuals, women 15-49 years, and children aged less than 5 years, 2.0-4.9 years and 5.0-14.9 years, by sector and district

Sector/ District	Total Number of individuals	Women 15.0-49.9 years		Children < 5 years		Children 2.0-4.9 years		Children 5.0-14.9 years	
		No	%	No	%	No	%	No	%
Sector									
Urban	7130	1897	26.6	671	9.4	389	5.5	1141	16.0
Rural	18960	5251	27.7	1925	10.2	1115	5.9	3245	17.1
Estate	1772	456	25.7	269	15.2	156	8.8	313	17.7
District									
Anuradhapura	2676	775	29.0	253	9.5	134	5.0	430	16.1
Badulla	2869	769	26.8	271	9.4	149	5.2	485	16.9
Colombo	2780	746	26.8	268	9.6	160	5.8	419	15.1
Colombo MC	3017	799	26.5	292	9.7	157	5.2	501	16.6
Hambantota	2717	733	27.0	293	10.8	182	6.7	442	16.3
Jaffna	2776	763	27.5	286	10.3	179	6.4	542	19.5
Kurunegala	2801	775	27.7	235	8.4	144	5.1	417	14.9
Nuwara Eliya	2789	756	27.1	361	12.9	215	7.7	498	18.0
Ratnapura	2893	802	27.7	270	9.3	144	5.0	467	16.1
Trincomalee	2544	687	27.0	336	13.2	196	7.7	498	19.6
Total	27862	7604	27.3	2865	10.3	1660	6.0	4799	17.0

3.2 Household characteristics

3.2.1 Household composition

Distribution of households by sex of household head and household size is shown in Table 3.3. Of them, 10.6 percent were headed by a female, with this proportion being marginally lower in Nuwara Eliya, and Trincomalee, and higher in the CMC area. Approximately 73 percent of households had four or more members, with an average household size of 4.6. The average household size was marginally higher in the CMC area and Nuwara Eliya district.

3.2.2 Educational attainment and occupation

As shown in Table 3.3, 95.5 percent of household heads had some level of education and the mean years of schooling was 9. Of them, 20.1 percent had some level of primary education (1-5 years of schooling), 37.0 percent completed primary education (6-10 years of schooling), and 38.4 percent had completed more than 10 years of schooling. Those who had completed more than 10 years of schooling was higher in Colombo, Jaffna and Kurunegala districts. In the districts of Trincomalee, Badulla, and Ratnapura, the percentage who did attend school were relatively high. The level of education of the spouse showed a similar pattern to that of head of the household.

Agriculture related work was the commonest occupation among the heads of households (20.6 percent), with those employed in skilled and unskilled labour categories showing approximately 15.6 and 14.8 percent respectively. Inter district variations were seen with Colombo district and the CMC area having remarkably lower percentages of heads of households being employed in agriculture related work.

Study of occupational categories of the spouse showed that 70.9 percent of them were housewives with small percentages in other jobs, i.e., Agricultural work 5.4 percent, unskilled work 4.0 percent, skilled work 3.1 percent. The percentage of those who belonged to the housewife category was comparatively low in Nuwara Eliya district (42.7 percent) and high in Trincomalee (84.2 percent).

Table 3.3 Distribution of households by household headship, size, education level, and occupation by district

Characteristic	% within district										All Districts	
	Anuradhapura	Badulla	Colombo	Colombo MC	Hambantota	Jaffna	Kurunegala	Nuwaraceliya	Ratnapura	Trincomalee	No	%
Household headship												
Male	89.0	90.4	89.8	84.0	89.3	89.6	89.5	93.0	88.6	91.1	5428	89.4
Female	11.0	9.6	10.2	16.0	10.7	10.4	10.5	7.0	11.4	8.9	643	10.6
No. of members resident												
1-3	28.1	24.7	28.4	23.6	28.3	31.8	27.6	22.1	23.6	29.8	1627	26.8
4-6	64.7	66.5	63.4	59.3	61.0	55.0	64.5	64.6	66.0	58.2	3787	62.4
≥7	7.2	8.8	8.1	17.1	10.7	13.2	7.9	13.2	10.4	12.0	657	10.8
Mean (SD)	4 (1.5)	.5 (1.5)	4 (1.5)	5 (1.9)	4. (1.7)	4. (1.7)	4 (1.4)	5 (1.7)	5 (1.5)	5 (1.7)	5 (1.6)	
Years of schooling (head of household)												
No Schooling	3.5	6.8	1.6	4.7	3.2	4.1	2.8	4.8	6.2	8.1	268	4.5
1-5	22.7	19.1	12.4	14.5	22.6	21.0	17.5	26.3	25.8	19.7	1195	20.1
6-10	37.5	37.5	33.5	44.3	39.6	33.0	35.4	38.4	33.6	38.0	2202	37.0
11-13	34.2	35.1	47.0	34.3	31.8	38.6	41.1	29.7	32.8	31.9	2128	35.8
Higher	2.0	1.5	5.5	2.3	2.8	3.3	3.2	0.7	1.6	2.4	152	2.6
Mean (SD)	8 (3.6)	8 (3.8)	10 (3.4)	9 (3.5)	8 (3.7)	9 (3.6)	9 (3.6)	8 (3.6)	8 (3.9)	8 (3.9)	8 (3.7)	
Years of schooling (spouse)												
No Schooling	3.1	8.6	0.7	4.2	3.1	2.6	2.6	6.7	6.3	8.8	240	4.6
1-5	16.4	14.1	8.7	14.3	13.7	17.1	10.7	22.5	14.8	16.4	770	14.8
6-10	36.8	29.4	33.0	42.9	34.4	28.1	35.2	35.1	29.9	39.8	1783	34.3
11-13	42.7	46.8	54.2	36.5	44.6	48.8	49.4	35.5	46.7	33.4	2298	44.2
Higher	1.0	1.1	3.3	2.0	4.2	3.5	2.1	0.2	2.4	1.5	112	2.2
Mean (SD)	9 (3.4)	9 (3.9)	10 (3.0)	9 (3.4)	9 (3.6)	9 (3.4)	10 (3.3)	8 (3.7)	9 (3.8)	8 (3.8)	9 (3.6)	
Occupation (head of household)												
Managerial	1.3	1.6	3.3	2.2	1.6	1.5	2.3	0.7	1.6	1.7	105	1.8
Professional	3.2	1.3	4.1	2.2	2.6	2.7	3.9	1.3	1.3	5.8	165	2.8
Clerical	1.3	1.1	4.3	2.9	1.4	1.7	1.8	1.4	1.8	2.6	119	2.0
Sales & related	8.4	8.3	16.6	19.3	10.7	14.6	13.1	9.7	9.0	12.9	720	12.3
Agricultural worker	40.2	37.2	2.0	0.5	33.1	17.3	20.6	15.1	19.5	21.5	1203	20.6
Security forces	7.0	3.6	1.1	0.5	1.8	0.8	2.9	2.5	1.3	6.5	161	2.8
Skilled worker	11.5	10.1	23.0	24.6	16.4	13.8	15.2	14.6	14.6	11.2	910	15.6
Unskilled worker	6.1	11.5	9.3	11.2	11.1	25.8	11.6	25.8	21.0	15.1	867	14.8
Housewife*	2.3	4.9	4.6	8.3	4.2	4.4	5.6	2.2	5.9	4.1	275	4.7
Other	15.8	16.5	26.9	22.0	15.7	10.6	19.8	19.6	17.9	14.8	1055	18.0
Unemployed	2.9	3.8	4.9	6.3	1.4	6.7	3.2	7.0	6.1	3.7	270	4.6
Occupation (spouse)												
Managerial	1.2	0.5	0.6	0.4	0.4	0.6	0.8	0.0	0.6	0.4	28	0.5
Professional	3.2	2.0	2.8	1.6	4.1	4.1	2.6	2.1	2.4	2.6	142	2.7
Clerical	0.8	0.9	2.2	0.4	0.6	0.6	1.3	0.4	1.3	0.0	45	0.9
Sales & related	1.0	2.2	2.9	2.2	2.2	0.9	4.1	1.4	3.5	2.8	121	2.3
Agricultural worker	19.3	13.4	0.4	0.0	3.5	0.7	3.6	6.0	5.9	1.3	282	5.4
Security forces	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.8	0.0	0.0	6	0.1
Skilled worker	2.0	2.9	1.8	4.4	2.2	5.2	2.4	5.5	4.8	0.0	163	3.1
Unskilled worker	1.0	5.4	1.8	2.4	1.0	2.2	1.5	18.7	5.9	0.9	209	4.0
Housewife*	58.0	66.2	76.3	77.2	79.6	79.8	76.4	42.7	68.0	84.7	3671	70.9
Other	4.3	3.8	7.9	4.6	5.9	2.1	4.9	8.0	4.8	2.4	252	4.9
Unemployed	9.1	2.7	3.3	6.7	0.4	3.7	2.4	14.4	2.9	4.9	256	4.9

* Non-working women were categorized as "housewife"

3.2.3 Housing characteristics

Table 3.4 presents information relevant to the housing structure and access to electricity, according to the districts. A majority lived in houses with a cement or tile/ terrazzo floor (84.6 percent), tiles/ asbestos or concrete roofing (81.4 percent) and brick or cement walls (87.5 percent). There was some variation in the material used for construction of housing, between districts. In Nuwara Eliya district, 58.2 percent of houses had corrugated sheets for roofing. Proportion of houses with cadjan roofs was relatively high in Jaffna. Almost 81 percent of households had access to electricity, the coverage being relatively low in Jaffna (61.0 percent) and high in Colombo (96.0 percent).

Table 3.4 Distribution of households by housing characteristics, by district

Characteristic	% within district										All Districts	
	Anuradhapura	Badulla	Colombo	Colombo MC	Hambantota	Jaffna	Kurunegala	Nuwaraeliya	Ratnapura	Trincomalee	No.	%
Flooring Material												
Cement	75.5	69.9	75.6	81.5	78.6	76.8	83.4	72.0	77.7	92.7	4752	78.3
Tile or Terrazzo	3.8	4.0	20.0	17.1	5.4	1.3	5.7	1.2	3.0	0.4	382	6.3
Mud/ cow dung	18.1	22.6	1.6	0.7	14.3	20.1	6.7	23.5	16.2	3.8	774	12.7
Other	2.5	3.5	2.9	0.6	1.6	1.8	4.3	3.3	3.1	3.2	163	2.7
Roofing material												
Tiles	58.4	45.9	23.5	8.6	81.6	55.5	78.9	11.0	57.5	62.0	2941	48.4
Asbestos	24.6	29.8	61.8	58.0	5.6	24.8	11.1	24.2	28.2	20.2	1758	29.0
Concrete	1.7	1.8	5.6	20.3	2.8	0.7	1.4	4.2	0.8	1.3	245	4.0
Corrugated sheet	12.3	21.5	8.5	12.7	5.6	6.4	4.8	58.2	12.5	12.7	925	15.2
Cadjan	3.0	0.6	0.0	0.2	4.4	10.9	3.8	0.9	0.6	3.2	168	2.8
Other	0.0	0.3	0.6	0.3	0.0	1.8	0.0	1.6	0.3	0.7	34	0.6
Type of wall												
Brick/ cabok	77.7	56.0	36.4	35.1	70.9	3.1	72.7	36.1	45.7	67.1	3036	50.0
cement block	12.0	21.7	54.5	58.2	20.7	78.1	20.1	44.6	39.6	25.0	2277	37.5
Clay	8.7	9.4	0.5	0.3	6.4	10.1	3.8	10.5	11.7	3.4	393	6.5
Wood	0.0	0.6	6.1	4.8	0.0	1.3	1.0	5.4	0.6	0.0	120	2.0
Cadjan	1.0	0.3	0.6	0.2	0.5	3.6	0.5	0.2	0.2	1.3	50	0.8
Other	0.7	11.9	1.9	1.5	1.5	3.7	1.9	3.3	2.3	3.3	195	3.3
Availability of Electricity												
Yes	76.4	86.1	96.0	93.2	81.4	61.0	83.5	80.3	73.6	77.8	4917	81.0
No	23.6	13.9	4.0	6.8	18.6	39.0	16.5	19.7	26.4	22.2	1153	19.0

3.2.4 Household possessions

Information on possession of household items, livestock and land is presented in Table 3.5. More than 75 percent of households had a television or radio and 31.1 percent had a refrigerator. As for the means of transportation, 45.1 percent of households owned a bicycle and 25.2 percent owned a motorcycle. Households having mobile telephones (57.7 percent) was higher than non-mobile telephone (47.6 percent).

Availability of household items varied between districts with Jaffna showing low levels of availability of possessions such as radio, television, non mobile telephone. All districts other than

Colombo, CMC area and Kurunegala showed a low availability of relatively expensive household items such as refrigerators and motorized transport facilities (car, van etc).

Respondents were also asked about the ownership of cattle, buffalos, goats, pigs and chicken. The percentage of households that owned any form of livestock was 18.4. Ownership of livestock was much higher in Jaffna compared to other districts. The mean land extent per household was 0.9 acres.

Table 3.5 Percent of households with household possessions and ownership of livestock and land, by district

Possession / ownership	% within district										All Districts	
	Anuradhapura	Badulla	Colombo	Colombo MC	Hambantota	Jaffna	Kurunegala	Nuwaraeliya	Ratnapura	Trincomalee	No	%
Household items												
Radio	75.2	79.7	89.6	83.5	76.3	59.1	79.2	71.3	76.8	61.5	4577	75.4
Television	78.7	79.3	93.9	89.1	77.5	45.2	84.3	76.1	76.9	62.2	4643	76.5
Mobile telephone	56.2	44.3	74.8	73.1	59.7	47.5	62.9	45.6	55.1	56.3	3499	57.7
Telephone (non mobile)	59.2	52.3	62.9	49.1	45.7	10.8	59.7	47.2	46.8	41.2	2890	47.6
Refrigerator	28.1	19.5	60.9	54.2	32.2	12.7	39.9	14.3	25.2	22.0	1888	31.1
Transport facilities												
Bicycle	75.5	20.4	28.0	18.1	56.4	82.2	62.8	10.3	31.4	66.2	2734	45.1
Motorcycle/Scoter	45.1	12.3	23.5	12.5	34.4	24.3	46.1	5.4	20.8	26.7	1529	25.2
Trishaw	6.5	6.1	15.2	10.9	10.4	2.3	6.5	3.3	8.5	5.4	458	7.6
Car/Van/Bus/Truck	4.8	3.5	14.5	6.3	6.4	1.6	10.0	3.0	4.2	2.0	346	5.7
Boat	1.2	0.5	0.3	0.3	1.5	0.7	1.1	0.0	0.2	2.2	47	0.8
Tractor/Land Master	13.8	2.4	0.3	0.2	7.6	1.3	8.9	0.0	2.4	6.1	260	4.3
Livestock												
Yes	18.0	19.3	5.4	0.7	9.5	64.3	21.2	17.2	6.9	22.1	1119	18.4
No	82.0	80.7	94.6	99.3	90.0	35.7	78.6	82.8	92.9	77.9	4947	81.5
Lands												
Mean extent of lands (Acres)	0.7	0.5	0.1	0.1	0.6	2.1	2.1	0.4	1.5	0.8	0.9	

3.2.5 Income and wealth index

Two indicators of economic status was used in this study, the first being the average household income per month and the second, the Household Wealth Index. Household income was categorized into 6 classes considering the class limits of the income deciles described in the Household Income and Expenditure Survey, 2007¹⁵ and adequacy of the number of observations in each class-interval.

The 'household wealth index' was developed using 3 sources of information: housing characteristics, household possessions and availability of water and sanitation facilities. Principal component analysis was performed by using information on the ownership of household goods and amenities (assets) to assign weights to each household asset, and obtain wealth scores for each household in the sample. The assets or variables used in these calculations were as follows: housing characteristics (type of floor; type of roof; type of wall) availability of household assets (electricity supply, solar power, radio, television, mobile phone, static phone, refrigerator, watch, bicycle, motorcycle, three wheeler,

¹⁵ Department of Census and Statistics, 2008. Household Income and Expenditure Survey 2006-07. Colombo

tractor/land master, car and motorized boat) and available water and sanitation facilities (source of drinking water, type of sanitary facility).

The sample was then divided into five groups of equal size, from the poorest quintile to the richest quintile, based on the wealth scores of households they were living in. The wealth index is assumed to capture the underlying long-term wealth through information on the household assets, and is intended to produce a ranking of households by wealth, from poorest to richest. A single index was developed for the whole sample and indices were not prepared for each district separately.

As shown in Table 3.6, 39.1 percent of the households had a monthly income less than 9000 Sri Lankan Rupees (LKR). The percentage of households in the lowest income category was high in the districts of Jaffna (59.8 percent), Badulla (55.0 percent) and Ratnapura (51.7 percent), and relatively low in the Colombo district (16.6 percent) and the CMC area (17.3 percent). Income pattern indicates that 42.8 percent of the households received income on a monthly basis, while 31.1 percent on a daily irregular basis.. In Jaffna district., 54.0 percent of the households received their income on a daily basis and the availability of income was not regular.

Percentage of households classified as belonging to the lowest wealth quintile varied from 4.6 percent in the Colombo district to 40 percent in Jaffna district. Conversely, households belonging to the highest wealth quintile ranged from 5.1 percent in Jaffna to 46.6 percent in Colombo district.

Table 3.6 Distribution of households according to income and wealth index, by district

Characteristic	% within district										All Districts	
	Anuradhapura	Badulla	Colombo	Colombo MC	Hambantota	Jaffna	Kurunegala	Nuwaraeliya	Ratnapura	Trincomalee	no.	%
Monthly household income (LKR)												
< 9,000	32.6	55.0	16.6	17.3	39.5	59.8	32.6	44.1	51.7	41.1	2311	39.1
9,000 – 13,999	13.9	15.6	18.9	19.6	19.0	17.3	20.3	23.5	17.4	19.1	1090	18.4
14,000 – 19,999	18.2	9.5	17.6	22.7	17.8	11.4	15.9	15.4	12.0	22.2	957	16.2
20,000 – 31,999	25.0	14.6	28.9	26.1	16.1	9.2	18.6	13.4	12.5	13.8	1057	17.9
≥ 32,000	10.3	5.3	17.9	14.4	7.6	2.2	12.5	3.6	6.4	3.8	502	8.5
Pattern of income												
Daily paid irregular	20.9	22.7	29.3	33.8	36.9	54.0	29.7	21.9	26.8	35.7	1861	31.1
Daily paid regular	4.7	9.0	9.8	12.0	7.5	8.9	10.5	7.2	8.2	12.1	538	9.0
Weekly	3.0	3.2	2.3	1.2	1.7	4.2	10.5	2.3	3.9	2.9	212	3.5
Monthly	46.6	42.4	55.6	50.9	36.9	23.2	36.2	54.9	40.0	42.0	2560	42.8
Seasonal	24.7	22.7	2.9	2.2	17.1	9.7	13.2	13.6	21.1	7.2	809	13.5
Wealth Index Quintile												
Lowest	19.0	22.3	4.6	6.4	17.3	40.0	10.5	32.4	22.8	26.4	1214	20.0
Second	17.8	25.4	8.8	10.5	16.6	26.6	16.5	32.1	17.1	29.6	1210	20.0
Middle	20.1	22.5	14.7	15.0	18.6	18.8	25.7	19.7	24.4	21.3	1219	20.0
Fourth	22.1	17.2	25.2	31.3	24.2	9.6	24.4	9.8	20.0	15.0	1214	20.0
Highest	21.0	12.6	46.6	36.7	23.4	5.1	23.0	6.1	15.7	7.7	1214	20.0

Chapter 4

Nutritional Status

4.1 Nutritional status of children

4.1.1 Prevalence of malnutrition

The three indices of physical growth that describe the nutritional status of children according to WHO growth standards (WHO, 2006) are : Height-for-age, Weight-for-height and Weight-for-age. Each of the four nutritional status indicators is expressed in terms of standard deviations from the median (Z-scores) of the reference population as given below:

Stunting

A child whose height for age is below -2 SD from the median of the reference population is considered short for his/her age, or “stunted,” a condition reflecting the cumulative effect of chronic under nutrition. Those that have height for age values less than -3 SD are considered as ‘severely stunted’.

Wasting

A child whose weight for height is below -2 SD from the median of the reference population is considered as “wasted,” a condition reflecting the effect of short term under nutrition. Those that have weight for height values less than -3 SD are considered as ‘severely wasted’.

Underweight

A child whose weight for age is below -2 SD from the median of the reference population is considered as “underweight”. Those that have weight for age values less than -3 SD are considered as ‘severely underweight’.

Overweight

A child whose weight for height is above +2 SD from the median of the reference population is considered as “overweight”.

A total of 2865 children under five years were identified to be included in the survey. Of them, anthropometric assessments were carried out in 2748 children, 96 percent of the total sample who were available at the time of taking measurements. Excluding the children whose data showed recording errors, anthropometric data on 2588 children (90 percent) were included in the final analysis.

As shown in Table 4.1, among all children in the age group 0–59 months, 19.2 percent were stunted, 11.7 percent wasted and 21.6 percent were underweight . Severe stunting was seen among 4.6 percent of the total group, with the comparable figures for severe wasting and severe underweight being 1.9 percent and 3.9 percent respectively. Children with weight for height values more than +2 SD were considered to be over weight and this percentage was 0.9 percent.

The prevalence of stunting (height for age <-2 SD) was relatively low during the first year of life and showed an increase from 12 months up to 47 months, with a decline in the fifth year. There was no consistent pattern seen in the prevalence of wasting (weight for height <-2 SD) with age. Prevalence of underweight was relatively low during the first year even though this percentage during the first 6 months was higher than the second six months. Thereafter, a consistent increase in the prevalence is seen with increasing age.

The percentage of children with stunting and wasting were marginally higher among males compared to females. Comparison between sectors show that the prevalence of all three indicators – stunting, wasting and underweight - was highest in the estate sector, with the urban sector showing the lowest prevalence. The most marked difference between sectors was in the prevalence of stunting in the estate sector (46.7 percent) being more than thrice that of the urban sector (14.3 percent).

Inter district differentials were seen with high percentages of children being stunted in Nuwara Eliya, Badulla and Ratnapura districts, 40.9 percent, 23.9 percent and 21.6 percent respectively. A similar pattern was seen in the prevalence of underweight. However, the prevalence of wasting was highest in Colombo district (17.4 percent) and lowest in the Colombo MC area (7.5 percent).

In general, a declining trend was seen in the prevalence of stunting, wasting and underweight with increasing monthly household income and wealth quintiles. However, there was no consistent trend in the prevalence of wasting though the rates in the richest quintile was lower than the poorest quintile. The prevalence of all three indicators decreased with increasing maternal educational levels.

Prevalence of severe stunting, was highest in the fourth year of life (6.4 percent), among males (5.2 percent), markedly higher in the estate sector (15.4 percent), with lower levels reported among the higher maternal educational categories, income levels and wealth quintiles. Regarding severe wasting, the prevalence was high in the first 6 months of life, in the estate sector, in Colombo and Nuwara Eliya districts, with no consistent pattern seen in relation to maternal educational status and the two indicators of economic status.

Table 4.1 Prevalence of malnutrition: stunting, wasting, overweight and underweight by background characteristics

Background characteristic	Height-for- age (%)		Weight-for-height (%)			Weight-for-age (%)		Total No of Children
	<-2SD	<-3SD	<-2SD	<-3SD	≥+2SD	<-2SD	<-3SD	
Age of child (months)								
<6	13.3	4.0	12.4	4.4	2.7	15.9	3.5	226
6-11	13.5	3.7	6.7	0.0	0.7	11.6	1.5	267
12-23	20.9	4.4	8.3	1.9	0.4	17.6	3.9	569
24-35	20.6	5.1	13.6	1.9	0.9	26.0	3.8	574
36-47	23.3	6.4	14.0	2.5	0.6	26.1	5.8	486
48-59	17.6	3.0	13.9	1.1	0.9	24.9	3.6	466
Sex of child								
Male	19.8	5.2	12.1	1.9	0.7	21.6	3.6	1261
Female	18.7	4.0	11.5	1.9	1.0	21.6	4.2	1327
Sector								
Urban	14.3	3.8	11.0	1.5	1.1	17.7	2.8	610
Rural	17.4	3.4	11.9	1.9	0.8	20.8	3.7	1751
Estate	46.7	15.4	12.3	3.1	0.4	37.9	8.8	227
District								
Anuradhapura	14.0	2.7	11.7	1.8	0.0	17.1	4.1	222
Badulla	23.9	5.1	9.4	1.6	1.6	22.4	5.5	255

Background characteristic	Height-for-age (%)		Weight-for-height (%)			Weight-for-age (%)		Total No of Children
	<-2SD	<-3SD	<-2SD	<-3SD	≥+2SD	<-2SD	<-3SD	
Colombo	13.4	3.6	17.4	3.2	1.2	22.3	4.5	247
Colombo MC	12.8	3.8	7.5	0.4	1.5	15.4	2.3	266
Hambanthota	15.4	3.7	13.2	2.2	0.7	22.8	5.1	272
Jaffna	15.2	1.9	9.6	0.7	0.7	14.4	1.5	270
Kurunegala	12.6	3.7	14.0	2.3	0.9	19.2	2.3	214
Nuwaraeliya	40.9	12.1	11.1	3.0	0.3	36.2	5.4	298
Ratnapura	21.6	4.8	13.6	1.6	0.8	25.2	4.4	250
Trincomalee	18.0	3.1	10.9	2.0	0.7	18.7	3.7	294
Mother's education								
No schooling	42.9	10.7	14.3	0.0	0.0	35.7	0.0	56
Primary	29.6	11.6	14.8	2.1	0.5	34.9	7.9	189
Secondary	21.2	4.9	11.2	1.5	0.8	21.6	4.6	741
Passed O' Level	17.9	3.7	10.5	2.0	0.9	20.5	3.2	803
Higher	11.0	2.1	11.6	1.9	1.1	14.1	2.3	474
Monthly household income								
< 9,000	23.2	5.9	12.5	2.1	0.7	24.3	4.6	955
9,000 – 13,999	21.1	5.5	11.5	1.6	1.2	24.4	3.7	513
14,000 – 19,999	16.6	4.3	13.0	2.1	0.7	21.8	5.0	422
20,000 – 31,999	15.3	2.7	10.4	1.8	1.1	16.4	2.9	450
≥ 32,000	10.7	1.5	9.7	1.9	0.5	12.1	1.9	206
Wealth index quintile								
Poorest	28.5	7.2	14.2	2.3	0.9	32.3	5.9	557
Second	22.2	6.1	11.0	1.6	0.4	21.6	4.1	510
Middle	19.2	3.7	11.8	2.1	0.4	21.4	3.3	485
Fourth	15.7	2.5	13.8	2.1	1.3	20.8	4.0	471
Richest	10.4	3.0	8.3	1.4	1.2	11.9	2.1	565
Overall	19.2	4.6	11.7	1.9	0.9	21.6	3.9	2588

Note: Details related to all indicators are given in the text above.

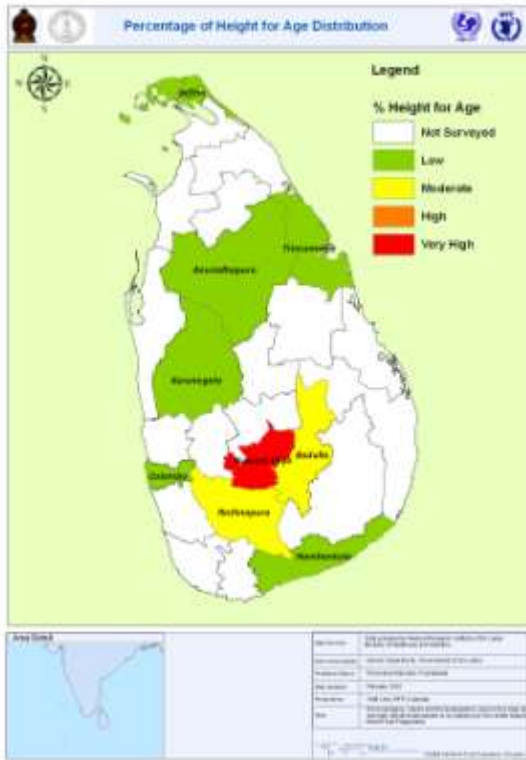


Figure 6: Map of Sri Lanka showing Percentage of Height for Age distribution

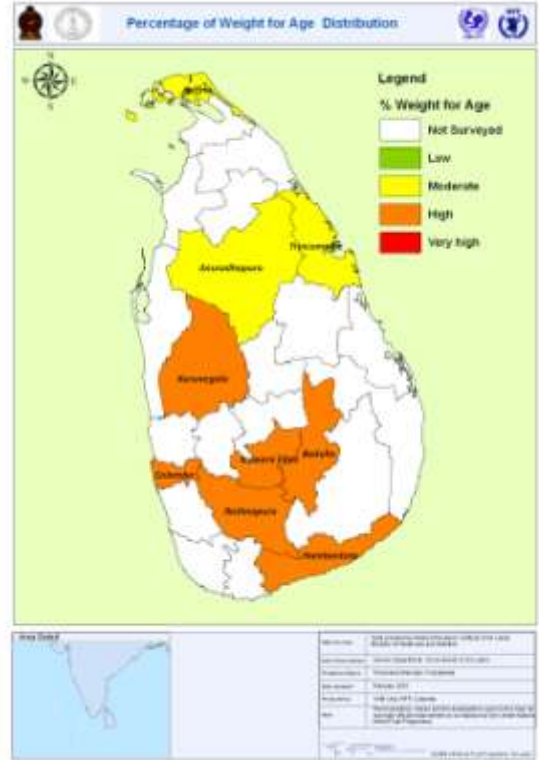


Figure 7: Map of Sri Lanka showing Percentage of Weight for Age Distribution

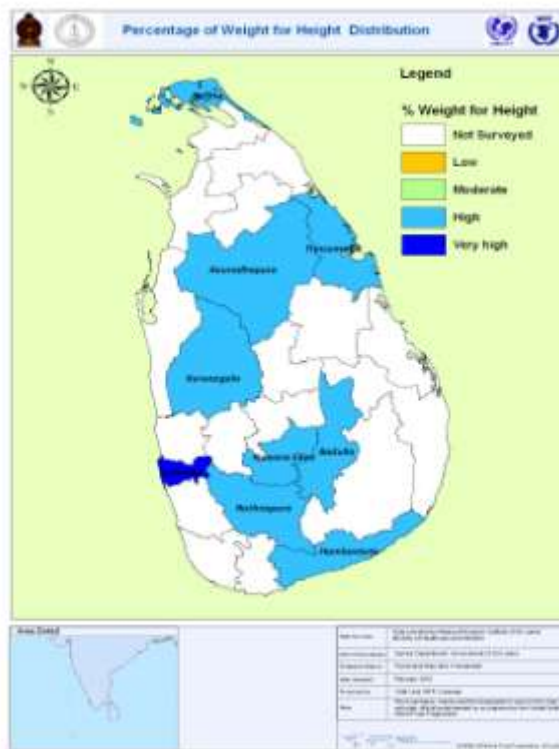


Figure 8: Map of Sri Lanka Percentage of Weight for Height Distribution

4.1. 2. Anaemia in children

The haemoglobin levels of 2373 children in the age group 6–59 months were assessed using the ‘haemocue’ method (cut off point - Hb <11.0 gms %). As shown in Table 4.2, the prevalence of anaemia in this group was 25.2 percent, with the highest percentage during the latter half of infancy (50.4 percent), and declining with increasing age, with the 48–59 months age group showing the lowest prevalence (10.2 percent). Male children showed a higher prevalence than females. Inter district comparisons showed that the prevalence ranged from the lowest value of 19.3 percent in Kurunegala to the highest, 34.0 percent in Jaffna. There was no major difference by sector.

There was no consistent pattern in the prevalence of anaemia with increasing maternal education and indicators of income and wealth.

Table 4.2 Prevalence of anaemia among children 6-59 months of age by background characteristics

Background characteristic	% of children with Anaemia (Hb<11.0g/dl)*	Number of Children who were investigated for Hb
Age of child (months)		
6-11	50.4	270
12-23	34.3	569
24-35	24.6	582
36-47	15.8	482
48-59	10.2	470
Sex of child		
Male	27.3	1155
Female	23.2	1218
Sector		
Urban	26.7	546
Rural	24.7	1609
Estate	25.2	218
District		
Anuradhapura	24.7	194
Badulla	21.2	231
Colombo	22.3	220
Colombo MC	27.8	237
Hamabantota	21.3	249
Jaffna	34.0	262
Kurunegala	19.3	192
Nuwaraeliya	24.3	280
Ratnapura	28.9	232
Trincomalee	26.1	276
Mother's education		
No schooling	24.1	54
Primary	29.8	181
Secondary	27.6	699
Passed O' Level	24.7	726
Higher	21.3	428
Monthly household income (n=2331)		
< 9,000	28.0	890
9,000 – 13,999	23.8	470
14,000 – 19,999	23.8	383
20,000 – 31,999	22.7	410
≥ 32,000	23.6	178
Wealth index quintile		
Poorest	29.2	527
Second	29.4	473
Middle	22.8	439
Fourth	24.3	437
Richest	19.9	497
Overall	25.2	2373

*Adjustment in the cut off points in haemoglobin levels have been made for altitude

4.1.3. Birth weight

The birth weights were obtained from the Child Health Development Records (CHDRs). This study included children born within the 5 years preceding the survey. Considering the newborns with a birth weight of less than 2500 grams as being low birth weight (LBW), the overall prevalence was 18.1 percent. Birth weight distribution by the current age of the child enables comparison of prevalence of LBW among different birth cohorts. There is no definite pattern observed except that the cohort aged between 24–35 months at the time of the study had the highest prevalence of LBW of 21.1 percent.

The prevalence was higher among female newborns than males. There was a marked inter sectoral difference, with the prevalence in the estate sector (38.3 percent) being more than double that in the urban sector (15.7 percent). Inter district differentials showed that the prevalence varied between 12.7 percent in Trincomalee district to 27.1 percent in Nuwara Eliya district. There is a decline in the prevalence with increasing income levels and wealth quintiles.

Mean birth weight for the total group was 2.89 ± 0.51 kg with no clear pattern observed between age groups, districts, and maternal educational levels. However, an upward trend was observed in relation to increasing income levels and higher levels of wealth quintiles.

Table 4.3 Prevalence of low birth weight, and mean birth weight among children born in the 5 years preceding the survey, by background characteristics

Background characteristic	Birth Weight				Number of children
	< 2500g (%)	≥ 2500g (%)	Mean (kg)	SD	
Age of child (months)					
0-5	17.5	82.5	2.87	0.45	252
6-11	14.5	85.5	2.93	0.53	275
12-23	16.0	84.0	2.92	0.55	580
24-35	21.1	78.9	2.86	0.51	579
36-47	19.4	80.6	2.87	0.50	480
48-59	18.4	81.6	2.91	0.49	468
Sex of child					
Male	15.6	84.4	2.94	0.51	1293
Female	20.6	79.4	2.85	0.51	1341
Residence					
Urban	15.7	84.3	2.94	0.55	637
Rural	16.8	83.2	2.91	0.49	1801
Estate	38.3	61.7	2.58	0.46	196
District					
Anuradhapura	19.0	81.0	2.89	0.49	237
Badulla	22.6	77.4	2.81	0.58	261
Colombo	16.1	83.9	2.92	0.45	261
Colombo MC	16.1	83.9	2.91	0.52	280
Hambantota	21.5	78.5	2.89	0.49	279
Jaffna	16.6	83.4	2.99	0.55	277
Kurunegala	16.9	83.1	2.91	0.45	219
Nuwaraeliya	27.1	72.9	2.72	0.44	255
Ratnapura	14.0	86.0	2.85	0.41	257
Trincomalee	12.7	87.3	3.00	0.59	308
Mother's education					
No schooling	17.5	82.5	2.85	0.42	57
Primary	26.3	73.7	2.78	0.52	171
Secondary	20.6	79.4	2.88	0.54	759
Passed O' Level	17.0	83.0	2.91	0.52	819
Higher	14.4	85.6	2.95	0.47	500
Monthly household income (n=2592)					
< 9,000	21.1	78.9	2.84	0.55	946
9,000 – 13,999	20.6	79.4	2.88	0.49	524
14,000 – 19,999	16.6	83.4	2.92	0.50	434
20,000 – 31,999	14.6	85.4	2.95	0.47	466
≥ 32,000	11.3	88.7	2.97	0.49	222
Wealth index quintile					
Poorest	24.5	75.5	2.79	0.55	559

Background characteristic	Birth Weight				Number of children
	< 2500g (%)	≥ 2500g (%)	Mean (kg)	SD	
Second	20.7	79.3	2.83	0.47	487
Middle	16.3	83.7	2.92	0.52	504
Fourth	15.1	84.9	2.95	0.48	498
Richest	14.2	85.8	2.97	0.50	486
Overall	18.1	81.9	2.89	0.51	2634

4.2 Nutritional status of women of 15-49 years

4.2.1 Non pregnant women (using Body Mass Index)

A total of 2146 non-pregnant women aged between 15 to 49 years, and with a child under 5 years age were included in the assessment of body mass index . As shown in Table 4.4., of the total sample of non-pregnant women, 18.2 percent had BMI less than 18.5, 22.5 percent with values between 25 and 29 (overweight) and 6.7 percent, with BMI values 30 or above (obese).

The prevalence of underweight (BMI less than 18.5) was high in the 15 -19 age group (40.5 percent) with a substantial decline in the age groups 20-29 years (22.5 percent) and 30-39 years (12.9 percent). Of all non-pregnant women studied, 29.2 percent were either overweight or obese. This percentage increased with increasing age, most marked after 30 years of age.

Marked inter-sectoral differences were seen, with the estate sector showing the highest percentage (42.6 percent) women with BMI less than 18.5, compared to 11.3 percent in the urban sector. Conversely, in the urban sector, there was a high percentage of women who were overweight (28.3 percent) and obese (15.0 percent).

Comparison between districts show that the percentage with low BMI ranged from 12.1 percent in Colombo district to 25.3 percent in Ratnapura. There was a declining pattern in the prevalence with increasing income levels and wealth quintiles. The prevalence of overweight and obesity showed an increase with higher income levels and wealth quintiles.

Table 4.4 Distribution of non-pregnant women 15-49 years by BMI levels, by background characteristics

Background Characteristics	BMI category (%)				Total women
	Underweight (BMI<18.5)	Normal (BMI=18.5-24.9)	Overweight (BMI=25.0-29.0)	Obese (BMI>30.0)	
Age group (years)					
15-19	40.5	45.2	14.3	0.0	84
20-29	22.5	54.7	18.1	4.8	922
30-39	12.9	51.8	26.6	8.7	929
40-49	14.2	50.7	26.5	8.5	211
Sector					
Urban	11.3	45.4	28.3	15.0	533
Rural	18.7	55.5	21.6	4.2	1491
Estate	42.6	50.0	7.4	0.0	122
District					
Anuradhapura	16.9	53.7	26.4	3.0	201
Badulla	24.1	51.7	19.8	4.3	232
Colombo	12.1	52.8	27.1	7.9	214

Background Characteristics	BMI category (%)				Total women
	Underweight (BMI<18.5)	Normal (BMI=18.5-24.9)	Overweight (BMI=25.0-29.0)	Obese (BMI>30.0)	
Colombo MC	9.6	38.4	32.3	19.7	229
Hambantota	20.4	52.6	22.3	4.7	211
Jaffna	20.5	57.7	15.5	6.4	220
Kurunegala	19.2	49.5	25.3	6.0	182
Nuwaraeliya	22.5	59.9	11.8	5.9	187
Ratnapura	25.3	56.5	17.3	0.8	237
Trincomalee	12.0	54.5	26.2	7.3	233
Women's education level					
no schooling	20.0	58.2	18.2	3.6	55
primary	23.4	52.5	19.0	5.1	158
Secondary	18.1	49.5	24.2	8.3	678
Passed GCE (O/L)	18.5	54.2	21.7	5.7	757
Higher	15.2	54.1	23.9	6.7	460
Monthly household income					
< 9,000	21.9	52.4	21.4	4.3	748
9,000 – 13,999	15.9	55.4	21.6	7.1	408
14,000 – 19,999	12.2	56.8	25.5	5.5	329
20,000 – 31,999	16.0	49.1	24.3	10.6	350
≥ 32,000	9.6	51.4	28.8	10.3	146
Wealth index quintiles					
Poorest	26.2	57.4	13.9	2.5	432
Second	22.2	53.2	19.0	5.7	406
Middle	19.4	50.0	24.3	6.3	412
Fourth	13.2	52.4	25.8	8.6	418
Richest	11.1	50.4	28.7	9.8	478
Overall	18.2	52.7	22.5	6.7	2146

4.2.2. Pregnant women

Nutritional status of 228 pregnant women were assessed using the measure - Mid Upper Arm Circumference

(MUAC). Those who had a MUAC value of ≤ 23 cms were identified as being underweight. Table 4.5 shows that in the total sample 13.4 percent of pregnant women were underweight. High percentages were seen among the age groups less than 20 years (37.5 percent) 40 – 49 years (37.5 percent) and in the estate sector (41.7 percent). . However, these observations need to be interpreted with caution as they are based on small numbers of pregnant women.

Comparisons between districts are also based on small numbers of women in each district with low values seen in the districts of Anuradhapura (6.3 percent) and Hambantota (8.9 percent). No consistent pattern was seen in relation to the mothers educational status or indicators of income and wealth, even though lowest values are in the highest educational status category (9.3 percent) , income level (13.6 percent) and wealth quintile (7.8 percent).

Table 4.5. Distribution of pregnant women by their nutritional status and background characteristics.

background characteristic	MUAC Category		Total No of Women
	Undernourished ≤23cm	Normal >23cm	
Age group (years)			
< 20	33.3	66.7	15
20-29	17.4	82.6	132
30-39	15.1	84.9	73
40-49	37.5	62.5	8
Residence			
Urban	12.3	87.7	57
Rural	18.9	81.1	159
Estate	41.7	58.3	12
District			
Anuradhapura	6.3	93.8	16
Badulla	21.7	78.3	23
Colombo	25.0	75.0	24
Colombo MC	14.8	85.2	27
Hambanthota	8.0	92.0	25
Jaffna	14.8	85.2	27
Kurunagala	31.3	68.8	16
Nuwara Eliya	30.0	70.0	20
Ratnapura	38.5	61.5	13
Trincomale	10.8	89.2	37
Women's education level			
no schooling	40.0	60.0	5
primary	14.3	85.7	14
Secondary	22.5	77.5	71
Passed GCE (O/L)	18.3	81.7	93
Higher	9.3	90.7	43
Monthly household income			
< 9,000	17.6	82.4	74
9,000 – 13,999	19.4	80.6	36
14,000 – 19,999	25.0	75.0	48
20,000 – 31,999	17.6	82.4	34
≥ 32,000	13.6	86.4	22
Wealth quintile of household			
Poorest	34.9	65.1	43
Second	18.4	81.6	38
Middle	22.7	77.3	44
Fourth	11.5	88.5	52
Richest	7.8	92.2	51
Overall	18.4	81.6	228

4.2.3 Anaemia in women

Three groups of women were included in this component of the study : (i). pregnant women (228) (ii) lactating women (921) (iii.) all non pregnant women including lactating women (2139).

Pregnant women

As shown in Table 4.6, overall prevalence of anaemia among this group was 16.7 percent. Comparisons between subgroups require cautious interpretation due to limited number of pregnant women included in each of the sub-categories.

The prevalence is seen to increase with increasing age. Comparison between sectors showed that the highest prevalence was in the urban sector (19.3 percent) with the lowest, in the estate sector (8.3 percent). Inter district comparisons indicate that Colombo MC area had the highest prevalence (28.6

percent), with Anuradhapura (25.0 percent), Badulla (21.7 percent), Ratnapura (21.4 percent) and Hambantota (20.0 percent) also showing high values. The highest prevalence was seen among the mothers who had 'higher' education. There was no consistent pattern with income levels and a lower prevalence was seen in the lowest wealth quintile (8.9 percent) and the highest quintile (9.4 percent).

Lactating women

Among lactating women, the overall prevalence was 20.5 percent, higher than among the pregnant women with high values in the lowest and highest age groups. Highest prevalence were seen in the estate sector (30.2 percent) and in the districts, Jaffna (35.1 percent), Anuradhapura (25.2 percent), Colombo (22.0) and Colombo MC area(21.4 percent). There was a consistent decline in the prevalence with increasing level of mother's education, even though no consistent pattern was seen with the changes in the two income related measures.

All non-pregnant women

The overall prevalence among this group was 22.2 percent , showing an increasing trend with increasing age. Inter sectoral differences was similar to that among the lactating women with the estate sector showing highest value (33.6 percent) . Jaffna showed the highest prevalence (35.3 percent) with Ratnapura, Nuwara Eliya ,Hambantota, and Colombo district and CMC also showing high prevalence.

Table 4.6 Prevalence of Anaemia*, among (i) pregnant women, (ii). lactating women and (iii). All non-pregnant women by background characteristics

background characteristic	Pregnant		Lactating		All Non-pregnant	
	Percent	Total No of Women	Percent	Total No of Women	Percent	Total No of Women
Age group (years)						
< 20	13.3	15	26.7	30	23.5	81
20-29	17.4	132	19.2	459	20.6	912
30-39	17.8	73	20.2	372	21.3	927
40-49	0.0	8	29.8	57	32.2	214
Residence						
Urban	19.3	57	21.0	205	21.3	535
Rural	16.4	159	19.8	673	21.5	1482
Estate	8.3	12	30.2	43	33.6	122
District						
Anuradhapura	25.0	16	25.2	123	22.4	201
Badulla	21.7	23	17.6	108	16.6	229
Colombo	13.0	23	22.0	82	21.7	212
Colombo MC	28.6	28	21.4	103	24.1	228
Hambanthota	20.0	25	16.4	110	21.4	215
Jaffna	14.8	27	35.1	57	35.3	218
Kurunagala	6.7	15	18.5	81	14.9	174
Nuwara Eliya	10.0	20	19.6	51	23.9	188
Ratnapura	21.4	14	21.6	97	24.2	240
Trincomale	8.1	37	13.8	109	16.2	234
Women's education level						
no schooling	0.0	5	27.3	22	30.4	56
primary	7.1	14	24.1	58	26.9	160
Secondary	19.7	71	22.9	297	23.8	676
Passed GCE (O/L)	21.3	94	21.2	312	23.1	748
Higher	7.1	42	15.7	210	15.9	460
Monthly household income						
< 9,000	18.9	74	22.4	331	25.0	747
9,000 – 13,999	8.3	36	21.4	173	22.7	401
14,000 – 19,999	14.3	49	18.4	147	20.2	327
20,000 – 31,999	12.1	33	19.0	168	20.2	357
≥ 32,000	13.6	22	17.5	57	19.2	146

background characteristic	Pregnant		Lactating		All Non-pregnant	
	Percent	Total No of Women	Percent	Total No of Women	Percent	Total No of Women
Wealth quintile of household						
Poorest	9.3	43	25.1	183	26.7	430
Second	31.6	38	27.1	170	27.0	404
Middle	20.0	45	18.2	181	22.4	407
Fourth	15.4	52	14.5	186	17.0	417
Richest	10.0	50	18.4	201	18.3	481
Overall	16.7	228	20.5	921	22.2	2139

**A pregnant woman was considered as anaemic, if the Hb level was less than 11 gms/dl. Appropriate adjustments were made taking altitude into consideration.*

Chapter 5

Childhood Illnesses

Diarrhoea and respiratory infections are the two common illnesses that lead to increased morbidity and mortality among children under 5 years. The present study sought information from respondents related to the occurrence of these two illnesses during the two weeks preceding the interview.

5.1 Respiratory illness

Respondents were asked whether their children less than five years of age had one or more symptoms related to respiratory illness (cough, rapid or difficult breathing) during the period of 2 weeks preceding the survey. A child who was having cough with rapid or difficult breathing, was identified as having had symptoms of respiratory illness.

Among the total group, 17.0 percent reported to have had symptoms related to respiratory illness during the specified period (Table 5.1). Nearly one-fifth of under five children in the districts of Jaffna and Hambantota belonged to this category with the percentages being lower in the districts of Anuradhapura and Colombo. Prevalence of symptoms of respiratory illness was lower in higher income or wealth index categories and among the children of mothers with higher levels of education.

5.2 Diarrhoea

The respondents were asked whether their children under five years had experienced an episode of diarrhea during the two weeks preceding the survey. (Diarrhoea was defined as three or more loose or watery stools per day or blood in stool). If the child had diarrhea, information on giving oral dehydration fluid using the packet 'Jeewani' during the episode of diarrhoea, was inquired into.

Of the total group, 7.0 percent of children who reported to have had diarrhea during the specified period (Table 5.1). Of them, 40.6 percent were given "Jeewani". The prevalence of diarrhoea was higher in the estate sector (11.6 percent) compared to urban (5.7 percent) and rural sectors (6.9 percent). Of the districts, Nuwara Eliya and Kurunegala reported high values. Though there was no consistent pattern, the prevalence of diarrhoea was lower among the higher income categories.

Table 5.1 Percentage of under-5 children who reported symptoms of respiratory illness and diarrhoea by background characteristics

background characteristic	Total number of children	% reported symptoms of		Total No. of children reported Diarrhoea	% Given Jeewanee *
		Respiratory illness	Diarrhoea		
Age of child (months)					
<6	258	13.6	8.5	22	20.0
6-11	287	19.9	8.4	24	37.5
12-23	603	19.6	7.1	43	59.0
24-35	597	16.6	8.4	50	40.4
36-47	505	16.2	7.1	36	29.0
48-59	480	15.4	3.5	17	50.0
Sex of child					
Male	1315	17.6	6.9	91	42.4
Female	1415	16.5	7.1	101	38.9
Sector					
Urban	648	14.4	5.7	37	40.6
Rural	1831	17.9	6.9	126	37.1
Estate	251	17.5	11.6	29	55.6
District					
Anuradhapura	235	11.5	8.9	21	25.0
Badulla	265	17.4	3.4	9	66.7
Colombo	261	13.0	6.1	16	71.4
Colombo MC	285	15.1	4.6	13	18.2
Hambanthota	284	20.8	4.9	14	33.3
Jaffna	269	22.3	5.2	14	28.6
Kurunegala	222	15.3	11.3	25	47.8
Nuwara Eliya	335	18.8	11.0	37	38.9
Ratnapura	263	16.7	4.9	13	41.7
Trincomale	311	17.7	9.6	30	44.4
Mother's education					
No schooling	62	22.6	8.1	5	33.3
Primary	196	18.9	13.3	26	28.0
Secondary	778	20.2	7.5	58	43.6
Passed O' Level	835	17.1	6.2	52	40.4
Higher	519	13.2	6.3	32	46.4
Monthly household income					
< 9,000	1018	17.7	8.4	86	29.5
9,000 – 13,999	559	18.4	7.7	43	43.9
14,000 – 19,999	450	16.4	4.4	20	50.0
20,000 – 31,999	484	12.8	5.8	28	52.2
≥ 32,000	226	11.1	5.8	13	72.7
Wealth quintile					
Poorest	587	22.0	9.0	53	30.0
Second	534	19.3	8.4	45	25.6
Middle	511	17.6	5.5	28	60.0
Fourth	506	14.6	6.7	34	46.4
Richest	592	11.7	5.4	32	58.6
Overall	2730	17.0	7.0	192	40.6

* Of the children who reported diarrhoea in the previous 2 weeks

Chapter 6

Dietary Intake and Feeding Practices

The study enabled assessment of dietary intake using several different criteria, some of which provided direct information while others, gave indirect information. They included: food consumption pattern, individual dietary diversity score, minimum dietary diversity, minimum meal frequency and minimum acceptable diet.

6.1 Food Consumption

Food consumption pattern was based on the information about the food groups given to children aged 6 – 59 months on the day preceding the interview. Ten different food groups were included in this analysis. Table 6.1 shows the percentage of children in this age group who were given foods included in the identified food groups, within the preceding 24 hours, by background characteristics.

For the total sample, almost 95 percent of the children were given grains/roots/tubers, while 70 to 80 percent were given vitamin A rich fruits and vegetables, other fruits and vegetables, and meat fish/poultry/ organ meats. Proportions of children who received eggs (31.0 percent), dairy products (33.7) food cooked with oil or fat were relatively low (45.1 percent). Nearly a third of the children (33.2 percent) had been given fortified food (commercially available cereals) with a much higher percentage (78.1 percent) having been given sugary food (chocolates, sweets, candies, cakes, biscuits etc.).

Of the 6-11 months of age group, only 21.9 percent received eggs, and 25.3 percent were given food cooked with oil or fat. These percentages increased with age, even though there was no consistent pattern.

Comparison between sectors showed marked variations. With the exception of grains/roots and tubers, the percentage of children who were given food items belonging to groups such as legumes, vitamin A rich foods, other fruits and vegetables, dairy products, eggs, meat, poultry/organ meat was comparatively low in the estate sector. However, the percentage of estate children given sugary foods was marginally higher than other sectors.

Inter district variations in the consumption of eggs were marked in that more than 50 percent of children in Jaffna and Trincomalee consumed eggs compared to less than 20 percent in Hambantota, Ratnapura and Badulla. Consumption of meat, poultry and organ meats varied between districts with the percentage being highest in Hambantota (84.2 percent) and low in Jaffna (49.4 percent) and Nuwara Eliya (52.6 percent).

A consistent upward trend was seen in the percentage of children who consumed legumes/nuts, vitamin A rich fruits and vegetables, other fruits and vegetables and meat/poultry/organ meat with increasing levels of maternal education and with increasing income levels and higher wealth quintiles.

Table 6.1 Percentage of children aged 6-59 months, who were given food items belonging to the different food groups, on the day preceding the interview, by background characteristics

background characteristic	Gra ins/Ro ots/T ubers	Legu me/N uts	Vit A rich fruits and veget ables	Othe r fruits and veget ables	Dairy prod uct/ Milk / yogur t/ chees e*	Eggs	Meat/ fish/P oultr y/org an meats	Food cooke d with oil or Fat	Fortif ied Food	Suga ry Food
Age of child in months										
6-11	86.1	55.9	77.8	62.8	24.7	21.9	54.2	25.3	34.7	58.0
12-23	96.2	61.1	75.7	72.9	35.5	33.3	68.6	44.0	40.4	81.9
24-35	95.6	58.5	74.6	69.4	33.6	32.8	75.8	48.8	32.1	80.7
36-47	96.7	67.1	81.3	75.4	37.6	33.3	72.3	51.9	31.0	82.8
48-59	95.7	59.2	74.2	73.8	33.1	29.2	73.8	46.7	27.0	77.1
Sex of child										
Male	95.1	58.9	76.9	71.4	34.9	30.8	69.1	43.9	31.4	78.3
Female	94.7	62.5	76.2	71.8	32.7	31.4	71.8	46.3	34.9	77.9
Residence										
Urban	96.3	59.0	78.7	73.9	46.2	33.4	76.8	49.2	31.4	80.5
Rural	94.5	62.4	78.8	72.7	30.8	31.5	71.9	45.0	36.7	76.7
Estate	94.5	53.2	54.9	57.8	23.2	21.9	44.3	35.4	12.7	81.9
District										
Anuradhapura	95.1	61.6	84.7	78.8	32.0	32.0	76.8	37.9	37.4	75.4
Badulla	98.3	63.1	86.0	72.5	39.4	18.6	64.0	55.5	26.7	76.7
Colombo	98.3	63.2	77.0	77.8	52.3	27.6	78.2	52.3	35.6	79.9
Colombo MC	96.9	61.6	80.2	71.3	46.1	29.1	77.9	50.0	26.7	81.8
Hambanthota	97.7	54.6	76.2	75.4	28.5	16.5	84.2	29.6	28.5	78.8
Jaffna	84.9	69.7	68.3	57.6	26.2	57.6	49.4	52.0	46.5	80.1
Kurunegala	98.5	65.5	84.7	74.9	35.0	24.6	80.3	46.3	35.0	75.9
Nuwara Eliya	93.3	51.3	65.7	63.8	17.6	21.5	52.6	39.1	18.9	76.3
Ratnapura	96.7	64.7	68.5	75.9	30.7	16.2	67.2	43.2	23.7	78.0
Trincomale	92.1	55.9	80.0	73.1	34.8	60.7	80.7	46.2	53.1	77.6
Maternal education										
no schooling	91.4	53.4	70.7	53.4	36.2	37.9	50.0	46.6	25.9	72.4
primary	93.7	54.5	61.4	57.1	20.6	29.1	59.3	40.7	25.9	74.6
Secondary	95.8	55.5	74.7	67.0	28.7	32.0	70.9	41.6	35.6	76.5
Passed GCE (O/L)	94.2	64.7	77.8	74.5	34.4	29.3	70.6	45.9	35.0	79.8
Higher	96.3	68.0	86.5	81.5	42.9	30.9	76.5	52.7	30.5	78.0
Monthly household income										
< 9,000	93.1	58.4	73.7	65.9	30.2	30.2	63.6	43.3	34.8	75.1
9,000 – 13,999	95.4	58.6	71.2	66.0	31.6	31.6	70.8	46.3	33.2	79.1
14,000 – 19,999	96.3	59.4	80.0	80.4	30.8	30.8	76.5	39.6	33.0	80.0
20,000 – 31,999	96.0	66.9	81.4	77.4	32.9	32.9	76.7	46.6	31.0	82.5
≥ 32,000	99.0	66.3	87.8	81.5	32.2	32.2	79.5	62.4	34.6	79.5
Wealth quintile of household										
Poorest	92.8	56.7	70.3	60.1	19.7	29.5	61.2	41.5	34.2	73.9
Second	92.9	55.1	68.0	69.8	25.5	33.6	65.8	39.7	34.0	77.1
Middle	95.3	62.8	79.1	69.0	37.0	28.6	70.3	44.0	34.6	81.2
Fourth	95.7	61.9	81.0	77.2	35.8	31.9	72.0	44.8	35.1	77.2
Richest	97.9	67.3	84.7	82.4	51.2	31.8	83.2	55.1	28.4	81.5
Overall	94.9	60.8	76.6	71.7	33.7	31.0	70.6	45.1	33.2	78.1

(*Breast milk was not included)

6.2. Dietary diversity

Dietary diversity is based on the premise that more diverse diets are more likely to provide adequate levels of a range of nutrients.

In this study, two measures of dietary diversity were assessed according to two different guidelines. They are i. Individual dietary diversity score for children aged 6 – 59 months according to FANTA¹⁶
 ii Dietary diversity score for the age group 6-23 months according to WHO¹⁷.

6.2.1. Individual dietary diversity score for children aged 6-59 months

Foods given to children were grouped into 8 food groups as described by the Food and Nutrition Technical Assistance Project (FANTA) 2003. The food groups were as follows:

1. Grains, roots and tubers
2. Legumes and nuts
3. Vitamin A-rich fruits and vegetables
4. Other fruits and vegetables
5. Dairy products
6. Eggs
7. Meat, poultry, fish, and shellfish
8. Foods cooked with fat or oil

The individual dietary diversity score (IDDS) was derived for each child by adding 1 point for each of the 8 food groups consumed within the 24 hours preceding the survey (FANTA 2006). As shown in Table 6.2, for all children in this age group, the IDDS was 4.8 with a relatively low value in the estate sector (3.9) and a score of 4.0 in Nuwara Eliya. The highest value of 5.3 was in the Colombo district. There was an increasing trend in the IDDS with increasing levels of maternal education and income and wealth quintiles.

Table 6.2. Individual dietary diversity score in children (IDDS) according to background characteristics for children 6 – 59 months

Background characteristic	IDDS (range 0-8)		% of individuals yet to achieve the target	Total number of children
	Mean	SD		
Age of child in months				
6-11	4.1	1.9	76.7	288
12-23	4.9	1.7	62.4	612
24-35	4.9	1.7	63.4	607
36-47	5.2	1.6	58.5	513
48-59	4.9	1.7	63.7	493
Sex of child				
Male	4.8	1.7	64.8	1228
Female	4.9	1.8	62.7	1285
Residence				
Urban	5.1	1.7	56.8	595

¹⁶ FANTA

¹⁷ WHO new indicators for assessing IYCF

Background characteristic	IDDS (range 0-8)		% of individuals yet to achieve the target	Total number of children
	Mean	SD		
Rural	4.9	1.7	63.0	1681
Estate	3.9	1.6	86.5	237
District				
Anuradhapura	5.0	1.7	62.1	203
Badulla	5.0	1.5	59.7	236
Colombo	5.3	1.5	54.0	239
Colombo MC	5.1	1.6	59.3	258
Hambantota	4.6	1.5	73.8	260
Jaffna	4.7	1.9	66.4	271
Kurunegala	5.1	1.6	53.7	203
Nuwara Eliya	4.0	1.7	80.4	312
Ratnapura	4.6	1.6	69.3	241
Trincomalee	5.2	2.0	53.1	290
Maternal education				
no schooling	4.4	2.3	69.0	58
Primary	4.2	1.8	79.9	189
Secondary	4.7	1.7	68.7	731
Passed GCE (O/L)	4.9	1.6	64.0	761
Higher	5.4	1.7	48.8	459
Monthly household income				
< 9,000	4.5	1.7	72.0	927
9,000 – 13,999	4.7	1.8	63.6	497
14,000 – 19,999	5.0	1.6	63.8	409
20,000 – 31,999	5.2	1.6	53.1	429
≥ 32,000	5.6	1.5	44.4	205
Wealth quintile of household				
Poorest	4.3	1.7	77.2	552
Second	4.5	1.8	71.9	494
Middle	4.9	1.6	64.7	468
Fourth	5.0	1.7	58.6	464
Richest	5.5	1.6	46.0	535
Overall	4.8	1.7	63.7	2513

The dietary diversity score of children aged 6-59 in the households belonging to the highest wealth quintile was used as a “target to be achieved” based on the assumption that poorer households will diversify their food consumption practices as income increases, and thereby attempting to follow the consumption pattern of wealthier households. Table 6.2 shows the IDDS among children in the highest wealth quintile was 5.5. Based on this value, the percentage of children yet to achieve the target was assessed. This percentage was 63.7 for the total sample with a higher percentage in the estate sector (86.5 percent) compared to 63.0 percent in rural and 56.8 percent in the urban sector. Inter district differentials were marked with the percentage of such individuals being 80.4 percent in Nuwara Eliya and 53.1 percent in Trincomalee. This percentage decreased with increasing income categories.

6.2.2. Dietary Diversity Score for children aged 6-23 months

A dietary diversity score was calculated for each child in the age group 6 – 23 months, using the information on the number of food groups consumed on the day preceding the interview¹⁸. Seven foods groups were used as follows:

1. Grains, roots and tubers
2. Legumes and nuts
3. Dairy products (milk, yogurt, cheese)
4. Flesh foods (meat, fish, poultry and liver/organ meats)
5. Eggs
6. Vitamin-A rich fruits and vegetables
7. Other fruits and vegetables

If a child consumed an item in a given food group, a score of “1” and if not consumed, a score of “0” was given thus enabling a given child to obtain a score ranging from 0 – 7. Consumption of foods from at least 4 food groups on the previous day would mean that in most populations, the child had a high likelihood of consuming at least one animal-source food and at least one fruit or vegetable that day, in addition to a staple food (grain, root or tuber). Hence, a score of 4 or more, was considered as indicative of a diet of minimum diversity.

The mean dietary diversity score given in Table 6.3, was 4.2 for the total sample. A consistent upward trend in the mean diversity score were observed in relation to increasing level of maternal education and higher wealth quintiles. The percentage of children with minimum diversity (4 or more food groups) was 72.9 percent with this value being lower in the estate sector (46.6 percent).

Table 6.3. Minimum meal frequency, dietary diversity, and minimum acceptable diet in children 6-23 months, by background characteristics

Background characteristic	Minimum meal frequency		Dietary diversity score, Mean (range 0-7)	% with minimal dietary diversity (≥ 4 groups)	Percentage of minimum acceptable diet	Total no. of children
	Breastfed	Non-Breastfed				
Age group in months						
6-8	63.8	5.3	3.6	61.4	28.8	132
9-11	49.5	23.1	4.1	66.0	29.5	156
12-14	43.4	28.6	4.4	76.2	31.3	147
15-17	51.9	27.8	4.5	78.7	34.7	150
18-20	57.6	25.8	4.3	73.4	35.4	158
21-23	52.9	33.7	4.5	80.3	36.9	157
Sex of child						
Male	53.6	27.4	4.2	70.5	33.7	448
Female	53.1	24.6	4.3	75.2	32.1	452
Residence						
Urban	57.4	36.6	4.5	76.4	39.8	216
Rural	55.1	23.8	4.3	75.5	32.7	596
Estate	33.3	12.5	3.3	46.6	17.0	88
District						
Anuradhapura	41.8	10.0	4.4	80.5	42.9	77

¹⁸ WHO new indicators on IYCF

Background characteristic	Minimum meal frequency		Dietary diversity score, Mean (range 0-7)	% with minimal dietary diversity (≥ 4 groups)	Percentage of minimum acceptable diet	Total no. of children
	Breastfed	Non-Breastfed				
Badulla	45.2	14.9	4.3	75.3	23.6	89
Colombo	37.0	38.2	4.5	75.0	40.0	80
Colombo MC	40.0	43.5	4.5	80.2	47.2	106
Hambantota	33.3	58.8	4.2	75.0	53.8	80
Jaffna	92.9	21.7	4.0	71.1	14.4	97
Kurunegala	51.1	7.7	4.7	82.0	32.8	61
Nuwara Eliya	67.1	20.0	3.5	49.1	17.6	108
Ratnapura	34.9	35.0	4.0	70.2	43.3	104
Trincomale	56.1	14.0	4.6	78.6	19.4	98
Maternal education						
no schooling	20.0	0.0	3.6	47.4	10.5	19
Primary	51.7	20.8	3.6	56.6	22.6	53
Secondary	45.5	27.3	4.0	65.5	27.8	255
Passed GCE (O/L)	60.1	30.3	4.3	77.2	39.7	267
Higher	56.8	25.7	4.7	86.0	37.6	186
Monthly household income						
< 9,000	43.6	17.5	4.0	68.6	23.9	309
9,000 – 13,999	52.2	29.6	3.9	61.8	28.9	173
14,000 – 19,999	57.0	26.6	4.5	75.8	35.7	157
20,000 – 31,999	61.0	34.5	4.6	82.3	43.7	158
$\geq 32,000$	74.4	33.3	5.0	92.7	52.4	82
Wealth quintile of household						
Poorest	38.8	22.9	3.7	62.9	23.1	186
Second	50.0	10.8	3.8	60.8	19.4	186
Middle	56.6	26.1	4.3	76.2	35.1	168
Fourth	58.3	36.4	4.5	80.5	40.8	169
Richest	62.3	36.8	4.8	84.8	46.6	191
Overall	53.4	26.0	4.2	72.9	32.9	900

6.3. Minimum Meal Frequency

Frequency of feeding of was considered in relation to the minimum number of times a child was fed solid/ semisolid and soft food on the day preceding the interview. Recommended 'minimum meal frequency' varied with the age of child. The minimum meal frequency was defined as¹⁹:

- For breastfed infants
 - Age 6-8 months - 2 times a day
 - Age 9-23 months - 3 times a day
- For non-breastfed children
 - Age 6-23 months - 4 times a day (excluding number of milk feeds)

As shown in Table 6.4, 53.4 percent of the breast fed children and 26.0 percent of the non-breastfed children in the age group 6–23 months were fed at a frequency recommended for age. Among the breastfed, this percentage was lower in the estate sector (33.3 percent) compared to the urban sector (57.4 percent.) A wide variation was seen between districts ranging from 33.3 percent in Hambantota

¹⁹ WHO IYCF indicators

to 92.9 percent in Jaffna. The percentage of children who were fed at the recommended frequency among the breast fed infants increased with increasing income and higher wealth quintiles.

A similar pattern was seen for non-breastfed children with a low percentage of 12.5 in the estate sector. In this group, the highest percentage was seen in Hambantota (58.8) with the lowest in Kurunegala (7.7 percent). There was no consistent pattern seen in relation to income and wealth.

6.4. Minimum Acceptable Diet

To describe the overall feeding performance in children 6-23 months, a combined child feeding index, “minimum acceptable diet” was calculated taking into consideration, whether the child has continued with breastfeeding, given semisolids/solids in adequate frequency and fed with adequate number of food groups.

For breastfed children, a combination of “Minimum meal frequency” and “Minimum dietary diversity” was used to calculate the ‘minimum acceptable diet’ and for non breastfed children, milk feeds were excluded from minimum dietary diversity score” when calculating “Minimum acceptable diet”. This is because milk feeds are considered as a separate and a required input to non-breastfed children. Exclusion of milk feeds from the diversity score here avoids “double-counting” of this food group and allows use of this indicator in comparisons – across space and time – between populations with different rates of continued breastfeeding.

As shown in Table 6.3, only one third (32.9 percent) of children aged 6-23 months has received a minimum acceptable diet. This rate was low in the estate sector (17 percent) compared to the urban and rural sectors (39.8 percent and 32.7 percent respectively). Lowest proportions were seen in Jaffna district (14.4 percent) with the highest in Hambantota (47.2). The percentages increase with increasing levels of income and wealth.

6.5. Infant and Young Child Feeding Practices

It has been reported that sub optimum breastfeeding, especially non-exclusive breastfeeding in the first 6 months of life, results in 1.4 million deaths and 10% of disease burden in children younger than 5 years [3].

World Health Organization (WHO) and UNICEF jointly recommend:

- Initiation of breastfeeding within the first hour of birth
- Exclusive breastfeeding for the first six months of life
- Continued breastfeeding for two years or more
- Safe, appropriate and adequate complementary foods beginning at six months
- Frequency of complementary feeding: two times per day for babies aged 6-8 months and three times per day for 9-11 months.

6.5.1. Breastfeeding practices

Percentage of children less than 24 months years of age who were ever breastfed, currently breastfed and started breastfeeding within one hour / one day of birth are given in Table 6.4. . Almost all, 99.6 percent children were ever breastfed and 92.2 percent were given breast milk in the previous 24 hours (currently breast fed).

The percentage ‘ever breast fed’ was nearly universal, across all the sectors, districts and other sub groups. Infants who were breast fed within an hour of birth (92.3 percent) were high in almost all sub groups with marginally lower rates in the estate sector (86.4 percent) and in the districts of Nuwara eliya (89.5 percent) and Trincomalee (85.3 percent). For the total sample, 98.7 percent were breast fed within one day after birth.

The estate sector children has the lowest prevalence of current breastfeeding (83.1 percent) with the highest in the rural sector (95.7 percent). Inter-district comparison shows Nuwara Elliya district to have the lowest percentage of currently breast fed infants (84.3 percent). No consistent pattern was seen in relation to maternal educational level nor with indicators of income and wealth.

In depth interviews indicated that other foods are introduced to children early, as mothers feel that they do not have enough milk and they have to get back to work early.

Table 6.4. Infant and young child feeding practices by background characteristics.

background characteristic	Ever breastfed	Current ly breastfed	Percent				No. of children under 2 year
			Initiated breastfeeding within one hour of birth*	initiated breastfeeding within one day of birth	Introduced complementary food among infants 6-8 months	bottle-fed	
Age of child in months							
<6	100.0	98.8	92.8	98.4	-	13.1	272
6-11	100.0	96.6	90.6	97.5	-	46.1	288
12-23	99.2	85.4	92.8	99.5	-	36.6	612
Sex of child							
Male	99.8	91.8	91.5	98.6	91.1	34.5	587
Female	99.5	92.6	93.0	98.7	92.2	34.0	585
Residence							
Urban	99.5	86.7	93.1	99.0	95.8	40.2	279
Rural	99.8	95.7	92.9	98.5	90.8	32.1	784
Estate	98.9	83.1	86.4	98.9	85.7	34.3	109
District							
Anuradhapura	100.0	94.6	93.8	97.3	92.9	35.5	118
Badulla	100.0	97.3	93.2	97.3	85.7	30.3	118
Colombo	98.6	91.5	90.1	97.2	100.0	45.3	104
Colombo MC	100.0	88.1	94.1	99.0	100.0	36.2	137
Hambantota	100.0	96.7	96.6	100.0	91.7	15.3	107
Jaffna	100.0	91.3	91.3	100.0	80.0	42.7	108
Kurunegala	98.5	97.1	94.0	98.5	100.0	41.7	82

background characteristic	Percent						No. of children under 2 year
	Ever breastfed	Currently breastfed	Initiated breastfeeding within one hour of birth*	initiated breastfeeding within one day of birth	Introduced complementary food among infants 6-8 months	bottle-fed	
Nuwara Eliya	99.2	84.3	89.5	98.4	100.0	27.6	141
Ratnapura	100.0	92.3	93.3	100.0	89.5	41.5	126
Trincomalee	100.0	93.3	85.3	100.0	70.0	30.1	131
Maternal education							
no schooling	100.0	93.3	100.0	100.0	33.3	12.5	24
Primary	100.0	89.1	87.0	97.9	100.0	23.3	66
Secondary	99.6	89.5	92.4	98.7	96.4	33.3	323
Passed GCE (O/L)	100.0	96.0	94.7	98.7	90.6	33.0	352
Higher	98.9	94.2	91.8	99.4	90.9	35.4	244
Monthly household income							
< 9,000	99.6	94.7	94.7	99.7	83.3	27.7	400
9,000 – 13,999	100.0	89.7	91.5	98.2	96.6	35.4	235
14,000 – 19,999	100.0	92.1	92.1	98.5	100.0	31.7	198
20,000 – 31,999	99.4	93.2	89.4	98.2	90.9	41.7	213
≥ 32,000	100.0	87.3	91.3	97.1	85.7	46.9	103
Wealth quintile of household							
Poorest	100.0	91.8	89.9	98.8	87.0	26.5	233
Second	98.8	92.5	91.2	98.7	91.7	31.2	238
Middle	100.0	89.5	90.6	97.6	100.0	35.7	224
Fourth	100.0	95.7	95.0	99.4	90.0	35.8	225
Richest	99.4	91.7	94.4	98.9	88.9	42.0	252
Overall	99.6	92.2	92.3	98.7	91.6	34.3	1172

breast milk and solids/semisolids/or soft food

**includes those who started within one hour

^a of the ever breastfed

* Whether breastfed yesterday

- not applicable

6.5.2 Complementary feeding and bottle-feeding practices

As shown in Table 6.4, the percentage of children 6-8 months who were given breast milk and solid / semi solid foods for the total sample was 91.6, with this percentage being low in the estate sector (85.7) and markedly lower in Trincomalee district (70.0).

In the total sample, 34.3 percent of infants under 24 months had been bottle fed with high percentages in the urban sector (40.2 percent). Inter district variations ranged between the lowest value for Hambantota (15.3 percent) and the highest of 45.3 percent for Colombo district. The bottle feeding rates increased with the increasing levels of maternal education, and household income and wealth indicators.

The influence of grandparents to introduce complementary foods even prior to six months was revealed during the in depth interviews. In some districts where the environmental conditions are 'hot and dry' (e.g. Anuradhapura, mothers tend to give water several times a day to "avoid thirst and dehydration". It was noted during these interviews, that mothers start complementary feeding with mashed rice, then add pulses, fruit juice, kunjee and other foods. They also give powdered milk and special foods available for children that can be purchased.

Chapter 7

Care Practices

Care practices were studied in relation to activities on early childhood development including promoting early learning at household level, practices related to play activities, early childhood education, school enrolment. The age groups to be included in the different components in the study of care practices varied, depending on the relevance.

7.1 Early Childhood Development

7.1.1 Promoting early learning at household level

Involvement of any adult household member with early learning activities of children 2-5 years of age, during the previous 3 days, was assessed. Six activities were included in this assessment: reading books or 'looking at' picture books, telling stories, singing songs, taking children outside the home/compound/yard, playing with children, and spending time with children naming, counting, or drawing things. As shown in Table 7.1, the average number of such activities was 5.3.

For 89.0 percent of children, an adult was engaged in more than three activities that promoted early learning, during the 3 days preceding the survey. Inter district variations were observed with the percentage ranging from 75.0 per cent in Jaffna to 98.1 percent in Anuradhapura. There is an upward trend in the percentage with increasing levels of maternal education, income level and wealth quintiles.

Table 7.1. Participation of adult members in early learning activities of children aged 2 to 5 years, and percentage of under 5 children cared for by a child <10 years, by background characteristics

Background characteristic	Household adult* member involved		father's involvement		Total children 2- up to 5 years	% of children left under the care of <10 year old child in the past week	Total Children under 5 years
	Mean No. of activities	% of children with four or more activities	Mean No. of activities	% of children with at least one activity			
Age in months							
24-35	5.1	85.9	1.6	50.8	504	10.5	504
36-47	5.4	90.9	1.9	57.1	450	11.1	450
48-59	5.4	90.5	1.7	53.4	444	9.5	444
Sex of child							
Male	5.3	89.6	1.7	55.0	675	9.1	899
Female	5.3	88.4	1.7	52.4	723	10.5	950
Residence							
Urban	5.4	91.9	1.9	54.8	334	4.7	430
Rural	5.2	87.3	1.6	53.8	940	11.8	1267
Estate	5.5	93.5	1.8	49.2	124	7.9	152
District							

Background characteristic	Household adult* member involved		father's involvement		Total children 2- up to 5 years	% of children left under the care of <10 year old child in the past week	Total Children under 5 years
	Mean No. of activities	% of children with four or more activities	Mean No. of activities	% of children with at least one activity			
Anuradhapura	5.7	98.1	1.7	51.9	106	12.2	164
Badulla	5.4	92.2	1.1	43.8	128	12.3	179
Colombo	5.3	90.4	1.4	50.7	146	3.3	182
Colombo MC	5.3	90.8	1.9	51.9	131	3.4	177
Hambanthota	5.5	93.2	1.9	61.0	146	4.9	185
Jaffna	4.9	75.0	2.4	65.8	152	26.3	190
Kurunegala	5.4	90.7	1.3	53.5	129	9.6	156
Nuwara Eliya	5.4	92.7	2.1	55.1	178	6.3	224
Ratnapura	5.4	92.9	1.3	39.4	127	6.0	182
Trincomalee	4.8	78.1	1.7	58.7	155	13.8	210
Maternal education							
no schooling	4.8	78.8	1.6	48.5	33	10.6	47
primary	5.1	85.0	1.5	46.9	113	11.0	136
Secondary	5.3	88.5	1.7	52.7	408	9.7	545
Passed GCE (O/L)	5.2	88.8	1.7	55.1	445	8.8	582
Higher	5.6	93.3	2.0	60.7	239	9.3	324
Monthly household income							
< 9,000	5.1	84.3	1.6	50.7	529	13.0	675
9,000 – 13,999	5.3	89.1	1.8	56.5	285	7.2	387
14,000 – 19,999	5.4	91.9	1.6	55.9	222	10.0	300
20,000 – 31,999	5.4	92.6	1.6	52.7	243	8.1	321
≥ 32,000	5.6	95.9	2.1	59.2	98	7.3	137
Wealth quintile of household							
Poorest	4.9	80.8	1.4	44.6	312	13.6	405
Second	5.1	84.4	1.8	51.3	269	11.7	351
Middle	5.5	92.8	1.6	52.5	265	9.3	356
Fourth	5.4	92.2	1.8	59.7	258	9.1	342
Richest	5.6	95.6	2.0	61.2	294	5.6	395
Overall	5.3	89.0	1.7	53.6	1398	9.8	1849

* a person aged more than 15 years was considered as an adult member

Of the fathers, 53.6 percent were involved in at least one activity. Fathers' involvement increased with increasing wealth quintiles, from 44.6 per cent in the lowest wealth quintile to 61.2 percent in the highest .

Considering the children under 5 years of age, 9.8 percent were looked after by a child under the age of 10 years, within the week preceding the interview. This percentage was highest in the rural sector (11.8 percent) and lowest in the urban sector (4.7 percent). A wide inter-district variation was seen, with the percentage in the Colombo district being 3.3 percent with that in Jaffna, 26.3 percent. A declining trend was seen with increasing wealth quintiles.

7.1.2. Items used by the child for playing

Types of play items used by the children under 5 years included household objects, outdoor material, homemade toys and readymade toys. In the total sample, 84.5 percent of the children used 3 or more types of play items (Table 7.2) .

Inter-sectoral differences were seen in that in the urban sector, 93.1 percent used readymade toys compared to 83.7 percent in the rural sector. Conversely, 82.9 percent of the children in the rural sector used homemade toys compared to 76.8 percent in the urban sector.

There were differences between the districts, the most marked being the low percentage (47.0 percent) of children in Jaffna using readymade toys, which may be linked with non availability. The use of three or more types of play items was also low in the Jaffna (66.4 percent) compared to other districts.

Table 7.2. Use of different types of play items by children under 5 years of age, according to background characteristics

Background characteristic	percentage of children who play with:					Total number of children <5 year
	household objects	outdoor material	homemade toys	ready-made toys	3 or more types of play items	
Age group in months						
24-35	88.8	88.5	78.1	83.3	83.3	504
36-47	88.8	87.7	80.2	88.2	84.4	450
48-59	87.6	89.6	83.3	86.0	86.0	444
Sex of child						
Male	84.3	88.0	79.9	86.5	82.7	675
Female	92.2	89.1	80.9	85.0	86.3	723
Residence						
Urban	88.6	83.4	76.8	93.1	83.8	334
Rural	88.2	89.8	82.9	83.7	85.1	940
Estate	89.3	93.4	71.3	81.1	82.3	124
District						
Anuradhapura	80.0	81.0	89.5	88.6	81.1	106
Badulla	95.3	99.2	83.6	90.6	95.3	128
Colombo	90.3	89.0	73.8	97.2	91.1	146
Colombo MC	89.3	82.4	71.8	97.7	82.4	131
Hambantota	88.4	94.5	91.0	95.9	91.1	146
Jaffna	84.8	84.6	83.6	47.0	66.4	152
Kurunegala	86.8	92.2	79.1	92.2	88.4	129
Nuwara Eliya	84.0	85.1	72.6	89.7	80.3	178
Ratnapura	92.9	96.9	77.2	95.3	92.9	127
Trincomalee	92.1	82.1	84.9	68.9	80.0	155
Maternal education						
no schooling	93.8	93.8	81.3	75.0	81.8	33
primary	92.0	89.3	75.0	75.9	80.5	113
Secondary	86.4	87.5	82.9	84.1	83.1	408
Passed GCE (O/L)	87.2	88.1	80.4	86.5	84.7	445
Higher	92.9	90.8	83.7	92.5	91.6	239
Monthly household income						
< 9,000	87.6	90.0	78.1	77.8	81.1	529
9,000 – 13,999	88.0	86.3	82.0	85.5	83.9	285
14,000 – 19,999	88.2	87.7	81.4	91.4	85.1	222
20,000 – 31,999	88.8	88.8	81.8	94.2	89.3	243
≥ 32,000	95.9	89.7	83.7	94.9	91.8	98
Wealth quintile of household						
Poorest	86.5	89.3	77.8	69.7	78.2	312
Second	86.9	89.1	78.9	82.3	80.7	269
Middle	90.1	89.3	80.2	88.5	89.8	265
Fourth	90.6	85.9	83.6	93.8	85.7	258
Richest	88.4	89.1	82.0	96.3	89.1	294
Overall	88.4	88.6	80.4	85.7	84.5	1398

7.3. Early childhood education

Of the children aged 36-59 months, 69.0 percent had attended an early childhood educational programme. This percentage was highest among children in the urban sector (76.3 percent). There was a wide inter district variation with low percentages in the districts of Trincomalee (58.9 percent)

and Jaffna (61.0 percent) and relatively high in Colombo (81.3 percent) and Colombo MC area (78.3 percent). No clear pattern was seen in relation to maternal education and income indicators.

Table 7.3. Percentage of children aged 36-59 months who were attending an early childhood education programme, by background characteristics

Background characteristic	Percent attending Preschool or Daycare	Mean No of days attended in past 7 days		Total number of children
		Mean	SD	
Age group in months				
36-47	52.4	4.7	1.0	450
48-59	85.8	4.7	0.9	444
Sex of child				
Male	69.5	4.7	0.9	440
Female	68.5	4.7	1.0	454
Residence				
Urban	76.3	4.7	0.6	215
Rural	67.1	4.6	1.0	592
Estate	64.4	5.4	1.2	87
District				
Anuradhapura	77.8	4.8	0.9	63
Badulla	75.3	4.7	0.7	89
Colombo	81.3	4.7	0.5	96
Colombo MC	78.3	4.7	0.7	83
Hambantota	69.8	4.4	0.8	86
Jaffna	61.0	4.1	1.5	100
Kurunegala	59.7	5.0	0.7	77
Nuwara Eliya	64.7	5.0	1.0	116
Ratnapura	67.4	5.0	1.1	89
Trincomale	58.9	4.4	1.0	95
Maternal education				
no schooling	65.0	5.2	1.0	20
primary	58.7	5.0	1.1	75
Secondary	72.7	4.7	0.9	271
Passed GCE (O/L)	67.6	4.5	1.1	278
Higher	70.0	4.8	0.6	150
Monthly household income				
< 9,000	66.1	4.6	1.1	330
9,000 – 13,999	67.4	4.8	0.7	181
14,000 – 19,999	67.3	4.6	1.0	153
20,000 – 31,999	75.3	4.7	0.9	158
≥ 32,000	78.3	4.8	0.6	60
Wealth quintile of household				
Poorest	69.1	4.7	1.2	204
Second	60.8	4.6	1.0	176
Middle	71.0	4.8	0.8	169
Fourth	66.2	4.7	0.9	154
Richest	77.0	4.7	0.7	191
Overall	69.0	4.7	0.9	894

7.4. School enrollment

Of the children who have completed 5 years by 31st January 2009, 98.0 percent were enrolled in grade 1, and 99.1 percent of all children 5-10 years of age were attending primary school (Table 7.4). Only marginal differences were seen between the sub groups studied.

In depth interviews indicated that in most areas, schooling and school attendance are not affected as parents manage to send their children to school, even with their limited resources.

Table 7.4. Percentage of children 5-10 years of age attending Primary School, by background characteristics

background characteristic	Percentage of children of primary school age currently attending Primary School	No. of children of primary school age (5-10 years)	% entered Grade 1	No. of Children Completed 5 yrs By 31 st of Jan 2009
Sex of child				
Male	98.9	1469	97.5	162
Female	99.4	1435	98.5	136
Residence				
Urban	99.3	720	97.5	79
Rural	99.2	1986	98.5	200
Estate	97.5	198	94.7	19
District				
Anuradhapura	99.6	247	100.0	16
Badulla	99.3	305	96.9	32
Colombo	99.3	269	96.4	28
Colombo MC	99.1	328	97.2	36
Hambantota	98.9	271	100.0	22
Jaffna	99.7	331	100.0	41
Kurunegala	99.3	270	100.0	26
Nuwara Eliya	99.1	320	94.6	37
Ratnapura	98.2	275	96.6	29
Trincomalee	99.0	288	100.0	31
Monthly household income				
< 9,000	99.5	877	98.5	68
9,000 – 13,999	99.1	434	97.0	33
14,000 – 19,999	99.5	386	96.0	25
20,000 – 31,999	99.4	363	100.0	30
≥ 32,000	99.4	154	100.0	12
Wealth quintile of household				
Poorest	98.4	634	97.5	80
Second	99.8	547	100.0	46
Middle	99.1	565	95.2	62
Fourth	99.0	582	98.0	51
Richest	99.5	576	100.0	59
Overall	99.1	2904	98.0	298

7.5. Child labour

Children who had undertaken 'work' (paid or unpaid) within the previous one week and previous one year were identified. Of the children aged 5-14 years, only 0.6 percent had undertaken paid work during the preceding one week as well as one year. Unpaid work was undertaken by 8.5 percent of this group during the previous week, the comparable figure for the previous 1 year period being 8.3 percent. Children engaged in unpaid work in the previous 7 days was highest in the Jaffna district (27.3 percent), and was zero in Anuradhapura, Hambantota and Trincomalee districts.

The mean number of hours of work undertaken by those who worked during the preceding week was 4.84 which was lower in the urban sector (2.0 hours). A high value of 20 hours per week was observed in Ratnapura district.

Information available from in-depth interviews indicated that ‘it is a common practice for children of low income families to work with their parents/guardians in their paddy fields and homestead gardens with some working as wage labourers. Some children undertake work such as fishing , or working in a quarry, after school hours’.

Table 7.5 Percentage of children aged 5-14 years who are involved in child labour activities, and mean hours per week, by background characteristics

Background characteristic	working outside household in the previous week			working outside household in the last year		Total number of children aged 5-14 year
	paid work	unpaid work	mean hours per week	paid work	unpaid work	
Age group in years						
9-11	0.5	10.2	4.00	0.4	9.9	768
12-14	0.7	7.5	6.59	0.6	8.1	734
Sex of child						
Male	0.5	8.2	4.68	0.6	7.9	964
Female	0.6	8.7	4.97	0.6	8.6	953
Residence						
Urban	0.8	6.0	2.00	0.6	6.7	486
Rural	0.5	9.0	5.09	0.5	8.4	1271
Estate	0.6	11.9	4.00	0.6	12.3	160
District						
Anuradhapura	0.5	0.0	0.00	0.5	0.5	187
Badulla	0.6	22	3.00	0.0	26.1	159
Colombo	0.0	0.6	0.00	0.0	0.6	158
Colombo MC	1.5	6.4	0.00	1.1	8.1	203
Hambantota	0.0	0.0	0.00	0.0	0.0	216
Jaffna	0.5	27.3	4.50	1.0	21.1	221
Kurunegala	1.0	11.5	5.11	1.1	11.9	210
Nuwara Eliya	0.7	3.5	2.57	0.7	3.2	284
Ratnapura	0.5	9.7	20.00	0.5	11.8	195
Trincomale	0.0	0.0	0.00	0.0	0.0	84
Monthly household income						
< 9,000	1.0	10.3	5.10	0.9	10.4	583
9,000 – 13,999	1.1	7.6	6.17	1.1	7.7	278
14,000 – 19,999	0.4	6.6	4.00	0.0	7.3	258
20,000 – 31,999	0.0	5.9	2.00	0.0	5.7	272
≥ 32,000	0.0	1.3	.	0.0	1.3	79
Wealth quintile of household						
Poorest	1.9	14.8	5.39	1.7	13.7	431
Second	0.0	9.4	5.68	0.3	7.5	342
Middle	0.5	6.9	3.18	0.6	7.9	380
Fourth	0.3	4.3	3.00	0.0	4.9	376
Richest	0.0	6.2	1.00	0.0	6.6	388
Overall	0.6	8.5	4.84	0.6	8.3	1917

Chapter 8

Utilization of Services Provided by Health and Other Sectors

8.1 Use of health services by children

8.1.1 Child Welfare Clinic

Approximately 95 percent of children under 5 years had received care at a Child Welfare Clinic (CWC) (Table 8.1). There was no major variation between sectors in the use of these services. A total of 91.8 percent of the children had their Child Health Development Records (CHDRs) with them at the time of interview. Comparisons within the sub groups indicate a lower percentage availability in the estate sector (78.7 percent) and in Nuwara Eliya district. (81.7 percent).

Of the mothers who attended the clinics, 87.5, 86.2 and 79.3 percent received advice on growth, nutrition and early childhood development respectively. However, the percentage of mothers who received such advice was markedly low in the estate sector compared to the urban and rural sectors, the difference being more marked in respect to advice on early childhood development.

Table 8.1 Use of facilities available at Child Welfare Clinics by children less than 5 years of age by background characteristics

background characteristic		Availability of CHDR %	Children Attended CWC %	% of children whose mothers received advice on			% Received Thripdosa*	Total No. of Children
				Growth	Nutritional status	ECCD		
Age group in months	<6	88.6	91.1	81.9	82.9	74.1	**	**
	6-11	89.9	98.1	87.8	87.8	78.4	17.0	288
	12-23	94.0	94.7	88.8	88.1	81.2	14.9	612
	24-35	92.4	96.0	91.0	87.6	81.2	15.7	607
	36-47	91.4	94.3	87.6	85.2	79.0	17.5	513
	48-59	91.9	92.2	83.8	83.4	77.8	15.0	493
Sex of child	Male	92.2	94.5	86.4	84.4	77.7	14.8	1228
	Female	91.5	94.4	88.5	87.8	80.8	16.9	1285
Residence	Urban	93.6	93.8	86.0	84.5	79.5	18.7	595
	Rural	93.0	94.7	90.1	88.7	82.6	16.3	1681
	Estate	78.7	94.3	72.5	71.9	54.9	5.9	237
District	Anuradhapura	89.8	97.8	95	93.2	91.2	5.9	203
	Badulla	95.5	97.6	87.6	84.7	83.8	20.3	236
	Colombo	98.5	94.1	88.9	86.1	82.2	32.6	239
	Colombo MC	93.8	91.4	84.9	84.6	80.4	12.4	258
	Hambanthota	94.8	96.7	95.2	94.8	91.8	7.7	260
	Jaffna	90.4	86.5	88.6	88.8	82.4	14.8	271
	Kurunagala	89.3	99.1	88.8	89.1	84.9	11.3	203
	Nuwara Eliya	81.7	94.8	71.8	69.4	47.1	8.0	312
	Ratnapura	96.2	97.1	88.2	84.6	74.4	21.6	241
	Trincomale	91.0	91.1	90.5	91.3	84.7	23.8	290
Maternal education**	no schooling	90.5	98.2	73.8	75.4	65.0	12.1	58
	primary	84.7	90.6	83.6	83.0	73.3	15.9	189
	Secondary	91.2	94.8	84.2	81.5	73.6	18.5	731
	Passed GCE (O/L)	95.0	95.7	90.2	89.4	83.6	16.3	761
	Higher	94.2	93.7	90.3	88.9	84.8	12.4	459
Monthly	up to 9000	90.3	94.5	86.1	84.4	77.5	16.7	927

background characteristic		Availability of CHDR	Children Attended CWC	% of children whose mothers received advice on			% Received Thripasha*	Total No. of Children
				%	%	Growth		
household income***	9000-13999	91.1	93.9	83.5	82.5	74.0	14.7	497
	14000-19999	94.0	95.2	92.0	89.9	83.6	17.8	409
	20000-31999	94.4	96.4	88.9	88.0	82.7	17.2	429
	32000 +	92.9	89.3	91.6	91.6	85.7	9.3	205
Wealth quintile of household	Poorest	90.8	93.6	86.4	85.9	74.4	18.1	552
	Second	87.9	92.3	85.6	84.0	75.1	14.2	494
	Middle	92.6	95.9	86.7	85.7	80.2	20.1	468
	Fourth	93.1	96.5	88.3	85.4	80.9	14.0	464
	Richest	94.8	94.2	90.4	89.5	85.5	13.1	535
National		91.8	94.5	87.5	86.2	79.3	15.9	2513

* When calculating the percent received thripasha, children aged less than 6 months were excluded

Missing data – 284 * Missing data –02.

As shown in the Table 8.1, 15.9 percent of children aged 6-59 months had received at least one packet of thripasha in the previous month, with a markedly lower rate in the estate sector (5.9 percent) compared to the urban (18.7 percent) and rural (16.3 percent). A wide inter district variation was seen ranging from 5.9 percent in Anuradhapura to 32.6 percent in Colombo district.

8.1.2 Vitamin A supplementation for children

As shown in Table 8.2, approximately 88.3 percent of children who had completed 9 months of age had received a mega dose of vitamin with the percentage of children who received a vitamin A mega dose at 18 months, 36 months being 85.0 and 77.7 respectively. Considering all children aged 36 months and over 74.6 percent had been given 3 mega doses of Vitamin A. .

The coverage of vitamin A supplementation in the estate sector was poor as shown by the lower percentages 77.3, 72.2 and 54.3 at 9, 18 and 36 months respectively. Of the districts, Nuwara Eliya, Jaffna and Trincomalee reported low coverage among all age categories.

Of the children aged 36 –59 months, 8.6 percent had never received Vitamin A, this percentage being higher in the rural and estate sectors (10.2 and 9.0 percent respectively). Highest percentage was in the Trincomalee district (20.4 percent) with Jaffna and Nuwara Eliya also having high percentages of 15.8 percent and 10.3 percent respectively.

Table 8.2 Percentage distribution of children who received Vitamin A mega dose supplement at 9, 18 and 36 months, by background characteristics.

background characteristic		Children 9-59 months		Children 18-59 months		Children 36-59months			Of the children 36-59, percentage never received Vit A.
		Number of children	% received Vit A at 9 months	Number of children	% received Vit A at 18 months	Number of children	% received Vit A at 36 month	% received 3 doses of Vit A	
Sex of child	Male	1091	86.5	860	85.9	446	80.0	76.7	7.0
	Female	1149	86.1	937	84.2	478	75.5	72.7	10.1
Residence	Urban	543	90.6	431	91.2	221	81.0	79.4	4.0
	Rural	1419	86.0	1204	84.6	622	79.6	76.3	10.2
	Estate	207	76.8	162	72.2	81	54.3	49.4	9.0
District	Anuradhapura	183	87.4	144	86.8	70	78.6	77.1	5.9
	Badulla	218	93.6	172	92.4	95	86.3	84.2	6.2
	Colombo	227	94.3	185	93.5	99	83.8	81.6	3.9

background characteristic	Children 9-59 months		Children 18-59 months		Children 36-59 months			Of the children 36-59, percentage never received Vit A.	
	Number of children	% received Vit A at 9 months	Number of children	% received Vit A at 18 months	Number of children	% received Vit A at 36 month	% received 3 doses of Vit A		
Colombo MC	233	90.6	179	90.5	88	78.4	77.0	4.4	
Hambantota	235	93.6	194	89.7	101	81.2	80.2	6.9	
Jaffna	217	81.1	179	78.8	91	74.7	70.8	15.8	
Kurunegala	188	91.5	155	91	81	87.7	85.4	5.2	
Nuwara Eliya	279	74.2	225	68.9	111	55.9	49.5	10.3	
Ratnapura	210	93.8	168	94	88	87.5	85.2	3.2	
Trincomale	250	68.8	196	71.4	100	69	62.7	20.4	
Maternal education	no schooling	53	67.9	40	67.5	19	52.6	47.4	14.3
	primary	158	79.1	138	76.8	74	66.2	63.0	14.1
	Secondary	654	82.6	523	83.7	285	74.7	70.2	9.2
	Passed GCE (O/L)	689	90.4	559	88.4	281	84.0	81.6	6.2
	Higher	413	91.3	319	88.4	162	83.3	82.0	6.0
Monthly household income	up to 9000	808	82.9	668	82.8	335	74.6	71.3	12.5
	9000-13999	439	86.1	358	83.5	183	74.9	71.4	6.3
	14000-19999	374	89.3	487	88.2	160	81.9	78.1	5.4
	20000-31999	391	89.3	312	88.5	163	82.2	79.5	7.2
	32000 +	188	89.9	140	85.0	72	79.2	79.2	6.8
Wealth quintile of household	Poorest	473	83.1	398	80.4	204	68.1	66.5	16.3
	Second	435	76.8	339	76.1	175	68.6	63.3	12.1
	Middle	416	88.9	337	88.1	177	83.6	80.0	5.0
	Fourth	417	89.7	332	90.7	158	83.5	80.5	4.3
	Richest	499	92.6	391	90.0	210	85.2	83.3	4.2
National	2240	86.3	1797	85.0	924	77.7	74.6	8.6	

8.1.3 Source of medical care for common childhood illnesses

Source of medical care for those children who reported diarrhoea / respiratory symptoms within the 2 weeks preceding the interview was considered under services provided by the government sector, private sector and other sectors. As shown in Table 8.3, 55.1 percent of the total group used services from the government sector, 41.6 percent from the private sector and 3.2 percent from other sectors.

Use of services provided by the government sector was high in the estate (68.6 percent) compared to urban (53.6 percent and 51.2 percent in the urban and rural sectors respectively). There was a wide variation between districts with the highest percentage of users of government sector services being 67.0 percent in Badulla and lowest 37.2 in Kurunegala . .

With increasing levels of maternal education, the percentage using government sector services showed a decline while private sector services increased. A similar pattern was seen with the increasing income categories and wealth quintiles.

Table 8.3 Source of care provider for children who had diarrhoea or respiratory illness during 2 weeks preceding survey, by background characteristics

Background characteristic		Source of provider (%)			Number of children who had diarrhoea or respiratory illness in previous 2 weeks
		Govt. sector	Private sector	Other	
Age of child in months	<6	50.0	47.2	2.8	85
	6-11	51.7	46.6	1.7	133
	12-23	55.5	40.5	4.0	271

Background characteristic		Source of provider (%)			Number of children who had diarrhoea or respiratory illness in previous 2 weeks
		Govt. sector	Private sector	Other	
	24-35	56.5	41.6	1.9	244
	36-47	48.7	48.7	1.6	223
	48-59	54.9	38.6	6.5	198
Sex of child	Male	52.0	43.5	4.3	581
	Female	55.0	42.7	2.2	573
Residence	Urban	53.6	44.3	1.7	268
	Rural	51.2	45.8	2.9	769
	Estate	68.6	22.9	8.6	117
District	Anuradhapura	37.0	60.3	2.7	85
	Badulla	67.0	31.0	2.0	113
	Colombo	47.4	50.5	2.1	113
	Colombo MC	59.4	38.6	2.0	115
	Hambanthota	49.1	46.4	4.5	122
	Jaffna	50.9	47.4	1.8	122
	Kurunegala	37.2	61.6	1.2	94
	Nuwara Eliya	62.8	29.2	7.3	150
	Ratnapura	55.3	43.6	1.1	107
	Trincomale	58.6	35.3	5.2	133
Mother's education	No schooling	75.9	13.8	10.3	33
	Primary	74.4	21.8	3.8	93
	Secondary	57.2	39.8	2.7	358
	Passed O' Level	51.9	44.9	2.9	350
	Higher	34.1	64.0	1.8	191
Monthly household income	up to 9000	64.5	32.7	2.8	444
	9000-13999	54.0	40.8	4.7	244
	14000-19999	51.4	42.2	5.8	186
	20000-31999	39.0	60.4	0.6	186
	32000 +	22.1	76.5	1.5	79
Wealth quintile of household	Poorest	71.4	25.3	3.3	275
	Second	66.5	30.0	3.4	235
	Middle	48.0	48.5	2.6	211
	Fourth	47.5	49.0	3.5	229
	Richest	27.5	69.2	3.3	204
Overall		53.5	43.1	3.2	1154

A high level of acceptability of the 'local' health services for mothers and children by Public Health Midwife/ Public Health Inspector was noted during the in depth interviews. It was also mentioned that people have to travel distances to reach a government health facility, even though many considered the services provided by this sector, was 'acceptable and good'

8.2 Food and nutrient supplementation for women

Several food and nutrient supplementation programmes had been implemented by the government. Samurdhi (prosperity) program was launched in 1994 as a poverty alleviation programme, targeting at the household level. Provision of a monthly allowance, a credit program and a rural infrastructure development program, financed by a special fund are included as components.

8.2.1 Pregnant mothers

A total of 90.2 percent of the pregnant mothers had attended antenatal clinics regularly as shown in Table 8.4. In general, regular antenatal clinic attendance was above 80 percent in all the subgroups, except in the Kurunegala district (75.0 percent).

The two main nutrition supplementation programmes aimed at pregnant women are the provision of a food basket (“poshana malla”)‡ through the Samurdhi programme implemented by the : Ministry of Samurdhi and Poverty Alleviation and the Thriposha programme implemented by the Ministry of Health care and Nutrition. Under the Samurdhi programme, a “poshana malla”, a basket of foods²⁰ containing selected dry commodities to the value of Rs 500/- was issued monthly, to all pregnant mothers and lactating mothers for a period of 18 months, i.e. 6 months before delivery and 12 months, after delivery. (Samurdhi beneficiaries include families with with income less than Rs. 5000/- per month) in the most vulnerable districts)

Table 8.4 Percent of pregnant mothers who attended antenatal clinics, and who received “poshana malla”, “thriposha” and Iron tablets, by background characteristics.

background characteristic		Regular ANC Visits*		“poshana malla”		“thriposha”		Iron tablets			Total No. of Pregnant women
		Perc ent	Total No of Mothe rs	Perce nt	Total No of Moth ers	Perce nt	Total No of Moth ers	percent receive d tablets	Of the receive d, percent took daily	Total No of Mothe rs	
Residence	Urban	96.4	55	9.6	52	76.9	52	90.7	89.8	54	60
	Rural	88.5	148	29.2	120	74.2	120	85.8	84.8	141	162
	Estate	83.3	12	18.2	11	81.8	11	90.9	80.0	11	12
District	Anuradhapura	92.9	14	0.0	14	50.0	14	85.7	84.6	14	17
	Badulla	90.9	22	23.8	21	81.0	21	95.5	95.5	22	23
	Colombo	95.8	24	4.8	21	85.7	21	91.3	90.5	23	25
	Colombo MC	100.0	25	0.0	26	76.0	25	84.0	90.5	25	28
	Hambantota	91.3	23	27.8	18	55.6	18	72.7	82.4	22	25
	Jaffna	87.0	23	66.7	24	69.6	23	89.5	72.2	19	27
	Kurunegala	75.0	16	28.6	7	100.0	6	93.3	92.9	15	16
	Nuwara Eliya	84.2	19	10.0	10	80.0	10	100.0	82.4	17	21
	Ratnapura	92.9	14	21.4	14	85.7	14	92.3	91.7	13	14
Trincomale	88.6	35	32.1	28	80.6	31	80.6	79.3	36	38	
Maternal education	no schooling	100.0	5	66.7	3	100.0	3	80.0	100.0	5	5
	primary	84.6	13	18.2	11	70.0	10	90.9	90.0	11	14
	Secondary	89.2	65	22.2	54	76.8	56	88.7	84.2	62	72
	Passed GCE (O/L)	91.2	91	30.3	76	76.0	75	84.9	85.1	86	95
	Higher	89.7	39	8.1	37	70.3	37	92.5	86.8	40	46
Monthly household income	up to 9000	89.3	75	28.1	64	81.5	65	83.6	81.4	67	77
	9000-13999	89.7	39	30.0	30	66.7	30	97.1	87.9	34	38
	14000-19999	89.2	37	21.2	33	72.7	33	79.5	94.4	44	70
	20000-31999	97.5	40	14.7	34	81.8	33	96.6	85.7	29	21
	32000 +	88.9	18	13.3	15	80.0	15	81.0	82.4	21	25
Wealth quintile of household	Poorest	86.7	45	37.1	35	86.1	36	85.4	85.7	41	45
	Second	88.6	35	25.9	27	70.4	27	81.8	73.3	33	38
	Middle	95.3	43	25.0	36	75.7	37	88.4	94.7	43	46
	Fourth	88.9	45	22.0	41	67.5	40	88.4	84.2	43	52
	Richest	91.5	47	9.1	44	76.7	43	91.3	88.4	46	53
Overall		90.2	215	23.0	183	75.4	183	87.4	85.9	206	234

*(First visits were excluded)

‡Poshana malla includes Rice (5 Kg), Eggs (8), Cowpea / Green gram / Sprats (500g), Coconut 05 / Coconut oil (1 bottle) per month.

“Thripasha” programme provides a food supplement to all pregnant mothers at the antenatal clinics. Of the antenatal mothers who attended the clinics, 75.4 percent has received Thripasha. This percentage was higher in the estate sector (81.8 percent) compared to the urban (76.9 percent) and rural (74.2 percent) sectors.

Of the pregnant women, 23.0 percent had received “poshana malla”. As explained above, at present, this programme is being implemented in selected areas, hence the wide inter district variation as shown in the Table 7.4, is to be expected. For example none in the Anuradhapura had received “poshana malla” while 66.7 percent of pregnant mothers in the Jaffna district were recipients. However, these findings have to be interpreted with caution as the numbers in each of the sub groups are relatively small.

Percentage of pregnant mothers who received iron tablets from the antenatal clinic was 87.4 and of them only 85.9 percent reported to have taken the tablets daily. Compared to the other districts, the percentage who received iron tables was lowest in Hambantota (72.7 percent) .

8.2.2. Lactating mothers

Of the lactating mothers with a child under 6 months of age, 72.4 percent had received “thripasha” (Table 8.5), this percentage being lower in the estate sector (60.6 percent) compared to the urban (66.2 percent) and rural (75.2 sectors) sectors.

Of the total group of lactating mothers, vitamin A mega dose has been given to 80.8 percent, after childbirth. This percentage was low in the estate sector (66.7 percent) compared to 91.7 percent in the urban sector and 78.0 percent in the rural sector. Mothers in Anuradhapura reported the lowest coverage with Vitamin A mega dose (60.0 percent)) with Jaffna reporting the highest coverage (95.9 percent).

Table 8.5 Percentage of lactating mothers who received “thripasha” and Vitamin A by background characteristics

background characteristic		“thripasha” (child <6 months)		Vitamin A mega dose (child <24 months)	
		Percent	Total No of Women	Percent	Total No of Women
Sector	Urban	66.2	63	91.7	279
	Rural	75.2	188	78.0	784
	Estate	60.6	21	66.7	109
District	Anuradhapura	63.6	41	60.0	118
	Badulla	80.5	29	87.5	118
	Colombo	80.6	24	95.5	104
	Colombo MC	53.7	31	93.7	137
	Hambantota	80.3	27	70.8	107
	Jaffna	70.0	11	95.9	108
	Kurunegala	59.4	21	74.1	82
	Nuwara Eliya	75.0	33	67.6	141
	Ratnapura	67.1	22	81.0	126
	Trincomale	83.5	33	76.1	131
Maternal education	no schooling	81.3	5	87.5	24
	primary	68.2	13	74.4	66
	Secondary	74.1	68	83.9	323

background characteristic	“thripasha” (child <6 months)		Vitamin A mega dose (child <24 months)	
	Percent	Total No of Women	Percent	Total No of Women
Passed GCE (O/L)	75.0	85	76.2	352
Higher	65.7	58	84.0	244
Monthly household income	up to 9000	72.8	91	400
	9000-13999	75.6	62	235
	14000-19999	70.5	41	198
	20000-31999	74.2	55	213
	32000 +	64.7	21	103
Wealth quintile of household	Poorest	71.3	47	233
	Second	80.5	52	238
	Middle	75.4	56	224
	Fourth	70.5	56	225
	Richest	64.6	61	252
National	72.4	272	80.8	1172

8.3 Samurdhi beneficiaries

In the households included in the study, there were a total of 1302 non pregnant, non lactating women in the age group 15 – 49 years. Of this group, 21.3 percent received *Samurdhi* benefits, being members of households that were beneficiaries under the *Samurdhi* programme. (Table 8.6). Marked inter-sectoral differences were seen in this percentage with 8.2 percent in the urban, 28.2 percent in rural and 6.2 percent in the estate sectors. As would be expected, the percentage of *Samurdhi* recipients was high (40.0 percent) in the lowest monthly household income category (upto Rs. 9000). It is noteworthy that 5.8 percent of households in the highest household income category (Rs 32000 and above) also received such benefits. The percentage of such beneficiaries varied from 42.1 percent in the lowest to 6.6 percent in the highest wealth quintile.

Percentage beneficiaries among the pregnant women and lactating women were 17.2 percent and 19.9 percent respectively. Within these groups, the rural sector and the lower income groups had the highest percentages of beneficiaries.

Table 8.6 “Samurdhi” beneficiaries” among women 15-49 years by background characteristics

background characteristic	Pregnant		Lactating		Non-pregnant & non- lactating		
	Percent	Total No of Women	Percent	Total No of Women	Percent	Total No of Women	
Residence	Urban	6.7	60	11.2	214	8.2	354
	Rural	21.7	161	23.3	701	28.1	873
	Estate	8.3	12	8.9	45	6.2	81
District	Anuradhapura	5.9	17	16.0	125	13.9	79
	Badulla	13.0	23	10.4	115	15.0	127
	Colombo	4.0	25	12.5	88	8.6	139
	Colombo MC	0.0	28	5.7	106	4.4	138
	Hambantota	28.0	25	34.5	113	26.6	109
	Jaffna	29.6	27	40.0	60	42.3	201
	Kurunegala	25.0	16	11.2	89	15.6	96
	Nuwara Eliya	14.3	21	14.8	54	15.3	137
	Ratnapura	21.4	14	19.4	98	24.7	146

background characteristic		Pregnant		Lactating		Non-pregnant & non-lactating	
		Percent	Total No of Women	Percent	Total No of Women	Percent	Total No of Women
	Trincomale	27.0	37	37.5	112	33.1	136
Maternal education	no schooling	20.0	5	39.1	23	29.7	37
	primary	21.4	14	30.0	60	31.9	113
	Secondary	25.4	71	20.9	306	24.5	406
	Passed GCE (O/L)	15.8	95	18.3	327	21.0	462
	Higher	6.5	46	14.0	222	10.7	272
Monthly household income	up to 9000	23.8	80	21.7	286	30.1	345
	9000-13999	16.7	42	26.3	190	21.3	178
	14000-19999	23.1	39	18.2	187	13.2	151
	20000-31999	8.9	45	13.0	184	9.1	175
	32000 +	0.0	19	15.6	77	4.8	63
Wealth quintile of household	Poorest	25.0	44	31.7	189	40.0	270
	Second	15.8	38	28.6	175	23.6	250
	Middle	23.9	46	19.3	192	24.5	249
	Fourth	19.2	52	16.3	196	13.4	246
	Richest	3.8	53	5.8	208	6.1	293
Overall		17.2	233	19.9	960	21.3	1308

**lactating mothers those with a child <24 months*

Chapter 9

Water and Sanitation

The seventh MDG goal expects countries to reduce by half (between 2000 and 2015) the proportion of people without sustainable access to safe drinking water and basic sanitation. The World Fit for Children goal calls for a one-third reduction in the proportion of households without access to hygienic sanitation facilities and affordable and safe drinking water.

9.1 Use of improved water sources

The households using improved sources of drinking water are those supplied with water from one of the following sources: piped water into dwelling, piped water into yard or plot, public tap/standpipe, tube well/borehole, protected well, protected spring, rainwater collection and bottled water. As shown in table 9.1, 72.2 percent of the households included in the study have access to improved drinking water sources. There is a noteworthy inter sectoral difference in this percentage with 94.5 percent in urban, 66.1 percent in rural and 48.2 percent in estate sector households having access to improved water sources. Colombo MC area has the highest access rate of 99.7 percent and Kurunegala, the lowest of 47.7 percent.

The households with piped water inside the dwelling increased with increasing wealth quintiles, from 5.3 percent in the lowest quintile to 65.2 percent in the highest quintile. A similar increase was seen as the income increases.

Table 9.1:
Distribution of households according to the main source of drinking water and households with improved source of water, by background characteristics

Background Characteristics	Main source of drinking water									Unimproved sources	Improved source of drinking water *
	Improved sources										
	Piped into dwelling	Piped into yard or plot	Public tap /standpipe	Tubewell/ borehole	Protected well	Protected spring	Rainwater collection	Bottled water			
Sector	Urban	68.6	6.2	10.4	0.7	8.6	0.1	0.0	0.2	5.3	94.7
	Rural	16.9	11.4	6.1	3.0	25.2	3.4	0.2	0.0	33.9	66.1
	Estate	5.0	4.7	24.7	0.0	2.4	11.5	0.0	0.0	51.8	48.2
District	Anuradhapura	8.5	12.0	5.5	3.7	28.0	2.3	0.3	0.5	39.3	60.7
	Badulla	18.2	11.8	4.8	1.8	11.2	12.0	0.2	0.0	40.2	59.8
	Colombo	65.5	8.3	1.3	0.5	13.1	0.0	0.0	0.0	11.3	88.7
	Colombo MC	82.2	4.1	12.9	0.5	0.0	0.0	0.0	0.0	0.3	99.7
	Hambantota	37.3	25.5	11.8	1.5	11.0	0.2	0.0	0.0	12.7	87.3
	Jaffna	8.5	2.6	10.3	8.7	56.4	0.0	0.0	0.0	13.5	86.5
	Kurunegala	7.9	2.1	0.5	2.2	34.2	0.5	0.3	0.0	52.3	47.7
	Nuwaraeliya	17.9	10.6	16.7	0.7	5.1	8.5	0.2	0.0	40.4	59.6
	Ratnapura	21.2	13.8	0.5	1.3	13.1	6.6	0.2	0.0	43.4	56.6
Trincomale	23.6	6.4	19.8	1.4	24.8	0.2	0.2	0.0	23.6	76.4	
Income group	< 9,000	16.1	11.9	9.3	3.0	21.4	3.9	0.2	0.0	34.3	65.7
	9,000 -13,999	27.6	10.6	9.8	2.1	20.6	2.7	0.2	0.0	26.5	73.5
	14,000 – 19,999	35.1	8.6	9.0	2.1	16.9	2.3	0.1	0.1	25.8	74.2

	20,000 – 31,999	42.6	7.2	5.1	1.4	18.3	2.9	0.1	0.1	22.3	77.7
	≥ 32,000	52.6	5.0	4.2	0.8	20.5	1.8	0.0	0.2	14.9	85.1
Wealth index quintiles	Poorest	5.3	12.3	16.5	4.1	21.7	2.5	0.1	0.1	37.3	62.7
	Second	10.4	12.3	13.1	3.0	22.1	3.7	0.0	0.0	35.6	64.4
	Middle	20.0	13.1	6.8	1.9	21.2	5.0	0.2	0.0	31.6	68.4
	Fourth	36.1	8.6	5.2	1.9	19.1	2.6	0.3	0.1	25.9	74.1
	Richest	65.2	3.5	1.6	0.7	15.5	1.5	0.0	0.1	11.9	88.1
Overall		29.1	9.7	8.2	2.2	19.7	3.0	0.1	0.1	27.8	72.2

9.2 Household water treatment

The respondents were asked as to how they treated water at home to make it safe to drink. Boiling, adding bleach or chlorine, using a water filter or using solar disinfection were considered as the appropriate methods to treat water for consumption. As shown in Table 9.2, boiling was the most frequently used method, practiced by 54.3 percent of the total number of households. About 65 percent of the households used any one of the appropriate water treatment methods to treat their drinking water. The estate sector, despite the lowest access to improved water sources (refer section 9.1), showed the highest percent of households (78.8) using an appropriate water treatment method compared to urban (65.4) and rural (63.9) households. There was a wide variation between districts ranging from 54.8 percent in Hambantota to 86.3 percent in Badulla. Approximately one-fourth (24.3 percent) has not used any method to treat drinking water.

The percentage of households that used boiling as a method of making water safe, increased from the lowest wealth quintile to the highest. In some households, more than one method was used.

Table 9.2 Distribution of households according to methods used for ‘making drinking water safe’, by background characteristics*

Background Characteristics	Water treatment method used in the household									Appropriate water treatment method*	Total No of household
	None	Boil	Add bleach/chlorine	Strain through a cloth	Use water filter	Solar disinfection	Let it stand and settle	Other			
Sector	Urban	28.8	55.1	14.5	10.8	5.1	0.3	5.2	0.3	65.4	1520
	Rural	23.1	52.1	9.6	28.3	9.5	0.5	4.9	0.6	63.9	4211
	Estate	18.8	77.6	2.6	17.1	1.5	0.6	2.4	0.0	78.8	340
District	Anuradhapura	14.6	33.4	3.5	39.4	29.8	0.8	2.2	0.8	58.2	601
	Badulla	7.2	84.8	4.5	41.5	4.0	0.0	0.0	0.2	86.3	627
	Colombo	33.2	52.9	10.2	12.5	4.8	0.2	5.0	0.3	59.9	626
	Colombo MC	33.8	55.0	11.5	8.2	2.5	0.0	4.3	0.3	61.9	607
	Hambantota	36.5	46.9	7.2	9.2	8.9	0.5	5.6	0.2	54.8	608
	Jaffna	33.9	34.4	28.5	2.1	0.5	1.6	7.5	0.3	59.1	613
	Kurunegala	14.6	60.4	3.8	48.7	14.7	0.2	0.3	0.6	67.0	631
	Nuwaraeliya	12.0	83.6	5.9	19.7	3.5	0.7	5.7	0.5	85.9	574
	Ratnapura	26.3	57.9	4.6	30.1	2.6	0.0	5.6	0.3	61.4	624
	Trincomale	31.2	32.1	25.9	20.0	8.4	0.4	13.2	1.4	56.4	560
Wealth index quintiles	Poorest	27.7	48.1	12.5	23.7	2.5	0.5	3.9	0.5	59.5	1067
	Second	24.9	50.4	11.4	25.7	5.4	0.6	6.3	0.5	62.2	1118
	Middle	26.8	52.9	9.4	26.0	6.5	0.6	4.5	0.5	62.6	1242
	Fourth	23.4	55.6	9.0	23.5	9.3	0.3	4.2	0.4	66.0	1296
	Richest	19.7	62.5	10.4	18.2	14.3	0.2	5.3	0.6	73.4	1348
7Income group											

Background Characteristics	Water treatment method used in the household									Appropriate water treatment method *	Total No of household
	None	Boil	Add bleach/chlorine	Strain through a cloth	Use water filter	Solar disinfection	Let it stand and settle	Other			
< 9,000	26.3	51.7	10.7	25.2	4.4	0.8	4.5	0.3	61.8	2311	
9,000 – 13,999	25.9	54.8	11.7	22.3	6.0	0.0	4.5	0.6	64.6	1090	
14,000 – 19,999	25.2	52.4	9.2	23.1	9.6	0.3	6.0	0.6	64.3	957	
20,000 – 31,999	21.0	57.6	9.6	20.5	11.0	0.3	5.0	0.6	69.3	1057	
≥ 32,000	14.7	62.9	12.4	24.5	19.7	0.4	6.0	0.6	76.3	502	
Overall	24.3	54.3	10.4	23.3	7.9	0.4	4.8	0.5	65.1	6071	

9.3 Time to source of water

Excluding the households that have water in the premises - (51.0 percent), the amount of time taken by a household member for a 'roundtrip' to obtain water, (from home to the drinking water source and back) is presented in Table 9.3. In nearly one-third of households (32.8 percent), a member spends less than 15 minutes to collect water. The average time to and from the source of drinking water was 9.3 minutes. This was lowest in the urban sector (5.6 minutes) with that for the rural and estate sectors being 9.5 minutes and 12.5 minutes respectively.



Table 9.3. Distribution of households according to time spent to collect drinking water (to and from the source), by background characteristics.

Background Characteristics	Time to source of drinking water				Mean time to source of drinking water (excluding those on premises)	Number of households	
	Water on premises	Less than 15 minutes	15 minutes to less than 30 minutes	More than 30 minutes			
Sector	Urban	82.2	12.8	1.2	0.3	5.9	1520
	Rural	42.7	38.2	8.8	4.2	9.5	4211
	Estate	14.4	46.5	11.5	10.3	12.5	340
District	Anuradhapura	20.5	49.1	10.6	6.2	10.0	601
	Badulla	60.3	25.2	8.5	4.8	12.3	627
	Colombo	87.1	9.9	0.2	0.2	4.6	626
	Colombo MC	90.1	7.4	0.7	0.0	4.3	607
	Hambantota	62.8	27.3	2.1	0.5	5.1	608
	Jaffna	15.5	54.8	12.4	8.3	9.7	613
	Kurunegala	56.4	31.4	7.9	3.0	10.1	631
	Nuwara Eliya	28.4	38.5	11.1	4.7	10.7	574
	Ratnapura	54.5	29.2	8.3	4.0	11.3	624
	Trincomale	30.2	53.4	8.8	4.1	7.8	560
Income group	< 9,000	38.7	40.5	10.9	5.1	10.2	2311
	9,000 – 13,999	49.6	34.7	5.4	3.1	8.7	1090
	14,000 – 19,999	56.8	27.2	5.1	3.1	9.0	957
	20,000 – 31,999	62.5	24.8	4.5	2.0	8.1	1057
	≥ 32,000	77.1	15.1	0.4	1.6	7.1	502
Wealth index quintiles	Poorest	23.7	48.2	13.9	8.7	11.6	1067
	Second	34.0	44.3	10.3	4.7	9.4	1118

Background Characteristics	Time to source of drinking water				Mean time to source of drinking water (excluding those on premises)	Number of households
	Water on premises	Less than 15 minutes	15 minutes to less than 30 minutes	More than 30 minutes		
Middle	46.5	36.9	7.6	2.3	8.4	1242
Fourth	60.4	26.7	3.9	2.3	8.0	1296
Richest	82.0	11.1	1.3	0.9	7.2	1348
Overall	51.0	32.3	7.0	3.6	9.4	6071

9.4. Person collecting water

Table 9.4 presents the distribution of households, by the person who collects water in the household. An adult woman is the person who collects water in a majority (81.8 percent) of the households. In



general, adult men collect water in 15.0 percent of households, while use of either female or male children younger than 15 years for this purpose, was in less than 1 percent of households.

Between sector variation was seen in that in the estate sector, the percentage of men collecting water was much lower.

Between district variations were also seen in the percentage of households where men collected water, in that this value was comparatively higher in Jaffna and Trincomalee districts.

Table 9.4: Distribution of households according to the person collecting water used in the household, by background characteristics

Background Characteristics		Person collecting drinking water					Number of households
		Adult man	Adult woman	Male child (under 15)	Female child (under 15)	Other	
Sector	Urban	15.0	80.0	0.5	1.4	3.1	1520
	Rural	15.8	81.4	0.5	0.5	1.7	4211
	Estate	7.5	88.8	0.4	1.5	1.9	340
District	Anuradhapura	16.8	80.7	0.5	0.5	1.5	601
	Badulla	7.7	88.6	1.3	0.3	2.0	627
	Colombo	2.9	93.5	0.7	0.7	2.2	626
	Colombo MC	10.9	85.9	0.0	3.3	0.0	607
	Hambantota	11.3	87.8	0.4	0.0	0.4	608
	Jaffna	26.8	68.2	0.2	1.1	3.8	613
	Kurunegala	8.4	88.0	0.6	0.8	2.2	631
	Nuwaraeliya	5.5	90.6	0.5	1.0	2.4	574
	Ratnapura	14.0	83.8	0.3	0.6	1.3	624
	Trincomalee	23.4	74.5	0.6	0.4	1.0	560
Income group	< 9,000	15.3	81.4	0.5	0.7	2.1	2311
	9,000 – 13,999	13.0	84.2	0.2	1.2	1.5	1090
	14,000 – 19,999	16.1	82.1	0.7	0.4	0.7	957
	20,000 – 31,999	15.2	81.9	0.7	0.5	1.8	1057
	≥ 32,000	14.3	81.0	0.8	0.0	4.0	502

Background Characteristics	Person collecting drinking water					Number of households	
	Adult man	Adult woman	Male child (under 15)	Female child (under 15)	Other		
Wealth index quintiles	Poorest	16.0	80.5	0.7	1.5	1.3	1067
	Second	16.2	80.6	0.6	0.5	2.1	1118
	Middle	14.5	83.0	0.1	0.4	1.9	1242
	Fourth	13.8	83.2	0.5	0.5	1.9	1296
	Richest	12.9	82.8	0.6	0.3	3.4	1348
Overall		15.0	81.8	0.5	0.7	1.9	6071

9.5. Use of sanitary means of excreta disposal

Use of flush toilets connected to sewage systems, or septic tanks was considered as sanitary means of excreta disposal. As shown in Table 9.5, percent of households using sanitary means of excreta disposal was 88.1. The corresponding rate by sector shows some difference: urban 93.9 percent, rural 86.6 percent and estate 80.3 percent. Trincomalee district reported the lowest of rate of 59.3 percent households using sanitary latrines. The percentage of households with facilities for sanitary disposal of excreta and safe drinking showed a consistent upward trend with increasing income levels and higher wealth quintiles.

Table 9.5 Distribution of households according to the availability of sanitary means of excreta disposal, by background characteristics

Background Characteristics	Type of toilet facility used by household					Percentage of population using sanitary means of excreta disposal *	Number of households	
	Flush	Pit	Temporary	No toilet	Missing			
Sector	Urban	93.9	3.0	0.1	2.0	1.1	93.9	1520
	Rural	86.6	7.8	1.7	3.2	0.7	86.6	4211
	Estate	80.3	5.9	1.2	11.2	1.5	80.3	340
District	Anuradhapura	89.4	3.8	3.2	2.2	1.5	89.4	601
	Badulla	95.7	1.6	0.8	1.8	0.2	95.7	627
	Colombo	97.0	1.0	0.0	0.6	1.4	97.0	626
	Colombo MC	95.1	0.5	0.2	3.5	0.8	95.1	607
	Hambantota	90.6	3.1	2.1	2.0	2.1	90.6	608
	Jaffna	85.0	4.6	1.8	8.6	??	85.0	613
	Kurunegala	92.9	5.7	0.3	0.6	0.5	92.9	631
	Nuwara Eliya	82.2	8.9	1.4	6.1	1.4	82.2	574
	Ratnapura	90.2	5.4	0.6	3.2	0.5	90.2	624
	Trincomalee	59.3	32.7	2.3	5.5	0.2	59.3	560
Income group	< 9,000	82.9	8.4	2.2	5.5	1.0	82.9	2311
	9,000 – 13,999	88.0	7.5	0.8	3.1	0.6	88.0	1090
	14,000 – 19,999	91.4	5.1	1.0	1.4	1.0	91.4	957
	20,000 – 31,999	94.2	4.0	0.2	1.2	0.4	94.2	1057
	≥ 32,000	94.0	4.2	0.2	0.6	1.0	94.0	502
Wealth index quintiles	Poorest	61.9	15.3	6.2	16.0	0.6	61.9	1067
	Second	84.3	11.4	0.8	2.5	1.1	84.3	1118

Background Characteristics	Type of toilet facility used by household					Percentage of population using sanitary means of excreta disposal *	Number of households
	Flush	Pit	Temporary	No toilet	Missing		
Middle	93.6	5.3	0.1	0.4	0.6	93.6	1242
Fourth	96.0	2.6	0.0	0.0	1.4	96.0	1296
Richest	99.2	0.2	0.0	0.0	0.6	99.2	1348
Overall	88.1	6.5	1.3	3.4	0.9	88.1	6071

9.6. Use of improved water sources and sanitary means of excreta disposal

Table 9.6 shows the distribution of households that use both improved sources of drinking water and sanitary means of excreta disposal. At the national level, 64.1 percent of surveyed households reported using both improved water source and sanitary means of excreta disposal. The urban population reported a markedly higher percentage of such households (88.9 percent) compared to the rural sector (57.2 percent), and the estate sector (39.4 percent). The main reason for this discrepancy is the lower access to improved water sources in the rural and estate sectors. Among the districts, Trincomalee (43.1 percent) Kurunegala (45.6 percent) and Nuwara Eliya (49.8 percent) reported less than 50 percent of such households. The availability of both improved water sources and sanitary means of excreta disposal within a given household increased from 61.2 percent in the lowest to poorest to 99.2 percent in the highest wealth quintile. A similar trend was seen with increasing levels of income.

Table 9.6. Distribution of households using both improved drinking water sources and sanitary means of excreta disposal, by background characteristics

Background Characteristics		Percentage of household population using improved sources of drinking water *	Percentage of household population using sanitary means of excreta disposal **	Percentage of household population using improved sources of drinking water and using sanitary means of excreta disposal	Number of household
Sector	Urban	94.7	93.9	88.9	1520
	Rural	66.1	86.6	57.2	4211
	Sector	48.2	80.3	39.4	340
District	Anuradhapura	60.7	89.4	54.4	601
	Badulla	59.8	95.7	57.9	627
	Colombo	88.7	97.0	86.6	626
	Colombo MC	99.7	95.1	94.7	607
	Hambantota	87.3	90.6	79.6	608
	Jaffna	86.5	85.0	73.6	613
	Kurunegala	47.7	92.9	45.6	631
	Nuwara Eliya	59.6	82.2	49.8	574
	Ratnapura	56.6	90.2	53.5	624
	Trincomalee	76.4	59.3	43.6	560
Income group	< 9,000	65.7	82.9	54.8	2311
	9,000 – 13,999	73.5	88.0	64.5	1090
	14,000 – 19,999	74.1	91.4	68.2	957
	20,000 – 31,999	77.7	94.2	73.2	1057
	≥ 32,000	85.1	94.0	80.9	502

Background Characteristics		Percentage of household population using improved sources of drinking water *	Percentage of household population using sanitary means of excreta disposal **	Percentage of household population using improved sources of drinking water and using sanitary means of excreta disposal	Number of household
Wealth index quintiles	Poorest	62.7	61.9	38.2	1067
	Second	64.4	84.3	53.4	1118
	Middle	68.4	93.6	63.8	1242
	Fourth	74.1	96.0	70.8	1296
	Richest	88.1	99.2	87.5	1348
Overall		72.2	88.1	64.1	6071

Chapter 10

Food Security and Coping Strategies

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life²¹. Food security includes at a minimum (1) the ready availability of nutritionally adequate and safe foods, and (2) an assured ability to acquire acceptable foods in socially acceptable ways, that is, without resorting to emergency food supplies, scavenging, stealing, or other coping strategies²². In the present study, the food security has been studied by focusing on three dimensions: food utilization: food access and food availability.

10.1 Food utilization

10.1.1 Meal frequency

Table 10.1 shows that approximately 98 percent of the household members aged 5-17 and 18-59 years, and 95 percent of those aged 60 years and above, consume 3 or more main meals a day. The meal frequency rates do not vary markedly between sub-groups.

Table 10.1 Percentage of household members who consume three or more main meals a day by background characteristics

Background Characteristic	5-17 years		18-59 years		60 years or above	
	male	female	male	female	male	female
No. of members in family						
1-3	96.3	97.6	97.0	96.4	91.2	89.6
4-6	98.0	97.7	97.8	97.9	95.2	96.1
≥ 7	97.4	96.3	97.5	97.0	95.5	97.9
Sector						
Urban	99.6	99.1	98.5	98.6	97.2	97.3
Rural	97.3	97.1	97.2	97.0	92.4	92.7
Estate	95.1	96.2	97.7	97.8	100.0	98.4
District						
Anuradhapura	97.7	97.6	98.7	98.0	88.5	89.8
Badulla	98.1	98.1	96.8	97.1	91.3	94.9
Colombo	100.0	99.5	99.7	99.5	97.9	98.5
Colombo MC	99.1	98.8	98.0	98.4j	96.4	96.6
Hambantota	97.8	97.7	98.4	98.4	97.5	97.3
Jaffna	97.4	96.1	93.6	93.3	84.7	85.5
Karunegala	97.9	98.7	98.4	97.7	98.9	97.2
Nuwara Eliya	94.7	96.8	97.6	97.7	96.4	99.0
Ratnapura	99.1	97.0	98.4	99.0	95.5	94.7
Trincomalee	96.0	94.4	94.8	94.9	94.6	84.4
Monthly household income (LKR)						
< 9,000	96.5	95.8	95.3	95.2	90.6	89.5
9,000 – 13,999	98.0	98.0	98.2	98.0	94.4	95.7

²¹ FAO

²² USDA

Background Characteristic	5-17 years		18-59 years		60 years or above	
	male	female	male	female	male	female
14,000 – 19,999	98.0	97.7	98.4	98.6	96.8	96.9
20,000 – 31,999	98.7	99.5	99.4	99.5	95.1	97.9
≥ 32,000	100.0	98.7	99.8	99.2	99.0	99.2
Wealth quintile						
Poorest	95.0	92.9	93.3	92.2	86.4	85.7
Second	97.7	97.9	97.2	97.0	92.2	89.0
Middle	97.6	98.7	98.1	98.4	91.6	94.3
Fourth	98.6	98.5	98.7	98.7	96.0	98.4
Richest	99.8	99.2	99.3	99.6	99.1	99.0
Overall %	97.8	97.5	97.6	97.5	94.1	94.5
Total No.	2187	2313	5434	5577	801	1085

10.1.2. Household food consumption

The food items consumed by households were grouped into 11 categories based on the FAO classification of food groups(REF) . The list was modified by adding coconut and sugar separately. These food groups were used in assessing the food consumption pattern as shown in Tables 10.2 and 10.3.

Table 10.2 provides information on food items consumed within 24 hours preceding the survey. Consumption of rice and rice products and sugar was nearly 100 percent and consistent across all sub groups studied. Coconuts were used by 97.9 percent of households with no major differences between sub groups. Bread and wheat products were consumed by 60.7 percent of all households, with the estate sector being shown as high consumers (81.5 percent) and rural sector as low (50.0 percent) . Inter district differentials were marked ranging from a low value of 35.2 percent in Hambantoata to a high value of 71.6 percent in Nuwara Eliya.

Only 61.8 percent of households consumed nuts/pulses, with a higher percentage in the urban sector (68.7 percent). This percentage varied widely between districts ranging from 56.2 percent in Anuradhapura to 71.5 percent in Jaffna. A majority of households consumed vegetables (87.9 percent), with marginally lower rates in the estate sector (78.5 percent) and in Ratnapura district (80.6 percent). There was no consistent pattern in consumption of vegetables seen in relation to income and wealth indicators.

Of all households, 82.5 percent consumed meat/ poultry/ fish or dry fish, and this percentage showed a marked variation across sectors, income and wealth categories. Of the poorest households, 70.4 percent consumed foods of this food group compared to 93.6 percent in the richest. Jaffna (64.1 percent) and Nuwara Eliya (65.8 percent) reported lower rates than the other districts. Consumption of eggs was the lowest (35.7 percent overall) across all strata, however the percentages in the districts of Jaffna (53.4 percent) and Trincomalee (57.2 percent) were comparatively high. Only 66.7 percent of households consumed fruits, with the percentage being lower in the estate sector (40.8 percent) and in the districts of Nuwara Eliya (54.9 percent) and Jaffna (51.9 percent). An increasing trend of consumption of fruits was seen with increasing levels of income and higher wealth quintiles.

The percentages of households that consumed milk and milk products was 81.2 . Lower rates of consumption were seen in Jaffna (55.8 percent) and Trincomalee (48.1 percent). Consumption of oils and fats were 84.2 percent and was high across most strata.

Table 10.2 Types of food consumed by households during the 24 hours preceding the survey, by background characteristics

Background Characteristic	Food Groups										
	Rice/ rice products	Bread/ wheat products	Nuts/ pulses	Vegetables/ leaves	Fruits	meat/ poultry/ fish/ dry fish	eggs	milk/ dairy products	oils/fats	Coco nut	Sugar / jugger y
No. of members in family											
1-3	99.0	60.1	61.3	87.0	66.5	80.0	36.5	78.3	79.1	97.7	98.7
4-6	99.6	59.7	61.4	88.0	67.0	83.2	34.7	82.3	85.7	98.1	99.3
≥ 7	99.7	67.3	65.7	89.8	65.5	84.7	38.9	81.9	87.3	97.7	99.1
Sector											
Urban	99.1	77.3	68.7	88.4	72.3	88.7	36.1	88.5	84.3	98.7	99.6
Rural	99.6	50.0	59.3	88.5	66.3	82.0	36.1	77.6	83.0	97.9	98.9
Estate	98.8	81.5	61.2	78.5	40.8	58.8	28.2	82.1	96.4	94.4	98.5
District											
Anuradhapura	99.8	35.6	56.2	88.9	66.7	85.7	31.2	81.5	90.8	99.3	99.7
Badulla	99.7	53.7	55.6	91.3	72.1	72.6	21.7	89.9	96.1	91.0	98.7
Colombo	99.4	65.5	75.5	88.8	78.4	91.6	34.8	91.8	78.1	98.6	99.2
Colombo MC	98.7	88.9	67.7	86.0	67.9	89.9	36.9	94.8	90.9	99.0	99.8
Hambantota	100.0	35.2	56.9	90.2	68.0	89.0	33.2	87.4	72.5	100.0	99.8
Jaffna	98.3	66.8	71.5	92.6	51.9	64.1	53.4	55.8	89.6	97.5	99.2
Karunegala	100.0	46.2	56.1	86.7	65.0	89.1	27.3	77.4	74.0	99.4	99.0
Nuwara Eliya	99.3	71.6	56.1	83.1	54.9	65.8	28.5	83.9	96.0	97.2	98.4
Ratnapura	100.0	38.0	65.8	80.6	64.4	81.7	25.6	87.5	74.9	99.0	98.9
Trincomalee	99.3	68.8	54.6	91.0	69.0	89.7	57.1	48.1	76.5	98.6	98.0
Monthly household income											
< 9,000	99.0	58.3	57.5	86.7	60.2	74.2	34.4	71.4	82.0	96.8	98.8
9,000 – 13,999	99.6	63.3	60.5	85.1	63.7	84.6	36.3	78.8	84.4	97.9	99.3
14,000 – 19,999	99.8	63.7	60.2	90.1	68.4	87.3	35.8	84.8	85.7	98.8	99.5
20,000 – 31,999	100.0	59.5	64.6	90.0	75.6	88.8	36.9	89.8	86.0	99.2	99.3
≥ 32,000	99.4	60.6	78.2	92.3	77.9	93.1	37.8	90.4	88.2	99.0	99.2
Wealth quintile											
Poorest	99.1	62.1	56.1	84.7	51.2	70.4	36.9	60.7	82.6	96.0	98.1
Second	99.1	62.9	56.3	85.4	60.3	75.7	36.3	69.2	82.5	96.9	99.0
Middle	99.3	57.6	60.2	89.1	64.3	80.2	33.8	81.9	82.1	98.5	99.6
Fourth	99.8	58.3	63.7	88.3	70.6	87.7	35.1	86.9	85.9	98.4	99.0
Richest	99.9	62.8	70.1	91.0	78.7	93.6	36.4	92.0	86.8	99.4	99.6
Overall %	99.5	60.7	61.8	87.9	66.7	82.5	35.7	81.2	84.2	97.9	99.1
Total No. of households	6045	4301	5752	5983	5269	5716	4366	4419	5547	6038	6029

Information on the consumption of different foods for at least 5 days during the week preceding the survey is shown in Table 10.3. This information indicated the consistency of consumption of the foods and shows important differences from the Table 10.2 which focused on the consumption pattern during the 24 hours preceding the survey.

Similar to the 24-hour consumption pattern, rice, coconut and sugar were consumed by more than 95 percent of the households. However, the consumption of food groups such as bread and wheat products, nuts and pulses, fruits, meat/poultry/fish and dry fish, eggs, and milk/dairy products were markedly lower during 7-day period.

Marked increase in the consumption of fruits, meat/poultry/fish and dry fish and dairy products was seen with increasing income and wealth. Consumption of bread and wheat products is low in the rural sector (11.9 percent) and in the districts of Hambantota (4.9 percent), Anuradhapura (5.3 percent) and Ratnapura (9.1 percent). Conversely, high consumption rates of bread and wheat products were seen in Colombo MC area (71.5 percent) and in Nuwara Eliya (41.6 percent). Other major differences that can be highlighted from the Table 10.3 were: relatively lower rates of meat/poultry/fish and dry fish and fruits in the estates and Jaffna districts, low rates of consumption of fats and oils in the districts of Hambantota (36.6 percent) and Ratnapura (39.3 percent) and high consumption in in Badulla (88.0 percent) and Nuwaraeliya (84.3 percent). Except in Colombo and Colombo MC, regular consumption of milk/dairy products was relatively low.

Table 10.3 Foods consumed by households for at least 5 days during the week preceding the survey, by background characteristics

Background Characteristic	Rice/ rice products	Bread/ wheat products	Nuts /pulses	Vegetables/ leaves	Fruits	Foods meat/ poultry/ fish/ dry fish	eggs	milk /dairy products	oils/fats	Coco nut	Sugar / jugger y
No. of members in family											
1-3	97.5	21.8	20.6	72.4	28.4	44.8	6.8	49.7	51.0	93.2	95.2
4-6	98.0	23.8	24.1	76.2	29.0	51.0	6.7	55.5	63.3	95.7	96.6
≥ 7	97.9	32.8	26.8	73.6	30.6	48.8	8.2	57.8	66.9	95.0	96.5
Sector											
Urban	98.2	50.6	34.3	72.8	37.7	56.9	8.0	75.8	62.0	97.8	97.2
Rural	97.6	11.9	18.8	76.8	27.2	48.3	6.6	46.4	57.7	94.7	95.9
Estate	98.5	58.2	33.5	60.6	12.9	23.8	5.6	54.4	86.8	86.1	95.3
District											
Anuradhapura	98.0	5.3	13.0	78.2	28.1	54.7	5.5	52.4	76.7	96.5	94.3
Badulla	98.4	16.1	18.3	86.3	38.4	33.2	5.6	61.9	88.0	79.2	97.4
Colombo	98.4	35.2	43.5	72.5	45.0	67.7	6.4	81.6	52.7	98.1	97.4
Colombo MC	98.5	71.5	32.8	74.0	35.1	57.3	9.1	87.0	68.9	98.8	98.5
Hambantota	99.7	4.9	15.3	83.4	26.2	70.4	3.3	56.3	36.6	99.2	93.4
Jaffna	96.5	23.1	28.1	66.0	7.8	22.6	12.5	12.7	59.9	98.3	96.5
Karunegala	98.9	12.4	21.2	79.1	31.9	56.7	4.3	53.1	46.6	98.6	99.4
Nuwara Eliya	96.3	41.6	28.7	68.5	25.6	30.7	5.6	57.5	84.3	91.3	95.3
Ratnapura	98.6	9.1	24.4	72.1	23.7	47.8	2.2	49.8	39.3	96.5	97.9
Trincomalee	94.6	24.6	8.2	67.3	27.5	48.0	15.4	26.8	52.1	93.2	91.3
Monthly household income											
< 9,000	97.0	19.3	17.9	72.0	18.3	35.8	5.8	36.6	56.2	91.7	95.3
9,000 – 13,999	98.1	27.6	21.8	73.2	28.2	46.7	7.2	53.0	61.8	96.3	97.1
14,000 – 19,999	97.9	27.6	21.8	77.7	30.2	56.8	6.4	64.7	61.1	97.6	96.3

Background Characteristic	Rice/ rice products	Bread/ wheat products	Nuts /pulses	Vegetables/ leaves	Fruits	Foods meat/ poultry/ fish/ dry fish	eggs	milk /dairy products	oils/fats	Coco nut	Sugar / jaggery
20,000 – 31,999	99.2	26.8	29.9	77.6	41.9	63.8	8.7	72.8	65.5	97.7	97.4
≥ 32,000	98.6	28.3	41.1	82.4	51.9	70.3	9.0	78.6	70.9	97.4	96.6
Wealth quintile											
Poorest	95.2	22.3	17.1	67.8	13.8	30.8	6.5	26.3	57.0	89.2	94.0
Second	96.4	21.0	17.0	69.4	19.6	36.5	6.6	37.6	57.0	92.2	95.4
Middle	98.6	23.7	20.3	76.1	26.0	46.4	6.2	52.5	60.3	95.8	96.5
Fourth	98.8	23.6	24.9	77.4	32.1	55.5	5.4	65.5	62.7	97.3	97.1
Richest	99.4	29.5	35.5	81.4	48.7	70.1	9.5	80.7	63.6	98.9	97.5
Overall %	97.8	24.2	23.5	74.9	29.0	49.1	6.9	54.2	60.4	95.0	96.2
Total No.	5933	1469	1424	4540	1761	2975	418	3287	3661	5758	5835

10.1.3. Household dietary diversity

Household dietary diversity is a proxy measure of households consuming a variety of food indicating a nutritionally ‘satisfactory’ diet. All food items were categorized under 11 food groups as given below. were used to calculate the household dietary diversity score (HDDS)** A dietary diversity score was derived by adding 1 point for each of the 11 broad food groups consumed within 24 hours before survey²³.

- 1 Cereals (Rice, rice products, wheat and wheat products)
1. Pulses, Legumes and nuts
2. Vegetables
3. Fruits
4. Fish and seafood
5. Eggs
6. Meat, poultry, and offal
7. Milk and milk products
8. Oils and fats
9. Coconut
10. Sugar and honey

** Total HDDS was based on the above 11 food groups. (instead of 12 food groups as given in FANTA method). Coconut was placed with roots and tubers’ considering the high consumption pattern in SL and miscellaneous group was not considered due to lack of data

Table 10.4 indicates that the mean HDDS for the total group was 7.8 with a marginally lower value in the estate sector (7.5). The values ranged from 7.2 in the lowest income group to 8.7 in the highest income group. Among the districts, the lowest score was seen in Jaffna (7.2) with the highest

²³ Anne Swindale & Paula Bilinsky Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access: Indicator Guide VERSION 2 September 2006)

value of 8.8 in Colombo MC area. The score showed higher values with increasing levels of income and wealth quintiles.

The HDDS obtained by the households in the highest income category (8.7) was taken as the ‘target’ to be achieved and the percentage of households yet to achieve the target was calculated. For the total sample, the percentage of households yet to achieve the target was 63.5 and, higher in the estate sector (74.4 percent) compared to the urban sector (43.4 percent). The value varied from 35.1 percent in the Colombo MC area to 77.6 percent in Ratnapura and 77.2 percent in Jaffna. The percentage showed a consistent decline with increasing income and wealth quintiles.

Table 10.4 Household dietary diversity score (HDDS) according to background characteristics

Background Characteristic	Household diversity score		% of households yet to achieve the target	No of households
	mean	SD		
No. of members in Household				
1-3	7.6	1.8	68.2	1627
4-6	7.9	1.6	62.7	3787
≥ 7	8.1	1.7	56.8	657
Sector				
Urban	8.5	1.6	43.4	1520
Rural	7.6	1.7	69.9	4211
Estate	7.5	1.6	74.4	340
District				
Anuradhapura	7.7	1.5	69.1	601
Badulla	7.7	1.6	64.6	627
Colombo	8.5	1.5	43.6	626
Colombo MC	8.8	1.4	35.1	607
Hambantota	7.5	1.5	74.2	608
Jaffna	7.2	1.9	77.2	613
Karunegala	7.7	1.6	67.0	631
Nuwara Eliya	7.6	1.7	69.3	574
Ratnapura	7.2	1.6	77.6	624
Trincomalee	8.2	1.7	57.5	560
Monthly household income				
< 9,000	7.2	1.8	76.2	2311
9,000 – 13,999	7.8	1.5	67.0	1090
14,000 – 19,999	8.1	1.5	57.4	957
20,000 – 31,999	8.4	1.5	50.0	1057
≥ 32,000	8.7	1.5	36.1	502
Wealth quintile				
Poorest	6.9	1.8	81.3	1067
Second	7.4	1.7	74.1	1118
Middle	7.7	1.6	68.9	1242
Fourth	8.1	1.6	57.3	1296
Richest	8.6	1.4	41.8	1348
overall	7.8	1.7	63.5	6071

10.2. Food access at household level

USAID defines food access as individuals having adequate income or other resources to purchase or barter to obtain levels of appropriate food needed to maintain consumption of an adequate diet / nutrition level (REF). This section describes the available sources of information relevant to food access.

10.2.1. Food sources

The two main ways in which the households accessed food were through purchase and by producing the food items on their own. The main items that were produced by themselves were: fruits (21.8 percent), coconuts (20.7 percent), rice (20.2 percent) and vegetables (17.9 percent).

Table 10.5 Distribution of households by the main source through which different food groups were available

Background Characteristic	Food Groups											
	Rice / rice products	Bread/ wheat products	Nuts /pulses	Vegetables/ leaves	Fruits	meat/poultry	fish	eggs	milk/dairy products	Oils/fats	Coco nut	Sugar/Juggery
Main source												
Own production	20.2	1.2	2.3	17.9	21.8	0.6	1.6	7.2	2.3	6.6	20.7	0.7
Purchase	72.3	93.0	89.5	77.4	73.2	93.4	92.9	86.5	88.9	87.1	73.7	91.7
Purchase on credit	3.3	2.4	2.9	1.1	0.4	1.0	2.4	1.4	2.0	2.2	1.9	3.0
Traded goods or services	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Borrowed	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0
Gift from family or relatives	1.3	0.6	0.9	1.0	1.7	1.0	0.9	0.7	0.8	0.5	1.3	0.4
Food aid	1.7	0.4	2.0	0.1	0.1	0.1	0.2	0.1	0.2	0.4	0.2	1.3
Cash assistance	0.1	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Other	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0

10.2.2 Expenditure on food and other goods and services

Information on household expenditure for a one-month period is presented under six broad categories, (1) food (2) liquor/tobacco (3) utility/services (4) health (5) education and (6) productive assets. The proportion of expenditure on food provides an indication related to the vulnerability of the household to food price increase. Considering all households included in the study, 37.9 percent of the total household monthly income was spent on food, and 43.6 percent on productive assets (Table 10.6).

Percentage expenditure on food decreased with increasing number of family members. This percentage was high in the estate sector (60.6 percent) and was nearly double that of the urban sector (32.4 percent). Inter district variations were wide, ranging from 23.1 percent in Badulla to 70.3 percent in Jaffna. This percentage decreased with increasing levels of education of the head of the household and increasing levels of income indicators.

Table 10.6. Percentage of monthly household expenditure on major expenditure items, by background characteristics

Background characteristic	Percentage of monthly expenditure on major expenditure items in LKR						Total monthly expenditure (LKR)	No. of households
	food	liquor/to bacco	Utility services	health	education	productive assets		
No. of members in family								
1-3	51.5	4.2	11.8	6.0	3.3	23.1	18510	393
4-6	37.6	3.7	8.2	4.0	3.1	43.3	29702	1600
≥ 7	39.9	2.8	8.6	4.0	3.1	41.6	37359	405
Residence								
Urban	32.4	2.1	10.3	3.5	3.4	48.3	40006	558
Rural	41.1	3.9	7.6	4.3	3.1	40.0	27360	1650
Estate	60.6	5.6	10.2	7.3	3.5	12.9	16031	190
District								
Anuradhapura	31.8	2.7	6.8	2.3	2.1	54.2	32844	227
Badulla	23.1	1.9	3.8	2.1	1.9	67.2	43302	229
Colombo	42.4	6.3	14.8	5.6	5.2	25.7	27728	228
Colombo MC	53.5	5.2	18.1	5.4	5.5	12.1	25118	235
Hambantota	17.8	2.2	3.2	1.3	1.4	74.1	57186	243
Jaffna	70.3	4.5	8.6	4.9	3.7	8.1	19937	236
Kurunegala	37.5	3.3	8.8	5.6	4.5	40.3	29278	208
Nuwara Eliya	50.2	5.8	10.1	6.3	3.5	24.1	18890	272
Ratnapura	45.3	7.1	9.0	5.3	4.7	28.6	20734	238
Trincomalee	44.1	3.5	8.4	5.3	2.5	36.3	34311	282
Education of Head of the household								
No schooling	71.5	4.0	10.3	8.2	3.8	2.2	16954	79
Primary	59.0	5.9	8.8	5.2	2.9	18.2	18200	336
Secondary	47.3	4.0	8.3	5.1	3.5	31.9	24347	876
Passed O' Level	42.7	3.8	9.7	4.3	3.9	35.5	26413	935
Higher	25.6	2.6	8.4	3.4	3.0	57.0	49734	57
Monthly household income								
< 9,000	60.3	5.1	7.9	5.4	3.6	17.8	16991	891
9,000 – 13,999	56.8	5.2	10.9	6.5	4.1	16.4	19812	471
14,000 – 19,999	46.9	5.2	10.6	4.7	3.6	28.9	25494	384
20,000 – 31,999	35.0	2.8	9.9	4.0	3.7	44.6	36806	424
≥ 32,000	19.1	2.4	8.0	2.7	2.7	65.0	77037	186
Wealth quintile								
Poorest	63.4	5.8	7.4	5.7	3.4	14.3	16382	580
Second	60.4	5.5	9.8	6.0	4.1	14.2	18227	486
Middle	52.2	4.0	10.0	6.1	3.8	24.0	21493	422
Fourth	35.8	3.4	8.8	3.6	3.4	45.0	33481	439
Richest	23.7	2.8	7.9	2.9	2.7	60.0	56191	471
Overall	37.9	3.4	8.1	4.0	3.1	43.6	30446	2398

Variations in the percentage of expenditure on different food items showed that the highest percentage of 55.2 was spent on cereals/roots and tubers (Table 10.7), with this value being 13.2 percent for meat/poultry and fish. Expenditure on all other food items were less than 10 percent.

Expenditure on cereals/roots/tubers was higher in household with more than 7 members (59.5 percent). Variations between sectors were seen, with this value being higher in households with more members. This percentage was highest in the estate sector (60.9 percent), and in the districts of Jaffna (65.6 percent) and Ratnapura (57.9 percent). Lowest percentage for such expenditure was in Anuradhapura (33.5 percent). A decline in this percentage was seen with increasing levels of income.

Expenditure on meat/poultry/fish for the total sample was 13.2 percent, with the highest percentage in Colombo MC area (23.2 percent). Inter-sectoral differences in the expenditure pattern was marked in that, comparison of the urban and estate sectors show that the estate sector spends a lower percentage on meat/poultry/fish (4.4 percent) compared to the urban sector (15.4 percent).

Table 10.7. Percentage of expenditure on broad food groups, by background characteristics

Background Characteristic	percentage of expenditure on Food Groups									
	cereal s/roots Tubers	Nuts /pulses	vegetables	fruits	meat/ poultry/fish	eggs	milk/ diary products	oils/ fats	Coco nut	Sugar
No. of members in family										
1-3	49.7	5.1	7.2	4.3	15.5	1.3	5.8	2.9	4.8	3.4
4-6	54.7	5.1	7.2	3.9	12.6	1.1	4.4	2.8	4.4	3.7
≥ 7	59.5	4.6	5.2	3.4	13.2	1.0	3.6	2.7	3.6	3.2
Sector										
Urban	50.5	4.9	7.5	5.7	15.4	1.2	5.0	2.7	3.7	3.3
Rural	56.1	5.0	6.5	3.3	12.9	1.1	4.3	2.8	4.3	3.6
Estate	60.9	2.9	10.0	4.0	4.4	2.0	3.0	4.8	2.7	5.2
District										
Anuradhapura	33.5	8.1	12.1	6.8	17.8	1.3	6.0	5.1	5.6	3.8
Badulla	56.1	7.1	13.7	3.6	4.9	0.9	5.7	2.6	2.6	2.9
Colombo										
Colombo MC	39.5	6.9	9.8	7.0	23.2	0.7	5.0	1.9	2.7	3.3
Hambantota	38.0	6.5	14.4	7.1	14.3	1.1	6.9	2.5	5.7	3.5
Jaffna	65.6	3.8	3.8	2.5	8.6	0.9	3.8	2.7	4.6	3.7
Karunegala	56.2	6.0	4.4	2.5	15.5	1.3	5.3	2.3	3.6	2.8
Nuwara Eliya										
Ratnapura	57.9	5.1	13.4	4.2	4.9	0.9	2.7	2.8	3.8	4.2
Trincomalee	51.2	4.8	6.0	3.3	19.5	1.3	3.9	2.8	3.8	3.5
Monthly household income										
< 9,000	60.9	4.6	5.8	2.8	10.5	1.0	3.8	2.7	4.4	3.6
9,000 – 13,999	53.1	5.4	7.1	3.6	14.3	1.2	4.3	3.1	4.4	3.6
14,000 – 19,999	45.7	5.9	8.7	4.3	17.7	1.4	5.7	3.1	4.2	3.4
20,000 – 31,999	48.5	5.4	8.5	4.7	16.4	1.3	5.0	2.8	3.9	3.4
≥ 32,000	47.4	4.9	6.7	7.2	17.5	1.1	6.0	2.8	3.1	3.4
Wealth quintile										
Poorest	64.1	4.2	4.8	2.4	10.3	0.9	3.3	2.5	4.1	3.4
Second	56.0	5.3	6.6	3.0	12.8	1.2	4.0	3.2	4.2	3.7
Middle	52.3	5.1	7.4	3.2	15.4	1.1	4.9	3.0	4.2	3.4
Fourth	45.9	6.1	9.0	5.6	15.6	1.3	5.7	2.7	4.7	3.4
Richest	44.8	5.0	9.0	6.3	17.0	1.4	5.9	2.9	4.1	3.6
Overall	55.2	5.0	6.7	3.8	13.2	1.1	4.4	2.8	4.2	3.5

* Data for some food items for Colombo and Nuwara Eliya district were not available.

10.3. Food Availability at household level

To maintain food availability, sufficient quantities of appropriate, necessary types of food from domestic production, purchases or donors have to be consistently available to individuals or are within reasonable proximity to them.

10.3.1 Adequate household food provisioning

The number of months of adequate household food provisioning (MAHFP) was calculated to ensure that food is available above a minimum level the year round and is given by the total number of months out of the previous 12 months that the household was unable to meet their food needs. Table 10.8 gives the percentage of households who reported that they did not have adequate food for a period of time during the preceding 12 months by selected variables. For the total sample, this percentage was 31.6 with this percentage being high in the estate sector (55.9 percent) and in Jaffna district (58.2 percent).

The target to be achieved for MAHFP was considered as 12 months and the percentage of households below the target, were studied in relation to the sub groups. For the total sample, the percentage of households yet to achieve the target was 12.5 percent. This percentage in the estate sector (25.8 percent) was more than double that of the rural sector (12.5 percent). Badulla and Jaffna districts showed higher percentages, 23.3 and 20.0 percent respectively. There was a consistent decline with increasing levels of education of the head of the household and with both indicators of income and wealth.

Table 10.8 Percentage of households with ‘inadequate food’ within the previous 12 months, and months of adequate household food provisioning (MAHFP) by background characteristics

Background characteristic	% household s with ‘inadequate food’ during past 12 months	Average MAHFP	% yet to achieve the target	No. of Households
No. of members in family				
1-3	29.2	10.5	12.1	1627
4-6	31.9	10.5	12.7	3787
≥ 7	35.6	10.3	14.2	657
Residence				
Urban	20.8	10.8	10.0	1520
Rural	33.5	10.5	12.5	4211
Estate	55.9	8.9	25.8	340
District				
Anuradhapura	23.3	11.3	5.8	631
Badulla	41.8	9.2	23.3	574
Colombo	17.2	10.9	9.2	601
Colombo MC	16.5	10.8	10.0	560
Hambantota	23.1	11.2	6.7	626
Jaffna	58.2	9.6	20.0	607
Kurunegala	25.1	10.7	10.8	613
Nuwara Eliya	40.4	10.7	10.8	627
Ratnapura	33.5	9.8	18.3	624
Trincomalee	37.3	10.7	10.8	608
Education of household Head				
No schooling	69.1	8.8	26.7	143
Primary	55.3	9.9	17.5	648
Secondary	39.1	10.4	13.3	903
Passed O’ Level	32.2	11.0	8.3	1479
Higher	13.2	11.9	0.8	541
Monthly household income				
< 9,000	47.9	9.6	20.0	1067
9,000 – 13,999	33.3	10.5	12.5	1118
14,000 – 19,999	21.8	11.0	8.3	1242
20,000 – 31,999	13.9	11.5	4.2	1296
≥ 32,000	6.8	11.8	1.7	1348
Wealth quintile				
Poorest	63.6	8.6	28.3	1067

Background characteristic	% households with 'inadequate food' during past 12 months	Average MAHFP	% yet to achieve the target	No. of Households
Second	45.3	10.0	16.7	1118
Middle	30.4	10.6	11.7	1242
Fourth	18.4	11.2	6.7	1296
Richest	8.6	11.6	3.3	1348
Overall	31.6	10.5	12.5	6071

10.3.2. Food stocks

An assessment of the size of food stocks was made based on the response of each household, in comparison to the availability of food stocks during the previous year. Considering the 2 groups with “less food” and “much less food” together, the percentage of households that did not have adequate food stocks was 40.5 percent for all households, with no clear inter-district differentials (Table 10.9). A consistent declining trend in this percentage was seen with increasing levels of education of the head of the household, income and wealth.

The mean number of days for which the current food stocks would be adequate, showed a higher value for the estate sector (7.1 days), the lowest value for Colombo MC area (4.6 days). An upward trend in the number of days was seen with increasing levels of education of the head of the household, income and wealth.

Table 10.9 Distribution of households by availability of food stocks, by background characteristics

background characteristic	Size of food stock compared to last year				mean No. of days current food stock last	No. of households
	more (%)	same (%)	less (%)	much less (%)		
No. of members in family						
1-3	12.7	46.2	32.1	8.1	6.2	1340
4-6	20.8	39.8	30.5	8.6	6.0	3312
≥ 7	23.0	33.8	35.1	7.5	5.2	534
Sector						
Urban	16.3	44.1	31.0	8.6	5.9	1520
Rural	16.8	39.6	32.3	8.3	5.8	4211
Estate	31.4	23.4	35.6	9.3	7.1	340
District						
Anuradhapura	20.1	42.5	32.5	3.4	6.3	601
Badulla	22.7	36.1	28.4	12.8	6.8	627
Colombo	14.5	46.0	29.3	10.1	6.4	626
Colombo MC	11.8	43.1	36.7	8.5	4.6	607
Hambantota	21.4	46.8	30.3	1.0	4.8	608
Jaffna	5.3	42.4	35.8	6.6	5.3	613
Kurunegala	20.5	41.8	26.4	11.4	5.5	631
Nuwara Eliya	23.2	29.8	36.7	9.1	7.0	574
Ratnapura	17.4	36.7	33.8	11.9	6.2	624
Trincomalee	17.7	31.5	32.5	9.1	5.8	560
Education of household Head						
No schooling	24.5	16.3	34.7	18.4	3.8	55
Primary	20.1	29.9	31.8	13.0	3.8	161
Secondary	18.5	31.0	35.9	12.0	5.5	684
Passed O' Level	24.4	36.0	31.7	6.1	6.0	743
Higher	24.0	43.8	27.0	4.3	7.6	446
Monthly household income						

background characteristic	Size of food stock compared to last year				mean No. of days current food stock last	No. of households
	more (%)	same (%)	less (%)	much less (%)		
< 9,000	12.6	35.2	37.4	11.9	4.5	2311
9,000 – 13,999	18.8	37.5	33.3	8.9	5.6	1090
14,000 – 19,999	18.6	40.8	32.3	6.3	6.7	957
20,000 – 31,999	21.2	47.0	25.8	5.2	7.2	1057
≥ 32,000	24.8	49.1	21.8	3.5	8.4	502
Wealth quintile						
Poorest	15.3	32.2	34.9	12.8	4.0	1067
Second	16.3	33.0	35.8	11.8	5.2	1118
Middle	17.7	36.0	36.0	8.5	5.7	1242
Fourth	17.0	44.8	30.9	6.1	6.3	1296
Richest	20.5	50.0	24.7	4.5	7.5	1348
Overall	17.5	39.8	32.1	8.4	5.9	6071

10.3.2. Food aid

A variety of programmes provided food aid. Of the total sample, 63.6 percent were not beneficiaries under any of the food aid programmes (Table 10.10). This percentage was higher in the estate sector (82.1 percent). There was a clear upward trend in the percentage who did not receive food aid with higher level of income and wealth.

The target populations of the different food aid schemes vary, hence comparisons have major limitations. The mean number of times over the preceding 6 months the households benefitted from a range of food aid programmes varied between 2 to 5. These programmes included WFP/General Assistance, *Samurdhi*, Food basket, Corn Soya Blend, *Thripasha* and food for work. Feeding Programmes which are targeted at school children had been provided much more frequently, 70.6 times during the previous 6 months.

Table 10.10 Average number of times a household received food aid in the last 6 months, by background characteristics

Characteristic	Percent not received any food aid	Type of food aid (mean no. of times per 6 month)								No. of households
		WFP /GA	<i>Samurdhi</i>	Food Basket	CSB	<i>Thripasha</i>	Food for work	School feeding	Other	
No. of members in family										
1-3	68.6	4.0	4.2	4.6	5.1	2.6	0.0	65.2	4.8	1627
4-6	62.2	3.9	4.1	3.9	4.8	2.5	1.0	65.5	3.3	3787
≥ 7	59.3	4.5	3.9	5.3	4.4	2.4	6.0	97.1	3.7	657
Sector										
Urban	76.3	3.6	3.6	1.7	3.1	2.3	0.0	55.7	1.9	1520
Rural	57.5	4.1	4.2	4.3	5.0	2.6	3.5	71.5	4.2	4211
Estate	82.1	0.0	4.1	1.5	0.0	1.8	0.0	0.0	.	340
District										
Anuradhapura	72.6	6.0	3.9	5.3	0.0	1.5	6.0	9.3	4.3	601
Badulla	58.0	0.0	4.4	3.6	1.0	1.7	0.0	45.6	.	627
Colombo	76.2	3.0	4.3	3.7	3.0	2.5	0.0	37.6	.	626
Colombo MC	84.5	0.0	3.9	0.0	1.0	2.2	0.0	13.0	.	607
Hambanthota	56.9	5.5	5.4	4.3	2.3	2.2	0.0	2.1	6.0	608
Jaffna	31.8	3.9	2.9	3.8	5.1	3.7	1.0	103.8	4.1	613
Kurunegala	68.8	6.0	4.9	5.0	0.0	1.5	0.0	15.8	1.0	631
Nuwaraeliya	76.3	5.0	3.4	4.0	0.0	3.8	0.0	12.7	1.0	574
Ratnapura	52.9	2.0	3.8	4.9	0.0	1.8	0.0	49.7	.	624
Trincomalee	58.5	5.0	4.3	3.7	4.8		0.0	36.7	.	560

Characteristic	Percent not received any food aid	Type of food aid (mean no. of times per 6 month)								No. of households
		WFP /G/A	Samurdhi	Food Basket	CSB	Thriposhu	Food for work	School feeding	Other	
Monthly household income										
< 9,000	48.5	0.0	4.8	0.0	6.0	1.8	0.0	24.0	4.1	55
9,000 – 13,999	64.4	4.3	4.3	5.7	5.3	3.7	0.0	140.0	2.6	161
14,000 – 19,999	70.1	4.0	4.0	4.6	5.2	2.7	1.0	68.5	5.0	684
20,000 – 31,999	78.0	4.0	4.3	4.6	4.7	2.1	0.0	59.5	.	743
≥ 32,000	88.4	5.4	3.9	3.0	4.9	2.2	0.0	18.0	.	446
Wealth index quintile										
Poorest	43.2	4.2	4.0	4.4	5.1	2.5	1.0	82.0	3.8	2311
Second	53.1	3.6	4.2	3.9	5.1	3.2	0.0	53.2	3.9	1090
Middle	59.0	3.5	4.6	3.6	4.2	2.3	6.0	53.4	4.4	957
Fourth	72.7	2.4	4.3	5.5	3.7	2.0	0.0	35.5	1.0	1057
Richest	83.9	6.0	4.3	3.0	6.0	2.1	0.0	41.0	4.0	502
Overall	63.6	4.0	4.1	4.2	4.8	2.5	3.5	70.6	3.9	6071

10.4 Food prices

During the market survey, the unit price of commonly used food items were obtained. Average prices for different food items are presented in Table 10.11. Even though an attempt was made to obtain the information on the prices of the food items six months prior to the survey, the availability of such information was limited, hence are not presented in a table form.

The most expensive food items were meat/poultry and fish, as indicated by the mean unit costs. Considering each food item, no major variations are seen between the sectors or districts.

Interviewees who participated in the in depth interviews indicated that in almost all areas, prices of food items had increased during the past 1 – 2 years, thus reducing the purchasing capacity of the households making it difficult for the poor households to stock food to ensure food security. It was also mentioned that prices of rice and vegetables were less affected by price hikes during harvesting times.

Table 10.11 Average unit prices for different food items by sector and district

Background Characteristic	Average price of selected (LKR) Food Groups (Std. Dev.)											
	cereals (per Kg)	roots Tubers (per Kg)	Nuts/pulses (per Kg)	vegetables (per Kg)	fruits (per Kg)	meat/poultry (per Kg)	fish (per Kg)	eggs (per egg)	milk/dairy products (per litre / 400 gms.	oils/fats (per litre)	Coconut (per nut)	Sugar (per Kg)
Sector												
Urban	67.50 (21.00)	60.00 (75.00)	170.00 (214.00)	60.00 (77.50)	50.00 (37.50)	330.00 (80.00)	350.00 (300.00)	10.00 (5.00)	125.00 (254.00)	150.00 (240.00)	27.00 (19.00)	76.00 (5.00)
Rural	65.00 (51.00)	60.00 (101.00)	162.50 (230.00)	60.00 (90.00)	40.00 (117.00)	336.25 (640.00)	350.00 (507.50)	10.63 (13.00)	118.50 (239.00)	150.00 (240.00)	25.00 (28.50)	75.00 (15.00)
Estate	66.00 (10.00)	66.50 (45.00)	177.50 (210.00)	52.50 (45.00)	47.50 (30.00)	315.00 (90.00)	335.00 (320.00)	11.50 (7.50)	242.50 (163.00)	142.50 (65.00)	24.00 (13.50)	75.00 (5.00)

District												
Anuradhapura	65.50 (13.00)	35.00 (56.00)	155.00 (95.00)	40.00 (52.50)	33.75 (60.00)	335.00 (90.00)	350.00 (110.00)	11.00 (3.00)	85.00 (120.00)	140.00 (70.00)	20.00 (13.00)	.
Badulla	60.00 (14.00)	47.50 (105.00)	165.00 (130.00)	56.25 (67.50)	35.00 (39.50)	365.00 (95.00)	320.00 (525.00)	11.00 (4.00)	112.25 (239.00)	140.00 (100.00)	25.00 (17.50)	75.00 (10.00)
Colombo	69.50 (11.00)	69.00 (65.00)	160.00 (70.00)	65.00 (45.00)	55.00 (37.50)	315.00 (100.00)	360.00 (200.00)	10.00 (5.00)	119.50 (228.00)	145.00 (125.00)	28.00 (13.00)	76.00 (12.00)
Hambantota	62.50 (22.50)	55.00 (58.50)	160.00 (75.00)	60.00 (50.00)	40.00 (40.00)	345.00 (92.50)	300.00 (250.00)	12.00 (10.00)	100.00 (240.00)	140.00 (72.50)	22.00 (7.50)	.
Jaffna	105.00 (5.00)	80.00 (5.00)	165.00 (30.00)	32.50 (20.00)	117.50 (75.00)	587.50 (225.00)	475.00 (25.00)	13.50 (2.50)	60.00 (0.00)	180.00 (27.50)	38.75 (7.50)	.
Karunegala	65.50 (20.50)	52.00 (87.00)	161.25 (140.00)	60.00 (62.50)	40.00 (40.00)	320.00 (350.00)	305.00 (420.00)	10.00 (2.00)	125.00 (237.00)	160.00 (135.00)	22.75 (21.00)	70.00 (8.00)
Nuwara Eliya	65.00 (14.50)	70.00 (47.50)	180.00 (180.00)	52.50 (40.00)	46.25 (72.00)	310.00 (70.00)	360.00 (385.00)	11.75 (7.50)	187.50 (266.00)	170.00 (70.00)	25.00 (18.50)	75.00 (3.00)
Ratnapura	65.00 (31.00)	50.00 (76.50)	175.00 (199.00)	60.00 (80.00)	37.50 (35.00)	327.50 (105.00)	345.00 (368.00)	10.00 (6.00)	146.00 (238.00)	160.00 (222.00)	25.00 (17.50)	80.00 (10.00)
Trincomalee	59.75 (22.00)	45.00 (48.00)	157.50 (57.50)	85.00 (60.00)	42.50 (30.00)	355.00 (35.00)	360.00 (210.00)	11.00 (2.00)	72.50 (169.00)	150.00 (29.00)	22.00 (15.00)	.
Overall	65.00 (51.00)	60.00 (105.00)	165.00 (244.00)	60.00 (90.00)	41.25 (117.00)	330.00 (640.00)	350.00 (525.00)	10.75 (14.50)	125.00 (267.00)	150.00 (240.00)	25.00 (28.50)	75.00 (15.00)

10.5. Coping Strategies

During the periods when there were limitations in food availability, different coping strategies were adopted by households (Table 10.12). Use of such strategies during the month preceding the survey was studied paying attention to the frequency of practice. Of the total number of households, 2127 (35.1 percent) had adopted 1 or more coping strategies. Of them, more of the households adopted food related coping strategies compared to non-food coping strategies.

The common strategies adopted were: to rely on less preferred food (29.6 percent) and purchased food on credit (19.5 percent). Between 18 to 20 percent had borrowed food or reduced meal size. The main non-food strategies adopted were: borrowing money from relatives/neighbours (20.2 percent), pawning jewellery (17.2 percent) and using savings (12.2. percent).

Table 10.12. Percentage of households that adopted different coping strategies during the previous 30 days, with its frequency

A: Food related coping strategies					
Coping Strategy	% of households adopted strategy				Total households
	Never	Ever			
		Once in a while (1-2 per week)	Pretty often (3-6 per week)	Daily (>24 days)	
Food-related coping strategy					
a. Relied on less preferred food	70.4	16.9	9.5	3.2	6042
b. Borrowed food	80.5	12.6	5.8	1.1	6046
c. Purchased food on credit	72.2	16.6	8.8	2.5	6049
d. Consumed seeds held for next season	95.8	2.7	1.2	0.3	6040
e. Reduced meal size	81.6	11.8	5.2	1.5	6047
f. Reduced number of meals per day	84.6	10.1	4.2	1.1	6044
g. Restricted consumption for adults	86.5	8.0	4.1	1.3	6044
h. Sent children to live with relatives	97.5	1.5	0.7	0.3	6027
i. Reduced expenditure on health and	91.6	4.9	2.4	1.1	6037

education			
B: Non-food coping strategies			
Non-food coping strategies	% of Households		Total households
	No	Yes	
j. Sold livestock	98.1	1.9	6028
k. Pawned jewellery	82.8	17.2	6045
l. Sold agricultural tools, seeds	97.8	2.2	6040
m. Sold other assets	99.0	1.0	6042
n. Used savings	87.8	12.2	6035
o. Borrowed money from relatives/neighbours	79.8	20.2	6041
p. Took children out of school to earn income	98.8	1.2	6035

The distribution of the households that adopted a specific food-related coping strategy by background characteristics is shown in Table 10.13. Of those who adopted a food related copying strategy, 84.0 percent relied on less preferred food and 79.1 percent purchased food on credit. There are no major variations by sector. adoption of copying strategies in Jaffna varied markedly from other districts. The differences were: high percentage of households that borrowed food (75.4 percent), reduced meal size (72.7 percent) and reduced number of meals per day (68.9 percent). The proportion using each of the 9 coping strategies decreased with increasing household income and wealth.

Table 10.13. Food-related coping strategies adopted during the 30 days preceding the survey, by background characteristics

Background Characteristic	Percentage of households that adopted the strategy at least once during the preceding 30 days									
	No of households adopted	Relied on less preferred food	Borrowed food	Purchased food on credit	Consumed seeds held for next season	Reduced meal size	Reduced number of meals per day	Restricted consumption for adults	Sent children to live with relatives	Reduced expenditure on health and education
No. of members in Household										
1-3	513	84.2	57.5	77.2	12.5	56.5	49.7	24.8	6.8	21.1
4-6	1348	83.6	53.1	79.9	11.6	49.7	39.5	42.1	7.3	23.0
≥ 7	266	85.7	62.0	78.9	13.2	57.9	53.4	44.7	7.1	33.1
Sector										
Urban	404	86.6	54.2	73.0	5.4	60.1	46.5	38.9	5.7	22.8
Rural	1524	83.1	54.7	80.0	14.8	48.7	40.9	35.0	7.4	23.8
Estate	199	85.9	62.3	84.9	4.5	64.8	58.8	62.3	8.5	25.6
District										
Anuradhapura	123	77.2	49.6	77.2	14.6	40.7	30.9	36.6	6.5	16.3
Badulla	323	90.1	45.2	91.3	15.2	51.7	46.4	43.0	2.8	18.9
Colombo	163	84.7	36.8	68.1	0.6	43.6	30.7	36.8	4.9	31.3
Colombo MC	160	89.4	50.6	71.9	1.9	63.1	45.6	40.6	6.9	26.3
Hambantota	123	87.8	57.7	86.2	4.9	42.3	38.2	40.7	7.3	20.3
Jaffna	293	68.9	75.4	67.6	17.7	72.7	68.9	34.5	10.9	37.5
Karunegala	210	86.7	48.1	76.8	12.4	39.0	30.5	25.7	7.1	16.7
Nuwara Eliya	233	80.3	53.2	79.8	8.2	51.1	41.2	46.8	10.7	20.6
Ratnapura	266	92.1	51.1	86.8	4.9	49.6	38.7	40.6	2.6	22.2
Trincomalee	233	84.1	75.1	79.4	29.6	54.5	45.5	35.6	12.4	23.6
Monthly household income										
< 9,000	1196	86.8	61.0	80.1	14.2	59.4	52.0	43.0	8.9	26.0
9,000 – 13,999	413	85.7	58.1	82.3	12.1	49.4	37.8	36.6	6.3	22.0
14,000 – 19,999	225	78.2	40.4	75.1	8.4	37.3	27.6	31.1	3.1	23.1
20,000 – 31,999	191	73.8	33.5	71.2	4.2	33.5	24.6	23.0	3.7	16.2
≥ 32,000	53	67.9	32.1	73.6	1.9	30.2	18.9	30.2	1.9	17.0
Wealth										

quintile										
Poorest	663	85.2	68.9	82.1	14.2	67.7	61.7	49.3	12.1	30.8
Second	544	86.4	57.7	81.5	14.7	53.1	45.8	39.7	7.4	23.5
Middle	455	85.5	47.5	80.2	12.3	48.4	38.5	33.8	3.7	20.9
Fourth	308	82.5	45.1	74.7	6.5	38.0	24.4	27.3	4.5	17.5
Richest	157	69.4	31.8	64.3	3.8	24.8	13.4	21.0	1.3	15.9
overall	2127	84.0	55.3	79.1	12.0	52.4	43.7	38.3	7.2	23.8

Qualitative methods included in the study provided supportive information related to the observations on coping strategies. It was noted that even with increases in food prices, people in some areas did not reduce meal frequencies and they obtain food from available sources in their surroundings and take less expensive and easily available foods to meet the needs. People in low-income groups reduce their meal frequency, took less expensive low quality foods and less quantity of foods. . Some stopped consuming milk, fish, meat etc.

Taking loans is a commonly adopted strategy to cope with difficult situations, whether it be food related or not. As shown in Table 10.14, approximately one-third of households had taken loans within the preceding month which were used for: purchase food (36.1 percent), income generation activities (18.7 percent), repair damaged house (12.5 percent) and medical costs (9.4 percent).

Using money obtained through loans for purchase of food items was highest in the estate sector (69.7 percent) and in Jaffna and Nuwara Eliya districts (53.3 and 51.9 respectively). Use of loaned money for income generation was highest in the rural sector (22.3 percent) and in districts Hamabantota (38.9 percent), Anuradhapura (29.3 percent), Badulla (26.0 percent) and Kurunegala (24.8 percent).

In depth interviews indicated that people take loans from a variety of sources, personal loans from neighbors or relatives, village based welfare societies and from microcredit programmes. Availability of facilities for obtaining loans vary between areas. It is a common practice for people to purchase food items and other requirements on credit.

Table 10.14. Distribution of households by reasons for taking loans, by background characteristics

Background Characteristic	Received loan		Main reason for loan (% of the total received loan)								
	No	%	Purchase food	Medical cost	Repair of damaged house	Transport	Repay loan	support additional members	Marriage	Income generation	other
No. of members in Household											
1-3	328	26.3	32.8	11.7	13.8	1.2	5.9	0.2	2.1	19.2	13.1
4-6	1019	33.8	35.9	8.1	13.0	1.1	6.4	0.5	0.8	19.0	15.3
≥ 7	191	39.5	42.6	12.0	7.8	1.2	8.1	0.8	1.9	16.7	8.9
Sector											
Urban	402	26.5	40.9	9.0	13.0	1.5	7.2	0.5	2.5	15.7	9.7
Rural	1349	32.2	29.5	9.9	13.7	0.9	7.0	0.4	0.7	22.3	15.7
Estate	209	62.0	69.7	7.1	3.3	1.9	1.9	0.9	1.9	1.9	11.4
District											
Anuradhapura	140	23.5	13.6	4.3	15.7	1.4	6.4	0.0	0.0	29.3	29.3
Badulla	216	34.4	33.5	2.8	16.3	0.9	6.0	0.5	0.5	26.0	13.5
Colombo	148	23.8	27.4	6.2	22.6	2.1	10.3	0.0	2.1	17.8	11.6
Colombo MC	126	20.8	47.2	3.9	10.2	0.0	11.0	0.0	3.1	15.0	9.4
Hambantota	164	27.3	13.6	4.3	18.5	0.6	6.8	0.0	0.6	38.9	16.7
Jaffna	301	49.1	53.3	23.7	3.3	1.0	6.7	0.3	1.0	7.0	3.7
Karunegala	200	31.9	11.9	5.9	26.2	1.0	7.4	1.5	0.0	24.8	21.3
Nuwara Eliya	262	46.1	51.9	8.7	4.9	1.1	3.0	0.8	1.9	10.6	17.0
Ratnapura	199	31.9	38.2	9.5	12.6	1.5	6.0	0.5	0.5	13.6	17.6
Trincomalee	204	36.5	48.0	12.7	4.9	1.5	4.9	0.5	2.9	17.6	6.9
Monthly household income											
< 9,000	951	41.4	44.5	10.5	8.4	0.9	5.4	0.3	1.2	16.8	12.1
9,000 – 13,999	403	37.0	36.0	10.4	10.2	1.2	7.2	0.7	0.7	17.1	16.4
14,000 – 19,999	242	25.4	24.8	7.9	19.0	1.7	8.3	0.0	2.1	23.1	13.2
20,000 – 31,999	235	22.3	18.9	6.9	19.3	1.7	6.4	1.3	1.7	26.2	17.6
≥ 32,000	86	17.2	8.2	2.4	32.9	0.0	12.9	0.0	1.2	20.0	22.4
Wealth quintile											
Poorest	495	46.7	54.7	11.4	6.6	1.0	5.0	0.4	0.6	10.4	9.8
Second	445	40.0	43.6	11.9	8.1	0.7	6.5	0.2	0.7	15.3	13.0
Middle	419	33.9	34.6	10.7	9.5	1.0	6.2	0.7	1.7	19.3	16.2
Fourth	336	26.0	20.7	5.4	21.6	0.9	6.9	0.3	2.1	26.7	15.3
Richest	265	19.7	10.3	4.2	24.0	2.7	9.1	0.8	1.5	29.3	18.3
overall	1960	32.4	36.1	9.4	12.5	1.1	6.5	0.5	1.2	18.7	14.0

10.6. Food insecurity

A state of food insecurity exists when nutritionally adequate and safe foods are not readily available or there is inability to acquire acceptable foods. In this study, food insecurity levels were determined

according to the method described by the World Food Programme (WFP). The steps followed in estimating levels of food insecurity were as follows:

Step1: Calculate a household food consumption adequacy score (HFCAS) based on food groups consumed during 1 week prior to survey, grouped into 3 categories as described in footnote²⁴.

Step 2: Estimating the expenditure on food as a percentage of the total household expenditure, and categorizing the households into 3 groups indicating different levels of food access (<75 percent - good; 75 to 90 percent - average and >90 percent - poor food access).

Step 3: Cross-tabulation between food consumption categories and food access categories.

Food insecurity levels were assessed in accordance with the classification given in Figure 4.

Figure 4. Assessment of food insecurity levels (**This figure has to be re done to makt the sections clear, in the printed dform)**

Food consumption	Poor	Borderline	Adequate
Food access			
Poor	<i>Severely food insecure</i>	<i>Severely food insecure</i>	<i>Moderately food insecure</i>
Average	<i>Severely food insecure</i>	<i>Moderately food insecure</i>	<i>Food Secure</i>
Good	<i>Moderately food insecure</i>	<i>Food Secure</i>	<i>Food Secure</i>

10.6.1 Household food consumption adequacy score (HFCAS)

As shown in Table 10.15, the mean HFCAS for all households was 67.7(SD 16.0). The score was lower in rural sector (64.0) compared to the urban (77.5) and the estate sector (71.1). There is a wide

** Eight food groups were used to calculate the Food consumption adequacy score.

Food group	Food times
1. Staple foods (starches)	Rice, bread / chapiti /roti
2. pulses/legumes	Pulses
3. Vegetables	vegetables (including leaves)
4. Fruits	fruits
5. Animal protein	Fish, meat (beef, pork, chicken), eggs
6. Sugar	sugar/ jaggary
7. Dairy products	Curd, milk (liquid or powder)
8. Oil/fats	palm oil, vegetable oil, fats, coconut products (dried copra)

The number of days the food items were consumed during the previous week was summed for the food items in each of the 8 food groups. If the total sum of the number of days of the separate items in a food group was higher than 7 days, the sum is converted to 7. Thus, the maximum score for each food group is 7 days. The food score of each household is calculated as follows:

Simple food score = 2 * staple + 3 * pulses + 1 * vegetables + 1* fruit + 4 * animal protein + 0.5 * sugar + 3 * dairy + 0.5 * oil

The households were grouped according to their scores by applying the standard cut-offs as follows:

- Poor food consumption: simple food score is 0 – 21
- Borderline food consumption: simple food score is 21.01 – 35
- Adequate food consumption: simple food score is 35.01 and higher

inter district variation ranging from 61.1 in Ratnapura to 82.7 in Colombo MC area. The HFCAS increased with the levels of household income and wealth.

Study of HFCAS categories indicates that 0.2 percent of all households had poor food consumption, 2.2 percent borderline and 97.6 percent adequate food consumption. Only marginal variations were seen between sectors with a lower value in the rural sector with limited inter district variations. Even though marginal, the upward trend in the percentage with adequate food consumption, with increasing educational level of the head of the household and income and wealth indicators are noteworthy.

Table 10.15 Household Food Consumption Adequacy Score (HFCAS) and distribution of households by food consumption category, by background characteristics

Background characteristic	Mean HFCAS Score (SD)	Food Consumption Category (%)			No. of households
		Poor	Borderline	Adequate	
No. of members in family					
1-3	65.7 (16.5)	0.4	3.5	96.1	1621
4-6	68.1 (15.7)	0.2	1.8	98.0	3776
≥ 7	70.7 (16.0)	0.0	1.1	98.9	656
Residence					
Urban	77.5 (15.0)	0.0	0.3	99.7	1513
Rural	64.0 (14.7)	0.3	2.8	96.9	4201
Estate	71.1 (16.4)	0.3	2.4	97.3	339
District					
Anuradhapura	63.8 (12.6)	0.0	1.8	98.2	601
Badulla	62.6 (17.1)	0.2	6.1	93.8	627
Colombo	74.5 (14.4)	0.0	0.2	99.8	622
Colombo MC	82.7 (12.9)	0.0	0.0	100.0	606
Hambantota	62.7 (11.7)	0.0	1.6	98.4	608
Jaffna	65.6 (16.9)	0.3	2.3	97.4	606
Kurunegala	65.5 (13.9)	0.0	2.7	97.3	631
Nuwara Eliya	68.5 (18.0)	1.2	2.5	96.3	570
Ratnapura	61.1 (13.5)	0.3	3.2	96.5	623
Trincomalee	70.9 (15.0)	0.0	1.3	98.7	559
Education of household Head					
No schooling	63.7 (17.7)	0.0	5.7	94.3	262
Primary	63.2 (16.2)	0.4	3.6	96.0	1166
Secondary	67.2 (16.0)	0.2	2.2	97.5	2137
Passed O' Level	70.7 (14.9)	0.0	1.1	98.8	2059
Higher	73.8 (15.7)	0.0	0.0	100.0	146
Monthly household income					
< 9,000	62.1 (16.1)	0.3	4.6	95.1	2303
9,000 – 13,999	68.5 (15.2)	0.2	1.2	98.6	1089
14,000 – 19,999	71.1 (14.1)	0.0	0.4	99.6	955
20,000 – 31,999	73.2 (14.4)	0.0	0.5	99.5	1056
≥ 32,000	75.1 (14.2)	0.0	0.6	99.4	499
Wealth quintile					
Poorest	60.4 (17.1)	0.8	6.1	93.0	1063
Second	64.1 (15.6)	0.3	2.7	97.0	1114
Middle	67.0 (15.4)	0.0	2.0	98.0	1240

Background characteristic	Mean HFCAS Score (SD)	Food Consumption Category (%)			No. of households
		Poor	Borderline	Adequate	
Fourth	69.8 (14.3)	0.0	0.7	99.3	1291
Richest	75.3 (13.7)	0.0	0.2	99.8	1345
Overall	67.7 (16.0)	0.2	2.2	97.6	6053

10.6.2 Food insecurity categories

Food insecurity levels obtained by cross-tabulating food access categories and food consumption categories for households with a child aged less than 5 years (n=2397) are presented in Table 10.16. Of these households, 0.5 percent were found to be ‘severely food insecure’ with comparable percentages for ‘moderately insecure’ and ‘secure’ were 11.8 and 87.6 percent respectively.

Table 10.16 Results of the Cross-tabulation of food access categories and food consumption categories TABLE TO BE RE -DONE

Food consumption	Poor No. (%)	Borderline No. (%)	Adequate No. (%)
Food access			
Poor	0 (0.0) <i>i</i>	13 (0.5) <i>i</i>	269 (11.2) <i>ii</i>
Average	0 (0.0) <i>i</i>	15 (0.6) <i>ii</i>	1040 (43.4) <i>iii</i>
Good	0 (0.0) <i>ii</i>	8 (0.3) <i>iii</i>	1052 (43.9) <i>iii</i>

- percentage for each cell was calculated as out of the total (n=2397) households

i - Food insecure ii. Moderately food insecure iii. Food secure

In interpreting food insecurity, the two categories, moderately and severely food insecure categories were combined. The percentage of insecure households decreased with increasing number of members in the household from 18.0 percent in households with 1-2 persons to 9.3 percent in those with 7 or more (Table 10.17). Inter-sectoral differences were marked with the percentage of insecure households in the estate sector (19.0 percent) being more than 3-fold of that of urban sector (5.4 percent).

Colombo district and Colombo MC area had the lowest percentage of food insecure households (3.9 and 5.1 percent respectively). Jaffna district (23.3 percent) showed the percentage to be more than 5 fold compared to Colombo district. Other districts that showed high values were Badulla (18.4 percent), Hambantota (16.4 percent), Anuradhapura (13.6 percent) and Nuwara Eliya (12.9 percent).

Considering the key socio-economic indicators included in this study, the marked influences such indicators have on food insecurity is clearly shown. There was a consistent downward trend of food insecurity from 21.6 percent in household heads with ‘no schooling’ to 1.8 percent in the highest educational category. Similar trends were shown with increasing levels of household income (from 22.3 percent to 0.5 percent) and increasing wealth quintiles (from 26.9 percent to 2.3 percent).

Table 10.17 Distribution of households by food insecurity levels, by background characteristics

Background characteristic	Food Security Level			No. of households
	Food Secure (%)	Moderately Food insecure (%)	Severely food Insecure (%)	
No. of members in family				
1-3	81.9	16.5	1.5	393
4-6	88.2	11.4	0.4	1599
≥ 7	90.6	9.1	0.2	405
Sector				
Urban	94.6	5.4	0.0	558
Rural	86.0	13.3	0.7	1649
Estate	81.1	17.9	1.1	190
District				
Anuradhapura	86.3	13.2	0.4	227
Badulla	81.7	16.2	2.2	229
Colombo	96.1	3.9	0.0	228
Colombo MC	94.9	5.1	0.0	235
Hambantota	83.5	16.0	0.4	243
Jaffna	76.7	22.5	0.8	236
Kurunegala	92.3	7.7	0.0	208
Nuwara Eliya	87.1	12.2	0.7	271
Ratnapura	89.5	10.5	0.0	238
Trincomalee	88.7	10.6	0.7	282
Education of household Head				
No schooling	78.5	20.3	1.3	79
Primary	80.1	18.5	1.5	336
Secondary	85.5	13.8	0.7	875
Passed O' Level	92.2	7.7	0.1	935
Higher	98.2	1.8	0.0	57
Monthly household income				
< 9,000	77.7	21.0	1.3	891
9,000 – 13,999	91.9	7.9	0.2	471
14,000 – 19,999	90.4	9.6	0.0	384
20,000 – 31,999	96.9	3.1	0.0	424
≥ 32,000	99.5	0.5	0.0	186
Wealth quintile				
Poorest	73.1	25.0	1.9	579
Second	85.6	14.0	0.4	486
Middle	90.0	10.0	0.0	422
Fourth	95.9	4.1	0.0	439
Richest	97.7	2.3	0.0	471
Overall	87.6	11.8	0.5	2397

Chapter 11

Factors Associated with Malnutrition in children

The analyses of associations in respect of child malnutrition were based on the conceptual framework described by UNICEF, identifying, basic, underlying and immediate causes. Appropriate cross-tabulations were made between selected indicators of malnutrition and other variables, comparing the prevalence estimates across subgroups using 95% confidence intervals. The differences that are observed to be statistically significant are mentioned in the text.

11.1 Basic causes

11.1.1 Socio-demographic factors

The basic causes studied included sector, district, parental educational status, and family size (table 12.1). Stunting and underweight rates were significantly higher in the estate sector than the urban and rural, but the rates of wasting and anaemia were not significant different between sectors. Comparison between districts showed that there were significant inter-district differences in the rates undernutrition. The prevalence of stunting was higher in the districts of Nuwaraeliya, and Badulla: wasting in the district of Colombo: underweight in Nuwaraeliya and Ratnapura and anaemia in Jaffna. In general, the increasing level of maternal and paternal education were associated with lower prevalence of stunting and underweight. Increasing family size and number of children under 5 years, were predictive of higher level of stunting.

Table 11.1 Prevalence of stunting, wasting, underweight and anaemia by basic causes

Characteristic	Stunting (height-for-age<-2Z)			Wasting (weight-for-height<-2Z)			Underweight (weight-for-age<-2Z)			Anaemia		
	%	95% CI		%	95% CI		%	95% CI		%	95% CI	
Sector												
Urban	14.3	11.7	17.3	11.0	8.7	13.7	17.7	14.9	20.9	26.7	23.2	30.6
Rural	17.4	15.7	19.3	12.0	10.5	13.6	20.8	19.0	22.8	24.7	22.6	26.8
Estate	46.7	40.3	53.2	12.3	8.7	17.3	37.9	31.8	44.4	25.2	19.9	31.4
District												
Anuradhapura	14.0	10.0	19.2	11.7	8.1	16.6	17.1	12.7	22.7	24.7	19.2	31.3
Badulla	23.9	19.1	29.5	9.4	6.4	13.7	22.4	17.7	27.9	21.2	16.4	27.0
Colombo	13.4	9.7	18.2	17.4	13.2	22.7	22.3	17.5	27.9	22.3	17.3	28.3
Colombo MC	12.8	9.3	17.4	7.5	4.9	11.4	15.4	11.6	20.3	27.8	22.5	33.9
Hambantota	15.4	11.6	20.2	13.2	9.7	17.8	22.8	18.2	28.2	21.3	16.6	26.8
Jaffna	15.2	11.4	20.0	9.6	6.6	13.8	14.4	10.7	19.2	34.0	28.5	39.9
Karunegala	12.6	8.8	17.8	14.0	10.0	19.3	19.2	14.4	25.0	19.3	14.3	25.5
Nuwara Eliya	40.9	35.5	46.6	11.1	8.0	15.2	36.2	31.0	41.9	24.3	19.6	29.7
Ratnapura	21.6	16.9	27.1	13.6	9.9	18.4	25.2	20.2	31.0	28.9	23.4	35.0
Trincomalee	18.0	14.0	22.8	11.2	8.1	15.3	18.6	14.6	23.5	26.1	21.2	31.6
Mother's education												
No schooling	34.2	24.3	45.8	11.0	5.6	20.4	28.8	19.6	40.1	25.0	16.1	36.6
Primary	29.6	23.6	36.5	14.8	10.4	20.6	34.9	28.5	42.0	29.8	23.6	36.9
Secondary	21.2	18.4	24.3	11.2	9.1	13.7	21.6	18.8	24.7	27.6	24.4	31.0
Passed O' Level	17.9	15.4	20.7	10.5	8.5	12.8	20.5	17.9	23.5	24.7	21.7	27.9
Higher	10.9	8.4	14.1	11.8	9.2	15.0	14.1	11.3	17.5	21.3	17.6	25.4
Father' education												

Characteristic	Stunting (height-for-age<-2Z)			Wasting (weight-for-height<-2Z)			Underweight (weight-for-age<-2Z)			Anaemia		
	%	95% CI		%	95% CI		%	95% CI		%	95% CI	
No schooling	30.4	20.8	42.2	20.3	12.4	31.4	37.7	27.1	49.6	23.9	15.2	35.5
Primary	25.7	21.2	30.9	14.1	10.7	18.5	28.0	23.3	33.2	26.6	21.9	32.0
Secondary	18.1	15.6	20.9	11.5	9.5	13.8	22.0	19.3	24.9	23.3	20.4	26.4
Passed O' Level	15.3	13.1	17.9	11.8	9.8	14.1	18.7	16.2	21.4	23.3	20.5	26.4
Higher	14.0	6.8	26.6	4.0	1.0	14.6	8.0	3.0	19.5	20.8	11.6	34.6
No. of members in Household												
1-3	13.0	9.8	16.9	11.8	8.9	15.6	18.3	14.6	22.7	23.0	18.7	27.8
4-6	18.6	16.7	20.6	12.3	10.7	14.1	21.9	19.9	24.1	24.4	22.2	26.8
≥7	24.1	20.0	28.6	12.7	9.7	16.5	25.9	21.8	30.6	25.7	21.4	30.6
No. of children less than 5 years												
1	17.4	15.7	19.2	13.0	11.5	14.6	21.3	19.5	23.2	26.4	24.3	28.6
2	22.5	19.6	25.8	8.5	6.7	10.9	21.8	18.9	25.1	23.0	19.9	26.5
≥3	34.8	24.5	46.7	13.0	6.9	23.2	27.5	18.3	39.2	15.4	8.5	26.3
Overall	19.2	17.8	20.8	11.8	10.6	13.1	21.6	20.0	23.2	25.2	23.5	27.0

11.1.2 Economic status

Significant declining trends were observed in the prevalence of stunting, wasting, underweight and anaemia with increasing wealth quintiles (Table 12.2). Increasing monthly household income was significantly associated with lower rates of stunting and underweight. Non-availability of electricity was found to be a significant determinant of stunting and underweight in children.

Table 11.2 Prevalence of stunting, wasting, underweight and anaemia by indicators of economic status

Characteristic	Stunting (height-for-age<-2Z)			Wasting (weight-for-height<-2Z)			Underweight (weight-for-age<-2Z)			Anaemia* (6-59 months)		
	%	95% CI		%	95% CI		%	95% CI		%	95% CI	
Household Income												
< 9,000	23.2	20.7	26.0	12.5	10.5	14.7	24.3	21.7	27.1	28.0	25.1	31.0
9,000 – 13,999	21.1	17.7	24.8	11.5	9.0	14.6	24.4	20.8	28.3	23.8	20.2	27.9
14,000 – 19,999	16.6	13.3	20.4	13.0	10.1	16.6	21.8	18.1	26.0	23.8	19.8	28.3
20,000 – 31,999	15.3	12.3	19.0	10.4	7.9	13.6	16.4	13.3	20.2	22.7	18.9	27.0
≥ 32,000	10.6	7.1	15.6	10.1	6.7	15.1	12.1	8.3	17.3	23.6	17.9	30.4
Wealth Index												
Poorest	28.5	24.9	32.4	14.2	11.5	17.3	32.3	28.6	36.3	29.2	25.5	33.3
Lower	22.1	18.7	25.9	11.2	8.7	14.2	21.5	18.2	25.3	29.4	25.5	33.7
Middle	19.2	15.9	22.9	11.8	9.2	14.9	21.4	18.0	25.3	22.8	19.1	26.9
Upper	15.7	12.7	19.3	13.8	11.0	17.2	20.8	17.4	24.7	24.3	20.5	28.5
Highest	10.4	8.2	13.2	8.3	6.3	10.9	11.9	9.4	14.8	19.9	16.6	23.7
Type of Income												
Daily paid irregular	22.0	17.6	27.2	10.8	7.7	15.0	24.5	19.8	29.8	28.7	23.6	34.3
Daily paid regular	19.0	16.6	21.8	13.9	11.8	16.4	22.1	19.5	25.0	27.6	24.6	30.8
Weekly	19.6	13.0	28.5	10.8	6.1	18.4	17.6	11.4	26.3	25.3	17.4	35.2
Monthly	18.4	16.2	20.9	11.2	9.4	13.2	20.5	18.2	23.0	22.9	20.3	25.6
Seasonal	20.2	15.7	25.6	8.7	5.8	12.9	22.5	17.8	28.1	23.9	18.9	29.8
Ownership of lands												
Available and in use	17.8	15.1	20.7	11.9	9.8	14.5	21.9	19.0	25.1	23.2	20.1	26.6
Available, not in use	18.4	15.2	22.0	11.9	9.4	15.0	21.7	18.3	25.5	24.7	21.0	28.8
Not available	18.2	15.0	22.0	12.6	9.9	15.9	20.8	17.4	24.8	27.1	23.0	31.6
Ownership of livestock												
Owned	22.0	18.3	26.2	11.2	8.6	14.6	21.1	17.5	25.2	24.4	20.4	28.8
Not owned	17.8	16.1	19.7	12.5	11.1	14.1	22.2	20.4	24.2	24.4	22.4	26.5
Availability of Electricity												
Available	16.9	15.2	18.8	11.6	10.2	13.2	20.3	18.5	22.3	23.4	21.4	25.6
Not available	24.4	20.8	28.3	14.8	11.9	18.2	27.9	24.2	32.0	27.7	23.8	31.9

11.2 Underlying Causes

11.2.1 Household food insecurity

Table 11.3 describes the associations between child malnutrition and food insecurity at household level.

An increase in the expenditure on food as a percentage of total household expenditure was significantly associated with an upward trend in the rate of stunting .

Children in the food insecure households had a higher prevalence of stunting, wasting, underweight and anaemia, specifically underweight. However, these differences were not statistically significant, likely to be influenced by the limited number of children in the food insecure group. The prevalence of stunting and underweight were significantly higher in those households that adopted one or more copying strategies. Similarly, a significantly higher rate of stunting was reported in households that received loans. Though not significant, an upward trend in all three indicators were seen with increasing duration of food inadequacy. Prevalence of stunting, wasting, underweight and anaemia were marginally higher in the households that received any food aid.

Households with children who were stunted or underweight had a significantly lower household dietary diversity score (HDDS). A similar observation was made in respect of months of adequate household food provisioning (MAHFP) in the previous year. The mean number of days the food stocks last was significantly lower in the household with the wasted children. However, household food consumption adequacy score (HFCAS) was not significantly different between households with undernourished and normal children.

Table 11.3 Prevalence of stunting, wasting, underweight and anaemia according to dimensions of food security

Characteristic	Stunting (height-for-age<- 2Z)			Wasting (weight-for- height<-2Z)			Underweight (weight-for-age<- 2Z)			Anaemia (6-59 months)		
	%	95% CI		%	95% CI		%	95% CI		%	95% CI	
Percent expenditure on food												
<50 percent	12.0	7.7	18.2	14.0	9.3	20.5	18.7	13.2	25.7	28.4	21.4	36.6
50-74 percent	15.6	13.2	18.3	12.0	9.9	14.5	19.8	17.1	22.7	21.0	18.2	24.2
75-90 percent	21.3	18.8	24.0	12.0	10.1	14.2	22.5	20.0	25.2	24.8	22.0	27.7
≥ 90 percent	22.9	19.9	26.3	10.3	8.2	12.9	23.2	20.1	26.6	29.5	25.9	33.4
Number of months with food inadequacy												
<1	20.9	14.4	29.3	9.6	5.4	16.5	24.3	17.4	33.0	34.0	25.6	43.5
1-3	23.9	19.4	29.1	14.9	11.3	19.5	28.0	23.2	33.4	20.9	16.5	26.1
4-6	21.2	14.7	29.5	11.6	7.0	18.6	25.6	18.6	34.1	20.2	13.8	28.6
7-12	28.0	21.7	35.3	14.4	9.8	20.6	28.6	22.2	35.9	22.8	16.9	30.0
Comparative size of food stock												
More	21.0	17.6	24.9	11.5	8.9	14.7	22.1	18.6	26.1	22.2	18.6	26.3
Same	17.4	14.9	20.3	13.3	11.1	15.9	21.9	19.1	24.9	26.3	23.2	29.7
Less	18.2	15.5	21.2	11.4	9.3	14.0	22.3	19.4	25.5	23.1	20.1	26.5
Much less	22.5	17.0	29.0	16.0	11.4	22.0	24.1	18.5	30.7	24.3	18.5	31.2
Received loan												
No	16.8	14.9	18.8	12.3	10.7	14.1	20.4	18.4	22.6	24.1	21.8	26.5
Yes	21.6	18.9	24.6	12.3	10.2	14.8	24.9	22.0	28.0	24.8	21.8	28.0
Household Received any food aid												
No	18.1	16.0	20.4	11.0	9.4	13.0	19.8	17.7	22.2	23.4	21.0	26.0
Yes	19.2	16.9	21.8	13.7	11.8	16.0	24.5	22.0	27.3	25.8	23.1	28.7
Copying strategy (food related)												

Characteristic	Stunting (height-for-age<-2Z)			Wasting (weight-for-height<-2Z)			Underweight (weight-for-age<-2Z)			Anaemia (6-59 months)		
	%	95% CI		%	95% CI		%	95% CI		%	95% CI	
never	16.0	14.2	18.0	11.6	10.0	13.4	19.4	17.4	21.6	24.0	21.8	26.5
at least one	23.2	20.4	26.2	13.7	11.5	16.3	26.9	24.0	30.1	24.9	21.9	28.1
Food insecurity category												
Food Secure	18.0	16.3	19.8	12.3	10.9	13.9	21.2	19.4	23.0	23.8	21.8	25.8
Moderately or Severely food insecure (combined)	22.1	17.6	27.4	13.0	9.6	17.6	27.2	22.2	32.7	26.5	21.4	32.3
Comparison of Scores	mean (95 CI)		mean (95 CI)		mean (95 CI)		mean (95 CI)		mean (95 CI)		mean (95 CI)	
	stunted	not stunted	wasted	not wasted	under weight	non underweight	aneami c	non- anaemic				
Household Dietary Diversity Score (HDDS)	7.71 (7.55, 7.87)	8.09 (8.02, 8.16)	* (7.68, 8.07)	7.87 (7.97, 8.11)	7.77 (7.62, 7.92)	8.09 (8.01, 8.16)	* (7.85, 8.11)	8.03 (7.96, 8.11)				
months of adequate household food provisioning (MAHFP)	9.90 (9.55, 10.24)	10.61 (10.48, 10.75)	* (9.99, 10.74)	10.49 (10.36, 10.63)	10.13 (9.83, 10.42)	10.58 (10.44, 10.72)	* (10.31, 10.83)	10.40 (10.25, 10.55)				
No of days of food stock last	5.83 (5.22, 6.44)	5.90 (5.57, 6.22)	4.95 (4.24, 5.67)	6.01 (5.70, 6.33)	* (4.93, 6.03)	6.00 (5.66, 6.33)	5.67 (5.13, 6.22)	5.93 (5.58, 6.29)				
Household food consumption adequacy score (HFCAS)	68.44 (66.86, 70.01)	69.90 (69.23, 70.58)	69.18 (67.38, 70.98)	69.69 (69.03, 70.36)	68.44 (67.03, 69.84)	69.97 (69.27, 70.66)	70.06 (68.80, 71.32)	69.62 (68.86, 70.38)				

11.2.2 Care practices

Table 12.4 shows that children who received less than 4 food groups had relatively higher rates of stunting and anaemia which were not found to be statistically significant. However, comparison of mean HDDS (Individual Dietary Diversity Score) in children aged 6-59 months showed significantly lower mean scores in stunted and anaemic groups. Dietary diversity score of young children (6-23 months) was also significantly lower among stunted children. Lower meal frequency was associated a higher level of stunting, though the association was not statistically significant.

Children who visited child welfare clinics (CWC) reported a significantly higher prevalence of underweight, and higher, but non-significant, prevalence of stunting and wasting. Children of mothers who received advise on growth, nutrition and early childhood development at CWC had a significantly lower level of stunting. Having received vitamin A mega dose at least once was associated with a lower prevalence of anaemia but was not related to any of the other indicators.

Table 11.4 Prevalence of stunting, wasting, underweight and anaemia according to infant feeding, early childhood care practices

Characteristic	Stunting (height-for-age<-2Z)			Wasting (weight-for-height<-2Z)			Underweight (weight-for-age<-2Z)			Anaemia		
	%	95% CI		%	95% CI		%	95% CI		%	95% CI	
Minimum Dietary diversity												
Yes (Score ≥4)	16.8	14.1	20.0	8.0	6.1	10.4	15.4	12.7	18.4	38.2	34.5	42.2
No (Score <4)	23.1	18.1	29.1	7.6	4.7	11.8	16.4	12.1	21.9	42.8	36.4	49.4
Minimum Meal frequency in												
Yes	16.0	12.5	20.2	8.5	6.0	12.0	14.5	11.2	18.6	41.9	36.7	47.2
No	20.4	17.0	24.2	7.4	5.4	10.1	16.5	13.4	20.0	37.8	33.6	42.1

Characteristic	Stunting (height-for-age<-2Z)			Wasting (weight-for-height<-2Z)			Underweight (weight-for-age<-2Z)			Anaemia		
	%	95% CI		%	95% CI		%	95% CI		%	95% CI	
Minimum Acceptable Diet												
Yes	17.2	13.2	22.2	8.8	6.0	12.8	16.1	12.2	21.0	40.0	34.3	46.0
No	19.1	16.1	22.6	7.4	5.5	9.9	15.4	12.7	18.7	39.2	35.3	43.3
Introduced complementary food among infants 6-8 months												
Yes	14.3	7.5	25.6	4.8	1.5	14.1	9.5	4.3	20.0	65.1	52.3	76.0
No	0.0	-	-	0.0	-	-	0.0	-	-	57.1	22.3	86.1
Bottle fed												
No	15.9	12.4	20.2	7.4	5.0	10.7	14.5	11.1	18.6	37.3	32.2	42.8
Yes	18.5	15.7	21.6	8.5	6.6	11.0	15.7	13.1	18.7	40.8	36.6	45.2
Attending an organized ECD programme												
Yes	20.2	17.8	22.7	12.8	10.9	15.0	24.7	22.1	27.4	19.9	17.5	22.6
No	17.5	14.8	20.6	11.5	9.3	14.2	21.2	18.2	24.5	24.6	21.4	28.0
Visited well baby clinic												
Yes	19.2	17.6	20.9	11.9	10.6	13.3	21.9	20.2	23.6	25.5	23.7	27.4
No	13.3	8.6	20.2	5.9	3.0	11.4	10.4	6.2	16.8	20.7	14.3	29.0
Received advise on growth												
Yes	18.9	17.2	20.6	12.3	10.9	13.8	22.3	20.6	24.2	25.6	23.7	27.6
No	25.7	20.6	31.7	9.7	6.5	14.2	24.1	19.0	29.9	26.7	21.1	33.1
Received advise on nutrition												
Yes	18.9	17.2	20.6	12.1	10.7	13.6	21.8	20.0	23.6	25.6	23.7	27.7
No	25.9	21.0	31.5	11.3	8.0	15.7	27.4	22.4	33.1	26.9	21.8	32.8
Received advise on ECCD												
Yes	18.1	16.4	19.9	12.4	10.9	14.0	21.5	19.6	23.4	25.3	23.3	27.4
No	26.5	22.5	31.0	10.9	8.3	14.4	27.7	23.6	32.3	26.2	22.0	30.9
Received Vit. A mega dose by child at least once												
Yes	19.0	17.3	20.8	11.9	10.5	13.4	21.6	19.8	23.5	23.6	21.7	25.5
No	15.0	11.9	18.7	10.8	8.2	14.1	16.8	13.6	20.6	37.4	31.8	43.3
Comparison of Scores												
	mean (95 CI)		mean (95 CI)		mean (95 CI)		mean (95 CI)		mean (95 CI)		mean (95 CI)	
	stunted	not stunted	wasted	not wasted	underweight	non underweight	anaemic	non-anaemic				
IDDS (Individual Dietary Diversity Score) for 6-59 months aged	4.59 (4.44, 4.75)	4.93 (4.85, 5.00)	4.87 (4.68, 5.06)	4.86 (4.79, 4.93)	4.70 (4.56, 4.84)	4.91 (4.83, 4.99)	4.64 (4.50, 4.78)	4.94 (4.86, 5.02)				*
Dietary Diversity Score 6-23 months aged	3.94 (3.69, 4.20)	4.32 (4.20, 4.43)	4.29 (3.91, 4.67)	4.25 (4.14, 4.36)	4.06 (3.79, 4.33)	4.28 (4.17, 4.40)	4.19 (4.01, 4.37)	4.34 (4.21, 4.47)				

Environmental Sanitation

Households with poor latrine facilities reported a significantly higher prevalence of stunting and underweight. However, contrary findings were seen in relation to sources of water, where the households with 'unimproved' water sources reported a lower prevalence of stunting and underweight.

Table 11.5 Prevalence of stunting, wasting, underweight and anaemia according to household availability of water and latrines

Characteristic	Stunting (height-for-age<-2Z)			Wasting (weight-for-height<-2Z)			Underweight (weight-for-age<-2Z)			Anaemia		
	%	95% CI		%	95% CI		%	95% CI		%	95% CI	
Water Source												
Improved	23.1	19.9	26.6	13.0	10.6	16.0	26.1	22.7	29.7	25.7	22.3	29.5
Not improved	16.9	15.2	18.8	12.0	10.5	13.7	20.5	18.6	22.6	23.9	21.8	26.2
Availability of latrines												
Improved	17.6	16.0	19.4	11.7	10.4	13.3	20.7	18.9	22.6	24.1	22.1	26.1
Not improved	24.2	19.9	29.2	15.6	12.1	20.0	29.8	25.0	34.9	26.4	21.8	31.5

11.3 Immediate causes

Childhood illnesses

As indicated in Table 12.5, none of the three anthropometric indicators were related to prevalence of diarrhoea or symptoms of respiratory illness.

Table 11.6 Prevalence of stunting, wasting, underweight and anaemia according to prevalence of diarrhoea and symptoms of respiratory illness

childhood illness	Stunting (height-for-age<-2Z)			Wasting (weight-for-height<-2Z)			Underweight (weight-for-age<-2Z)			Anaemia in children		
	%	95% CI		%	95% CI		%	95% CI		%	95% CI	
Diarrhoea												
Present	19.9	14.6	26.4	10.8	7.0	16.3	22.7	17.1	29.5	28.1	21.7	35.6
Absent	19.2	17.7	20.8	11.8	10.5	13.1	21.6	19.9	23.3	25.1	23.3	27.0
Respiratory illness												
Present	17.2	13.9	21.0	11.9	9.2	15.3	22.4	18.8	26.6	29.8	25.5	34.4
Absent	19.7	18.0	21.4	11.7	10.4	13.1	21.5	19.8	23.3	24.4	22.5	26.3

11.4 Other causes

11.4.1 Biological causes

As shown in table 12.6, prevalence of stunting was significantly higher during the fourth year of life, compared to infancy, and the prevalence of wasting and underweight from 2nd to 5th years of life. In contrast, the prevalence of anemia showed a consistent decline with increasing age which was statistically significant. There were no sex difference in the prevalence of stunting, wasting and underweight even though the prevalence of anaemia was marginally higher in males. Children with low birth weight were found to have significantly higher prevalence of stunting, wasting and underweight, more than double of those with normal birth weight. These associations were

consistently present when the mean birth weights were compared between undernourished and normal children.

Table 11.7 Prevalence of stunting, wasting, underweight and anaemia by biological characteristics

Characteristic	Stunting (height-for-age<-2Z)			Wasting (weight-for-height<-2Z)			Underweight (weight-for-age<-2Z)			Anaemia		
	%	95% CI		%	95% CI		%	95% CI		%	95% CI	
Child's age in months												
<6	13.3	9.4	18.4	12.4	8.7	17.4	15.9	11.7	21.3	-	-	-
6-11	13.5	9.9	18.1	6.7	4.3	10.4	11.6	8.3	16.0	50.4	44.4	56.3
12-23	20.9	17.7	24.4	8.4	6.4	11.0	17.5	14.6	20.9	34.3	30.5	38.3
24-35	20.6	17.4	24.1	13.6	11.0	16.6	26.0	22.5	29.7	24.6	21.2	28.2
36-47	23.3	19.7	27.2	14.0	11.2	17.4	26.1	22.4	30.2	15.8	12.8	19.3
48-59	17.6	14.4	21.3	13.9	11.1	17.4	24.9	21.2	29.0	10.2	7.8	13.3
Sex of child												
Male	19.8	17.7	22.1	12.1	10.4	14.0	21.6	19.4	23.9	27.3	24.8	29.9
Female	18.7	16.7	20.9	11.5	9.9	13.4	21.6	19.5	23.9	23.2	20.9	25.7
Birth weight of child												
<2500	32.3	28.2	36.7	20.5	17.1	24.5	39.7	35.4	44.3	26.8	22.8	31.3
≥2500	15.6	14.1	17.2	9.9	8.7	11.3	17.1	15.5	18.8	25.1	23.2	27.1
Comparison of birth weight												
	mean (95 CI)		mean (95 CI)		mean (95 CI)		mean (95 CI)			mean (95 CI)		
	stunted	not stunted	wasted	not wasted	under weight	non underweight	aneamic	non-anaemic				
Birth weight (Kg)	2.66 (2.62, 2.70)	2.94 (2.92, 2.97)	2.68 (2.63, 2.74)	2.92 (2.90, 2.94)	2.65 (2.61, 2.69)	2.96 (2.94, 2.98)	2.90 (2.86, 2.94)	2.89 (2.87, 2.92)				

11.4.2 Maternal nutrition

There were declining trends in all four nutritional indicators of children with increasing maternal BMI values. There was a wide difference in the rate of childhood wasting between thin mothers and obese mothers.

Table 11.8 Prevalence of stunting, wasting, underweight and anaemia according to maternal BMI and Anaemia

Characteristic	Stunting (height-for-age<-2Z)			Wasting (weight-for-height<-2Z)			Underweight (weight-for-age<-2Z)			Anaemia in children		
	%	95% CI		%	95% CI		%	95% CI		%	95% CI	
Maternal nutritional status												
Thin (BMI<18.5)	25.1	21.0	29.7	17.8	14.3	22.0	31.3	26.9	36.2	29.5	24.9	34.4
Normal (BMI=18.5-24.9)	19.6	17.4	21.9	11.5	9.8	13.4	21.2	19.0	23.6	24.5	22.1	27.2
Overweight BMI=25.0-29.0)	15.2	12.2	18.8	9.7	7.4	12.7	18.3	15.1	22.1	26.5	22.6	30.9
Obese (BMI>30.0)	17.9	15.0	21.3	9.6	7.4	12.3	20.1	17.0	23.6	23.3	19.8	27.1
Maternal Anaemia												
No	23.7	20.0	27.9	10.1	7.7	13.2	23.7	20.0	27.9	34.0	29.6	38.7
Yes	17.1	15.4	19.0	11.4	9.9	13.0	19.5	17.7	21.5	23.3	21.2	25.4

11.5 Multivariable analysis for the factors Associated with Malnutrition in children aged 6-59 months

Multiple logistic regression analysis was used to determine the factors associated with undernutrition in children aged 6-59 months. Separate analyses were performed for the four outcomes - stunting, wasting, underweight and anaemia. As a large number of variables were to be included in the model, the records where some of the variables were missing / not applicable, had to be excluded from this analysis. Thus, the sample included in this analysis, was restricted to 1382 observations.

The independent variables included (covered) basic causes, underlying causes, immediate causes of child under nutrition, selected biological characteristics and maternal nutritional status. Most of the independent variables were available in the categorical form, and the numeric variables such as IDDS, MAHFP etc. were categorized before entering the model. The magnitude of association was expressed as adjusted Odds Ratio (OR) and 95 percent confidence interval (95%CI) with the p value for statistical significance.

11.5.1. Factors associated with stunting

Table 12.7 presents the results of the multivariate analysis indicating the magnitude of association of each independent variable with prevalence of stunting or wasting, and their statistical significance. The OR of 1.00 indicates the reference category.

Compared to CMC, the districts which had significantly higher risk of having stunted children were: Nuwaraeliya (OR=4.40), Badulla (OR=3.70), Trincomalee (OR=3.00), Ratnapura (OR=2.77) and Colombo (OR=2.40). Children in estate sector had 1.6 times higher risk than the urban sector, but the adjusted odds ratio was not statistically significant. Households with 7 or more members (OR=2.23) or 3 or more children (OR=6.12) were found to have a higher risk for stunting. Compared to (Contrast to) 6-11 months aged children, those in the older age categories showed an increased risk of stunting. Birth weight more than 2500 grams was strongly predictive of a lower risk (OR=0.43) of stunting. (or inversely, LBW was associated with higher risk (OR= 2.33) of stunting).

11.5.2. Factors associated with wasting

As shown in Table 11.9, likelihood of wasting was significantly low in families with 3 or more children (OR=0.47), richest wealth quintiles (OR=0.37), and received food aid (OR=0.66). Risk for wasting significantly increased with increasing age of child. Female children had lower risk (OR=0.69) of wasting than males. Birth weight more than 2500 grams was strongly predictive of lower risk (OR=0.41) of wasting. (or inversely, LBW was associated with higher risk (OR= 2.44) of wasting). Increasing maternal BMI was associated with reduced risk of wasting.

Table 11.9 Factors associated with stunting and wasting in children aged 6-59 months (n=1382)

Characteristic	Stunting (height-for-age<-2Z)			Wasting (weight-for-height<-2Z)				
	OR	95% CI	p value	OR	95% CI	p value		
Sector								
Urban	1.00			1.00				
Rural	0.77	0.46	1.30	0.330	0.87	0.39	1.95	0.728
Estate	1.62	0.70	3.72	0.256	0.58	0.15	2.31	0.440
District								
Colombo MC	1.00			1.00				
Anuradhapura	2.24	0.90	5.55	0.082	0.99	0.31	3.15	0.988
Badulla	3.70	1.55	8.87	0.003	0.65	0.21	2.02	0.451
Colombo	2.40	1.12	5.14	0.025	1.59	0.71	3.56	0.263
Hambantota	2.44	0.98	6.12	0.056	1.13	0.37	3.49	0.832
Jaffna	2.41	0.96	6.02	0.060	0.69	0.19	2.46	0.567
Karunegala	1.73	0.66	4.49	0.262	1.26	0.43	3.70	0.678
Nuwara Eliya	4.40	1.83	10.57	0.001	0.50	0.13	1.92	0.311
Ratnapura	2.77	1.12	6.85	0.027	0.90	0.27	2.97	0.863
Trincomalee	3.00	1.21	7.43	0.018	0.80	0.25	2.58	0.713
Mother's education								
No schooling	1.00			1.00				
Primary	1.03	0.40	2.64	0.951	1.27	0.34	4.75	0.724
Secondary	1.06	0.45	2.50	0.895	0.88	0.25	3.18	0.849
Passed O ¹ Level	1.11	0.46	2.67	0.822	0.63	0.17	2.31	0.489
Higher	0.73	0.28	1.90	0.515	1.34	0.35	5.14	0.669
Father's education								
No schooling	1.00			1.00				
Primary	1.01	0.40	2.56	0.982	0.55	0.19	1.62	0.279
Secondary	0.58	0.24	1.44	0.240	0.55	0.20	1.51	0.244
Passed O ¹ Level	0.77	0.30	1.93	0.571	0.80	0.29	2.21	0.665
Higher	0.84	0.20	3.59	0.810	0.17	0.01	2.03	0.162
No. of members in Household								
1-3	1.00			1.00				
4-6	1.38	0.89	2.12	0.147	1.29	0.79	2.09	0.310
≥7	2.23	1.26	3.93	0.006	1.45	0.75	2.81	0.271
No. of children less than 5 years								
1	1.00			1.00				
2	0.91	0.59	1.40	0.657	0.47	0.27	0.81	0.007
≥3	6.12	1.07	35.10	0.042				
Household Income								
< 9,000	1.00			1.00				
9,000 – 13,999	1.11	0.73	1.68	0.624	0.97	0.57	1.62	0.894
14,000 – 19,999	1.06	0.65	1.73	0.802	1.51	0.90	2.53	0.122
20,000 – 31,999	1.06	0.63	1.77	0.836	1.14	0.62	2.09	0.673
≥ 32,000	1.13	0.51	2.50	0.770	2.15	0.93	4.97	0.072
Wealth Index								
Poorest	1.00			1.00				
Lower	0.79	0.49	1.26	0.320	0.95	0.53	1.71	0.868
Middle	0.74	0.45	1.24	0.252	0.84	0.45	1.56	0.579
Upper	0.75	0.43	1.32	0.316	0.85	0.41	1.74	0.655
Highest	0.54	0.28	1.05	0.071	0.37	0.16	0.83	0.016
Percent expenditure on food								
<50 percent	1.00			1.00				
50-74 percent	1.08	0.58	2.02	0.798	1.09	0.50	2.38	0.819
75-90 percent	1.16	0.61	2.18	0.653	0.98	0.45	2.11	0.957
≥ 90 percent	1.12	0.21	6.02	0.893	1.70	0.22	13.40	0.613
Received loan								
No	1.00			1.00				
Yes	1.06	0.76	1.46	0.745	1.04	0.70	1.54	0.854
Household Received any food aid								
No	1.00			1.00				
Yes	0.99	0.71	1.39	0.973	0.66	0.44	0.99	0.042
Copying strategy (food related)								
never	1.00			1.00				
at least one	1.32	0.92	1.89	0.134	0.82	0.53	1.28	0.392
Food insecurity category								
Food Secure	1.00			1.00				
Moderately or Severely food insecure (combined)	0.75	0.17	3.35	0.704	0.67	0.10	4.54	0.678
Received advise on nutrition								
Yes	1.00			1.00				
No	1.40	0.87	2.25	0.163	0.82	0.46	1.49	0.525
Water Source								
Improved	1.00			1.00				
Not improved	0.86	0.61	1.22	0.407	1.19	0.77	1.85	0.437
Availability of latrines								
Improved	1.00			1.00				

Characteristic	Stunting (height-for-age<-2Z)				Wasting (weight-for-height<-2Z)			
	OR	95% CI	p value	OR	95% CI	p value		
Not improved	1.26	0.79	2.01	0.324	1.43	0.83	2.46	0.204
Diarrhoea								
Present	1.00				1.00			
Absent	1.39	0.70	2.79	0.347	1.15	0.56	2.39	0.702
Respiratory illness								
Present	1.00				1.00			
Absent	1.56	1.02	2.39	0.042	0.69	0.44	1.08	0.106
Child's age in months								
<6	1.00				1.00			
6-11	3.16	1.55	6.42	0.002	2.89	1.04	8.03	0.042
12-23	2.91	1.43	5.92	0.003	3.79	1.35	10.64	0.011
24-35	2.88	1.38	5.97	0.005	4.82	1.73	13.40	0.003
36-47	2.70	1.30	5.61	0.008	5.62	2.01	15.69	0.001
48-59								
Sex of child								
Male	1.00				1.00			
Female	0.96	0.71	1.30	0.803	0.69	0.49	0.99	0.042
Birth weight of child								
<2500	1.00				1.00			
≥2500	0.43	0.31	0.61	0.000	0.41	0.27	0.61	0.000
Maternal nutritional status								
Thin (BMI<18.5)	1.00				1.00			
Normal (BMI=18.5-24.9)	1.02	0.67	1.57	0.918	0.60	0.37	0.95	0.029
Overweight (BMI=25.0-29.0)	0.97	0.57	1.64	0.899	0.46	0.26	0.83	0.010
Obese (BMI>30.0)	1.01	0.52	1.97	0.966	0.18	0.07	0.47	0.000
Maternal Anaemia								
No	1.00				1.00			
YES	0.85	0.60	1.22	0.383	1.33	0.84	2.11	0.228
IDDS (Individual Dietary Diversity Score) for 6-59 months aged								
<4	1.00				1.00			
≥4	0.75	0.51	1.10	0.140	0.94	0.57	1.54	0.810
MAHFP (months of adequate household food provisioning)								
<5	1.00				1.00			
5-7.9	0.66	0.28	1.56	0.345	0.51	0.19	1.38	0.183
8-12	1.12	0.60	2.10	0.726	0.65	0.30	1.39	0.262

11.5.3 Factors associated with underweight

Table 11.10 presents the risk estimates for underweight. The risk of underweight was high among families with 7 or more members (OR=2.06), and with the increasing age of child. Children in the households of richest wealth quintile (OR=0.39) and those who received food aid (OR=0.67) were found to have lower risk for underweight. Birth weight more than 2500 grams was strongly predictive of lower risk (OR=0.36) of underweight. (or inversely, LBW was associated with higher risk (OR=2.78) of underweight). Similar to wasting, increasing maternal BMI was associated with reduced risk of underweight.

11.5.4 Factors associated with anaemia in children

Table 11.10 shows that children in the Jaffna district had a significantly higher risk of anaemia. Female children had a significantly lower risk for anaemia (OR=0.67) compared with male children. Children in households of richest wealth quintile (OR=0.56) and spent 50-74 percent of expenditure on food (OR=0.51) were found to have lower likelihood for anaemia. Risk of anemia shows a significant decline with increasing age of the children, and did not show any association with the birth weight of child. Children with individual dietary diversity score (IDDS) of 4 or more had a lower risk (OR=0.51) of anaemia. There were two significant associations that need explanation. First, compared

to urban sector, children in the rural and estate sectors had lower risk for anaemia. Second, Children of anaemic mothers had lower risk (OR=0.51) for anaemia.

Table 11.10 Factors associated with underweight and anaemia in children aged 6-59 months (n=1382)

Characteristic	Underweight (height-for-age<-2Z)			Anaemia (Hb<11.0 g/dl)				
	OR	95% CI	P value	OR	95% CI	P value		
Sector								
Urban	1.00			1.00				
Rural	0.90	0.52	1.70	0.847	0.42	0.72	0.002	
Estate	0.62	0.25	1.53	0.298	0.35	0.14	0.89	0.028
District								
Colombo MC	1.00			1.00				
Anuradhapura	0.93	0.40	2.18	0.873	1.59	0.75	3.39	0.227
Badulla	1.00	0.43	2.28	0.991	1.61	0.76	3.42	0.072
Colombo	1.00	0.53	1.91	0.995	0.96	0.52	1.78	0.895
Hambantota	0.97	0.42	2.27	0.952	1.30	0.57	2.98	0.532
Jaffna	0.42	0.17	1.05	0.064	2.52	1.13	5.61	0.024
Karunegala	0.88	0.38	2.05	0.763	0.88	0.39	1.98	0.749
Nuwara Eliya	1.19	0.51	2.76	0.684	1.03	0.44	2.41	0.942
Ratnapura	0.90	0.37	2.20	0.825	2.05	0.94	4.49	0.214
Trincomalee	0.67	0.28	1.60	0.362	1.77	0.80	3.93	0.158
Mother's education								
No schooling	1.00			1.00				
Primary	1.97	0.69	5.59	0.203	1.56	0.53	4.60	0.423
Secondary	1.27	0.47	3.49	0.637	1.11	0.40	3.05	0.838
Passed O' Level	1.36	0.49	3.78	0.550	1.14	0.41	3.18	0.805
Higher	1.40	0.49	4.04	0.530	1.01	0.35	2.91	0.984
Father' education								
No schooling	1.00			1.00				
Primary	0.63	0.26	1.49	0.290	1.18	0.44	3.19	0.744
Secondary	0.57	0.25	1.32	0.189	1.18	0.45	3.07	0.738
Passed O' Level	0.65	0.28	1.52	0.319	1.38	0.52	3.65	0.520
Higher	0.58	0.15	2.24	0.427	1.65	0.43	6.38	0.464
No. of members in Household								
1-3	1.00			1.00				
4-6	1.33	0.90	1.97	0.151	1.39	0.95	2.06	0.093
≥7	2.06	1.21	3.50	0.007	1.48	0.86	2.55	0.160
No. of children less than 5 years								
1	1.00			1.00				
2	0.88	0.59	1.30	0.523	0.76	0.49	1.19	0.237
≥3	1.27	0.14	11.64	0.832				
Household Income								
< 9,000	1.00			1.00				
9,000 – 13,999	1.21	0.83	1.77	0.320	0.86	0.57	1.28	0.455
14,000 – 19,999	1.28	0.83	1.97	0.268	1.09	0.70	1.69	0.702
20,000 – 31,999	0.80	0.49	1.32	0.390	1.09	0.68	1.74	0.732
≥ 32,000	1.01	0.50	2.05	0.979	1.26	0.62	2.57	0.527
Wealth Index								
Poorest	1.00			1.00				
Lower	0.87	0.56	1.36	0.541	1.12	0.70	1.78	0.641
Middle	0.70	0.43	1.15	0.160	0.88	0.54	1.43	0.604
Upper	0.81	0.48	1.38	0.444	1.05	0.63	1.75	0.859
Highest	0.39	0.21	0.74	0.004	0.56	0.31	1.00	0.052
Percent expenditure on food								
<50 percent	1.00			1.00				
50-74 percent	0.92	0.51	1.67	0.785	0.51	0.29	0.89	0.019
75-90 percent	0.81	0.44	1.49	0.503	0.64	0.36	1.12	0.119
≥ 90 percent	3.10	0.45	21.28	0.250	0.90	0.14	5.77	0.913
Received loan								

Characteristic	Underweight (height-for-age<-2Z)				Anaemia (Hb<11.0 g/dl)			
	OR	95% CI		P value	OR	95% CI		P value
No	1.00				1.00			
Yes	1.04	0.76	1.41	0.819	0.98	0.73	1.32	0.896
Household Received any food aid								
No	1.00				1.00			
Yes	0.67	0.50	0.91	0.009	1.07	0.78	1.46	0.685
Copying strategy (food related)								
never	1.00				1.00			
at least one	1.04	0.74	1.46	0.833	1.03	0.73	1.44	0.883
Food insecurity category								
Food Secure	1.00				1.00			
Moderately or Severely food insecure (combined)	0.27	0.04	1.64	0.154	0.64	0.11	3.61	0.610
Received advise on nutrition								
Yes	1.00				1.00			
No	1.31	0.85	2.03	0.226	0.85	0.54	1.34	0.495
Water Source								
Improved	1.00				1.00			
Not improved	0.99	0.71	1.39	0.972	0.81	0.58	1.15	0.239
Availability of latrines								
Improved	1.00				1.00			
Not improved	1.47	0.95	2.29	0.084	0.97	0.62	1.54	0.911
Diarrhoea								
Present	1.00				1.00			
Absent	1.04	0.58	1.88	0.894	1.00	0.58	1.72	0.996
Respiratory illness								
Present	1.00				1.00			
Absent	0.92	0.63	1.34	0.657	0.95	0.65	1.37	0.765
Child's age in months								
<6	1.00				1.00			
6-11	3.20	1.54	6.66	0.002	0.35	0.22	0.56	0.000
12-23	4.84	2.34	10.02	0.000	0.22	0.14	0.34	0.000
24-35	4.53	2.17	9.45	0.000	0.15	0.09	0.24	0.000
36-47	5.00	2.42	10.32	0.000	0.10	0.06	0.17	0.000
48-59								
Sex of child								
Male	1.00				1.00			
Female	0.89	0.68	1.18	0.435	0.67	0.51	0.89	0.005
Birth weight of child								
<2500	1.00				1.00			
≥2500	0.36	0.26	0.49	0.000	0.77	0.54	1.11	0.158
Maternal nutritional status								
Thin (BMI<18.5)	1.00				1.00			
Normal (BMI=18.5-24.9)	0.69	0.47	1.00	0.051	0.98	0.65	1.46	0.904
Overweight (BMI=25.0-29.0)	0.67	0.42	1.05	0.083	0.95	0.59	1.50	0.814
Obese (BMI>30.0)	0.39	0.20	0.75	0.005	1.08	0.61	1.91	0.782
Maternal Anaemia								
No	1.00				1.00			
YES	0.90	0.64	1.26	0.535	0.51	0.37	0.70	0.000
IDDS (Individual Dietary Diversity Score) for 6-59 months aged								
<4	1.00				1.00			
≥4	0.85	0.59	1.22	0.388	0.66	0.46	0.96	0.029
MAHFP (Months of adequate household food provisioning)								
<5	1.00				1.00			
5-7.9	0.76	0.36	1.62	0.482	1.00	0.42	2.39	0.995
8-12	0.94	0.50	1.61	0.726	1.90	0.97	3.75	0.063

Chapter 12

Factors Associated with nutritional status of women

Nutritional status of non-pregnant women in the age group 15 – 49 years from the households included in the study was described using BMI and haemoglobin levels as indicators of thinness and overweight and anaemia respectively. Three categories of women were identified based on BMI– thin (<18.5), normal (18.5-24.9) and overweight/obese (≥ 25). The correlates included in the study belonged to two broad categories : those related to socio-economic factors and to food security .

12.1 Socio-demographic characteristics

As shown in Table 13.7, the percentage of ‘thin’ women was significantly higher among women aged less than 30 years, especially among the teenagers. Women who had only one child were found to be associated with low BMI, possibly due to the confounding effect of age. The percentage of ‘thin’ women was significantly higher in the estate sector and districts of Ratnapura, Badulla and Nuwara Eliya. Higher prevalence of ‘thin’ mothers was significantly associated with households with the lowest income quintile, poorest wealth quintile and ‘not having electricity’.

In contrast, overweight and/or obesity in women were significantly higher after 30 years of age, in the urban sector, Colombo MC and Colombo district, highest income and wealth quintiles and households with electricity.

Prevalence of anaemia was significantly higher among women aged 40 years and above, lived in the estate sector or Jaffna district, and who had no schooling and no electricity.

Table 12.1 Prevalence (95%) of thin, normal, overweight/obese and anaemia in non-pregnant women by background characteristics

Characteristic	Thin (BMI <18.5)			Normal (BMI=18.5-24.9)			Overweight / Obese BMI $\geq 25.0-29.0$			Anaemia		
	%	95% CI		%	95% CI		%	95% CI		%	95% CI	
Women's age in yrs												
<20	40.5	30.5	51.3	45.2	35.0	55.9	14.3	8.3	23.5	23.5	15.5	33.9
20-29	22.5	19.9	25.3	54.7	51.4	57.9	22.9	20.3	25.7	20.6	18.1	23.4
30-39	12.9	10.9	15.2	51.8	48.6	55.0	35.3	32.3	38.4	21.3	18.7	24.0
40-49	14.2	10.1	19.6	50.7	44.0	57.4	35.1	28.9	41.8	32.2	26.3	38.8
No. of members in Household												
1-3	21.8	17.6	26.7	50.8	45.3	56.2	27.4	22.8	32.6	19.3	15.4	24.0
4-6	15.8	14.0	17.8	53.5	50.8	56.1	30.7	28.3	33.2	22.9	20.8	25.3
≥ 7	18.1	14.3	22.7	52.9	47.5	58.2	29.0	24.4	34.1	23.2	19.0	28.0
No. of children less than 5 years												
1	21.4	18.0	25.3	50.4	46.0	54.8	28.2	24.4	32.3	21.5	18.0	25.4
2	14.3	11.4	17.7	56.0	51.5	60.4	29.8	25.8	34.0	22.7	19.1	26.7
≥ 3	15.7	13.3	18.5	51.0	47.5	54.6	33.2	30.0	36.7	21.6	18.8	24.7
Sector												
Urban	11.2	8.8	14.2	45.5	41.3	49.8	43.3	39.1	47.5	21.3	18.0	25.0
Rural	18.7	16.8	20.7	55.4	52.9	57.9	25.9	23.8	28.2	21.5	19.5	23.7
Estate	42.6	34.2	51.5	50.0	41.2	58.8	7.4	3.9	13.6	33.6	25.8	42.4
District												
Anuradhapura	16.9	12.3	22.7	53.7	46.8	60.5	29.4	23.5	36.0	22.4	17.1	28.7

Characteristic	Thin (BMI <18.5)			Normal (BMI=18.5-24.9)			Overweight / Obese (BMI ≥ 25.0-29.0)			Anaemia		
	%	95% CI		%	95% CI		%	95% CI		%	95% CI	
Badulla	24.0	19.0	29.9	51.5	45.1	57.9	24.5	19.4	30.4	16.6	12.3	22.0
Colombo	12.1	8.4	17.3	52.8	46.1	59.4	35.0	28.9	41.7	21.7	16.7	27.8
Colombo MC	9.5	6.4	14.0	39.0	32.9	45.4	51.5	45.1	57.9	24.1	19.0	30.1
Hambantota	20.4	15.5	26.4	52.6	45.9	59.3	27.0	21.4	33.4	21.4	16.4	27.4
Jaffna	20.4	15.6	26.2	57.5	50.9	63.8	22.2	17.2	28.1	35.3	29.3	41.9
Karunegala	19.2	14.1	25.6	49.5	42.2	56.7	31.3	25.0	38.4	14.9	10.4	21.0
Nuwara Eliya	22.5	17.0	29.0	59.9	52.7	66.7	17.6	12.8	23.8	23.9	18.4	30.6
Ratnapura	25.3	20.2	31.2	56.5	50.2	62.7	18.1	13.7	23.6	24.2	19.2	30.0
Trincomalee	12.0	8.4	16.8	54.3	47.9	60.6	33.8	28.0	40.1	16.2	12.0	21.5
Mother's education												
No schooling	19.6	11.2	32.1	57.1	44.0	69.4	23.2	14.0	36.0	30.4	19.8	43.5
Primary	23.1	17.2	30.3	52.5	44.8	60.1	24.4	18.3	31.6	26.9	20.6	34.3
Secondary	18.1	15.4	21.2	49.4	45.7	53.2	32.4	29.0	36.1	23.8	20.8	27.2
Passed O' Level	18.5	15.9	21.4	54.2	50.7	57.7	27.3	24.3	30.6	23.1	20.2	26.3
Higher	15.2	12.2	18.8	54.1	49.6	58.6	30.7	26.6	35.0	15.9	12.8	19.5
Husbands' education												
No schooling	25.9	16.2	38.6	60.3	47.3	72.0	13.8	7.0	25.2	22.4	13.5	34.9
Primary	18.2	14.0	23.3	57.6	51.6	63.4	24.2	19.4	29.6	26.2	21.3	31.9
Secondary	20.4	17.7	23.5	48.4	44.9	52.0	31.2	28.0	34.6	22.4	19.6	25.5
Passed O' Level	12.8	10.6	15.3	55.4	51.9	58.9	31.8	28.7	35.1	20.5	17.8	23.4
Higher	10.4	4.4	22.7	52.1	38.1	65.7	37.5	25.1	51.9	24.0	14.2	37.7
Household Income												
< 9,000	21.9	19.1	25.0	52.4	48.8	56.0	25.7	22.7	29.0	25.0	22.1	28.3
9,000 – 13,999	15.9	12.6	19.7	55.4	50.5	60.1	28.8	24.6	33.4	22.7	18.9	27.1
14,000 – 19,999	12.2	9.0	16.2	56.8	51.4	62.1	31.0	26.2	36.2	20.2	16.2	24.9
20,000 – 31,999	16.0	12.5	20.2	49.0	43.8	54.2	35.0	30.2	40.2	20.2	16.3	24.7
≥ 32,000	9.6	5.8	15.5	51.4	43.3	59.4	39.0	31.5	47.2	19.2	13.6	26.4
Type of Income												
Daily paid irregular	13.9	9.9	19.1	51.1	44.6	57.6	35.0	29.0	41.5	21.4	16.4	27.3
Daily paid regular	19.9	17.0	23.0	49.9	46.1	53.6	30.3	27.0	33.9	22.4	19.4	25.7
Weekly	17.8	10.6	28.3	57.5	46.0	68.3	24.7	16.1	35.8	28.4	19.3	39.7
Monthly	16.6	14.2	19.3	53.4	49.9	56.8	30.0	27.0	33.3	21.7	19.0	24.6
Seasonal	13.5	9.5	18.7	63.7	57.1	69.9	22.8	17.7	28.9	25.2	19.9	31.5
Wealth Index												
Poorest	26.2	22.2	30.5	57.4	52.7	62.0	16.4	13.2	20.2	26.7	22.8	31.1
Lower	22.1	18.3	26.4	53.1	48.2	57.9	24.8	20.9	29.2	27.0	22.9	31.5
Middle	19.4	15.9	23.5	50.0	45.2	54.8	30.6	26.3	35.2	22.4	18.6	26.7
Upper	13.1	10.2	16.7	52.1	47.4	56.9	34.8	30.4	39.4	17.0	13.7	20.9
Highest	11.0	8.5	14.2	50.6	46.2	55.1	38.3	34.1	42.8	18.3	15.1	22.0
Ownership of lands												
Available and in use	17.5	14.8	20.6	56.9	53.1	60.7	25.5	22.3	29.0	22.1	19.1	25.4
Available, not in use	17.5	14.4	21.2	56.5	52.0	60.8	26.0	22.3	30.2	22.2	18.7	26.1
Not available	18.3	15.0	22.2	54.9	50.2	59.5	26.8	22.8	31.1	23.8	20.0	28.0
Ownership of livestock												
Owned	17.3	13.8	21.4	57.3	52.3	62.2	25.4	21.3	30.0	28.2	23.9	33.0
Not owned	17.1	15.4	19.0	51.9	49.5	54.3	31.0	28.8	33.2	21.1	19.2	23.2
Availability of Electricity												
Available	15.0	13.3	16.8	51.6	49.1	54.1	33.4	31.1	35.8	20.4	18.5	22.5
Not available	24.6	20.8	28.7	57.5	52.9	61.9	18.0	14.7	21.8	29.3	25.3	33.7
Water Source												
Improved	21.6	18.4	25.2	54.9	50.7	59.0	23.6	20.2	27.3	23.2	19.9	26.9
Not improved	15.5	13.7	17.4	52.2	49.6	54.8	52.9	50.7	55.1	22.1	20.0	24.3
Availability of latrines												
Improved	16.8	15.1	18.7	52.6	50.2	54.9	30.6	28.5	32.8	22.4	20.4	24.4
Not improved	19.2	15.0	24.3	55.1	49.2	60.8	25.7	20.9	31.2	22.7	18.2	28.1
Overall	18.2	16.6	19.9	52.6	50.5	54.7	29.2	27.3	31.2	22.2	20.4	24.0

12.2 Food insecurity

Percentage of ‘thin’ women was higher in households that spent 90 percent or more on food and have much less comparative food stocks, but the differences were not statistically significant. The households which adopted a coping strategy or belonged to moderate-to-severe food insecure reported significantly higher percentage of ‘thin’ women. On the other hand, prevalence of overweight/ obese women were significantly higher in households that spent less than 50 percent on food. Anaemia was high among those households who received food aid.

There was an increasing trend in the mean scores of Household Dietary Diversity Score (HDDS), months of adequate household food provisioning (MAHFP), household food consumption adequacy score (HFCAS) and number of days of food stock last , increased from those households with thin, normal and overweight/obese mothers in that order, indicating that households with poor food availability are at risk of under nutrition. Non-anaemic women had marginally higher scores than anaemic women, but these differences were non-significant.

Table 12.2 Prevalence (95%) of thin, normal, overweight/obese and anaemia in non-pregnant women by indicators of food insecurity

Characteristic	Thin (BMI <18.5)		Normal (BMI=18.5-24.9)		Overweight + Obese (BMI ≥ 25.0-29.0)		Anaemia	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Percent expenditure on food								
<50 percent	14.9	9.6 22.4	47.9	39.2 56.8	37.2	29.0 46.1	15.4	9.9 23.1
50-74 percent	13.9	11.4 16.9	50.6	46.6 54.5	35.5	31.8 39.4	20.2	17.2 23.6
75-90 percent	17.4	14.9 20.2	54.2	50.7 57.7	28.4	25.3 31.6	22.8	20.0 25.9
≥ 90 percent	19.9	16.7 23.6	55.1	50.7 59.3	25.0	21.4 28.9	22.6	19.1 26.4
Number of months with food inadequacy								
<1	24.4	16.5 34.6	45.3	35.1 56.0	30.2	21.5 40.7	21.2	13.7 31.2
1-3	17.7	13.4 23.1	54.9	48.5 61.1	27.4	22.1 33.5	24.5	19.4 30.4
4-6	24.5	16.8 34.2	55.3	45.2 65.1	20.2	13.3 29.6	26.1	18.1 36.0
7-12	24.2	17.6 32.4	52.3	43.7 60.9	23.4	16.9 31.6	26.6	19.6 35.1
Comparative size of food stock								
More	17.9	14.3 22.1	52.6	47.5 57.6	29.5	25.1 34.4	18.3	14.7 22.7
Same	15.8	13.2 18.9	51.3	47.4 55.2	32.9	29.4 36.7	23.1	19.9 26.5
Less	15.3	12.6 18.6	53.3	49.1 57.3	31.4	27.7 35.3	21.2	18.0 24.9
Much less	23.4	17.4 30.7	46.1	38.4 54.0	30.5	23.8 38.2	24.0	17.9 31.4
Received loan								
No	15.9	13.9 18.2	51.8	48.9 54.7	32.3	29.6 35.1	20.3	18.1 22.8
Yes	18.9	16.0 22.1	51.9	48.0 55.8	29.2	25.8 32.9	24.3	21.1 27.8
Household Received any food aid								
No	15.6	13.4 18.1	50.7	47.6 53.9	33.6	30.7 36.7	19.2	16.7 21.8
Yes	18.6	16.1 21.4	53.0	49.7 56.4	28.4	25.4 31.5	24.7	21.9 27.8
Coping strategy (food related)								
never	14.5	12.6 16.7	52.5	49.6 55.4	33.0	30.4 35.8	21.2	18.9 23.7
at least one	21.5	18.5 24.8	51.1	47.2 54.9	27.5	24.2 31.0	22.2	19.2 25.6
Food insecurity category								
Food Secure	15.7	14.0 17.6	52.3	49.8 54.7	32.0	29.8 34.4	21.1	19.2 23.3
Moderately food insecure + Severely food insecure (combined)	24.4	19.3 30.5	50.2	43.7 56.7	25.3	20.1 31.4	26.0	20.6 32.2

Characteristic	Thin (BMI <18.5)		Normal (BMI=18.5-24.9)		Overweight + Obese (BMI ≥ 25.0-29.0)		Anaemia	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Comparison of Scores	Thin		Normal		overweight/obese		ane ami c	non- anaemi c
	mean (95 CI)		mean (95 CI)		mean (95 CI)		mean (95 CI)	
Household Dietary Diversity Score (HDDS)	7.76 (7.59, 7.94)		7.95 (7.85, 8.05)		8.23 (8.10, 8.36)		7.87 (7.71, 8.02)	8.04 (7.96, 8.12)
Months of adequate household food provisioning (MAHFP)	10.00 (9.61, 10.39)		10.50 (10.31, 10.69)		10.83 (10.60, 11.05)		10.19 (9.85, 10.76)	10.60 (10.45, 10.76)
No of days of food stock last	5.39 (4.76, 6.01)		5.96 (5.50, 6.43)		6.10 (5.50, 6.63)		5.60 (4.96, 6.25)	5.98 (5.61, 6.35)
Household food consumption adequacy score (HFCAS)	66.85 (65.09, 68.61)		68.42 (67.49, 69.35)		71.30 (70.02, 72.57)		5.60 (4.96, 6.25)	5.98 (5.61, 6.35)

12.3 Multivariable analysis for the factors associated with malnutrition in non-pregnant women

Multiple logistic regression analysis was used to determine the factors associated with malnutrition in mothers of children 15-49 years of age. Separate analyses were performed for the three outcomes – thinness (BMI<18.5 kgm⁻²), overweight and obesity (BMI≥ 25 kgm⁻²) and anaemia. With varying number of missing values, the final sample was restricted to 1974 observations. The independent variables included background socio-economic characteristics and some indicators of food security. Most of the independent variables were available in the categorical form, and the numeric variables such as HDDS, MAHFP etc. were categorized before entering the model. The magnitude of association was expressed as adjusted Odds Ratio (OR) and 95 percent confidence interval (95%CI) with the p value for statistical significance.

12.3.1 Factors associated with thinness

As shown in Table 12.9, increasing age of women was associated with a lower risk for thinness. Women in the estate sector had almost 5 times (OR=4.9) risk of being thin, compared to those in the urban sector. Thinness in women was less likely with better socio-economic factors such as husband's education (O/Level and above OR=0.48), higher family income (Income 14000-19999 OR=0.64), and higher wealth index (richest OR=0.39).

12.3.2 Factors associated with overweight/obesity

In contrast to thinness, women in the estate sector had lower (OR=0.21) risk of being overweight/obese compared to urban sector (Table 12.9). Compared to the Colombo MC, risk of overweight/obesity was low in certain districts: Ratnapura (OR=0.46), Jaffna (OR=0.50), Colombo (OR=0.52), Hambantota (OR=0.57), and Badulla (OR=0.56). Increasing level of husband's education and wealth quintiles were strong correlates for the risk of having overweight/obesity in women.

12.3.3 Factors associated with anaemia

Table 12.9 shows that, risk of anaemia is almost 2.5 times higher (OR=2.48) among women in the estate sector than those in the urban sector. Compared to the Colombo MC, risk of anaemia was low in the districts of districts: Nuwara Eliya (OR=0.41), Hambantota (OR=0.51), Trincomalee OR=0.49), Kurunegala (OR=0.49) and Badulla (OR=0.46). The risk of anaemia was significantly higher (OR=1.86) when the expenditure on food as a percentage of household income was above 90 percent.

Table 12.9 Factors associated with thinness, overweight/obesity and anaemia in non-pregnant women (n=1974)

Characteristic	Thinness (BMI <18.5)				Overweight / Obese (BMI ≥)				Anaemia			
	OR	95% CI		p value	OR	95% CI		p value	OR	95% CI		p value
Women's age in yrs												
<20	1.00				1.00				1.00			
20-29	0.58	0.29	1.17	0.129	1.12	0.50	2.55	0.779	0.71	0.46	1.49	0.109
30-39	0.31	0.15	0.63	0.001	2.08	0.92	4.70	0.080	0.80	0.40	1.61	0.531
40-49	0.32	0.14	0.69	0.004	1.90	0.80	4.47	0.143	1.54	0.74	3.21	0.251
No. of children less than 5 years												
1	1.00				1.00				1.00			
2	0.71	0.49	1.01	0.059	0.86	0.65	1.14	0.304	0.93	0.70	1.25	0.641
≥3	0.72	0.54	0.97	0.030	1.02	0.80	1.30	0.870	1.06	0.84	1.35	0.609
Sector												
Urban	1.00				1.00				1.00			
Rural	1.21	0.67	2.18	0.525	0.72	0.50	1.03	0.072	1.26	0.84	1.87	0.260
Estate	4.92	2.11	11.50	0.000	0.21	0.09	0.49	0.000	2.48	1.30	4.74	0.006
District												
Colombo MC	1.00				1.00				1.00			
Anuradhapura	1.36	0.58	3.21	0.481	0.67	0.38	1.17	0.157	0.66	0.36	1.21	0.177
Badulla	1.45	0.65	3.26	0.366	0.56	0.33	0.97	0.039	0.46	0.25	0.83	0.010
Colombo	1.14	0.55	2.35	0.719	0.53	0.34	0.82	0.004	0.81	0.50	1.30	0.381
Hambantota	1.92	0.81	4.58	0.139	0.57	0.32	1.00	0.048	0.52	0.28	0.95	0.034
Jaffna	1.18	0.51	2.72	0.703	0.50	0.28	0.89	0.019	1.33	0.74	2.37	0.337
Kurunegala	1.87	0.81	4.35	0.144	0.69	0.39	1.21	0.197	0.49	0.27	0.91	0.023
Nuwara Eliya	0.65	0.24	1.74	0.394	0.63	0.35	1.15	0.132	0.41	0.21	0.80	0.009
Ratnapura	1.66	0.71	3.86	0.241	0.46	0.26	0.82	0.008	0.59	0.32	1.07	0.085
Trincomalee	0.58	0.23	1.46	0.251	0.95	0.56	1.61	0.842	0.49	0.27	0.89	0.019
Mother's education												
No schooling	1.00				1.00				1.00			
Primary	2.38	0.94	6.05	0.067	0.72	0.28	1.86	0.498	0.73	0.35	1.54	0.408
Secondary	2.07	0.85	5.06	0.112	1.02	0.42	2.51	0.964	0.77	0.38	1.56	0.472
Passed O' Level	2.30	0.93	5.68	0.072	0.80	0.32	1.99	0.633	0.83	0.40	1.72	0.624
Higher	2.19	0.84	5.66	0.107	0.73	0.29	1.84	0.503	0.67	0.31	1.44	0.308
Husbands' education												
No schooling	1.00				1.00				1.00			
Primary	0.52	0.25	1.10	0.086	2.78	1.07	7.20	0.035	1.21	0.63	2.32	0.568
Secondary	0.72	0.35	1.48	0.372	3.37	1.34	8.50	0.010	0.98	0.52	1.85	0.950
Passed O' Level	0.48	0.23	0.99	0.048	3.46	1.38	8.72	0.008	0.97	0.50	1.86	0.916
Higher	0.47	0.13	1.72	0.252	3.79	1.25	11.43	0.018	1.40	0.55	3.53	0.481
Household Income												
< 9,000	1.00				1.00				1.00			
9,000 – 13,999	0.71	0.50	1.03	0.070	0.95	0.70	1.28	0.714	1.07	0.79	1.45	0.649
14,000 – 19,999	0.64	0.42	0.99	0.045	0.83	0.59	1.17	0.283	1.05	0.75	1.47	0.785
20,000 – 31,999	1.16	0.76	1.76	0.491	0.78	0.56	1.09	0.147	1.28	0.90	1.81	0.167
≥ 32,000	0.68	0.35	1.33	0.257	0.88	0.56	1.40	0.593	1.38	0.85	2.24	0.188
Wealth Index												
Poorest	1.00				1.00				1.00			
Lower	0.88	0.61	1.28	0.514	1.40	0.96	2.04	0.080	1.17	0.84	1.63	0.349
Middle	0.72	0.49	1.07	0.105	1.58	1.07	2.33	0.020	1.17	0.82	1.66	0.380
Upper	0.46	0.29	0.72	0.001	1.98	1.34	2.93	0.001	0.89	0.61	1.31	0.560
Highest	0.39	0.23	0.67	0.001	2.07	1.35	3.19	0.001	0.79	0.52	1.22	0.291
Percent expenditure on food												
<50 percent	1.00				1.00				1.00			
50-74 percent	0.98	0.55	1.76	0.958	1.18	0.76	1.82	0.464	1.20	0.75	1.91	0.450

Characteristic	Thinness (BMI <18.5)				Overweight / Obese (BMI ≥)				Anaemia			
	OR	95% CI		p value	OR	95% CI		p value	OR	95% CI		p value
75-90 percent	0.87	0.48	1.58	0.652	1.12	0.71	1.77	0.615	1.13	0.71	1.82	0.604
≥ 90 percent	0.97	0.50	1.86	0.918	0.86	0.50	1.47	0.582	1.86	1.11	3.13	0.019
HDDS (Household Dietary Diversity Score)												
<4	1.00				1.00				1.00			
≥4	0.99	0.59	1.67	0.977	0.82	0.51	1.33	0.421	0.91	0.60	1.39	0.667
	1.01	0.60	1.70	0.960	1.09	0.68	1.75	0.709	0.92	0.61	1.39	0.684
MAHFP (months of adequate household food provisioning)												
<5	1.00				1.00				1.00			
5-7.9	1.32	0.70	2.49	0.396	0.89	0.48	1.67	0.719	0.74	0.42	1.29	0.285
8-12	0.96	0.59	1.55	0.861	1.16	0.73	1.85	0.533	0.74	0.37	1.08	0.406

Chapter 13

DISCUSSION

The Nutrition and Food Security Survey (NFSS) was carried out with the objective of identifying the most vulnerable populations in relation to their nutritional status. This study enabled the assessment of the prevalence of wasting, stunting, underweight and anaemia in children less than 5 years of age, and BMI and anaemia among mothers of these children. A wide range of factors associated with under-nutrition of these children were studied, based on the UNICEF Impact framework. These include: basic causes, underlying and immediate causes.

Sri Lanka Demographic and Health Survey (DHS) 2006/07 has also studied the nutritional status of under five children and women. Due to methodological differences between the two surveys, there are limitations in making direct comparisons between the findings from the present study with those of DHS 2006/7. However, it was considered useful to compare the main findings as both studies were based on large household samples, used the same indicators and methods in the assessment of nutritional status and were carried out within a three year period.

Findings from the NFSS showed that among all children in the age group 0–59 months, 19.2 percent were stunted, 11.7 percent wasted and 21.6 percent underweight and the comparable prevalence rates reported in the DHS 2006/07 were : 17.3 percent stunted, 14.7 percent wasted and 21.1 percent underweight . The main differences seen were the marginally higher prevalence of stunting and lower prevalence of wasting in the present study. According to the DHS data, prevalence of overweight as indicated by weight for height more than +2SD, among under five children was 1.6 percent which is marginally higher than that reported in the present study, 0.9 percent .

To analyze associations in respect of child under nutrition, appropriate cross-tabulations were made between selected indicators and other variables, comparing the prevalence estimates across subgroups using 95% confidence intervals. The differences that are observed to be statistically significant are discussed.

Stunting and underweight rates were significantly higher in the estate sector than the urban and rural, but the rates of wasting and anaemia were not significantly different between sectors. The prevalence of stunting was high in the districts of Nuwara Eliya, and Badulla, and wasting high in the district of Colombo, underweight in Nuwara Eliya and Ratnapura, and anaemia in Jaffna. In general, the increasing level of maternal and paternal education were associated with lower prevalence of stunting and underweight. Increase in family size and number of children under 5 years in the family, were predictive of higher level of stunting.

Data from the DHS 2006/07 are presented only as comparisons between the sub categories. These findings indicate that prevalence of stunting was high in the districts of Nuwara Eliya and Badulla. A reduction in stunting was seen with improved maternal educational status and higher wealth quintiles. All these associations are similar to those shown in the present study. The declining trends

in all three nutritional status indicators among children with increasing maternal BMI values as shown in the present study were similar to the observations made in the DHS 2006/07.

Prevalence of anaemia among the children aged 6 - 59 months was marginally higher in males and showed a consistent decline with increasing age (from 6 months onwards) which was statistically significant. The latter observation is likely to be associated with the diverse food items introduced to the child's diet after the period of exclusive breast feeding.

An important additional feature in the NFSS was the component that focused on food security and coping strategies. Comparable data are not available from DHS or other sources. Important associations between under nutrition and indicators of food insecurity were identified. Higher prevalence of under nutrition was significantly associated with: an increase in the expenditure on food as a percentage of total household expenditure, households with a lower dietary diversity score and those who adopted one of more food related coping strategies and/or took loans.

Though not significant, children in the food insecure household reported a higher prevalence of stunting, wasting, underweight and anaemia. An upward trend in all three anthropometric indicators were seen with increasing duration of food inadequacy. Dietary diversity score of young children (6-23 months) was significantly lower among the stunted group.

Study of care practices among under five children showed that those who visited child welfare clinics (CWC) reported a significantly higher prevalence of underweight, and higher, but non-significant, prevalence of stunting and wasting. This phenomenon could be related to the fact that mothers of undernourished children are actively encouraged to attend CWCs. The likely benefits of such attendance are shown by the significantly lower level of stunting seen among children of mothers who received advice on growth, nutrition and early childhood development. Having received vitamin A mega dose at least once was linked with a lower prevalence of anaemia but was not related to any of the other indicators.

Prevalence of stunting was significantly higher during the fourth year of life, compared to infancy, and the prevalence of wasting and underweight high from 3rd to 5th years of life. Stunting being a result of long term under nutrition, is likely to increase with increasing age, especially in the pre school age group showing an increase in the prevalence. Reported data from DHS indicate the highest prevalence of stunting in the 18-35 month age group showing a decline thereafter, with no clear pattern in the prevalence of wasting.

There were no sex difference associated with any of the anthropometric indicators. Children with low birth weight were found to have a significantly higher prevalence of stunting, wasting and underweight, more than double of those with normal birth weight, suggesting the importance of nutrition in-utero as a factor influencing the nutritional status of the young child. These associations were consistently present when the mean birth weights were compared between undernourished and normal children.

Nutritional status of mothers of under five children, who were not pregnant and in the age group 15 – 49 years was assessed using BMI as an indicator of thinness and overweight. The percentages of women identified as 'thin' was 18.2 with that of overweight and obese women were 22.5 percent and 6.7 percent respectively. Comparable data from DHS 2006/07 indicate the prevalence of thinness to be 16.2 with that for overweight and obesity being 24.0 and 7.2 percent, respectively.

Associated factors for thinness among this group of women when compared between the NFSS and the DHS 2006/07 showed similarities except for the inter district differences. Both studies show that the percentage of 'thin' women was significantly higher among those aged less than 30 years, especially among the teenagers, in the estate sector and in the lowest income group, and the poorest wealth quintile. In the present study, the districts that showed high prevalence of thinness were: Ratnapura, Badulla and Nuwara Eliya. In the DHS 2006/07, high prevalence of thinness were reported from the districts of Moneragala and Matale which were not included in the NFSS.

Prevalence of 'thin' mothers was significantly higher among those who had only one child, which may be possibly due to the confounding effect of age. In contrast, overweight and/or obese women were significantly higher after 30 years of age, in the urban sector, Colombo MC and Colombo district, and in the groups belonging to higher income levels and wealth quintiles. Prevalence of anaemia was significantly higher among women aged 40 years and above, lived in the estate sector, in Jaffna district, and who had no schooling.

Food related indicators were important factors that influenced the nutritional status of the women studied. Even though not statistically significant, the percentage of 'thin' women was higher in households that spent 90 percent or more of household expenditure on food. The households which adopted a coping strategy or belonged to moderate-to-severe food insecure category reported a significantly higher percentage of 'thin' women. It was also shown that prevalence of overweight/obese women were significantly higher in households that spent less than 50 percent on food.

Mean scores of Household Dietary Diversity Score (HDDS), number of months of adequate household food provisioning (MAHFP), household food consumption adequacy score (HFCAS) and number of days of food stock last, all indicate different aspects of food availability at the household level. Comparison of the mean scores of these indicators across 3 BMI categories shows an increase from 'thin' to 'overweight/obese'. This indicates that mothers belonging to households with 'improved' food availability are less vulnerable to thinness.

Multiple logistic regression analysis was used to determine the factors associated with undernutrition in children aged 6-59 months and non-pregnant women aged 15-49 years. Findings of the multivariable analysis supported many of the factors identified through the bivariate analyses.

Though at the planning stage of the study, a multi stage randomized cluster sampling technique was used to identify the sample, there were a few limitations posed during the implementation phase. They included "absentee bias": when the survey teams were not able to return to households in which no one was home when first visited. In some districts, the non-response rate was higher than 5%, weakening the representativeness of the data. In a few districts, modifications had to be made in the process of selecting clusters which may have enabled smaller villages to be more likely to be included in the sample.

Chapter 14

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. The assessment of nutritional status of 2865 children in the age group 0 – 59 months showed that 19.2 percent of them were stunted, 11.7 percent wasted and 21.6 percent underweight. Of the children 6-59 months age, 25.2 were anaemic. The prevalence of low birth weight was 18.1 percent. These findings highlight the continuing importance of under nutrition among preschool children as a public health issue in Sri Lanka.
2. Of the women aged 15-49 years who had a child under 5 years and not pregnant at the time of the survey, 17.0 percent had BMI less than 18.5 (thin), 22.8 percent with values between 25 and 29 (overweight) and 6.6 percent with BMI values 30 or above (obese). The prevalence of anaemia was 16.2 percent among pregnant women, 19.6 percent among lactating women, and 21.7 percent among non-pregnant and non-lactating women.
3. Stunting and underweight rates were significantly higher in the estate sector than the urban and rural, but the rates of wasting and anaemia were not different between sectors. The prevalence of stunting was high in the districts of Nuwara Eliya, and Badulla, and wasting, high in the district of Colombo, underweight in Nuwara Eliya and Ratnapura and anaemia in Jaffna. In general, the increasing level of maternal and paternal education were associated with lower prevalence of stunting and underweight. Increasing family size and number of children under 5 years of age were predictive of higher level of stunting.
4. Significant declining trends were observed in the prevalence of stunting, wasting, underweight and anaemia with increasing wealth quintiles. Increasing monthly household income was significantly associated with lower rates of stunting and underweight.
5. Higher prevalence of under nutrition was significantly associated with: an increase in the expenditure on food as a percentage of total household expenditure, households with a lower dietary diversity score ,and those that adopted one or more food related coping strategies.
6. Between 55-60 percent had borrowed food or reduced meal size. The main non-food coping strategies were: borrowing money from relatives/ neighbours, pawning jewellery and using savings. According to WFP food insecurity classification, 0.5 percent of the households were 'severely food insecure', 11.8 percent 'moderately food insecure' and 87.6 percent 'food secure'.
7. Though not significant, higher prevalence of wasting, underweight and anaemia were seen among children in the food insecure households. An upward trend in all three anthropometric indicators were seen with increasing duration of food inadequacy. Dietary diversity score of young children (6-23 months) was significantly lower among stunted children.

8. Children who visited child welfare clinics (CWC) reported a significantly higher prevalence of underweight, and higher, but non-significant, prevalence of stunting and wasting. Children of mothers who received advice on growth, nutrition and early childhood development at CWC had a significantly lower level of stunting. Having received vitamin A mega dose at least once was linked with a lower prevalence of anaemia but was not related to any of the other indicators.
9. Prevalence of stunting was significantly higher during the fourth year of life, compared to infancy, and the prevalence of wasting and underweight was higher from 2nd to 5th years of life. In contrast, the prevalence of anemia showed a significant decline with increasing age. There were no sex difference in the prevalence of stunting, wasting and underweight even though the prevalence of anaemia was marginally higher in males. Children with low birth weight were found to have significantly higher prevalence of stunting, wasting and underweight, the rates been more than double of those with normal birth weight..
10. Results of the multivariable analysis supported the findings of the bivariate analyses, highlighting the significance of the following: Prevalence of stunting was high among children with low birth weight, older children, and those who lived in households with 7 or more members or 3 or more children and in the districts of Nuwara Eliya, and Badulla. Children in the estate sector had higher risk than the urban sector, even though this was not statistically significant. Prevalence of wasting was higher among children with low birth weight, older children, children of thin mothers, and those in poorest wealth quintiles. Higher prevalence of underweight was associated with low birth weight, the increasing age of child, poorest wealth quintile, and children of thin mothers. Prevalence of anemia was high in males children, those in poorest wealth quintile, younger children and those with lower individual dietary diversity score (IDDS).
11. Multivariable analysis to identify the factors associated with nutritional status of :non-pregnant women supported the findings of the univariate analysis. Thinness: lower age of women, being in the estate sector, lower level of husband's education, lower family income, and poorest wealth quintiles. In contrast, increasing level of husband's education and higher wealth quintiles were strong correlates of high prevalence of overweight or obesity in women. Higher prevalence of anaemia in women was found in the estate sector, and when the expenditure on food as a percentage of household expenditure was above 90 percent.

Recommendations

1. The study identifies the multi sectoral issues relevant to the problems of under nutrition. Hence, there is a need to develop a cohesive multi-sectoral programme with a special focus on food security.
2. In view of the inter- district differentials observed, it is necessary to develop such plans and programmes at sub national levels. Monitoring of the activities has to be an essential part. Programmes to focus on vulnerable groups, identified on a geographical basis and on selected socio economic criteria. In this context, it is recommended that district levels authorities develop their plans taking into account, such differences.

3. It is recommended that a simple method of identifying wealth (modified from wealth index criteria) be used to identify households as beneficiaries of poverty alleviation and food supplementation programmes
4. Individuals to be targeted as beneficiaries of food supplementation / poverty alleviation programmes have to be identified on strictly defined criteria and a comprehensive ‘package ‘ of inputs are to be implemented with necessary follow up.
5. Continuous and regularity of food and nutrient supplementation programmes with proper monitoring should be ensured.
6. Enhance the awareness among public through mass media and strengthen the behavior modification changes to improve the dietary diversity
7. Attention to be paid to develop and implement specific interventions aimed at reduction of low birth weight.
8. Specific health related iprogrammes to reduce the problem of anaemia in the infant to be considered with specific guidance given to health care personnel. e.g. practices related o clamping of umbilical cord
9. Implement community empowerment programmes to enhance physical activity and healthy diet to reduce the prevalence of Overweight and obesity among women.