

# The impact of supplementary feeding programmes on the nutritional status of beneficiaries in Addis Ababa

Teshome Demeke and Zewdie Wolde-Gabriel

---

## INTRODUCTION

During the last 30 years in various developing countries a large number of supplementary feeding programmes have been conducted, varying in content and methods of operation depending on the resources available and the objective for which they were established. These supplementary feeding programmes, operating with funds made available from local and international sources, varied from supplementary foodstuffs issued to mothers attending maternal and child health (MCH) centres, to Mothercraft Nutrition Centres, nutrition rehabilitation services, food assistance such as food-for-work, and emergency feeding programmes. Almost all of these programmes focused on delivery of fortified foods and in some cases were complemented with health and nutrition education.

Similarly, in recent years various types of supplementary feeding programmes have been undertaken in the city of Addis Ababa by philanthropic, religious, voluntary, and international organizations through clinics, day-care units, food and nutrition centres, and welfare institutions. Beneficiaries of these feeding programmes have been mainly children of preschool age from underprivileged families. Lactating and expectant mothers from the low socio-economic level of the population have also received food aid from some of the supplementary feeding programme centres.

Wide operational diversities existed among the various agencies charged with the responsibility for the implementation of these programmes. These included differences in the type and amount of food commodity distributed, frequency of distribution, selection of criteria for the vulnerable population, and procurement of information for programme evaluation. Among the main donors of the supplementary foods were the World Food Programme, the Christian Relief and Development Association, Catholic Relief Service, and UNICEF.

Realization of the magnitude of operational variations and lack of co-ordination among the different feeding programmes led the agencies involved to form a central body known as the International Co-ordinating Committee for Welfare and Development (ICC) in 1976. The main tasks of this committee include co-ordination, monitoring, and evaluation of the supplementary feeding programmes in Addis Ababa. The overall objectives of the feeding programmes operated by donor agencies, as stated in the report of a subcommittee of ICC in March 1979, were:

- to provide undernourished children, particularly those below the age of five years, with nutritionally balanced food to supplement their unbalanced staple diet, aimed at ensuring normal growth and preservation of health;
- to integrate health education with food and nutrition services; and
- to make the community eventually self-sufficient in meeting its nutritional needs.

The feeding programmes also focused on indirect strategies, including increasing MCH attendance, promotion of production and acceptance of low-cost but nutritious foods, and other related activities.

Among the several measures that the ICC has considered during its short span of operation to meet its objectives was its request to the Ethiopian Nutrition Institute to assess the impact and performance of the supplementary feeding programmes under its auspices, including feasibility of methods and techniques used in the execution of the programmes. It was with this background that the Institute embarked on this study of the impact of supplementary feeding programmes on the nutritional status of beneficiary children in Addis Ababa.

## THE EVALUATION SURVEY

### Objectives

Supplementary feeding programmes have been in operation in Addis Ababa for some time. In July 1981 alone, a total of 71,236 beneficiaries, of whom 40,339 were preschool

---

Teshome Demeke and Zewdie Wolde-Gabriel  
Ethiopian Nutrition Institute, Addis Ababa, Ethiopia

children and 30,897 were mothers, were registered in 42 feeding centres. Programmes were carried out through daycare centres, MCH clinics, and supplementary food distribution centres. Beneficiaries in welfare boarding institutions were not included in the study.

The purpose of the survey was to determine nutritional effects of the programmes as manifested in the growth

and weight gain of preschool child beneficiaries. It was also intended to evaluate the effectiveness of the different feeding schemes in operation. The reason for the survey, as stated initially, was to help in decision-making for possible changes in operational strategies of the various feeding programmes.

**TABLE 1. Study Centres and Their Operational Characteristics**

Category and Centre	Scheme Code	Type	Frequency	Food Ration per Child
<i>Day-care centre</i>				
Kef. 1 Keb. 08*	1	on-spot feeding	one meal per day	220 g faffa
<i>MCH clinic</i>				
Kolfe Clinic	2	take-home	daily	500 ml fresh milk
<i>Supplementary food distribution centres</i>				
Kef.19 Keb.50*	3	take-home	monthly	1,000 ml oil, 3,000 g sorghum, 2,000 g dry milk, 3,000 g CSM
St. George's Church	4	take-home	fortnightly	500 ml oil, 1,500 g sorghum, 1,000 g dry milk, 1,500 g CSM
Medhanealem Church	5	take-home	weekly	250 ml oil, 750 g sorghum, 500 g dry milk, 750 g CSM

\* Organizational units.

### Methodology

Before the main evaluation began, a preliminary survey was undertaken at all the feeding centres to obtain information required to design the principal survey. An array of information collected from each feeding centre included number and type of beneficiaries, criteria for their selection, type and amount of food commodities distributed, frequency of distribution, and type of feeding scheme. Based on the information obtained from the preliminary survey, supplementary food distribution centres were grouped into different categories (table 1). The supplementary feeding programmes studied use daily and monthly distribution schemes, reflecting the established practices in the respective sectors. However, fortnightly and weekly schemes were also included in the study for purposes of determining the effect of frequent handouts as opposed to the routine practices of the centres.

### Population and Sample

Children under six years of age who were beneficiaries of the supplementary food programmes in Addis Ababa constituted the target population of the survey. A list of these children and other pertinent information, such as type and amount of food ration, frequency of distribution, and the usual practices in each centre were obtained from the preliminary survey on which the principal survey was based.

The sample size was determined for each centre, taking the following factors into consideration:

- prevalence of malnutrition (median minus 2 SD) among children under six years of age, 60 per cent;
- required precision for the estimate of change, +5 percent;
- width of confidence interval, 10 per cent.

A total of 1,174 children from 1,096 households were randomly selected out of 9,442 beneficiaries registered in five centres. The total population of beneficiary children and the sample size of each feeding scheme are given in table 2. (A small increase in sample size was allowed in some of the feeding centres to alleviate problems encountered at the start of the survey.) Age and sex distribution are also given in the table.

*Age and sex distribution of the study children.* The age of the children in the survey ranged from six months to six years, and a breakdown of this shows that more than two-thirds (70.8 per cent) were between one and four years (table 2). Those under one and those between four and six years of age accounted for 9.7 and 19.5 per cent of the total, respectively. A similar pattern was observed in schemes 3, 4, and 5 and in the control group. In scheme 1, however, all children studied were two years old and older, while in scheme 2 a large proportion (89.8 per cent) were less than two years old. Males slightly outnumbered females in the sample and in most of the schemes, but the difference was negligible.

**TABLE 2. Total Population of Beneficiary Children, Sample Size, and Age and Sex Distribution (Percentage) by Feeding Scheme at the Start of the Study**

Scheme Code	Population	Sample Size	Age in Months								Totals	
			6-11.9		12-23.9		24-47.9		48-72			
			M	F	M	F	M	F	M	F	M	F
1	80	71	-	-	-	-	22.7	17.3	34.7	25.3	57.4	42.6
2	116	88	12.5	12.5	33.0	31.8	3.4	4.5	2.3	-	50.1	49.9
3	2,390	353	2.3	2.5	10.5	6.8	29.5	31.2	9.3	7.9	51.6	48.4
4	4,028	333	3.9	5.7	14.4	9.9	25.8	25.2	5.1	9.9	49.2	50.7
5	2,828	329	5.8	3.3	20.7	18.5	21.9	26.4	1.8	1.5	50.2	49.7
Total	9,442	1,174										
Average			4.9	4.8	15.7	13.5	20.7	20.9	10.6	8.9	51.9	48.1
Control	401	158	8.9	6.3	10.7	13.3	18.4	20.9	12.7	8.2	51.3	48.1

*Control group.* A control group was not part of the original design of the evaluation survey. The plan was to study six different sites representing all the feeding practices, but one had to be dropped after two months because it ceased distributing food. Data collection at this centre was, however, continued as in the other sites because of its potential to serve as a control centre. A total of 401 beneficiaries were registered at the control centre, and among these 158 children from 108 households were randomly selected as control subjects.

*Attrition of survey sample.* Five children, all from scheme 1, did not complete the survey: three could not be traced because of moving to unknown addresses, and the other two died before the survey ended. In the control group two children could not be traced, another two dropped out because their parents were reluctant to co-operate, and one died during the survey.

#### *Choice of Nutritional Status Indicators and Method of Data Collection*

*Anthropometry.* The main type of malnutrition the supplementary food programmes intended to correct or prevent was protein-energy malnutrition. The survey was designed to indicate changes in nutritional status of children in each centre and among the different feeding schemes. Three indicators were compared among children at the different sites: weight for age, height for age, and weight for height.

*Frequency of data collection.* In order to obtain adequate data to show the pattern of change in indicators and to ensure greater precision of the estimated change, a longitudinal approach was chosen in data collection. Anthropometric data were therefore collected at the beginning of the survey and three months thereafter for one year.

*Standardization of procedures and control of measurements.* The collection of data and observations on food distribution according to the schemes shown in table 1 were carried out by temporarily employed staff. Both activities were regularly supervised by a nurse. Data collectors and the supervisor were trained in the techniques of measuring heights, lengths, and weights of infants and older children. A standardization test to determine precision and accuracy indicated satisfactory performance by the survey staff. The quantity of food commodities distributed was determined by measuring the volume of the utensils used to dispense the rations to obtain the approximate weight and volume of the ration.

#### *Household Background Information*

General household information on families of the children receiving the supplementary food was obtained along with other data at the beginning of the survey. Information collected included household characteristics such as age and sex composition of the families; occupation, marital status, and education of heads of households; and data on facilities such as latrines, lighting, water supply, ownership of residence, and number of rooms in the house. These data were intended to serve as indirect indicators of the socio-economic status of the study population, which was felt important for comparing the effectiveness of the different feeding schemes. The same information also provided an indication of the relationship between the prevalence of malnutrition and socio-economic factors.

Children under one and between one and four years constituted 6 per cent and 21.3 per cent of the total household members respectively. The male-to-female ratio was approximately 1: 1.2. The ages of family members of the recipient households in the survey ranged from 0.5 to 45+ years.

**TABLE 3. Family Size, Marital Status, and Education of Head of Household (Percentages)-Families of Survey Subjects and Control Group**

	Family Size			Marital Status		Education				
	2	3-4	5	Married	Single	None	R&W*	Grade completed		
								3	4	8+
Subjects	5.6	28.1	66.3	76.4	23.6	37.9	35.9	5.6	14.1	6.5
Control	2.8	36.1	61.1	78.7	21.3	77.8	22.2			

Subject N = 1,096 households; control-group N = 108 households

\*Able to read and write.

**TABLE 4. Occupation of Head of Household (Percentages)**

	Employed		Day labourer	Craftsman	Merchant	Welfare	Other
	State	Private					
Subjects	30.2	15.1	20.4	11.9	7.8	9.8	4.8
Control	1.9	-	-	-	4.6	82.4	11.1

Subject N = 1,096 households; control-group N = 108 households.

Family size, marital status, and education level of heads of households. Table 3 shows the size of the families of the children in the survey sample and the control group and the marital status and education of the heads of the households. The average family size in the sample population for all schemes was 5.4. Out of the total of 1,096 heads of households, 76.4 per cent were married; the highest percentage of married household heads appeared to be among those in scheme 2 and the lowest in scheme 1. The other most important factor in all schemes was education level of household heads. Data from these studies showed that 62.1 per cent of household heads in all schemes had some education, ranging from the ability to read to a grade level of eight or above. Data for the control population were not significantly different.

Occupational status of heads of households. Table 4 shows the occupations of heads of households. For the sample survey, 45.3 per cent of the heads of households were employed. The highest rate of employment was among those in scheme 3 (61.5 per cent) and the lowest in scheme 5, where only 38.5 per cent were employed. The majority of the unemployed heads of households in all schemes were day labourers, followed by craftsmen in

schemes 1, 2, and 3 and welfare dependents in schemes 4 and 5. Only 1.9 per cent of the heads of households in the control group were employed, and a large majority (82.4 per cent) of the unemployed lived on welfare assistance.

Ownership of residence and housing conditions. Table 5 shows home ownership data and housing conditions. More than a third of the survey households did not own their homes. The highest percentage of ownership was observed in scheme 1, where it was about 85.5 per cent, while only 14.5 per cent in scheme 5 owned their homes. A little less than half of the families (43.9 per cent) of the control group also owned their homes. Of the households that did not own their homes, 83.5 per cent paid a monthly rent of Br 10 or less (1 birr = US\$0.48). The difference in rental costs among households in the different schemes is negligible except in scheme 1, where fewer than half paid more than Br 10 per month. The 56.1 per cent of households in the control group who did not own their residence paid a monthly house rent of less than Br 10. Over 53 per cent of total households lived in a one-room private home, and a similar pattern is seen in most of the schemes and in the control group.

**TABLE 5. Ownership of Residence, Rents, and Number of Rooms in Home (Percentages)**

	Residence		Rent (Birr per Month)				Number of Rooms		
	Owned	Not owned	<5	5-10	11-20	21+	1	2	3+
Subjects	32.3	67.7	38.5	45.0	10.5	6.0	53.6	38.5	7.9
Control	43.9	56.1	79.7	20.3	-	-	54.2	40.2	5.6

Subject N = 1,096 households; control-group N = 108 households.

**TABLE 6. Sewage Disposal, Lighting, and Water Source (Percentages)**

	Sewage Disposal			Lighting		Water Source		
	Pit	Flush toilet	Field	Electricity	Oil lamp	Pipe	Well	River
Subjects	82.2	2.9	14.9	94.3	5.7	96.5	2.3	1.2
Control	53.7	-	46.3	91.7	8.3	86.1	13.9	-

Subject N = 1,096 households; control-group N = 108 households

*Sanitary facilities, electricity, and water supply.* Table 6 shows the households' means of sewage disposal, use of electricity, and water source. Pit latrines were used by 82.2 per cent of the sample households, 14.9 used the field, and 2.9 per cent had flush toilets for disposal of waste, with minor differences among the different schemes. In the control group, however, pit latrine and field were used almost equally. About 94.3 per cent of both sample and control groups used electricity for lighting. The differences in the percentage of electric light-users among the schemes were not significant. More than 90 per cent of households in all schemes used pipe water; 10.6 per cent in scheme 3 and 4.6 per cent in scheme 2 depended on well water and river water respectively. Of those in the control group 13.9 per cent used well water.

*Summary of data on socio-economic status of households.* Baseline information such as that given above is intended to give a bird's-eye view of the socio-economic comparability of the households from which the study subjects were drawn. As can be seen from the data in tables 3-6, there were only small differences in the standard of living among households where survey children lived. Of all households surveyed, those from scheme 1 appeared to be relatively better off, as indicated by education and employment of household head, ownership of home, house rent, sanitary facilities, and water supply. These criteria applied to the control group showed that they had a slightly lower standard of living.

### Assessment of Nutritional Impact

The measurement of the impact of supplementary feeding programmes on the nutritional status of the recipient children was based on data collected at the beginning of the survey and at its termination one year later.

As a measure of malnutrition, two arbitrarily chosen cut-off points—one and two standard deviations below the median of a reference population (Bulletin of the World Health Organization, vol. 55, no. 4 [1977]) for each of the three anthropometric indicators of nutritional status—were used for comparative purposes. In the course of statistical analysis, however, 2 SD below the median was the only cutoff point used: malnutrition in this survey was defined as the level of nutritional status falling below the median minus 2 SD of the reference population.

### Distribution of Nutritional Indicators

The distribution of nutritional indicators at the start and end of the survey is given in table 7. As can be seen from the table, the proportion of the study children below median minus 2 SD to be high for both height-for-age and weight-for-age indicators and lowest for the weight-for-height indicator. A similar pattern is observed in the control group.

**TABLE 7. Distribution of Nutrition Indicators at the Beginning and End of the Survey (Percentages)**

	Weight/Age		Height/Age		Weight/Height	
	Start	End	Start	End	Start	End
Below median - 1 SD						
Subjects	70.0	70.9	72.2	75.3	26.0	23.4
Control	66.5	66.2	67.7	66.9	28.5	29.1
Below median - 2 SD						
Subjects	33.2	29.4	45.7	46.1	3.5	3.6
Control	30.4	25.0	36.7	31.8	2.5	2.7

Number of children examined: at start of survey, subject N = 1,174, control-group N = 158; at end of survey, subject N = 1,171, control-group N = 148.



**TABLE 8. Prevalence of Malnutrition at the Beginning and End of the Survey (Percentages)**

	Weight/Age		Height/Age		Weight/Height	
	Start	End	Start	End	Start	End
Excess below median - 1 SD						
Subjects	54.1	55.0	56.8	59.4	10.1	6.5
Control	50.6	50.3	51.8	51.1	12.6	13.2
Excess below median - 2 SD						
Subjects	30.9	27.1	43.4	43.8	1.2	1.3
Control	28.1	22.7	34.4	29.5	0.2	0.4

Prevalence is expressed as percentage in excess of the value in the reference population

#### *Prevalence of Malnutrition*

Data collected during the survey were compared with the distribution of the indicators in the reference population. The proportion of children in the reference population falling below the median minus 1 SD for each of the three indicators was 15.9 per cent, with 2.3 per cent falling below the median minus 2 SD. These two figures were subtracted from the values presented in table 7 to obtain those in table 8. The same approach was followed in calculating subsequent prevalence of malnutrition using the same three indicators. In general, the data indicate that the supplementary feeding programmes in Addis Ababa do not seem to have had a marked impact on the nutritional status of the beneficiaries. Statistically significant improvement in the

prevalence of malnutrition was noted in the weight-for-age indicator, while the indicator of height-for-age and weight-for-height showed no reduction in the prevalence of malnutrition between the start and end of the survey. Comparable values were observed in the control group, thus supporting the observations in the study population.

#### *Effectiveness of the Feeding Programmes*

The effectiveness of the feeding programmes is expressed in terms of the percentage of reduction in the prevalence of malnutrition (median minus 2 SD) between the start and the end of the study. Table 9 shows a reduction of 12.3 per cent only for the weight-for-age indicator. Negative signs for the other two indicators show an increase in prevalence during the course of the study.

**TABLE 9. Reduction in Prevalence of Malnutrition (Effectiveness of Feeding Programmes)**

	Weight/ Age	Height/ Age	Weight/ Height
Below median - 1 SD			
Subjects	-1.7	-4.6	34.7
Control	0.6	1.5	-4.8
Below median - 2 SD			
Subjects	12.3	-0.9	-8.3
Control	19.2	14.2	100.0

Reduction is expressed as the difference between final and initial prevalence values (table 8) as a percentage of the initial value (initial value minus final value, divided by initial value, times 100).

**TABLE 10. Prevalence of Malnutrition, by Sex (Percentages)**

	Girls						Boys					
	Weight/age		Height/age		Weight/height		Weight/age		Height/age		Weight/height	
	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
Excess below median- 1 SD												
Subjects	56.0	54.9	55.1	59.3	99.8	6.3	52.4	55.1	58.3	59.6	10.4	6.7
Control	44.1	52.0	47.9	45.4	9.1	6.5	57.1	52.6	55.9	56.7	17.4	19.7

Excess below median - 2 SD												
Subjects	32.7	29.0	43.9	45.6	0.3	1.6	29.3	25.2	42.9	42.1	2.0	1.2
Control	25.2	19.0	29.0	28.4	1.0	1.6	31.0	26.5	40.0	30.6	1.5	0.9

Number examined: Girls at start of survey, subject N = 569, control-group N = 80; at end of survey, subject N = 568, control-group N = 75. Boys at start of survey, subject N = 605, control-group N = 78; at end of survey, subject N = 603, control-group N = 73.

**TABLE 11. Prevalence of Low Levels of Weight for Age, by Age Group (Percentages) Age Groups (in Months)**

	Age Groups (in Months)							
	6-11.9		12-23.9		24-47.9		48-71.9	
	Start	End	Start	End	Start	End	Start	End
Excess below median - 1 SD								
Subjects	48.4	-	58.9	56.5	51.1	56.0	58.7	53.2
Control	24.1	-	55.1	43.2	50.2	52.8	65.9	50.2
Excess below median - 2 SD								
Subjects	23.2	-	39.1	33.4	28.2	32.1	28.5	23.3
Control	9.7	-	37.2	15.9	28.3	25.6	31.0	21.4
Number examined								
Subjects	99	-	326	98	581	624	168	447
Control	25	-	38	22	62	67	33	59

#### Prevalence of Malnutrition by Sex

The data on the prevalence of malnutrition by sex (table 10) show that more girls than boys were malnourished at the start of the survey in terms of weight-for-age and height-for-age indicators, which were 32.7 vs. 29.3 per cent and 43.9 vs. 42.9 per cent respectively (differences not statistically significant). However, the relationship was reversed for the weight-for-height indicators, which were 0.3 vs. 2.0 per cent. At the end of the survey more girls seem to have been malnourished than boys for all the indicators. In the case of the control group, however, more boys were malnourished than girls

at the start of the survey for all indicators, although these differences were statistically insignificant. Comparison of the prevalence of malnutrition between the start and end of the survey shows reduction only in the weight-for-age indicator among the girls. Improvement was seen in all indicators for boys, but without statistical significance. In the control group, reduction in prevalence was noted among the girls in the weight-for-age and height-for-age indicators, but neither was statistically significant. Control-group boys showed reduction in all the indicators, but again without statistical significance.

**TABLE 12. Prevalence of Low Levels of Height for Age, by Age Group (Percentages)**

	Age Groups (in Months)							
	6-11.9		12-23.9		24-47.9		48-71.9	
	Start	End	Start	End	Start	End	Start	End
Excess below median - 1 SD								
Subjects	44.7	-	66.9	70.8	51.6	43.4	62.1	57.3
Control	20.1	-	63.0	38.6	51.8	55.7	62.9	50.2
Excess below median - 2 SD								
Subjects	260	-	67.3	54.8	38.5	42.6	54.2	43.3
Control	17.7	-	47.7	29.5	29.9	27.5	40.1	31.6

Number of children examined as in table 11.

**TABLE 13. Prevalence of Low Levels of Weight for Height, by Age Group (Percentages)**

	Age Groups (in Months)							
	6-11.9		12-23.9		24-47.9		48-71.9	
	Start	End	Start	End	Start	End	Start	End
Excess below median - 1 SD								
Subjects	8.3	-	13.5	10.4	6.3	6.2	4.3	6.0
Control	20.1	-	18.3	6.8	9.9	9.5	8.3	-10.8
Excess below median - 2 SD								
Subjects	3.8	-	1.9	1.8	1.1	2.2	-1.7	-0.1
Control	5.7	-	0.0	2.2	0.9	-0.8	0.0	1.1

Number of children examined as in table 11.

#### *Prevalence of Ma/nutrition by Age Groups*

Data on the relationship between age and prevalence of malnutrition as reflected by the three indicators are presented in tables 11-13. The prevalence of malnutrition at the start of the survey was the lowest among children 6-11.9 months old and highest in those 12-23.9 months old from the standpoint of weight-for-age and height-for-age values. The weight-for-height indicator showed the highest prevalence in the youngest age group and the lowest in the oldest group, those 48-71.9 months old. The control group followed a similar pattern. As the feeding programmes do not include children under 6 months old, and the survey lasted for a year, none of the children examined were in the 6-11.9 month age group at the end of the survey. Nonetheless, among the rest of the subjects the prevalence of malnutrition was highest

in the same age group using the same indicators at the end of the study as at the beginning.

In general, the prevalence of malnutrition was highest in the 12-23.9-month age group, which then tended to decrease as children grew older. However, all indicators showed some degree of improvement in the nutritional status of children 12-23.9 and 48-71.9 months old at the end of the survey. The change is statistically significant only for height for age in the older group. In the 24-47.9 month age group, however, no reduction in the prevalence of malnutrition was observed in any indicator. The prevalence of malnutrition both at the start and end of the survey and the reduction observed were less marked in weight for height in all age groups. Thinness was not associated with shortness in any age group at either end of the survey.

**TABLE 14. Centile Distribution of Nutritional Indicators, for All Ages and Both Sexes (Percentages)**

		Centile Distribution									
		0- 9.9	10- 19.9	20- 29.9	30- 39.9	40- 49.9	50- 59.9	60- 69.9	70- 79.9	80- 89.9	90- 100
		Weight for age									
Subjects	Start	54.9	13.7	9.9	6.3	4.6	3.4	2.8	2.0	1.0	1.3
	End	52.9	15.7	10.9	7.0	5.0	3.1	2.5	1.5	0.8	0.6
Control	Start	57.0	10.8	8.2	7.6	5.7	5.1	1.3	1.9	-	2.5
	End	60.1	8.1	13.5	6.1	6.8	2.0	1.4	1.4	-	-
Height for age											
Subjects	Start	62.4	10.8	8.6	3.9	3.1	2.4	2.0	2.1	1.5	3.2
	End	63.0	11.0	7.0	6.3	3.0	3.2	1.5	1.4	0.9	2.6
Control	Start	58.9	12.0	5.1	2.5	2.5	3.8	3.2	3.8	1.9	6.3
	End	61.5	10.1	8.1	4.7	3.4	2.0	2.0	2.0	4.7	1.4
Weight for height											
Subjects	Start	13.7	10.1	14.8	12.9	12.3	9.5	7.1	7.0	5.2	7.6
	End	10.2	11.2	13.3	14.9	11.2	11.4	8.1	7.0	4.9	7.9
Control	Start	13.3	22.2	16.5	10.1	13.3	6.3	7.6	5.1	1.9	3.8
	End	18.2	23.6	12.2	12.2	7.4	4.7	6.1	8.8	2.7	4.1

Number of children examined: at start of survey, subject N=1,174, control-group N=158; at end of survey, subject N = 1,170, control-group N = 148.



### Centile Distribution of Nutritional Indicators

The centile distribution presents a continuous distribution of the three nutritional indicators and provides an overall view of the nutritional condition of the population benefiting from the feeding programmes. As can be seen in table 14, a large proportion of malnourished children in both study and control groups are clustered in the first ten centiles except for the weight-for-height indicator, which appears to have a uniform distribution in the first fifty centile brackets.

### Comparisons of the Effects of the Feeding Programmes on the Prevalence of Malnutrition

As mentioned earlier, the study was designed to compare the prevalence of malnutrition among the different feeding schemes to measure their effectiveness in reducing undernutrition. Data on comparisons of the prevalence of malnutrition and effectiveness of different feeding schemes reveal the following:

- The prevalence of malnutrition both at the start and end of the survey is the highest in scheme 2 for all indicators.

- Schemes 3 and 5 show the highest percentage of reduction of malnutrition (19.3 per cent each) in the weight-for-age indicator. However, as the same value is exhibited by the control group, the improvement can hardly be attributed to the intervention programme.
- No marked association of thinness with stunting (weight/height) is observed in children in any of the feeding programmes.
- Statistical tests on comparisons of the prevalence of malnutrition and the effectiveness of the intervention programme in reducing malnutrition among the different schemes show no significant values for any of the indicators.

### The Influence of Some Socio-economic Factors on the Nutritional Status of Beneficiaries

It is well known that socio-economic factors have an overwhelming impact on the nutritional status of any population, particularly the young. In this study some of these factors have been selected and their impact on nutritional status of the study children, as measured by the weight-for-age indicator, were analysed at the end of the survey. Tables 15-21 present this information.

**TABLE 15. Prevalence of Low Levels of Weight for Age, by Marital Status of Head of Household (Percentages)**

	Marital Status	
	Married	Single
Excess below median - 1 SD		
Subjects	55.1	55.1
Control	58.8	72.1
Excess below median - 2 SD		
Subjects	27.3	24.9
Number of children in households responding		
Subjects	901	270
Control	103	25

**TABLE 16. Prevalence of Low Levels of Weight for Age, by Family Size (Percentages)**

	Family Size			
	2	3-4	5-6	7
Excess below median - 1 SD				
Subjects	51.7	54.5	53.0	57.1
Control	11.3	76.2	58.0	54.3
Excess below median - 2 SD				
Subjects	30.0	24.5	25.3	30.3
Control	15.8	31.9	32.4	13.1
Number of children in households responding				
Subjects	68	335	41	342
Control	11	38	46	37

**TABLE 17. Prevalence of Low Levels of Weight for Age, by Number of Children under 6 Years Old in Household (Percentages)**

	Number of Children			
	1	2	3	4
Excess below median - 1 SD				
Subjects	48.8	57.3	66.8	66.5
Control	81.1	55.3	50.7	50.7
Excess below median - 2 SD				
Subjects	21.3	28.9	43.6	32.9
Control	30.0	27.8	19.9	-
Number of children in households responding				
Subjects	516	516	122	17
Control	34	73	18	3

**TABLE 18. Prevalence of Low Levels of Weight for Age, by Education of Head of Household (Percentages)**

	Education (Grade Completed)				
	None	R&W*	3	4-8	8+
Excess below median - 1 SD					
Subjects	57.9	53.8	49.7	51.2	52.9
Control	60.8	64.1	-	-	-
Excess below median - 2 SD					
Subjects	27.7	30.1	24.7	20.3	22.7
Control	25.9	29.7	-	-	-
Number of children in households responding					
Subjects	444	420	122	137	48
Control	103	25	-	-	-

\*Able to read and write.

The marital status of heads of households did not appear to influence the prevalence of malnutrition among study subjects (table 15). This is not surprising because all the study children of married heads of households and over 70 per cent of those from single heads of households lived with their mothers, who were primarily responsible for feeding their children. In the control group, however, the prevalence tended to be slightly higher among children of single heads of households.

Household size did not seem to affect the prevalence of malnutrition in any consistent manner (table 16). As

opposed to household size, there appeared to be a close relationship between the number of children under six years of age and the prevalence of malnutrition (table 17). The prevalence tended to increase with the number of children in a household. This is to be expected in families with economic constraints, as the limited food available has to be shared among all family members. Data on the controls contrasted with those on study subjects in this measurement.

**TABLE 19. Prevalence of Low Levels of Weight for Age by Household Ownership and House Rent (Percentages)**

	Residence			Rent (Birr per Month)			
	Rented	Owned	Shared	<5	5-10	11-20	>20
Excess below median - 1 SD							
Subjects	54.1	55.4	56.5	56.6	56.1	49.3	42.1
Control	55.2	59.7	84.1	58.3	72.3		
Excess below median-2 SD							
Subjects	25.6	34.2	25.9	26.7	27.7	16.5	16.7
Control	16.2	24.5	22.7	28.0	21.2	-	-
Number of children in households responding							
Subjects	877	178	110	361	399	69	31
Control	83	41	4	66	17	-	-

**TABLE 20. Prevalence of Low Levels of Weight for Age, by Occupation of Head of Household (Percentages)**

	Employed	Day Labourer	Craftsman	Merchant	Welfare	Other	None
Below median - 1 SD							
Subjects	53.1	58.8	47.7	43.5	47.6	53.0	-
Below median - 2 SD							
Subjects	27.5	24.0	27.7	25.2	69.1	9.3	21.2
Number of children in households responding							
Subjects	523	277	210	69	63	95	34

Information on the occupation of the heads of households is not available for the control group.

Data on education and the prevalence of malnutrition (table 18) indicated that the magnitude of undernutrition was marked among study subjects from households whose heads had no education or who could only read and write compared to subjects from households where the head had a basic education of grade three and above. This demonstrates the impact of parents' level of education on the nutritional status of their children.

An examination of the prevalence of malnutrition in households owning their own home (table 19) indicated a slightly increased rate of undernutrition for families who owned their home. Analysis of the condition among subjects from families living in rented houses showed higher prevalence values for those paying a monthly rent of Br 10 and less than for those paying Br 11 and more. The relatively high prevalence of undernutrition among those paying a rent of Br 10 and less could be a reflection of their economic status. Why the prevalence was higher among subjects from families owning their own home is hard to explain. The same pattern was observed in the control group.

No clear association was observed between the occupation of the heads of households and the prevalence of malnutrition (table 20). This is presumably because

there were no substantial differences in income among the households in various occupational categories. A relatively high prevalence of malnutrition (69.1 per cent) is indicated among subjects from families living on welfare assistance.

**TABLE 21. Prevalence of Low Levels of Weight for Age, by Number of Rooms in House (Percentages)**

	Number of Rooms			
	1	2	3	4
Below median - 1 SD				
Subjects	56.2	53.8	50.7	29.5
Control	66.6	54.3	67.2	-
Below median - 2 SD				
Subjects	28.1	25.1	25.7	15.9
Control	32.6	17.0	64.3	-
Number of children in households responding				
Subjects	667	383	57	11
Control	63	57	6	
Not stated	43			

The prevalence of malnutrition according to the number of rooms in the house revealed it to be higher

by about 28.1 per cent among subjects of families with a one-room residence and lower by about 15.9 per cent in homes with four rooms (table 21). The size of the residence could be an indicator of a family's economic situation and may explain why the prevalence of malnutrition appeared to be greater among those living in a one-room home.

## CONSTRAINTS OF THE SUPPLEMENTARY FEEDING PROGRAMMES

Children in the study sample suffered from longstanding malnutrition both at the start and end of the study. This is indicated by the high prevalence of malnutrition in weight-for-age and height-for-age indicators. Significant improvement in weight for height is not, therefore, to be expected. Moreover, the feeding programmes did not have any impact on changing height that was already short of reference value.

The feeding programmes appear to have had significant impact on the nutritional status of the beneficiaries as shown by the weight-for-age indicator. However, as a comparable value is seen for the same indicator in the control group, factors other than the feeding programmes may have been in operation, resulting in the observed improvement, or it may simply have been an artifact.

Dietary analysis indicates that the total daily food energy the study subjects received from the supplementary foods provided by the different schemes ranged from 25 to 100 per cent of their requirement. This appeared to ensure coverage of most of the food energy requirement of the beneficiaries, which is more than generally expected from a supplementary feeding programme. However, despite the fact that the supplementary foods provided a major portion of the daily energy requirement, the feeding programmes undertaken in Addis Ababa did not result in significant reduction of the prevalence of malnutrition as expected. The following are some of the factors that might have contributed to this.

1. It is unrealistic to assume that food handouts in supplementary feeding programmes are used for feeding beneficiary children only. In families of low socio-economic status, owing to inconveniences imposed by time and economic factors, mothers tend to decline from preparing meals solely for the beneficiary child. In the Ethiopian culture it is customary to prepare family food together and consume it from a common plate. The supplementary foods made available by feeding programmes are likely to be shared among all family members. It is

therefore obvious that the beneficiary child gets only a small proportion of the food supplement and that the effect of such an amount on nutritional status becomes negligible.

2. Because of the economic pressure to meet household expenses for immediate requirements, such as clothing, food, rent, etc., foods received by families of beneficiary children may be sold or exchanged. Although mothers declined to confirm the sale of the food-aid commodities, which was not unexpected, some of the foodstuffs were observed to be on sale in the various retail market areas of Addis Ababa. The information on the number of families involved and the proportion of food commodities marketed is sensitive and hard to obtain. With such background information it is not difficult to conclude that supplementary foods given to families are used not only for feeding beneficiary children but also as a source of family monetary income, and consequently significant nutritional impact is not to be expected.
3. Another but less important factor that might have contributed to the lack of significant nutritional impact of the feeding programmes is the concept that mothers have about the role of supplementary foods they receive in the beneficiary child's diet. Some mothers might have understood such commodities as foods on which the child could rely solely, thus leading to total dependence of the child on food handouts, ultimately resulting in inadequate feeding.

## RECOMMENDATIONS

Supplementary feeding programmes, whether they are government or voluntary-agency undertakings, follow either the food handout scheme or the on-spot feeding approach, both of which have their merits and demerits. The take home schemes have the advantage of being simple to operate and easy to administer. However, as the system does not guarantee the utilization of supplementary foods by the recipient children, its effectiveness as an intervention strategy is questionable. The on-spot feeding approach is desirable in that it makes certain that the food prescribed is consumed by the subjects in need. This scheme, too, is not free from limitations; the administrative problems it entails, the strong financial support it requires, and the need for increased manpower are but a few.

In view of the problems faced by the feeding programmes evaluated, believed to be a reflection of the take-home scheme, the following general recommendations are made. However, they need to be weighed against the current practice of schemes in operation.

It is felt that a supplementary food handout scheme is likely to operate effectively in communities where there are favourable educational and economic standards. It is, therefore, suggested that in countries like Ethiopia the emphasis be on on-spot feeding despite the constraints mentioned above. If these on-spot feeding programmes are felt appropriate and desirable, they should be carried out through day-care centres and pre-primary and primary schools.

The number of day-care centres currently in operation is too small to be effective as a strategy for intervention programmes. An increase in the number of these centres is desirable, as the reduction in the distance that has to be travelled by mothers and children is likely to result in the participation of more families. This approach is worthy of consideration as it is in harmony with the government's policy to expand day care-centre services in both urban and rural communities.

Pre-primary and primary schools include all those that are run by the government, mass organizations, various religious sects, and voluntary organizations. Priority is to be given to centres serving children from families in the low socio-economic sector of the community.

Some take-home schemes may still be required. Children less than two years old who are not able to attend either preschool or day-care centres because of reluctance on the part of the mother or inconvenience should be given special consideration. For this group of children the only choice appears to be the take-home scheme. Whenever the food-handout scheme is inevitable for these or other reasons, it should be complemented with:

- rigorous teaching of mothers on child nutrition and proper utilization of supplementary foods;
- discouragement of the sale of food handouts by curtailing the distribution of cash-food commodities such as oil and milk and dispensing foods that have less market demand such as faffa, sorghum, and corn-soy-milk (CSM),

- regular home visits to the beneficiary families aimed at strengthening both the teaching of mothers and follow-up of food-handout utilization.

Observation of the current supplementary feeding programmes showed that food handouts are given to children from underprivileged families regardless of their age or nutritional status. It is therefore suggested that supplementary foods be given on the basis of the nutritional needs of children and should not be an economic blanket coverage. More attention should be given to families with large numbers of children under the age of six years, whose household heads are illiterate or poorly educated, who live in a one-room home, or who pay a low monthly rent.

In carrying out a supplementary feeding programme of any type, emphasis must be given to proper training of the staff in simple means of identifying malnourished children, recording data, programme management, interpretation of information, and the like. Differences in some aspects of programme implementation are acceptable, as this provides the opportunity to test different operational strategies to compare effectiveness. However, a general framework to guide the activities of feeding programmes is necessary, particularly for supervision and evaluation purposes.

In addition to its administrative functions, the International Coordinating Committee for Welfare and Development will have to assume the responsibility of supervision and evaluation of feeding programmes under its auspices. This entails the development of staff and the establishment of a special unit to handle the task.

## ACKNOWLEDGEMENTS

The authors would like to thank Sister Mulu Belete, Ato Haile Gebru, Ato Yacob Tekle Berhan, members of the data processing unit, the secretarial staff, and data enumerators, without whose help this study could not have been completed. Thanks are also due to Ato Tamrat Ejigu for his interest in the task of editing the final document.