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## **List of Acronyms:**

<b>ARI</b>	Acute respiratory Infection
<b>CI</b>	Confidence Interval
<b>DOH</b>	Directorate of Health
<b>MOU</b>	Memorandum of Understanding
<b>OFF</b>	Oil for Food Programme
<b>PHC</b>	Primary Health Centre
<b>PPM</b>	Parts per Million
<b>SD</b>	Standard Deviation
<b>UN-SCR</b>	United Nations Security Council Resolution
<b>UNICEF</b>	United Nations Children's Fund
<b>WHO</b>	World Health Organization

## **Executive Summary**

The cumulative effect of the Oil for Food Programme implementation has supported significant changes in improving the nutritional status of children under five years of age in northern Iraq. As a part of the regular nutrition survey carried out every year, a household nutritional status survey was conducted in the three Governorates (Dohuk, Erbil and Suleimanyiah) with a total sample of 2,745 children under five years of age between 30 June and 12 July 2001. The main objectives of the survey were to assess the current health and nutrition status of children and their mothers, to assess feeding practices and to identify risk groups for future interventions.

The survey results show that 10.7% of children under five are underweight for their age, 3.0% are acutely malnourished and 11.4% suffer from chronic malnutrition (World Health Organisation – WHO - classification). These results indicate significant improvements in chronic malnutrition compared to the 1996 (26.3%) and 1994 data (37.3%). The assumption is that this is related to the cumulative effect of improved household food security due to the distribution of food rations, health inputs and the overall improvement of the local economy. There was also improvement in underweight prevalence compared to 1994 (25.2%) and 1996 (19.3%) data. The current high prevalence of acute malnutrition has to be seen in relation to the summer season where diarrhoea prevalence is high and the cumulative effect of low rain level in the last three years, which have had negative effects on the harvest.

There is a high rate of bottle-feeding of infants (56%), which will remain a potent cause of diarrhoea, ill health and increased infant and child morbidity and mortality risk. This is linked to the large amount of infant milk formula in the food rations (3.6 kg/month) compared to complementary foods (0.9 kg/month). The prevalence of breast-feeding is 78% during infancy and 38% during the second year. Exclusive breast-feeding is low with 5.4% for infants aged 0-5 months. There is an urgent need to continue advocating for an increase of complementary foods in the monthly food rations with a corresponding reduction in infant formula. There is also a pressing need to continue the promotion of exclusive breast-feeding in young infants. Children under two years of age in rural areas living in the so-called collective towns and born to illiterate mothers remain the high risk group in terms of inadequate breast-feeding and high use of infant formula. Incidence of diarrhoea (25%) and acute respiratory infections (18%) was high during the past two weeks of the survey. Some (about 14%) of these children had both, diarrhoea and ARI.

More than half of the mothers (53%) interviewed were illiterate. This was highest (59%) in Dohuk and higher in rural/settlement areas as compared to urban areas. More than half of the mothers (53%) reported that they delivered at home. Home deliveries were less in Dohuk (40%), in urban areas (42%) and in literate women (42 %).

Family use of adequately iodised salt was high (89.1%) at 15 parts per million and above, while 6.8% use inadequately iodised salt below 15 PPM, and only 4.2% of the families used salt without iodine. This is mainly attributed to the provision of potassium iodate to the salt iodization plants under the oil for food programme. This represents an improvement from the 72% reported in 1996, especially in Dohuk.

## **Acknowledgement**

This report describes the findings of a household-based nutritional status survey conducted by United Nations Children's Fund (UNICEF) in co-operation with local health authorities in the three northern autonomous Governorates of Iraq (Erbil, Dohuk and Sulaymaniyah) between 30 June and 12 July 2001. The fieldwork was carried out by ten core teams from the Directorates of Health (DOH) of the three Governorates. Their contribution is gratefully acknowledged.

The UNICEF-Northern-Iraq Nutrition team was responsible for the survey design, the sampling frame, preparation of the questionnaires, training of team supervisors and field supervision. Data entry was done by a private computer company. Dr. Bakhtiyar Ahmed Rasheed edited the data and conducted tabulation and analysis using Epi-Info Version 6.04. Dr. Qasim Othman, Dr. Stenberg Vasconcelos and Ms. Dorothee Klaus reviewed and finalised the manuscript.

## **Introduction**

The three Northern autonomous Governorates of Iraq (Dohuk, Erbil and Suleimaniyah) are located in the Northern and Northeast of the Iraq, bordering Iran, Turkey and Syria. In its majority, the population is Kurdish. An estimated 70% of the population live in the three major cities and towns. The household nutrition status survey of December 1994 supported by UNICEF, revealed a high prevalence of malnutrition in Northern Iraq with 37.3% of children suffering from chronic malnutrition (low height-for-age), 25.8% from underweight (low weight-for-age), and 4.2% from acute malnutrition (low weight-for-height).

Since 1997, Northern Iraq has been effected by the implementation of the UN-SCR (Oil-For-Food) programme, which has considerable consequences on the provision of basic needs (food, medicines, water & sanitation), and the rehabilitation of its infrastructure, that was destroyed during the preceding years of conflict (school and health centre buildings). The result of the current nutrition status survey from June 2001 show that 11.4 % of under five years old children have chronic malnutrition, 10.7% are underweight, and 3.0% are wasted. These results are further supported by the Child and Maternal Mortality survey supported by UNICEF in 1999, which shows that U5 mortality rates have been reduced from 89.4 to 68.2 during the last five years.

## **Methodology**

### **Sampling**

The sample for the current survey was based on a systematic random sampling technique (WHO methodology) where 30 clusters each of 30 children with specific age groups were selected in each of the three Governorates based on 1996 population data. Using random start and direction, consecutive households were selected within the cluster until the 30<sup>th</sup> child was reached. A total of 2,745 under five children were measured during the survey.



### **Training**

Ten core teams consisting of one doctor and two paramedical staff carried out the survey. Training was conducted in Dohuk for two days for the teams, which included orientation on survey objectives, sampling, fieldwork procedures and practical exercising on the use of height and length board for children and uniscale (electronic mother/infant weighing scale). Pre-tests were carried out to estimate the required time for household interviews and anthropometric measurement. Questionnaires comprised basic information on the child's name, gender, date of birth, place of delivery, recent illnesses, mother's education, weight and height, and feeding practices for children under two years. A question to assess the use of iodised salt

was added. The improved salt iodination testing kit to test the iodine content of household table salt was introduced to the teams.

### **Fieldwork, supervision & data processing**

UNICEF made all logistical arrangements and prepared a detailed field schedule for the movement of the survey teams. The teams started to operate from the centre of the cluster by identifying the starting household shown by throwing a pencil in air. The first household was selected randomly by taking the last digit of a currency note. The nearest household in the assigned direction was the second to be visited and so forth until the required numbers of children were measured (30 children). If a child was not at home, the team had to return to measure him/her again. Each household interview took about 20 minutes and one cluster was covered per day. The teams completed the survey in nine working days.

One team from UNICEF and two teams from the DOH supervised the fieldwork in the three Governorates, to ensure intensive field monitoring and quality control of data. Special forms for supervisors were prepared in English to monitor performance of the staff in measuring, reading, recording and sampling of the children. The supervisor's results were matched with the teams' record to ensure accuracy in reading and recording of data. Differences more than 0.2 kg for weight and 0.5 cm for height/length were not accepted. Data was collected by the Directorate of Health supervisors in each location and reviewed for errors. Field team supervisors checked the questionnaires on a daily basis to avoid missing information or discrepancies. Where discrepancies were discovered, the team was sent back to the respective household for verification.



Children data sheets were entered using MS-Excel spreadsheets. EPI-INFO software version 6.04b was used to analyse the data.

## Results

The sample size was the same in each Governorate (30 clusters each), yet the populations differed in the three Governorates. Hence, weighting of data was necessary to allow proper estimates of rates.<sup>1</sup> A total of 2,749 children under five years of age were measured. Age distribution favoured younger children, as was the case in the 1997-2000 surveys (*Table 1*). The distribution of children of the various age categories was similar to previous surveys. Gender distribution of children was even (*Table 1*).

**Table 1: Age & gender distribution (percents) of the children and compared to previous results, June 2001**

Age Group	Period of Survey					Gender Percents (June 01)	
	Nov 97	Nov 98	Jun 99	Jun 2000	June 2001	Males	Females
0-1 years	22.6 %	21.8%	23.6%	23.0%	<b>20.3%</b>	<b>52%</b>	<b>48%</b>
1-2 years	21.0 %	23.6%	21.6%	22.1%	<b>24.0%</b>	<b>51%</b>	<b>49%</b>
2-3 years	18.6 %	20.1%	19.7%	20.9%	<b>20.7%</b>	<b>49%</b>	<b>51%</b>
3-4 years	19.2 %	19.7%	18.9%	18.2%	<b>18.2%</b>	<b>53%</b>	<b>47%</b>
4-5 years	18.6 %	15.2%	16.3%	15.8%	<b>16.7%</b>	<b>53%</b>	<b>47%</b>
Sample size	2248	2703	2760	2721	2,749	51%	49%

### Prevalence of malnutrition

The prevalence of the three indicators of malnutrition is presented in Table 2. All results are based on the standard WHO criteria of moderate/severe malnutrition - less than -2 Standard Deviations (SD) from the reference. With a total estimated population of 3.4 million, approximately 550,000 children are expected to be under five years of age (16% of the total population). Hence, with the current rates of malnutrition, approximately 62,700 children are expected to have chronic malnutrition, 58,800 to be underweight-for-age and about 16,500 to have acute forms of moderate to severe malnutrition (*Table 2*).



<sup>1</sup> Weighting of the results for the total sample is needed to adjust for the different sampling probabilities for each Governorate. These are estimated according to the expected number of households in each Governorate, based on the population list for ration distribution: Dohuk = 705,000; Erbil = 1,140,000 and Suleimanyiah = 1,399,000 corresponding to .2222, .3333 and .4444 weights respectively for each Governorate.

**Table 2 Estimated numbers of malnourished children-Northern Governorates, June 2001**

Malnutrition type	Current findings	Estimated number (Total <-2SD)*	Estimated number (Moderate <-2 to -3SD)*	Estimated number (Severe <-3SD)*
Chronic (low weight for age)	11.4%	62,700	51,150	11,550
Underweight (low weight for age)	10.7%	58,800	52,800	6,000
Acute (low weight for height)	3.0%	16,500	13,750	2,750

\* Between -2SD (Standard Deviations) and -3SD represents moderate and under-3SD severe malnutrition, by WHO criteria

These results show significant improvement since 1996, when the prevalence of chronic malnutrition was 26.3%, underweight 19.3% and acute malnutrition 3.8%. The most recent decrease has been in stunting (chronic malnutrition). These improvements reflect the cumulative effect of the implementation of Oil-for-Food programme and the settlement of conflicts in the region.

According to prevalence rates<sup>2</sup> of various forms of malnutrition the severity in the extent of malnutrition in young children was proposed (Table 3) for the region. Based on these criteria, Northern Iraq can be classified as a region with low malnutrition prevalence. Prevalence of stunting (under 20%) and wasting (under 5%) are in the lower range, and only prevalence of underweight (under 20%) are in the medium range.

**Table 3: Proposed criteria to assess severity of malnutrition in children 0 to 5 years of age**

Indicator	Prevalence			
	Low	Medium	High	Very High
Stunting (chronic)	<20%	20-29.9%	30-39.9%	≥40%
Underweight	<10%	10-19.9%	20-29.9%	≥30%
Wasting (acute)	<5%	5-9.9%	10-14.9%	≥15%

**Underweight:** <-2 standard deviations (SD) weight-for-age; **stunting** <-2SD height-for-age; **wasting** <-2SD weight-for-height

*Shaded cells correspond to results from the current survey in the North.*

<sup>2</sup> Gorstein J, Sullivan K, Yip R, de Onis M, Trowbridge F, Fajans P, Clugston G. Issues in the assessment of nutritional status using anthropometry. Bulletin of the World Health Organization 72:273-283, 1994.

## Malnutrition by Governorate

The prevalence of malnutrition appears to be similar in the three Governorate, except for chronic malnutrition, which continues to be higher in Dohuk compared to Erbil and Suleimanyah (Annex II for significance testing and Confidence Intervals).

**Table 4: Prevalence of malnutrition by Governorate - June 2001**

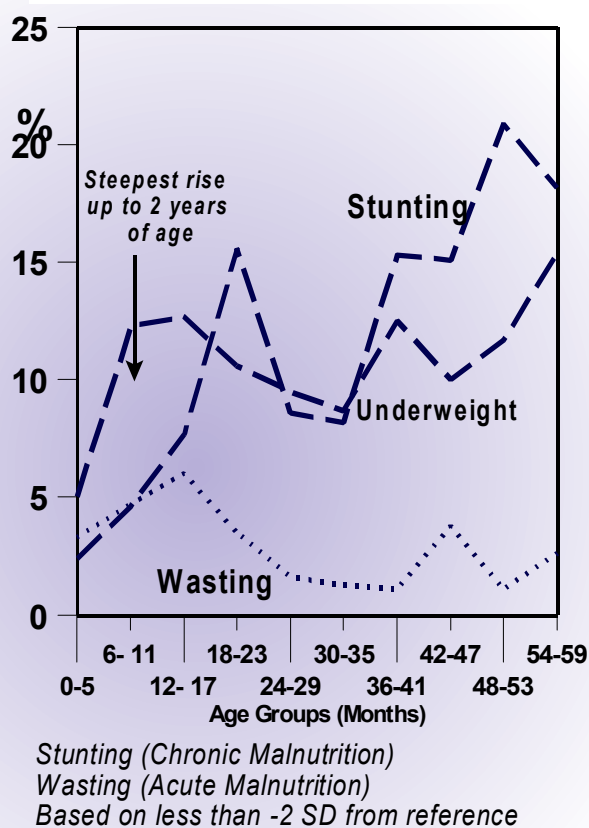
Governorate	Stunting (Chronic)	Underweight	Wasting (Acute)
Dohuk	16.1 %	11.4%	2.0%
Erbil	10.4%	10.5%	3.4%
Suleimanyah	9.8%	10.5%	3.2%
All Governorates	11.4%	10.7%	3.0%

## Malnutrition by age

The prevalence of malnutrition tends to follow the same pattern of previous surveys. Stunting prevalence tends to rise steeply during the first 24 months of age, then levels off, but reaches a peak at 42-53 months which remains high (*Figure 1*). Underweight, influenced by both stunting and wasting, reaches a peak at 18 months of age, then continues at high level. Wasting prevalence reaches a peak at 6-18 months, then drops to relatively low levels. **Results illustrate that the process of malnutrition is most evident prior to 2 years of age and dominates the later growth and development of the child.**

Note that additional surveys to follow will deepen the picture of the extent of chronic indicators (such as stunting) and less of the acute, such as wasting which often depends on the health status of the child at the time of survey. Wasting is more readily identified over time.

**Figure 1: Prevalence of Malnutrition by age**



## Malnutrition by location

The prevalence of chronic malnutrition is higher in rural areas and collective towns compared to urban areas (13.4% versus 9.9%), but statistically not significant at 95% confidence interval (C.I.). In contrast, underweight prevalence shows statistically significant differences at the 95% C.I between the rural and urban area (13.7% versus 9.2%) (Table-5). There is no statistically significant difference between urban and rural areas in respect to the prevalence of acute malnutrition. These results emphasize the need to focus more on the rural and collective town areas.

**Table 5: Prevalence of malnutrition by location**

<b>Locations</b>	<b>Stunting (Chronic)</b>	<b>Under weight</b>	<b>Wasting (Acute)</b>
<b>Urban</b>	<b>9.9%</b>	<b>9.2%</b>	<b>3.2%</b>
<b>Resettled areas<sup>3</sup></b>	<b>13.2%</b>	<b>11.8%</b>	<b>2.9%</b>
<b>Rural</b>	<b>13.5%</b>	<b>13.7%</b>	<b>2.6%</b>
<b>Rural/settlement</b>	<b>13.4%</b>	<b>12.7%</b>	<b>2.8%</b>

## Malnutrition Prevalence By Key Indicators

### Gender

The results show higher prevalence of underweight and stunting among female children, but these differences are statistically not significant (table 6)

### Literacy/Education of the mother

The prevalence of chronic malnutrition and underweight (but not acute malnutrition) is significantly\* higher in children of mothers who are illiterate compared to children whose mothers are literate (Figure 2 & Table 6). These findings are similar to the June 2000 survey.

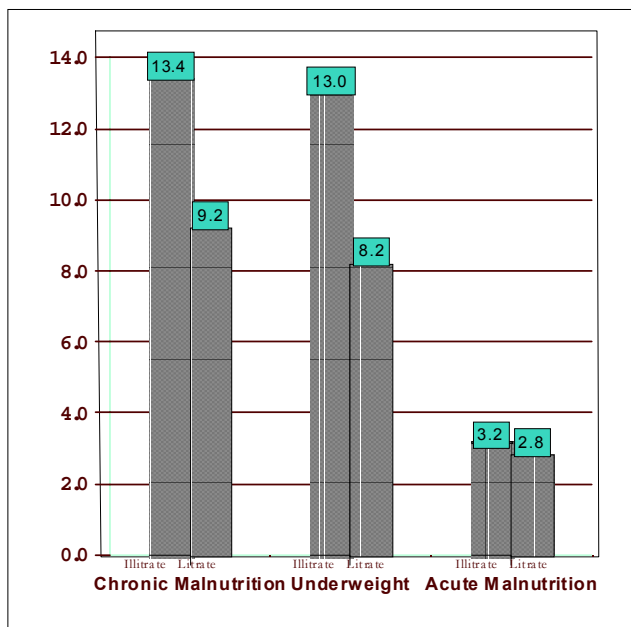
<sup>3</sup> Villagers from numerous remote villages were gathered together in what called collective villages or settlements.

**Table 6: Malnutrition prevalence by child gender & mother’s education**

Indicator	Child Gender		Mother’s literacy	
	Male	Female	Illiterate	Literate
Stunting (Chronic)	10.2%	12.7%	13.4%	9.2%
Under weight	9.3%	12.3%	13.0%	8.2%
Wasting (Acute)	3.0%	3.0%	3.2%	2.7%
Sample Size	1408	1323	1445	1286

**Figure 2: Prevalence of malnutrition by Mother Literacy**

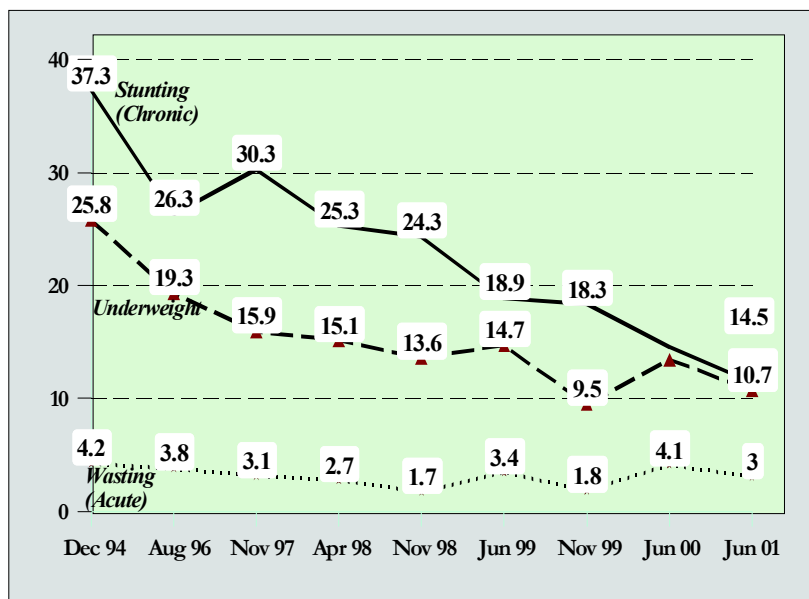
- Statistical significance: The level of confidence that ranges do not overlap - see annex for more details and examples. The prevalence of chronic malnutrition in children of illiterate mothers is 13.4% (range 11.5-15.3) and that of children with literate mothers is 9.2% (range 7.3-11.0). There is no overlap; i.e. the upper part of the range for literate (11.0%) is less than the lower part of the range for illiterates (11.5%). Hence the difference cannot be explained by chance alone. A similar situation applies to underweight, but not acute malnutrition.*



## Trends in nutritional status

After an initial reduction of chronic malnutrition in levels from late 1994 to late 1996 (-2 SD height-for-age from 37.3% to 26.3%), there has been further significant reduction from 1996 to 2001 - *Figure 3* - (excluding a spike to 30.3% in Nov 1997) reflecting an overall improvement in basic needs (food, health and economic). Since 1994, acute malnutrition does not seem to be a serious problem throughout the region (although some pockets may exist, especially during the hot summer season), compared to the level of 2-3% found throughout the world.

**Figure 3: Trend of Malnutrition Prevalence Northern Iraq, 1994-2001**



Prevalence of stunting (chronic malnutrition), underweight and wasting (acute malnutrition) based on <- 2SD of reference WHO criteria. NOTE All sources were household surveys except April 1998 (based on Primary Health Centers).

There appears to be a continuous reduction in prevalence of underweight from 1994 to November 1998 (25.8% to 13.6%). Further steady reduction is obvious, when compared with results from surveys conducted in the same time of the year (i.e. June 99 with June 00 and June 01, and Nov 98 with Nov 99 and 00 surveys). Reduction in stunting prevalence is made obvious when comparing survey data. Interpretation of results and trends requires an understanding of the causes that have an impact on the nutritional status of children.

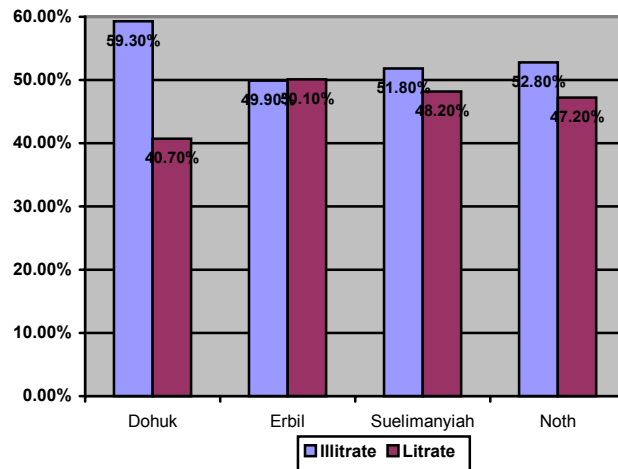
The results of these surveys suggest that the oil-for-food programme (OFF) having a significant impact on the nutritional status of children from August 1996 to June 2001, resulting in reduction of underweight from 19.3% to 10.7% and prevalence of chronic malnutrition from 26.3% to 11.4%. This is a continued improvement since 1994. Key factors contributing to this improvement are: improved food rations, improved access to health, safe water and sanitation and education services; and the rehabilitation of the living infrastructure. However, persisting problems of electrical power supply jeopardise the provision of safe water, and consequently menace the nutritional status of young children.

## Mother's characteristics

### Mother's education

More than half (53%) of the mothers interviewed were unable to read and write. The illiteracy among mothers was highest (59%) in Dohuk compared to Erbil (50%) and Sulaimaniyah (52%) *figure 4*. The percent of illiterate mothers was higher in rural areas (74%) areas compared to urban areas (39%). Correspondingly, the percentage of mothers with higher education was much less in rural areas (0.5%) compared to urban (19%) areas.

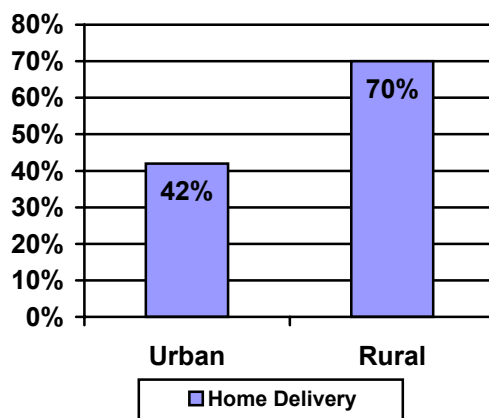
Figure 4: Mother Literacy per Governorate



### Place of Delivery

Almost (53%) of mothers reported their child being delivered at home. Home deliveries were less in Dohuk (40%) compared to Erbil (55%) and Sulaimaniyha (58%). Conversely home delivery was less in urban areas (42%) compared to rural areas (70%) *figure 5*. Home deliveries were also less among literate women (42%) than among illiterates (58%) and of women with higher education (post-secondary), of which only 26% delivered at home.

Figure 5: Prevalence of Home Delivery



## Use of iodised salt

Family household table salt was tested using the improved salt iodination testing kit colour reagents, with results graded at 0, <15 and >15 parts of iodine per million (PPM) according to the colour changes. Over 89% of tested salt<sup>4</sup> had a satisfactory level (>15 PPM), and additional 7% of samples had <15PPM iodine while only 4% had no iodine in the salt (Table 7).

These results show steady improvement in availability of iodised salt since the August 1996 survey (72%). Improvement was achieved in particular in Dohuk, where the current level of iodised salt is estimated to be at 88.6%<sup>5</sup> compared to 39% in 1996. In Suleimaniyah Governorate the percentage of households using iodized salt was 86% compared to results 77% in June 2000. This is mainly due to the wide ranging social mobilisation activities conducted during the year and the tightening of the local market control system by DOH. A major factor for the overall improvement is the provision of potassium iodate for the local salt iodization plants in the three Governorates and the distribution of iodised salt in the *oil-for-food* ration.

**Table 7: Percentage of households with iodised salt**

Year of Survey	Salt Iodised	Governorate			Urban/Rural			Education	
		Dohu	Erbil	Suleim.	Urban	Settlement	Rural	Illiterate	Literate
June 2001	89	88.6	93.1	86.3	91.3	88.2	84.4	87.8	90.5
Jun 2000	89	96.4	99.3	77.4	91.3	82.7	85.8	88.1	90
Nov 1999	92	96.3	98.4	85.8	93.7	87.1	94.2	90.9	94.4
Jun 1999	88	87	96	81	91	84	86	84	93
Nov 1998	87	87	94	81	91	88	77	85	90
Nov 1997	83	85	93	71	92	86	72	81	88
Aug 1996	72	39	72	87	72	NA	72*	NA	NA

NA - no information \* rural plus settlement

<sup>4</sup> Responses for salt were duplicated for mothers with more than one child under five years of age, which results in their over-representation.

<sup>5</sup> In Dohuk, salt imported from Turkey was regarded as non-iodized as the indicator only identifies salt iodised with Potassium Iodate, while in Turkey they use Potassium Iodite.

## Recent illness in children

### Diarrhoea

Mothers with under-five children were asked *did your child have diarrhoea during the last 2 weeks?* Diarrhoea was defined as at least three watery or semi-watery (sometimes with blood) stools per day. Almost 25% of mothers reported diarrhoea in children within the past two weeks. There was no difference in prevalence of diarrhoea when compared by gender, Governorates, residence and education of mother.

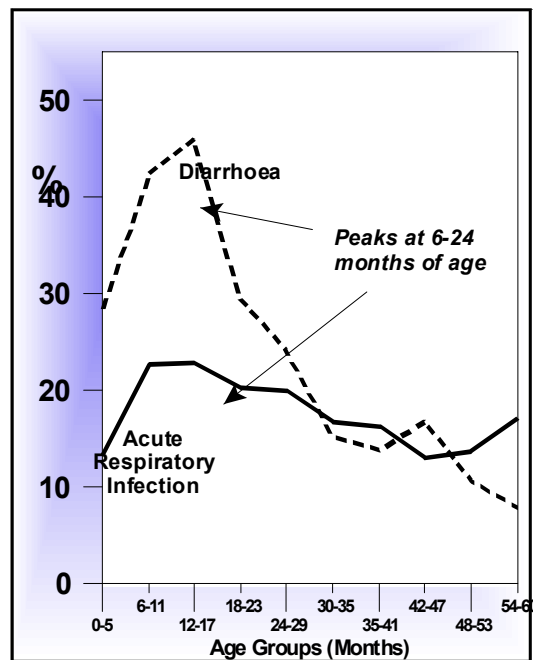


### Acute respiratory infection (ARI)

Mothers with under-five year children were asked *did your child have cough with fever for more than two days during the last 2 week?* Almost 18% reported cough with fever. The prevalence of ARI was similar by gender, Governorate, location and education of mother.

The prevalence of diarrhoea and ARI by age is presented in *Figure 8*. After the first month of life, the prevalence rises rapidly to a peak at 6-24 months of age (diarrhoea about 52.7% and ARI about 25.1%), and then gradually decreases. The peak corresponds to the period when malnutrition prevalence rises; hence the importance of reacting to both, to diarrhoea and ARI with proper feeding practices. At this age, more than half of the children have either diarrhoea or ARI or both (*Figure 8* - graph on the right). Those children with both (about 14% of all) need attention for both.

**Figure 6: Prevalence of Illness by Age**



It is interesting to show the effect of illness on the child's nutritional status. The results show strong association between child's nutritional status and current illness, although it was not statistically significant (*Table 8*)

**Table 8: Malnutrition Prevalence by the current Illness (Percents) June 2001**

Malnutrition type	Diarrhoea		Combination of Illness			
	Yes	No	Both	Diarrhoea	ARI	Non
Acute malnutrition	4.2%	2.4%	4.4%	4.9%	3.0%	2.3%
Underweight	12.8%	10.1%	13.0%	12.7%	11.1%	9.9%
Chronic Malnutrition	12.6%	11.0%	14.7%	11.8%	13.9%	10.6%

## Feeding patterns

Questions were asked with reference to feeding patterns such as breast-feeding, other fluids, infant formula, use of feeding bottles, complementary and family foods. The questions were based on the past 24 hours recall. Each response was recorded separately and the frequency for each pattern was asked and recorded. The responses were combined for further analysis.

### Breast-feeding

Almost all infants in Northern Iraq are breast-fed soon after birth, which remains relatively high (89%) until the age of 6 months, then decreases to (66%) at the age of 6-11 months and to (38%) during the second year of life (*table 9*). There was no major difference in the prevalence of breast-feeding by age, gender, Governorate, residence, education of mother and presence of recent diarrhoea or ARI.

**Table 9: Percentage of prevalence of breast-feeding by age (in months) – June 2001**

Date	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23	Sample
Jun-01	95	85	68	64	53	41	33	26	1207

Date	0-5	6-11	12-23	18-23	0-11	12-23
Jun-00	89	66	46	30	78	38

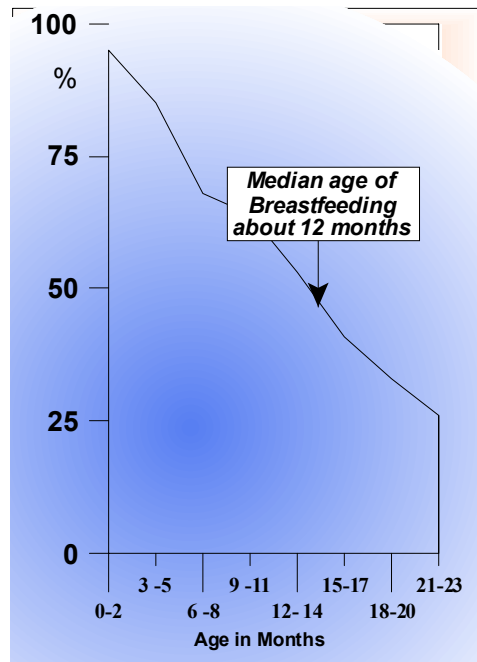


**Table 10: Percent prevalence of breast-feeding by age and year of survey**

Date	0-2	3-5	6-8	9-11	12-14	15-17	18-20	21-23	Sample
June 01	95	85	68	64	53	41	33	26	1207
Jun-00	97	77	63	42	56	39	32	18	1208
Nov-9	93	87	72	61	52	39	37	24	1220
Jun 99	93	83	64	63	55	39	34	27	1230
Nov 98	95	90	65	56	49	45	37	23	1206
Nov 97	98	94	84	83	76	81	67	59	888
Aug 96	94	84	72	67	58	51	36	22	720
Dec 94	81	79	75	65	55	55	36	30	1071

Date	0-5	6-11	12-17	18-23	0-11	12-23
Jun-00	89	66	46	30	78	38
Jun-00	85	56	47	26	70	39
Nov 99	90	67	45	30	77	37
Jun 99	88	65	46	30	76	40
Nov 98	92	59	50	29	73	37
Nov 97	95	83	78	73	87	75
Aug 96	88	69	54	30	77	45
Dec 94	80	71	55	33	76	43

**Figure 7: Percent prevalence of breast-feeding by age, June 2001**



The reasons for a decline in the prevalence of breast-feeding rates from Nov 97 to June 2001 (reverting to the rates for 1996 and 1994) remain unclear. The changes are mainly for children over 6 months of age. One possibility is the improved economy, hence being able to buy other foods, and increased availability of infant formula in the food rations.<sup>6</sup> This correlates with a rise in bottle-feeding.

<sup>6</sup> Infant formula (i.e. milk powder) is available in two forms in the food rations - one for infants under 6 months of age; the other for infants from 6-12 months of age. Previously, families with infants could choose whether to receive an added ration or infant formula. Since mid-1997, this was changed to distribution of infant formula without selection opportunity. The quantity of the milk formula provided has been increased from 2.8 Kg to 3.6 Kg since phase IV.

## Exclusive breast-feeding

Exclusive breast-feeding (no added foods or fluids, including water) occurred in 5.4% of infants from 0-5 months of age. The rate is slightly higher in infants under three months of age - *Table 11 and Figure 7*.

The generally low rate of exclusive Breast-feeding, could be due to the hot summer season in 2001, the increased availability of the milk formula within the general food ration (increased from 2.8 kg to 3.6kg/infants/month), and the dramatic reduction in the price of the milk formulas in the market. The category of children who were breast-fed with fluids, which includes animal milk (but not formula) suppresses breast-feeding due to interference with the lactation reflex. The use of the bottle with formula poses an added danger, such as contamination with microbes causing diarrhoea, other illnesses and loss of appetite. This can lead to dehydration risking death.

Figure 8: Pattern of Breast-feeding by Age

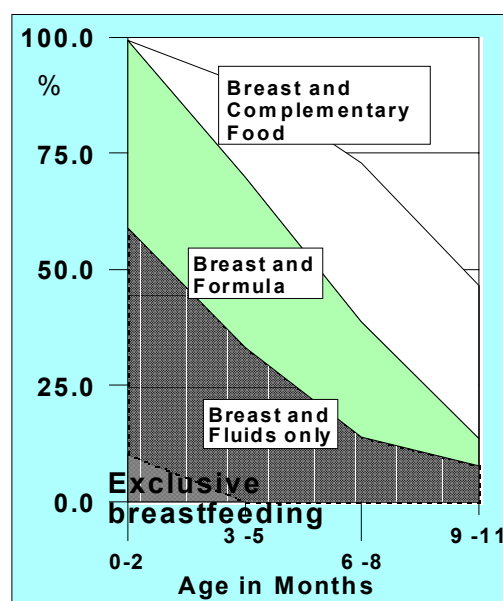


Table 11: Breast-feeding patterns in infants by age - June 2001

Months	0-2	3-5	6-8	9-11		0-5	6-11		0-11
Exclusively breast	10.1	-	-	-		5.4	-		3
Breast and fluids	47	33	14	8		44	14		30
Breast + formula + bottle + fluids	40	34	23	15		35	18		32
Breast with other food	0	20	33	43		10	39		24
Breast-fed	95	85	68	64		89	66		78
Not breast-fed	5	15	32	36		11	34		22
Number	116	127	91	51		244	142		396

## Bottle-feeding

As expected, the prevalence of bottle-feeding in infants during their first year was high (56%), (Table 12) mainly due to the free distribution of infant formula under the MOU general food ration. More than one third of infants in their first 6 months of life are fed with formula besides breast-feeding (table 11).

It appears that bottle-feeding often starts soon after birth with the mother following traditional practices that unfortunately are also communicated by health workers in hospitals and elsewhere and is further encouraged through the provision of food rations including infant formula (figure 8). There is no major difference in the prevalence of bottle-feeding of infants (0-11 months) by Governorate, gender, residence and mothers' education. Similar results were found in the June 2000 survey. Hence it would appear that this habit is pervasive and is affecting children everywhere.

Figure 9: Bottle-feeding in Children by age and year

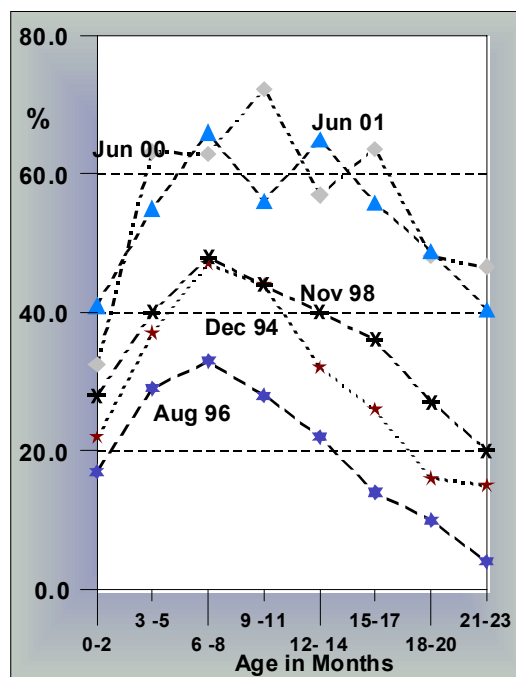


Table 12: Prevalence of bottle-feeding by age in months, June 2001

Months	0-2	3-5	6-8	9-11	0-5	6-11	0-11
Prevalence (%)	41	55	66	56	49	63	56

There has been an increase of 20-25% in the prevalence of bottle-feeding of infants since August 1996 (Figure 8). This raises the same issues discussed in relation to an apparent decline of breast-feeding in infants.

### Added foods

Only about (67%) of children aged 6-8 months received complementary foods (solid/mushy) (Table 13 & figure 9). This is well below the level of 100% required amount and frequency of such feeding – without even taking into account the level of quality as certain complementary foods (e.g. vegetables) have insufficient density to provide adequate nutrition for the growing child. In the following six months of life, still more than 32% of infants do not receive complementary foods, which is increasing the risk of stunting. This period in a child’s life is very crucial for later physical and mental development.

Figure 10: Pattern of complementary feeding by age

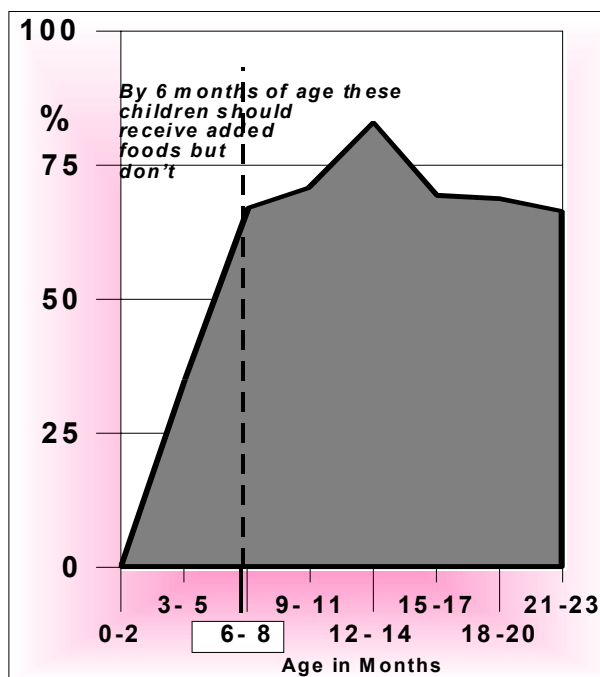


Table 13: Prevalence of children receiving added foods by age (June 2001)

Months	0-2	3-5	6-8	9-11	0-5	6-11	0- 11 m
Total	0.5	35	67	71	20	68	44



Annex I      **The questionnaire:**

## Annex II: Estimates of nutritional status prevalence using confidence intervals

Confidence intervals<sup>7</sup> (CI) allow statistically significant comparisons between prevalence estimates. In the current survey, the prevalence for chronic malnutrition is estimated at 11.4% with a 95% C.I., meaning that 9.8%-13.0% of children are stunted. Similarly 10.7% of the sample population was found to be underweight, meaning that 9.3% to 12.2% of children are underweight (*Table 14*). Comparing the data available since 1994 (the most comprehensive survey since sanctions were imposed in 1990) and 1996 (baseline data prior to introduction of oil for food programme), we may conclude that there is a statistically significant reduction in chronic and underweight malnutrition.

**Table 14: Prevalence and range of malnutrition - trends from 1994 to 2001**

	Chronic malnutrition		Underweight		Acute malnutrition	
	Prevalence %	95% CI	Prevalence %	95% CI	Prevalence %	95% CI
<b>June 2001</b>	<b>11.4%</b>	<b>9.8- 13.0</b>	<b>10.7%</b>	<b>9.3 –12.2</b>	<b>3.0%</b>	<b>2.3 –3.7</b>
<b>Jun 2000</b>	<b>14.5%</b>	<b>12.6- 16.3</b>	<b>13.4%</b>	<b>11.7-15.1</b>	<b>4.1%</b>	<b>3.1-5.1</b>
<b>Nov 1999</b>	<b>18.3%</b>	<b>16.3- 20.2</b>	<b>9.5%</b>	<b>8.0 -10.8</b>	<b>1.8%</b>	<b>1.1- 2.4</b>
<b>Jun 19 99</b>	<b>18.9%</b>	<b>16.6, 21.0</b>	14.7%	12.9, 16.5	3.3%	2.6, 4.0
<b>Nov 1998</b>	24.3%	22.0, 26.5	<b>13.6%</b>	<b>12.2, 14.9</b>	<b>1.7%</b>	<b>1.2, 2.2</b>
<b>Apr 1998</b>	25.3%	23.2, 27.4	15.1%	13.4, 16.8	2.7%	2.0, 3.4
<b>Nov 1997</b>	30.3%	27.1, 33.5	15.9%	13.5, 18.3	3.1%	2.2, 4.0
<b>Aug 1996</b>	26.3%	22.6, 30.1	19.3%	16.4, 22.1	3.8%	2.9, 4.8
<b>Dec 1994</b>	35.5%	32.9, 38.1	25.2%	22.4, 28.0	4.1%	3.1, 5.1
		significant reduction since 94 & 96		significant reduction since 94		

*All based on household surveys, with the exception of April 1998 (based on PHC records)*

With the prevalence of malnutrition mentioned above, the number of malnourished children under five years of age with chronic moderate or severe malnutrition is estimated at 62,700. Using a 95% confidence interval the estimated number of children under five years of age with chronic moderate or severe malnutrition would range between 53,900 to 71,500 (*Table 15*).

<sup>7</sup> Confidence interval is a range of 95% confidence that the prevalence estimate is within the bounds of the range. Results for prevalence rates and confidence intervals are based on the sample statistical program in the software package EpiInfo (Version 6.04). Prevalence and range are based on the standard definition by WHO: under -2 standard deviations from the reference.

Table 15: Estimated numbers malnourished and ranges – Nov 97 - Jun 2001

	Chronic malnutrition		Underweight		Acute malnutrition	
	Number	Range	Number	Range	Number	Range
<b>June 2001</b>	<b>62,700</b>	53,900-71,500	<b>58,800</b>	51,100-67,100	<b>16,500</b>	12,650-20,350
<b>June 2000</b>	<b>79,700</b>	69,300- 89,650	<b>73,700</b>	64,700- 83,000	<b>22,550</b>	17,000- 28,000
<b>Nov 1999</b>	<b>100,650</b>	89,650-111,100	<b>52,250</b>	44,000-59,400	<b>9,900</b>	6,650-13,200
<b>Jun 1999</b>	<b>103400</b>	91,300-115,500	<b>80850</b>	70,950-90,750	<b>18150</b>	14,300-22,000
<b>Nov 1998</b>	<b>135000</b>	122,000-147,000	<b>75000</b>	70,000-80,000	<b>9500</b>	6,000-11,000
<b>Nov 1997</b>	<b>167000</b>	150,000-184,000	<b>87000</b>	65,000-90,000	<b>17000</b>	11,000-23,000

Figures for 1996 are not included due to a different population base

Reduction in the prevalence of malnutrition has occurred in all Governorates (Table 16)

Table 16: Prevalence and range of malnutrition by Governorate

		June 2001 and prior years					
Governorate	Year	Chronic malnutrition		Underweight		Acute malnutrition	
		Prevalence	95% CI	Prevalence	95% CI	Prevalence	95% CI
<b>Dohuk</b>	Jun 01	<b>16.1%</b>	<b>13.1-19.1</b>	<b>11.4%</b>	<b>9.1-13.7</b>	2.0%	1.3-2.6
	Jun -00	<b>16.6%</b>	<b>13.2-20.0</b>	<b>13.3%</b>	<b>10.1-16.1</b>	2.3%	1.3-3.4
	Nov-99	<b>20.7%</b>	<b>17.1-24.1</b>	<b>9.7%</b>	<b>7.0- 12.3</b>	1.8%	1.0-2.5
	Jun 99	<b>24.9%</b>	<b>20.8, 29.0</b>	<b>16.4%</b>	<b>12.9, 19.8</b>	3.0%	2.0, 4.0
	Nov 98	31.0%	25.9, 36.1	<b>15.8%</b>	<b>12.8, 18.8</b>	1.7%	0.7, 2.7
	Nov 97	31.4%	26.8, 36.0	15.4%	12.0, 18.9	3.5%	2.2, 4.7
	Aug 96	27.1%	22.0, 32.2	17.7%	14.8, 20.6	4.1%	2.3, 5.9
	Dec 94	38.5%	34.1, 43.0	28.1%	23.6, 32.5	4.1%	2.4, 5.8
<b>Erbil</b>	Jun 01	<b>10.4%</b>	<b>8.1-12.8</b>	<b>10.5%</b>	<b>7.9-13.2</b>	3.4%	2.0-4.8
	Jun -00	<b>13.0%</b>	<b>10.1-16.0</b>	<b>13.2%</b>	<b>10.1-16.3</b>	4.3%	2.8-5.7
	Nov-99	<b>17.6%</b>	<b>14.1-21</b>	<b>8.9%</b>	<b>7.0- 12.3</b>	1.4%	0.7-2.9
	Jun 99	<b>19.1%</b>	<b>15.9, 22.5</b>	<b>15.0%</b>	<b>11.9, 18.2</b>	3.4%	2.1-4.7
	Nov 98	<b>22.8%</b>	<b>19.5, 26.1</b>	<b>11.8%</b>	<b>10.4, 13.3</b>	<b>1.2%</b>	<b>0.6, 1.8</b>
	Nov 97	33.1%	26.9, 39.2	19.2%	14.7, 23.7	4.9%	2.9, 6.9
	Aug 96	29.2%	21.1, 37.2	21.3%	15.3, 27.3	3.0%	1.8, 4.3
	Dec 94	34.3%	30.2, 38.4	24.0%	20.2, 27.8	4.4%	2.5, 6.3
<b>Suleimanyiah</b>	Jun 01	<b>9.8%</b>	<b>7.4-12.2</b>	10.6%	8.3-12.8	3.2%	2.0-4.4
	Jun-00	<b>14.5%</b>	<b>11.5-17.5</b>	13.6%	10.8-15.1	4.8%	3.0-6.9
	Nov-99	<b>17.6%</b>	<b>14.7- 20.5</b>	9.8%	7.4-12.1	2.1%	0.8-3.3
	Jun 99	<b>15.5%</b>	<b>12.0, 19.1</b>	13.6%	10.8, 16.4	3.5%	2.3-4.6
	Nov 98	22.0%	18.9, 25.2	13.8%	11.5, 16.1	2.1%	1.2, 3.0
	Nov 97	27.1%	22.4, 31.9	13.2%	10.0, 16.4	1.3%	0.5, 2.0
	Aug 96	23.5%	18.3, 28.6	18.4%	14.0, 22.9	4.3%	2.6, 6.1
	Dec 94	29.5%	23.8, 34.7	19.3%	11.9, 26.6	3.2%	1.7, 4.6

significant reduction since 94 and 96

significant reduction since 94

Whereas prevalence rates differ by geographical residence (urban/rural), no significant differences can be detected between the three Governorates. Urban areas show a significant reduction in chronic malnutrition since 1996, yet not for rural areas. The level of reduction in underweight and acute malnutrition for rural areas between from 1996 to late 1998 is of little significance (Table 17). In the 1996 survey, no distinction was made between urban and rural areas and no codes for residence were available for the 1994 survey.

**Table 17: Prevalence and range of malnutrition by area – 2001 and prior years**

Governorate	Year	Chronic malnutrition		Underweight		Acute malnutrition	
		Prevalence	95% CI	Prevalence	95% CI	Prevalence	95% CI
<b>Urban</b>	Jun 01	<b>9.9%</b>	<b>8.0-11.7</b>	<b>9.2%</b>	<b>7.3-11.0</b>	3.2%	2.1-4.2
	Jun-00	<b>13.2%</b>	<b>10.9-15.4</b>	<b>12.1%</b>	<b>10.0-14.2</b>	4.2%	3.0-5.4
	Nov 99	<b>14.9%</b>	<b>12.9-16.9</b>	<b>7.2%</b>	<b>5.7-8.6</b>	1.2%	0.7- 1.8
	Jun 99	14.5%	11.9, 17.1	<b>11.7%</b>	<b>9.6, 13.9</b>	3.2%	2.4, 4.0
	Nov 98	18.2%	15.6, 20.7	<b>11.7%</b>	<b>10.0, 13.5</b>	2.1%	1.3, 2.9
	Nov 97	23.7%	20.0, 27.5	13.4%	10.0, 16.8	3.3%	1.8, 4.9
	Aug 96	24.8%	19.7, 29.9	17.3%	13.7, 21.0	3.4%	2.2, 4.5
<b>Rural/ Settlement</b>	<b>Jun 01</b>	<b>13.4%</b>	<b>10.8-16.0</b>	<b>12.8%</b>	<b>10.6-14.9</b>	2.8%	1.8-3.7
	<b>Jun 00</b>	<b>16.6%</b>	<b>13.6-19.7</b>	<b>16.0%</b>	<b>13.4-18.6</b>	3.9%	2.2-5.6
	Nov-99	23.1%	20.2-26.0	<b>12.7%</b>	<b>10.6- 14.8</b>	2.6%	1.4- 3.8
	Jun 99	23.6%	20.7, 26.7	<b>18.0%</b>	<b>15.5, 20.5</b>	3.6%	2.4, 4.8
	Nov 98	29.9%	27.1, 32.7	<b>15.3%</b>	<b>13.3, 17.2</b>	<b>1.4%</b>	<b>0.7, 2.0</b>
	Nov 97	32.3%	25.8, 38.8	<b>14.5%</b>	<b>10.9, 18.2</b>	2.9%	1.4, 4.4
	Aug 96	29.5%	24.4, 34.5	23.1%	18.6, 27.5	4.8%	3.0, 6.5
significant reduction since 96							

<b>Rural</b>	<b>Jun 01</b>	<b>13.5%</b>	<b>9.8-17.3</b>	<b>13.7%</b>	<b>11.3-16.0</b>	<b>2.7%</b>	<b>1.2-4.6</b>
	<b>Jun-00</b>	<b>17.5%</b>	<b>13.0-22.0</b>	<b>19.1%</b>	<b>16.2-22.1</b>	<b>4.9%</b>	<b>2.3-7.5</b>
	Nov 99	<b>21.4%</b>	<b>17.1-25.4</b>	<b>11.4%</b>	<b>8.6-14.2</b>	1.7%	1.2- 2.3
	Jun 99	<b>23.6%</b>	<b>17.9, 29.3</b>	17.8%	13.3, 22.3	3.9%	1.7, 6.0
	Nov 98	31.7%	27.9, 35.4	<b>15.7%</b>	<b>12.9, 18.5</b>	1.5%	0.6, 2.5
	Nov 97	38.5%	33.4, 43.5	20.1%	15.7, 24.5	3.7%	2.1, 5.4
<b>Settlement</b>	<b>Jun 01</b>	<b>13.2%</b>	<b>9.8-16.7</b>	<b>11.8%</b>	<b>8.2-15.3</b>	<b>2.9%</b>	<b>1.6-4.2</b>
	<b>Jun-00</b>	<b>15.5%</b>	<b>11.6-19.3</b>	<b>11.8%</b>	<b>8.4-15.1</b>	<b>2.6%</b>	<b>1.9-4.0</b>
	Nov 99	<b>24.6%</b>	<b>20.8-25.4</b>	13.8%	10.8-16.6	3.4%	1.5-5.4
	Jun 99	23.6%	20.3, 26.9	18.1%	15.2, 21.0	3.4%	2.1, 4.8
	Nov 98	28.0%	24.1, 32.0	14.8%	12.1, 17.4	1.2%	0.4, 1.9
	Nov 97	32.3%	25.8, 38.8	14.5%	10.9, 18.2	2.9%	1.4, 4.4
significant reduction since 97							

*No separation of rural/settlement made in the 1996 survey*

## **Box I Nutritional implications for the anthropometric indicators**

**Chronic malnutrition** (or stunting) reflects the cumulated detrimental effect on child growth by adverse economic and environment conditions, poor health, feeding and care. This results in poor physical growth, often accompanied by sub-standard capacity for mental development. Because children with chronic malnutrition are small for their age and do not appear thin, they are not readily recognized. However, these stunted children often grow up to be stunted adults, with a continuation of the same detrimental process on their children.

**Acute malnutrition** (or wasting) is the most readily recognized form of malnutrition, due to the child appearing thin. It reflects more recent onset adversities, such as diarrhoea and acute respiratory infections compounded by inadequate feeding. It is most easily reversed, but often recurs due to repetition of this cycle. Wasted children are the ones most likely to be admitted to hospitals, because of kwashiorkor and marasmus, the most severe forms of clinical manifestations of malnutrition.

**Underweight** implies a composite of chronic and acute malnutrition - either or both of these can result in underweight. The trends in underweight prevalence are often sensitive to even relatively slight changes in acute malnutrition, as seems to be the case in the survey results for the Northern Governorate.

*Photos: UNICEF-North Nutrition Section*