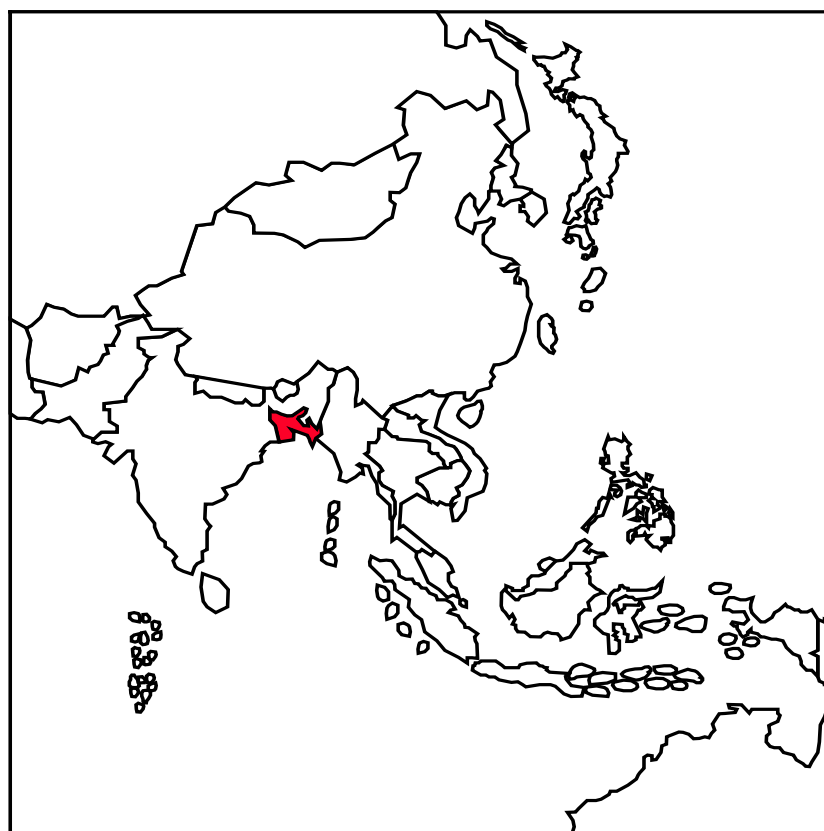


## FAO - NUTRITION COUNTRY PROFILES

# BANGLADESH



**FOOD AND AGRICULTURE ORGANIZATION  
OF THE UNITED NATIONS**

Note for the reader

*The objective of the Nutrition Country Profiles (NCP) is to provide concise analytical summaries describing the food and nutrition situation in individual countries with background statistics on food-related factors. The profiles present consistent and comparable statistics in a standard format. This pre-defined format combines a set of graphics, tables and maps each supported by a short explanatory text. Information regarding the agricultural production, demography and socio-economic level of the country are also presented.*

*In general, data presented in the NCP are derived from national sources as well as from international databases (FAO, WHO...).*

*Technical notes giving detailed information on the definition and use of the indicators provided in the profile can be obtained from the Food and Nutrition Division, Assessment and Evaluation Service upon request. An information note describing the objectives of the NCP is also available.*

*Useful suggestions or observations to improve the quality of this product are welcome.*

*The data used to prepare the maps are available in Excel upon request at:*

E-mail: [nutrition@fao.org](mailto:nutrition@fao.org)

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Bangladesh

*The designations employed and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Food and Agriculture Organization of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers.*

**FAO 1999**



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*Graphs, tables and maps can be visualised by clicking on the words in bold and underline, only in the "Full profile" pdf file.*

## SUMMARY

Rates of malnutrition in Bangladesh are among the highest in the world. More than 54% of preschool-age children, equivalent to more than 9.5 million children, are stunted, 56% are underweight and more than 17% are wasted (**Maps 2, 3 and 4**). Although all administrative divisions were affected by child malnutrition there were important differences in the prevalences of the three anthropometric indicators. The prevalence of underweight ranged from 49.8% in Khulna to 64.0% in Sylhet which also showed the highest prevalence of stunting (61.4%) and wasting (20.9%). Despite the high levels, rates of stunting have declined steadily over the past 10 years.

Bangladeshi children also suffer from high rates of micronutrient deficiencies, particularly vitamin A, iron, iodine and zinc deficiency. Bangladesh should be commended for making significant progress in reducing vitamin A deficiency (VAD) among preschool children over the past 15 years; however, consumption of VA-rich foods is still low, suggesting that the underlying causes of VAD require further attention and support. Anemia is also highly prevalent among children in Bangladesh and few programs have been initiated to improve their iron status.

Malnutrition among women is also extremely prevalent in Bangladesh. More than 50 percent of women suffer from chronic energy deficiency and studies suggest that there has been little improvement in women's nutritional status over the past 20 years. As observed for children there were important differences in the prevalence of women malnutrition among administrative divisions. The prevalence of women with a BMI < 18.5 kg/m<sup>2</sup> ranged from 47.6% in Khulna to 59.6% in Sylhet (**Map 5**) Clinical VAD is common among women of reproductive age and during pregnancy. Subclinical VAD and anemia are also highly prevalent among pregnant and lactating women. Programs in Bangladesh also need to begin to incorporate components for adolescents and school-age children who will also benefit from improvements in nutrition.

Improving nutrition can have a significant impact on survival as well as physical and cognitive development and productivity. Good nutrition, comprising adequate quality and quantity of food intake and reduction of illness is also a basic human right and is an essential input for economic development.

Significant progress has been made in cereal production in Bangladesh over the past decades. However, the rapid population growth and resulting high and growing food requirements pose a difficult challenge given the limited availability of cultivable land in Bangladesh. Re-occurring disasters further complicate the stability of food production. Recently the GOB and interested organisations have started to encourage non-cereal food production and consumption along with food self-sufficiency. Greater attention is being given to supportive policies for agriculture input, research on non-cereal crops, and commercial and homestead promotion of poultry and fruits/vegetables are receiving greater attention. There is a clear need to diversify food sources both in terms of land/environmental sustainability, development of the rural economy and increased consumption to achieve improvements in the nutritional status of the people of Bangladesh.

TABLE 1: GENERAL STATISTICS OF BANGLADESH

Indicator (\$)	Year	Unit of measure	Indicator (\$)	Year	Unit of measure																								
<b>A. Land in use for agriculture</b>			<b>G. Average Food Supply</b>																										
1. Agricultural land	1995	ha per person	0.080																										
2. Arable and permanent crop land	1995	ha per person	0.074																										
<b>B. Livestock</b>			<b>1. Dietary Energy Supply (DES)</b> 1994-96 Kcal/caput/day <b>2063</b>																										
1. Cattle	1994-96	thousands	23772																										
2. Sheep & goats	1994-96	thousands	31666																										
3. Pigs	1994-96	thousands	...																										
4. Chickens	1994-96	millions	128																										
<b>C. Population</b>			<p><b>Percentage of DES by major food groups</b></p> <table border="1"> <thead> <tr> <th>Food Group</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Cereals (excl. beer)</td> <td>83%</td> </tr> <tr> <td>Starchy roots</td> <td>1%</td> </tr> <tr> <td>Sweeteners</td> <td>1%</td> </tr> <tr> <td>Pulses, nuts, oilcrops</td> <td>1%</td> </tr> <tr> <td>Fruits &amp; Vegetables</td> <td>1%</td> </tr> <tr> <td>Vegetable oils</td> <td>5%</td> </tr> <tr> <td>Animal Fats</td> <td>3%</td> </tr> <tr> <td>Meat &amp; offals</td> <td>3%</td> </tr> <tr> <td>Fish &amp; seafood</td> <td>1%</td> </tr> <tr> <td>Milk &amp; Eggs</td> <td>1%</td> </tr> <tr> <td>Other</td> <td>1%</td> </tr> </tbody> </table> <p>Note: Value not indicated if below 1%</p>			Food Group	Percentage	Cereals (excl. beer)	83%	Starchy roots	1%	Sweeteners	1%	Pulses, nuts, oilcrops	1%	Fruits & Vegetables	1%	Vegetable oils	5%	Animal Fats	3%	Meat & offals	3%	Fish & seafood	1%	Milk & Eggs	1%	Other	1%
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Milk & Eggs	1%																												
Other	1%																												
1. Total population	1998	thousands	124043																										
2. 0-5 years	1998	% of total pop.	13.4																										
3. 6-17 years	1998	% of total pop.	32.6																										
4. 18-59 years	1998	% of total pop.	48.9																										
5. >= 60 years	1998	% of total pop.	5.1																										
6. Rural population	1998	% of total pop.	80.0																										
7. Population growth rate, Total	1995-2000	% of total pop.	1.6																										
8. Population growth rate, Rural	1995-2000	% of rural pop.	0.9																										
9. Projected total population in 2025	2025	thousands	179980																										
10. Agricultural population	1995	% of total pop.	60.6																										
11. Population density	1995	pop. per sq Km	821.0																										
<b>D. Level of Development</b>			<b>2. Proteins</b> 1994-96 g/caput/day <b>45</b>																										
1. GNP per capita, Atlas method	1996	current US\$	260																										
2. Human Development Index rating	1995	min[0] - max[1]	0.371																										
3. Incidence of poverty, Total	1991/92	% of population	49.7																										
4. Incidence of poverty, Rural	1991/92	% of population	52.9																										
5. Life expectancy at birth (for both sexes)	1995	years	56.9																										
6. Under-five mortality rate	1996	per 1,000 live births	112																										
<b>E. Food Trade</b>			<b>3. Vegetable products</b> 1994-96 % of total proteins <b>86.8</b>																										
1. Food Imports (US \$)	1994-96	% of total imports	14.7																										
2. Food Exports (US \$)	1994-96	% of total exports	6.1																										
3. Cereal Food Aid (100 MT)	1994-96	% of cereals imports	45.2																										
<b>F. Indices of Food Production</b>			<b>4. Animal products</b> 1994-96 % of total proteins <b>13.2</b>																										
1. Food Production Index	1994-96	1989-91=100	104.7																										
2. Food Production Index Per Capita	1994-96	1989-91=100	97.1																										
			<b>% Energy from:</b>																										
			<b>5. Protein</b> 1994-96 % of total energy <b>8.8</b>																										
			<b>6. Fat</b> 1994-96 % of total energy <b>9.0</b>																										
			<b>H. Food Inadequacy</b>																										
			1. Total population "undernourished" 1990-92 millions <b>39.4</b>																										
			2. % population "undernourished" 1990-92 % of total pop. <b>34.0</b>																										
... no data available § see References for data sources used. See Technical Notes for definitions used.																													

# BANGLADESH

## I. OVERVIEW

### 1. Geography

With a land area of 147,570 square kilometres, Bangladesh is comparable in size to England and Wales combined (BBS, 1998). Bangladesh is bordered by India on the north, Northwest, Northeast and east. A small section of the south-eastern border is shared with Myanmar. The mouth of the Ganges (Padma) river forms the southern border along the Bay of Bengal.

Rivers are the most important geographical characteristic in Bangladesh and are the soul of life for the vast majority of Bangladeshi households. Several large rivers and their tributaries (a total of 230) create a river delta that comprises nearly 90% of the country (World Bank, 1989). The Padma and Jumuna rivers essentially divide the country into six regions now identified as six administrative regions. In addition to the vast delta, Bangladesh has two hilly areas, in the Northwest bordering Assam (Sylhet Division) and in the Chittagong Hill Tracts near the Myanmar border (Chittagong Division). Coastal forest covers part the south-western portion of the country (Khulna Division). Annual flooding during the monsoon season brings essential soil nutrients for this agriculture-based country, but at times also causes devastation and suffering as in 1988 and 1998. In addition to flooding, Bangladesh is plagued by other natural calamities such as cyclones, tidal surges, droughts and tornadoes.

Bangladesh is a subtropical country with three main seasons, March through May is the hot season, when the climate is characterized by heat, increasing humidity, and scattered storms. June through September is the monsoon season, characterized by regular rainfall and rising rivers; and October-February is a cool season, characterized by drier air and cooler temperatures (BBS, 1998). Administratively, Bangladesh is divided into 6 divisions, 64 districts and 490 subdistricts (BBS, 1998).

### 2. Population

In 1998, the total population in Bangladesh was estimated to be more than 124 million inhabitants (**Table 1**). With more than 820 persons per square kilometre, Bangladesh is one of the most densely populated country in the world (**Table 1**). The Bangladeshi population is growing at an annual rate of 1.6% and is estimated to reach 180 million inhabitants by the year 2025. According to the BDHS, total fertility has declined from more than 6 children per woman in 1991 to 3.3 births per woman in 1996 (Mitra, et. al., 1997). Total fertility rates vary regionally in Bangladesh, from 2.5 births per woman in Rajshahi Division to more than 4.0 births per woman in Sylhet and Chittagong Division (Mitra, et. al., 1997). Despite the remarkable decline in fertility rates, Bangladesh is characterized by a young age structure (more than 32% of the population are less than 18 years of age) and thus has a 'built-in population momentum'. It is estimated that the population may stabilize at 211 million by 2056 if replacement fertility is reached by the GOB's targeted date of 2005 (Mitra, et. al., 1997).

More than 80% of the population currently resides in rural areas; however, urbanization has increased dramatically in the past 10 years (Bhadra, 1997). Urbanization in Bangladesh is largely due to rural to urban migration; only a small percent of the growth in urban cities is associated with longer life expectancy and lower child mortality rates (Bhadra, 1997).

More than 85% of the population in Bangladesh are Muslims, followed by approximately 12% Hindu. Less than one percent are Buddhists or Christians.

### **3. Level of development: poverty, education and health**

Several methods have been proposed to assess the level of poverty within a given country. Using either 'direct calorie intake' methods or 'cost of basic needs' methods, it is clear that poverty has declined significantly in Bangladesh in the past 10 years (MHFW, 1997). According to the recent World Bank Poverty Assessment, the incidence of the 'very poor' has declined from 43% in 1991 to 36% in 1995 (WB, 1998). However, with concurrent population growth, the absolute number of poor persons has increased. Declines in poverty were observed in both urban and rural areas, but a large percentage of the rural population (40%) are still poor. Income inequity has increased nationally, but significantly more so in urban than rural areas (WB, 1998). The upper 5 percent of the population receives almost 20 percent of the national income whereas the lower 40 percent of the population receives only 17 percent of the national income (UNDP, 1998).

The poor reside in both rural and urban milieu and generally have unstable and inadequate employment, less education. In the rural areas, poverty is linked to land ownership. Poor households are more susceptible to both chronic and acute crises, such as frequent natural disasters, because they have little or no savings or less access other strategies to cope with these crises. In rural areas, female-headed households have a higher probability of being very poor compared to households headed by men (WB, 1998). Wage rates are increasing for both women and men, but female wage rates remain significantly lower male rates (UNDP, 1998). Women in Bangladesh have poor nutritional status, perform undervalued work, have less access to credit, poor access to health care, less control over assets, and high insecurity (violence at home, workplace).

Primary education became compulsory in 1991 and school attendance is improving. Recent data from the Bangladesh Demographic and Health Survey (BDHS) suggests that more than 45% of women and 58% of men receive at least some primary education (Mitra, et. al., 1997). A much greater percentage of younger women and men in the survey sample had attended school than older women (Mitra, et. al., 1997). Data from UNICEF suggest that literacy rates have increased for both men and women. Literacy among women have increased from 17% in 1980 to 26% in 1995 (UNICEF, 1998). During the same period of time, literacy rates among men have increased from 41% to 49% (UNICEF, 1998). While the increase has been more dramatic for women, literacy rates are still significantly lower for women than men. Non formal education for adults is also being promoted by many non-governmental organisations (NGOs) in Bangladesh.

Childhood mortality has declined significantly in the last two decades. Mortality among children under 5 years of age has declined from 247 deaths per 1000 live births in 1960 to 115 deaths per 1000 live births in 1995 (UNICEF, 1998). Similarly, infant mortality (deaths among children less than one year of age) has also declined from 151 deaths/1000 live births in 1960 to 85 deaths /1000 live births in 1995 (UNICEF, 1998). Very similar rates are reported from the BDHS (116/1000 and 82/1000 respectively). Despite this decline, child mortality rates are still high, more than one in nine children in Bangladesh die before their fifth birthday. Life expectancy has also increased. People born in 1960 could expect to live on average until 40 years of age whereas those born in 1995 can expect on average to live to 57 years of age (UNICEF, 1998). In most countries women outlive men, however, Bangladesh is one of the few countries in the world where life expectancy of men is equal to women. This reflects the low social status of women and gender bias that reduces their life expectancy.

The accessibility of health service has also improved in Bangladesh. The most recent figures from UNICEF and the BDHS suggest that more than 90% of children have been immunized against TB, 69% against polio and DPT and 79% against measles (UNICEF, 1998, Mitra, et. al., 1997). More than 75% of women received tetnus toxoid during pregnancy. An estimated 97% of households have access to safe drinking water (only slightly higher in urban than rural, 99%, and

96% respectively); however, less than one-half of all Bangladeshi households have adequate sanitation (79% in urban areas compared to 44% in rural areas). Recent studies have found high levels of arsenic in water sources in parts of Bangladesh, suggesting that the definition of 'safe' might need to be re-examined. Less than 30 percent of women receive adequate antenatal care (Mitra et al., 1997).

#### 4. Agricultural production, land use and food security

Agriculture is an important sector of the Bangladesh economy. It is the major source of livelihood for more than 65% of the population and contributes approximately one-third of the GDP (FAO, 1997, MOA, 1996). On average, agriculture GDP grew at approximately 2% over the last 15 years, although there were wide fluctuations during this period (WB, 1998). The growth rate has been lower, just above 1 percent, since the mid-1990s, due largely to poor performance in the crop sub-sector (FAO, 1998). Growth in the livestock, fisheries and forestry sub-sectors has been high, yet because these constitute such a small share of the overall production, this could not compensate for the poor performance of growth in the crop sub-sector (FAO, 1997, MOA, 1996). The growth that has been observed in the crop sub-sector is associated largely with a shift from local to high yielding varieties of rice and wheat (FAO, 1998).

Approximately 67% of total land area is cultivable (MOA, 1996). Of this, approximately 70% is highland and medium highland where shallow flooding occurs (FAO, 1998). In this land space, farmers can grow two to three crops per year. The remaining land is low lands where only one to two crops are grown per year. Rice is the dominating crop and occupies approximately 75 of the currently utilized arable land (FAO, 1998). In low lands, *boro* (irrigated) rice is the major crop if irrigation is available. The average farm size is decreasing and the percent of functionally landless households (less than 0.2 ha of land) has increased (MOA, 1996). More than 60% of households in rural Bangladesh are functionally landless compared to 48% in 1982 and more than 80% are net food purchasers (FAO, 1997; MOA, 1996). The majority of financial and human resources (program, extension, and research) are directed at grain production, particularly rice production. Only recently have resources been directed at non-grain crops and agriculture diversification (FAO, 1997).

Total cereals production has increased from 28 to 32 million tons between 1990 and 1998 (FAOSTAT). This increase in cereals production is mainly due to rice production which represents almost 90% of total cereals production (FAOSTAT). In the same period the production of fruit has remained the same 1.4 million tons although there has been an increase in the production of banana and papaya, respectively from 624,000 and 29,000 thousand tons in 1990 to 634,000 and 39,000 thousand tons in 1998.

The production of meat has increased from 308,000 to 438,000 thousand tons and that of milk from 1.6 to 2.1 million tons between 1990 and 1998 (FAOSTAT).

Food security is linked to land ownership in rural areas but the rural economy is expanding and occupational patterns in rural areas are changing. Food security is also linked to stability of employment/income sources in both urban and rural, food distribution, storage and marketing.

Natural and man-made disasters further drive the cycle of poverty and food insecurity in Bangladesh. Poor households living who are already living on the margin are often pushed further to the edge as a result of damage from floods, cyclones, drought and other crises. The disasters damage crops, which can impact on labour/employment opportunities for landless households. Further, households are forced to use any savings and take loans at exorbitant interest rates to recoup from the damage incurred as a result of a disaster.

## 5. Economy

With a current GNP per caput of \$US 260, Bangladesh is among the poorest country in the world. The GNP has increased at approximately 4% per year in the early 1990's, slowed in 1995, but increased to 5.5 percent in 1998 (WB/ADB, 1998). Although GNP currently exceeds population growth rate, it is not considered adequate to raise Bangladesh from its impoverished state (WB/ADB, 1998). National and domestic savings have increased over the last decade, but the rates of inflation for both food and non-food items have been on the rise since January, 1997 (WB/ADB, 1998, WB, 1998).

The main source of the economic growth is from large-scale industry, construction, transportation and other services (FAO, 1997). Agriculture has a large share of the GDP, but has declined since the early 1990s as mentioned above. Although agriculture's share of total GDP will continue to decline, it will likely remain the single most important source of income and employment in Bangladesh over the next decades (MOA, 1996). It will play an important role in national efforts to achieve food self-sufficiency, reduce rural poverty, curb urbanisation, and promote sustainable economic development. Major exports include garments, leather goods, jute products, frozen foods and tea (BBS, 1998). In general, export growth rates are good, yet a greater diversification of the export base has been recommended. (WB/ADB, 1998). Food, industrial raw materials and machinery are the major imports.

## II. THE FOOD AND NUTRITION SITUATION

### 1. Trends in energy requirements and energy supplies

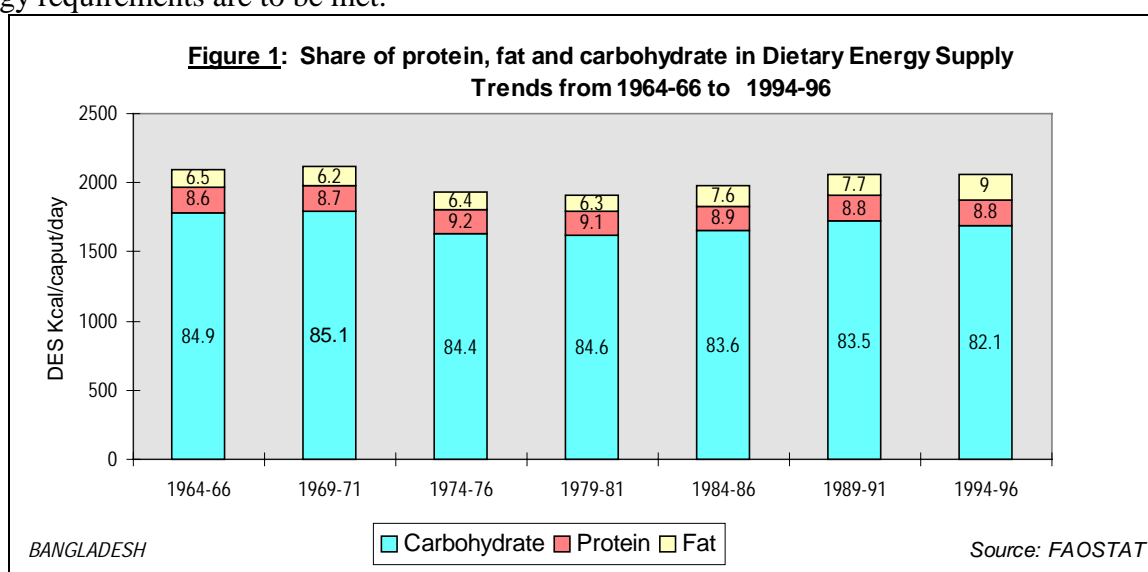
Despite impressive gains in food production, Bangladesh has not been able to reach stabilization between energy requirement and energy supplies. Energy requirement is increasing compared to the declining trend in energy supply (**Table 2**). In 1965, energy supplies (DES) were very close to energy requirement, but by 1995, this gap has widened. Increases in energy requirement are the result of increases in population size, changes in the demographic age pyramid (improvements in child survival and increased life expectancy lead to an ageing population) and increases in height, and therefore higher requirements, as a consequence of better nutrition. Urbanisation is also increasing rapidly in Bangladesh and this will have an important affect on the requirement:supply balance. New challenges will include better transport, distribution and storage of food and food safety/food quality.

**Table 2: Total population, urbanisation, energy requirements and dietary energy supplies (DES) per person and per day in 1965, 1995 and 2025**

Year	1965	1995	2025
Total population ( <i>thousands</i> )	58312	118229	179980
Percentage urban (%)	6.2	18.3	37.3
Per caput energy requirements ( <i>kcal/day</i> )	2114	2153	2226
Per caput DES ( <i>kcal/day</i> ) *	2100	2063	---

\* Three-year average calculated for 1964-66 and 1994-96 (*Source: FAOSTAT*)

Based on data from food balance sheets, the majority of energy supply is derived from carbohydrate which provide 82-85% of total energy in Bangladesh. Proteins and fat combined supply less than 18 percent of the total energy supply (Figure 1). Although the share of energy supply from fat has increased by one-third since 1964 it is still far from the recommended dietary allowance (RDA) of 30 percent of total caloric intake from fat. The share of total energy from carbohydrate has declined marginally while the contribution of protein to overall energy supply has not changed over the last 30 years. Increasing the share of energy supply from fat is crucial if overall energy requirements are to be met.

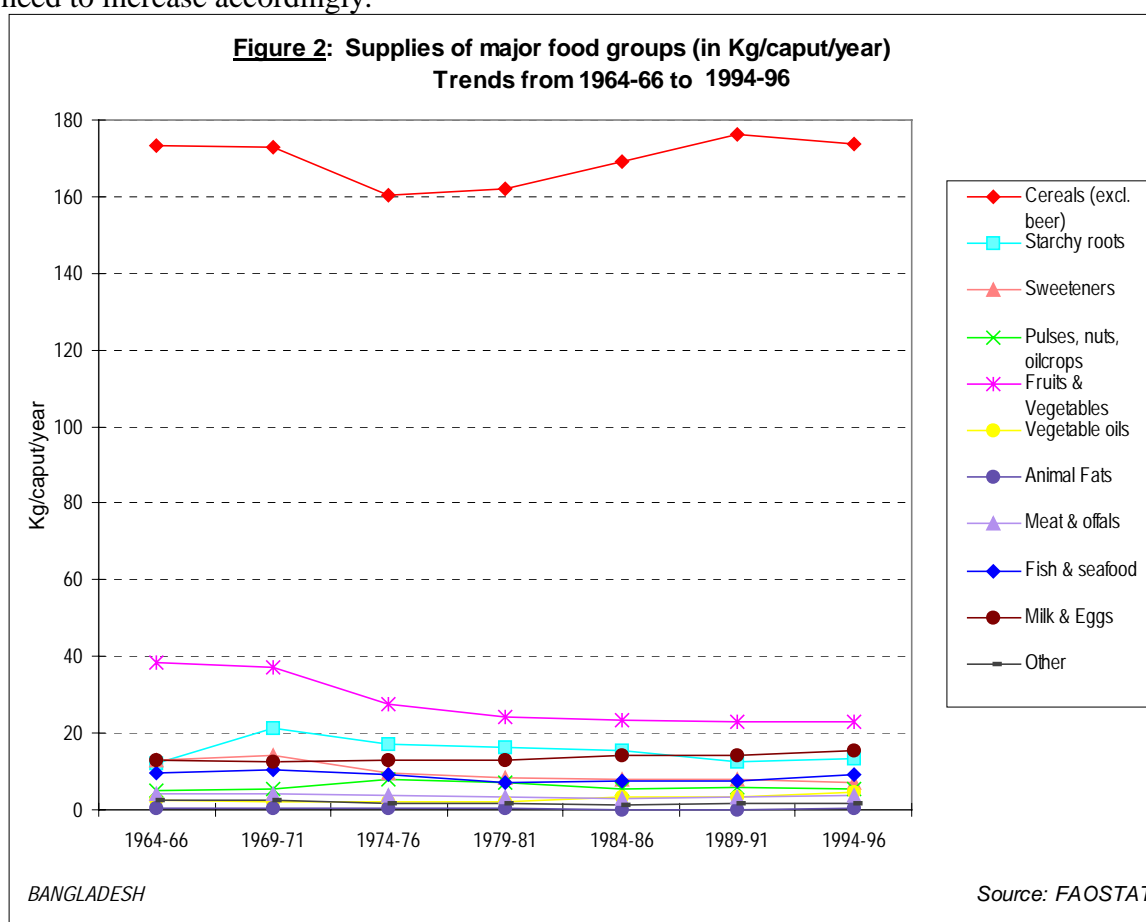


FAO Sixth World Food Survey estimated that the DES did not covered the requirements of 34% of the population in 1990-92, compared to 23% in 1969-71, meaning that the proportion of the population which is “undernourished” in terms of food inadequacy has increased (FAO, 1996). As the country achieves further economic development, energy requirements will continue to increase and in order to achieve sustainable development, more efforts will be needed to improve the quality of the diet (diversification of food intake).

## 2. Trends in food supplies

*Quantity:* The trends in food availability and composition of food supplies in Bangladesh are presented in **Figures 2-3**. These figures estimate the amount of food that is available to the population and not necessarily what has been consumed.

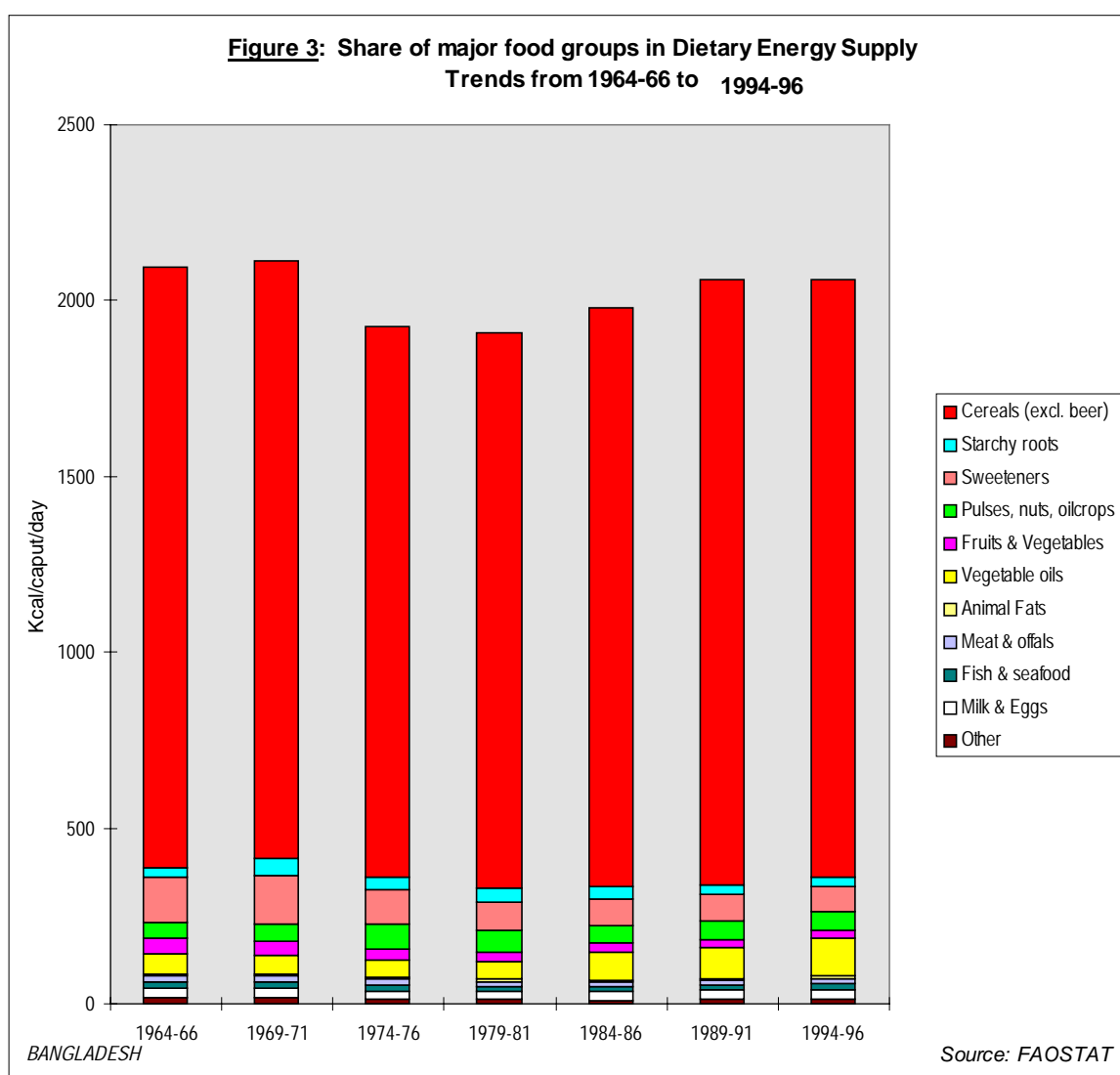
**Figure 2** shows trends and changes in the food supply over the past 30 years. The total supply of cereals has increased from a low period (post the severe famine) in the mid-1970s. The per capita supplies of cereal have remained relatively constant over the past 10 years despite the rapid increases in population growth. This suggests that production/import of cereals increased at a rate that was nearly equal to the increase in population. However, between 1989-91 and 1994-96 there was a slight decline in the average cereal supply from 176 to 174 kg/caput/year. Clearly population growth will continue at a rapid pace in Bangladesh for several decades and therefore cereal supplies will need to increase accordingly.



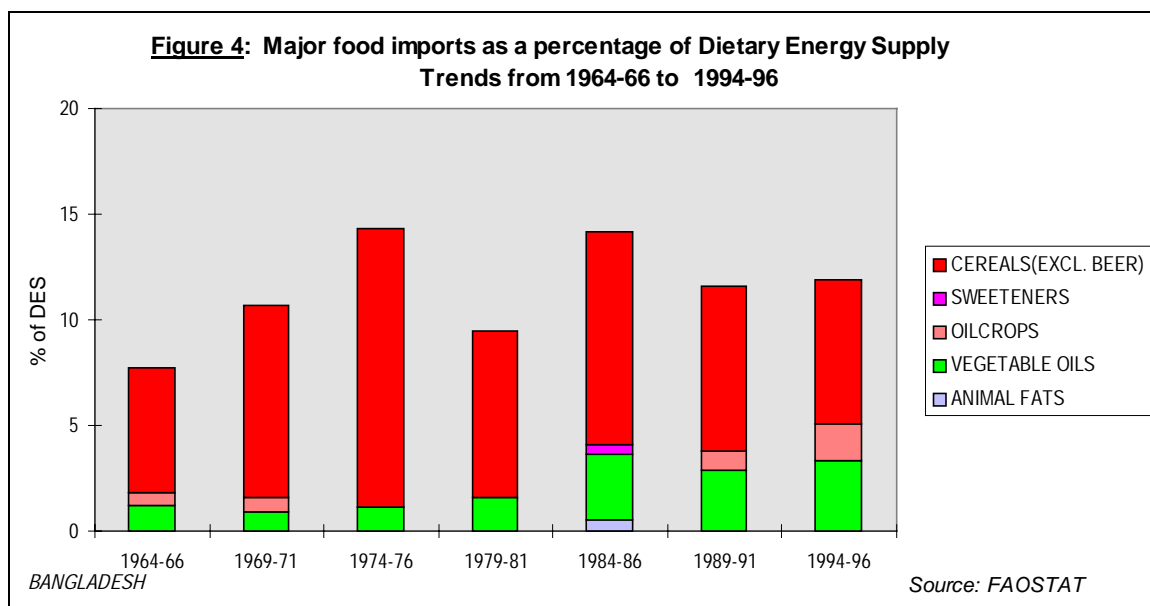
On the other hand, availability (per capita) of many non-cereal foods has remained unchanged or even declined in the past 30 years according to the food balance sheets and is extremely low compared to cereals. The focus on grain self-sufficiency has led to slow growth in the production of non-cereal crops. The net supply of many of the non-cereal foods may have increased, but these increases were not enough to match the increases in population, thus supply per capita declined. In the last thirty years the fruits&vegetables supply has decreased dramatically from nearly 40 to 23

kg/caput/year (**Figure 2**). Between 1979/81 and 1994-96, the supply of vegetable oils, although extremely low, has more doubled from 2 to 5 kg/caput/year. In the same period the supplies of milk&eggs, fish&seafood and meat&offals have increased respectively by 20%, 20% and 30%. On the other hand, between 1979/81 and 1994-96, the supplies of pulses, nuts&oilcrops, starchy roots and sweeteners have decreased respectively by 23%, 18% and 16% (Figure 2).

**Energy:** The relative contributions of major food groups in daily per caput energy supply are shown in Figure 3. DES has increased from 1913 to 2063 kcal/caput/day between 1979-81 and 1994-96. Clearly, cereals represent the main source of energy in the Bangladeshi diet, providing 1,700 kcal/caput/day, equivalent to more than 82% of the total energy (**Figure 3**). The share of animal products in DES is less than 4% therefore indicating that the diet in Bangladesh is mainly based on vegetable products which provide respectively, 97%, 87% and 82% of total energy, protein and fat supplies.



*Major food imports:* Overall, the percent of DES from imported foods has fluctuated greatly over the past 30 years. Total imports have declined from 14 to 12% between 1984-86 and 1994-96 (Figure 4). In this period the major portion of this decline is associated with the decrease in the amount of cereals imported as a percentage of DES from 10% to 7%. On the other hand, there has been an increase in vegetable oil and oil crop imports over the past three decades from 1 to 3% of DES (Figure 4). This increase in oil imports reflects an increasing demand that has resulted from increased purchasing power of households and changes in diet and food habits, particularly in the urban areas.



### 3. Food consumption

Food consumption in Bangladesh is closely linked to food production and access, including price and purchasing power/employment opportunities of households (Ahmed, 1993). Self-sufficiency in food production in Bangladesh is constrained by several factors, including rapid population growth, traditional farming practices, limited land for agriculture production and frequent natural disasters. However, achieving adequate food/nutrient intake is more complex than having adequate availability and access to food. It also requires an understanding of socio-cultural issues such as intra household distribution of food, food purchasing and preparation practices, infant feeding practices and control of infection and illness.

Food consumption patterns in Bangladesh are presented in **Table 3** using the data obtained from two surveys conducted in 1995-96: the National Nutrition Survey carried out by the Institute of Nutrition and Food Science and the Household Expenditure Survey conducted by the Bangladesh Bureau of Statistics of the Ministry of Planning (Jahan and Hossain, 1998; BBS, 1997a).

In the National Nutrition Survey (NNS) the data were collected from 1245 households in 32 rural and 9 urban sites. Household food consumption was recorded for 24 hours by direct food weighing method of foods. Left over foods for the previous day and food not consumed during the 24 hour period were accounted for in the estimates of intake. Intra household food distribution and consumption was assessed in approximately 50% of the total survey sample. Individual intakes of cooked and uncooked foods were weighed using standardized kitchen scales. Households in four rural areas were re-sampled later to determine pre and post harvest differences in nutritional intake. Cereals represented the largest amount of food consumed (436 g/caput/day) followed by fruits&vegetables (126 g/caput/day) and roots&tubers (72 g/caput/day) (Table 3). Findings from this survey suggested that fish, milk, meat, eggs, pulses, oils&fats and other highly nutritious foods accounted for less than 10% of the daily energy intake of 1868 kcal. In 1962-64 a similar survey was conducted and the authors suggest that average daily per caput energy intake has declined by 18% from 2118 to 1868 kcal between 1962-64 and 1995-96.

Cereals (mainly rice) are the main staple foods in Bangladesh providing most of the energy intake. Food consumption patterns among rural households were different than urban households. In both surveys (NNS and HES) the consumption of cereals was found to be lower in urban areas, while that of pulses, milk, meat, fish, oils&fats and was higher (Table 3). Therefore, the protein and energy content of the urban diets was found to be higher. Important seasonal differences in total per capita consumption of food were also observed. Post-harvest intakes were 23% higher than pre-harvest intakes (829 g against 676) (a very small sample size was available for the seasonal comparisons).

The Household Expenditure Survey (HES) followed a multi-stage sampling framework to collect information from 7420 households selected randomly from 372 primary sampling units throughout the country. Households were interviewed during four rounds and food consumption was estimated from expenditure data.

The findings of the HES expenditure survey show that daily per caput energy intake was 2244 kcal and that the share of total household expenditure on food has declined in both rural and urban areas over the past 10 years (BBS, 1997a). As observed in the NNS the food consumption patterns among rural households were different than urban households. Moreover, the share of food expenditure was found to be lower in urban compared to rural areas. Cereals intake was found to be higher in rural areas 511 compared to 439 g/caput/day in urban areas.

The consumption of fish, milk, meat, eggs, pulses, oils&fats and other highly nutritious foods was lower in rural areas (42, 30, 9, 3, 13 and 8 g/caput/day respectively compared to 52, 42, 24, 6, 19 and 17 g/caput/day in urban areas) (**Table 3**). Oil consumption in the rural areas in Bangladesh is still extremely low. Fish is clearly an important source of nutrients in the Bangladeshi diet although its availability and consumption is higher only during certain times of the year. Despite the increased intakes of non-grain food items, total intakes are still well below what is needed to ensure adequate nutrient intake, particularly among sections of the population who have higher requirements (e.g., lactating and pregnant women and children).

Rice is the main staple food in Bangladesh and contributes approximately 70-80% of total energy intake, 65 percent of the total protein intake and 69 percent of the total iron intake (Ahmed, 1993). A small percentage of the grain intake comes from wheat, which is consumed more frequently in the northern wheat producing areas of the country and in urban areas in the form of chapati and processed foods. Consumption analysis suggests that wheat is an inferior good in Bangladesh and therefore is self-targeting for food assistance programs (Ahmed, 1993).

There are clear patterns of food insecurity in Bangladesh that are linked to the agriculture production cycle. As a result, food insecurity is greatest in October-November before the *aman* (winter) harvest when prices are often higher and employment opportunities for labourers are limited (Ahmed, 1993). A second food insecure period occurs in April-May prior to the boro rice harvest. In recent years, *boro* (summer) rice crop has contributed a larger share of the total grain production. This change in the production cycle of rice, (harvested six months apart), has helped to stabilize the price of rice and indirectly influenced the cyclical pattern of food insecurity in Bangladesh. Rural landless households, those that are net purchasers of rice and other foods, are the most vulnerable to seasonal patterns in food availability and are also most negatively affected by price increases and disasters/crises (HKI, 1996).

Consumption of non-grain foods is still very low and varies according to season in most regions of Bangladesh. Fish are an important source of nutrients and are consumed more frequently following the monsoon season when availability is high (and price is lower) (IFPRI/BIDS/INFS, 1998a and 1998b). Similarly, although many varieties of vegetables can be grown year round in Bangladesh, vegetable consumption is also seasonal and is highest during the cool season, the time of the winter harvest (HKI, 1997, Ahmed, 1993). Papaya and banana are available year round but jackfruit, mango and other fruits are highly seasonal and post-harvest losses are high. The net production of many high quality foods has increased. Further, infrastructure to process and preserve foods is limited; therefore, many of these foods are not available or too expensive for most Bangladeshi families to purchase in off-peak seasons.

Several studies have suggested that food intake favors males in Bangladesh (Ahmed, 1993). During pregnancy and lactation women have higher requirements and many studies have shown that women do not increase intake to meet these additional requirements due to inaccessibility and cultural constraints (Blanchet, 1991). There is also some evidence that caloric intake decreases during the pre-harvest periods (Jahan and Hossain, 1998, Ahmed, 1983).

**Table 3: Food consumption surveys**

Source /Year of survey	Location	Sample Number households	Average food intake										
			Major Food Groups (kg/caput/year)										Other
			Cereals	Roots/ Tubers	Pulses	Fruits/ Vegetables	Oils/Fats	Meat	Fish	Milk products	Sweeteners	Eggs	
<b>BBS, 1997a</b>	National	7420	498.0	49.5	13.9	180.1	9.8	11.6	43.8	32.3	9.2	3.2	62.5
HES, 1995-96	Rural	5040	511.4	46.7	12.9	179.7	8.4	9.1	42.2	30.3	9.1	2.6	58.1
	Urban	2380	439.4	64.4	19.4	181.7	17.0	24.1	51.7	42.1	10.1	5.9	84.8
<b>Jahan&amp;Hossain,1998</b>	National	1245	436.0	72.0	11.0	126.0	8.0	9.0	33.0	15.0	7.0	4.0	7.1
NNS, 1995-96	Rural	975	452.0	70.0	10.0	126.0	6.0	6.0	32.0	13.0	6.0	3.0	6.8
	Urban	270	379.0	77.0	16.0	126.0	13.0	21.0	37.0	20.0	9.0	7.0	8.0
			Nutrient Intake (person/day)										
			Energy (kcal)	% Protein	% Fat	Protein (g)	% from Animal products	Fat (g)	% from Animal products				
<b>BBS, 1997a</b>	National	7420	2244	11.6	...	65.0	...	...	...				
HES, 1995-96	Rural	5040	2251	11.5	...	64.5	...	...	...				
	Urban	2380	2209	12.2	...	67.5	...	...	...				
<b>Jahan&amp;Hossain,1998</b>	National	1245	1868	10.0	7.7	47.0	...	16.0	...				
NNS, 1995-96	Rural	975	1892	9.8	6.6	46.4	...	14.1	...				
	Urban	270	1779	11.0	10.7	49.0	...	22.5	...				

Notes: ... data not available

### Breastfeeding

Almost all infants in Bangladesh are breastfed from birth and breastfeeding continues through the second and third year of life for most children (the median duration of breastfeeding in Bangladesh is 33 months). Breast feeding is longer in rural areas than urban areas. Although universal breastfeeding is common, exclusive breastfeeding for the first six months of life is not commonly practised. In addition to poor exclusive breastfeeding practices, improper introduction of complementary foods has been identified as a contributing factor to malnutrition in Bangladesh (Mitra and associates, 1996, Brown K, et. Al, 1982a and 1982b). Generally foods with low nutrient density such as sugar water, weak rice porridge or finger foods are given to children. These foods do not contribute significantly to caloric or micronutrient intake. Although programs are now being implemented to improve infant feeding practices, comprehensive, qualitative information on infant feeding practices, the constraints faced by women and lessons learned from successful programs is limited.

#### 4. Anthropometric data

Anthropometry is commonly used to assess the nutritional status of individuals and populations and the prevalence of malnutrition is closely linked to poverty in many developing countries. The nutritional status of children under five is commonly assessed using three indices: weight-for-height (wasting) which reflects acute growth disturbances, height-for-age (stunting) which reflects long-term growth faltering and weight-for-age (underweight) which is a composite indicator of both long and short term effects. Weights and heights of children are compared with the reference standards (NCHS/CDC/WHO) and the prevalence of anthropometric deficits is usually expressed as the percentage of children below a specific cut-off point such as minus 2 standard deviations from the median value of the international reference data.

Anthropometric measurements of children are collected in several surveys in Bangladesh. Data presented in this document are from the Bangladesh Demographic and Health Survey (BDHS), conducted by the National Institute of Population Research and Training (NIRPORT), the Ministry of Health and Family Welfare and the Child Nutrition Survey conducted by the Bangladesh Bureau of Statistics (Mitra et al., 1997; BBS, 1997b) (**Table 4a**).

The BDHS included anthropometric measurements of children and women for the first time in 1996-97. Data were collected from 4,787 children and 3,921 women from a multi-stage sampling procedure from November 1996-March 1997.

The national and divisional estimates from the BDHS are supplemented with information on trends over time and fluctuations in malnutrition by season from the Nutrition Surveillance Project (NSP) operated by Helen Keller International and the Institute of Public Health Nutrition which is not included in the tables (HKI/IPHN, 1997, 1998a and 1998b). The NSP collects health, nutrition and socio-economic data every two months from a randomly selected sample of 7,200 households representing each of the six administrative divisions. Data from several small studies are also presented to supplement the information on nutritional status of women and adolescent girls.

According to the findings of the BDHS survey, malnutrition among preschool children (0-59 months) continues to be major problem in Bangladesh based on the three commonly used indicators. The prevalence of underweight was 56.3%, that of stunting was 54.6% and 17.7% of children were underweight (Mitra, et. al., 1997) (**Table 4a**). According to the WHO classification of child malnutrition, a prevalence of underweight above 30% or stunting above 40% is considered very high while a prevalence of wasting above 15% reflects a critical public health problem (WHO, 1995).

Although all administrative divisions were affected by child malnutrition there were important differences in the prevalences of the three anthropometric indicators. The prevalence of underweight ranged from 49.8% in Khulna to 64.0% in Sylhet which also showed the highest prevalence of stunting (61.4%) and wasting (20.9%) (**Maps 2, 3 and 4** and **Table 4a**). The children residing in rural areas showed higher prevalences of underweight (57.8%), stunting (56.2%) and wasting (18.2%) compared to urban areas (respectively, 41.9%, 39.4 and 12.8%). The prevalence of underweight (64.6%) and wasting (29.4%) was found to be higher in children 12-23 months of age, coinciding with the period of complementary feeding (weaning period) and high rates of illness. No statistically significant differences in the prevalence of malnutrition were observed between girls and boys (**Table 4a**).

The Child Nutrition Survey (CNS) of Bangladesh, conducted in 1995-96, collected information from 200 population sample units as a special module of the household expenditure survey (HES) (BBS, 1997b). In the CNS, anthropometric measurements (heights and weights) were collected on 2,614 children age 6-71 months from the sampling units and the findings are presented in **Table 4a**. Overall 57.4% of children were underweight, 51.4% were stunted and 16.6% were wasted. Rates of malnutrition using all three indicators were higher in the rural areas (underweight 59.3%, stunting 52.8% and wasting 17.2%) compared to the urban sample (underweight 46.3%, stunting 42.9% and wasting 13.5%) (**Table 4a**).

**Table 4a: Anthropometric data on children**

Source/ Year of survey	Location	Sample			Percentage of malnutrition						
		Size number	Sex	Age Mths	Underweight % Weight/Age		Stunting % Height/Age		Wasting % Weight/Height		Overweight % Weight/Height
					< -3SD	< -2SD	< -3SD	< -2SD	< -3SD	< -2SD	> +2SD
<b>Mitra et al., 1997</b>	National	4787	M/F	0-59	20.6	56.3	28.0	54.6	3.7	17.7	...
DHS, 1996-97	Urban	448	M/F	0-59	14.2	41.9	16.9	39.4	1.7	12.8	...
	Rural	4339	M/F	0-59	21.3	57.8	29.2	56.2	3.9	18.2	...
	National	2383	M	0-59	18.8	54.6	26.7	54.3	3.9	18.6	...
		2404	F	0-59	22.4	58.0	29.4	55.0	3.5	16.8	...
	National	477	M/F	<6	3.8	15.0	2.6	14.0	4.7	11.7	...
		493	"	6-11	16.0	46.7	8.0	30.9	6.3	20.7	...
		941	"	12-23	30.0	64.6	31.8	60.6	6.1	29.4	...
		953	"	24-35	26.2	62.2	34.4	60.2	3.3	15.9	...
		972	"	36-47	19.5	62.2	34.3	65.3	2.2	13.3	...
		951	"	48-59	17.9	62.0	34.7	64.9	1.4	14.0	...
	Division										
	Barisal	317	M/F	0-59	18.9	55.4	31.4	59.9	3.7	13.5	...
	Chittagong	1175	"	"	25.2	60.0	31.5	54.4	5.1	21.3	...
	Dhaka	1494	"	"	21.5	54.8	28.6	55.8	3.3	15.5	...
	Khulna	479	"	"	15.7	49.8	19.4	46.5	2.3	17.5	...
	Rajshahi	1017	"	"	16.0	55.5	23.4	53.4	3.0	17.5	...
	Sylhet	305	"	"	24.1	64.0	37.8	61.4	4.7	20.9	...
<b>BBS, 1997b</b>	National	2614	M/F	0-71	17.9	57.4	24.2	51.4	2.5	16.6	0.4
CNS, 1995-96		1349	M	"	15.9	56.7	23.6	51.6	2.5	15.9	0.3
		1265	F	"	19.9	58.1	24.9	51.2	2.5	17.3	0.4
		814	M/F	"	12.0	46.3	17.8	42.9	2.4	13.3	0.7
		430	M	"	11.5	45.4	15.2	42.1	3.3	15.6	1.0
		384	F	"	12.5	47.2	20.7	43.9	1.3	10.6	0.4
		1800	M/F	"	18.9	59.3	25.3	52.8	2.5	17.2	0.3
		919	M	"	16.7	58.8	25.0	53.2	2.4	16.0	0.2
		881	F	"	21.1	59.8	25.6	52.5	2.7	18.5	0.4

Notes: ... data not available

Despite the high rates of malnutrition in Bangladesh, there is evidence that the rates have declined over the last 10 years. The NSP has documented a 10% decline in stunting from 1990-1997 from 69% to 59% and a significant downward shift in stunting by cohort (HKI/IPHN, 1997, HKI/IPHN, 1998a and 1998b). Although absolute rates of malnutrition are consistently higher among children from poorer households (defined as landless) than less poor households, malnutrition has declined among children of landless and landowners in rural Bangladesh, suggesting programs may be reaching those in greatest need in rural Bangladesh. However, the decline in stunting among children in several urban slum areas included in the NSP has been much less equitable among socio-economic groups.

Acute malnutrition exhibits a strong seasonal pattern in Bangladesh. The rates of malnutrition are highest during the monsoon season (June/August) and are lowest in December/February during the winter harvest (rice, vegetable) (HKI/IPHN, 1998a and 1998b; Brown, et. al., 1982b).

The nutritional status of adults is usually assessed using the Body Mass Index (BMI) calculated as weight (kg) over height squared ( $m^2$ ). For classifying individuals according to their nutritional status, cut-off levels of BMI have been proposed. Adults with a BMI less than 18.5

kg/m<sup>2</sup> are considered to suffer from chronic energy deficiency (CED). A BMI of over 25.0 kg/m<sup>2</sup> indicates overweight.

Malnutrition among women in Bangladesh has been long identified as a problem of significant magnitude (Huffman et. al., 1979). The recent BDHS included an assessment of weight and height of women 15-49 years of age and the findings for non pregnant women are presented in Table 4b. Rates of malnutrition are very high among Bangladeshi women. More than 52% of women were suffering from chronic energy deficiency (Mitra, et. al., 1997).

**Table 4b: Anthropometric data on adults**

Source/ Year of survey	Location	Sample			Percentage of malnutrition					
		Size number	Sex	Age years	Body Mass Index (kg/m <sup>2</sup> )			Chronic Energy Deficiency 18.5<	Overweight % BMI 25.0-29.9	Obesity % BMI >30.0
					mean	SD	median			
<b>Mitra et al., 1997</b>	National	3921	F	15-45	18.8	...	...	52.0	2.9	...
DHS, 1996-97	Urban	392	"	"	20.4	...	...	35.8	12.2	...
	Rural	3529	"	"	18.6	...	...	53.8	11.3	...
		654	"	15-19	18.6	...	...	50.1	...	...
		1155	"	20-24	18.7	...	...	53.6	...	...
		1079	"	25-29	19.1	...	...	49.2	...	...
		579	"	30-34	19.0	...	...	53.0	...	...
		440	"	35-49	18.6	...	...	56.3	...	...
	Division									
	Barisal	264	F	15-45	18.8	...	...	52.8	3.2	...
	Chittagong	867	"	"	18.9	...	...	52.0	3.5	...
Dhaka	1229	"	"	18.9	...	...	51.8	3.6	...	
Khulna	445	"	"	19.0	...	...	47.6	2.6	...	
Rajshahi	889	"	"	18.6	...	...	52.4	2.1	...	
Sylhet	226	"	"	18.3	...	...	59.6	1.9	...	

Notes: ... data not available

For women, as observed for children, there were important differences in the prevalence of malnutrition among administrative divisions: the less affected division was Khulna with a prevalence of women with a BMI < 18.5 kg/m<sup>2</sup> of 47.6% while the highest prevalence was observed in Sylhet (59.6%) (Map 5 and Table 4b). As for children, women residing in rural areas (53.8%) were more affected by CED compared to those living in urban areas (35.8%). More than 17% of women are less than 145 centimeters, a criterion used to identify increased risk of complications during labour and delivery (Mitra, et. al., 1997).

The analysis of the BDHS also showed that a larger percentage of women with no formal education (46%) were malnourished compared to women with secondary (25%). There are no statistically significant differences in malnutrition among women by administrative division, but rates of malnutrition varied by reproductive status. Among non pregnant women, a greater percentage of lactating women (49.3%) were malnourished compared to non-lactating women (39.9%). Although limited data is available to examine trends of women's nutritional status, a recent study in Matlab subdistrict provides data that can be compared with data collected in the same area in 1977. Such a comparison suggests only very small changes in maternal nutritional status over the past 20 years (Stoltzfus, et. al.).

Information on PEM among school children, adolescents and adult males is limited. Two recent studies of adolescents in high school and employed in garment factories provide some insight on the nutritional status among urban adolescent populations. In the small study in Dhaka, 24 percent of adolescents (12-15 years of age) employed in the factory sector were wasted (below 90 percent of median) (Ahmed, et. al. 1996).

## 5. Micronutrient deficiencies

### Iodine Deficiency Disorders (IDD)

Iodine deficiency disorders (IDD) include the clinical and subclinical manifestations of iodine deficiency. Iodine deficiency in pregnant women may cause irreversible brain damage in the developing foetus, whereas in infants and young children it may cause brain damage, psychomotor retardation and intellectual impairment.

A study conducted in 1993 on 30,072 individuals reported the prevalence of IDD in children 5 to 11 years and in men and women 15-44 years (Counts, et. al., 1997, Yussuf, et. al., 1993). The survey estimated rates of goitre and cretinism from physical exam and palpation and urinary iodine level were analyzed by wet digestion method of Gutekunst. The country was stratified into three ecological zones for the study: hilly, flood-prone and plains. The EPI-30 cluster sampling methodology was employed to select the survey sample. The findings of the survey are presented in **Table 5a**. Overall, 47% and 53% of boys and girls respectively were classified as having grade 1 or 2 goitre (Total Goitre Rate). Among the adult sample, the total goitre rate (TGR) was 33.6% for men and 55.6% for women. Very small differences were observed in the different ecological regions. For both age groups and for both sexes, the TGR was highest in the flood plains, however; visible goitre rates were highest in the hilly area. The prevalence of cretinism among boys was 0.7% and 0.5% among girls (**Table 5a**). The prevalence of cretinism was 0.3% among women and 0.6% among men. The prevalence of cretinism was slightly higher in the hilly areas (1.0% for children and 0.6% for children).

### Vitamin A Deficiency (VAD)

Vitamin A, also known as retinol, is an essential micronutrient required for normal health and survival. This fat soluble vitamin has four major roles in the body: vision, epithelial cell growth and maintenance, immune function and growth and development. Children under 3 years of age and pregnant and lactating women are the most at-risk of vitamin A deficiency.

Clinical vitamin A deficiency (xerophthalmia) among preschool-age children in rural Bangladesh has declined significantly in the past 15 years in Bangladesh. A recent survey reported a decline in the prevalence of night blindness among preschool-age children in rural Bangladesh from 3.6 % in 1982/83 to 0.67% (HKI/IPHN, 1998a and 1998b, HKI/IPHN, 1985). Other signs of xerophthalmia have also declined significantly and are below the cutoffs established by WHO/IVACG signifying it is no longer a serious public health problem. The prevalence of VAD is higher among boys, a pattern observed in other countries (Sommer and West, 1997).

The successful vitamin A capsule distribution campaign is undoubtedly partially responsible for this remarkable decline in clinical VAD. Over the past three years, the national VA capsule program in Bangladesh has achieved more than 80 percent coverage (external monitoring through the NSP, HKI/IPHN, 1998a and 1998b; HKI, 1997; HKI/IPHN, 1996). The findings from the HKI/IPHN survey further suggest that home gardening and other food-based approaches have also contributed to the decline of VAD in preschool children in Bangladesh. However, intake of VA is not yet adequate to meet daily requirements for high-risk sub populations (women and children), therefore the vitamin A capsule (VAC) program will need to be continued until VA intake meets the daily requirements.

Among women of reproductive age, clinical vitamin A deficiency continues to be a serious problem. More than 2.7% of pregnant women, 2.4% of lactating women and 2.0% of non pregnant/non lactating women reported being night blind in 1997 (HKI/IPHN, 1997) (**Table 5a**). More than 6% of women reported being night blind at some stage of their most recent pregnancy. Similar to the findings among preschool age children, pregnant women with a homestead garden were less likely to be night blind than their counterparts without a garden (HKI/IPHN, 1997).

**Table 5a: Surveys on iodine and vitamin A deficiencies**

Source/ Year of survey	Deficiency	Location	Sample			Percentage
			Size number	Sex	Age years	
<b>Iodine</b>						
<b>Yusuf et al., 1993</b>	TGR	National	...	M/F	5-44	47.1
NIDDS, 1993	Visible goiter	"	...	M/F	"	8.8
	Cretinism	"	...	M/F	"	0.5
	TGR	National	...	F	5-11	53.0
	"	Hilly	...	"	"	50.4
	"	Flood Prone	...	"	"	55.8
	"	Plains	...	"	"	52.0
	Cretinism	National	...	"	"	0.5
	TGR	National	...	M	5-11	47.0
	"	Hilly	...	"	"	43.4
	"	Flood Prone	...	"	"	50.5
	"	Plains	...	"	"	46.0
	Cretinism	National	...	"	"	0.7
	TGR	National	...	F	15-44	55.6
	"	Hilly	...	"	"	56.1
	"	Flood Prone	...	"	"	59.8
	"	Plains	...	"	"	51.3
	Cretinism	National	...	"	"	0.3
	TGR	National	...	M	15-44	33.6
	"	Hilly	...	"	"	27.2
	"	Flood Prone	...	"	"	36.7
	"	Plains	...	"	"	34.2
	Cretinism	National	...	"	"	0.6
<b>Vitamin A</b>						
<b>HKI/IPHN, 1997</b>					Mths	
NSP, 1997	Nightblindness	National	27574	M/F	6-59	0.67
	Bitot's spot	"	"	"	"	0.25
	Corneal xerosis	"	"	"	"	0.01
	Xerophthalmia	"	"	"	"	0.10
	Nightblindness	National	6827	F	15-49	2.00
	"	"	2461	F*	"	2.70
	"	"	14381	F#	"	2.40

Notes: ... data not available F: non-pregnant and non-lactating; F\*: Pregnant women; F#: Lactating women

### Anaemia/Iron Deficiency (IDA)

The consequences of Iron Deficiency Anaemia (IDA) include reduced physical work capacity and productivity, impaired cognitive functions and brain metabolism and reduced immunocompetence. The causes of IDA include low dietary intake in relation to the Recommended Dietary Allowances (RDA), poor bio-availability of iron in the diet and high prevalence of parasitic infestations.

Nationally representative data on iron deficiency is limited in Bangladesh. Two recent studies have reported different rates of anaemia among women and children in Bangladesh (HKI/IPHN, 1998b; Husain et al., 1997). In the HKI/IPHN survey, haemoglobin concentration was estimated using venous blood with the Hemocue on a subsample of 1200 women in rural Bangladesh. According to WHO classifications, the prevalence of anaemia among pregnant women in this study was 50.0% (Hb<11.0 g/dl) and 45% of non pregnant women were anaemic (Hb<12.0 g/dl) (**Table 5b**). Anaemia in women was not associated with land ownership or other socio-economic variables. Anaemia rates were lower among women with formal education than among women with no formal education and women with serum retinol concentrations below the median were more likely to be anaemic. In the HKI/IPHN survey, overall prevalence of anaemia (haemoglobin concentration<11.0 g/l) among preschool children in Bangladesh was 47% (HKI/IPHN, 1998b). The findings from this survey suggested that the prevalence of anaemia was

higher among younger children; 78% of children 6-11 months and 64% of children 12-23 months of age were anaemic, respectively (**Table 5b**). No differences in anaemia by gender were observed (46.9% among boys and 47.2% among girls).

The findings from another national anaemia survey conducted by the Institute of Epidemiology and Disease Control Research (IEDCR) are also presented in **Table 5b** (Husain, et al., 1997). Data were collected from 14 villages in 14 different districts in Bangladesh (cluster n=14; sample size per village ranged from 298 to 1071 persons). Blood samples were collected from a finger prick on a total 7764 children and adults. Haemoglobin levels were analyzed from dried filter paper spots using cyanmethoglobin method by the Institute of Nutrition and Food Science (INFS). Rates of anaemia among children 0-5 years of age were 66.5% for boys and 71.3% for girls (haemoglobin concentration <11.0 g/dl). The rates of anaemia among children 6-14 years of age were highest; 90.7% for boys and 90.6% for girls (**Table 5b**). The survey reported anaemia rates of 89.1% among adult males (haemoglobin concentration <13 g/dl) and 86.8% among adult females (haemoglobin concentration <12 g/dl).

The hemoglobin levels of children, women and men were also assessed in a sub-sample of households (Jahan, 1998). Hemoglobin levels in this survey were also analyzed from dried filter paper spots using cyanmethoglobin method by the Institute of Nutrition and Food Science (INFS). Findings are presented in **Table 5b**.

**Table 5b: Surveys on iron deficiency**

Source/ Year of survey	Deficiency	Location	Sample			Percentage
			Size number	Sex	Age years	
<b>Husain et al., 1997</b>	Hb<11.0g/dl	National	709	M	<5	66.5
	"	"	550	F	"	71.3
	Hb<12.0g/dl	"	...	M	6-14	90.7
	"	"	...	F	"	90.6
	Hb<13.0g/dl	"	...	M	>14	89.1
	Hb<12.0g/dl	"	...	F	"	86.8
<b>HKI/IPHN, 1998b</b> NSP, 1998	Hb<11.0g/dl	National	120	F*	15-49	50.0
	Hb<12.0g/dl	"	1087	F	"	45.0
					Mths	
	Hb<11.0g/dl	National	1199	M/F	6-59	47.0
		"	665	M	"	46.9
		"	534	F	"	47.2
		"	54	M/F	6-11	77.8
		"	180	"	12-23	64.1
		"	247	"	24-35	47.8
		"	328	"	36-47	46.3
	"	390	"	48-59	35.5	
				Mths		
<b>Jahan&amp;Hossain,1998</b> NNS, 1995-96	Hb<11.0g/dl	Rural	712	M/F	6-71	68.1
					years	
	Hb<11.0g/dl		1209	"	6-14	51.4
	Hb<12.0g/dl		221	F#	>15	83.7
	Hb<11.0g/dl		70	F*	>15	60.0
	Hb<13.0g/dl		1246	M	>15	70.8
					Mths	
	Hb<11.0g/dl	Urban	208	M/F	6-71	39.5
					years	
	Hb<11.0g/dl		356	"	6-14	42.0
Hb<12.0g/dl		63	F#	>15	80.9	
Hb<11.0g/dl		15	F*	>15	34.9	
Hb<13.0g/dl		355	M	>15	59.4	

Notes: ... data not available

F\*: Pregnant women F#: Lactating women

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References for data presented in Table 1 on Global Statistics:

<i>Source</i>	<i>Indicator</i>
<b>FAOSTAT</b>	<i>A.1-2, B, C.10-11, E.1-3, F, G</i>
<b>UN. 1996/1997</b>	<i>C.1-9, D.5</i>
<b>WB. 1997.</b>	<i>D.1</i>
<b>UNDP. 1997.</b>	<i>D.2</i>
<b>Tabatabai H. 1996.</b>	<i>D.3-4</i>
<b>UNICEF. 1997.</b>	<i>D.6</i>
<b>FAO. 1996.</b>	<i>H</i>

## **NCP of BANGLADESH MAPS**

### **- General map of Bangladesh**

#### **- Map 1:**

Population density by administrative division in Bangladesh

#### **- Map 2:**

: Prevalence of underweight in children under five years old by administrative division in Bangladesh

#### **- Map 3:**

Prevalence of stunting in children under five years old by administrative division in Bangladesh

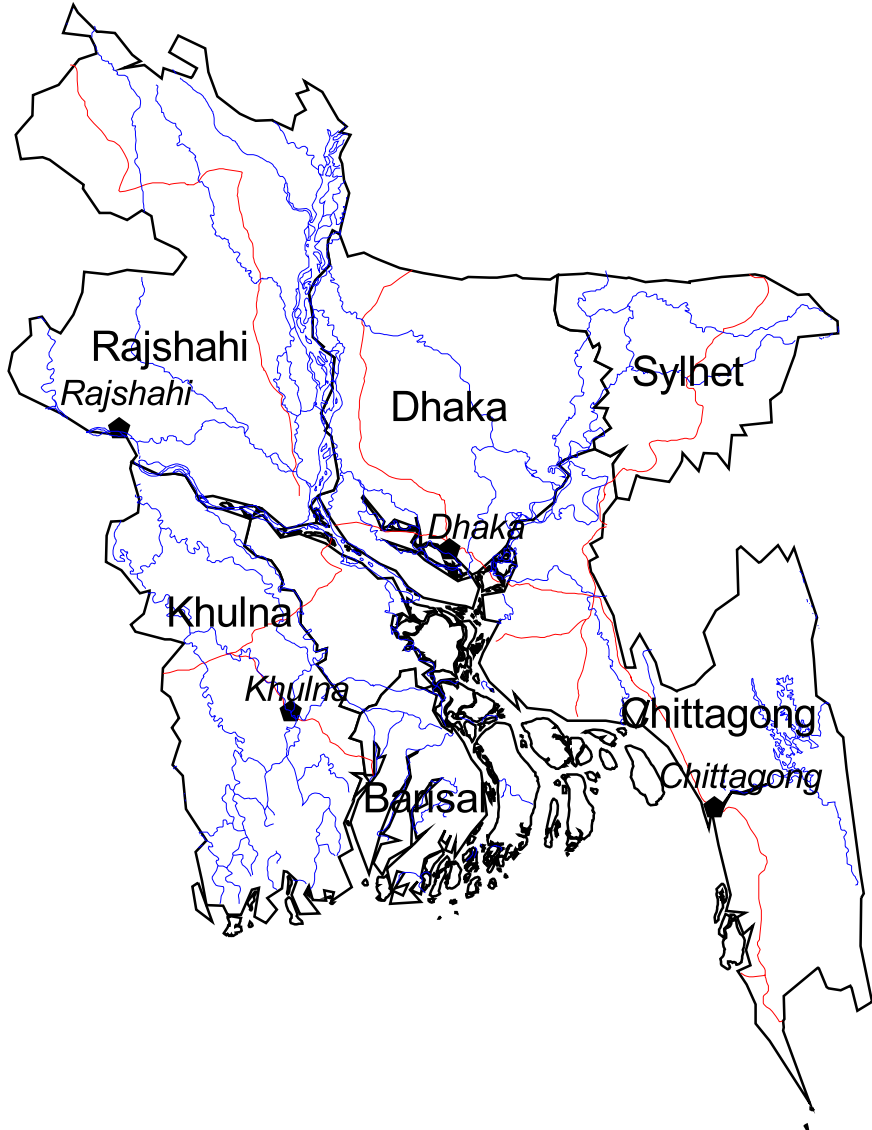
#### **- Map 4:**





Prevalence of wasting in children under five years old by administrative division in Bangladesh

#### **- Map 5:**

Prevalence of women 15-45 years old with a BMI < 18.5 kg/m<sup>2</sup> by administrative division in Bangladesh

# General map of Bangladesh



-  Main rivers
-  Main cities
-  Main roads
-  Administrative division

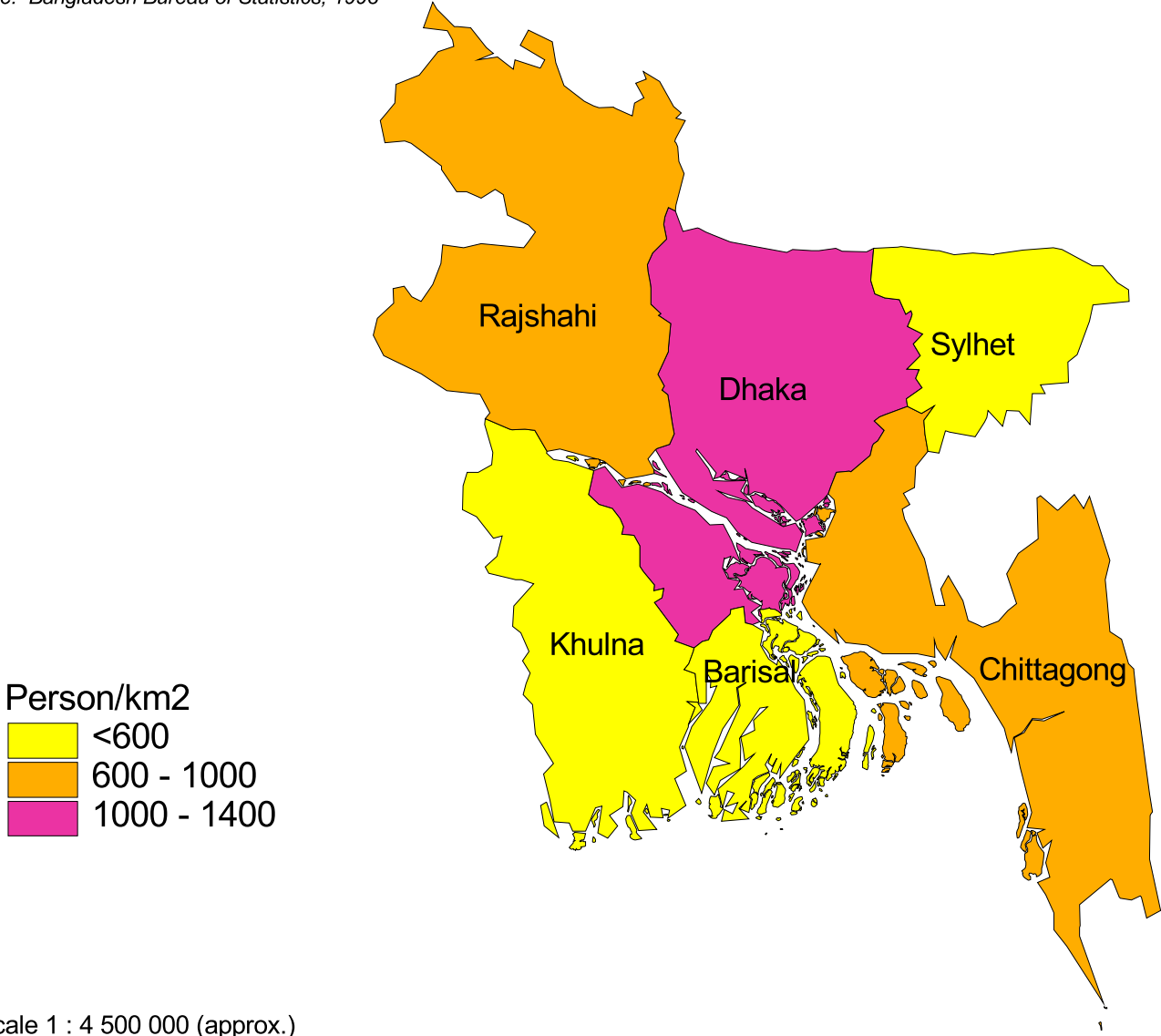
Scale 1 : 4 500 000 (approx.)  
Geographic Projection



FAO - ESNA, February 1999

# Map1: Population density by administrative division, in Bangladesh

Source: Bangladesh Bureau of Statistics, 1998



Person/km<sup>2</sup>  
Yellow: <600  
Orange: 600 - 1000  
Pink: 1000 - 1400

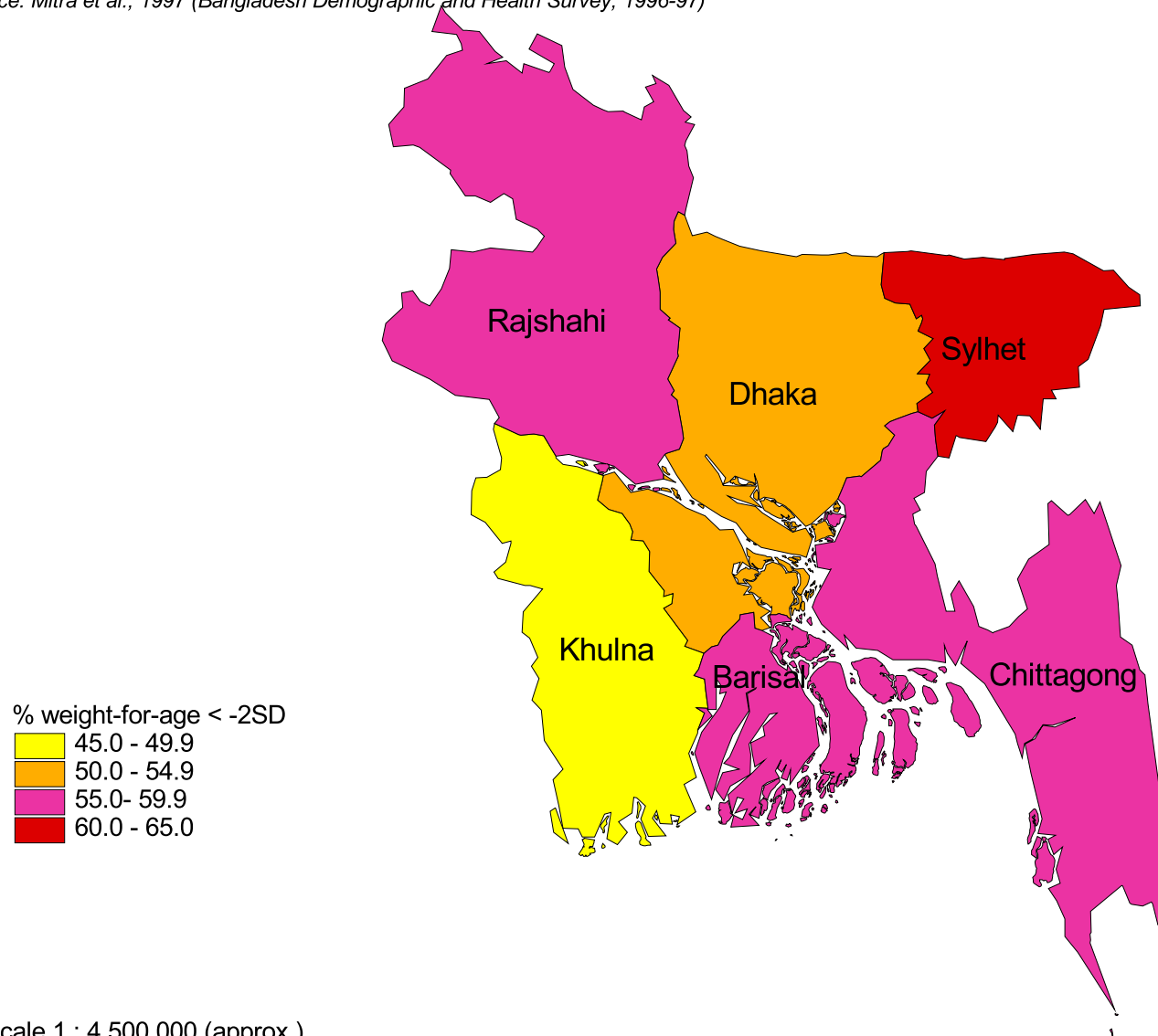
Scale 1 : 4 500 000 (approx.)  
Geographic Projection



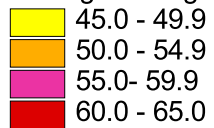
FAO - ESNA, February 1999

## Map2: Prevalence of underweight in children under five years old, by administrative division, in Bangladesh

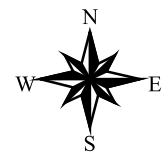
Source: Mitra et al., 1997 (Bangladesh Demographic and Health Survey, 1996-97)



% weight-for-age  $< -2SD$



Scale 1 : 4 500 000 (approx.)  
Geographic Projection

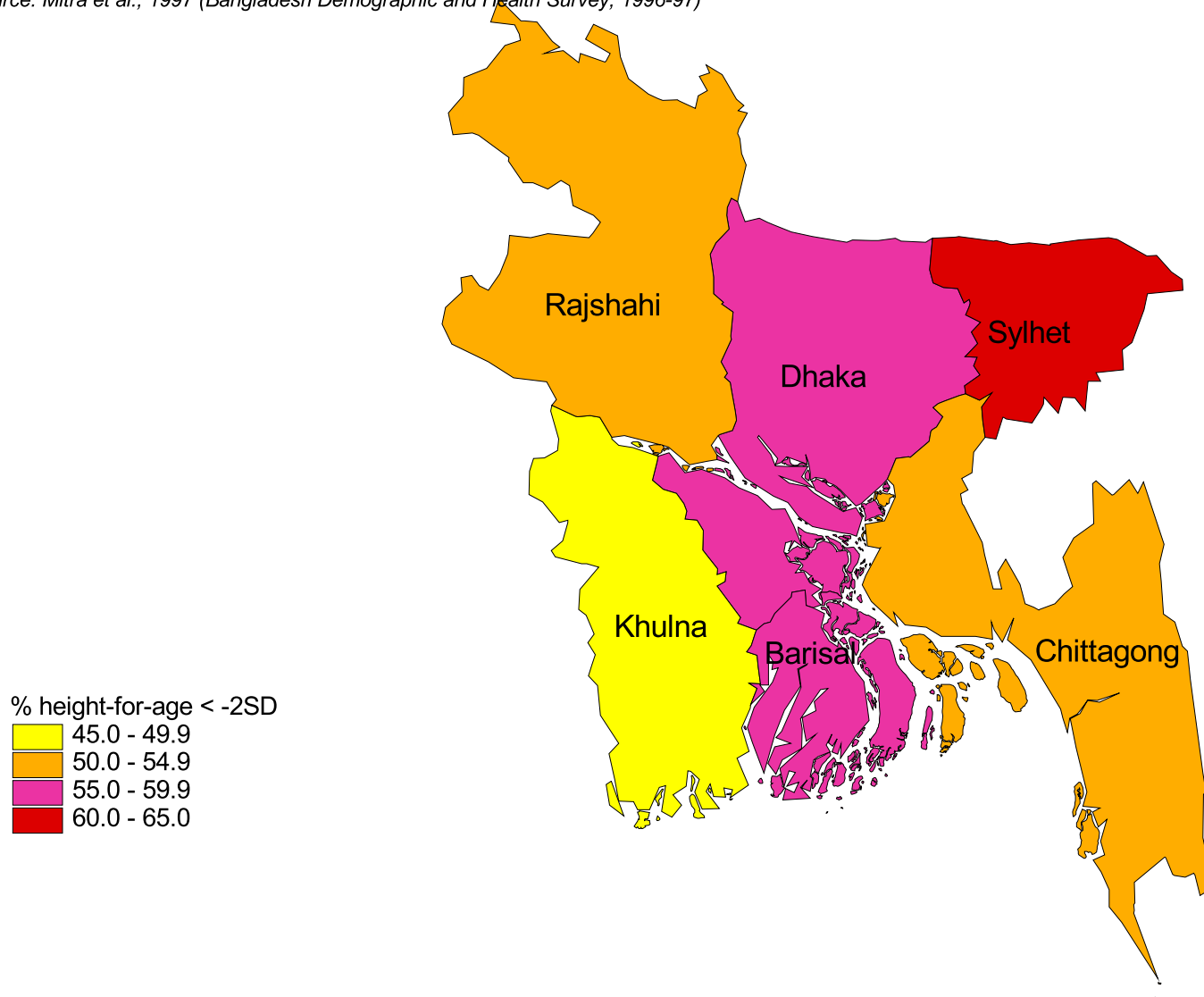


FAO - ESNA, February 1999

Bangladesh

### Map3: Prevalence of stunting in children under five years old, by administrative division, in Bangladesh

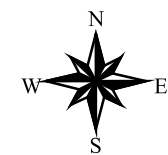
Source: Mitra et al., 1997 (Bangladesh Demographic and Health Survey, 1996-97)



% height-for-age < -2SD

- 45.0 - 49.9
- 50.0 - 54.9
- 55.0 - 59.9
- 60.0 - 65.0

Scale 1 : 4 500 000 (approx.)  
Geographic Projection

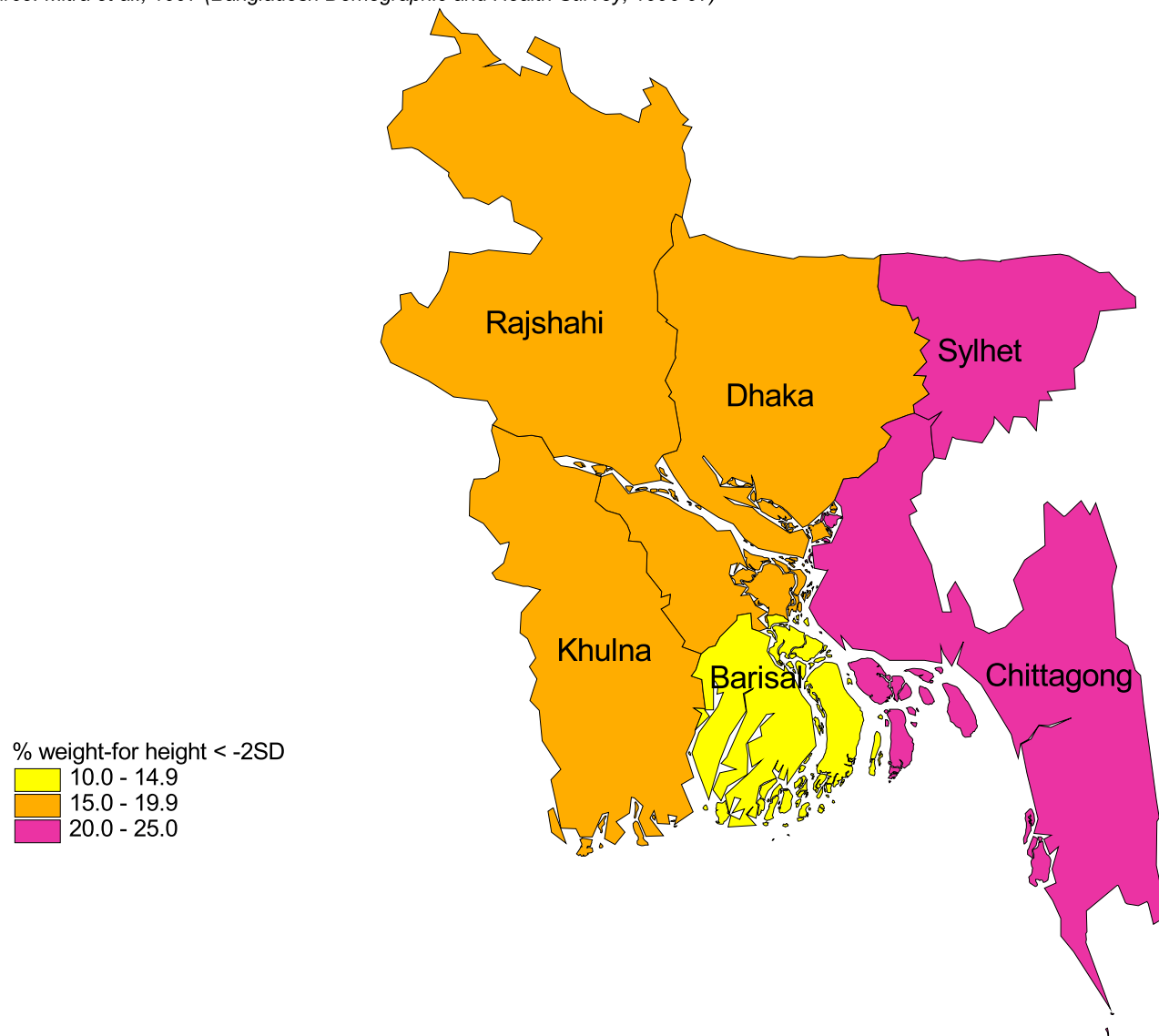


FAO - ESNA, February 1999

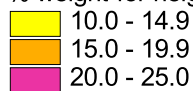
**Bangladesh**

# Map4: Prevalence of wasting in children under five years old, by administrative division, in Bangladesh

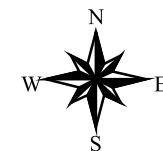
Source: Mitra et al., 1997 (Bangladesh Demographic and Health Survey, 1996-97)



% weight-for height < -2SD



Scale 1 : 4 500 000 (approx.)  
Geographic Projection

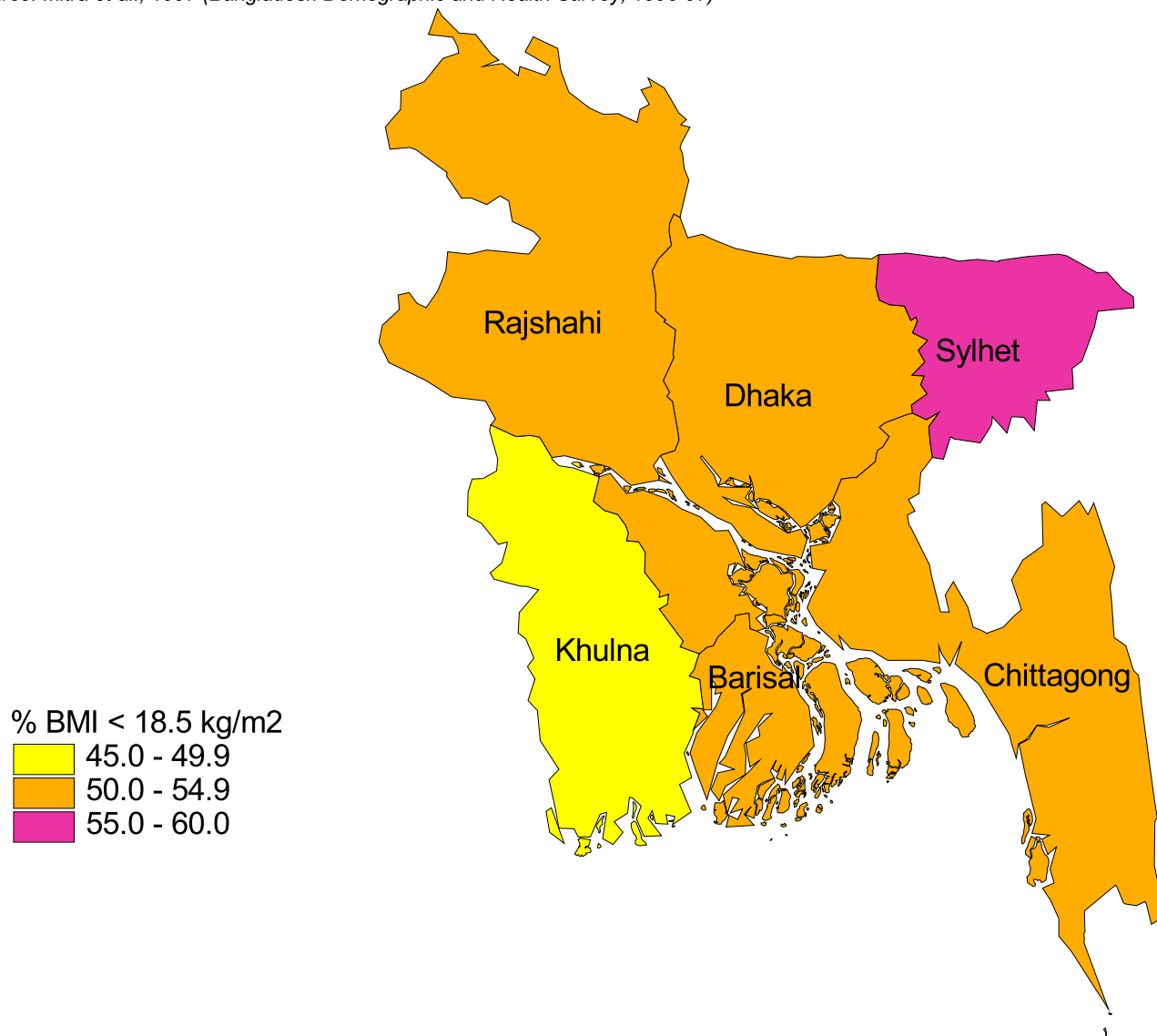


FAO - ESNA, February 1999

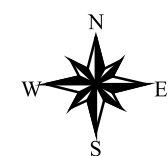
**Bangladesh**

# Map5: Prevalence of women 15-45 years old with a BMI<18.5 (kg/m2), by administrative division, in Bangladesh

Source: Mitra et al., 1997 (Bangladesh Demographic and Health Survey, 1996-97)



% BMI < 18.5 kg/m<sup>2</sup>  
45.0 - 49.9  
50.0 - 54.9  
55.0 - 60.0



Scale 1 : 4 500 000 (approx.)  
Geographic Projection

FAO - ESNA, February 1999

**Bangladesh**