

**TRENDS AND PATTERNS IN FOOD
CONSUMPTION AND NUTRITION OF RURAL AND
URBAN POOR IN BANGLADESH, 1991-2000**

A review prepared by

Harun K.M. Yusuf, Ph.D.

*Professor of Biochemistry and Human Nutrition
Department of Biochemistry and Molecular Biology,
University of Dhaka*

In collaboration with

Shantana R. Halder, Ph.D.

*Senior Research Economist,
BRAC/RED*

For

**BRAC Research and Evaluation Division
BRAC Centre, Mohakhali
Dhaka-1212**

December, 2002

ACKNOWLEDGEMENTS

I wish to render my sincere thanks to Professor A.M. Muazzam Husain, Director Research, BRAC Research and Evaluation Division for giving me the opportunity to do the work for BRAC, an organization which I always cherish and feel comfortable to work with. Thanks to Dr. S.M. Ziauddin Hyder, Senior Research Nutritionist of the Division (at present on leave) who first initiated the proposal, which I readily agreed to accept.

This review is prepared in collaboration with Dr. Shantana R. Halder, Senior Research Economist, BRAC/RED. I am thankful to her for her painstaking critical review of the manuscript and valuable suggestions. She provided many important recent data on food economics which were very helpful for the review.

I would also like to thank Dr. Paul Thompson, Social Scientist & Officer-in-Charge of ICLARM, Dhaka and Dr. Dora Panagides, Country Director and Dr. Harriet Torlesse, Nutrition Advisor of HKI, Dhaka for their kind help with valuable data, many of which were in process of publication. Professor M. Nurul Islam of the Department of Statistics, Dhaka University deserves special thanks for his advise on statistical matters.

Finally, I would like to thank Mr. Bijoy Kumar Dev for his excellent secretarial assistance in preparing the report.

HKMY

SUMMARY

A review report is prepared on the trends and patterns of food intake and nutritional status of the poor rural and urban households of Bangladesh during the decade of 1991-2000. Because agricultural production is the main determinant of the quantity and quality of meals in a poor agrarian country like Bangladesh, a thorough review of trends in gross production and gross per capita availability of commonly consumed foods was first made. The decade is marked by a commendable increase in food production, particularly rice during the second half of the decade, along with other food items like wheat, potato, vegetables, fish, meat and milk. This made the average national diet of the year 2000 richer in terms of quantity (892 g/capita/day), energy (2,112) Kcal and protein (53 g) compared to the diet of all previous survey years. However, the country is yet to achieve the desirable requirement level in any terms: the diet is still highly imbalanced, with rice and other cereals contributing nearly 80% of total energy and fruits and vegetables contributing only 3%. The diet is thus deficient in vitamins and minerals.

The decade of 1991-2000 is marked by a commendable economic growth, with concomitant decline in the incidence of both absolute poverty and extreme poverty, by 9 percentage points each, more in urban than in rural areas, although the rate of decline in urban poverty slowed down in the latter years of the decade. However, in 2000, the incidence of absolute poverty was still 50% and the incidence of extreme poverty was 34%. In absolute terms, during the decade, the number of poor in rural areas decreased from 58 million to 42 million, while the number of poor in urban areas showed an appalling 100% increase from 7 million to 15 million.

Since food distribution inequity is heavily weighted on the poor, the food intake of the poor in both rural and urban areas, remained inadequate in quantity (around 700 g/day), energy (1790 Kcal, 25% less than the requirement) as well as in protein (40 g/day, 30% less than required). Their diet is also precariously imbalanced, nearly 90% energy coming from cereals, 85% from rice alone, an inevitable consequence of which is malnutrition. Analysis shows that between 1991-2000, no improvement had occurred in the quantity nor in the quality of the diet of the poor and the poorest (bottom 40% expenditure category). This is true for both rural and urban areas. The urban slums are even worse.

In poor households of both rural and urban areas, allocation of household expenditure for food is 70%. So, more than two-thirds of the income is spent for food which is inadequate in quantity and quality. Needless to say, the remaining 30% can barely meet the other necessities of life. Market dependence is very high in the rural areas, where nearly one-quarter of major foods like rice, vegetables and fish are procured from own production and the remainder is purchased from the market. Only in case of egg, the proportion of own

production in both poor and rich households is 32-54%, indicating traditional poultry raising in rural areas.

Parallel with national average economic growth, poverty reduction, increased food production and food intake, Bangladesh has achieved a commendable reduction in child malnutrition rates during the nineties. Night blindness due to vitamin A deficiency in children under 6 years of age decreased to almost non-existence levels (0.3%) during the decade. But despite these improvements, 50% of preschool children were still stunted or underweight, 18-19% severely, in 2000. Percentage of malnourished children coming from poor families is even higher, over 60%. The prevalence is higher in rural than in urban areas and girls are more affected than boys. Over 50% children are anaemic.

Chronic energy deficiency (CED) prevalence in women of child bearing age has also decreased over the years of the decade, but still, 45% of rural and 35% of urban (slum) mothers suffer from CED. Still, about half of all pregnant mothers are anaemic.

Infant feeding practice (colostrum and breast milk as first food after birth and start of complementary feeding with right type of food at the right time, i.e. 5 months of age or later) are found to have strong bearing on child's nutritional status. Enriching the family food, which becomes more and more important in the infant's diet, may be enriched with egg, fish, pulse and oil. Appalling is the finding that 65% of poor families do not eat egg at all, even though they have egg in the house: they save it for hatching or sell it for hard cash.

Thus, poor households, rural and urban alike, did not get the benefit of increased food production and the economic growth that the country has achieved during the nineties: in year 2000, their food intake was low and their food was imbalanced, as it was in year 1991. Those who have come out of poverty are lucky, but more pro-poor action programmes need to be taken to bring more poor out of poverty, and sooner the better.

TABLE OF CONTENTS

	Page
Acknowledgements	ii
SUMMARY	iii
Abbreviations	vii
List of Tables	viii
List of Figures	ix
INTRODUCTION	1
Requirement of food and nutrients	2
The balanced diet	4
AGRICULTURAL PRODUCTION AND DIETARY DEVELOPMENT	
IN BANGLADESH IN THE NINETIES	4
TREND AND PATTERN OF FOOD INTAKE IN	
BANGLADESH IN THE NINETIES	7
Poverty Trends in Bangladesh in the Nineties	11
Trend and Pattern of Food and Non-food Consumption Expenditure by Poor Households in Rural and Urban Bangladesh, 1991 - 2000.	13
Pattern of Food Intake by Rural and Urban Poor and Non-poor	15
Trend and Pattern of Food Intake by Rural and Urban Poor, 1991-2000.	17
Source of Food Consumed in the Household	18
Food Consumption by Young Children in Rural Areas	21
NUTRITIONAL SITUATION AMONG RURAL AND URBAN POOR	
Malnutrition Among Infants	22
Malnutrition Among Children Under 6 Years of Age	23
Protein-energy malnutrition	23

Rural_urban differential in child malnutrition	26
Child malnutrition by poverty status	29
Child malnutrition by administrative divisions	29
Seasonality of child malnutrition	30
Child malnutrition by infant feeding practices	30
<i>Vitamin A-deficiency and night blindness</i>	31
<i>Iron-deficiency anaemia</i>	33
Malnutrition in Women	33
Protein-energy malnutrition	33
<i>Vitamin A deficiency</i>	34
<i>Nutritional anaemia</i>	35
DISCUSSION AND CONCLUSION	36
References	40

ABBREVIATIONS

ACC/SCN Nutrition	Administrative Committee on Coordination/Sub-committee on
ADB	Asian Development Bank
BBS	Bangladesh Bureau of Statistics
BDHS	Bangladesh Demographic and Health Survey
BMI	Body Mass Index
BRAC	Bangladesh Rural Advancement Committee
CBN	Cost of basic needs
CED	Chronic energy deficiency
CNS	Child Nutrition Survey
DHEW	Department of Health, Education and Welfare (U.S)
EPI	Extended Programme for Immunization
FAO	Food and Agriculture Organization of the United Nations
g	gramme
GDP	Gross Domestic Product
GOB	Government of Bangladesh
HES	Household Expenditure Survey
HIES	Household Income and Expenditure Survey
HKI	Helen Keller International Worldwide
ICDDR,B	International Center for Diarrhoeal Diseases Research, Bangladesh
ICLARM	International Center for Living Aquatic Resources Management
INFS	Institute of Nutrition and Food Science
IPHN	Institute of Public Health Nutrition
Kcal	Kilo calorie
Kg	Kilogramme
L	litre
MOE	Ministry of Environment
MOF	Ministry of Finance
MOHFW	Ministry of Health and Family Welfare
MUAC	Mid-upper arm circumference
NCHS	National Center for Health Statistics
NGO	Non-governmental Organization
NNC	National Nutrition Council
NPAN	National Plan of Action for Nutrition
PRSP	Poverty Reduction Strategy Paper
SP	Nutritional Surveillance Project
RDA	Recommended Dietary Allowance
SNB	State of Nutrition in Bangladesh
UNFPA	United Nations Population Fund
UNICEF	United Nations Children Fund
UNDP	United Nations Development Programme
WB	World Bank
WHO	World Health Organization
WSC	World Summit for Children

List of Tables

- Table 1: Per capita energy requirement for an average Bangladeshi.
- Table 2: Average national requirements of nutrients
- Table 3: Average national requirements of foods for balanced nutrition
- Table 4: Contribution of agriculture to GDP in Bangladesh (at current market price) (BBS, 2002).
- Table 5: Production and gross availability of selected food items in Bangladesh, 1991-2000.
- Table 6: Trends and patterns of national average food intake in Bangladesh (1991-2000)
- Table 7: Average Per capita food intake in rural and urban areas of Bangladesh, 2000
- Table 8: Trends in CBN poverty measures in Bangladesh, 1991-2000
- Table 9: Annual rate of reduction (%) changes in the incidence of poverty in rural (derived from Table 12) and urban areas of Bangladesh
- Table 10: Trends in relative food prices in rural and urban areas
- Table 11: Changes in the distribution pattern of monthly per capita household consumption expenditure (percent)
- Table 12: Food and non-food expenditure profile (%) in rural and urban areas according to economic status (BBS, HIES, 2000)
- Table 13: Per capita per day consumption of different food items in rural and urban areas in 2000 by expenditure quintiles (gm/capita/day)
- Table 14: Trends in per capita per day food intake by rural and urban poor (bottom 2 quintiles) in the nineties
- Table 15: Source of food consumed in rural households by economic status, 1997 and 2000 (BRAC, unpublished)
- Table 16: Trends in the prevalence of low mid-upper arm circumference (MUAC) in children by residence and gender (BBS, 1998, 2002)
- Table 17: Prevalence of undernutrition (chronic energy deficiency) among women of reproductive age in rural and urban areas of Bangladesh 1992-2000
- Table 18: Prevalence of anaemia in women in Bangladesh, 1992-1997

List of Figures

- Fig. 1: Production, requirement and per capita availability of rice, 1990-2000 (BBS, World Bank, 2000)
- Fig. 1a: Change in absolute number of poor in Bangladesh in rural and urban areas between 1991 and 1999 (Mujeri, 2000).
- Fig.2: Per capita rice consumption of rural and urban hhs. by expenditure quintiles
- Fig.3 : Source of rice and pulse consumed in rural households according to per capita expenditure quintile, 1997 (BRAC, unpublished).
- Fig. 4: Distribution of rural landless households by no egg consumption and egg consumption from own production or purchase from market in year 2000 (NSP, HKI, 2002)
- Fig. 5: Main types of foods given to infants and young children aged less than 24 monthly in rural Bangladesh in the year 2000 (NSP, HKI, 2002)
- Fig. 6: Prevalence of underweight among infants in rural Bangladesh (adapted from HKI, 2000)
- Fig. 7 : Child malnutrition rates (%) in Bangladesh ages 6-71 months, 1999-2000 (World Bank, 2002)
- Fig. 8: Trend in malnutrition rates among children aged 6-71 months, 1989-2000 (CNS, various years, BBS).
- Fig. 9: Contribution (%) and cumulative contribution (%) of different areas to number of severely stunted children in Bangladesh, 2000 (Adapted from World Bank, 2002)
- Fig. 10: Changes in % underweight children in rural Bangladesh and in urban slums in Dhaka, Khulna and Chittagong, 1991-2000 (HKI/IPHN, 1999)
- Fig. 11: Child stunting rate (%) by per capita expenditure quintile, ages 6-71 months, 2000 (CNS, 2001)
- Fig. 12: Prevalence of underweight and stunting in children aged 6-59 months in different administrative divisions, 1999 (HKI/IPHN, 2001)
- Fig. 13: Changes in prevalence of underweight, stunting and wasting in children 6-59 months old by season, 1999 (HKI/IPHN, 2001).
- Fig. 14 : Prevalence of stunting in children by infant feeding practice (CNS, 2000)
- Fig. 15 : Prevalence of night blindness among children below 6 years of age, 1962-1999

INTRODUCTION

Food is the first and foremost of all basic needs of life. Every living organism needs food for growth, development and maintenance. Ever since the dawn of creation, man has been on the quest for food for his survival and propagation. In those ages, most of the man's time was spent in finding food for the next meal. The discovery of the cultivation of cereals and other foods, followed by the attainment of the ability to cultivate successive crops and to store food between harvests, was a landmark in the development of the human society. Ironically, in today's highly civilized human society, a sizeable proportion of world's population, mostly from poor developing countries still spend most of their time in finding food for the next meal. Unfortunately, Bangladesh has to be quoted as one of those countries despite the great strides it has made in food production in recent years.

Bangladesh is a predominantly flat land of about 148,000 sq. km area, extending from the Bay of Bengal in the south up to the highlands of India under the foothills of the Himalayas in the north. More than 250 rivers, including the three major ones – the Padma (downflow of the Ganges), the Jamuna (downflow of the Brahmaputra) and the mighty Meghna, drain the Himalayan ranges and pass to the Bay of Bengal through this small country. The huge volume of water brings with it the yearly cycle of floods and an estimated annual silt load of about 2.4 billion tons (UNDP, 1995) that constitute the natural base for soil revitalization. Moreover, Bangladesh, lying between 21° and 26° N latitude and 88° and 93° E longitude, is one of the heavy monsoon lands in Asia: the yearly rainfall ranges from 120 to 240 cm, with an average of 200 cm (MOE/GOB, 1993).

The alluviation of the soil by the enormous rivers and their innumerable branches, coupled with abundant rainfall, provides the country – the biggest delta in the world – with a fertile agriculture base and rich inland fisheries opportunity. Indeed, rice and fish have since time immemorial dominated the diet of the vast majority of the rural population in Bangladesh, justifying the old proverb – “Macchey Bhatey Bangali” – meaning “fish and rice – that make a Bangali”. However, rice is by far the largest constituent of the diet, which accounts for about 60% of raw food, compared to only 3-4% contributed by fish. Thus, rice, in addition to its being the bulk item of the diet, provides most of the energy and other nutrients. Small quantities of fish, pulses, vegetables, and spices are also eaten. Meat, poultry and milk are rare additions in most of the poor households.

With the increase in population, pressure increased on the staple food, rice, and hence, Bangladesh had to adopt to the fruits of green revolution. Beginning from the sixties, Bangladesh agriculture has yielded to the green revolution and has made tremendous strides in increasing rice production. This was possible through many changes in the overall agricultural production and the

management of land and water: more and more areas were brought under rice cultivation, irrigation expanded concomitantly and new areas were drained and protected by flood control embankments. This had a detrimental effect in the production of other foods, particularly the protein-dense pulses and fish, and energy dense oilseeds. As a result the composition of food eaten and the proportion of energy and other nutrients coming from different food items changed in recent decades.

With time also has increased the pace of urbanization, not only in terms of change in infrastructure of cities and towns but also in terms of migration of rural poor to the cities on the quest for job and food. The country has thus experienced changes in poverty profile, with concomitant change in food consumption pattern in rural and urban areas. Also, with the advent of globalization accompanied by modernization of human society, local food markets today are very much different from the food markets few years back: most items are now sold in attractive processed forms, either produced locally or imported from abroad. As a result, people's attitude towards food, and so their food habit, particularly among the children, has changed over time in recent years. These changes are most remarkable in urban areas, but the wind is blowing fast toward the remote corners of the country. The present report is an overview of the changes in the trend and pattern of food consumption that have taken place in Bangladesh over the period of the last decade (the 1990s). The nutritional implications of these trends will also be depicted, where possible. Trends in poverty will also be discussed. Poor rural and urban households will be the main target of discussion.

Requirement of food and nutrients

Dietary habits in populations of different regions of the world have been determined mainly by the locally available foods and local food practices. Man has evolved his habitual dietary pattern to the need of maintenance of good health. Satisfaction of hunger is usually the primary criteria for adequate food intake (satisfying the perceptible hunger). However, satisfaction of perceptible hunger itself by adequate quantity of food does not ensure good health; for sustained healthy and active life, the "hidden hunger" of the cells for micronutrients (vitamins and minerals) must also have to be met. A balanced food, adequate in all necessary nutrients – energy, protein, vitamins and minerals - can satisfy both perceptible and hidden hunger.

Unfortunately, the real value for the recommended dietary allowance (RDA) which is defined as the amount of nutrient present in the diet that satisfies the daily requirement of nearly all individuals in a population, has not been unanimously reached at for any nutrient in Bangladesh. For example, a considerable controversy exists as to the per capita daily requirement of energy for the average Bangladeshi. A value of 2310 Kcal/day, recommended by WHO, has been in use for a long time, when other organizations and/or

individuals came up with various figures (Table-1). Such differences arise because it is difficult to draw a minimum requirement line, below which people will not exist as healthy human beings. Also, the minimum energy requirement varies from person to person of the same age, sex and body size, depending on the level of individual physical activity.

Table 1: Per capita energy requirement for an average Bangladeshi.

Kcal/capita/day	Reference
2310	WHO()
2220	Knudsen and Scandizzo (1982)
2273	Ahmad and Hasan (1983)
2150	FAO (1997)
2039	Jahan and Hossain (1998)
2159	Kabir (2001)

The values presented by FAO (1997), Jahan and Hossain (1998) and Kabir (2001) need to be corrected, because these values were calculated on the basis of present body weight (adult male: 60 kg and adult female: 50 kg). If the desirable body weights for men as 65-70 kg and women as 55-60 kg are considered, then at least a 5% enhancement of the energy requirement seems reasonable, in which case the value stands to be 2268 Kcal/capita/day, very close to figures suggested by Ahmad and Hassan (1983) and not much different from the value originally recommended by WHO (). The WHO value of 2310 Kcal/person/day will be used as energy requirement throughout this report. Given that the requirements of other nutrients were calculated on present body weight basis (Kabir, 2001), the requirements as revised on the basis of desirable body weight stand to be as shown in Table 2.

Table 2: Average national requirements of nutrients

Nutrient	Requirement ¹ Per capita per day	Requirement ² Per capita per day
Energy (Kcal)	2159.4	2267
Protein (g)	42.9	45
Calcium (mg)	540	567
Iron (mg)	14.2	14.9
Vitamin A		
-retinol (µg)	607.9	638
-β-carotene (µg)	2431.4	2553
Thiamine (mg)	1.06	1.10
Riboflavin (mg)	1.12	1.60
Nicotinic acid (mg)	14.2	14.9
Vitamin C (mg)	27.09	28.4

¹ Based on present weight (Kabir, 2001).

² Based on desirable weight of 65-70 kg for men and 55-60 kg for women

The balanced diet

As stated earlier, a balanced diet is one that is composed of food items in such quantities and such proportions as to meet the requirements of all the nutrients the body needs to maintain a healthy and active life. Recommendations for balanced diets for different types of occupations with different levels of physical activity are available for Bangladesh (Yusuf, 1996,1997; NNC, 1999; Kabir, 2001; Rahman and Hossain, 2000) (Table 3). Among these, the pattern originally suggested by Yusuf (1996,1997) appears to be most reasonable, because the formulation conforms more closely, compared to the other recommendations, with the universally accepted food: energy ratio of 60% from carbohydrate, 25% from fat/oil and 15% from protein (Garrow and James, 1995). The formulation provides a total quantity of food as 949 g/person/day, supplying 2310 Kcal and 69 g protein. The requirement of rice is kept at a low level of 312 g, compensated by increased suggested requirements of potato at 130 g, pulses 66 g, animal food 126 g and oil 38 g/person/day. All together, energy coming from carbohydrate-type foods would be around 65%, that coming from added oil alone would be 15%, while energy coming from fruits and vegetables together would be 5%. The NNC-suggested formulation also makes an allowance of 2310 Kcal and 67 g protein from a total amount of 944 g of food, but rice and wheat together would contribute as high as 73% of total energy. The formulations suggested by Kabir (2001), and Rahman and Hossain (2000) not only provide food in less quantities (around 820-830 g/day), less energy (2122-2159 Kcal/day) and less protein (around 55g protein/day), the percent contribution of rice, wheat and other carbohydrates to energy is again 76-80%. These latter recommendations are thus almost similar to the pattern of food consumed by an average Bangladeshi today – a food studded with rice (and wheat). This high allowance of carbohydrate in the diet makes the diet imbalanced, minimising the intake of fruits and vegetables and animal products, the main providers of micronutrients (vitamins and minerals).

AGRICULTURAL PRODUCTION AND DIETARY DEVELOPMENT IN BANGLADESH IN THE 1990s

The natural endowment of fertile land and abundant water resources made the country's food (and economy) traditionally based on agricultural production. Nearly 77% of the population now live in rural areas and agriculture provides more than 60% of employment in rural areas (BBS 2002). Although the contribution of agriculture to national GDP (Gross Domestic Product) has shown a decline of about 6 percentage points in the 90s (Table-3), it is still, and it will continue to be, the largest contributing sector to total GDP of the country. In 1999-2000, its contribution to GDP was 28.7%, which was 34.5% in 1991-92. Although there was a marked increase in crop (rice) production in the second half of the nineties the contribution of crop sector to total GDP actually declined by 2 percentage points between 1995 and 2000, due presumably to decrease in market price. However, the contributions of fisheries and livestock sub-sectors showed encouraging increases during the period.

Table 3 : Average national requirements of foods for balanced nutrition

Food item	Bundle suggested by Kabir ¹	Bundle suggested by NNC ²	Bundle suggested by Yusuf ³	Normative Bundle suggested by WB ⁴	Bundle suggested by RH ⁴	Current Practice BBS 2000
Cereals	458	490	372	437	430	474
-rice		390	312	397	343	450
-wheat		100	60	40	87	24
Pulses	22	30	66	40	37	17
Animal food	50	109	126	118	142	88
- Fish		45	50	48	32	40
- Meat		24	22	12	14	14
- Egg		10	7	-	58	7
- Milk	20	30	47	58	38	27
Fruits	89	50	57	20	23	30
Roots and tuber	148	165	262	177	83	185
- Potato	39	90	130	27	37	47
Added oil	21	20	38	20	11	14
Sweeteners	31	10	28	20	10	7
- Sugar			8			
- Gurh			17			
- Molasses			3			
Spices	-	10	10	-	22	36
Total Intake (g)	819	944	949	820	830	826
Total Intake (calorie)	2159	2310	2310	2122	2122	2112
Share of carbohydrate rich food in total energy	80%	78%	65%	76%	76%	81%
Total protein (g)	53	67	69	56	51	53
Monthly cost of bundle	-	-	-	638	652	648

¹Kabir (2001); ²NNC (1999); ³Yusuf (1996,1997), ⁴Rahaman & Hossain (2000) and World Bank.

Table 4 : Contribution of agriculture to GDP in Bangladesh (at current market price) (BBS, 2000, 2002)

Sector	At current market price		
	1991-92	1995-96	1999-2000
Agriculture	34.5	30.0	28.7
- Crops	24.6	18.1	16.2
- Livestock	3.4	3.6	4.0
- Forestry	3.1	3.3	3.2
- Fisheries	3.4	5.0	5.4
Industry	9.1	9.6	8.5
Services	56.4	60.4	62.8
Total	100.0	100.0	100.0

Even within this declining, and slowly growing, agricultural sector, notable achievements marked the period: the country attained self-sufficiency in food grain in 2000 and the estimated aggregate production was approx. 25 million tons, much to the great relief in economic and food strains of the country and its population as a whole. Not only in food grain, notable increases were also achieved in some other food items during this period, especially in the second half of the nineties. Because, as mentioned earlier, in a poor country like Bangladesh which does not have much means to import all food as per its requirements, agricultural production is the main determinant in shaping the meals, and therefore the nutrition, of the people at large.

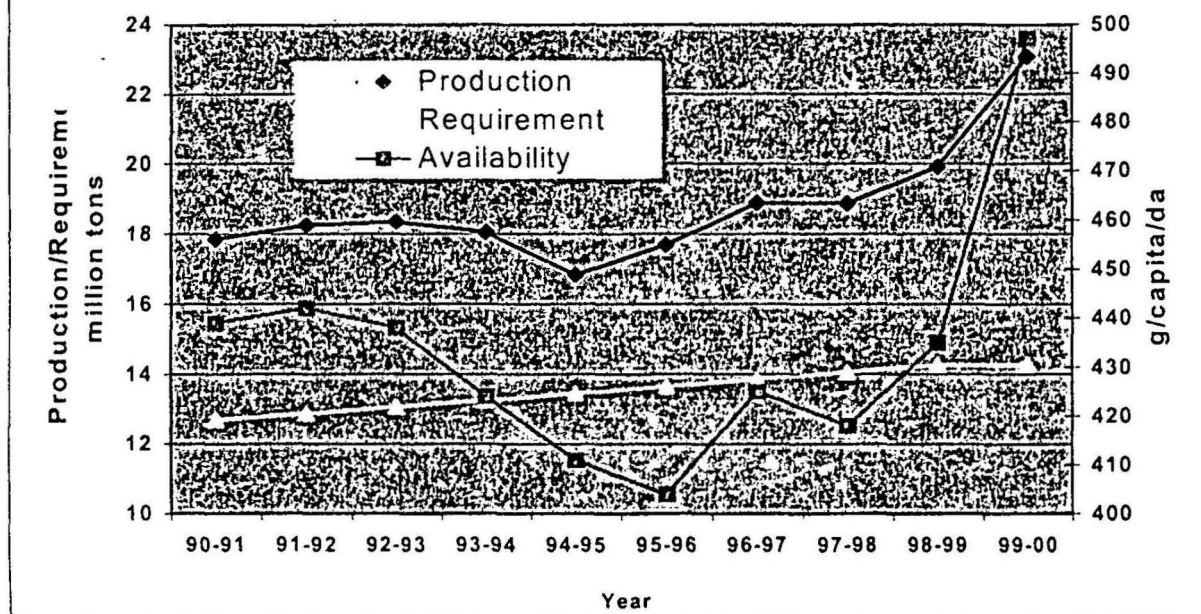
We shall now have a quick look at the agricultural production and per capita availability scenario in the 1990s of the major food items habitually consumed in Bangladesh (Table 5) (BBS, 1998, 2002). The total requirement was calculated from the number of population in each year (estimated) and the ideal requirement for balanced nutrition. The daily per capita availability data are gross availability.

Rice: Rice production decreased from 17.8 million tons in 1991 to 16.8 million tons in 1995, which then began to increase and reached the staggering figure of 23.1 million tons in 2000. The population increased from 111.4 million to 127.1 million during this time, with a growth rate of 1.47% per year. The gross per capita availability of rice showed a continuous decreasing trend during the first half of the decade (439 g/day to 422 g/day) but then it showed a persistent increase during the second half (422 g/day to 499 g/day) (Table 5, Fig. 1) . Needless to say, this high per capita availability, although much higher than the ideal requirement of 312 g/day for balanced nutrition, played an important role in reducing poverty and hunger in the country.

Wheat: Wheat also registered an impressive 83% increase between 1991 and 2000 (by 24% between 1991 and 1995 and by about 53% between 1996 and 2000). The per capita availability increased slightly from 25 to 29 g/day up to 1995, which then increased to 40 g/day in 1999-2000. However, the ideal requirement is estimated to be 60 g/day (Table 3).

Potato: The year of 1999-00 experienced a milestone in potato production, which increased from 1240 thousand tons to 2951 thousand tons, resulting in increase in per capita availability from the ever stragnating value of 30-37 g/day to 64 g/day. The ideal requirement is recommended to be 130 g/day.

Fig. 1: Production, requirement and per capita availability of rice, 1990-2000 (BBS, World Bank, 2000)



Pulses, fruits and oil: Pulses, fruits and oilseeds appear to have become a casualty of the revolution in cereal production. Production of pulses increased somewhat during 1991-95 (during which time rice production decreased), but then their production showed a steady decrease, which showed a record low value of 383 thousand tons in 1999-2000. Accordingly, per capita availability decreased. Same was the fate of fruits and oilseeds (oil). However, the gap between production and requirement of oil was reduced by imports to make the net availability reasonably well (around 18 g/capita/day in 1998-99, see later).

Vegetables: In contrast to pulses and fruits, vegetables production registered an increase, particularly during the latter half of the decade, contributing to increase in gross per capita availability. The amount (31 g/day excluding potato) is, however, far below the recommended requirement (132 g/day).

Animal food: The 1990s were a decade of sustained increase in all kinds of animal products – fish, meat, egg and milk. The increase in **fish** production was essentially due to increase in inland fishery, per capita availability of which increased from 17 g/day in 1991 to 23 g/day in 1995 and to 27g/day in 2000. The per capita availability of marine fish, on the other hand, remained stagnant at the value of 6-7 g/day throughout. The total availability was 33 g/person/day in 2000, as against ideal requirement of 50 g/day.

Meat production increased, superceding the rate of increase in population, so the per capita availability increased to a value of 14 g/day in 2000 from 9 g/day

in 1991. The amount, however, is still small compared to the recommended amount of 22 g/day .

Egg and milk registered similar increasing pattern, but the availability of egg remained appallingly low (4 g/day) compared to the requirement. Amount of available milk (37 g/day) was approaching the recommended requirement (47 g/day).

All together, at the decade end the per capita gross availability of total animal food (88 g/day against requirement of 126 g/day) was not too bad really, in the context of Bangladesh situation.

The per capita gross availability of sweeteners and spices remained almost unchanged during the decade.

Thus, excepting a few items like pulses, oilseeds and fruits, the 1990s were marked by so to say a revolutionary increase in food production, particularly in rice, wheat, potato, vegetables, and fisheries and livestock. The major increases occurred during the latter half of the decade.

Table 5: Production and gross availability of selected food items s in Bangladesh, 1991-2000.

	Production (million tons)			Gross availability g/capita/day		
	90-91	94-95	99-00	90-91	94-95	99-00
cereal	18.85	18.08	24.91	464	451	539
-rice	17.85	16.83	23.07	439	422	499
-Wheat	1.00	1.25	1.84	25	29	40
Pulses	.52	0.53	0.38	13	12	9
Animal food	2.39	3.09	4.11	59	75	88
-fish	0.90	1.20	1.55	22	29	33
- Meat	0.36	0.45	0.66	9	11	14
- Egg	.08	0.13	0.2	2	3	4
- Milk	1.0	1.24	1.70	25	30	37
Fruit	1.42	1.43	1.32	35	33	28
Vegetable	2.25	2.58	4.41	55	63	95
-potato	1.24	1.50	2.95	30	37	64
Oil	0.13	0.13	0.11	3	3	2
Sugar & gur	0.8	0.83	0.87	20	20	19
Spices	0.4	0.26	0.43	10	8	9

BBS (1998, 2002), HIES (2000)

*Net availability is calculated after adjusting total production for import, export, loss and storage (BBS, 2002).

** - 1998-99 data

TRENDS AND PATTERNS OF FOOD INTAKE IN BANGLADESH IN THE NINETIES

The previous section dealt with the trends and patterns of production and per capita gross availability of different food commodities per day, the latter was calculated by dividing the total production by total population.

In this section we will have a look at the trend and pattern of national average food intake. We will see that between 1991 and 2000, food intake has increased not only in quantity but to an extent in quality also (Table 6).

The table shows that the per capita total food intake remained almost unchanged at around 730 g/day up to 1995-96 and then increased by 14% to 892 g/day in the next four years. Similarly, the total calorie intake also registered an impressive 15% increase to reach the value of 2112 Kcal/day from 1832 Kcal/day between 1995-96 and 1999-00. The total protein intake has also increased by 20% from 50 to 59 g/day during this time (Table 6).

A closer look at the composition of the diets of 1991 and 2000 would reveal that despite increase in rice intake, percentage contribution of cereal to total food energy decreased from 83% to 77%, meaning that the contribution of non-cereal items increased. Indeed, the contributions of animal food increased from 2.5% to 3.9% and that of oil increased almost double, 3.1% to 6.0%. The diet of 2000 was thus more balanced compared to what it was in 1991.

However, despite these improvements during the decade, today's diet is still too much dominated by cereal as before, contributing nearly 80% of total energy, which is not desirable. Consequently, the percentage contribution to total energy of other food components, particularly fruits, pulses and animal products has remained less than desirable. This makes the diet deficient in valuable vitamins and minerals.

The diet can therefore be termed as adequate but imbalanced. Moreover, since food distribution inequity affects the poor more, a small proportion of the population enjoys better intake and nutrition than depicted in Table 6, but a great majority of the population do not have the access to the food and nutrition they need due to poverty. Also, there are great rural-urban differentials in food consumption pattern, due to differences in income, attitude and availability of foods in the two areas.

An example of these differences is given in Table 7 which shows the consumption pattern in rural and urban Bangladesh observed in 2000. It can be seen that although the urban people consume less amount of food and calorie, their diet was more balanced in nutrition. Their diet was characterized by markedly lower amount of cereals and therefore lower percent contribution of cereals to total food energy (73%, compared to over 81% in rural areas). The

low cereal in urban diet is compensated by intake of non-cereal food, particularly oil and animal food. (Table 7).

Table 6: Trend and pattern of national average food intake in Bangladesh (1991-2000)

Food	Intake g/capita/day			Energy as % of total			Desirable ⁴ energy %
	1991- 92 ¹	1995- 96 ²	2000 ³	1991-92 ¹	1995- 96 ²	2000 ³	
Cereals	487	436	474	83	82.1	77.4	55
Pulses	14	11	17	2.4	2.1	2.8	10
Animal food	56	61	88	2.5	3.2	3.9	5
- Fish	22	33	40	1.1	1.8	1.9	2.2
- Meat	9	9	14	0.4	0.6	0.7	1.0
- Egg	2	4	7	0.2	0.3	0.5	0.5
- Milk	23	15	27	0.8	0.6	0.9	1.3
Fruits	34	14	30	1.7	0.8	1.4	2.5
Vegetables	57	184	206	1.2	6.1	5.3	2.5
-Potato+ Sweet potato	42	72	47	1.8	3.4	1.9	5
Added oil	7	8	14	3.1	4.0	6.0	15
Sweeteners	19	7	7	3.8	1.5	1.3	5
- Sugar	6			1.2			1.4
- Gur	11			2.1			2.9
- Molasses	2			0.5			0.7
Spices and condiments	11	7	54	0.2	0.2	1.3	0.2
Total amount (g)	727	728	892	-		-	-
Total energy (Kcal)	2021	1832	2112	100	100	100	100
Total protein (g)	49	50	59	-	-	-	-

¹BBS: Statistical Pocketbook (1998).

²National Nutrition Survey (Jahan and Hossain, 1998)

³Calculated from Household Income and Expenditure Survey 2000 Data, BBS

⁴Yusuf: 1996,1997.

Table 7: Average Per capita per day food intake in rural and urban areas of Bangladesh, 2000 (BBS 2000)

Indicators	Rural	Urban	National
Amount of food consumed (gm)	900	875	892
Total calorie (Kcal.)	2132	1998	2112
Energy from (%)			
cereal	80.8	72.9	77.4
pulses	2.5	3.4	2.8
animal food	3.6	5.0	3.9
oil	5.1	9.0	6.0
vegetable	4.4	4.7	4.4
fruits	1.3	1.8	1.4

The following sections will now deal with the dynamics of poverty observed in Bangladesh in the 1990s and the consequent differences in the trends and patterns of food consumption of the poor in rural and urban areas more closely.

Poverty Trends in Bangladesh in the Nineties

Bangladesh with a per capita income of about US\$380 (in 2000) is one of the poorest countries in the world. The term poverty is a broad horizon encompassing deprivation in all aspects of human well-being, not just measured by income, but also by assessment of opportunities to employment, food security, health care, education, housing, quality of life, participation in decision making and development activities and over and above all, the opportunity to demonstrate the optimal resource potential of a human being. Poverty affects human dignity and it thwarts development (Chowdhury, 1995; Mandal, 2002; Yusuf, 1996; Sen, 2002).

Bangladesh achieved a commendable performance in economic growth in the decade of the nineties, with real GDP of the country increasing by 60% at a growth rate of about 5% per year. In consistence with this growth performance, estimates of different studies and surveys show that incidence of poverty in Bangladesh has decreased over the period between 1991 and 2000.

Various methods have been in practice for the estimation of the level of poverty. The most widely used of them are the food energy intake method and the cost-of-basic-needs (CBN) method. In the former, a household is considered as poor if its per capita energy intake is less than 2,122 Kcal/day in rural areas and 2,112 Kcal/day in urban areas (Mujeri, 2000). Such households are called "absolute poor" living below "upper poverty line" or "poverty line 1". Households consuming less than 1,805 Kcal/capita/day are the "hard core" poor living below lower poverty line (poverty line 2).

In the CBN method, the poverty lines represent the level of per capita expenditures at which the members of a household can meet their basic needs (food for energy as well as other basic non-food needs). Thus in this method, poverty lines are drawn on the basis of energy intakes (2,122 and 1,805 Kcal/person/day, respectively) and a non-food allowance that corresponds to non-food expenditure among households whose food expenditure equals the food poverty line. Households can be segregated into 5 quintiles according to per capita expenditure – bottom, first, second, third and the top. The bottom quintile is regarded as the poorest, first quintile as poor and the top quintile as the richest.

According to Foster *et al.* (1984), three aspects of poverty can be measured: the head-count index (P_0) which simply measures the prevalence of poverty, i.e. the percentage of the population living below the poverty line; the poverty gap index (P_1) measures the depth of poverty, which estimates the average distance

separating the poor from the poverty line as a proportion of that line (zero distance being allocated for households who are not poor); and the squared poverty gap index (P_2) measures the severity of poverty, which takes into account not only the distance separating the poor from the poverty line, but also the inequity among the poor. The head-count index is the most widely used measure of poverty in Bangladesh.

The results of various Household Expenditure Surveys (HES) of the Bangladesh Bureau of Statistics show that the incidence of poverty in Bangladesh has fallen considerably during the decade (1991-2000), by about 9 percentage points, as measured by both the upper (absolute) and the lower (extreme) CBN poverty lines (Table 8). Incidence of absolute poverty

Table 8: Trends in CBN poverty measures in Bangladesh, 1991-2000.¹

Head-count index	Upper poverty line			Lower poverty line		
	1991-92	1995-96	2000	1991-92	1995-96	2000
National	58.8	51.0	49.8	42.7	34.4	33.7
Urban	44.9	29.4	36.6	23.3	13.7	19.1
Rural	61.2	55.2	53.0	46.0	38.5	37.4

¹ World Bank/ADB (2002): Household Expenditure Survey: various years.

decreased from 58.8% to 49.8% between 1991 and 2000, while the incidence of extreme poverty decreased from 42.7% to 33.7% during the same period. In 2000 hard-core poverty incidence in rural areas was almost double that in urban areas. Trends in the poverty gap and the squared poverty gap indices, not shown here, suggest that even among the poor, a greater proportion of people are closer to the poverty line in 2000 than they were in 1991-92 (World Bank, 2002).

Although a visible decline in poverty occurred during the nineties, the current picture is still very grim – one-half of Bangladeshi population are poor and one-third are extremely poor. In absolute terms, in 2000 the number of poor was 62.4 million and the number of extremely poor was 41.2 million.

Table 9 shows that the decline in poverty between 1991 and 1996 occurred at an annual rate of 1.95% — 1.5% in rural areas and 3.87% in urban areas.

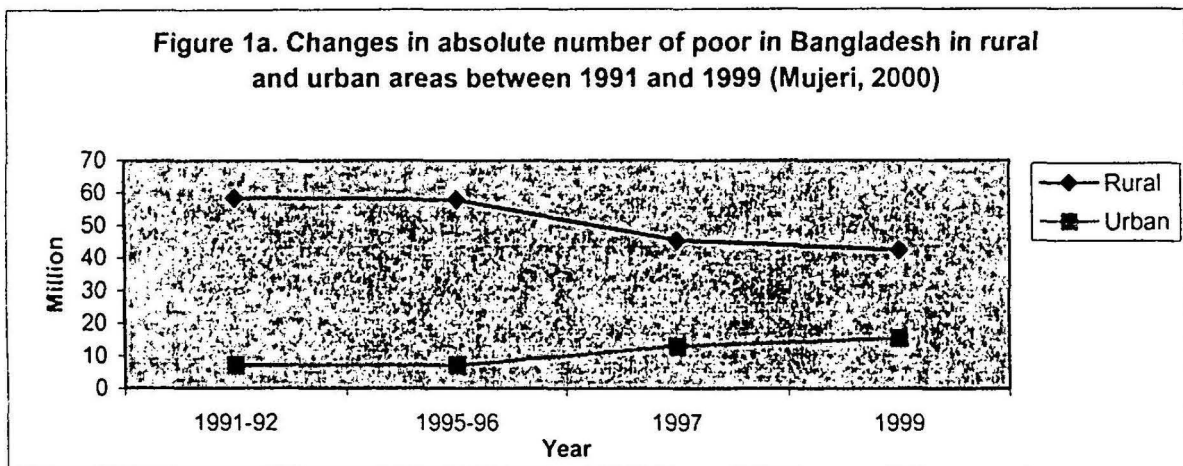
Table 9 : Annual rate of reduction (%) changes in the incidence of poverty in rural and urban areas of Bangladesh¹ (derived from Table 8)

Head count ratio	1991-92 — 1995-96	1995-1996 — 2000	1991 — 2000
National	-1.95	-0.3	-1.0
Urban	-3.87	+1.8	-0.90
Rural	-1.50	-0.55	-0.91

The 1995-96 to 2000 period, on the other hand, recorded a slow rate of poverty reduction in rural areas (0.55% per year) and a rather *increase* in urban areas

(at an annual rate of 1.8%). The overall decline in poverty was 0.3% per year during this period. Thus, in the 1990s rural poverty declined throughout (at a rate of about 0.9% per year), but the rate of urban poverty slowed down in the late 1990s.

The absolute number of poor in rural areas decreased from 58.4 million in 1991-92 to 42.4 million in 1999, while the absolute number of poor in urban areas showed an appalling 100% increase from 7.2 million to 15.4 million during the same period (Fig. 1a).



Trends and Patterns of Food and Non-Food Consumption Expenditure by Poor Households in Rural and Urban Bangladesh, 1991-2000

As mentioned earlier, food distribution inequity is heavily weighted on the poor, who consume much less food than the national average. In the backdrop of high incidence of poverty in the country, particularly in rural areas and to a somewhat lesser extent in urban areas, question therefore arises to what extent poverty influences this inequity. The question is particularly pertinent when food prices fluctuate. Recent trends indicate that the relative price of food in rural areas has marginally declined since 1986-87, while in urban areas, there has been an increase in the relative price (Table 10). The inter-linkage between poverty and food price becomes evident when the changing patterns of food consumption expenditure in the two areas are examined (Table 11). It can be seen

Table 10 : Trends in relative food prices in rural and urban areas¹

	1986/87	1991/92	1995/96	1996/97	1998/99
Measure 1					
Rural	101.3	100.1	99.0	97.9	100.2
Urban	101.1	100.5	101.2	100.1	104.8
Measure 2					
Rural	103.9	100.2	97.1	94.1	101.2
Urban	102.5	101.1	102.9	100.1	111.9

¹Mujeri (2000).

Measure 1 gives the ratio of value of food component of consumer price index to value of consumer price index itself, whereas measure 2 provides the ratio of values of food component to non-food component of the index. In both cases, the 1985/86 price index was taken as the base.

Table 11: Changes in the distribution pattern of monthly per capita household consumption expenditure (percent)

	Rural				Urban		
	1991-92*	1995-96*	1997**	2001**	1991-92*	95-96*	2000*
Food	69.2	62.4	60.1	65.2	56.1	46.3	44.1
-cereal	35.9	29.8	29.0	26.6	21.7	14.4	18.2
-non-cereal	33.3	32.6	31.1	38.6	34.4	31.9	35.9
Non-food	30.8	37.6	39.9	34.8	43.9	53.7	45.9
Total	100	100	100	100	100	100	100

*HES, various years. ** BRAC study (unpublished); *** Own estimate.

from Table 11 that in the nineties, two major changes seemed to have happened in the pattern of household food and non-food consumption expenditure: a shift in the expenditure from cereal consumption to non-cereals within food and from food to non-food within the household. The trends are stronger in rural areas than in urban areas. For example, the proportion of expenditure on food in rural areas declined from 69.2% in 1991-92 to 65.2% in 2001, while the decline in urban areas was from 56.1% to 54.1% during the same period. Similarly, the share of cereals declined during the period, from 35.9% to 26.6% in rural areas and from 21.7% to 18.2% in urban areas. Conversely, the share of non-food expenditure increased in both areas, more in rural than in urban (Table 11).

When food - non-food expenditure data are segregated by economic status, it will be seen that in both rural and urban areas, expenditure for food consumption decreases, and that for non-food consumption increases, as economic status improves (Table 12). In both areas, for the poor and the poorest (bottom 2 quintiles), 41-50% of total food expenditures goes for cereals alone, compared to only 25-29% for the richest (top quintile). Conversely, the rich give away more than 50% of their total household expenditure for non-food consumption.

Table 12: Food and non-food expenditure profile (%) in rural and urban areas according to economic status (BBS, HIES, 2000).

	Rural Per capita expenditure quintile					Urban Per capita expenditure quintile				
	Bottom	2 nd	3 rd	4 th	Top	Bottom	2 nd	3 rd	4 th	Top
Food	71.1	68.8	66.7	61.0	48.3	66.6	65.1	61.7	57.6	42.5
Cereal	(58.8)	(42.5)	(38.3)	(34.2)	(29.3)	(46.9)	(41.3)	(36.7)	(32.3)	(25.2)
Non-cereal	(49.2)	(57.5)	(61.7)	(65.8)	(70.7)	(53.1)	(58.7)	(63.3)	(67.7)	(74.8)
Non-food	28.9	31.2	33.3	39.0	51.7	33.4	34.9	38.3	42.4	57.5
Total	100	100	100	100	100	100	100	100	100	100
Annual per capita total expenditure (Tk.)	5220	7345	9252	12241	20811	5356	7371	9366	12356	26593

Figures in parentheses are percentage expenditure to total food expenditure.

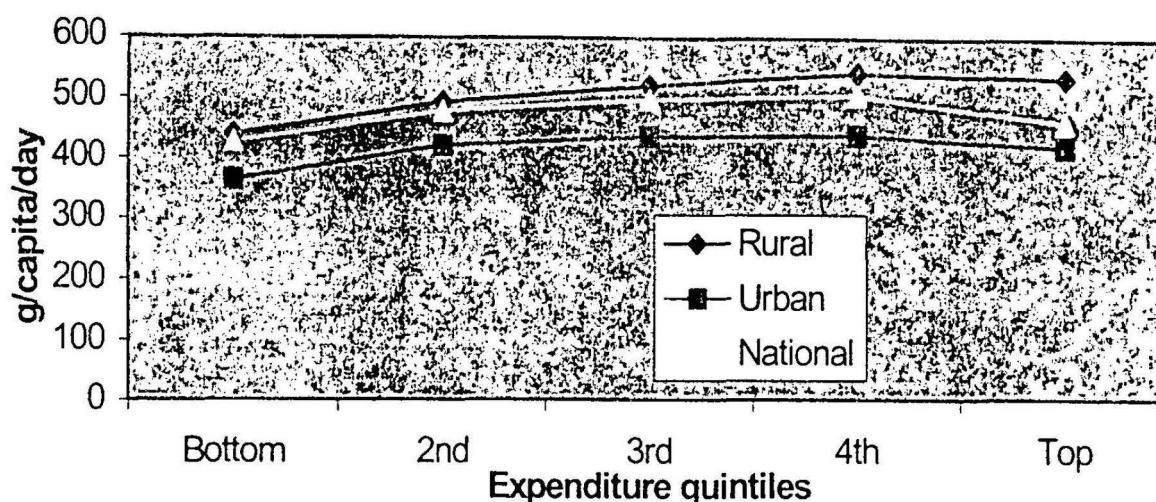
Pattern of Food Intake by Rural and Urban Poor and Non-poor

When food consumption pattern in rural and urban areas is segregated among different expenditure quintiles, two contrasting pictures in rice consumption is noted, as revealed by the Household Income and Expenditure Survey of 2000 (Table 13). Firstly, in rural areas, per capita consumption of rice is higher for all the expenditure groups than those in urban areas, but interestingly one important and common trend which is observed in both the areas is that the consumption of rice increases with an increase in income up to a certain level at which the demand for cereal item does not increase any more, whereas the demand for non-cereal items increases (Fig. 2). The steady increase in the consumption of non-cereal items with an increase in income in both the areas indicate the fact that the intake of better quality food of a household is dependent on household's own purchasing power.

Table 13. Per capita per day consumption of different food items in rural and urban areas in 2000 by expenditure quintiles (gm/capita/day)

Food items	Rural					Urban					National				
	<=20 %	21-40%	41-60%	61-80%	>80%	<=20 %	21-40%	41-60%	61-80%	>80%	<=20 %	21-40%	41-60%	61-80%	>80%
Cereal	440	492	521	542	534	364	421	437	440	420	428	478	498	506	461
Pulses	10.4	13.6	16.1	19.3	21.9	11.5	14.5	16.5	19.6	23.1	10.6	13.8	16.2	19.4	22.7
Leafy veg.	17.8	18.2	22.2	23.9	25.9	20.5	23.3	22.8	24.6	27.8	18.2	19.2	22.4	24.2	27.1
Root vegetable	155	170	192	211	233	143	159	179	186	201	153	168	189	202	213
Fish	21.1	32.0	40.7	52.1	67.5	21.2	28.1	34.9	41.5	58.2	21.1	31.2	39.1	48.3	61.5
Meat	3	6.2	9.1	16.6	30.3	3.9	7.3	11.1	19.7	37.7	3.1	6.4	9.6	17.7	35.0
Egg	2.6	5.5	5.3	7.3	9.3	3.1	3.8	5.2	8.7	14.3	2.7	5.2	5.3	7.8	12.5
Milk	8.6	15.3	25.9	42.2	69.5	3.6	9.6	14.8	22.2	47.2	7.8	14.2	22.9	35.0	55.2
Edible oil	7.2	10.0	12.4	15.5	20.1	9.3	11.8	14.7	18.9	27.1	7.5	10.4	13.0	16.7	24.6
Sweets	2.1	4.4	6.2	9.6	15.1	1.6	3.3	5.0	8.7	14.4	2.0	4.2	5.8	9.3	14.6
Spices	39.4	46.0	53.3	62.0	73.1	37.1	45.1	51.9	57.3	70.7	39.0	45.8	52.9	60.3	71.6
Fruit	13.5	19.4	27.8	40.9	53.6	11.2	23.6	18.9	32.4	53.8	13.1	20.2	25.4	37.9	53.7
Total intake (gm)	721	832	932	1042	1154	631	750	811	880	995	707	817	900	984	1052

Fig.2: Per capita rice consumption of rural and urban hhs. by expenditure quintiles



Trends and Patterns of Food Intake by Rural and Urban Poor, 1991-2000

The trend and pattern of food intake by the bottom 2 per capita expenditure quintiles (bottom 40%) of population (absolute and extreme poor together) in rural and urban areas between 1990-91 and 2000 are shown in Table 14. In the rural areas the total food intake of the poor was 638 g per capita per day in 1990-91, which increased somewhat to around 700 g in 1995-1996 through to 2000. The total calorie intakes were 1721, 1770 and 1793 Kcal/capita/day and protein intakes were 40.6, 42.6 and 41.4 g/capita/day in 1990-91, 1995-96 and 2000, respectively. Thus, although there was a slight improvement in total food intake over the years, the diets were deficient in energy by 22 to 26% and in protein by about 30%.

The diets were not only deficient in energy and protein, they were also extremely imbalanced: 80-85% of total energy came from rice alone and nearly 90% from total cereal. Animal food contributed only 1.5 to 2.0% of the energy. Fruits and vegetables together contributed around 3% and oil only around 3% of total energy. The diets were thus clearly deficient in vitamins and minerals (micronutrients) also. Unfortunately, no discernible change or improvement in the trends or patterns in the diets of the rural poor were to be recognized during the entire decade of the nineties. Needless to say, such diets cannot support growth, development and maintenance of the body.

The picture on the diet of the urban poor is not much different from that of their rural counterparts (Table 14). The total food intake increased only marginally from 716 to 745 g/capita/day between 1990-91 and 1995-96, but by 2000 the intake fell to 702 g/capita/day. The food energy intake was nearly 1850 Kcal/capita/day in 1990-91 and 1995-96 which fell to 1766 Kcal/capita/day in 2000. Total protein

intake also fell from around 46 to 42 g/capita/day during the period. Thus, in 2000, the diet of the poor in urban areas was comparable to the diet of the poor in rural area both in quantity and quality. The poor of the country, rural or urban, thus remain

Table 14: Trend in per capita per day food intake by rural and urban poor (bottom 2 quintiles) in the nineties

Food	Rural poor						Urban poor					
	1990-91		1995-96		2000		1990-91		1995-96		2000	
	Intake	% Energy	Intake	% Energy	Intake	% Energy	Intake	% Energy	Intake	% Energy	Intake	% Energy
Cereals	440	88.2	446	86.9	448	86.2	442	82.6	439	81.9	415	81.1
rice	400	80.4	413	80.7	440	84.9	406	76.0	406	76.1	396	77.6
wheat	240	7.9	33	6.3	8	1.3	36	6.6	33	5.9	19	3.5
Potato	30	1.5	37	1.8	42	2.0	47	2.3	56	2.6	51	2.5
Pulse	12	2.4	9	1.7	11	2.2	18	3.4	14	2.6	14	2.8
Animal food	28	1.5	40	2.0	37	1.9	48	2.4	60	3.0	50	2.6
Fish	19	-	27	-	24	-	32	-	37	-	27	-
Meat	2	-	2	-	2	-	5	-	7	-	7	-
Egg	1	-	1	-	1	-	1	-	2	-	3	-
Milk	6	-	10	-	10	-	10	-	14	-	13	-
Fruits	6	0.3	7	0.4	7	0.4	8	0.4	9	0.5	6	0.3
Vegetables	100	2.5	40	3.5	120	2.9	116	2.8	123	2.9	123	3.0
Added oil	5	2.6	5	2.5	7	3.5	10	4.9	10	4.9	12	6.1
Sugar	1	0.2	1	0.2	1	0.2	3	0.6	3	0.6	3	0.7
Spices	16	0.4	18	0.5	21	0.5	24	0.6	31	0.8	28	0.8
Total amount (g)	638	-	703	-	694	-	716	-	745	-	702	-
Total energy (kcal)	1721	100	1770	100	1793	100	1847	100	1848	100	1766	100
Total protein	40.6	-	42.6	-	41.4	-	45.7	-	46.3	-	42.4	-

¹Household Expenditure Survey: World Bank 2002.

'half-fed' with a diet which is seriously imbalanced and are therefore subjected to serious consequences of nutritional deficiencies.

Therefore, although there was an overall economic development in the country between 1991-2000, the benefit was not reflected in the food consumption of the poor, in rural nor in urban areas: their diet remained unchanged throughout the entire decade.

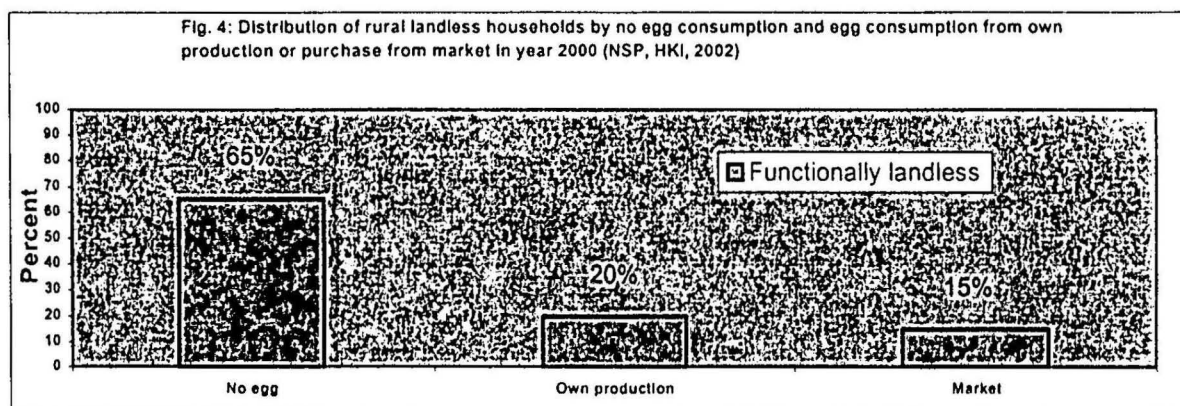
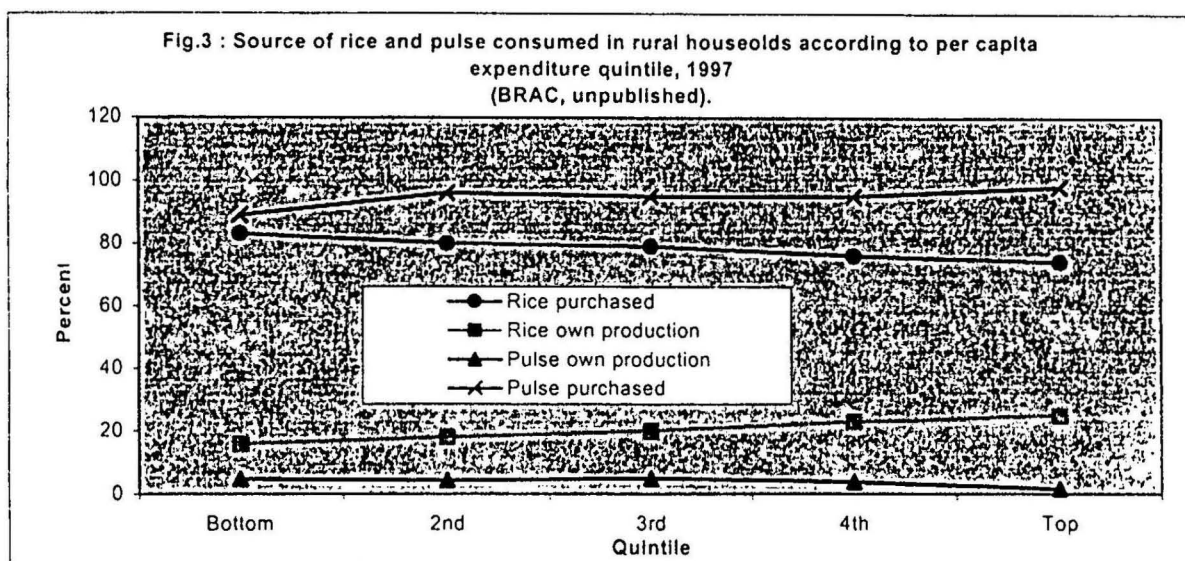
Source of Food Consumed in the Household

Not much information is available on the source of the food consumed in the household, whether from own production or purchased from the market or obtained as gift, relief or exchange. The 1997 and 2000 data of a BRAC study and those of HIES of 2000 show that only around one-fifth to one-quarter of food items like rice, vegetables and fish are obtained from own production and the rest are purchased from the market or direct from the growers (Table 15). Interestingly, for rice, the proportion purchased decreases and the proportion produced increases as the economic status of the households increases (Fig

13), indicating increasing land holding and production (and also consumption, Table 17) with increase in economic status. In 2000, this trend was more pronounced: the proportion of own production increased more dramatically, from 21.8% in the poorest to 42.8% in the richest. This thus shows high market dependence of the poor for rice (and also other food commodities).

However, pulses show the opposite picture: proportion of pulse produced decreases, and therefore proportion purchased increases, with increase in economic status (Fig. 3). Also, proportion of pulse produced is very little (2-5%) compared to rice, indicating that the farmers give more importance to production of rice than of pulse.

Among all food items, the proportion of egg from own production remained very high, 32-54% (Table 15). This point to the traditional poultry raising in rural households, poor or rich alike.



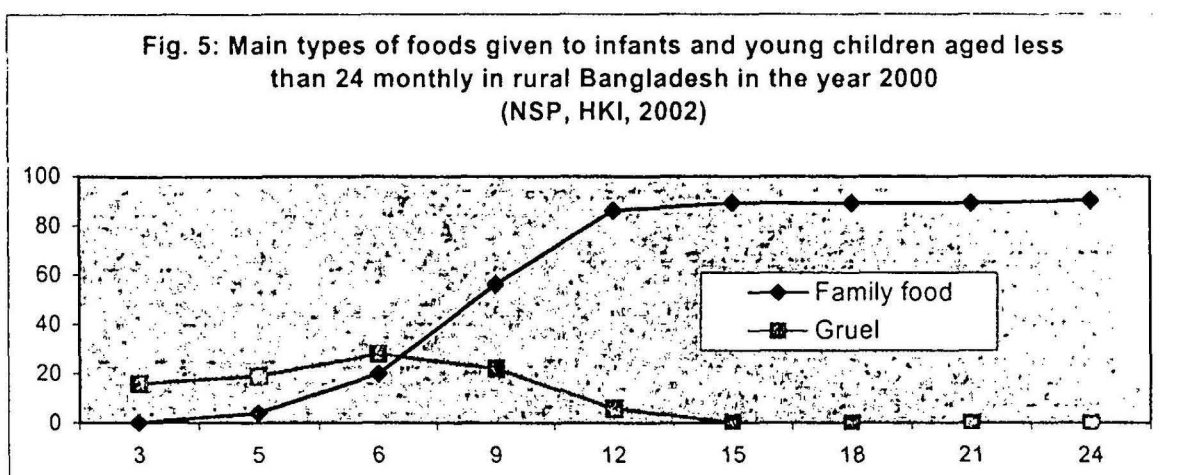
However, although by tradition, most households (more than 90%) in rural Bangladesh raise poultry and even 80% of the functionally landless households (having less than 0.5 acre) also raise poultry, a survey in 2000 (HKI, 2002) showed that 65% of them had not eaten egg at all in the last week, only 20% ate an egg from own production and 15% ate by purchasing from the market (Fig. 4). A number of reasons are conceived of for this, prominent of which are either the eggs are kept to hatch chicks, or the eggs are sold, given away or exchanged. This is just an example of very low consumption of nutritious food by rural poor households.

Food Consumption by Young Children in Rural Areas

Bangladesh. Survey data of 2000 show that 99% of children aged 6-11 months were given breast milk and that even among children aged 12-23 months, 43% were still being breast-fed (HKI/IPHN, 2002). These figures were found almost unchanged over the 10 year period of 1991-2000. However, concern arises due to the complementary food that is fed to the children from the age of 6 months being usually poor in quantity and quality. Around this age family food becomes an increasingly important part of the diet: 20% children given family food at 6 months, 56% at 9 months and 87% at 12 months of age (Fig. 5).

Unfortunately, the family food in poor households is not nutritionally sound, being studded with rice and containing little of the nutritious foods like fish, egg, pulses, green leafy vegetables. Indeed, the NSP data of HKI show that 60% of infants aged 6-11 months had not eaten either fish, egg, pulse, green leafy vegetables, or yellow or orange fruit or vegetables in the last week.

Thus, nutritional deprivation in poor households begin very early in life and continues till adulthood, probably persisting throughout the whole life for many of them.



NUTRITIONAL SITUATION AMONG RURAL AND URBAN POOR

Malnutrition is wide-spread and has long been a public health problem in Bangladesh. It affects all sectors of the community but infants, young children and women of child bearing age are at greatest risk because of their proportionately higher nutritional requirements for growth and development (children) and motherhood (women). These requirements are not met due to inadequate dietary intakes, for most part in poor households, or due to improper utilization of ingested nutrients due to infection which is more common in poor malnourished subjects. Thus, nutritional inadequacy sets in motion a vicious circle of malnutrition, poverty and infection from early life.

About a billion people of more than 80 developing countries of the world face the great challenge of coming out of this vicious circle and living a more decent healthy life. About half of Bangladeshi population are among them, because of their poverty and nutrition inadequacy described in the preceding sections. The consequences of malnutrition are most severe if it happens very early in life. Maternal malnutrition during pregnancy affects foetal growth, resulting in low birth weight which marks a bad start in life, risking the survival of the child. More than 50% of all child mortality is linked to malnutrition (World Bank, 1997). Malnutrition from this age onward has long lasting effects on subsequent growth, morbidity, cognitive development, educational attainment and productivity in adulthood (UNICEF, 1998). For these reasons, nutrition status of young children, particularly those aged 6-59 months, has been shown to be one of the most sensitive indicators of food supply and health conditions. Child nutritional status can thus be an important gauge to monitor economic and social development of a country.

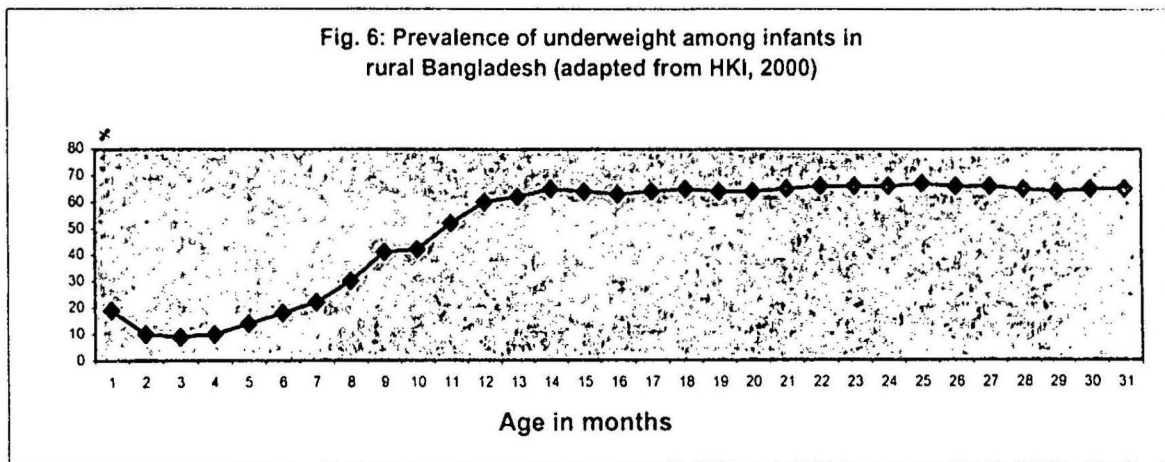
The following sections give an analytic overview of the trend of nutritional situation in vulnerable population groups - infants, young children, mothers - in the light of food and nutrient consumption over the period of the nineties, as described in the previous sections.

Malnutrition Among Infants

As mentioned earlier, infants in Bangladesh, particularly in rural areas, are almost universally breast-fed. WHO and UNICEF suggest that breast feeding should continue well into the second year and that from 6 months of age, infants should be given, in addition to breast milk, frequent small complementary meals that are rich in energy, protein and micronutrients. However, surveys show that while breast feeding is sustained, infants are given family food that rarely contains items which supply these nutrients in adequate quantities, even if these are available in the household. As a result, infants do not grow well and the percentage of underweight children increases sharply between 6 and 12 months. The findings of such a rural survey in 2000 is shown in Fig. 16. The figure shows that the prevalence of underweight children

increased nearly 3-fold from 22% at 6 months to 60% at 12 months of age. This prevalence of underweight persists throughout the preschool years. Along with infectious diseases, faulty weaning is held responsible for this growth faltering. Because family food becomes an increasingly important part of the child's diet during this time, there is potential to improve this nutritional situation of the infants by making better use of nutritious foods already available in the household, i.e. making proper intra-household food distribution.

The situation of urban infants is conceivably worse, because in urban areas, particularly in urban slums, practice of breast feeding is less than in rural areas. The babies are weaned earlier because the mothers have to go to work. They are given formula milk instead, not always prepared properly and hygienically. The babies thus fall easy prey to infection. Thus, ill fed and sick and uncared after, the infants lose weight quickly. This scenario is reflected in higher prevalence of underweight children in most urban slum areas even compared to that in rural areas (see below).



Malnutrition Among Children Under 6 Years of Age

Protein-energy malnutrition

Several indicators are used to monitor the nutritional status of preschool children aged up to 6 years. These include underweight, stunting and wasting which can be measured from anthropometric data on weight, height and age of the growing children. Mid-upper arm circumference (MUAC) is also used to assess malnutrition. A child is considered malnourished when his/her anthropometric measures are as follows:

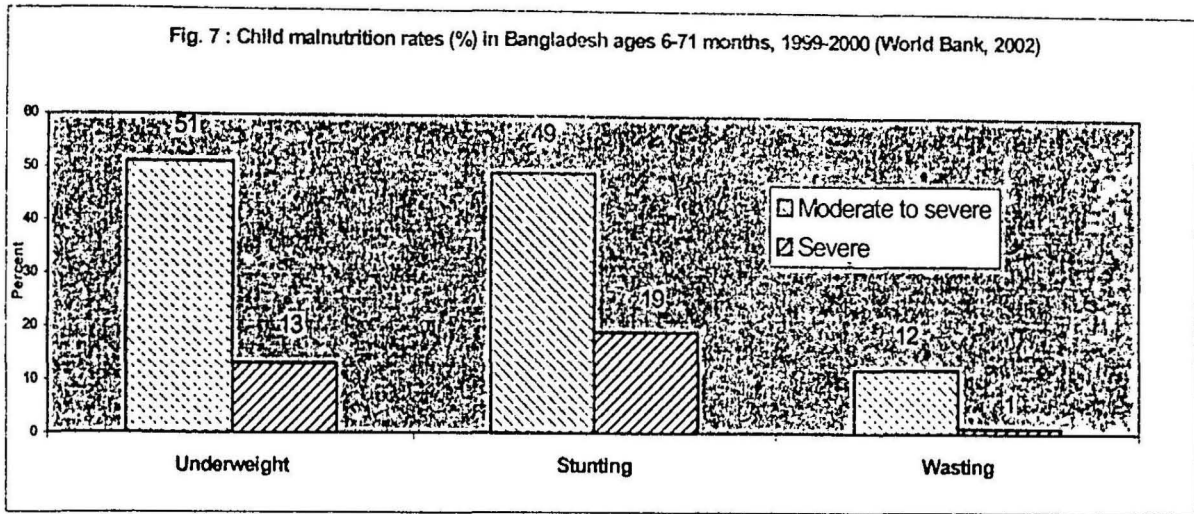
Malnutrition

Indicator	Moderate-to-severe	Severe	
Underweight: Weight-for-age	≥ -3 SD to < -2 SD	-3 SD	of reference NCHS weight
Stunting: Height-for-age	≥ -3 SD to < -2 SD	-3 SD	of reference NCHS height
Wasting: Weight-for-height	≥ -3 SD to < -2 SD	-3 SD	of reference NCHS weight
Malnourished: MUAC	<12.5 cm	<11.0 cm	

According to WHO recommendation (WHO, 1983), the reference values used for comparisons for above measurements are those of the National Center for Health Statistics (NCHS), Atlanta, USA. The different indicators of malnutrition have different implications. Wasting reflects recent or *acute* malnutrition that has caused substantial loss of body weight within a short time. Stunting, because it involves loss of height (skeletal growth) which takes a long time to happen, reflects *chronic* malnutrition associated with poor overall socio-economic condition. It is a measure of attained linear growth. Underweight (weight-for-age) is primarily a non-linear combination of wasting and stunting and thus is a composite index which makes it somewhat complex to interpret since it does not distinguish between tall but thin children from short, well proportioned children. It reflects general undernutrition, either from wasting or from stunting or from both.

There are several sources of data on nutritional status of children aged 0-71 months: the Child Nutrition Surveys (CNS) routinely conducted by Bangladesh Bureau of Statistics (BBS) on children aged 6-71 months, Bangladesh Demographic and Health Survey (BDHS), also conducted by BBS, on children aged 0-59 months, the regular monitoring surveys under the Nutritional Surveillance Project (NSP) of Helen Keller International (HKI) on children aged 6-59 months, National Nutrition surveys occasionally conducted by the Institute of Nutrition and Food Science (INFS) of Dhaka University and so on. The results of these surveys agree with each other fairly well, with little variations. This section of the present review is based on findings of these surveys.

According to the Child Nutrition Survey 2000, one-half of children in Bangladesh below the age of 6 years are underweight (51%) or stunted (49%), 13% being severely underweight and 19% severely stunted (Fig.7). About 12% children are wasted. Almost similar results were obtained in the Demographic and Health Survey 1999-2000 on children aged 0-59 months. These rates of child malnutrition in Bangladesh are among the highest in the world, higher than the rates in most developing countries, including those in Sub-Saharan Africa. However, some countries in South Asia (India, Pakistan) have even higher rates (UNDP, 2001).



* Adapted from World Bank 2002.

An examination of the child malnutrition rates in Bangladesh during the last decade (1990-2000) reveals an encouraging picture: the country has attained impressive gains in reducing these rates during the last years.

For instance, while between 1989-90 and 1992, the rates of underweight and stunting remained almost unchanged at levels of 65-70%, the rates started to decrease rapidly from 1992 to levels of about 50% in 2000 (Fig. 8). Spectacular improvements in the rate of wasting occurred during the latter half of the 1990s: while increasing and remaining at the level of 17% up to 1995, the prevalence sharply decreased to 12% in 2000 (World Bank, 2002).

In terms of low MUAC also, child malnutrition (MUAC <12.5) shows the same pattern as shown by other indicators described above : decrease of prevalence over the years from 1990 to 1999 in both rural and urban areas and higher prevalence in rural than in urban areas (Table 16). The table also shows that girls are worse off than boys, irrespective of area of residence.

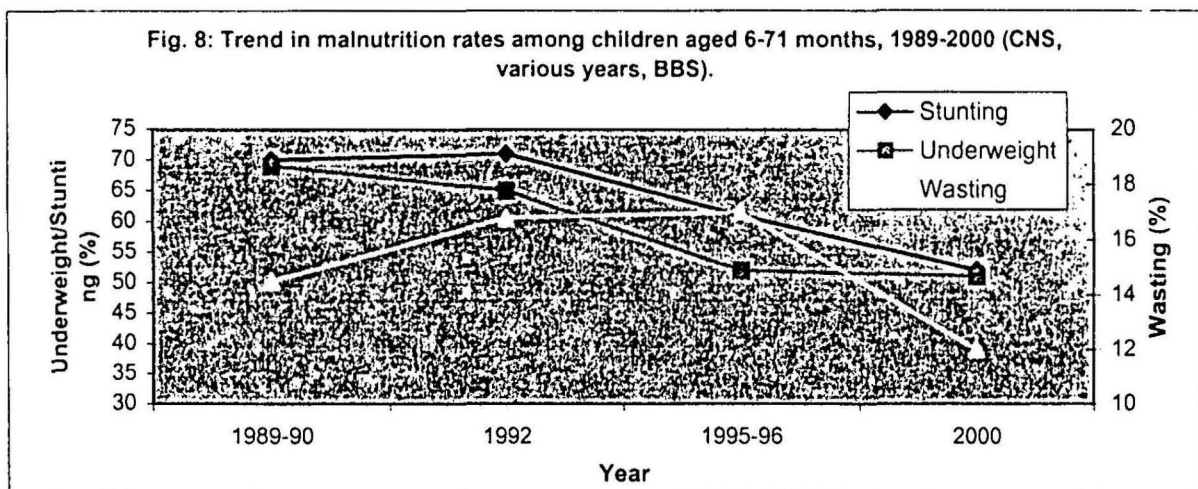


Table 16: Trends in the prevalence of low mid-upper arm circumference (MUAC) in children by residence and gender (BBS, 1998, 2002)

Year	Rural		Urban		National	
	Boys	Girls	Boys	Girls	Boys	Girls
1989-90	7.7	14.5	7.3	9.8	7.7	14.0
1992	12.6	13.7	6.5	10.2	11.9	13.3
1995	6.6	9.9	3.1	6.6	6.2	9.5
1996	8.9	12.9	6.6	8.2	8.7	12.4
1997	6.6	9.1	3.6	6.0	6.3	8.8
1999	5.1	8.2	3.0	5.6	4.9	7.9

At the World Summit for Children (WSC) in 1990, 27 health, education and development goals for children were set to be met by the year 2000. Of these, 8 were nutritional goals. The first nutritional goal was to reduce severe and moderate undernutrition among under-5 children by one-half of 1990 levels.

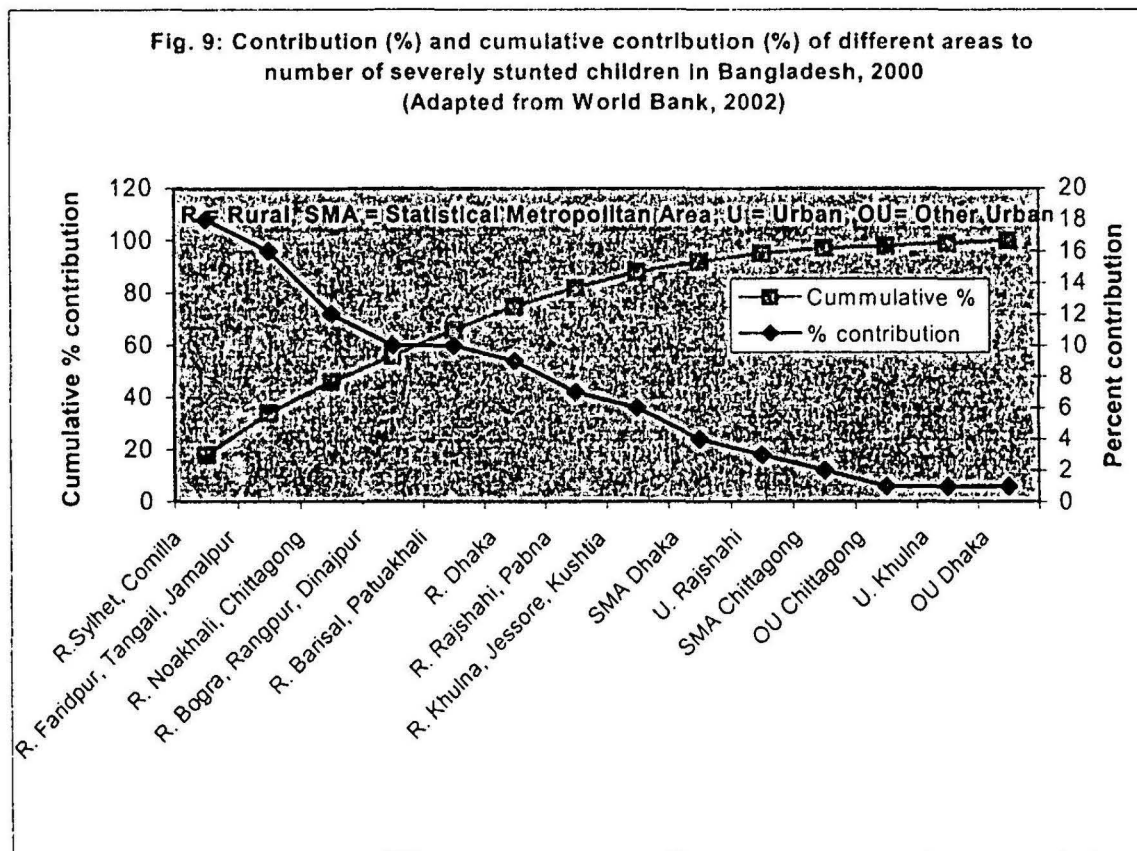
Despite the impressive and consistent decline in prevalence of underweight and stunting throughout the 1990s, the goal to reduce malnutrition by 50% of 1990 levels by 2000 was not achieved. Between 1990 and 2000, stunting declined from 73% to 49% (target 36.5) and underweight prevalence declined from 73% to 55%. On the basis of the yearly trends in z-scores of stunting and wasting in the 1990s, and assuming that these trends will not alter over the next one to two decades, it has been estimated that the WSC goal for stunting (36.5% prevalence) would be achieved by the year 2008 and that for underweight might be achieved by 2018 (HKI, 2002).

Rural-urban differential in child malnutrition in Bangladesh

Malnutrition rates in Bangladesh vary greatly with area of residence, with children in rural areas having a higher incidence of malnutrition than urban children (Table 13). This probably reflects higher consumption of cereals in proportion to non-cereals in rural households (see Table 11). Again, among the rural areas, malnutrition appears to be more concentrated in certain locations than in others. For instance, the rural districts of Sylhet, Comilla, Faridpur, Tangail, Jamalpur, Noakhali and Chittagong have nearly one-half of all severely stunted children in the country (Fig.9). On the other hand, the lowest rates of such children are contributed by the urban areas of Dhaka and Khulna Divisions (World Bank, 2002).

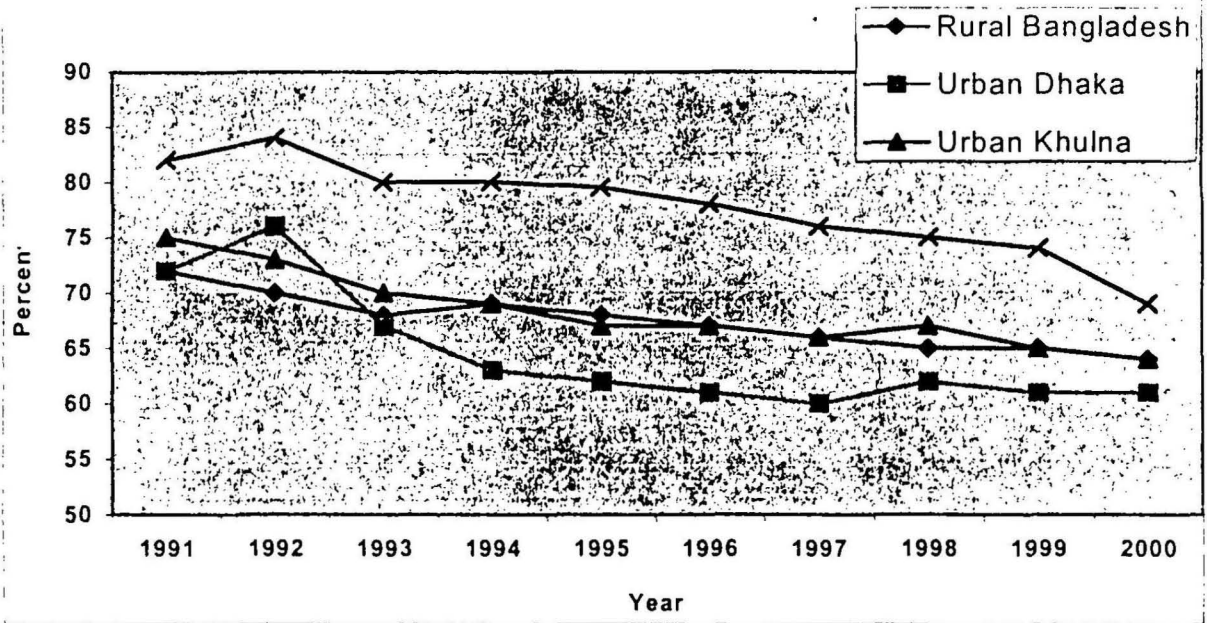
However, when urban slums are considered, malnutrition rates in these locations are found to be higher than the rural rates. The NSP surveys of HKI provide a comparative picture on the changes in the rates of underweight children in rural Bangladesh and urban slum areas during 1991 to 2000 (HKI, 2002). These results also show a slow but steady decrease in underweight prevalence in both rural and urban slum children, but the prevalence in the slums of Khulna and Chittagong remain higher than in the rural areas

throughout. On average, the rates of underweight were nearly 80% in 1991, which decreased to 53-61% in 2000 (Fig. 10). These figures are slightly higher than reported in the Child Nutrition Survey or Demographic and Health surveys of BBS.



The higher rate of malnutrition among urban slum children compared to that in rural areas, which is already high relative to urban areas in general, poses yet another challenge for management of malnutrition situation in the country. This is particularly pertinent in view of the alarming pace of urbanization which is occurring in Bangladesh: over the last 10 years, the population of all urban areas in the country grew by 38%, compared to only 10% in rural areas (BBS, 2001). Especially frightening is the situation of Dhaka city, where urbanization is increasing at such a rate that its population is estimated to be doubled (21 million) by the year 2015 (UNFPA, 2001). Conceivably, much of this increase is due to migration of rural poor to towns and cities where they often find a place to live in appalling conditions of slums.

Fig. 10: Changes in % underweight children in rural Bangladesh and in urban slums in Dhaka, Khulna and Chittagong, 1991-2000 (HKI/IPHN, 1999)

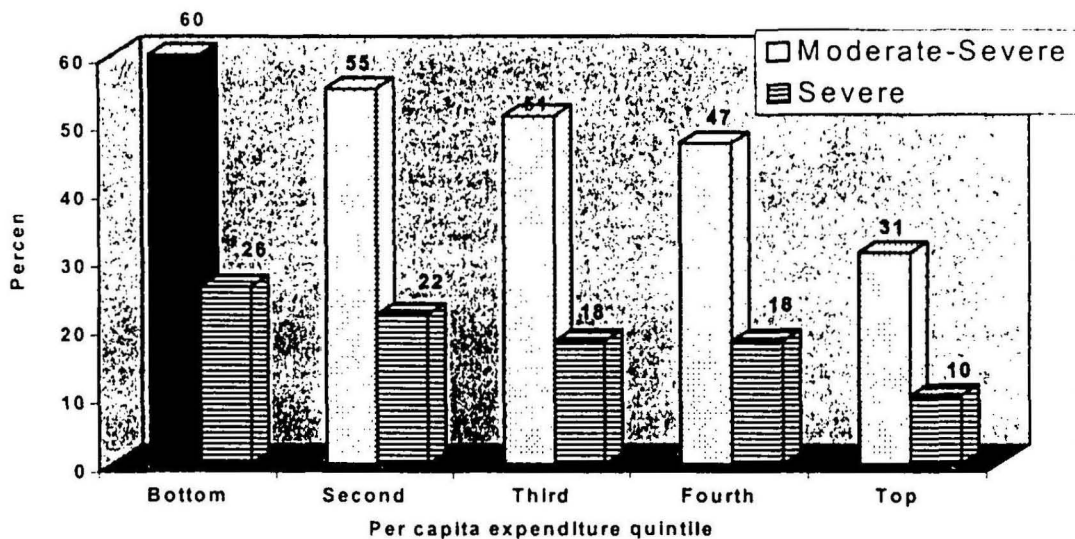


Child malnutrition by poverty status

As is expected, the rate of malnutrition varies with economic status, being very pervasive among the poor. Around 60% of the children aged 6-71 months coming from bottom quintile families are malnourished (underweight or stunted) compared with 47% and 31% in families coming from the 4th and top quintiles respectively (Fig. 11).

The observation, made persistently over the years, that nearly one-third of children from richest 20% families – a group that certainly has good economic

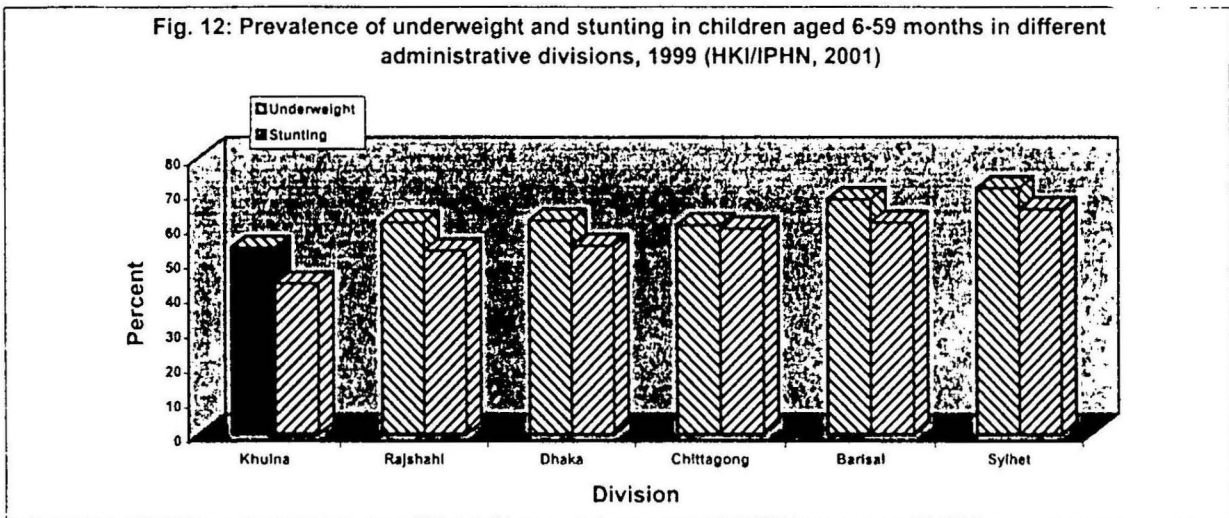
Figure 11: Child stunting rate (%) by per capita expenditure quintile, ages 6-71 months, 2000 (CNS, 2001)



access to food – are malnourished, suggests that in Bangladesh, as elsewhere in the world, malnutrition is a multifaceted problem, not determined by economic status alone.

Child malnutrition by administrative divisions

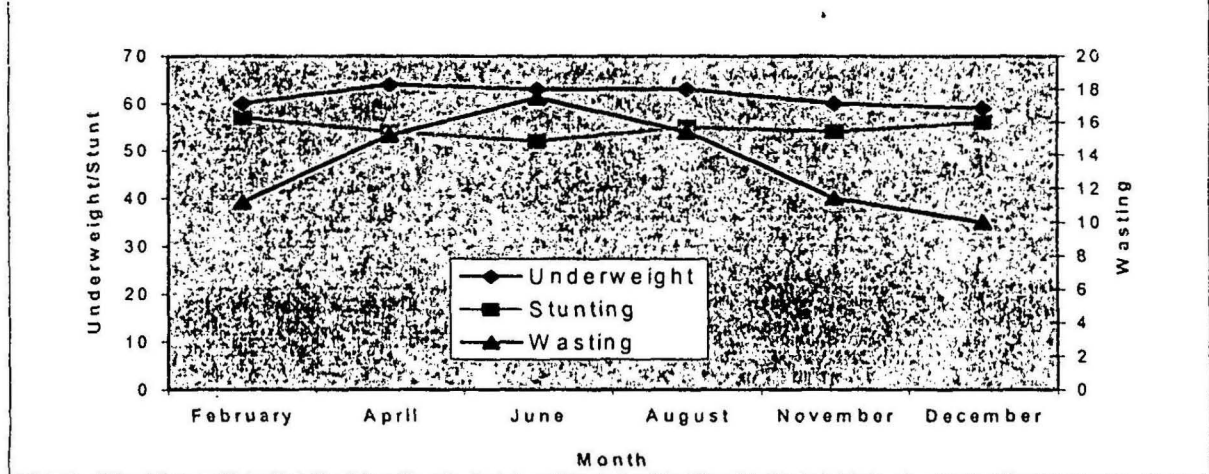
The NSP data of HKI show that among all divisions, Khulna shows the lowest prevalence of both underweight (53.7%) and stunting (43.2%), while the rates are highest in Sylhet division (underweight, 70.9%; stunting, 64.9%) (Fig. 22). The other divisions have intermediate prevalence rates. Wasting does not show such consistent geographical concentration, but it is the indicator that shows widest variations with season (see below).



Seasonality of child malnutrition

While prevalence of underweight or stunting remains fairly unchanged throughout the year, the prevalence of wasting is highly seasonal: in all divisions, prevalence of wasting peaks in the months of June to August (pre-harvest period of rice) and falls to lowest values in the months of December to February (post harvest). The data conform with the definition of wasting being a measure of short-term acute malnutrition (Fig. 13).

Fig. 13: Changes in prevalence of underweight, stunting and wasting in children 6-59 months old by season, 1999 (HKI/IPHN, 2001).



Child malnutrition by infant feeding practices

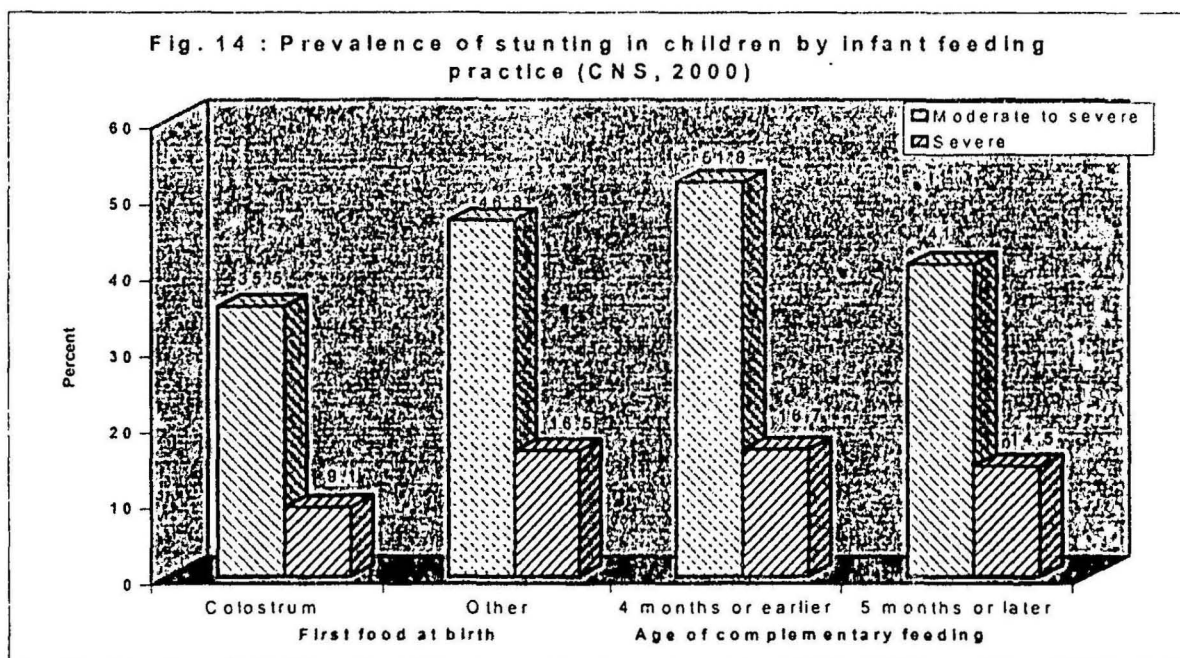
That infant feeding practice has a profound effect on subsequent nutritional status in childhood is shown by the results of the Child Nutrition Surveys. The survey results of the year 2000 are shown in Fig. 14 for prevalence of stunting.

The results clearly show that the incidence of stunting and severe stunting is markedly lower among infants whose first food after birth was colostrum (mother's first milk, which is rich in antibody and vitamin A) and breast milk than among infants who were given cow milk, sugar, honey etc. as the first food (Fig. 14). Similarly, the rates of malnutrition are higher among children who were given complementary feeding at 4 months of age or earlier than among children whose complementary feeding started at 5 months of age or later.

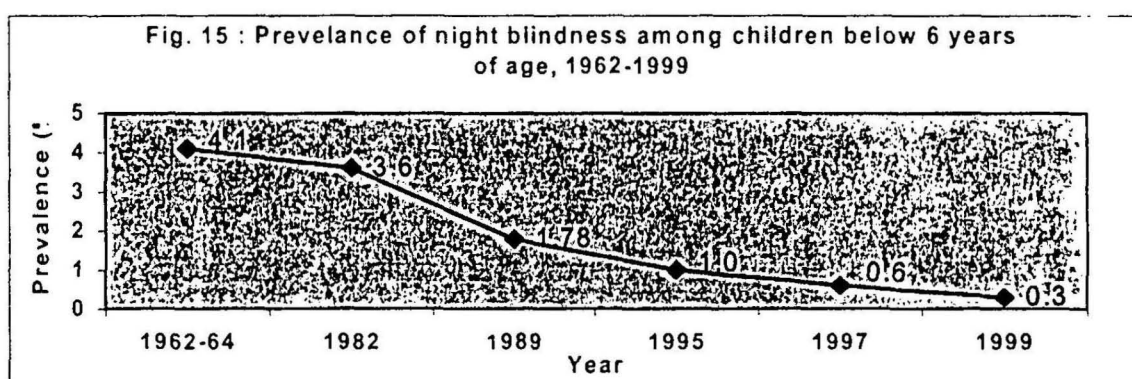
These data show the great potential that simple changes in feeding and caring practice of infants at birth and few months after birth have on the subsequent growth and development of the children. Mother's education in this regard is very important. Indeed, the Child Nutrition Surveys have persistently shown the strong impact of mother's years of schooling on the nutritional status of the children in the first two years of life.

Vitamin A deficiency and night blindness

The diet of the poor is not only deficient in macronutrients (energy and protein) resulting in protein-energy malnutrition, it is also deficient in almost all micronutrients (vitamins and minerals). The most overt and common dietary insufficiency-induced micronutrient deficiencies seen in the population are vitamin A-deficiency night blindness and iron-deficiency anaemia.



For long, night blindness in children due to vitamin A deficiency was a common nutritional problem in Bangladesh, where green leafy vegetables and yellow/orange vegetables and fruits - foods rich in the vitamins and minerals - can be grown in abundant quantities. The first nutrition survey of 1962-64 in the then East Pakistan (now Bangladesh) showed a night blindness prevalence of over 4% in children under 6 years of age. Since then, wide spread intervention programmes along with public awareness were launched by government and non-government agencies. Today, after 35 years of long struggle, the scourge is almost non-existent in the country. Fig. 15 shows the decline in the prevalence of night blindness in children below 6 years revealed by data of various surveys. The figure shows that the prevalence decreased steadily with time, from 3.6% in 1982 to 1.78% in 1989, 1.0% in 1995, 0.6% in 1997 and finally to 0.3% in 1999.



Sources: 1962 (DHESW, 1965), 1982 (HKI/IPHN, 1985), 1989 (IPHN/UNICEF, 1989), 1995 (INFS, 1998), 1997 (HKI/IPHN, 1999), 1999 (HKI/IPHN, 2001)

The WSC goal in 1990 on vitamin A deficiency was to virtually eliminate vitamin A deficiency and its consequences, including blindness, by 2000. The National

Plan of Action for Nutrition (NPAN) later set the country-specific goal of reducing night blindness to less than 1% by year 2000 and eliminating vitamin A deficiency by 2010 (MOHFW, 1997). The results of Fig. 15 show the heartening situation that Bangladesh has met its vitamin A deficiency reduction goal two years in advance of the target year.

The surveys also show somewhat higher prevalence of night blindness in girls than in boys and somewhat more in rural than in urban areas.

Although clinical vitamin A deficiency is now almost non-existent (0.3%), sub-clinical vitamin A deficiency (measured by serum level of vitamin A) is still highly prevalent, though. The National Vitamin A Deficiency Survey of 1997 showed that one in four children (25%) aged 6-59 months had serum level of vitamin A (retinol) below the cut-off level of 20 µg/dl (0.7 µmol/L). The prevalence of sub-clinical vitamin A deficiency was found highest among the 12 to 23 months age group, as is the case with protein-energy malnutrition (underweight, stunting).

The major cause of decline in clinical vitamin A deficiency (night blindness) in rural Bangladesh is the high coverage, like that of EPI, achieved by the national vitamin A capsule distribution programme (HKI/IPHN, 1999). In this programme, children aged 12-59 months are given a vitamin A capsule twice a year at six-monthly intervals. Since 1990, the coverage increased from 50% to over 80% in 1996 and attained the level of 85% in 1999.

Side by side with this regular yearly vitamin A capsule feeding programme, programmes like homestead gardening and school-yard gardening have also been geared up across the country by the government and many NGOs to provide the vitamin from diet as the ultimate solution to the problem. Homestead gardening (and the consequent increase in vegetable intake) has been shown to be capable of lowering the risk of clinical and sub-clinical vitamin A deficiency in preschool children in rural Bangladesh (HKI/IPHN, 1999).

Physiologically, vitamin A is not only involved in vision, but also in many vital processes including immunity, mobilization of iron from liver store and also in bone formation and growth.

Iron deficiency anaemia

Iron deficiency is the most common but ill understood nutritional problem in the world. A WHO estimate in 1992 tells that about half of all pre-school children and pregnant women in developing countries have anaemia (blood hemoglobin less than 110 g/L). Anaemia increases the risk of death and is associated with low-birth weight, impaired growth and retarded cognitive development, work capacity and productivity (ACC/SCN, 2000). It thus thwarts socio-economic development of a nation (Ross and Horton, 1998).

The prevalence of anaemia among pre-school children in Bangladesh has long been known to be very high. The most recent report (HKI/IPHN, 1999b) shows 52.7% prevalence among rural preschool children. The national nutrition survey of 1995-96 showed 67% prevalence (Jahan and Hossain, 1998). Prevalence of anaemia, like that of stunting wasting and underweight, is probably declining in this population group.

However, the situation in urban slums is reported to be precarious: HKI/IPHN study of 1997 shows a prevalence of 76% among children aged 6-59 months, compared to only 40% prevalence in urban children in general in 1995-96. As mentioned earlier, slum population really faces a strong challenge to survive such appalling malnutrition conditions.

Malnutrition in Women

Protein-energy malnutrition

Women of childbearing age constitute another population group who, like growing children, are highly vulnerable to nutritional insufficiencies because of their increased need for food and nutrients during pregnancy and lactation. In Bangladesh, as in many other developing countries, poverty, ignorance and social taboos play strong negative roles on food intake by girls and their mothers: they feed most but eat last and the least. Burdened with repeated pregnancies from early adolescence and also with the household chores that they have to perform as wives and mothers, they suffer most from the serious consequences of nutritional insufficiency.

The most common nutritional problem in women, especially the poor, is chronic energy deficiency (CED). CED is measured by Body Mass Index (BMI) which is weight in Kg divided by height squared in meters. BMI value less than 18.5 indicates CED (WHO, 1995).

Table 22 shows prevalence of CED in women of reproductive age. Again, the data show a heartening decline in CED prevalence in women of both rural and urban areas. The decline in rural area is spectacular, 76% in 1992 to 45% in 2000. The current rate is still very high, even when compared with the situation in Nepal where CED prevalence in women is 26%. According to WHO, in Bangladesh, the rural women are still in 'critical' situation (>40% of population with BMI <18.5) and the urban women are in serious situation (20-30% of population with BMI <18.5) indicating high food insecurity situation obtaining in the country.

Table 22: Prevalence of undernutrition (chronic energy deficiency) among women of reproductive age in rural and urban areas of Bangladesh 1992-2000.

Year	Rural	Urban
1992	76	62
1995	50	26
2000	45	35*

* Urban slum

Sources: 1992 : SNB 1995, 1995 : Jahan & Hossain (1998), 2000 (HKI/IPHN, 2001).

DISCUSSION AND CONCLUSION

The present report is a bench review of the changes in food and nutrition scenario that have occurred in Bangladesh during the decade of 1991-2000. The trends and patterns of agricultural production of different food-items were first described, because in a poor country like Bangladesh which has little means of importing food as per need, agricultural production largely determines the amount and composition of the diet of majority population. In years when there is bumper crop production, which mainly depends on favourable climate and good management of production supports, people get enough to eat, at least in terms of the staple food rice.

In the first half of the decade, Bangladesh had the bad experience of rice harvest mainly due to mismanagement of agricultural support. Especially grim was the picture in the years 1994-95 and 1995-96, when rice production dropped to lowest levels in the decade.

Fortunately, from 1996, Bangladesh regained the order and started getting bumper harvests in rice, thanks to the good management of fertilizer, irrigation, seed supply and other agricultural support deliveries, which resulted in filling the long standing the food gap. In the year 2000, some 25 million metric tons of rice were produced and the country, for the first time in its history, attained self sufficiency in food grain. This contributed to an increase in gross per capita availability of rice from 411 to 497 g/day between 1995 and 2000. The net availability data for the year 2000 have not yet been published by BBS. Data show that net availability of rice, which is calculated from gross production + import – export - storage for seed – loss, data that are obtained at least a year later than the year of production, first decreased from 426 g/day to 420 g/day between 1991 and 1995 but then increased to 453 g/day by the year 1999.

Along with rice, production of wheat, potato, vegetables and fisheries and livestock all recorded remarkable increases during the 1990's, especially in the latter half. However, production of items like pulses and oilseeds became casualty of increased production of rice and wheat (green revolution) production of these foods fell during the decade, especially during its latter half.

Overall, the increased food production in the country resulted in increased national average food intake and in year 1999, the food intake by an average Bangladeshi rose to 863 g/day with energy content of 2345 Kcal and protein content of 59 g. The food intake was 730 g/day in 1995 with energy value of 2073 Kcal and protein content of 50 g in 1991 the food intake was 727 g with energy value of 2021 Kcal and protein content of 44 g, as against the energy requirement of 59 g/person/day. The diet of 1999 thus provided Bangladesh for the first time in its history a diet adequate in quantity, calorie and protein. Dietary intake in 2000 would have been even better due to better production and better availability.

However, for two things, one cannot have a sense of complacency of attaining self sufficiency in food. Firstly, a closer look at the composition of the diet would reveal that it is imbalanced despite being adequate in quantity, calorie and protein. The diet is still over-dominated by cereals, especially rice and much less represented by fruits and vegetables which provide the valuable vitamins and minerals and also animal products which supply the growth-supporting good quality proteins. Secondly, food intake by the poor, who still comprise half of total population, despite a commendable decrease in poverty incidence from 58.8% to 49.8% between 1991 and 2000, is far from satisfactory in terms of quantity (around 700 g/day), energy (1790 Kcal, nearly 25% less than required) as well as protein (40 g/day, 30% less than required). Moreover, their diet is extremely imbalanced, nearly 90% energy comes from cereals, 85% from rice alone.

On a national scale, the average urban and rural diets differ considerably from each other, the latter being much less rice-intensive than the former. However, examination of the diet of poor and non-poor population of rural and urban areas reveals that there is virtually no difference between the diet of the poor in urban and rural areas. Also, when the trend of food intake by the poor in the two areas is examined between 1991 and 2000, no discernible change (improvement) is seen, meaning that while during this period, national average income has increased, poverty incidence has decreased, the national average food intake has increased, but no change has occurred in the diet of the poor in rural and urban areas alike. Naturally, the benefit of national development did not reach the poor to any appreciable extent.

Also, in proportionate terms, the pattern of the food intake in rural poor, rural rich and urban poor is almost similar, with rice contributing 50-60%. The dietary pattern of the urban rich, on the other hand, contains only 37% rice, approaching the desirable proportion. Thus, while rural poor and urban poor are comparable in food intake pattern, the urban rich are quite different from their rural counterparts in this respect.

Analysis of data has also revealed great disparity between poor and non-poor in respect of proportion of food to non-food expenditure. In both rural and urban areas, the poor and the poorest (bottom two expenditure quintiles) allocate around 70% of their total expenditure for food, 50-57% of which is for cereals alone, and the remaining 30% is allocated for non-food consumption. These data very well indicate the deplorable life-style of the poor: 70% of income is spent for food which is inadequate and imbalanced and 30% is spent on all other things like housing, clothing, health care, education etc. Needless to see, very little of these necessities are met.

Analysis of data also show that in rural areas nearly one-quarter of rice, vegetables, fish are obtained in the household from own production, the

remainder is purchased from the market. Thus, market dependence is very high in rural areas. Conceivably, it is much more so in urban areas. The highest proportion of own production was observed in case of egg in all income groups – 32-54%, which points to the traditional poultry raising in rural households, poor or rich alike. However, ironically, nearly two-thirds of the functionally landless households are found not to eat egg at all, although they have egg in the house – they either save them for hatching or they sell the eggs for cash to meet other 'more important' necessities.

In parallel with economic growth, poverty reduction, increased food production and food intake, Bangladesh has achieved a commendable decline in child and maternal malnutrition rate during the period of 1991 to 2000. The rates of stunting and underweight in preschool children have decreased from over 70% to about 50% during the decade. The rate of wasting is now 12%, compared to 17% a decade ago. So, despite decline in malnutrition, the current rates are among the highest in the world. Again, like food intake inequity, prevalence of malnutrition is also weighted on the poor, families belonging to the bottom two expenditure quintiles (poor and the poorest) have 55-60% of their children stunted, compared to only 47% in the 4th and 31% in the top (richest) quintile. That even the richest families also have about one-third of their children malnourished indicate that malnutrition is indeed a multifaceted problem.

Infant feeding practice has profound effect on child nutritional status: colostrum feeding and start of complementary feeding at 5 months or later promote good growth, which should be considered as an important strategy in child nutrition. Also, improvement of the family food that is fed to child at weaning by incorporating nutritious food like egg, fish and pulse can greatly improve the nutritional status of the children. Maternal education can play a pivotal role in this regard.

Because poverty is concentrated in rural areas, so are malnutrition rates. For instance, just a few rural districts, namely Sylhet, Comilla, Faridpur, Tangail, Jamalpur, Noakhali and Chittagong have nearly one-half of all severely stunted children in the country. However, urban slums are even worse: malnutrition rates in urban slum children are higher than in rural children. Thus, malnutrition in urban slums, which are growing fast due to unabated flow of rural poor to cities and towns for better opportunities, is the worst challenge to manage.

Among all odds, reduction of child night blindness to almost non-existence levels during the nineties is another success story in Bangladesh, after the EPI (Extended Programme for Immunization). The present incidence is 0.3%, compared to 1.78% in 1989. Vitamin A capsule feeding and increased vegetable intake through intensified homestead gardening have brought about this success.

Maternal malnutrition rates (chronic energy deficiency) have also shown a declining trend during the last decade. However, nutritional anaemia is still a big health problem in both children and women, especially pregnant and lactating

mothers. Appropriate strategic programmes are needed to combat this human scourge.

In conclusion, the decade of 1991-2000 is a period of great improvements in food production, economic growth and poverty reduction, concomitant with reduction in malnutrition rates in children and mothers. But, still, at the end of the decade, one-half of the country's population is poor, one-third extremely poor, their diet is inadequate and imbalanced and malnutrition rates in their families – children and women – are very high, around 50%. Urban slums are particularly miserable. The government of Bangladesh has prepared the much discussed Poverty Reduction Strategy Paper (PRSP) (MOF, 2002) and is now working on it. One of the main essences of these strategies is to ensure all development programmes to be pro-poor. If that is achieved, it is expected that poverty incidence will decline further, economic status will improve and with that will improve people's access to food (food intake) and their nutritional status.

References

- Ahmad, K. and Hassan, N. (1983) Nutrition Survey of Rural Bangladesh 1981-82. Institute of Nutrition and Food Science, Dhaka University, Dhaka, Bangladesh.
- ACC/SCN (2000) Fourth Report on World Nutrition Situation. Administrative Committee on Coordination/Sub-committee on Nutrition, Geneva.
- Bangladesh Bureau of Statistics (1998, 2002): Statistical Pocketbook Bangladesh, January 1998 and January 2002, Ministry of Planning, Govt. of the People's Republic of Bangladesh.
- Bangladesh Bureau of Statistics (2001) Preliminary Report of Household Income and Expenditure Survey, 2000, Dhaka.
- Bangladesh Demographic and Health Survey. Various years National Institute of Population Research and Training (NIPORT), Dhaka.
- Chowdhury, O.H. (1995) Nutrition dimension of poverty. In: Rethinking Rural Poverty: Bangladesh as a case study, (Rahman, H.Z. and Hossain, m., eds), sage Publication, India Pvt. Ltd.
- DHEW (1966) Nutrition Survey of East Pakistan, 1962-1964. US Department of Health, Education and Welfare and University of Dhaka, Dhaka.
- FAO (1997). Report of the FAO Mission on Sustained food security in Bangladesh. Food and Agriculture Organization of the United Nations, Rome, 1997.
- Foster, J., Greer, J. and Thorbecke, E. (1984) A class of demographic poverty measures. *Econometrica* 52: 761-766.
- Garrow, J.S. and James, W.P.T. (1993) Human Nutrition and Dietetics, 9th edition. Churchill – Livingstone, Edinburgh.
- HKI/IPHN (1985) Bangladesh Nutritional Blindness Study, 1982-83. Helen Keller International and Institute of Public Health Nutrition, New York and Dhaka.
- HKI/IPHN (1999a) Vitamin A status throughout the life cycle in rural Bangladesh. Helen Keller International/Institute of Public Health Nutrition, Dhaka.
- HKI/IPHN (1999b) Iron deficiency anaemia throughout the life cycle in rural Bangladesh. Helen Keller international/Institute of Public Health Nutrition, Dhaka.
- HKI/IPHN (2000) High anaemia prevalence among Bangladeshi children in urban slums. Nutritional Surveillance Project (NSP) Bull. No. 1. Septemebr 2000, HKI/IPHN, Dhaka.
- HKI/IPHN (2001) Complementary feeding in rural Bangladesh: family food for breast-fed infants. NSP Bull. No.6. July 2001. HKI/IPHN, Dhaka.

- HKI/IPHN (2002) Eggs are rarely eaten in rural Bangladesh: why and how to improve their availability. NSP Bull. No. 11. April 2002. HKI/IPHN, Dhaka.
- IPHN/UNICEF (1989) Night Blindness Prevention Program Evaluation Report, 1989, Dhaka.
- ICLARM (2002) Changing significance of inland fisheries for livelihoods and nutrition in Bangladesh. Report by Thompson, P., Ross, N., Sultana, P. and Thilsted, S.H. International Center for Living Aquatic Resources Management, Bangladesh, Dhaka.
- Jahan, K. and Hossain, M. (1998) Nature and Extent of Malnutrition in Bangladesh. Bangladesh National Nutrition Survey, 1995-96. Institute of Nutrition and Food Science, Dhaka University, Dhaka.
- Kabir, Y. (2001) The Status of Nutritional Food Sufficiency in Bangladesh : A Study Based in Habitual Diet. Strengthening of Early Warning and Food Information System Project, Ministry of Food, Govt. of the People's Republic of Bangladesh, Dhaka.
- Knudsen, O.K. and Scandizzo, P.L. (1982) Nutrition and food needs in developing countries. World Bank Staff Working Paper No. 328. Washington, D.C.
- Mandal, M.A.S. (2002) Rural economy, agriculture and poverty reduction nexus in Bangladesh. A.F.A. Hossain Memorial Lecture presented at the 14th Biennial conference of the Bangladesh Economic Association on "State and Market:: The Bangladesh Perspective", 18-20 September, 2002, Dhaka.
- MOHFW (1997) National Plan of Action for Nutrition, Ministry of Health and Family Welfare, Govt. of the People's Republic of Bangladesh, Dhaka.
- MOE/GOB (1993) Ministry of Environment and Forest, Govt. of the people's Republic of Bangladesh, Dhaka.
- MOF (2002) Poverty Reduction Strategy Paper. Ministry of Finance, Govt. of the people's Republic of Bangladesh, Dhaka.
- Mujeri, M.K. (2000) Poverty trends and agricultural growth linkage. Food Management and Research Support Project, Ministry of Food, Govt. of the People's Republic of Bangladesh and International Food Policy Research Institute (IFPRI), Dhaka.
- NNC (1999) Food and Nutrition Policy of Bangladesh. Bangladesh National Nutrition Council, Dhaka.
- PMS (1997) Poverty Monitoring Survey, 1997, Bangladesh Bureau of Statistics, Ministry of Planning, Govt. of the People's Republic of Bangladesh. Dhaka, 1998.

- Rahaman, Pk. M.M. and Hossain M.S. (2000) Determination of food bundle and absolute food_poverty line: an optimization approach. *Indian Econ. J.* **48**: P. 18-26.
- Ross, J. and Horton, S. (1998) Economic Consequences of Iron Deficiency. The Micronutrient Initiative, Ottawa, Canada.
- Sen, B. (2002) Poverty in Bangladesh: A review. Paper presented on the occasion of the international Poverty Day, Dhaka.
- SNB (1995) State of Nutrition in Bangladesh – 1995. Ministry of Health and Family Welfare, Govt. of the People's Republic of Bangladesh, Dhaka.
- UNFPA (2001) State of World Population 2001. United Nations Population Fund, New York.
- UNICEF (1998) State of World's Children. United Nations Children Fund, New York.
- UNDP (1995) Report on Human Development in Bangladesh: From Counting the Poor to Making the Poor Count, Poverty Reduction and Economic Management Sector Unit, South Asia Region, Washington, D.C.
- WHO (1983) Measuring change in nutritional status. World Health Organization, Geneva.
- WHO (1995) Physical status: The use and interpretation of anthropometry. WHO Technical Report Series, No. 854.
- Yusuf, H.K.M. (1996) Food and Development in Bangladesh – Keynote paper presented at the seminar on World Food Day, 16 October, 1996. BARC Ministry of Agriculture, Govt. of the People's Republic of Bangladesh, Dhaka.
- Yusuf, H.K.M. (1997) Nutritional status in Bangladesh. In : Report of the FAO Mission on Sustainable Food Security in Bangladesh, Dhaka, 1997.