Patterns and Trends in Food Consumption in Poor Urban and Rural Households in Bangladesh

Changing Food Consumption Patterns: Implications for Nutrition and Livelihoods

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Abstract

This report presents a review results on the trends and patterns in food intake and nutritional status of the poor rural and urban households of Bangladesh during the period 1991-2000. It then looks at the socio-economic changes that have occurred during the last decade that have affected the food consumption pattern and the development of the food system. The 1990s was marked by a substantial increase in food production, however, the country is yet to achieve desired nutritional levels.

The 1990s also saw substantial economic growth, with an associated decline in the incidence of both absolute poverty and extreme poverty. Parallel with food production and economic growth, poverty reduction, Bangladesh achieved notable reductions in child malnutrition rates during the nineties although percentage of malnourished children of the poor families was over 60%. Thus poor households, rural and urban alike, did not benefit proportionately from increased food production and the economic growth that the country achieved during the nineties. In 2000 the food intake of the poor was as low and imbalanced as it was in 1991.

With the changes in food production and consumption, the total food system in Bangladesh is also changing. The growth of urban middle-income groups due to economic growth has created the demand for higher value products such as livestock products, fruits and vegetables. Increasing urbanisation and industrialisation has also encouraged market expansion for food products and increased market dependence for certain households.

Transport infrastructure improved in the last decade. A more integrated food transportation network has developed which have increased the length of supply chains and the volume of food supplied. The integration of Bangladesh with the global economy expanded both the legal and illegal trade which have implications on the availability of food produce, dietary diversity, price stabilisation, and employment opportunities in the expanding sector.

Executive Summary

This report considers the trends and patterns in food intake and nutritional status of the poor rural and urban households of Bangladesh during the period 1991-2000. It then looks at the socio-economic changes that have occurred during the last decade that have affected the food consumption pattern and the development of the food system. The implications of these changes on livelihoods and poverty alleviation will be the ultimate focus of this study. Impacts on livelihoods will come from changing consumption patterns, transforming livelihood opportunities within the food system, and the evolving systems of production to meet the new demands of consumers and the food system.

Agricultural production is the main determinant of the quantity and quality of food in a poor agrarian country like Bangladesh. Consequently a review of trends in gross production and gross per capita availability of commonly consumed foods was conducted. The 1990s was marked by a substantial 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 increased the average national diet in 2000, in terms of quantity to (892 g/capita/day), energy (2,112) Kcal and protein (53 g). This was an improvement on all previous survey years. However, the country is yet to achieve desired nutritional levels. The diet is still highly imbalanced, with rice and other cereals contributing nearly 80% of total energy and fruits and vegetables contributing only 3%, consequently the diet is deficient in vitamins and minerals.

The 1990s saw substantial economic growth, with an associated decline in the incidence of both absolute poverty and extreme poverty, by 9 percentage points in each. The rate was higher in urban 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 a disturbing 100% increase from 7 million to 15 million.

Since food distribution inequity is heavily weighted against 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). The diet of the poor is also seriously imbalanced, nearly 90% of energy coming from cereals, 85% from rice alone, an inevitable consequence of which is malnutrition. Analysis shows that, between 1991-2000 no improvement occurred in the quantity or in the quality of the diet of the poor and the poorest groups (bottom 40% expenditure category). This is true for both rural and urban areas. The record in urban slums was even worse.

In poor households of both rural and urban areas, allocation of household expenditure for food is 70%, yet the diet was still inadequate in quantity and quality. Market dependence is very high in the rural areas, where only 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 the case of eggs was the proportion of own production in both poor and rich households higher at 32-54%. This is indicative of the traditional poultry raising in rural areas.

Parallel with national average economic growth, poverty reduction, increased food production and food intake, Bangladesh achieved notable reductions 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%). Despite these improvements, 50% of pre-school children were still stunted or underweight, 18-19% severely, in 2000. The percentage of malnourished children coming from poor families was even higher, over 60%. The prevalence was higher in rural than in urban areas and girls are more affected than boys. Over 50% of 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.

Correct infant feeding practice was found to have a strong bearing on children's nutritional status. Enriching the family food may be achieved with eggs, fish, pulses and oil. A disturbing finding was that 65% of poor families eat no eggs, even though they have eggs in the house, preferring to save eggs to hatchlings or sell them for hard cash.

Thus poor households, rural and urban alike, did not benefit proportionately from increased food production and the economic growth that the country achieved during the nineties. In 2000 the food intake of the poor was as low and imbalanced as it was in 1991.

There were important changes occurring in Bangladesh during the 1990s that drove changes in food consumption patterns and the food system. Economic growth has been important, generating demand for food produce especially from the expanding urban middle-income groups. Demand for higher value products such as livestock products, fruits and vegetables has increased as a result of higher disposable income within these groups, together with population growth, especially urban.

Increasing urbanisation and industrialisation is leading to various socio-economic changes impacting on the system. A key element has been the changes in the labour market. The number of people in formal wage employment has increased, textiles and garments being the major growth areas. This has encouraged market expansion for food products and increased market dependence for certain households. Many of the new jobs are for women, altering the availability of labour for domestic work. Combined with technological change this has altered the nature of domestic food processing, resulting in a shift to the purchase of more pre-processed produce.

Industrial workers may also change the nature of their consumption patterns, consuming less food at home and more from food outlets close to, or on the journey to, work. Canteens and subsidized food may also be available at the place of employment. These adaptations may affect the type and level of processing of food items consumed.

Urban lifestyles are clearly more market dependent for food with very limited capacity for home production. Also many poor urban households have limited space and fuel resources to prepare and cook food in the household. As a consequence the diet can be even more heavily biased towards pre-prepared food and pre-cooked food. This not only affects consumption patterns but the whole nature of the food system, especially the retail sector.

Transport infrastructure improved in the last decade and the food system has clearly responded. A more integrated food transportation network has developed. Linked to the huge demand from urban areas, the length of supply chains and the volume of food involved have increased. Many commodities including the main components of the diet, rice and fish, have changing marketing chains with increasing concentration in the hands of the larger traders (See Case study Paper).

Bangladesh has become much more integrated into the global economy, with substantial growth in international trade. Bangladesh imports many products including livestock products, oilseeds, wheat, fruits, and rice (during periods of shortfall). Export of food commodities is growing, shrimp and prawn export is well established and there are developments in the fruit and vegetable sector. Cross border trade with India has expanded. Levels of cross border trade may be substantially higher than recorded when the large volume of unofficial trade is considered. Trade development has implications on the availability of food produce, dietary diversity, price stabilisation, and employment opportunities in the expanding sector.

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Glossary of Bangla Terms

Aman	Seasonal paddy group, growing in the monsoon season and harvested November / December.
Aratdar	Wholesaler usually with premises and larger scale than bepari and faria
Atta	Whole wheat flour
Atta Chakka	Wheat crushing machine
Aus	Seasonal paddy group sown in the pre-monsoon season and harvested in the monsoon season July/August
Beel	Inland water body (lake)
Bepari	Produce collector without premises, smaller scale than an aratdar
Boro	Seasonal paddy group grown in the dry/ cold season, harvested March/April. Boro paddy is transplanted and mainly irrigated.
Chalani	Type of wholesaler in the fish sector
Chandabaz	A tout
Dadon	Traditional form of trade tying loan
Dheki	Traditional manually powered method of paddy milling
Dhaner upore	Traditional form of credit provision
Faria	Small scale collector/wholesaler similar to bepari
Haat	Local market usually without built structures
Ghat	River crossing point
Gher	Ponds used for the cultivation of prawns and shrimp
Jalmahal	Form of leasehold tenure
Kalajira	Variety of fine aromatic rice
Khuchra bepari	Small–scale trader in fingerlings
Mastaani	Terms for local hard-men / thugs involved in protection rackets and corruption
Masur	Variety of pulse / lentil

Misti doi	Sweet yoghurt based dessert
Paddy	Rice in its un-milled state
Paiker	A retailer
Rabi	Season corresponding to the dry / winter season, harvesting in March or April.
Thana	Local administration area based on the police station area control

Abbreviations

ACC/SCN	Administrative Committee on Coordination/Sub-committee on Nutrition
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	gram
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
MOE	Ministry of Environment
MOF	Ministry of Finance
MOHFW	Ministry of Health and Family Welfare

MUAC	Mid-upper arm circumference
NCHS	National Centre 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

Preface

This research study supports DFID's and other agencies commitment to attaining the International Development Targets, the first of which is "reducing by one half the proportion of people living in extreme poverty by 2015". In Bangladesh, in spite of food system improvements and economic growth insufficient progress has been made on reaching the targets. The core problem to be addressed by the research is that in Bangladesh widespread and severe malnutrition damages human health and the capacity for physical and intellectual work.

The research will concentrate on analysing the food system as a complex of enterprises with livelihood opportunities for the poor. The on–going transition of the food system will be destroying some opportunities whilst creating others. Analysis of interventions by Government, NGO's and donors should aim to focus policy on increasing enterprise opportunities for the poor in the transitory system. Allied to this specific nutritional implications and interventions will have to be considered. Critical in the delivery of these interventions will be the role of the NGO sector.

The research is designed as a scoping study providing an overview and small-scale case studies that will stimulate and guide further detailed research in this area.
The research is a partnership between Imperial College London (Wye Campus) and BRAC. The principal researchers at Imperial are Jonathan Kydd, Edward Clay (ODI) and Ian Urey; the Principal BRAC researchers are Muazzam Husain, Shantana Halder, H.K.M. Yusef and Proloy Barua. The research also draws upon the advice of W.M.H. Jaim (BAU), David Lewis (LSE), and Abdus Sattar Mandal (BAU).

This component of the project is a desk study of food consumption and nutrition trends together with the changing scene in Bangladesh driving these trends. The authors would like to thank the team members together with following people for providing important literature; Bob Baulch (IDS), Brigitta Bode (CARE), Paul Dorsoh (IFPRI), Martin Greeley (IDS), A. Halls (Imperial), Gerard Hendrikson (REFPI/BAU), Martin Leach

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Introduction

This paper forms part of the DFID sponsored Imperial College/ BRAC project "Patterns and trends in food consumption in poor urban and rural households in Bangladesh". The project will examine changing patterns of food consumption in rural and urban areas across income groupings with an emphasis on the nutritional implications for the poor and the livelihood opportunities lost or created in the changing food system. New consumption patterns may also be altering marketing systems and associated production patterns. The project aims to investigate these trends focusing on the livelihood implications, especially for poor people.

Changes in food consumption can be both quantitative and qualitative. Therefore the analysis should not simply concentrate on the absolute increases/decreases in calorie or protein consumption but focus on the changing sources of food produce, (geographical and market) and the nature of the types of food consumed, whether they are processed, packaged, or branded for example.

Bangladesh is predominantly a flat land of around 148,000 sq. km, extending from the Bay of Bengal in the south 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 (down flow of the Ganges), the Jamuna (down flow of the Brahmaputra) and the 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) . This constitutes the natural base for soil revitalization. Moreover, Bangladesh, lying between latitudes 21^0 and 26^0 N and longitudes 88^0 and 93^0 E, is strongly affected by heavy monsoons. 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 major rivers and their tributaries, coupled with abundant rainfall, provides the country with a fertile agriculture base and rich in-land fisheries. Rice and fish have long 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 makes a Bengali". However, rice is by far the largest constituent of the diet. Rice accounts for about 60% of raw food, compared to only 3-4% contributed by fish. Thus, rice, in addition to 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.

Population growth has increased pressure on food availability, especially of staples. Bangladesh adopted the green revolution packages at the beginning of the 1960s, and agriculture changed considerably with progress made in increasing rice production. This was possible through many changes in 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 on 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 has changed in recent decades.

The pace of urbanization has also increased over time. This has resulted in the spread of the built areas and infrastructure expansion. This urbanisation has been driven by migration of rural poor to the cities in the quest for employment and increased income. The country has thus experienced changes in the poverty profile, with the associated changes in food consumption patterns in rural and urban areas.

Also, with globalisation and the modernization of society in urban Bangladesh changes have occurred to the food marketing system. Local food markets today are very much different from food markets even 3 or 4 years ago. Many items are now sold in attractive processed forms, either produced locally or imported from abroad. As a result, people's attitude towards food and their consumption pattern have changed markedly in urban areas. This is particularly so amongst the younger generation. These changes are

more easily observed in less poor urban areas. However, change is occurring rapidly in Bangladeshi society and these trends are dispersing even into remote areas of the country.

The first section of this report is an overview of the changes in the trends and pattern of food consumption that have taken place in Bangladesh over the last decade (the 1990s). The concentration is on the consumption patterns associated with poor groups in rural and urban areas. Consequently the section also includes a brief discussion of the changing nature of poverty within the period.

Section two looks at the nutritional implications of these trends. Levels of child and maternal nutrition are investigated together with important issues such as the seasonality of malnutrition and the urban rural differences in malnutrition.

Section three provides background information on trends within Bangladesh that have impacted, and will continue to impact on food consumption patterns and the food system. These trends include; urbanisation, industrialisation, changes to the labour market; infrastructure development etc

Section 4 concentrates on the livelihood implications of changes in the nature of the food system. Numerous factors are changing the employment opportunities and livelihood strategies in Bangladesh, such as the development of processing industries, the lengthening of marketing chains, the expansion of the retail sector, and the changing food habits associated with an industrialising society.

The emphasis is not only on the livelihoods of producers and consumers but is also concerned with the changing scene in the transitional sector between production and consumption. This involves people whose livelihoods are involved in the processing, transporting, and marketing of food products post-production and before the final consumer. Livelihood opportunities could be created or lost in processing, trading, transporting, input supply and equipment manufacture and repair as patterns of

consumption and production shift. It is likely that many of these changes may affect the livelihoods of poor people. Therefore the paper will attempt to highlight livelihood implications, especially for poor people, in the changing food system.

Section five discusses observations following the review with an attempt to highlight areas of interest for the project and development of further research work.

The project hypotheses that urban and wealthy consumption patterns show distinct differences from rural and poor patterns. For example the rural diet has a higher proportion of rice in food expenditure and energy intake, in contrast urban diets show higher consumption of more wheat based and livestock products, and the proportion of rice in the urban diet appears to be declining. So as urbanisation continues it may be anticipated that patterns of urban consumption will spread into peri-urban and rural areas and the implications of these changing patterns may become more widespread. The dispersal of a consumption transition can be expected to increase in rapidity as the benefits of economic growth spread throughout the income profile. How widespread and how rapid these changes are likely to be is a crucial issue for Bangladeshi policy makers.

1. Food Consumption and Poverty in Bangladesh

1.1 Food and nutrient requirements

Diets of populations around the world were primarily determined by the availability of local food and food practices. Dietary patterns evolved to maintain good health, with satisfaction of hunger the primary criteria. However, satisfaction of perceptible hunger itself does not ensure good health. For sustained healthy and active life, the "hidden hunger" of the cells for micronutrients (vitamins and minerals) must also be met. A balanced diet, 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), 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 for any nutrient in Bangladesh.

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. Other organizations and/or individuals have suggested alternative figures (Table1.1). Such differences arise because it is difficult to draw a minimum requirement line below which people will not function 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 1.1 Per capita energy requirements for an average Bangladeshi.

KCAL/CAPITA/DAY	REFERENCE
2310	(WHO 1983)
2220	(Knudsen and Scandizzo 1982)
2273	(Ahmad and Hassan 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 1.2.

Table 1.2: 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

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; Yusuf 1997),(NNC 1999), (Kabir 2001), (Rahaman and Hossain 2000)

(Table 1.3). Among these, the pattern originally suggested by Yusuf (1996,1997) appears to be most reasonable, because the formulation conforms more closely with the universally accepted food: energy ratio of 60% from carbohydrate, 25% from fat/oil and 15% from protein (Garrow and James 1993). 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 suggested increased 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 much 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 diet dominated by rice. 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).

Table 1.3 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
-		24	22	12	14	14
Meat	20	10	7	-	58	7
- Egg		30	47	58	38	27
- Milk						
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			
- Guru			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

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

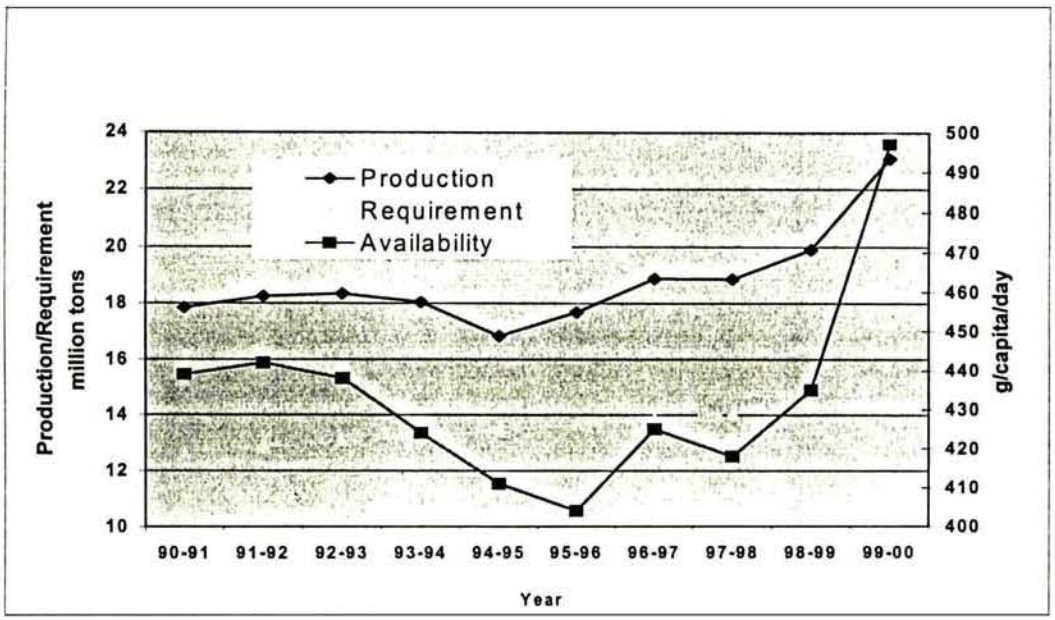
1.2 Agricultural Production And Dietary Development In Bangladesh In The 1990s

The natural endowment of fertile land and abundant water resources has traditionally based the country's economy 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 1990s (Table1.4), 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%, down from 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 1.4 Contribution of agriculture to GDP in Bangladesh (at current market price)

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

(BBS, 2000, 2002).



The agricultural sector had some notable achievements during the period. The country attained self-sufficiency in food-grains in 2000 with an estimated aggregate production of 25 million tons. This has important economic and food security implications for the population as a whole. Increases were also achieved in some other food items, especially in the second half of the nineties. This is crucial as Bangladesh lacks the means to import all its food requirements, so agricultural production is the main determinant in shaping the diet, and therefore the nutrition status of the population.

The agricultural production and per capita availability scenario in the 1990s of the major food items habitually consumed in Bangladesh is very important (Table 1.5) (BBS, 1998, 2002).

Figure 1.1 Production, Requirement and per capita availability of rice, 1990-2000

(BBS, World Bank, 2000)

The total requirement was calculated with the estimated population 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. Production then began to increase and reached 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 1.5, Fig. 1.1). 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 production also registered a substantial 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, this is still below the ideal requirement estimated to be 60 g/day (Table 1.3).

Potato: The 1990s saw a substantial increase in potato production from 1240 thousand tons to 2951 thousand tons, resulting in an increase in per capita availability from the low level value of 30-37 g/day to 64 g/day. Again this is still below the recommended requirement of 130 g/day.

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 in the period 1991-95 (during which time rice production decreased), but then pulse production showed a steady decline, reaching a record low value of 383 thousand tons in 1999-2000. Accordingly, per capita availability decreased. The fate was the same for fruits and oilseeds (oil). However, the gap between production and requirement for oil was reduced by imports thus improving net availability to around 18 g/capita/day in 1998-99.

Vegetables: In contrast to pulses and fruits, vegetables production registered an increase, particularly during the latter half of the decade, contributing to an increase in gross per capita availability. The level of 31 g/day (excluding potato) in 1999-2000 is, however, far below the recommended requirement of 132 g/day.

Livestock products: The 1990s were a decade of sustained increase in most livestock products.

Meat production increased at a higher rate than population growth, 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.

Eggs and milk registered a similar increase, but the availability of eggs remained low at 4 g/day compared to the requirement. Amount of available milk (37 g/day) was approaching the recommended requirement (47 g/day).

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.

In summary, in the early 1990s food grain availability stagnated somewhat, at best only growing slowly. However, the availability of other food items, especially livestock products increased. This increase in availability has not been across the board with significant declines in the availability of pulses for example (Table 1.5). Thus, excepting a few items like pulses, oilseeds and fruits, the 1990s were marked by an increase in food production, particularly in rice, wheat, potato, vegetables, and fisheries and livestock. The per capita gross availability of sweeteners and spices remained almost unchanged during the decade.

The major increases occurred during the latter half of the decade. At the end of the decade the per capita gross availability of total animal food (88 g/day against requirement of 126 g/day). In the context of Bangladesh this is an encouraging result.

Table 1. 5 Per Capita Availability for Consumption of Selected Food items

FOOD ITEM (KG)	1990-91	1998-99	% CHANGE P.A.
Food Grains	169.3	184.7	1.04
Pulses	5.4	4.1	-3.96
Edible Oil	1.50	2.28	4.27
Meat	3.31	5.12	4.42
Milk and Milk products	9.2	13.2	3.78

Source (BBS 2000)

Table 1.6: Production and gross availability of selected food items 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*

These increases in food production have reduced the susceptibility of Bangladesh to acute food shortages (Shahabuddin and Dorosh 1998). Increased rice production and net rice availability has been the driving force in this change. The majority of the production gains were made in the 1970s and 1980s (Dorosh 1999). The introduction of HYV rice in the late 1960s came to dominate Boro production by the 1970s. The large increase in the Boro crop, irrigated by mechanised lift irrigation, occurred in the 1980s and 1990s. This allowed the expansion of the *Boro* crop, reducing the dependence on *Aman* production for domestic food supplies.

Food availability has also been increased by changes in both import and internal markets. Firstly, Bangladesh does not face the acute shortages of foreign exchange experienced in the 1970s and access to imported products has improved significantly. Domestic grain markets have expanded and developed especially as a consequence of the increased *Boro* crop, with development of the internal transport infrastructure being an important factor in the improvement to both these channels (Shahabuddin and Dorosh 1998).

1.3 Trends And Patterns Of Food Intake In Bangladesh in the 1990s

Trends in food consumption are notoriously difficult to estimate due to changing methodologies and the variance between demand and supply based calculation methods (Chowdhury and Del Ninno 1998). Chowdhury (1993) suggests that total food consumption in energy terms has fluctuated but the overall level remained similar up to the early 1990s. The real price of rice, as the major staple and largest item of expenditure, in Bangladesh declined considerably from the mid 1970s to the mid 1990s and instinctively this would suggest higher levels of food consumption. However, over the same period Dorosh (1999) finds that per capita food consumption actually fell by 1.6 %. However, the BBS supply side data shows that the average quantity of major food items consumed has increased considerably giving a greater diversity to the diet (excepting pulses).

The HIES data from the 2000 survey illustrate a concerning levelling off in consumption figures (Table 1.7). The table illustrates that although rice consumption has fallen over the period other items have witnessed consumption increases. Fish in rural areas and poultry/duck nationally have shown increased consumption.

Table 1.7 Average Per Capita Daily Intake

ITEM	1991-92			1995-6			2000		
	Nation	Rural	Urban	Nation	Rural	Urban	Nation	Rural	Urban
Food Total (gms)	887	878	938	914	911	931	893	899	871
Rice (gms)	473	481	416	464	479	390	459	479	372
Fish (gms)	35	33	48	44	42	52	38	38	41
Vegetables (gms)	137	135	151	152	154	142	140	141	138
Poultry (gms)	2.0	1.9	3.1	4.0	3.4	7.5	4.5	3.52	8.41
Calories K. Cal	2266	2267	2258	2244	2251	2209	2240	2263	2150
Protein	62.7	62.3	65.5	64.9	64.5	67.5	62.5	61.9	64.9

Source: (BBS 2001a)

A closer examination of the trends and pattern of national average food intake reveals many interesting features. Importantly, between 1991 and 2000, food intake has increased not only in quantity but to an extent in quality also (Table 1.8).

Table 1.8 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.

A closer look at the composition of the diets of 1991 and 2000 reveals that despite the increase in rice intake, the 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 almost doubled from 3.1% to 6.0%. The diet of 2000 was thus more balanced compared to 1991.

Despite these improvements during the decade, cereals still heavily dominate the diet. Cereals contribute 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 disproportionately, a smaller proportion of the population enjoy better intake and nutrition than depicted in Table 1.8. 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 patterns, due to differences in income, attitude and availability of foods in the two areas.

An example of these differences is given in Table 1.9. This shows the consumption pattern in rural and urban Bangladesh observed in 2000. It can be seen that although the urban people consume less food and calories, their diet was more balanced in nutrition. Their diet was characterized by markedly lower amount of cereals. Therefore in the urban diet cereals provide a lower percent contribution to total food energy (73%, compared to over 81% in rural areas). Lower cereal consumption in the urban diet is compensated by intake of non-cereal food, particularly oil and animal food (Table 1.9).

Table 1.8: Trend and pattern of national average food intake in Bangladesh (1991-2000)

FOOD	INTAKE G/CAPITA/DAY			ENERGY AS % OF TOTAL			DESIRABLE[4] ENERGY %
	1991-2[1]	19956[2]	2000[3]	1991-2[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	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	11	7	54	0.2	0.2	1.3	0.2
Tot amount (g)	727	728	892	-		-	-
Tot energy (Kcal)	2021	1832	2112	100	100	100	100
Tot protein (g)	49	50	59	-	-	-	-

[1]BBS: Statistical Pocketbook (1998).

[2] National Nutrition Survey (Jahan and Hossain, 1998)

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

[4]Yusuf: 1996,1997.

Table 1.9: Average Per capita per day food intake in rural and urban areas of Bangladesh, 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

(BBS 2000)

1.4 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); (Sattar Mandal 2002); (Yusuf 1996); (Sen 2002)).

Bangladesh achieved substantial economic growth in the nineties, with real GDP of the country increasing by 60% at a growth rate of about 5% per year. Consistent with this growth performance, estimates from different studies and surveys show that the incidence of poverty in Bangladesh decreased during the decade.

Income poverty in the 1990s declined from 59% to 50% of the population, this represents a modest decline of 1% per annum according to the Bangladesh Bureau of Statistics Household Income and expenditure Survey (HIES) unit-record data (GoB 2002). This reduction in poverty is supported by other poverty measures which indicate that broadly poverty declined faster in the 1990s than the 1980s (GoB 2002). However, (Toufique and Turton 2002) describe these official HIES findings as "the most favourable estimates" and suggest that these trends should not obscure the fact that the absolute number of people below the poverty line is increasing due to population growth. Approximately 50% of the population below the poverty line equates to 63 million people (Toufique and Turton 2002).

Various methods have been in practice for the estimation of the level of poverty. The most widely used are the food energy intake methods and the cost-of-basic-needs (CBN) methods. 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 1.10).

Table 1.10: 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] (WB 2002) (2002): Household Expenditure Survey: various years.

Incidence of absolute poverty 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).

Table 1.11 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 1.11 Annual rate of reduction (%) changes in the incidence of poverty in rural (derived from Table 12) and urban areas of Bangladesh[1]

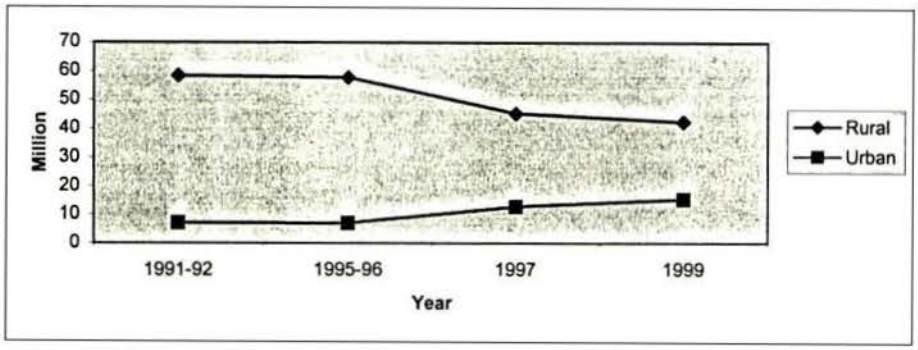
HEAD COUNT RATIO	1991-92 — 1995-96	1995-1996 — 2000	1991 — 2000
National	-1.95	-0.3	-1.0
Urban	-3.87	+1.8	-0.90
Rural	-1.50	-0.55	-0.91

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 an *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 a 100% increase from 7.2 million to 15.4 million during the same period (Fig 1. 2).

There have been wide regional and rural–urban variations in the extent of poverty reduction. Although Wodon (2000) comments that rural and urban levels of poverty have tended to move hand in hand so that national trends are probably at work. Rural areas have had better progress in reducing the depth and severity of poverty (GoB 2002) (Table 1.12). This looks at other measurements of poverty described earlier and the Gini coefficient for inequality.

Figure 1.2 Change in absolute number of poor in Bangladesh in rural and urban areas between 1991 and 1999



(Mujeri, 2000).

Table 1.12 Trends in Poverty and Inequality in the 1990s

		1991/92	2000	CHANGE PER YEAR %
Headcount rate (% Of population)	National	58.8	49.8	-1.8
	Urban	44.9	36.6	-2.2
	Rural	61.2	53.0	-1.6
Poverty Gap (P1)	National	17.2	12.9	-2.9
	Urban	12.0	9.5	-2.5
	Rural	18.1	13.8	-2.8
Squared Poverty Gap (P2)	National	6.8	4.6	-3.8
	Urban	4.4	3.4	-2.7
	Rural	7.2	4.9	-3.8
Gini Index of Inequality	National	0.259	0.306	2.1
	Urban	0.307	0.368	2.3
	Rural	0.243	0.271	1.4

Source (GoB 2002) (BBS 2000) (World Bank 2002)

The World Bank (WB 2002) concludes that by 2000 not only were there fewer people living in extreme poverty but the poor on average were better off than in the previous

decade It is noted though that inequality increased in the period as reflected in the rising Gini coefficients, and that poverty would have declined more rapidly during the decade, if the growth had been more broadly based (WB 2002). Wodon noted that inequality increased in both rural and urban sectors but more so in urban areas, so that nationally the Gini coefficients have increased due to intra urban and intra rural divides more than the urban rural divide.

There are also pockets of more extreme poverty and distress, especially in the flood prone areas of the north and the urban *bustees* (EU 2000). Also, there are differences between urban areas with Dhaka and Chittagong urban districts performing much better than other urban areas (Wodon 2000).

Progress in poverty reduction based on non-income measures has been greater in rural than urban areas. Urbanisation has resulted in even more crowded and deteriorating living conditions (EU 2000). The urban population of 22 million in 1994 has increased to 35 million by 2000, an 8% p.a. growth rate, generating concerns that urban poverty will be the focus of concern in the future.

A study on the determinants of poverty (Wodon 2000) highlighted education, access to land, occupation, and household demographics (number of adults, household head age, household size) as the key determinants of per capita consumption levels. Of these demographics is the most important, urban households for example tend to have fewer children, which reduces poverty levels. In rural areas poverty is still highly correlated to access to land, for those with less than 0.2 ha of land 64% are in poverty, for those who rely on agricultural labour as their main source of income 74% are in poverty, however for those in rural areas with formal sector employment only 24% are in poverty (EU 2000). In respect of this study the importance of occupation is significant. Occupational shift can be effective in enhancing the prospects of the landless poor, especially if micro-credit programmes facilitate this transition.

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

Food distribution inequity is heavily weighted on the poor, who consume much less food than the national average. Against the backdrop of the high incidence of poverty in the country, particularly in rural areas and to a somewhat lesser extent in urban areas, questions therefore arise as 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 1.13). 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 1.14).

Table 1.13: Trends in relative food prices in rural and urban areas[1]

	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

[1]Mujeri (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 1.14: 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.

It can be seen from Table 1.14 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 1.14).

When food - non-food expenditure data are segregated by economic status, it can 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 1.15). In both areas, for the poor and the poorest (bottom 2 quintiles), 41-50% of total food expenditures goes on cereals alone, compared to only 25-29% for the richest (top quintile). Conversely, the rich spend more than 50% of their total household expenditure for non-food consumption.

Table 1.15: Food and non-food expenditure profile (%) in rural and urban areas according to economic status

	RURAL PER CAPITA EXPENDITURE QUINTILE					URBAN PER CAPITA EXPENDITURE QUINTILE				
	1st	2nd	3rd	4th	Top	1st	2nd	3rd	4th	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 expend (Tk.)	5220	7345	9252	12241	20811	5356	7371	9366	12356	26593

Figures in parentheses are percentage expenditure to total food expenditure. (BBS 2001a).

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

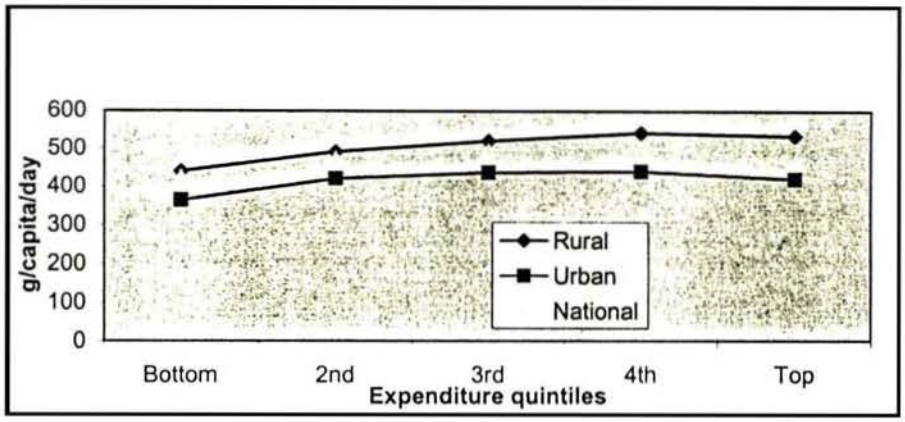
When food consumption patterns in rural and urban areas are segregated among different expenditure quintiles, two contrasting pictures in rice consumption are noted, as revealed by the Household Income and Expenditure Survey of 2000 (Table 1.16). Firstly, in rural areas, per capita consumption of rice is higher for all the expenditure groups than those in urban areas, but interestingly one important and common trend observed in both areas is that the consumption of rice increases with an increase in income up to a certain level at which the demand for cereal items does not increase any more, whereas the demand for non-cereal items increases (Fig. 1.3). 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 1.16. Per capita per day consumption of different food items in rural and urban areas in 2000 by expenditure quintiles (gm/capita/day)

FOODS	RURAL					URBAN					NATIONAL				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
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 veg.	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

Figure 1.3 Per Capita rice consumption of rural and urban households by expenditure quintiles



1.7 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 1.17. 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 1.17). 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.

Table 1.17: 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	

[1] *Household Expenditure Survey: World Bank 2002.*

The poor of the country, rural or urban, thus remain 'half-fed' with a diet that is seriously imbalanced and are therefore subjected to serous 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.

1.8 Sources of Food Consumed in the Household

Little 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 1.18). Interestingly, for rice, the proportion purchased decreases and the proportion produced increases as the economic status of the household increases (Fig 13), indicating increasing land holding and production (and also consumption, Table 1.17) 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. 1.4). Also, proportion of pulse produced is very little (2-5%) compared to rice, indicating that the farmers give more importance to rice over pulse production.

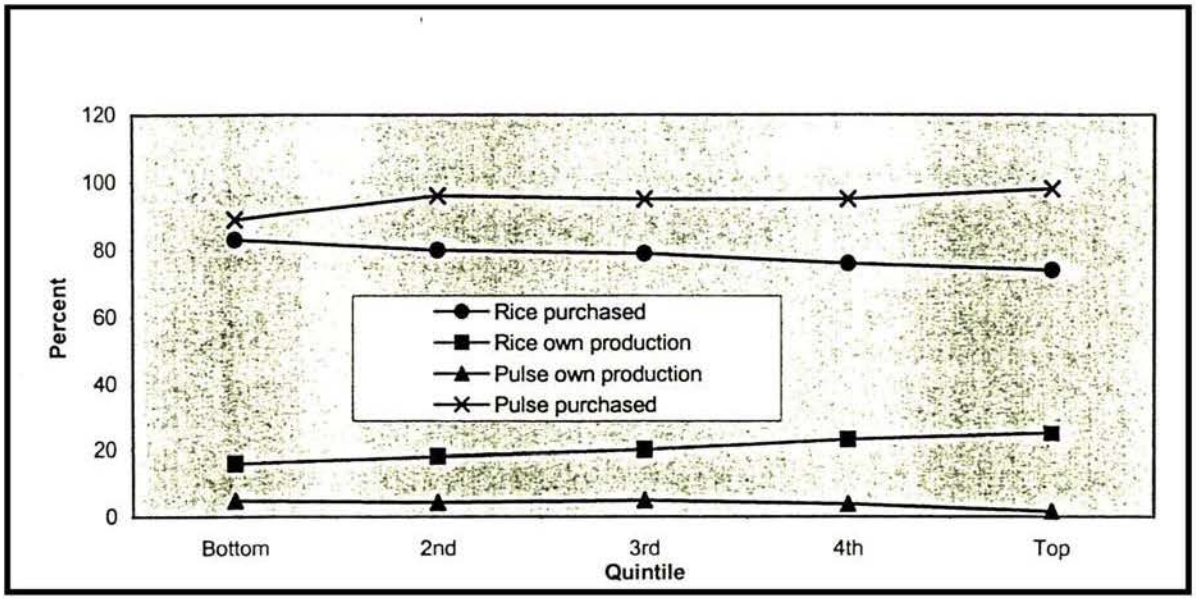
Among all food items, the proportion of egg from own production remained very high, 32-54% (Table 1.18). This point to traditional poultry rearing in both poor and rich rural households

Table 1.18: Source of food consumed in rural households by economic status, 1997 and 2000.

FOOD	BOTTOM QUINTILE			SECOND QUINTILE			THIRD QUINTILE			FOURTH QUINTILE			TOP QUINTILE		
	1997[1]	2000[1]	2000[2]	1997[1]	2000[1]	2000[2]	1997[1]	2000[1]	2000[2]	1997[1]	2000[1]	2000[2]	1997[1]	2000[1]	2000[2]
Rice															
Own production	16.3	9.8	21.8	18.1	11.8	29.4	20.8	17.6	34.2	22.8	19.9	41.8	25.5	29.3	42.8
Purchased	83.2	88.8	74.7	79.9	87.2	68.9	79.1	79.2	69.6	76.6	79.2	57.4	74.1	69.2	56.8
Gift/relief/exch	0.5	1.4	3.4	2.0	1.0	1.7	0.1	0.9	1.1	0.6	0.9	0.8	0.4	1.5	0.4
Vegetables															
Own production	21.7	6.1	27.8	21.9	9.7	25.2	23.1	3.9	24.7	23.0	9.3	24.8	21.6	12.7	17.2
Purchased	71.7	89.2	52.1	75.0	87.8	64.5	74.4	89.3	64.8	74.8	88.4	65.9	76.8	86.3	73.8
Gift/relief/exch	7.2	4.7	20.1	3.1	2.5	10.3	2.5	1.3	10.5	2.2	2.3	9.3	1.6	1.1	8.9
Fish															
Own production	21.3	9.9	10.8	21.2	7.1	11.4	20.3	7.8	12.1	17.7	8.3	11.8	16.6	9.1	10.2
Purchased	74.8	87.3	77.0	75.4	90.7	80.9	76.1	90.0	81.0	79.4	89.4	82.7	80.6	88.2	86.8
Gift/relief/exch	3.9	2.8	12.2	3.4	2.2	7.7	3.6	2.2	6.9	2.9	2.3	5.5	2.8	2.7	3.0
Egg															
Own production	31.9	33.6	34.4	34.1	30.3	34.7	53.8	33.0	33.1	31.8	47.6	35.6	42.5	43.7	30.5
Purchased	68.1	66.4	64.1	65.9	63.9	64.8	44.8	64.4	65.4	68.2	50.0	63.5	57.5	53.8	68.8
gift/relief/exch	-	-	1.6	-	5.8	0.5	1.4	2.6	-	-	2.4	0.9	-	2.5	0.7
Pulses															
Own production	4.9	1.8	2.7	4.4	1.0	3.0	5.0	-	4.3	3.9	0.8	5.6	1.6	0.7	3.7
purchased	88.9	98.2	95.1	95.6	98.1	96.0	95.0	100	94.7	94.5	98.0	93.4	98.4	97.2	95.8
Gift/relief/exch	6.2	-	2.2	-	0.9	1.0	-	-	1.0	1.6	1.2	1.0	-	2.1	0.5
Meat															
Own production	-	19.9	18.3	11.1	19.9	20.0	17.0	19.9	18.2	34.5	19.9	18.8	16.9	19.9	15.2
Purchased	100	79.2	73.0	81.5	79.2	73.8	75.8	79.2	73.6	65.5	79.2	75.6	82.8	79.2	80.9
Gift/relief/exch	-	0.9	8.6	7.4	0.9	6.2	7.2	0.9	8.2	-	0.9	5.6	0.9	0.9	3.8

[1]BRAC (1997, 2000); [2] HIES/BBS (2000).

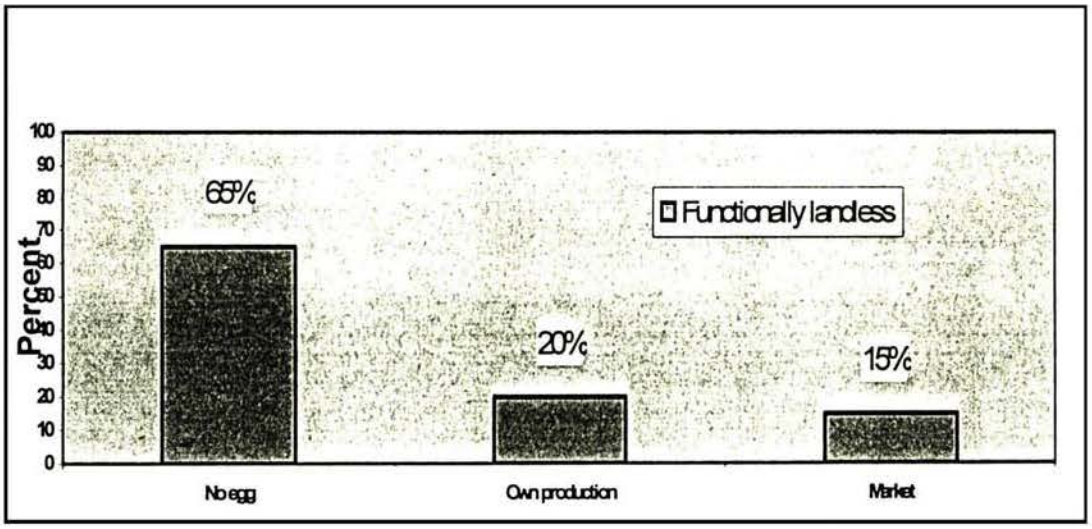
Figure 1.4 Source of rice and pulses consumed in rural households according to per capita expenditure quintiles



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/IPHN 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. 1.5). A number of reasons are ventured for this, but primarily it is as a result of the eggs being kept to hatch chicks, sold, given away or exchanged. This is just an example of very low consumption of nutritious food by rural poor households.

1.9 Food Consumption by Young Children in Rural Areas

Figure 1.5 Distribution of Rural landless households by egg consumption from own production or purchase from market in 2000



(NSP/HKI 2002)

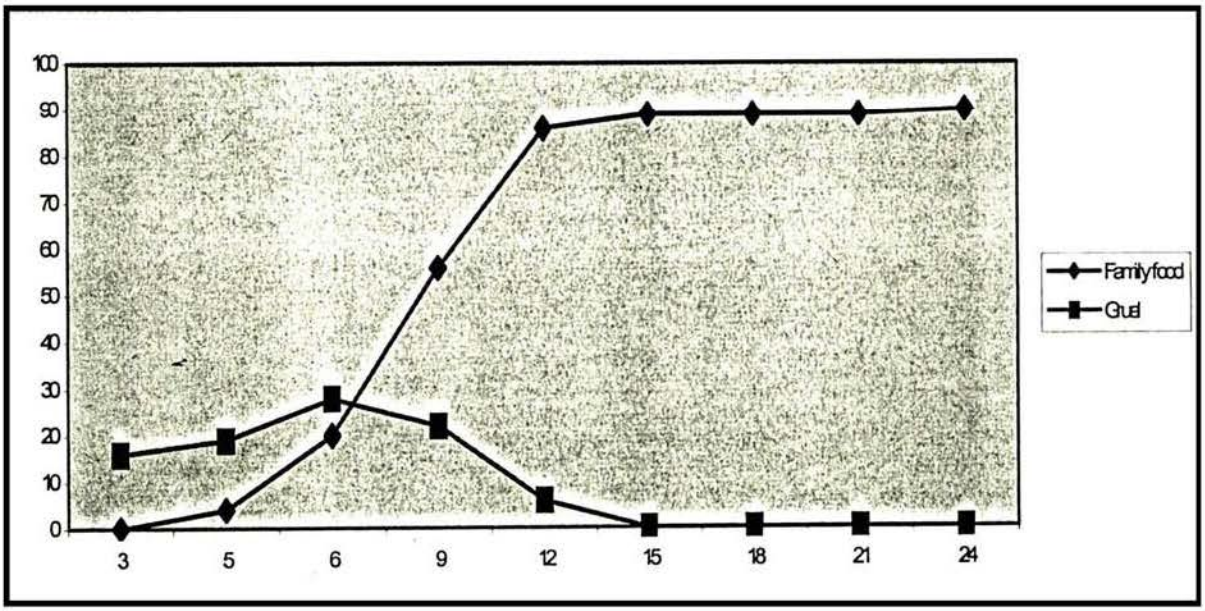
Breast-feeding is almost universally practiced (over 99%) in rural Bangladesh. Survey data of 2000 show that 99% of children aged 6-11 months were given breast-milk and that even among children aged 12-23 months, 43% were still being breast-fed (HKI/IPHN, 2002). These figures were almost unchanged over the 10-year period 1990-2000. 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 1. 6).

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 fish, egg, pulse, green leafy vegetables, yellow/orange fruit or vegetables in the last week.

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

Figure 1.6 Main types of food given to infants and young children aged less than 24 months in rural Bangladesh in 2000



(NSP, HKI 2002)

2. Nutritional Implications

2.1 Nutrition amongst the rural and urban poor

Malnutrition is widespread 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. 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 people. Thus, nutritional inadequacy sets in motion a vicious circle of malnutrition, poverty and infection from early life.

About 50% of the Bangladeshi population face these problems because of their poverty and the nutrition inadequacy of their consumption patterns.

The consequences of malnutrition are most severe if it occurs in very early in life. Maternal malnutrition during pregnancy affects foetal growth, resulting in low birth weight risking the survival of the child. More than 50% of all child mortality is linked to malnutrition (WB 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, nutritional 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.

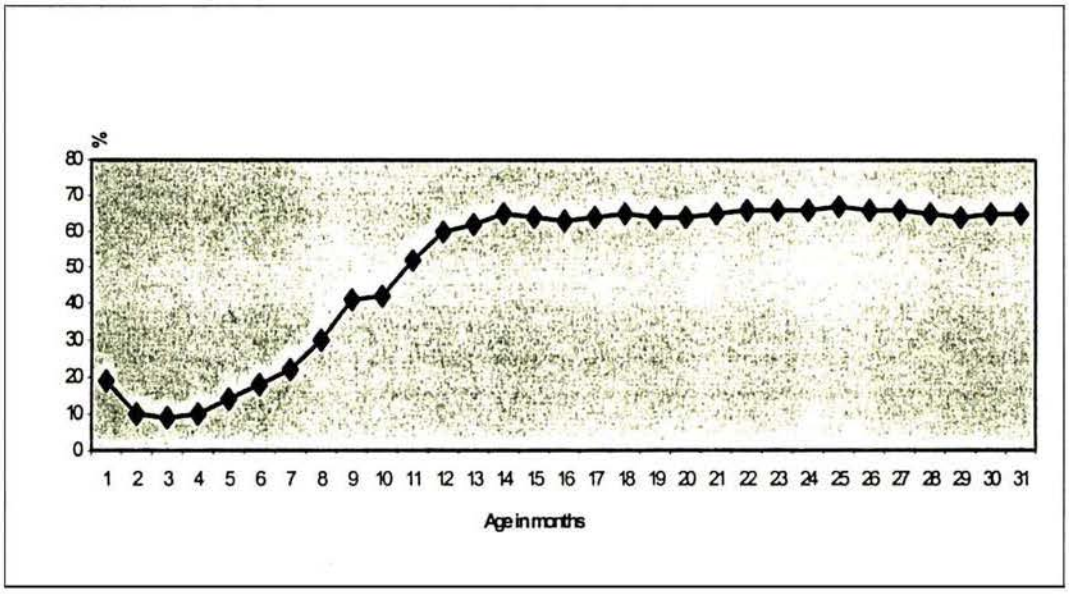
The following sections give an analytic overview of the trend of nutritional situation in vulnerable population groups - infants, young children, mothers - in the light of food and nutrient consumption over the period of the nineties, as described in the previous sections.

2.2 Malnutrition amongst 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 that 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. 2.1. 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, the 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).

Figure 2.1 Prevalence of Underweight among infants in rural Bangladesh (adapted from HKI 2000)



2.3 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:

Table 2.1 Malnutrition Measures

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 Centre 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

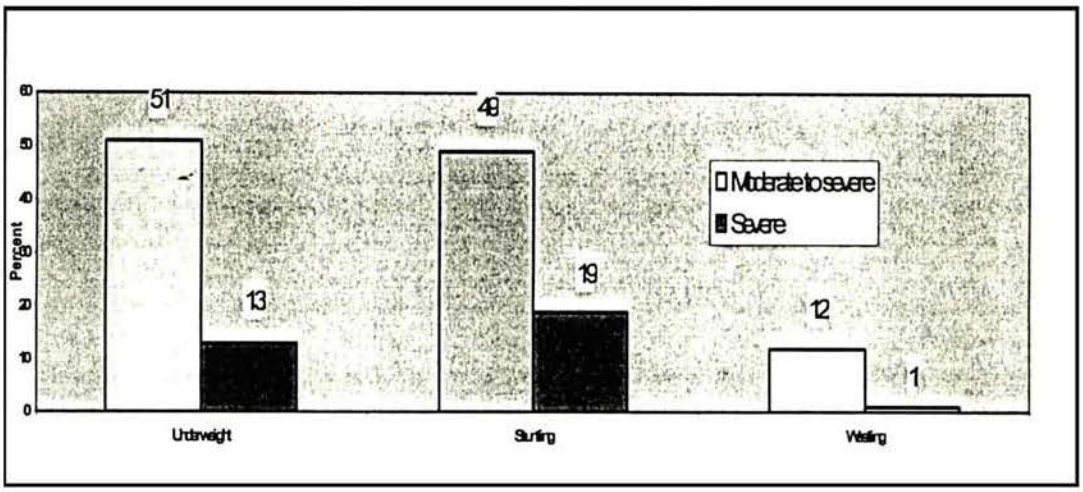
well, with little variations. This section of the present review is based on findings of these surveys.

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.2.2). 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.

Figure 2.2 Child Malnutrition Rates (%) in Bangladesh ages 6 –72 months 1998-2000

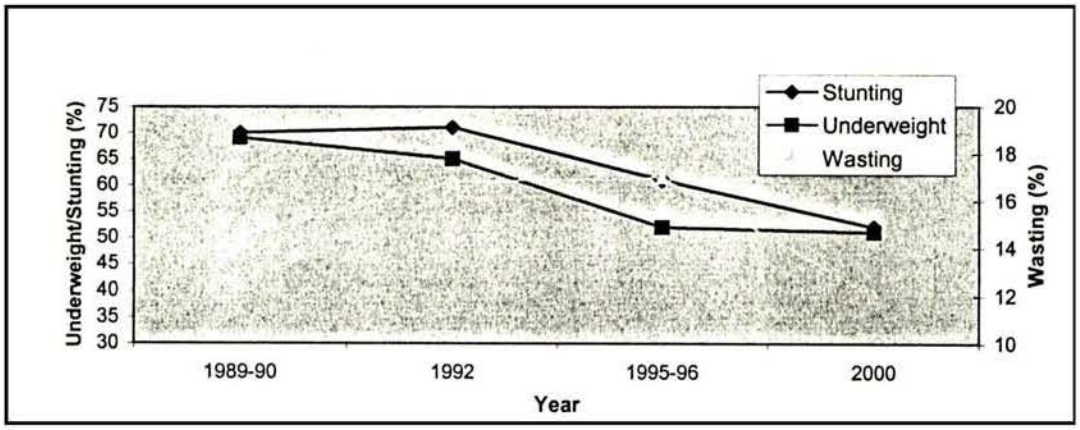


(World Bank 2002)

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. 2.3). 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).

Figure 2.3 Trends in Malnutrition rates amongst children aged 6-71 months, 1998-2000 (CNS various years, BBS)



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 2.2). The table also shows that girls are worse off than boys, irrespective of area of residence.

Table 2.2 Trends in the prevalence of low mid-upper arm circumference (MUAC) in children by residence and gender

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

(BBS, 1998, 2002)

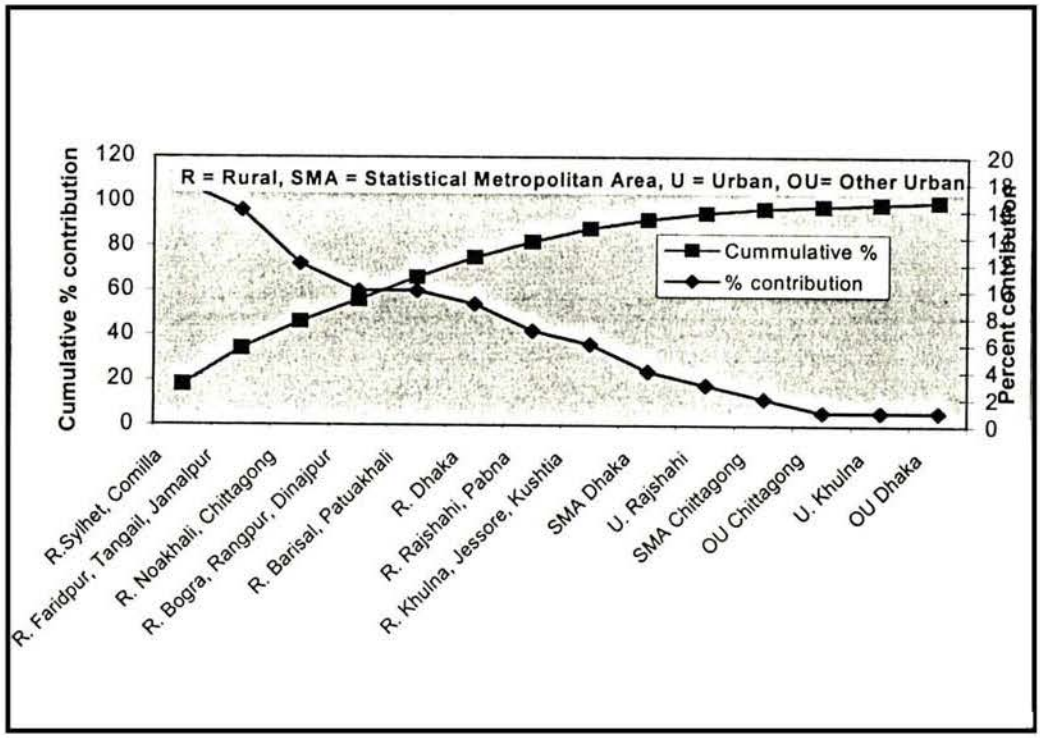
At the World Summit for Children (WSC) in 1990, 27 health, education and development goals for children were set for the year 2000. Of these, 8 were nutritional goals. The first nutritional goal was to reduce severe and moderate under-nutrition among under-5 children by one-half of 1990 levels.

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).

2.4 Rural-Urban Differentials 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 20). This probably reflects higher consumption of cereals in proportion to non-cereals in rural households. 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.2.4). On the other hand, the lowest rates of such children are contributed by the urban areas of Dhaka and Khulna Divisions (World Bank, 2002).

Figure 2.4 Contribution (%) and cumulative contribution (%) of different areas to number of severely stunted children in Bangladesh, 2000 (World Bank 2002)

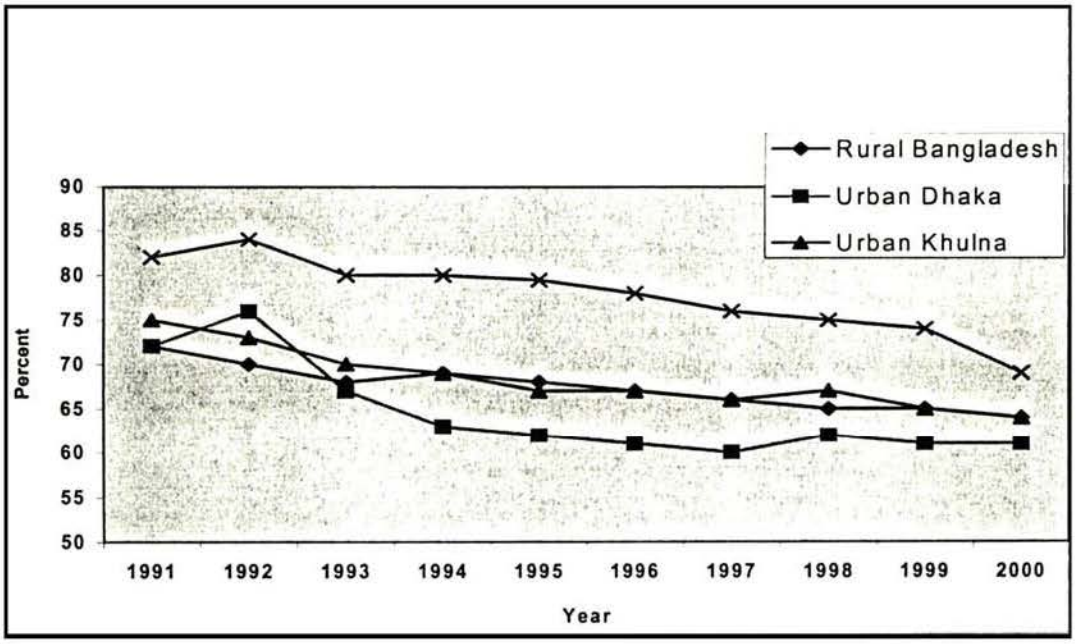


However, when urban slums are considered, malnutrition rates in these locations are found to be higher than the rural rates. The NSP surveys of HKI provide a comparative picture on the changes in the rates of underweight children in rural Bangladesh and urban slum areas during 1991 to 2000 (HKI, 2002). 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. 2.5). 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.

Figure 2.5 Changes in % Underweight children in rural Bangladesh and in urban slums in Dhaka, Khulna and Chittagong, 1991-2000 (HKI/IPHN 1999)

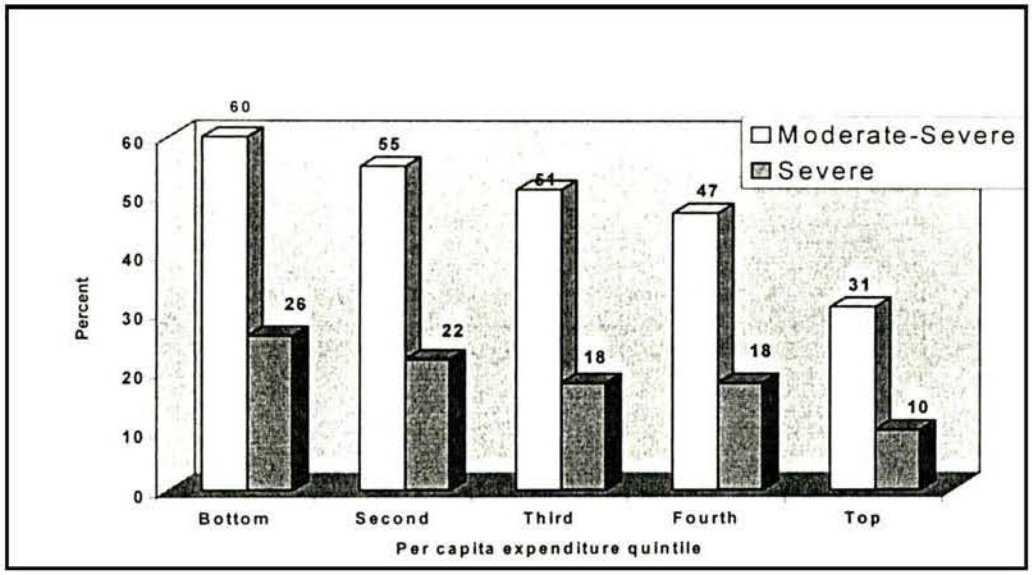


2.5 Child Malnutrition by Poverty Status

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. 2.6).

Figure 2.6 Child stunting rate (%) by per capita expenditure quintile, ages 6-71 months, 2000 (CNS, 2001)

The observation, made persistently over the years, that nearly one-third of children

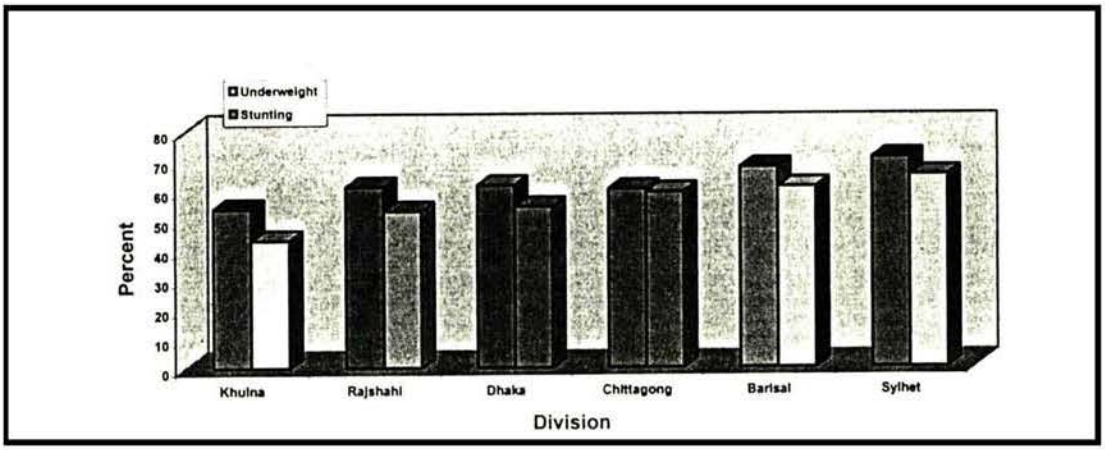


from richest 20% families – a group that certainly has good economic access to food – are malnourished, suggests that in Bangladesh, as elsewhere in the world, malnutrition is a multifaceted problem, not determined by economic status alone.

2.6 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. 2.7). 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).

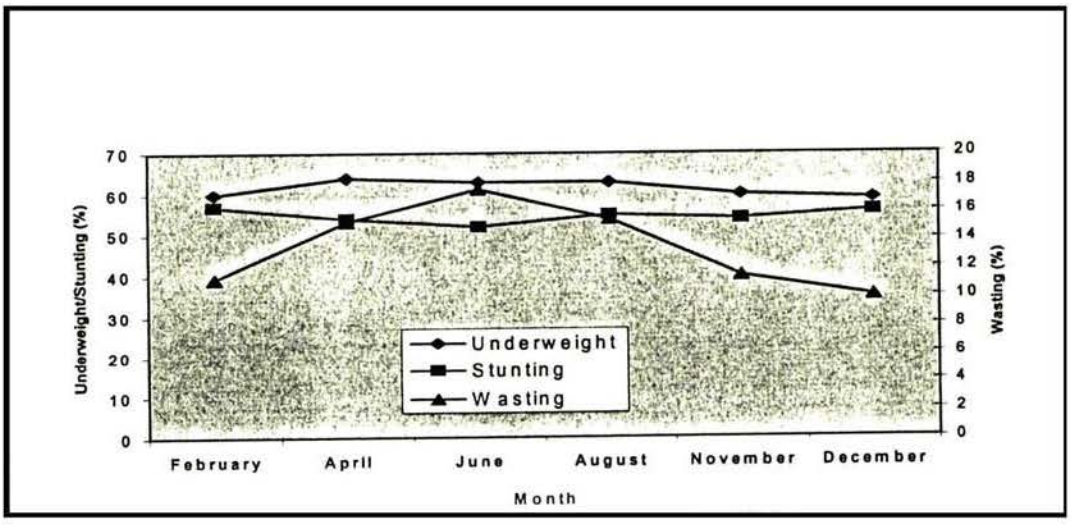
Figure 2.7 Prevalence of underweight and stunting in children aged 6-59 months in different administrative divisions, 1999 (HKI/IPHN 2001)



2.7 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 to the definition of wasting being a measure of short-term acute malnutrition.

Figure 2.8 Changes in prevalence of underweight, stunting and wasting in children 6-59 months old by season 1999 (HKI/IPHN 2001)

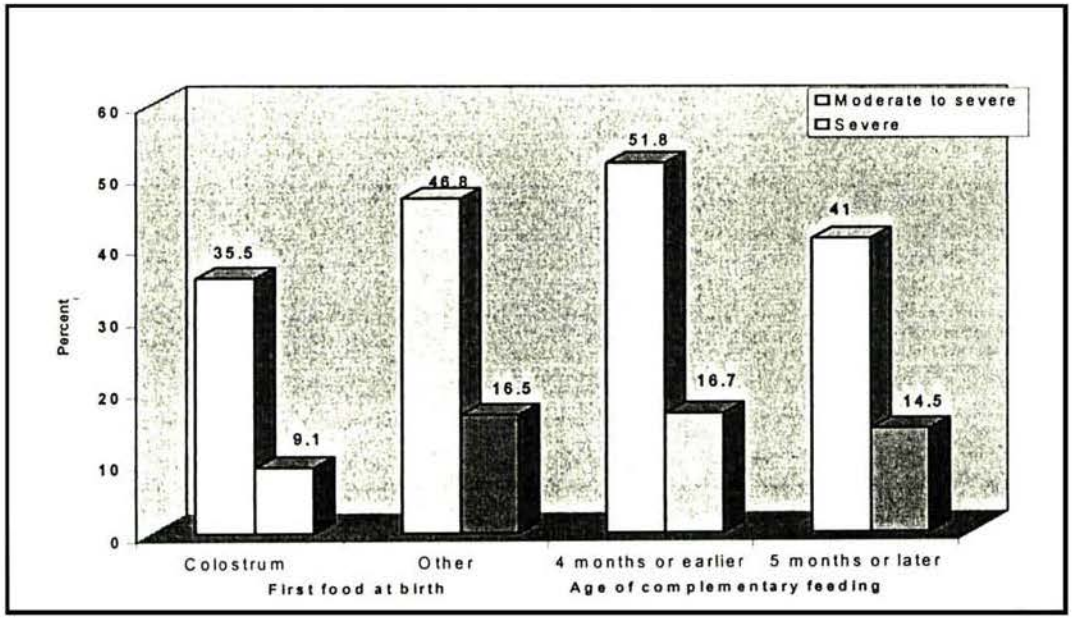


2.8 Child malnutrition by infant feeding practices

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. 2.9 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. 2.9). 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.

Figure 2.9 Prevalence of stunting in children by infant feeding practices (CNS 2000)



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

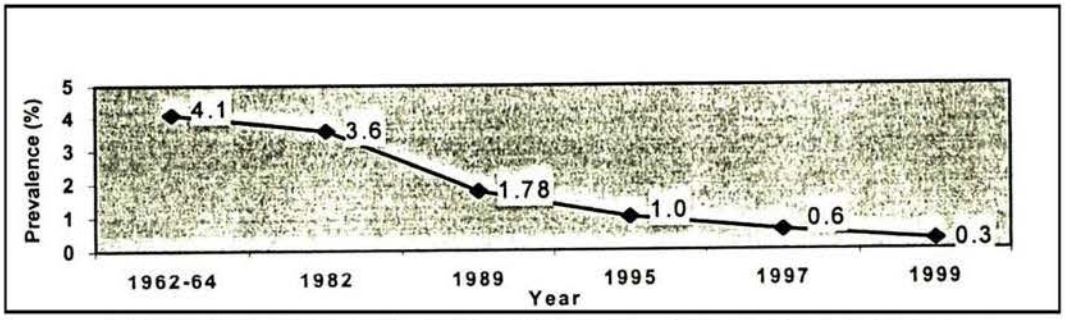
mother's years of schooling on the nutritional status of the children in the first two years of life.

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 s long time, 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, the scourge is almost non-existent in the country. Fig. 2.10 shows the decline in the prevalence of night blindness in children below 6 years revealed by data of various surveys.

Figure 2.10 Prevalence of Night Blindness among children below 6 years of age 1962-1999



Sources: 1962(DHEW 1966), 1982 (HKI/IPHN 1985), 1989 (IPHN/UNICEF 1989), 1995(INFS 1977) , 1997(HKI/IPHN 1999a), 1999 (HKI/IPHN 2001)

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.

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. 24 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. 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 1999a). 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 vitamins 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 1999b).

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 states that about half of all pre-school children and pregnant women in developing countries have anaemia (blood haemoglobin 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 populations really face a strong challenge to survive such appalling malnutrition conditions.

2.9 Malnutrition in Women

Protein-energy malnutrition

Women of child-bearing 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 need most but eat last and 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 2.3 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 existing in the country.

Table 2.3: Prevalence of under-nutrition (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).

Vitamin A deficiency

Because of the obvious importance to children, the problem of vitamin A deficiency in grown up girls and women of childbearing age has remained unattended until

recently, when it was discovered that these population groups also suffer from vitamin A deficiency and even show up overt symptoms of night blindness.

HKI/IPHN monitoring of night blindness prevalence in women shows that it remained at a rate of 1-2% from 1992 through to 1997, with wide seasonal variation in each year. The prevalence is highest in the months of December to February and lowest in the months of April to August (HKI/IPHN, 1999). These periods correspond with seasonal variations in the availability of fruits and vegetables. The 1995-96 national nutrition survey also showed a night blindness prevalence of about 1% in pregnant and lactating mothers. In the 1997 national vitamin A survey, 49.2% of pregnant women and 45.9% of lactating mothers were found sub-clinically deficient in vitamin A (serum retinol <1.05 μmol/L). It has been shown from a study in ICDDRB that breast milk of mothers deficient in vitamin A is also deficient in vitamin A.

Nutritional anaemia

Anaemia in women is a major health and nutritional problem in all developing countries including Bangladesh. The problem was first detected from the national nutrition survey of 1962-64 (DHEW 1966) and since then all subsequent surveys showed high prevalence of anaemia among women, particularly pregnant and lactating mothers (Table 2.4).

Table 2.4: Prevalence of anaemia in women in Bangladesh, 1992-1997.

	1992[1]	1995-96[2]	1997[3]
Pregnant/ lactating	77	59	49
Non-pregnant/ non-lactating	74	85	39

[1]SNB (1995); [2]Jahan and Hossain (1998); [3]HKI/IPHN (1999b).

Table 2.4 shows a declining trend in the prevalence of anaemia in all women, pregnant/lactating or non-pregnant/non-lactating. The decline in the latter group by 35 percentage points is remarkable. However, since no data are available for the year 1990 and 2000, how far the improvement in anaemia status conforms to WSC goal of reducing iron deficiency anaemia by one-third in the 90s, is difficult to ascertain.

3. Factors Influencing Changes in Consumption patterns and the Food System.

3.1 Economic Growth

Bangladesh experienced relatively high growth rates in the 1990s with an annual average economic growth rate of nearly 5% (Table 3.1), resulting in an overall rise in GDP of 52%. This meant a rise in real GDP per capita of 36% during the decade. The industrial sector was the major growth area with growth in the 1990s of 86%.

Table 3.1 Growth in the 1990s and Sectoral Composition in 2000

SECTOR	GROWTH 1991-2000	COMPOSITION OF GDP IN 2000
Industrial	86%	26%
Service	50%	49%
Agricultural	33%	25%
Overall	52%	100%

(WB 2002)

Table 3.2 Average Annual growth in GDP by Sector

AVERAGE ANNUAL GROWTH %	GDP	AGRICULTURAL	INDUSTRIAL	MANUFACTURING	SERVICES
Years					
1980-90	4.3	2.7	4.9	3.0	4.4
1990-2001	4.9	3.1	7.2	7.0	4.6

(World Development Indicators 2003)

The growth in the industrial and manufacturing sectors are supported in Tables 3.2 & 3.3) with average annual growth rates of 7.2% and 7.0% respectively. Textiles and ready-made garments (RMG) were the main contributors to this industrial growth (WB 2002), this export based sector had annual growth rates above 10% in the 1990s. Textiles and garments represented around one third of all manufacturing in 2000 (WDI 2003).

Agriculture (Tables 3.1 & 3.2) was the slowest growing sector and consequently its share of GDP declined from 29% to 25%. However, the agricultural sector did not perform badly, the agricultural sector product still grew by 2.9% despite natural disasters. Also by the end of the decade Bangladesh had achieved self-sufficiency in food grains, which had been a long-term goal (WB 2002).

Table 3.3 Annual Growth of GDP by Sectors

SECTOR	1992/3	1993/4	1994/5	1995/6	1996/7	1997/8	1998/9	1999/00	2000/01
Agriculture	1.35	0.65	1.93	2.03	5.57	1.64	3.24	6.92	3.99
Mining	8.91	5.15	9.65	7.81	3.56	5.76	1.32	9.48	10.55
Industry	8.62	8.15	10.48	6.41	5.05	8.54	3.19	4.76	9.10
GDP	4.57	4.08	4.93	4.62	5.39	5.23	4.87	5.94	6.04

BBS 2000

These growth rates have been attributed to economic reforms in the 1980s and early 1990s including; the liberalisation of foreign trade, deregulation of the investment climate, and more market oriented policies (WB 2002). Inflation remained low and the levels of trade increased in the decade.

Economic growth will clearly have impacted on consumption patterns; fewer people were living in extreme poverty and on average the incomes of the poor increased. However, this income growth was not evenly distributed and inequality rose during the decade, consequently the reductions in poverty were not as large as could have been achieved with more broad -based economic growth.

The mean growth rates in income nearly doubled in urban areas but this growth was concentrated in certain groups and inequality has risen substantially in urban areas, in rural areas growth was lower but more broad- based. Income growth should lead to changes in consumption patterns, especially in the less poor urban population. Demand from this group could be the catalyst for an expansion in the development of markets and rapid changes to the retail system.

3.2 Urbanisation

The growth in the urban population has been substantial over the last 20 years (Table 3.4) and the process has been more rapid recently both as a result of rural-urban migration, and also the development of rural centres into peri-urban and urban environments. Recent population census data suggests that urban population has grown 4 times as fast as rural population in the last decade.

Table 3.4 Urbanization in Bangladesh

	URBAN POPULATION (MILLIONS)	URBAN POPULATION % OF TOTAL POPULATION	PERCENTAGE OF POPULATION IN CITIES OVER 1 MILLION	PERCENTAGE OF URBAN POPULATION IN DHAKA
1980	12.7	15	6	26
2001	34.1	26	13	38

(World Development Indicators 2003)

The urban population is now over a quarter of the country and the importance of large cities, especially Dhaka is growing (Table 3.4). Only 30 years ago Dhaka was estimated to have a population of 250,000, this has now risen to 12 million and is currently growing at more than a million per year (Guardian 2003).

Allied to this high population densities in Bangladesh are leading to a blurring of the rural/urban divide. Rural growth centres have expanded rapidly, transforming these regional centres. Improvements in transportation mean that urban influences are spreading into rural areas, which are experiencing an increasingly urban lifestyle.

This growth in urban living can be expected to impact upon the food system. Urban dwellers may develop differing consumption patterns; these are likely to be more market oriented, thus creating employment opportunities. The nature of the supply chains may alter to service the demand for food from urban areas, and this could impact upon the production side of the food system. Market dependence is especially strong for slum dwellers, they have limited access to food preparation and cooking

resources and consequently the diet is comprised of more food prepared outside the home. Urban dwellers are also more likely to be influenced by cultural changes influencing dietary choices e.g. the move towards some western-style food items.

3.3 Industrialisation

Bangladesh is a rapidly industrialising country, with growth concentrated in the textile and garment industries (Tables3.5). The gross value of industrial production has more than doubled in the decade, whilst the gross value of garments increased by a factor of over 5. Much of this industrial growth was based on export markets, and the Bangladesh economy integrated rapidly with the global economy, the ratio of trade to GDP more than doubled in the 1990s (See section 3.7).

Industrial development is concentrated in existing urban areas and in rural growth centres, and has created a shift in employment patterns (Table 3.6). The average annual number of jobs has nearly doubled in the decade and the substantial increase can be seen in the garment sector. There is an increase in wage employment both in urban areas and in growth centres. Employment has increased for women and there are opportunities to migrate to the urban areas, sending remittances to rural households. The increase in wage income is likely to increase the market dependency of households and thus lead to market expansion and development.

Table 3.5 Gross Value of Industrial Production Total and by selected Industrial groups

000 million Taka

SECTOR	1991-2	1992-3	1993-4	1995-6	1997-8
Food manufacture	45	48	69	73	89
Garments	30	46	70	140	160
Textiles	53	50	69	67	80
Total	223	256	330	508	577

CMI/ BBS 2000

Table 3.6 Average annual employment Total and by selected Industrial groups

"000" number

SECTOR	1991-2	1992-3	1993-4	1995-6	1997-8
Food manufacture	106	105	100	123	139
Garments	215	343	307	720	990
Textiles	583	520	458	488	627
Total	1156	1248	1203	1714	2104

(BBS 2000)

Important lifestyle changes are also associated with industrialisation and these too will impact on the food system in general. Labour available for domestic work e.g. food preparation is likely to decline and food preparation and sourcing can be expected to adopt a convenience based approach. Food items could be purchased in a more processed state and food items will be distributed more widely to avoid time consuming shopping journeys.

Workers are likely to consume more food outside the home, either from stalls/traders or food provided at the place of employment. These changes are likely to be more pronounced as many of the new jobs are for women.

3.4 Changes in Labour Market

Urbanisation, industrialisation, and changes in the agricultural sector are causing changes in the employment structure (Table 3.7). An important feature is the growth in formal sector private employment. The whole of the formal sector now accounts for 19% of total employment. There is a clear reduction in the percentage of unpaid family work, as the labour market increases in importance and households become more market dependent, not simply for food consumption but also income generation.

Table 3.7 Trends in the Labour Market 1991-2000

	1990-91	1995-96	1999-0
Employment Status % Employed			
Self -employed	27	29	32
Employee	12	12	13
Day labourers	14	18	18
Unpaid family help	47	40	37
Other	1	-	-
Sector of employment % Employed			
Formal public	-	4.2	4.5
Formal private	-	8.8	14.4
Informal	-	87	81.1

(BBS 2000)

Agriculture is still the main employer, but even in rural areas non–farm employment is increasing in importance. Non–farm activities (manufacturing, trade, transport and services) provide the main source of employment for about 40% of the rural labour force, whilst also providing important secondary sources of income. Crucially these non-farm employment opportunities have higher returns than traditional agricultural employment. In 1997 industrial workers received 1.7 times the wage rate of agricultural workers in comparison to 1.4 times in 1990.

The increasing participation of women has been an important feature of the employment scene in the 1990s, excluding unpaid family helpers the participation rates of women in employment have increased from 14% in 1990-91 to 18% in 1995-96 and 23% 1999-2000. Interestingly female employment has been concentrated in the highest and lowest income deciles. Rich women are moving into well paid skilled employment opportunities, especially in the health and social sectors. Poor women are entering into low paid wage employment in agriculture or manufacturing, clearly through necessity. Around 18% % of employed women work in the manufacturing sector, with more than 50% of these in garments and textiles. The garment industry has provided 1 million jobs for women during the decade, mostly in urban areas and this has encouraged rural/urban migration. These changes have resulted in better pay, increased status, and empowerment, for women, but changing roles will clearly influence the food system and consumption patterns.

Clearly, these three processes of economic growth, urbanisation, and industrialisation are closely interlinked resulting in changes to the social and economic nature of the country.

3.5 Infrastructure Development

The infrastructure in Bangladesh has improved in the last decades in a number of areas. Transport infrastructure has improved in the last decade with increases in road distance and vehicles (Table 3.8). After post-war rehabilitation a major programme of bridge and road building has continued. Improved road connectivity during the 1990s has been important in developing markets and reducing temporal and spatial price variations in food commodities. Network expansion has also increased access to agricultural inputs and has been a stimulus to the RNFE.

Table 3.8 Changes in Transport Infrastructure

SECTOR		1990	1995	2000
Roads Km	National		2,868	3,096
	Regional		1,573	1,744
	Feeder Type A		10,508	16,334
Vehicles Estimated number	Car	33,397	39,454	57,458
	Truck	30,175	34,936	44,630
	Tractor	2,549	2,702	3,125
Railways Total	Stations	499	489	455
	Route KM	2746	2706	2768

Source (BBS 2000)

Weaknesses in the transport system still exist, notably the poor quality of rural and feeder roads, and significant transport bottlenecks, usually associated with river crossings. The Jamuna Bridge, envisaged as a major link in the transport system, has failed to generate the anticipated levels of usage, mainly attributed to the high toll charges (Jaim pers comm.). Rail system development has stagnated (Table 3.8), however the opening of the Jamuna Bridge rail link will join the two networks of North Bengal and western districts with Dhaka and the eastern districts. Though the problem will still remain of the differing gauges. These weaknesses still present a

major constraint to market expansion (WB 2002) and Bangladesh still lags behind neighbouring countries in terms of infrastructure provision.

Whilst noting these weaknesses it is clear that the transport network has improved and the volume of trade moving around the country has increased. The distribution networks and the length of supply chains of many items have increased. In this light food consumption patterns might be anticipated to be less regionalised and employment in the food distribution system is likely to increase.

Many donor agencies have on-going rural road and market improvement projects generally concentrating on rural roads, river transport jetties and market structures. These projects hope to impact on poverty alleviation in a number of ways: by reducing transport and transactions costs for poor producers; by increasing food availability through reduced post–harvest losses; and by increasing farm and non-farm employment.

Access to electricity improved significantly in the last decade, helping the growth of the RNFE and the electrification of farm processes. From 1977 to 2000 there were nearly 2.5 million domestic electricity connections, 80,000 new electric irrigation pumps and 400,000 new commercial businesses electrified. Table 3.9 indicates that the number of villages receiving electricity and the length on distribution lines nearly doubled in the decade, whilst the increase in length of transmission lines is even greater.

Table 3.9 Rural Electrification

YEAR	ELECTRIFICATION		
	No of villages Progressive total	Transmission lines km	Distribution lines km
1990-91	13955	2652	79038
1994-95	18505	10783	10012
1999-2000	25078	14164	131316

BBS 2000

These advances have clear implications for the food system with growth in the number of chilling centres, the introduction of refrigeration in the retail sector, the development of agro-processing. However, access is far from universal with 20% of urban and 80% of rural households still having no access to electricity. Supply

reliability is poor with frequent power cuts, together with general shortages these supply interruptions are detrimental to development of the food system (WB 2002).

Communication infrastructure has also expanded the number of telephones increased from 250,000 in 1992-933 to 580,000 in 1999-2000 (BBS2000) and the large scale development of the mobile phone network has had significant impacts on the operations of market chains around the country (Murshid 2001). Even small- scale traders can obtain access to market information across the country and thus improve supply chain efficiency.

3.6 Trade Expansion

Bangladesh has become more integrated in the global economy in the last 10 years and the levels of international trade have increased (Table 3.10)

Table 3.10 Merchandise Trade

	AVERAGE ANNUAL % GROWTH RATE			
Period	Export Volume	Import volume	Export Value	Import Value
1980-1990	0.4	-4.5	7.8	3.6
1990-2001	15.6	18.8	11.1	10.3

(World Development Indicators 2003)

The export growth has concentrated on garment and textile manufacturing. In the agricultural sector the only major export growth area has been the large increase in the export of prawn and shrimps. A large-scale industry has grown up that has provided employment and changed the agricultural landscape in parts of southern Bangladesh.

Agricultural exports have grown nearly 5% in the 5 years to 2000 with shrimps alone generating nearly $300 million with a large % of the value added staying in the country, fruit and vegetables have also witnessed export growth. There has been a decline in certain export sectors e.g. Jute. However, generally export developments have expanded jobs, incomes, value added, and improved nutrition. Further export expansion is a major government, NGO, and donor development policy.

There is further potential for export growth in Bangladesh, especially if agricultural diversification allows the growth in the production of export based agricultural products. On the other hand a concentration on export commodities may obscure the fact that Bangladesh is an industrialising economy of 130 million people and that domestic market growth potential is strong.

These changes in the levels of trade, especially in agricultural produce, can be expected to have a major impact on the food system. It is likely to speed the moves towards agricultural diversification on the production side, increase the development of modern technology, and improve levels of quality control, which may impact on a range of food items. Employment is likely to be created in the growth of export supply chains and many items will require processing and packaging prior to export, which could provide employment for large numbers of poor people. Import markets have also developed, these again could help to stabilise prices, provide employment, introduce new items into the consumption pattern, and raise the standards of food quality.

3.7 Growth in the Rural Non-Farm Sector

In the last 10 years there has been a substantial expansion in the rural non-farm sector (RNFS), and as a livelihood source it is increasing in relative importance. The service sector has been especially vibrant with a 4.2% growth rate in the 1990s. The growth in the RNFS is emerging as a prominent growth engine of the rural economy contributing about 36% of total GDP at 1883/84 prices and providing employment for nearly 66% of the rural workers and generating 52% of average rural household incomes (Sattar Mandal 2002).

These increased incomes, often from wage employment, should impact on food consumption patterns in rural areas. Table 3.11 shows that, even for poor rural households, the proportion of daily labour in the non-agricultural sector has increased (although the time period for analysis is obviously too short to assess trends). However, a disturbing trend from a poverty reduction viewpoint is the growing differential between the wage rates of unskilled agricultural to unskilled industrial

workers. This leads to greater inequality, which impacts negatively on poverty reduction.

Table 3.11 Sources of Income and Main Occupation of Rural Poor Households

SOURCES OF INCOME	% OF MONTHLY INCOME		MAIN OCCUPATION	1997 %	1999 %
Crop Agriculture	22.2		Daily Labour	47.1	48.0
Livestock/Poultry	3.6		Agriculture D. L.	41.1	33.3
Fisheries	0.3		Non –agric D.L.	6.0	14.7
Forestry	2.0		Self –employment	49.5	43.5
Wages	47.5		Agriculture S.L.	26.9	24.1
Unincorporated enterprises	12.7		Non-Agriculture S.L.	22.6	19.4
Others	11.7		Others	3.4	8.5
Total	100		Total	100	100

(Mujeri 2001) from BBS data 1998, 2000.

Income generated from non-agricultural sources such as, manufacturing, service industries, and trading, has, together with remittances, allowed land purchases. Purchasing land from agricultural earnings is generally too difficult as the plot size is too small. Land accumulation via these alternative income sources is likely to change the agricultural landscape, perhaps reversing the fragmentation process (EU 2000).

The RNFS sector has been particularly important for overall female employment. Female participation in the formal rural economy grew from 5% in 1983/4 to 12% in 1995/6, mainly due to the shift of males into RNFS employment and women replacing them in the agricultural sector. The female proportion of the total agricultural labour force increased from 39% to 49% during the first half on the 1990s (EU 2000). As noted this will have important implication on household work patterns and consequently household food consumption patterns.

However, the RNFS in Bangladesh does not appear to be growing as quickly as many other Asian economies and further stimulation to the sector could be gained from food market expansion and the changing dietary patterns

3.8 Agricultural Sector Changes

3.8.1 Introduction

Changes in the agricultural sector are likely to have the most immediate impact on consumption patterns and the food system. The majority of the rural poor secure their income from agriculture and the overwhelming majority of available food is produced within Bangladesh.

Agriculture in Bangladesh is defined to include, crops, livestock, forestry and fisheries. Agriculture is declining as a proportion of GDP, but remains the major source of employment in the country, in rural areas accounting for 61% of male and 55% of female employment. After stagnating in the early 1990s there were significant increases in agricultural growth in the late1990s with annual growth exceeding 5% 1997-2000 (Mujeri 2001). Successes included reaching the goal of self-sufficiency in rice production, this opens the possibility of diversification into higher value products, or even the export of rice.

Rice is still the predominant crop accounting for 50% of the total value added in agriculture and 75% of the gross cropped area. Nevertheless the share of non-crop production has been increasing and accounted for nearly 43% of agricultural value added in 1999/2000 (Mujeri 2001) with fisheries also emerging as a more important contributor to GDP (Table 3.12). A factor in the growing importance of non-crop production could also be declining rice prices.

Table 3.12 Composition of Agricultural Value Added

% At constant 1995/96 prices

SECTOR	1989/90	1994/95	1999/00
Crop & Horticulture	65.5	59.3	57.1
Animal farming	12.6	13.2	11.8
Forest activities	7.1	7.5	7.3
Fishing	14.8	20.0	23.8

Source (Mujeri 2001) (BBS 2000)

Value addition to agricultural production has occurred as the contribution of non-crop agriculture has increased. The move towards more non-crop and non-rice agriculture can be expected to increase incomes and increase dietary diversity. However, it has been noted that this shift is far less than anticipated (Sattar Mandal 2002). Initial improvements in rice cultivation often lead to the establishment of areas of rice monoculture and declines in dietary diversity.

Rice production intensification has been a key determinant in the changing agricultural scene. Rice production increased from 11.7 million M.T. in 1974 to 23.1 million M.T. in 2000. Wheat also had large production increase from 0.11 million M.T. in 1974 to 1.8 million M.T. in 2000. These increases have contributed to maintaining low cereal prices, vital in increasing the consumption of the poor, and allowed the prospect of agricultural diversification (West 2000). However, the rice-biased diet is low in some important amino acids, fats, minerals and vitamins. A transition to more wheat, fruit, pulses and vegetable in the diet would improve overall nutrition and health

3.8.2 Changes to the Land Holding Pattern

An important aspect in the operation of the food system has been the reduction in the average size of land holdings. Population growth, the inheritance structure, and increasing land use demands have caused major changes to the land–holding structure. Land available for crop cultivation has decreased by 1 % p.a., and average farm size has decreased with land holdings becoming increasing fragmented (Sattar

Mandal 2002). Currently marginal (less than 0.2ha) and small farms (0.2 - 1.00 ha) predominate in the agricultural scene. The number of marginal holdings increased by 27% and land operated as marginal holdings rose by around 60% from 3.1 to 4.9% over 12 years (Table 3.13).

Clearly, landless, functionally landless, and marginal households have to rely more heavily on market sources for food and as these numbers are increasing an expansion in market activities for poor people can be envisaged. The reduction in farm size also has important implications for the collection and distribution channels that are developing to service this highly fragmented agricultural sector.

Tenancy arrangements have been in transition with a reported increase in fixed rent type agreements and a decline in sharecropping arrangements. A growth in non-conventional arrangements is associated with the spread of tube well irrigation. Sharecropping for water provision i.e. paying the supplier in crops in return for water, has also started to develop. There is reverse tenancy as well where tube-well owners rent land from other owners to maximise the benefits from their access to water and this could in turn begin to reduce the levels of fragmentation (Sattar Mandal 2002).

Table 3.13 Patterns of Rural Land Holdings in Bangladesh

FARM SIZE	1983-1984				1996		
(Ha)	No of holdings (000)	% Total holdings	% Of land operated		No of holdings (000)	% Total holdings	% Of land operated
Marginal 0.04-0.2	3,373	30.6	3.1		4,277	33.6	4.9
Small 0.21-1.01	4,659	42.3	26.2		6,066	47.7	36.5
Medium 1.02-3.03	2,483	22.6	44.9		2,078	16.4	41.1
Large 3.04 +	496	4.5	25.8		298	2.3	17.3

Source (Mujeri 2001) BBS 1999

3.8.4 Agricultural Diversification

Agricultural diversification has been a constant theme in agricultural policy, however only limited diversification has taken place in recent years. Livestock and fisheries have been emerging as dynamic sectors but the crop sector is still dominated by rice. There is potential to increase rice production, but yield increases rather than area expansion will have to supply these increases. Yields in Bangladesh are currently lower than many neighbouring countries so there is scope for production gains. Nevertheless, more favourable options might concentrate on the diversification of agriculture production related to a growth strategy in agro-processing. This would lead to higher value added in agriculture and an increased diversity in consumption patterns.

Marketing chains and infrastructure development will have to take place to support this strategy and this should have positive affects on employment and income generation. However, shorter marketing chains do have the potential to reduce income-generating opportunities especially if localised small scale trading opportunities are lost (Mujeri 2000).

Diversification in the agricultural scene has and will continue to have important environmental, economic, marketing and nutritional implications, therefore support must be carefully considered.

3.8.5 Agro-Processing Development

The processing of agricultural products is obviously not new in Bangladesh, but traditionally it has been household or micro-scale based. Many processing activities are still undertaken by the private sector at the micro production level, involving numerous people using traditional technologies for the localised domestic market (Sattar Mandal 1999). Traditional agro-processing has included activities such as parboiling and husking, puffed rice making, pulse husking, beaten rice making, fish drying, pickle making, and *gur* making.

In the 1980s and 1990s many of these traditional processing methods declined e.g. the *dheki* method of rice milling. Commercial processing in the rice sector expanded

greatly in the 1980s and 90s and now there is a strong emphasis on agro-processing outside the rice sector e.g. vegetables, spices, shrimps, and fruits.

Traditional processed food items could be developed to supply the large domestic market, regional specialities could be developed and branding opportunities might arise. These moves need to be accompanied by improvements in food preservation and marketing channels to allow poor traders to remain involved in the trade. Commodities that are highly perishable represent a significant risk, especially for poor traders when operating over longer distances.

The establishment of large-scale commercial food processing industries also took place in the 1990s, especially in the in the Export Processing Zone. Technical improvements made in this commercial sector can cascade downwards to help the micro-scale processors. Although the primary aim of the larger concerns is the development of export markets, it is important to note that the concentration on export markets must not obscure the fact that the domestic market is large and expanding. Often the rigorous quality standards required for export grade food means that the local supply of these food items increases due to the high percentage of rejected produce. Agricultural production changes are also likely to occur with the growth of contract farming for agro-processing concerns.

Better communications are a key to the continued growth of this sector and should allow the quantities and qualities required in distant markets and by agro-processing industries to be supplied. It is important that agro-processing develops alongside diversification otherwise problems will arise with wide price swings associated with seasonal and perishable crops.

The growth of agro-processing could also stimulate industrial development in the manufacture of processing and packaging equipment. However, it would seem likely that initially imports of this machinery would be required (WB 1999; Shahabuddin 2002).

3.8.6 Agricultural and Rural Development policy

Fundamentally policy in this area has changed little during the decade, all of the country's five-year plans have prioritised rural development. Major goals have been to; increase food production to reach self-sufficiency, generate employment opportunities, and alleviate poverty.

Food self-sufficiency has been a long-term goal, concentrating on rice production; consequently non-crop enterprises have been relatively neglected until recently, although now agricultural diversification is high on the agenda.

The involvement of the private sector in rural enterprises has been a limited aspect of official policy, however, recently policy drives are encouraging the private sector and self-employment through skill training, credit support, marketing facilities, empowerment of the poor, and women's participation in non-farm activities (Sattar Mandal 2002a). Support for entrepreneurship, business skills development, and an effective business environment is seen as vital for both medium and small-scale ventures. This could be extended to micro-level entrepreneurs, such as street vendors, to have important poverty reduction implications.

Improvement in the marketing structure is a vital element of the strategy. Public investment in rural infrastructure, electrification, regulatory frameworks, and market support services (such as quality control, grades and standards and market information) is crucial.

The rural non-farm economy needs similar support with improved technology and market support, especially forging rural-urban linkages. Rural industry can have advantages over urban counterparts, rural produced consumer goods have a niche market in the rural areas because of their lower price, even though they are inferior to urban consumer goods, so they are protected by specialised rural demand and transport costs involved in marketing in the rural areas (GoB 2002).

The promotion of larger scale commercial operations, such as dairy and poultry production is also recognised as important, as it has livelihood implication for

smallholders and supporting workers. Action has concentrated on the supply side with work on research, new technology, markets, infrastructure and institutions.

Agro-processing and agri-business development is common to policy documents. In the 2002 Strategy paper, growth in this sector is expected to: facilitate access to modern inputs; increase the demand for agricultural products; provide the resource base for better farm investment; generate value added for the farmers; support diversification; develop the logistics of efficient marketing at the grassroots level; and help to evolve better marketing practices and linkages to expand the benefits of public policies.

4. Employment/ Livelihood Implications

4.1 Introduction

Traditional livelihood patterns in Bangladesh are changing rapidly due to a number of socio-economic developments. Infrastructure, services, marketing outlets, and livelihoods have adapted accordingly. Many new income sources have developed to support the changing livelihood strategies. Employment in the industrial and service sectors has grown, as has female employment in agriculture. Many emerging strategies involve migration to towns and cities or abroad to find work in construction and services (Toufique and Turton 2002). Livelihoods now straddle urban/rural and agricultural/ non-agricultural employment opportunities.

The rural economy is diversifying providing labour for urban and industrial jobs, the growing fisheries and livestock sectors, the service sector and the transport sector. Drivers of this process have included the improvement in rural roads, the expansion of marketed surplus, and improved literacy. Occupational mobility has increased for many households, especially into the areas of rural trade and transport (Hossain 2000). This is supported by (Toufique and Turton 2002) who note a significant growth in the village service sector creating new jobs for small shopkeepers, small artisanal traders (tailoring and crafts), rickshaw pulling, small-scale traders, and rural transport providers.

Migration for work has become a very important strategy, but human capital is needed to take advantage of many of these opportunities. The ability to adopt new employment opportunities is creating a growing division, leaving those unable to adapt in deeper poverty. Certain trades have begun to disappear and if no compensatory employment is accessible poverty can worsen.

Statistics confirm this changing pattern of livelihoods (Table 4.1). In the period 1984 to 1996 the percentage of households in the farm sector decreased from 73% to 66 % and non-farm households grew at a rate of 4 % p.a., triple the rate for farm household (Saha 2002). Employment opportunities in agriculture are generally declining.

There is an emerging trend towards a substantial wage market especially in the labour force of the non-farm rural economy. The wage rates in the non-farm economy tend to be higher than the farm economy. This shift out of agriculture has mainly taken place at the lower end of the income scale and therefore could be having benefits for the poor (Saha 2002).

Table 4.1 Proportion of the Rural Population Employed and the Share of Non-Agricultural Sectors in the Employed Population 1981-1996/7

		POP CENSUS		LABOUR FORCE SURVEY		
		1981	1991	1984-85	1990-91	1996-96
% Of rural population employed	Both sexes	25.8	25.9	29.3	31.8	34.1
	Male	49.5	49.7	53.2	53.3	55.4
	Female	2.7	3.6	8.8	8.8	12.0
Share of non-agric sectors emp. pop.	Both sexes	29.3	33.9	34.4	38.6	39.6
	Male	27.2	30.9	29.4	35.1	36.6
	Female	67.3	76.1	88.8	61.3	54.1

Source: (Saha 2002) various BBS reports.

Women have gained some benefits from the changing context, with employment in agriculture and the service sector. The garment industry, both in rural and urban locations, has provided work opportunities for women Older women can run shops from their own homes but are unlikely to be involved in the local markets. Seasonal work in shrimp farming and processing is an option. In many instances women take on these roles reluctantly and this seldom occurs in households that can afford not to do so.

The quality of the livelihood diversification is an important issue. Livelihood diversification driven by distress, with a shift into low paid temporary employment is unlikely to lead to reductions in poverty and improving consumption patterns. Most of the attractive diversification opportunities do not accrue to the ultra poor and therefore inequality can be deepened (Toufique and Turton 2002).

Sen (1996) does comment though that the landless and functionally landless are heavily involved in transport, rural industry, construction and trade. Whilst marginal and small farmers are involved in the formal and informal service sector, so there are clear opportunities in the changing landscape for poor people. In rural areas the majority of these non-farm employment opportunities are still largely dependent on agriculture and the food system.

Hosssain Zillur Rahman notes three key explanatory processes for the changing livelihood context.

- *The declining centrality of land.* Land is no longer the sole basis of power and status and non-ownership no longer serves to limit livelihood opportunities.
- *The emerging rural urban continuum.* All-weather roads have served to blur boundaries and allow income generating opportunities from migratory livelihoods and an expansion of urban lifestyles into rural areas. Large urban centres have developed extensive peri-urban fringes. Also some rural areas are densely populated.
- *The labour market transformation.* There is a trend towards an occupational hierarchy with casual daily labour at the bottom with piece rate and fixed term contracts being more sought after, the capacity to shift employment is therefore crucial. The elements of making the switch include, skills, networks and access to finance (Hosssain Zillur Rahman).

4.2 Institutions and Livelihoods

The changing socio-economic scene in Bangladesh has impacted on the nature of institutions and the institutional framework. The private sector has expanded greatly (Table 4.2), a large-scale increase has been observed in the number of; local shops, artisans and cottage industries. The food retail sector has been an important element of this with perceived increases in the number of outlets such as tea stalls, hot food snack outlets and local grocery stores.

Table 4.2 Private Sector Growth

Year	Domestic credit provision to the private sector as % of GDP
1990	16.7
2001	26.7

(World Development Indicators 2003)

Improvements in transport and communications infrastructure together with increasing demand for food items have supported this change. The nature of the food distribution and collection systems is changing with national and international suppliers entering the market. Traders and distributors are now active even in remote regions linking the village to district, national and international levels. (Thornton 2002). The larger players employ agents to check quality in remote regions and develop the links with producers and retailers over long distances.

As yet the development of the private sector should not be overstated in and the formal organisation of the private sector, other than at *bazaar* and *haat* level, is still limited below district level.

Toufique (2002) also notes the concern that increasing private enterprise is eroding the rights of the poor, especially their access to common property resources, which have been important to their livelihood strategy. The fishery is an example, where common property resources such as *beels* are increasingly coming under the control of private landlords, thus excluding poor people from a valuable source of protein in capture fishery and worsening consumption patterns.

Formal structures are also growing in influence, with the development of the legal framework and regulatory bodies in the food system. However (Thornton 2002) , notes the development of formal institutions must be monitored with care as they can strengthen the traditional sources of power if they are captured by the traditional elite engaging in rent seeking behaviour.

NGOs in the Bangladeshi contest have been very important institutions in the transformation of rural areas. Often through the provision of micro-credit schemes they have gained a strong position in village decision-making. NGOs have focused on

income generating activities related to fisheries, livestock, poultry, social forestry, homestead gardening sericulture, bee-keeping, plant nursery development, and irrigation development. Clearly this focus has a substantial influence on consumption patterns and the food system. The main thrust of their work has been in the smallholder sector, however, certain large NGOs notably BRAC and Proshika have developed commercial scale operations linked to contract growing schemes (Sattar Mandal 2002a).

The work done by the NGOs has helped to raise awareness of the need for dietary diversification and the health benefits of food groups together with the income and employment generation benefits. Using BRAC as an example, Table 4.3 illustrates the extent of job creation by a single NGO in various sectors.

Table 4.3 Job Creation by BRAC as of December 2000

POULTRY	1,367,770
Livestock	234,988
Agriculture	317,172
Social Forestry	25,433
Fisheries	193,271
Seri culture	13,734
Horticulture	120,350
Agro-Forestry	24,189
Handicraft producers	12,951
Small enterprises	32,516
Small traders	1,282,316

Source (BRAC 2000a)

NGOs have also been active in the development of the institutional environment in other areas crucial to the development of the food system. They have attempted to develop market linkages between poor rural areas and the urban markets through such projects as BRAC Dairy and Aarong. Markets are increasingly being seen as important institutions via which the poor can improve their conditions but livelihood opportunities depend on the pro-poor nature of the market development. The

livelihoods of most poor people are directly dependent on their involvement in markets as private agents or employees.

4.3 Case studies of Changing Livelihoods in Bangladeshi Villages

A village case study by (Westergaard and Hossain 1996) provided real examples of changing livelihoods. The first study in 1975/76 noted few job opportunities outside agriculture, with only a few traders and artisans. Since then the agricultural landscape and the local government structure in the area has undergone great changes resulting in demand for agricultural labour and labour in the service sector including trade and transportation.

The village with only 3 tea stalls in 1976; had by the mid 1990s 3 large restaurants, modern shops, and service industries. Numerous landless people has found employment in the informal sector e.g. rickshaw pulling, petty trading and milk vending.

Similar opportunities also lie in the non-food sector with cow dung cooking sticks, tailoring, and embroidery. The report notes that the increasing demand for services in the near-by town is one area that the rural poor have been able to exploit and this has taken place simultaneously with increasing demands for labour in the agricultural sector.

Another study (Lewis 1996) looked at the changing opportunities in the village of Adhunikgram near Chandina in eastern Bangladesh. The study notes four areas where opportunities outside agricultural production have arisen:

- Investment in technology for own production that can be rented out to others as a separate income-generating source (tube-well, tractor, power tiller etc.).
- Invest in similar technology but to service a lack of provision niche in the area
- Involvement in the agricultural business, facilitating the market linkages, e.g. trading in inputs and outputs, credit provision, and transport network growth.
- The use of expertise or training to start up a venture, e.g. mechanical knowledge allowing the establishment of small scale repair services.

Lewis highlighted 5 networks within the village in which opportunities were being created; they included rice milling, potato cold storage, tractor ownership and hiring out, STW irrigation and chemical inputs. An important feature of all these ventures is that they allowed access by people with non-land forms of human capital (information, skills, contacts and knowledge).

4.4 Sectoral Case Studies

Examples of recent transitions to the food system and their implication do exist and a number are now briefly discussed.

Rising incomes and urbanisation has generated an increase in demand for and consumption of livestock products, leading to poultry sector development. This has provided small-scale income generation for poor people, especially women. Income sources include chick rearing, chicken rearing, egg production, and vaccinating. Access to these opportunities for the poor is feasible, especially when given support by NGOs. Increased earning capacity and further development of NGO practices could develop the trend into goat, sheep and cattle ownership. However, there is concern that the poor are not always able to afford the commodities they produce, and that the "ultra poor are not able to access these opportunities. Further research into the development of the livestock sector is warranted, given that there appears to be a shortage of animal protein in the diet.

The shift to freshwater prawn production away from rice cultivation is a further example. The complexity of its affect is illustrative of the need to study food system changes in a more holistic manner. This particular change appears to have created an array of new diversified livelihood opportunities together with increasing returns from production. The nutritional and food security implications are less straightforward. Food availability may decrease and women may not have access to domestic rice resources that have been an important bargaining tool in their livelihood strategies. Production is mainly for export and has not been driven by changes in domestic consumption patterns, although there is evidence from this sector of increased domestic consumption of these high value products. This is due to increased availability in local markets from produce failing to meet the stringent quality standards required for export.

In contrast to the previous examples there are cases of changing market and processing structures that are reducing employment opportunities in the production consumption transition. The rice marketing chain appears to be shortening and increasingly concentrated in the hands of larger players, reducing employment for *bepari* and small-scale *aratdars*. However, the more frequent and longer distance movements of rice to wholesale markets in urban areas are creating employment in the transport sector. As this is such a crucial sector for income opportunities in Bangladesh it would seem to be important to assess the extent to which employment opportunities are being created and lost in this sector nationally.

5. Discussion

This report begins with a review of the changes in the food and nutrition scenario that occurred in Bangladesh during the decade of 1991-2000. The trends and patterns of agricultural production of different food-items were examined because in a poor country like Bangladesh, that has limited ability to import food, agricultural production largely determines the amount and composition of the diet of the majority of the population.

In the first half of the decade, Bangladesh experienced poor rice harvests mainly due to mismanagement of agricultural support. The worst years in the decade were 1994-95 and 1995-96. Fortunately, from 1996, order was restored and bumper rice harvests were recorded. As well as favourable weather conditions this was due to good management of fertilizer, irrigation, seed supply and other agricultural support deliveries. 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. Data shows 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 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 the casualty of increased production of rice and wheat. Production of pulses and oilseeds fell during the decade, especially during its latter half.

Overall, the increased food production 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.

However, for two reasons there can be no sense of complacency following the attainment of self-sufficiency in food items. Firstly, a closer look at the composition of the diet reveals that it is imbalanced despite being adequate in quantity, calorie and protein. The diet is still dominated by cereals, especially rice, with low levels of consumption of fruits, vegetables, and animal products. These provide the valuable vitamins and minerals that supply the growth-supporting quality proteins. Secondly, food intake by the poor, who still comprise half of total population, 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 with nearly 90% of the energy requirement coming 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. This indicates that in spite of the facts that during this period; national average income has increased, poverty incidence has decreased, the national average food intake has increased, no change has occurred in the diet of the poor in rural and urban areas alike. The benefits of national developments did not reach the poor to any appreciable extent.

Also, in proportionate terms, the pattern of the food intake of the rural poor, rural rich and urban poor is quite similar, with rice contributing 50-60%. The dietary pattern of the urban rich, on the other hand, contains only 37% rice, approaching a more desirable level. 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 a 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. This data clearly indicates the harsh 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. Obviously given these expenditure patterns few of these necessities are resourced properly.

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 and rich alike. However, ironically, nearly two-thirds of the functionally landless households eat no 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 decline in the child and maternal malnutrition rates 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. Yet, despite these declines in malnutrition, the current rates are still amongst 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 47% in the 4^{th} and 31% in the top (richest) quintile. The fact that even the richest families experienced a 31% child malnutrition rate indicates that malnutrition is indeed a multifaceted problem.

Infant feeding practice has a profound effect on child nutritional status: Colostrum feeding and start of complementary feeding at 5 months or later promotes good growth. This should be considered as an important strategy in child nutrition. Also, the improvement of family food fed to child at weaning can greatly improve the

nutritional status of the children. This can be achieved by incorporating nutritious food like egg, fish and pulse. Maternal education can play a pivotal role in this regard.

As poverty is concentrated in rural areas, malnutrition rates are consequently higher as well in rural areas. For instance, a few rural districts, namely Sylhet, Comilla, Faridpur, Tangail, Jamalpur, Noakhali and Chittagong contain nearly one-half of all severely stunted children in the country. However, urban slums are a particular problem. Malnutrition rates in urban slum children are higher than in rural children. Malnutrition in urban slums, which are growing fast due to the unabated flow of rural poor to cities and towns for better opportunities, is the most pressing challenge.

Reduction of child night blindness to almost non-existence levels during the nineties is a success story in Bangladesh. This was brought about by 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.

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. However, at the end of the decade, one-half of the country's population is still poor, one-third being extremely poor. Their diet is inadequate and imbalanced and malnutrition rates are very high, around 50%. The conditions in urban slums are particularly miserable. The government of Bangladesh has prepared the Poverty Reduction Strategy Paper (PRSP) (MOF, 2002) and is now in the process of implementation. A major aspect of these strategies is to ensure that all development programmes are pro-poor in nature. If that is achieved, it can be expected that poverty incidence will decline further and economic status will improve. This should improve people's access to food (food intake) and their nutritional status

The review then discussed changes in the socio-economic scene that have impacted, and are likely to continue impacting on changes in consumption patterns and the food systems. Clearly, economic growth, poverty reduction, labour market development, infrastructure development, and the processes of industrialisation and urbanisation have been crucial elements in changing food consumption patterns and the changing food system. The focus of this project is to highlight possible developments in food consumption and the food system in its entirety and then suggest areas for further study. In this respect possible areas for further research are now discussed.

Obviously the nutritional implications of changes in food consumption and the food system must be more fully understood. The style and degree of processing along with the quantity, source and type of food consumed can be expected to have substantial nutritional implications. Issues such as; the entry of new food items into the diet, quality and safety standards associated with processed food items, problems of adulteration of processed food items (especially those aimed at the poor), and the nature of dietary diversification taking place. Although not yet applicable to the vast majority of the Bangladeshi population, the impacts of consumption trends on obesity is a growing area of concern especially amongst young urban dwellers.

Research into marketing and processing chain development is highly relevant, where employment creation or loss could be the focal issue. As development progresses the share of GDP and employment in the agricultural sector declines, however, employment in the food system as a whole tends to increase. Employment gains occur in transportation and retail sectors, much of the employment can be for low-skilled, poor workers. An assessment of the employment implications of the trends in Bangladesh are important to allow human resource development to allow poor households to access these opportunities. Attention to gainers and losers in the transformation is vital to allow support, education, and training to be directed into the correct areas. Processing and packaging are areas of potential "gainers" in the food system, though there maybe "losers" in traditional processing sectors. Identification and quantification of the trend towards processed and packaged food consumption is necessary. Whether the new opportunities compensate for the old and if the poor are positively or negatively affected by the changes are vital research issues. It is believed

that in this context lessons could also be learnt from, and for, other countries experiencing food system transformations.

The importance of well functioning markets in the livelihoods of the poor is well recognised. This applies not only to staple food markets but also labour and financial markets. The livelihoods of most poor people are directly dependent on their involvement in markets as private agents or employees. In Bangladesh market dependence for the poor is very high, with over 70% of food consumption coming from market sources. For the urban poor market dependence may increase to 100 %.

The liberalisation of domestic markets is a key issue in creating a shift from domestic food crop to cash crop production. Income generation benefits are likely but possible negative impacts on food security and nutritional status, especially amongst women and children may occur. Changes in the intra-household distribution of resources and labour will occur and women and children may suffer if they no longer have access to domestically produced food sources but rely on cash income from trading by male household members. This is clearly an important area of consideration for producers.

Transitions in food consumption patterns are often most clearly seen in wealthy urban areas. This project emphasises poor rural and urban households, so the extent and pace at which trends are percolating into poor and rural areas is an important issue. Once changes begin to affect the majority poor grouping then rapid system change can be expected. Patterns emerging in urban areas may not simply transfer over time to poor rural households. Alternative patterns may emerge in poor rural areas, based around lifestyles differences. Traditional agricultural-based lifestyles may counter against more rapid changes, whilst urban areas without food production and preparation resources but with better market access may experience more dramatic changes.

A recognised trend in urban areas has been the increasing consumption of street food, especially by slum dwellers. How widespread this is and the nature of the livelihood opportunities it provides are very interesting topics. Observations suggest substantial trading and petty trading activities, with street sellers offering a variety of fresh, semi-processed and processed food items. This could be described as a nascent "fast food"

industry with evidence of dispersion into rural areas. Associated employment opportunities could be seen as important micro-entrepreneurial opportunities or conversely distress driven coping strategies. Evidence has indicated that street trading can be a quick survival strategy requiring much less capital than farming or small business ventures.

Issues to consider include; whether the development of more packaged and branded products assists in the development of street trade businesses and small retail outlets. Packaging should increase product storage life, thus reducing the risk in purchasing stocks, whilst branded products should encourage sales by reducing quality and safety concerns; also if these processed foods can contribute to the diets of the very poor then it may assist in lessening the burden of work and allowing poor people to take advantage of the employment and educational chances.

The linkage between the processes of agricultural diversification and food consumption diversification warrants further analysis, as these are important elements in poverty and malnutrition alleviation. Agricultural diversification could offer benefits in a number of areas including higher income generation for smallholders and improved dietary diversity. Agricultural diversification is widely advocated and forms a major part of government, NGO and donor agency policy. Further research focusing on which produce would maximise income growth, improve nutrition and maintain food security would be beneficial. This would require consideration of the production, income, nutritional, environmental and employment generating characteristics of the produce, together with consumer preferences.

Growth in the international trade of food produce in Bangladesh is an interesting area, both from a macroeconomic standpoint and the impact on food availability. Cross border trade, especially with India, is vital in determining the net availability of food for consumption. However, accurate assessment of the scale of cross border trade is difficult due to the level of unofficial trade and the incorrect registration of official trade. To obtain a more accurate picture of the food system in Bangladesh investigation of the nature of cross border trade is necessary. There are national implications but also specific local issues relating to food consumption trends and employment patterns in border areas. Much of the unofficial trade is said to be in

small lots and this could be having income generating implications for poor people in border areas.

Transition in the retail sector offers one of the most interesting avenues for further research. Currently the retail sector in Bangladesh is seeing the proliferation of small shops. If the sector develops, as in many other countries, with the growth of a supermarket sector, then the implications for smallholder producers will be substantial. The nature of the supply chains serving a supermarket driven retail sector is likely to be very different from the current position.

The retail sector has already witnessed a large expansion in the number of outlets in both urban and rural areas. Village studies have highlighted income-generating opportunities both in local *haats* and the growth of fixed retail outlets. Investigations could assess the growth of fixed *bazaars* and the extent to which they are creating a class of shopkeepers, possibly damaging petty trading opportunities for the poor. The process can be a precursor for the growth of the supermarket sector, which is in its nascent stage in Bangladesh but has seen rapid expansion in many developing countries.

The transition in the food system has not, as yet, directly impacted upon the livelihoods of very poor people in isolated rural areas but it can be anticipated that with increasing urbanisation, infrastructure improvements, and economic growth that the transition of consumption patterns and employment changes which is already diffusing into peri–urban areas will continue into rural and perhaps remote rural locations. Given this assumption it seems sensible to develop some level of preparedness for anticipated changes.

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