Bangladesh Household Food Security and Nutrition Assessment Report 2009

World Food Programme, UNICEF,
Institute of Public Health Nutrition,
Ministry of Health and Family Welfare
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Most importantly we are extremely grateful to the communities, household members, food traders, and market shop owners, who generously and patiently answered a multitude of questions to help us better understand the impact of high food prices on their lives and their livelihoods. We sincerely hope this report and assessment will make a contribution to the food and nutritional security of the more than 10,000 households whom made this survey possible.

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Acronyms and abbreviations

BBS	Bangladesh Bureau of Statistics
BDHS	Bangladesh Demographic and Health Survey
CDC	Centers for Disease Control
CMNS	Child and Mother Nutrition Survey of Bangladesh
DAM	Department of Agricultural Marketing
DGHS	Directorate of General Health Services
EPI	Expanded Programme on Immunisation
FAO	Food and Agricultural Organization
FFWC	Flood Forecasting and Warning Centre
FOB	Freight on Board
FPMU	Food Planning and Monitoring Unit
GAM	Global Acute Malnutrition
GHI	Global Hunger Index
GoB	Government of Bangladesh
HFSNA	Household Food Security and Nutrition Assessment
HIES	Household Income and Expenditure Survey
HKI	Helen Keller International
IFPRI	International Food Policy Research Institute
IMCI	Integrated Management of Childhood Illness
IMF	International Monetary Fund
IPHN	Institute of Public Health Nutrition
IPP	Import Parity Price
MDG	Millennium Development Goals
MEP	Minimum Export Price
MOHFW	Ministry of Health and Family Welfare
MICS	Multiple Indicator Cluster Survey
MOFDM	Ministry of Food and Disaster Management
MUAC	Mid-Upper Arm Circumference
NCHS	National Center for Health Statistics
NI	Nutrition Interventions
OMS	Open Market Sales
PFDS	Public Food Distribution System
SAM	Severe Acute Malnutrition
SSN	Social Safety Net
TANGO	Technical Assistance to NGOs
TR	Test Relief
TSC	Transitional Support Credit
UNICEF	United Nations Children's Fund
USD	U.S. Dollars
VGD	Vulnerable Group Development
VGF	Vulnerable Group Feeding
WES	Water, Environment & Sanitation Section of UNICEF
WFP	World Food Programme
WHO	World Health Organization

Executive Summary

i. Background to the assessment

Multiple factors contributed to high and volatile food prices in Bangladesh during the 2007/2008 period. A "perfect storm" of international, regional, and national conditions delivered a powerful economic shock to the country's food security. Rising global food and fuel prices, regional trade barriers for food exports from South and Southeast Asia, and efforts to ensure macro-economic stability within Bangladesh, all played important roles as the shock of high food prices reverberated throughout the economy. The world's cereal stocks fell to levels unseen in over three decades, as global food prices were pushed higher by poor harvests in major grain exporting countries. Regionally, strong economic growth in numerous Asian economies, including China and India, further contributed to increased demand on limited global grain supplies.

In Bangladesh, monsoon rains from Nepal and India flooded most of the Amman rice fields in August-September 2007. By the end of the monsoon, over 42% of Bangladesh was flooded. These were the largest floods in nearly a decade and the third largest floods in more than 50 years. Less than two months later, Cyclone Sidr struck coastal Bangladesh in November 2007. More than 3,000 deaths occurred and the property damage and asset losses were huge. Fishing and farming livelihoods were hit particularly hard. Large volumes of saltwater were swept onto the land by tidal surges causing soils to become saline, which in turn led to damaged crops and reduced yields. An estimated 1.4 million metric tonnes of Amman rice was lost to both the 2007 floods and Cyclone Sidr.

Concerns regarding the adequacy of Bangladesh's food supply dominated the news and much of the public dialogue. Such concerns were accompanied by predictions of future food crisis possibilities due to both the harvest losses and to rising food prices on the international markets. Against this growing apprehension, numerous situational assessments were undertaken by the Government of Bangladesh and its humanitarian and development partners. Considerable information was generated to help stakeholders better comprehend the nature of the high food price shock and its impact on Bangladesh. Nonetheless, significant gaps in both knowledge and understanding remained, most importantly on the impact of the shock on household food security and nutrition in the country.

ii. Assessment objectives and methodology

These important information and knowledge gaps were the major impetus for UNICEF, WFP and the Institute of Public Health Nutrition to jointly undertake a national Household Food Security and Nutrition Assessment of the situation. The broad objective of the assessment was:

To analyze the impact of the food price hikes on food security and nutrition/health status, in order to suggest response options and recommendations.

More specific objectives pertained to understanding in greater detail, aspects of food security and nutrition, including food markets, household food access and food utilization, nutrition and health, and water and sanitation. The food security component and market analysis were led by WFP and the nutritional component by UNICEF with IPHN.

Data collection was undertaken from November 2008 to January 2009 during the Amman harvest season. The nationally representative food security and nutrition assessment included 10,378 households. The market component surveyed 180 markets and interviewed 900 traders. Anthropometric measurements were taken on 3868 mothers and pregnant women (mid-upper arm circumference) and 4175 children aged 0 to 59 months (mid-upper arm circumference, weight, height and oedema) to assess nutritional status.

iii. General results

The broader macro-economic environment during 2007/2008 was analyzed with an emphasis on food availability. In Bangladesh, a variety of factors were critical for ensuring adequate food supply, including both food imports and the bumper 2008 Boro rice harvest. Prior to the harvest, uncertainty about the adequacy of supply ran high and there was great pressure to import relatively large volumes of food, at a time when international prices were soaring. Regional trade barriers exacerbated the situation, as did sub-optimal tendering and procurement procedures. Although the large majority of food grain consumed in Bangladesh is produced internally, food imports play an important stabilizing role, particularly during post-disaster times and during times of acute food insecurity.

Import costs in Bangladesh rose significantly during fiscal year 2008, mostly due to the soaring food and fuel prices. Compared to fiscal year 2007, import payments for food grains (rice and wheat) increased by 141% for fiscal year 2008. The associated increase for Soya beans was 71%, and for petroleum products 32%. The share of food grain imports in total imports rose to 6% in fiscal year 2008 from an annual average of about 3% since fiscal year 2000. Bangladesh's deteriorating terms of trade adversely affected the balance of trade in fiscal year 2008, meaning that addressing the food availability problem vis-à-vis increased food imports would be costlier.

The rapid increase in food prices raised serious concerns about impacts on the country's food security and nutritional situation. Bangladesh is placed in the bottom 25% of the Global Hunger Index rankings that highlight countries facing the most risks within the context of the food price hikes. The prospect for an improved food security and nutrition situation and for meeting related Millennium Development Goals (MDGs) became questionable within the context of volatile global food prices. The surging import costs and the challenges they posed to macroeconomic stability in Bangladesh became an increasing cause of concern for high-level officials within the Government.

The World Bank and the IMF also expressed concerns about the import situation noting that some two million tonnes of rice needed to be imported during a period of limited global rice availability. Maintaining adequate foreign exchange reserves was also a concern due to the rise in food imports and adverse effects of the natural disasters. In early April 2008, the IMF approved over USD 217 million in emergency assistance for Bangladesh. The soft loan assistance to the Government of Bangladesh was both a direct response to the natural disasters and an indirect response to the food security and macroeconomic stability needs of the country. In June 2008, the World Bank extended USD 320 million in credit, including USD 200 million for budgetary support. The USD $200 million Transitional Support Credit was provided to help reduce pressure on the country's current budget due to the impact of natural disasters and to the impact of rising food prices.

Macro-economic stability was successfully maintained during the food price crisis. This was undoubtedly due to a combination of factors, including a bumper Boro harvest in May to June 2008, the fall in global commodity prices (especially fuel/oil and food) and relatively low inflation rates of 6% per annum, representing a two year low.

iv. Food market results

International and regional food market dynamics, and more specifically, trade barriers and minimum export rice prices set artificially high, contributed to higher food prices in Bangladesh. Obtaining a better understanding of food market dynamics in Bangladesh was essential to understanding the impact of high food prices on consumers and household food access. Markets for rice, Bangladesh's most important staple food, remained integrated during 2008, although rice prices were subject to increased volatility. Higher global and regional prices were transmitted to Bangladesh's central market in Dhaka and beyond to the markets within all six administrative divisions. Price transmission of the shock was relatively lower for the two divisions of Chittagong and Barisal where considerable Cyclone Sidr-related recovery assistance likely helped to stabilize prices. The northern divisions of Rajshahi and Sylhet were subject to the highest price transmission.

Traders reported hoarding or stock-holding and high fuel prices as their two main difficulties related to the high food prices. Increased fuel costs meant that food transport costs also increased, which in turn contributed to higher food prices for consumers.

Despite adequate food availability on domestic markets, 35% of traders highlighted consumers' low purchasing power as a major constraint to a more dynamic and responsive market. Low purchasing power was also associated with reduced sales volume and reduced profit margins. Price spreads for local rice shrank by 60% percent, and by 40% for lentils (daal). Credit was increasingly extended to customers to maintain business and trade. The analysis of food markets confirmed that despite the availability of credit and food, low consumer purchasing power prevented numerous consumers from accessing sufficient food via the market.

v. Food security results

Generally, there were no major shifts in livelihood patterns between 2005 and 2008 suggesting that income sources and dependency on them did not change significantly. Due to higher food prices, a majority of households lost purchasing power on the market. This included many farming households with small landholding sizes, as well as others in the agricultural sector such as share-croppers and wage earners.

Higher food prices are generally considered to be beneficial to farmers due to the assumption that most are net-food-sellers as opposed to net-food-buyers. In Bangladesh, the picture is less clear because of the extremely small farm plots that limit production and the amount of food marketed. The inequalities of land distribution and land ownership are striking. An estimated 10% of farmers own one-half of the agricultural land and small farmers represent 80% of all farmers. The extent to which the agricultural sector can be a driver of pro-poor economic growth is a critical question given many of the constraints and challenges highlighted above.

The assessment showed that many of these marginal households were amongst the poorest and most food insecure in Bangladesh. Nearly one-half (45%) of agricultural labourers had

food consumption scores that were poor or marginal and associated with food insecurity. As a livelihood group, these households spent 69% of their total expenditures on food compared to the national average (62%).

In 2008, household real monthly income decreased by 12% compared to 2005, terms of trade further decreased, and real wage rates remained stable. Food expenditures increased to unprecedented levels and represented 62% of total household expenditures compared to 52% in 2005 and 51% in 2000. The highest food share expenditures at divisional level were found in Sylhet division where households spent more than two thirds of their income on food (67.7%). This finding along with the higher price transmission finding suggests that many households in this area were particularly affected by the high food price shock.

Changes in types of food expenditures were also examined in comparison to the pre-shock period, and expenditures for vegetables, oil, fish, pulses, and sugar had all increased. In contrast, decreased expenditures were found for rice, meat, dairy and fruit. Rural areas showed the highest decreases in rice expenditures and these decreases were likely related to seasonality. Data was collected during the Amman rice harvest, a time when rice purchases often decline because many farming households consume part of their own production.

The assessment captured households' perceptions about the degree or extent to which they were affected by high food prices. Two out of every five households (40%) reported being highly or severely affected. Nearly one-half of female-headed households (48%) reported being highly or severely affected compared to male-headed households (39%). Barisal (54%) and Sylhet (48%) divisions had the highest proportion of their populations reporting they were highly or severely affected.

Approximately two-thirds (66%) of households in Barisal division reported having insufficient money to buy food in the one-year prior to the assessment because of the price shock or because of other difficulties. The lasting effects of Cyclone Sidr, as well as the impact of high food prices, likely contributed to the reported food insecurity in this region.

Households used a broad range of strategies to cope with difficult times. For those households with insufficient means to cover food or non-food essentials, borrowing and taking on debt was the main coping strategy. Over one-third of households (34%) borrowed money from friends or relatives during the one-year prior to the survey and one-third of all households borrowed from financial institutions such as banks. Incurring debt was more common in Barisal division where 47% of households borrowed from financial institutions and 41% borrowed from relatives and friends.

Other more negative coping strategies were reported, such as reducing health expenditures. Nationally, 22% of households utilized this strategy. The rate amongst female-headed households (27%) was comparatively higher.

Of the numerous food-based coping strategies, the three strategies most reported by households were "relying on cheaper and less preferred foods," (56%) "borrowing food from friends or neighbours," (53%) and "reducing portion sizes at meal times" (31%). Relying on cheaper and less preferred foods often means compromising the quality of the diet and can lead to inadequate intake of micronutrients and increased rates of malnutrition.

Households were asked a series of questions to capture how often various coping strategies were used. These strategies and the severity levels associated with them were used to create

an indicator, expressed as a score, called the Coping Strategies Index. Higher scores of the Coping Strategies Index reflected greater food insecurity. Female-headed households had much higher Coping Strategies Index scores (64% higher) when compared to male-headed households. The Coping Strategies Index score for Barisal division was also notably high and likely a result of both Cyclone Sidr and the high food price shock.

Household dietary diversity and food intake frequency were analyzed using a food consumption score indicator. Households with "poor" or "borderline" food consumption score values were considered to be food insecure. These households represented approximately 25% of the overall population. This estimation of food insecurity in the Bangladesh population should be considered conservative due to the low thresholds used in the food consumption score.

The prevalence of food insecurity was higher for rural households with 27% having "low" or "borderline" food consumption scores. A significantly smaller percentage of urban households (17%) fell into the same food insecurity category. Although the lower proportion of urban households was somewhat unexpected, pre-shock (2005) poverty prevalence rates in urban areas were also considerably lower compared to rural areas. Thus, many urban households were arguably better positioned to cope due to their relative pre-shock advantage compared to their rural counterparts. Divisionally, food consumption scores showed households in Rajshahi (31%) and Barisal (26%) as being the most food insecure.

There was a general sense that the diet of poor households worsened with the price crisis in Bangladesh, raising concerns about the impacts on the short and long-term nutritional status. Household diets were generally found to be poor in dairy and fruit except for households having the highest food consumption scores. Food insecure households had very low diet diversities, with diets based predominantly on starchy staples with edible oil and vegetables. The food insecure households consumed animal protein only once or twice weekly with almost no pulses and little dairy or fruit.

The food insecure households generally had smaller than average family sizes and their household heads were less educated. They also had fewer assets and fewer income earners per household. Female-headed households were strongly over-represented within the food insecure group, with 38% of these households associated either with poor or borderline food consumption. The prevalence of food insecurity for male headed households was considerably lower (23%). As might be expected, the food insecure households more frequently used food-related coping strategies, such as changing to cheaper, less-preferred foods, reducing meal portions or reducing the number of meals per day.

In contrast, food secure households had more stable income sources, relied less on casual work, had slightly larger than average household sizes and had more income earners per household. Household heads of food secure households were more likely to have attended school and were better educated. These households had more assets and they spent proportionately less of their income on food. Due to these advantages, food secure households were better able to manage and cope with shocks such as high food prices and this was reflected in their lower Coping Strategy Index scores.

vi. Food market and food security recommendations

Higher rice prices on international and regional markets, inflated by trade barriers, contributed to subsequent higher prices in Bangladesh. Given the importance of external markets,

Bangladesh and neighbouring countries should promote and adopt open trade policies, particularly with regards to food and other essentials during times of crisis. Regional trade barriers on export bans or setting minimum export prices artificially high should be avoided at all costs. Dialogue on open trade and policies and commitments that respect free (regional) trade should be actively pursued in forums such as the South Asian Association for Regional Cooperation (SAARC) or in global forums like the World Trade Organisation.

Bangladesh should seek to update and streamline its food procurement procedures, policies and tendering mechanisms, to ensure timely and effective procurement on the international market. The process whereby the procurement price and the quantity to be procured are set should be improved. Procurement prices need to be set at levels that provide enough incentive and profit for producers to sell, and also reflect a consideration of prevailing market prices. The Public Food Distribution System stock levels should be optimally set for each month or quarter of the year and also take into account seasonality. This would ensure greater transparency in the management of the stock, for all concerned stakeholders.

Reporting on recent and current food security situations, as well as on future food security trends and prospects, should be improved to reflect the broader monitoring perspective that takes into account broader macro-economic trends and indicators, and their potential impact on food availability and food access. Improved collaboration between public sector institutions that monitor food security and other public sector institutions that monitor the macro-economy is needed and justified.

Greater attention should be given to monitoring global and regional trade and the potential impact on food security in Bangladesh. Early warning indicators that can inform or trigger critical decisions on food procurement and public stock management should be reviewed and/or developed. Further analysis should be undertaken on the impact of food harvests on domestic food prices; such analysis is crucial for planning timely and effective food-based social safety net assistance.

Market information systems and food security monitoring systems should go beyond the simple reporting of food prices. Changes in consumer buying patterns that reflect changing food security conditions should be reported. As necessary, data collection and analysis activities should be adapted to support such reporting for strengthened and comprehensive early warning and food security monitoring.

Analysts and researchers should explore possibilities for extended or new analysis on market price integration in Bangladesh to better inform food security programming and related investments in market or transport infrastructure. Analysis and research should be supported that can provide a better understanding of the economic viability of smallholder farming within the context of food prices, producer incentives and participation in food markets. The research outputs should be used to inform and influence policies and programs that are designed to address food and livelihood security as well as pro-poor growth and poverty reduction. The HFSNA 2009 food markets survey data should be made easily accessible to researchers and other stakeholders in order to promote improved understanding of the food markets and food security in Bangladesh and opportunities for collaboration should be explored.

Livelihoods associated with irregular income such as agricultural labourers, non-agricultural wage earners, and casual labourers are generally more food insecure and should be given serious consideration for inclusion within food security assistance programs. For longer term development solutions, such food security assistance programs should support the acquisition of marketable skills that can lead to stable and more regular employment.

Female-headed households are generally more food insecure and should be given serious consideration for inclusion within food security assistance programs. Such food security assistance programs should contribute to the reduction of gender-based wage discrimination within the marketplace. Life skills training could contribute to longer term food security. Complementary awareness and advocacy programs that are community-based and emphasize equal pay for equal work principles should also be considered.

Educational characteristics of the household, such as "whether the household head has ever attended school," can be a useful indicator for identifying most food insecure households. As such, this indicator should be considered amongst others, for the process of beneficiary selection for food security programs.

Asset ownership, not surprisingly, was associated with greater food security. Those responsible for designing new food security programs in Bangladesh need to give due consideration to programs that emphasize asset ownership. Including asset ownership within a beneficiary selection process that uses proxy means testing, can improve targeting efficiency however implementation needs to be well designed and well executed. Those administering food or cash-based social safety net programs should rigorously review their targeting methods in order to improve efficiency and to reduce the prevailing high inclusion error rates. Food security assistance programs using household size (i.e. larger household size) as a targeting indicator should reconsider such practice. The findings from the HFSNA survey found that the most food insecure households tended to have below average household sizes.

The feasibility of including the Coping Strategies Index tool and indicator in existing or planned food security monitoring systems in Bangladesh should be seriously explored. Food security assessments and monitoring efforts should consider use of the Food Consumption Score indicator as a valid proxy measure of food security. More refinements of the indicator are needed and elevating the food security score thresholds would likely result in improved usage.

Food security interventions that include nutrition awareness trainings for program participants should continue to stress the importance of a diversified and well-balanced diet. Greater emphasis should be made on the increased consumption of animal protein, pulses, dairy and fruit.

vii. Nutrition and health results

The food price hikes in Bangladesh meant that vulnerable children and women did not have access to essential diets and necessary micronutrients that could prevent negative impacts on their nutritional status. In the context of high food prices the food security findings showed that household expenditures were insufficient to provide quality diets and the nutrition assessment showed that the prevalence for acute malnutrition, underweight and stunting were worryingly high. In relation to previous national surveys, there were no major improvements; when looking at the trends from 2005 onwards, and there was no measurable progress towards achieving MDG 1.

Using WHO 2006 growth standards, the prevalence of global acute malnutrition was 13.5% and the rate of severe acute malnutrition was 3.4%. The chronic (stunting) and underweight malnutrition rates were 48.6% and 37.4%, respectively. As the assessment was carried out during the Amman harvest season, when acute malnutrition rates are expected to be the lowest, it is highly likely that these same figures would have been higher during the lean

seasons. Rural areas held statistically significant higher rates of acute, chronic and underweight malnutrition than urban areas.

The number of children aged 6 to 59 months with global acute malnutrition was estimated at more than 2.1 million, and over 548,000 of these children were severely acutely malnourished. As would be expected, the divisions with larger populations presented higher numbers of malnourished children. Dhaka division had most of the acutely malnourished children, followed by Rajshahi and Chittagong divisions.

Almost 49% of mothers were exclusively breastfeeding their children up to six months of age. This rate, although very low, was marginally higher than found with previous surveys in 2007 (43%) and 2006 (37%). On the positive side, the rates for continued breastfeeding at one year of age were 93.2% and 89.2% at up to two years of age. However, the assessment found that a high percentage of children aged 6 to 23 months had diets whose quality did not meet acceptable levels and that these children were more likely to be malnourished than children aged 24 to 59 months

The higher rates of malnutrition in the 6 to 23 month age group were closely linked to the poor infant and young child feeding practices. Results showed a decrease in complementary feeding in children aged 6 to 9 months from 62% (2004) to 57.6%. Children aged 6 to 23 months failed significantly to achieve the minimum meal frequency (52.2 %), the minimum diet diversity (35.5%) and the minimum acceptable diet (19.5%). These indicators provide information not just about whether complementary foods are being consumed by this vulnerable age group but also about the quantity and quality of those foods. Thus, these findings give real cause for concern as poor infant and young child feeding practices directly affect the nutritional status of children under two years of age and, ultimately, impact on child survival.

Vitamin A supplementation of children aged 9 to 59 months was 76.5%, with 64.8% coverage in children 9 to 11 months and 77.2% of children aged 12 to 59 months. The 2007 EPI coverage survey reported Vitamin A coverage of 86%. One explanation for the lower 2009 coverage rates could be that the HFSNA data was collected after more than six months had elapsed from the last national Vitamin A campaign in May 2008. Additionally, the Vitamin A supplementation programs in Bangladesh do not presently include the vulnerable age group from 6 to 8 months.

Low Vitamin A coverage was found in post-partum women (34%), as well as low iron and folate supplementation in pregnant women (50.3%). These findings can be linked to the capacity of Bangladesh health services to deliver the supplements, which is made more difficult as most women do not receive the recommended antenatal care and most choose to deliver their babies at home.

The assessment found that 18.2% of mothers were acutely malnourished by mid-upper arm circumference. These results support previous survey findings that measured acute malnutrition in women using the body mass index indicator. Although these two methods for measuring malnutrition in women are not directly comparable, the negative trends in maternal undernourishment and poor results in micronutrient supplementations are causes for concern.

Wasted, underweight and stunted children were more likely to have a malnourished mother. These findings reinforced the clear linkages between maternal and childhood malnutrition. Children of acutely malnourished mothers were 1.8 times more likely to be acutely malnourished, 1.3 times more likely to be stunted and 1.7 times more likely to be underweight.

The findings also showed that acute malnutrition and underweight rates were higher in children who had been ill compared to those that were healthier. Lack of money was an important reason for not seeking medical care, a factor highlighted in several studies on the effects of high food prices on household expenditures for basic needs such as health care. Although the assessment found that sick children were taken to health care providers, the types of services (professional or alternative) were not established. Mortality rates remained below the emergency thresholds and there were not any related food security or nutrition factors that impacted on the mortality of the surveyed population.

Poor access to safe water and basic sanitation combined with poor hygiene practices causes related illnesses, especially diarrhoea, and consequently contribute to malnourishment. Households were asked about access to safe water sources, types of toilet facilities, and whether their water and sanitation situation had changed in the last twelve months. The results showed that there were no statistically significant variations between the two time periods. Findings suggested an improvement in the use of improved drinking water sources but it is worth noting that the survey did not assess methods for collecting/supplying water or arsenic analysis. Thus, it could well mean that households with safe water supply sources used unsafe water. The lowest coverage of safe water sources was amongst the urban area population.

In contrast and as could be expected, rural areas had the lowest coverage of good sanitation facilities. By division, there was no statistically significant association with the type of sanitation facility used and the nutritional status of children and women. However, the three divisions with the highest malnutrition rates, Barisal, Sylhet and Rajshahi, had the lowest coverage of sanitation facilities.

The assessment found strong linkages between the nutritional status of children and women and key food security indicators related to the food price hikes. A strong statistical association was found between a child's nutritional status (wasting) and households that adopted higher numbers of food consumption-related coping strategies. Moreover, acutely malnourished women had higher mean Coping Strategy Index scores than non-acutely malnourished women; these same acutely malnourished women adopted more coping strategies, or more severe coping strategies, in comparison to non-malnourished women.

The proportion of food expenditures as a percentage of total household expenditures was significantly higher for households with acutely malnourished, stunted and underweight children. The association was stronger in stunting as might be expected due to the relation of food expenditures to longer-term impacts. In general, households with acutely malnourished women had higher percentages of food expenditures than households with non-acutely malnourished women. Households in rural areas with acutely malnourished children adopted more or more severe, coping strategies. In Barisal and Rajshahi divisions, there was a strong statistical linkage between acute malnutrition rates and Coping Strategy Index scores. These two divisions had the most food insecure households, as well as the highest acute malnutrition rates.

Households with seasonal or irregular incomes were more likely to have stunted and underweight children. As the food security findings showed, the majority of households lost their purchasing power when their real income diminished by 13%; it is likely that the decreasing real income levels impacted upon nutritional status. In the most affected livelihoods (non-agriculture wage earners, agriculture wage earners, and casual workers), the rates of

chronic malnutrition (56.8%) and underweight (43.9%) were higher than in the lesser affected livelihoods (45.2% and 34.3% respectively). Children that were stunted or underweight and acutely malnourished women were all strongly associated with households belonging to these most-affected livelihoods. It is likely that their subsistent earnings meant that the households had insufficient purchasing power to sustain meal adequacy and frequency.

The proportion of households that diverted income away from non-food expenditures and towards food purchases increased in 2007/2008. Significantly, these same households had the highest malnutrition rates. Descending trends of wasting, stunting and underweight were found from the poorest households to the richest households in Bangladesh. Nonetheless, high rates of malnutrition still prevailed in the wealthiest homes, where stunting rates of 36.5% demonstrated that malnutrition levels in Bangladesh were a concern within all the wealth statuses.

viii Nutrition and health recommendations

Given the large numbers of acutely malnourished children and the increased mortality risks for these children, assistance programs should be implemented at both facility and community levels, i.e. community-based management of acute malnutrition. These programs should initially be backed with data on effectiveness and cost effectiveness within the Bangladesh context.

It is important to ensure that such community-based programs for the management of acute malnutrition build-in the development of local production capacity for ready-to-use therapeutic foods. Reductions in cost will eventually make scaling up of these programs easier and less expensive, and will increase the possibility of future government-allocated resources for sustaining the programs.

Preventive and therapeutic nutrition interventions should be designed and adapted taking into account the "hunger season." Such programming will go a long way in reducing the impact of seasonality by addressing increased levels of acute malnutrition and associated higher risks for mortality during the peak of the lean periods.

Optimal infant and young child feeding should be supported through programming that emphasizes maternal and community participation. Furthermore, infant and young child feeding interventions should be based on a better understanding of why early initiation of breast-feeding, exclusive breast-feeding, and timely introduction of complementary food has not improved over the past decades despite such programs.

Given the existing poor quality of diets consumed by children aged 6 to 23 months, the promotion of complementary feeding might not yield the desired results without enhancing the dietary quality of the food. Therefore, it is recommended that proven interventions such as multiple micronutrient supplementation should be included together with the promotion of complementary feeding.

Appropriate entry points that can address the intergenerational effects of malnutrition and address the longer-term maternal nutritional problems should be explored and should include strengthening access to health care, as well as maternal micronutrient supplementation. As such, support to pregnant and lactating women should be improved through direct nutritional interventions like targeted supplementary feeding, as short term measures, through food assistance programs. The provision of micronutrient-enriched foods and promotion of diet

diversity within all food assistance interventions and food security and nutritional programs should be emphasised.

Vitamin A supplementation coverage should be strengthened to reach the recommended age groups twice yearly. Maternal iron and folate supplementation should be strengthened and scaled-up through complementary strategies to regular programs, such as community-based outreach programs that target the hard-to-reach. Additionally, an evaluation of the iron and folate supply chain, and related capacity and delivery systems is warranted. Delivery mechanisms should be strengthened by removing blockages that hinder the achievement of good coverage.

Access to basic health services to prevent and treat diarrhoeal-related illnesses, respiratory infections and fever should be supported. WHO's Integrated Management of Childhood Illness (IMCI) program is a promising entry point through which linkages between nutrition interventions and IMCI activities could be established at both community and facility levels.

An assessment of linkages between the nutrition findings and the state of household water and sanitation was undertaken. Related recommendations include increasing coverage of access to good sanitation and continued access to safe water with good quality and good management of household water. In conjunction, health and hygiene promotion should be strengthened to prevent and treat diarrhoeal illnesses, respiratory infections and fever. Moreover, in future studies, linkages should be established between hygiene practices, infant feeding practices and their impacts on malnutrition.

Food security and nutrition interventions that are integrated with food-based, economic empowerment programs should be scaled-up and targeted to both the poor and vulnerable and to the districts with the largest numbers of malnourished children. To monitor the impact of food price rises and the global economic crisis on communities and on child growth, support should be given to food security and nutrition information systems. Furthermore, supporting the government to develop and implement standardized national survey guidelines will enable good data quality and comparability. These same strengthened routine nutrition surveillance activities will allow early detection of changes in nutrition and health status through integration of the surveillance systems, including food security monitoring indicators, into government structures.

ix. Response analysis

The role and performance of Bangladesh's Social Safety Net programs were analyzed in response to the high food price crisis. In 2008, the largest targeted programs in terms of people assisted were the Primary Education and Stipend Programme, the Vulnerable Group Feeding program, the Vulnerable Group Development program, Test Relief, Gratuitous Relief and the cash-for-work "100-day Employment Programme."

The largest non-targeted program was the Open Market Sales price stabilization program. Between late 2007 and early 2008, three rounds of Open Market Sales took place and the assessment findings showed that this program reached 6% to 8% of households across the country.

At sub-national level, the divisions of Barisal, Chittagong, Dhaka, and Rajshahi received generally more assistance in 2007/2008 whilst divisions such as Sylhet and Khulna received comparatively less. Barisal and Rajshahi divisions had relatively high pre-shock (2005) poverty

prevalence rates. By extension, a greater percentage of households in these areas were poorer during the pre-shock period, and therefore had less capacity to cope with the shock of high food prices. Although many of the Social Safety Net programs had fairly large caseloads in Barisal and Rajshahi division, the pattern was not always consistent. Relevant factors that influenced the distribution of resources and assistance included not only poverty rates but also the size of the poor population. This would help to explain why large-populated areas such as Dhaka division received considerable assistance despite a relatively lower poverty rate.

In 2007/2008, humanitarian relief operations were mostly concentrated in Barisal and Khulna divisions, which were the areas most affected by Cyclone Sidr. Of the total households that received relief assistance in 2008, approximately two-thirds were from either Barisal or Khulna divisions. Barisal division also received a relatively large percentage of nutrition assistance during 2007/2008, as did Rajshahi division. Given the relatively higher rates of malnutrition in these divisions, such assistance seems warranted; both a Barisal (16.1%) and Rajshahi (15.2%) had global acute malnutrition rates exceeding the WHO emergency threshold (>15%).

Effective and efficient targeting of Social Safety Net assistance to the poorest and most deserving households is an ongoing concern for numerous stakeholders. Many studies have reported substantial inclusion and exclusion errors associated with various safety net programs. A 2006 World Bank report estimated that 27% of Vulnerable Group Development beneficiaries and 47% of Primary Education and Stipend Programme beneficiaries were not poor. A 2009 evaluation of the "100-day Employment Programme" in Bangladesh found that although 67% of participants were from the poorest 40% of the population, the remaining one-third, were from middle income or better off families.

The findings from this assessment complemented many findings from the earlier studies, strongly suggesting that improving targeting efficiency should remain a high-priority area for attention. For nearly all of the reviewed programs, more than one-half of program participants were found from within food secure households. The sole exception was Food-for-work where a relatively lower percentage of program participants (33%) were from food secure households.

Food-for-work programming in Bangladesh was significantly better targeted to the food insecure, with two thirds (67%) of its program participants having low or borderline food consumption scores. The remaining programs faired considerably worse with 31% to 41% of their program participants ranked as food insecure.

Earlier sources have produced targeting efficiency estimates for several Social Safety Net programs. Inclusion error estimates from this HFSNA survey are somewhat higher as compared to some earlier sources. Why targeting efficiency rates appeared to worsen during the 2007/2008 period is difficult to say. Given that the high food price shock affected nearly everyone regardless of wealth status, it could be that this perception contributed to less rigorous and less restrictive selection of beneficiaries. Regardless of the cause, these findings on targeting efficiency should be a major cause of concern for stakeholder institutions including both those administering social safety net programs, as well as those funding them.

Various Social Safety Net programs were examined at sub-national level for targeting efficiency. Within the Vulnerable Group Development program, Rajshahi division appeared to be the best targeted with approximately 54% of its caseload classified as food insecure. In comparison, Sylhet, division had a much smaller percentage of food insecure participants (29%) in its Vulnerable Group Development program coming from households with "poor" or "borderline"

Food Consumption Scores. The Test Relief program had some of the largest divisional-level differences in targeting efficiency. Over one-half (51%) of the Test Relief caseload in Rajshahi division were food insecure while the associated figure for Khulna (24.7%) was much lower.

Findings were analyzed to better understand the prevalence of malnutrition within households receiving Social Safety Net assistance. Almost 42% of acutely malnourished children were associated with households that received Food-for-work. The proportions of acutely malnourished children were also high within households receiving Nutrition Interventions (19%) and households receiving either Vulnerable Group Feeding or Test Relief (19%). In contrast, the proportions of acute malnourished children were considerably lower within households receiving relief (11%) and cash-for-work (8%) types of assistance.

The proportions of underweight children aged 6 to 59 months for the same Social Safety Net assisted households were also examined. A high proportion of children that were underweight were found within households receiving Food-for-work assistance (74%), Vulnerable Group Development assistance (50%), and Vulnerable Group Feeding assistance (41%). Only the Relief program (36%) was slightly below the national average (37.4%).

The majority (55%) of mothers participating in the Food-for-Work program were acutely malnourished by mid-upper arm circumference. The Vulnerable Group Development, Nutrition Interventions, Cash-for-work, and Test Relief programs also had a significant proportion of households with acutely malnourished mothers (all >20%).

Of all the Social Safety Net programs analyzed, Food-for-work clearly stood out in terms of its statistically significant associations with malnourished children and malnourished mothers. This was undoubtedly linked to the relatively higher rates of extreme poverty amongst households participating in Food-for-work programs. The 2007 IFPRI report on the relative efficacy of food and cash transfers found higher concentrations of extreme poor within food-for-assets or food-for-work programs.

The types of assistance needed by households and prioritization of these identified needs were analyzed. Just over one-half (51.2%) of households identified cash as their first-priority whilst food and employment were ranked second and third, respectively, as highest priority needs. As might be expected, the food insecure groups more frequently identified food as a first priority.

The high food prices of 2007/2008 in Bangladesh resulted in a serious deterioration of food security primarily due to inadequate household food access rather than inadequate food availability. The higher food prices compromised the ability of households in Bangladesh to meet their daily dietary requirements. This led to detrimental impacts on nutritional status for large segments of the population and likely contributed to longer term impacts for the many children and women that were already nutritionally compromised prior to the price increases. Thus, it can be concluded that that the food price hikes contributed towards maintaining the persistently high levels of all types of malnutrition. Both continuous and future support for integrated national food security and nutrition policies and programmes are critical. Equally important is the scaling up of community based programmes to improve food access and nutrition for vulnerable populations in Bangladesh.

1. Background

1.1 Background to the Bangladesh food price hikes

Multiple factors contributed to high and volatile food prices in Bangladesh through most of 2007 and 2008. A "perfect storm" of conditions at international, regional, and national levels came together to deliver a powerful economic shock to the nation's food security. Fuel and food prices on international markets were rising rapidly by late 2007, making headline news around the world. The world's cereal stocks, relative to overall utilization, fell to levels not seen in over three decades[1]. In important grain-exporting countries, world food prices were pushed higher by poor harvests, a rising demand for bio-fuels, and changing agricultural policies. Moreover, strong economic growth trends in numerous Asian economies, including China and India, further contributed to an increase in demand for limited global grain supplies.

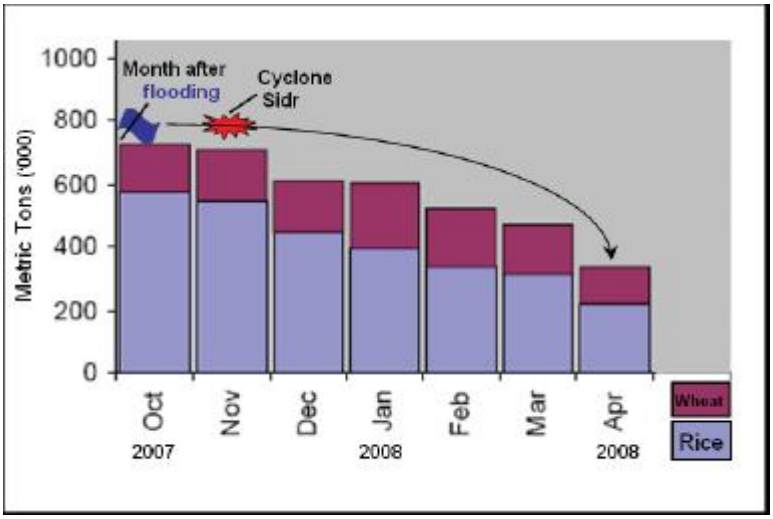
In June 2007, as millions of Bangladeshi farmers were planting their annual *Amman* season rice crop, South Asia's Monsoon rains were just getting started. Approximately one month later, torrential rains fell on the Himalayas of Nepal and neighboring India. Rivers swelled, and large volumes of water soon crossed the border into Northwest Bangladesh. By mid August, large swaths of Bangladesh's Amman rice fields were under water. According to estimates by Bangladesh's Flood Forecasting and Warning Centre/FFWC, over 42% of Bangladesh had been flooded by the end of the Monsoon season. These flood were the largest in nearly a decade and the third largest in more than 50 years[2].

In November 2007, less than two months later, Cyclone Sidr brought devastating destruction to coastal Bangladesh. Storm gusts were estimated at 240 kms/hour, tidal surges wreaked havoc on coastal communities, and torrential rains added to misery already inflicted by Monsoon rains. More than 3,000 deaths were associated with the disaster, property damage and asset losses were huge, and fishing and farming livelihoods were hit particularly hard[3]. Tidal surges swept large volumes of saltwater inland, which caused soil to become saline, and in turn led to damaged crops and reduced yields.

It is estimated that 1.4 million metric tonnes of *Amman* rice were lost in the 2007 floods and Cyclone Sidr[4]. Legitimate concerns regarding the adequacy of Bangladesh's food supply dominated the news and much of the public dialogue. Due to the rising prices on the international markets and flood-related domestic harvest losses, Dhaka-based newspapers published early warnings of future food crisis possibilities.

Although the GoB's public food stock/reserve levels were still relatively high (at approximately 800,000 MTs) when the floods of September 2007 struck, stock levels quickly fell after Cyclone Sidr and the subsequent large food relief distributions that followed. In a report by the Ministry of Food and Disaster Management, stock levels were described as "satisfactory" during the July to September 2007 period[5]. However, as both post-flood and post-cyclone relief and recovery operations expanded, stock levels fell, and by April, 2008, reached an approximate low of 350,000 MTs, as shown in Figure 1.1.

Figure 1.1 Public food stocks fall, following floods and cyclone monthly public closing stocks (October 2007 thru April 2008)



Source: Adapted from Ministry of Food and Disaster Management, Food Planning and Monitoring Unit/FPMU Food Situation Report; Vol. 74.

For Bangladesh's caretaker/interim government[6] of late 2007, replenishing the public stock was a clear priority as acknowledged in the GoB's Food Situation Report from the period:

> *"The government is trying to replenish the stock in view of heavy stock depletion due to increased distribution through VGF/Vulnerable Group Feeding and OMS/Open Market Sales over the coming months."*[7]

As the government attempted to navigate through a challenging set of circumstances associated with the high food price crisis, it faced considerable constraints, including:

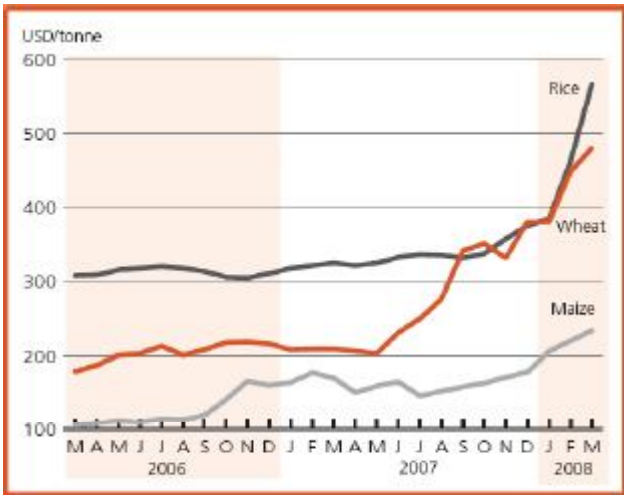
- *Decreasing public food stocks*. As the Government of Bangladesh's social safety net expanded, so did stock off-take;
- *A sellers market in procurement of domestic grain.* As the government attempted to replenish Public Food Distribution System stocks by buying grain on the local market, difficulties arose partly because of the gap between the purchase price set or "offered" by the government and the significantly higher price in the open market;
- *Rising international grain prices* making procurement on the international market more difficult and imports more challenging;
- *Decreased access to grain via regional markets*. Neighbouring grain-exporting countries, such as India and Vietnam, imposed grain export bans or set "minimum export prices" at prohibitively high levels, virtually stopping trade;
- *Higher import bills for costlier energy (fuel/oil) and food*. Import expenditures outpaced income/revenues from exports leading to a negative Balance of Trade. Prices for key export commodities such as ready-made garments and jute fell while prices for essential import items such as oil and rice increased. This resulted in deteriorating terms of trade, increased pressure on the Current Account Balance, and growing concerns regarding the government's fiscal deficits and potential impacts on macroeconomic growth and stability.

Most of these constraints received considerable attention in the literature;[8] however, issues such as regional trade barriers and the *challenges* to Bangladesh's macroeconomic stability were less well covered. The following sections provide further background.

1.1.1 Regional barriers to trade

In late 2007 and early 2008, cereal prices soared around the world, as shown in Figure 1.2. Numerous governments, including those in South and Southeast Asia, scrambled to secure adequate grain supplies to satisfy domestic demand and to shore up national stocks and reserves.

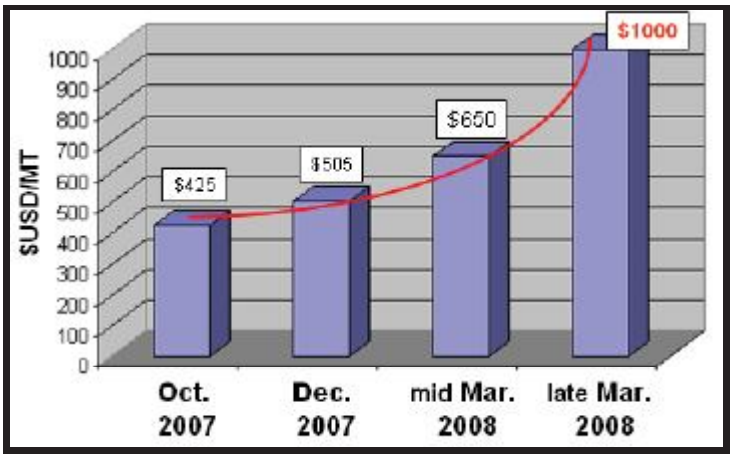
Figure 1.2: Selected international cereal prices



Source: FAO Crop Prospects and Food Situation; April 2008.

Grain exports came under increasing political and public scrutiny, and as a result, trade policies regulating exports changed. Countries that Bangladesh imports from, including India and Vietnam, were, or continue to be, subject to such pressures. As early as the summer of 2007, Vietnam placed a ban on new rice exports.[9] More importantly, India, which is by far the most important country for Bangladesh regarding rice imports, dramatically raised its minimum export prices between October 2007 and March 2008, and finally imposed an outright ban in April 2008. The graph in Figure 1.3 shows the progression of the extraordinary "marking up" of the minimum export price for Indian rice.[10]

Figure 1.3: India's changing Minimum Export Price (MEP) for rice



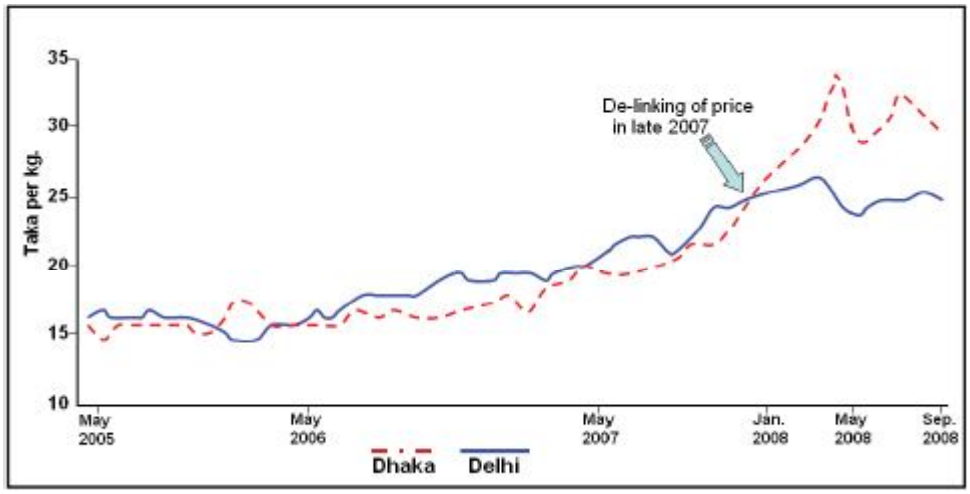
Source: MEP data from Government of India; Ministry of Commerce and Industry.

Following Cyclone Sidr, India made an exception for Bangladesh due to humanitarian considerations, and waived its own Minimum Export Price policy. A special export of 500,000 metric tonnes of rice was allowed under a one-time preferential condition.[11, 12] Aside from this

exception, difficulties associated with importing rice from India were a major factor that contributed to higher rice prices in Bangladesh.

The rice price in Dhaka has not varied greatly from the price in the Indian markets of Kolkata or Delhi, and in general, markets across borders are fairly well integrated. The import parity price has worked as a price ceiling for the domestic market in Bangladesh. Between 2005 and most of 2007, whenever Bangladesh's domestic price started to increase, the arbitrage in the rice market, through imports from India, stabilized the price so that it rarely went above the import parity price (IPP). However, the role of the IPP from India as a ceiling price was broken by the artificially high Minimum Export Price/MEP imposed in late 2007 and early 2008.[13] The MEP represented a barrier to trade which de-linked Dhaka's wholesale price from Indian wholesale prices, as shown in Figure 1.4.

Figure 1.4: Dhaka wholesale rice price vs. Delhi

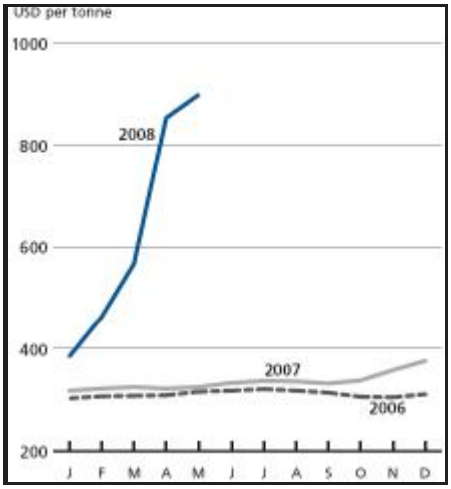


Source: Delhi data from Ministry of Consumer Affairs, Food and Public Distribution
Dhaka data from Ministry of Agriculture; Dept. of Agricultural Marketing

Private sector cereal imports from India have played an important stabilizing role for Bangladesh during post disaster periods. This role was highlighted by Del Ninno (2001) and others in an International Food Policy Research Institute study (IFPRI) of Bangladesh's devastating 1998 floods, "*. . . markets were stabilized by private sector imports of rice and wheat. Inflows of 1.3 million metric tonnes of rice from India kept prices from rising above import parity levels following the flood.*"[14] With India and Vietnam rice exports seriously curtailed during late 2007 and early 2008, Bangladesh's options for importing were quite limited. Exports from Myanmar to Bangladesh were planned but later cancelled after Cyclone Nargis struck in May 2008, destroying much of Myanmar's rice crop.[15]

Thailand, the world's largest rice exporter, continued to sell abroad albeit at a much higher price. The price of Thai export rice skyrocketed during early 2008, a period when Bangladesh was actively procuring on the regional and international markets. Between January and mid-May 2008, the prices of Thai export rice more than doubled, as shown in Figure 1.5.[16]

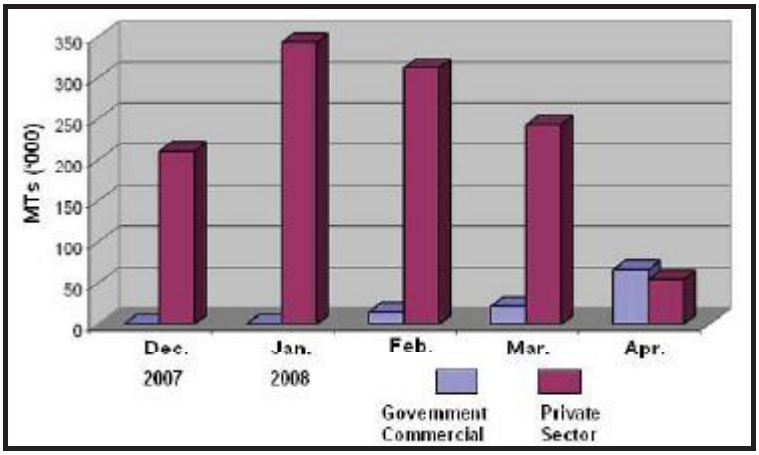
Figure1.5: Thai rice export price



Source: FAO Food Outlook (June 2008)

During early 2008, the large majority of Bangladesh's rice imports continued to come from India, mostly via the private sector, despite the very high minimum export prices. The chart in Figure 1.6 shows rice imports between December 2007 and April 2008, both through private sector channels and through the government's commercial channel.

Figure1.6: Quantity of rice imports into Bangladesh, (December 2007 thru April 2008)



Source: Adapted from Ministry of Food and Disaster Management,
Food Planning and Monitoring Unit/FPMU. Food Situation Report; Vol. 73.

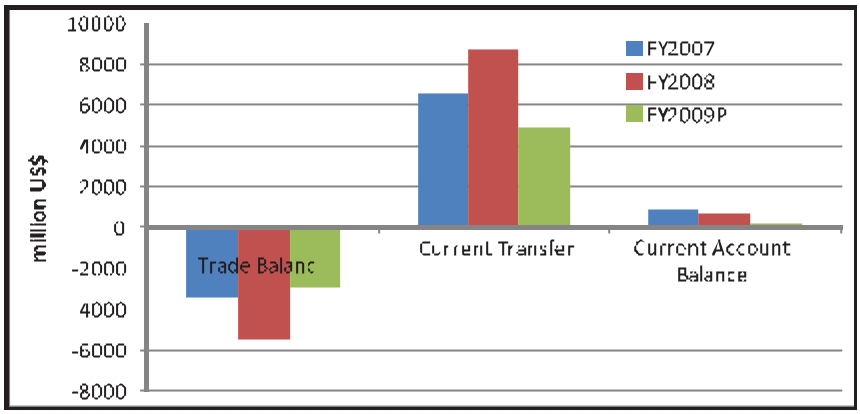
With India's Minimum Export Price set high, most of the private sector imports had Freight on Board (fob) costs ranging between USD 505 and USD 650 per tonne. With well over one million metric tonnes arriving during this four- to five-month period, the fob cost of rice imports alone easily surpassed USD 500 Million.

1.1.2 High food prices and challenges to Bangladesh's macroeconomic stability

Import costs rose significantly during fiscal year 2008[17] mostly due to soaring food and fuel prices. Although ordinarily the value of imports would normally exceed that of exports, the trade deficit ballooned from USD 5.7 billion in FY2007 to USD 9.3 billion in FY2008. On the other hand, Current Transfers grew during the same period, largely because of the strong growth in remittances from Bangladeshi workers abroad. Despite the growth in Current Transfers, the Current Account Balance shrunk largely due to the costly food and fuel imports.

The changes between fiscal years, as well as provisional estimates for FY2009, are shown in Figure 1.7.

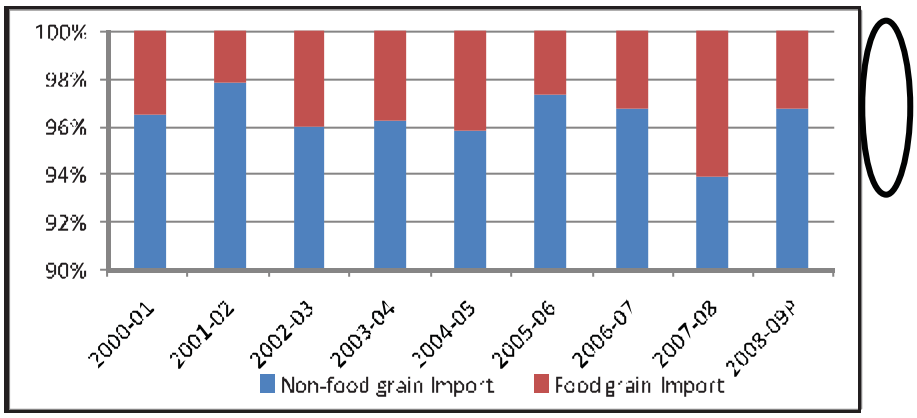
Figure1.7: Balance of payment situation during FY2007-2008



Source: Bangladesh Bank, Monthly Update (Feb 2009). P= Provisional Estimates up to Feb.2009

The fall in the Current Account was driven by substantial increases in the import bills for food and petroleum products. Compared to FY2007, import payments for food grains (rice and wheat) increased by 141% for FY2008. The associated increase for soya beans was 71% and for petroleum products 32%. The share of food grain imports in total imports rose to 6% in FY2008 from about 3% percent, which had been the average since FY2000.

Figure1.8: Share of Food Grain Imports in Total Imports



Source: Bangladesh Bank, Economic Trends (2009). P= Provisional estimates up to Feb.2009

Bangladesh's deteriorating terms of trade adversely affected the balance of trade in FY2008. This meant that addressing the food availability problem, via increased food imports, would be costlier. Letters of Credit were needed to facilitate the imports, and the value of these Letters of Credit surged as food prices continued to rise.[18]

Even before the rapid rise in food prices, terms of trade had been deteriorating for Bangladesh. For example, importing a barrel of oil in 2006 required the same amount of revenue generated from exporting 2.3 dozen ready-made garments. Only two years later, in 2008, the same hypothetical transaction would require 4.5 dozen ready-made garments–nearly twice as much. The deteriorating terms of trade for jute and rice was even more striking. Importing one tonne of rice in 2006 required the equivalent revenue generated from exporting approximately 0.5 tonne of jute. By 2008, more than three times as much jute (1.7 tonnes) was needed for the same transaction.[19]

Although the increased costs of food grain imports were mostly due to rising rice prices on the international market, costs were also driven higher simply because the volume of imported food (metric tonnes) also increased. In FY2008, the total imported metric tonnes of food rose by 43% in comparison to the previous year[20] and were 35% higher than the fiscal year 2006.[21]

The surging import costs and the challenges they posed to macroeconomic stability in Bangladesh became an increasing cause of concern for high-level officials within the Government. In March 2008, the head of the Government of Bangladesh's Ministry of Food and Disaster Management publicly stated at a seminar on Food Security at the National Press Club in Dhaka that "the price of rice has gone beyond the tolerable level."[22] One month later, the Head of the Ministry of Finance noted in a letter to the IMF that "the pressure on the balance of payments has intensified significantly and our current account balance is now negative for the first time in several years."[23]

Bangladesh's development partners, including the World Bank and the International Monetary Fund (IMF) were also expressing concerns about the import situation. Praful Patel, the World Bank's Vice President for South Asia, noted, "The country needs to import some two million tonnes of rice at a time when the availability of rice globally is limited. This is a very serious problem."[24] Maintaining adequate foreign exchange reserves was also an issue of concern, as noted by the IMF's Deputy Managing Director:

"The balance of payments has been adversely affected by the disasters, largely owing to a substantial rise in food imports, which has led to some pressure on international reserves. Support from the international community, including emergency assistance from the IMF, will therefore be crucial for financing needed imports while allowing international reserves to remain at about three months of import coverage."[25]

In early April 2008, the IMF approved over USD 217 million in emergency assistance for Bangladesh. The soft loan assistance to the Government of Bangladesh was both a direct response to the natural disasters and an indirect response to the food security and macroeconomic stability needs of the country.

With new loans and credit lines available from the international lending institutions, the Government of Bangladesh had enough "fiscal space" to maneuver. This was critical, not only for the continued financing of food imports, but also for covering additional expenses associated with the expanded social safety net. A comparison of the Government of Bangladesh's annual budget figures shows a 46% increase between fiscal year 2008 and fiscal year 2009 for food security social protection programs. The expanded social safety net for fiscal year 2009 would require an additional USD 316 Million.[26]

The emergency credit and financing had an additional benefit in that planned budget expenditures associated with longer-term development goals did not have to be compromised in order to address the short-term food security emergency needs. Keeping Bangladesh on track with the Millennium Development Goals (MDGs) and longer-term investments in social capital were issues of concern for both the Government of Bangladesh and its development partners. The World Bank's President, Robert Zoellick, when commenting on South Asia's development track in April of 2008 noted:

"I am particularly concerned about the risk of failing to meet the goal of reducing hunger and malnutrition, the 'forgotten MDG,' . . . reducing malnutrition has a 'multiplier' effect, contributing to success in other MDGs including maternal health, infant mortality, and education."[27]

A few months later, in June of 2008, the World Bank extended USD 320 million in credit, including USD 200 million for budgetary support. As noted in a press release from the period:

"The USD 200 million Transitional Support Credit (TSC) is designed to help reduce pressure on the country's current budget, staggering under the impact of the twin natural disasters of flooding and cyclone Sidr last year as well as the shocks of rising commodity prices, particularly oil, food, and fertilizer. This credit will allow the Government to protect its expenditures on core developmental priorities while maintaining fiscal sustainability."[28]

In retrospect, it seems reasonable to conclude that macroeconomic stability was successfully maintained during the food price crisis. As noted by the IMF in April 2009, Bangladesh's economy "remained relatively robust."[29] This was undoubtedly due to a combination of factors, including a bumper *Boro* harvest in May to June 2008, the fall in global commodity prices (especially fuel/oil and food), and relatively low inflation rates of 6% per annum, which represented a two-year low."[30]

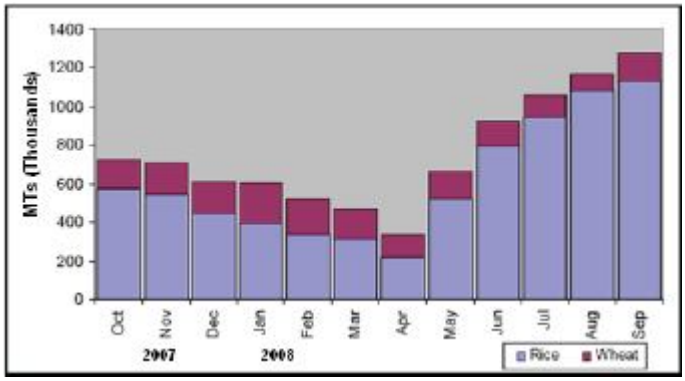
1.1.3 Bumper Boro 2008 harvest and food availability

By mid 2008, Bangladesh's food availability situation had clearly improved: a record breaking 17.8 million metric tonnes of *Boro* rice was harvested, 19% higher than in the previous year.[31] This was due to good weather and to an impressive farmers' mobilization campaign, a joint initiative by the Bangladesh Government and grassroots efforts whereby large quantities of agricultural inputs were mobilized as part of the post-disaster recovery efforts.[32]

The bumper *Boro* harvest meant that 29.8 million metric tonnes of food grain were available during the FY2007/2008 marketing year, a situation close to national self-sufficiency with regards to rice. Although the broader food security situation remained poor, mainly due to an unfavourable food access situation with food prices still relatively high, the country's food supply and aggregate food availability situation had improved.

Increased public procurement of widely available *Boro* rice and continuing food imports allowed the GoB to replenish the nation's public food reserves. The re-building and "turn-around" situation of public stocks can clearly be seen in Figure 1.9.

Figure1.9: GoB monthly public closing stocks (October 2007 thru September 2008)



Source: GoB MoFDM Bangladesh Food Situation Report; FPMU. July-September 2008, Volume 74, www.mofdm.go.bd

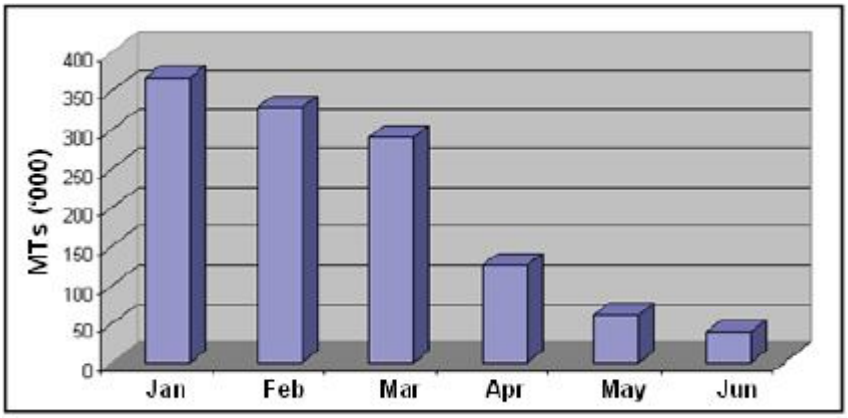
However, in spite of the increased food availability and the bumper *Boro* harvest, rice prices in domestic markets remained high during the months immediately following the harvest. In fact, rice prices actually increased from July to August 2008 and were well above 2007 price levels, as seen in Figure 1.10.

Figure1.10.: Nominal rice and wheat prices during 2008 and 2007

Source: Adapted from MoFDM, FPMU. Food Situation Report; Vol. 74.
Original data source Ministry of Agriculture, Department of Agricultural Marketing/DAM.

These unexpected rice price increases were probably related to a number of factors. The bulk of *Boro* rice takes numerous months to be sold in the markets. Two months post harvest is insufficient time for a bumper crop to effect lower prices in the market. Prices did eventually fall, but the decline did not begin until August/September 2008, nearly three months after the bumper *Boro* harvest. Although international rice prices had already begun to fall significantly in the May to June 2008 period, the price transmission or pass through effect also takes time. This lag could have contributed to the delay in falling Bangladesh rice prices. Additionally, rice imports into Bangladesh declined significantly during the first half of 2008. January 2008 imports were a substantial 367,000 metric tonnes, but each subsequent month brought a steady decline and by June 2008, monthly imports had dropped to just 39,000 metric tonnes, as seen in Figure 1.11. This tightening of import supplies likely contributed to the unexpected rising prices of July to August, after the *Boro* harvest.

Figure1.11: Bangladesh's declining rice imports (January thru June 2008)



Source: MoFDM, FPMU. Food Situation Report; Vol. 74

The higher food prices during the beginning of the 3rd quarter of 2008 would have allowed traders with sizable stock holdings to gradually draw down their inventories under favorable price conditions. By not releasing too much stock too quickly, traders could sell into a more gradual price decline.

While the macroeconomic level dynamics of the food price shock in both Bangladesh and globally has been well covered in the literature,[33] few studies have adequately examined the impacts of the shock on household food security and nutrition. This gap in the knowledge base, along with the more practical need to have an analysis that could help to inform programming and policy level decisions, provided the central rationale for undertaking the study and survey described in the subsequent chapters.

1.2 The food security and livelihood context in Bangladesh

1.2.1 Food availability

Rice is the most important food staple in Bangladesh, and provides approximately two-thirds of the population's caloric intake.[34] In addition to rice, other major crops grown and consumed in Bangladesh include wheat, potato, pulses, vegetables, oil seeds, and fruits. The large majority of food that is consumed in country is produced domestically. Both total rice availability and total utilization are approximately 32 million metric tonnes per year.[35] Bangladesh has become rice self-sufficient or moderately surplus producing, due to positive harvest outcomes in recent years.

1.2.2 Food access

Despite impressive progress in domestic food production, inadequate food access and resulting food insecurity are major problems for large segments of Bangladesh's population. The last official household income and expenditure survey of 2005[36] categorized approximately 40 percent of the population (56 million people) as "Absolute Poor," failing to meet minimum caloric consumption needs of 2122 Kcal per person per day. Within this population, 27 million people were categorized as "Hard-Core Poor," failing to consume 1805 Kcal per person per day, and 11 million were "Ultra Poor," failing to consume 1600 Kcal per person per day. The Hard-Core Poor and Ultra Poor represented just below 20 percent, and 8 percent of the overall population respectively.

Food insecurity affects both rural and urban households. Of the 56 million people classified as Absolute Food Poor in 2005, 41.2 million resided in rural areas and 14.8 million in urban areas. Of the 27 million Hard-Core Food Poor, 18.7 million resided in rural areas and 8.3 million in urban areas. Of the 11 million Ultra Poor, 7 million resided in rural areas and 4 million in urban areas.

1.2.3 Rural food insecurity

Numerous rural households continue to experience chronic as well as transitory food insecurity. Some of the most important contributing factors to food insecurity include inadequate access to land, unemployment or underemployment, debt, social exclusion or marginalization, and vulnerability to natural disasters.

A limited access to land compounded by a large and growing population is perhaps the single most important structural impediment to greater food security in rural Bangladesh. Other important pressures on the land include conversion of farm lands to non-farm use and land and river-bank erosion. Analysis of the HIES 2005 data confirms that the size of land owned is negatively correlated to the incidence of poverty (BBS 2007).

The major livelihood strategy in rural Bangladesh is subsistence agriculture either through cultivating one's own land or by working as an agricultural laborer. There are two pronounced

lean or hungry seasons. The first occurs in the March to April period, just prior to the *Boro* harvest; the second occurs in the October to November period, just prior to the *Amman* harvest. In addition to reduced food availability, a lack of employment and available labor opportunities are the most important factors contributing to seasonal rural food insecurity. A study published by TANGO and World Food Program (WFP) in 2006, focusing on rural food insecurity in WFP operational areas, reported that 15 percent of surveyed households suffer severely from food and livelihood insecurity and lack access to even minimum levels of physical, human, financial, and social capital.[37] These worst-off households had adequate food for only a quarter of the year and consumed only two meals per day. Average monthly per capita income for this group was very low at 674 taka, or approximately $10 USD per month. These households owned very few assets, and the average value of asset holding was approximately 91,000 taka, equivalent to less than $1350 USD. Many of these families are socially marginalized and lack access to either safety net or development assistance programs. An additional 32% of surveyed households were described as "vulnerable," with adequate food for 8 of 12 months in a year. Vulnerable households consumed fewer than 3 meals per day, and had low average monthly per capita incomes of 775 taka, or approximately $11.4 USD per month. Compared to the worst off households mentioned above, asset values for vulnerable households were considerably higher at 495,000 taka on average. However, with such valuations being equivalent to less than $7,300 USD, these households were also considered to be generally asset poor.

1.2.4 Urban food insecurity

Numerous factors contribute to urban food insecurity including unemployment, underemployment, and among job seekers, low levels of education attainment or low levels of marketable skills. Very difficult living conditions, particularly in urban slum communities, contribute to poor health, which in turn directly and indirectly contributes to food insecurity.

A recent IFPRI study on urban food security within major slum areas found that 29 percent of the slum population had expenditure levels associated with more severe food insecurity (< 1805 kcals/person/day), while 47.8 percent were food insecure (< 2122 kcals/person/day).[38] Urban slum households with smaller numbers of dependants tend to be more food secure. Similarly, the regularity or stability of wage employment was positively associated with food security. While many of the factors that contribute to urban food insecurity were equally attributable to urban slum and urban non-slum populations, comparing human development measures made distinguishing characteristics were more meaningful. For example, indicators related to literacy and educational attainment, were notably worse for urban slum populations, as compared to the broader urban population. The proportions of children "never attending school," or those who were illiterate, were notably higher within the slums. With regards to employment and participation within the work force, children from urban slum areas entered the work force considerably earlier than children living elsewhere in urban areas. Similarly, women living in urban slums had notably higher workforce participation rates as compared to women living in urban areas outside the slums.

1.3 The nutrition situation in Bangladesh

The rapid increase in food prices in Bangladesh over the past few years has raised serious concerns about impacts on the country's nutritional situation. Bangladesh is placed in the bottom 25% of the Global Hunger Index[39] (an *alarming situation* by its severity grade), an

annual report whose rankings within the context of the current food price hikes highlights countries that face the most risks.[40] The prospect for an improved food security and nutrition situation in Bangladesh became questionable within the context of volatile global food prices. As global prices were expected to remain elevated, there were worries about the negative effects of the crisis on households,[41] in particular the nutritional consequences on infants, young children, pregnant women, and lactating mothers. Food price increases can reduce quality and quantity of a household's food access, and these reductions are likely to have direct consequences on the nutritional status of vulnerable women and children.[42] Globally, households resorted to decreasing their consumption of micronutrient-enriched foods in response to the sharp increase in staple food prices. Depending on the nutritional status of the affected populations, this shift was expected to result in a myriad of detrimental health effects.[43]

In South Central Asia, this situation is further complicated by malnutrition rates that are among the highest in the world, with 45% of the 175 million children under-five years of age being malnourished. Taking into account the density and total population of the region, the highest absolute numbers of malnourished children under five years of age for both chronic (74 million) and acute (29 million) malnutrition[44] are recorded in South Central Asia This widespread high prevalence of malnutrition has far reaching effects on the quality of life and economic growth. Nearly 50% of child deaths in low-income Asian countries are due to malnutrition, and studies have estimated that Bangladesh loses 3 billion dollars each year as a result of the lower productivity and treatment costs associated with malnutrition.[45] Recent studies (FAO 2009) have estimated that the number of food-insecure people in Bangladesh increased by 7.5 million in 2007/2008, up 13% from the previous year, and that 43% of the population consumed less than the recommended minimum 2100 daily calories.[46]

Although UNICEF's 2008 global *Countdown to 2015* places Bangladesh among 16 countries that are "making progress" towards achieving Millennium Development Goal 4 on child survival; it also shows Bangladesh "on track" for achieving the underweight target of Millennium Development Goal 1.[47] The nutritional situation remains unacceptable with persistently elevated levels of underweight, chronic malnutrition (stunting) and acute malnutrition (wasting). Bangladesh has nearly nine million stunted children and it is the fourth country – after India, Indonesia, and Nigeria – of 36 countries with stunting prevalence greater than 20%, and totalling 90% of the estimated number of 178 million of all globally stunted children.[48] Undernutrition among children is a serious public health problem in Bangladesh. Underweight and acute malnutrition prevalences follow seasonal patterns. Every year during the so-called "hunger-gap" that precedes the harvest and corresponds to the Monsoon season from June to September, unemployment is high, many people fall ill, and families in resource-poor communities cannot afford to provide their rapidly developing young children with an adequate, nutrient-rich diet. Acute malnutrition rates are also higher in the aftermath of natural disasters, such as the all-too frequent floods and cyclones that affect the country.

The last nationally representative nutrition survey in Bangladesh (BDHS 2007[49]) was conducted over the period that coincides with the Monsoon season, a time that corresponds to the lean period in the country. While the prevalence of underweight and stunted children declined slightly between 2004 (BDHS 2004[50]) and 2007 from 43% to 36% in underweight and from 48% to 46% in stunting, respectively, there was no significant evidence of a consistent change in acute malnutrition rates over those years. The BDHS 2007 found that 41% (WHO 2006 standards) of the children younger than five years of age were underweight and 43.2% suffered

from stunting. Moreover, the global acute malnutrition rate was 17.4%, exceeding the internationally recognized standards used in identifying a nutrition emergency (>15% *critical situation*, WHO).

Infant and young child feeding practices in Bangladesh also present as matters of concern. According to the BDHS 2007, the exclusive breastfeeding of children under six months of age has not improved in the past 15 years; the figure has remained static at 42% to 45% since 1993-94. Initiation of breastfeeding within the first one-hour after delivery is low (24%), while in most cases, complementary food is either introduced too early or too late with low quality and quantity of complementary foods. The BDHS 2007 found that 74% of children aged from six to nine months received complementary food in comparison to the 1993-94 finding of 29%. The complementary foods most commonly given to this age group were those made from grains such as rice and wheat that is made into porridge. Only one-third of these children received fruits and vegetables rich in Vitamin A and no more than 16% of children were fed meat, fish, poultry, or eggs.

The nutritional status of women as measured by body-mass indices showed that 30% of mothers were chronically malnourished with measurements less than 18.5%. Although this finding was an improvement from 34% (BDHS 2004) to 30% (BDHS 2007), the figures still remain high and imply a high risk for poor nutritional status in their children. Nutrition surveys carried out during the past decade all confirm that women in Bangladesh have low-quality diets. In particular, the diets of women in rural Bangladesh are dominated by starchy staples, like diets of the poor in many settings,. A 2008 study of women in rural areas of Bangladesh found that starchy staples (largely rice) contributed to 86% of the total daily energy consumed. The same study highlighted that all of the micronutrient intakes, except for zinc, were very inadequate.[51]

Micronutrient deficiencies among women and children in Bangladesh are major public health problems. Anaemia is often used as a proxy indicator for the prevalence and severity of iron deficiency, and its causes include low iron intakes due to poor dietary quality, low fish or meat intake, infections and pregnancy, as well as parasitic infections. Anaemia is associated with higher risks for maternal ill health and mortality, and can have devastating impacts on the cognitive and motor development of an entire generation of children with further-reaching implications for human capital, labor productivity, and economic losses. Iron deficiency anaemia is one of the most notable micronutrient deficiencies in the country. Findings from the HKI/IPHN National Anaemia Survey in 2004 showed that 68% of children aged 6 to 59 months were anaemic with the highest prevalence among infants aged 6 to 11 months (92%). In this same study, the prevalence of anaemia was lower in children that had been de-wormed.[52] The anaemia prevalence was also lower in children that had eaten animal source foods (66.5%) at least one day in the week prior to the survey than those children who had not (87.7%).

In Bangladesh, anaemia has been found in 46% of pregnant women, 39% of non-pregnant women,[53] and in more than one-third of adolescent girls (39.7%), predominantly as a result of depleted iron stores during pregnancy and lactation, a consequence of repeated infections, and largely due to poor intakes of foods rich in iron and folic acid. This implies that a large proportion of women become pregnant when they are malnourished, impacting on intrauterine development and pregnancy outcomes.[54] In the context of the food-price increases in Bangladesh, this situation is expected to deteriorate as the interventions that support

maternal nutrition in addressing these problems, such as postpartum Vitamin A supplementation and iron and folic acid supplements, are inadequate on their own.

Ensuring that children consume Vitamin A enriched foods and/or receive sufficient Vitamin A supplements reduces the severity of potential infections such as measles, diarrohea, and the incidence of night blindness. In Bangladesh, the Vitamin A supplementation program for children younger than five years of age has been successful at keeping night blindness levels below 1% since 1997, and although the last survey on night blindness was conducted in 2005, anecdotal evidence suggests that the trend is continuing. UNICEF's *Global Countdown to 2015* reports a decline in Vitamin A supplementation for children 9 to 59 months of age from 87% (2003) to 82% (2005), but this trend appears to have reversed with the BDHS 2007, which reported coverage of 88%. The MICS 2006 appears to support this improvement with a reported 89% of children aged 9 to 59 months receiving Vitamin A within the previous six months; coverage was lower for children living in the tribal areas (82%).[55]

Despite the fact that access to Vitamin A has increased for children since 2004, the prevalence of night blindness remains high among women with rates of 2.4% among pregnant women and 2.7% among lactating women, well above the WHO cut-off point of 1%, an indicator of a public health problem. The reported coverage of postpartum women in Bangladesh receiving a single dose of Vitamin A within six weeks of giving birth is contradictory. The BDHS 2007 reported an increase in coverage of 20% from 15% in 2004 (BDHS) while the 2007 EPI Coverage Evaluation Survey reported a higher figure of 35% and the MICS 2006 reported a lower 17% coverage. Nonetheless, these figures all remain unacceptably low. The MICS 2006 also found large socioeconomic disparities in postpartum Vitamin A supplementation. About three times as many mothers in the richest quintile received Vitamin A supplementation as did those in the poorest quintile. The same disparity exists between mothers with secondary education relative to those with no education. Interventions that support maternal nutrition in addressing these problems, such as postpartum Vitamin A supplementation and iron and folic acid supplements, are still inadequate.

1.4 Summary

The Government has developed various policies, strategies, and organizational structures to address malnutrition among women and children, but the delivery of nutrition services remains weak. Nutrition programming is hampered by a lack of coordination among the many actors involved, limited institutional capacity, and in most of the country, inadequate linkages between the Government's health care structure and communities. There is presently no national body with full responsibility and authority for coordinating nutrition activities, and there is no overarching framework existing for the many different types of activities that are underway. Outside of the National Nutrition Project, which covers about 20% of the population, neither local health services nor communities provide services for malnourished children, and government support to and the monitoring of organizations involved in nutrition is largely non-existent.

Thus, the government health care system provides basic medical treatment for undernourished children but no other nutrition services with the exception of Vitamin A supplementation. Given the estimated magnitude and consequences of acute malnutrition, programs to manage acute malnutrition in the communities would seem imperative. However, the recently developed national guidelines for the management of severe acute malnutrition have yet to

become operational although the Ministry of Health and Family Welfare (through the Institute of Public Health Nutrition), with UNICEF support, are developing plans for training health facility staff in their use.

In light of the present nutrition situation, the price increases in food items could have a large impact on the affected population in Bangladesh, especially among vulnerable infants, young children, and pregnant and lactating women. Their nutritional needs are most vulnerable to inadequate quality and quantity of food or insufficiently nutritional diets, and result in increased acute malnutrition rates and micronutrient deficiencies. Even among households consuming sufficient and adequate foods, an increase in staple food prices is likely to cause an increase in micronutrient deficiencies before an observable weight loss, as these households sacrifice dietary diversity in order to maintain a consistent level of staple food consumption.

It is likely that food prices will remain high in the near term, leading to food and nutrition insecurity for populations around the world including Bangladesh.[56] The effects of the food-price crisis on vulnerable children who are made even more vulnerable by their existing poor nutritional statuses are cause for concern. Moreover, the inability of households to provide adequate nutrition for pregnant and lactating women and the resulting long-term consequences on infants' future health and productivity as a result of high food prices today is particularly worrisome.

Taking into consideration the context of the food price hike in Bangladesh, the linkages between the food security situation and the nutritional status of children and women in Bangladesh, it was crucial to better understand the impact of the food price hike on the already tenuous nutrition situation in order to best formulate appropriate responses to the main needs and address the causes of malnutrition. As emphasized in the recent IFPRI report on the global food crises, there is an urgent need to know how countries, such as Bangladesh, are affected by volatile food prices, in order to ensure that effective responses are developed to assist those who need it most.[57] Thus, the WFP/UNICEF/IPHN Household Food Security and Nutrition Assessment (HFSNA 2009) was the first national food security and nutrition survey to be undertaken in Bangladesh to better understand the impact of the food price hike on household food security and nutrition.

2. Objectives and methodology

2.1 Partnership

The Household Food Security and Nutrition Assessment 2009 (HFSNA 2009) was jointly undertaken by the Government of Bangladesh's Institute of Public Health Nutrition (IPHN), the World Food Programme (WFP), and the United Nations Children's Fund (UNICEF.) The food security component and market analysis were led by WFP and the nutritional component by UNICEF with IPHN. A Technical Committee provided inputs throughout the entire assessment process and was composed of technical experts from WFP, UNICEF, IPHN, the Directorate General Health Services (DGHS), the Ministry of Health and Family Welfare (MOHFW), the Food and Agriculture Organization (FAO), the Bangladesh Bureau of Statistics (BBS), Mitra and Associates, and Helen Keller International (HKI).

2.2 Objectives of the assessment

2.2.1 General objective

The assessment aimed to analyze the current impact of the food price hikes on food security and nutrition and health status through the capture of changes in household food and nutrition security over time in order to suggest response options and recommendations for the short and medium term.

2.2.2 Specific objectives

The assessment's specific objectives were disaggregated across five components:

- Market analysis
- Household food security
- Nutrition and health
- Water and sanitation
- Response options and recommendations

Market analysis

- To better understand the performance of food markets during the high food price crisis;
- To examine and understand specific food market issues including market integration, price transmission, trade performance, and access to credit.

Household food security

- To understand food security dynamics and relative levels of food insecurity in the Bangladesh population, particularly in terms of differences between urban and rural areas;
- To establish the magnitude of the food-price increases and the impact of high food prices in different areas and administrative divisions of the country;
- To better understand the impact of high-food prices on specific demographic and livelihood groups, with details on the socio-economic characteristics of these groups.

Nutrition and health

Nutritional status

- To determine the prevalence of global and severe acute malnutrition, underweight, and stunting among children aged 6 to 59 months;
- To determine the prevalence of acute malnutrition by mid-upper arm circumference among women with children from 0 to 59 months and pregnant women.

(i) Infant and young child feeding

- To gain a better understanding of infant and young child feeding practices for children aged 0 to 23 months;

(ii) Infectious disease and mortality

- To estimate the prevalence of common illnesses among children aged 6 to 59 months and in the general population and health seeking behaviors in the two weeks prior to the survey;
- To estimate the crude mortality rate and under-five mortality rate in the six months prior to the survey.

(iii) Access to health services

- To estimate the proportion of children aged 6 to 59 months who received Vitamin A supplementation in the 6 months prior to the survey;
- To estimate the proportion of postpartum mothers who received Vitamin A supplementation during the first six weeks after delivery;
- To estimate the proportion of pregnant women who received iron/folate supplementation during their last or current pregnancy.

Water and sanitation

- To estimate access to safe water among households;
- To estimate the coverage of latrines among households.

Response options and recommendations

- To make recommendations to WFP, UNICEF, and partners on the priority and most urgently needed and priority interventions and/or programming changes in the food security and nutrition sectors in Bangladesh.

2.3 Methodology

Data collection was undertaken from November 11th, 2008 to January 19th, 2009 during the *Amman* harvest season. The nationally representative food security and nutrition assessment included 10,378 households. The market/trader component surveyed 180 markets and interviewed 900 traders.

2.3.1 Sampling frame

Sample size estimates were made to ensure that key indicators would be statistically representative at the national, urban, rural, and divisional levels. Sample sizes were calculated with a 0.05 statistical significance (95% confidence interval) for the key indicators (See Table 2.1). Based on previous surveys, assumptions were made that each household would have an average of one child aged 6 to 59 months of age, a household size of six members and one

mother. Prevalence estimates were based on the BDHS 2007 survey, which estimated acute malnutrition at 16%, stunting at 50%, and an underweight prevalence of 48%.

Table 2.1 . Assumptions and required estimated sample size for selected nutrition and health outcomes by each geographical zone

Indicator	Target Population	Prevalence	Precision	DEFF	Sample Size (households)	Non-response 10%	Number of target population per household	Number of households needed (by division and area)	Number of households needed (National)
Acute malnutrition	6-59 months	16%	± 5	1.5	310	344	1	344	2064
Stunting	6-59 months	50%	± 5	2	769	854	1	854	5124
Underweight	6-59 months	48%	± 5	2	769	854	1	854	5124
Vitamin A postpartum	6-59 months	95%	± 10	2	37	41	1	41	246
Maternal MUAC Pregnant & women w/ children	0-59 months	15%	± 5	2	392	435	1	435	2610

As two-stage cluster sampling was used, the sample size was increased by a factor that would allow for the design effect; thus, design effects of 1.5% for acute malnutrition and 2% for stunting and underweight were used, and the 5% desired precision was based on the estimated prevalence of the BDHS 2007.

Based on a crude mortality rate of 0.22 per 10,000 per day, a confidence interval of 95%, a precision of 0.05, a design effect of 1.6, and a calculation of rates for a 90-day recall period, a total of 2,000 households per division would have been required. The number of required households assumed a household size of five persons. The under-five mortality rate was estimated to be higher at 0.6 per 10,000 per day and a sample size of 5,400 households per division would have been required, which meant that mortality could be extrapolated for national, urban, and rural areas.

The size of the household sample required for statistical comparisons of the food security situation between states could not be calculated in the same way because there is no single food security indicator that can represent the multiple dimensions of food security and that can be used as a basis. However, as over 10,000 households were to be surveyed nationally, this sample size was deemed sufficient to be used in food security comparisons between divisions and even at lower levels of disaggregation (between population groups).

The sampling universe for this assessment, as created for the 2001 national census (PCPRB 1999), consisted of approximately 147 million people residing in 259,532 enumeration areas (EAs) in all six divisions of Bangladesh. An EA is a geographic area consisting of a convenient number of dwelling units that serves as the counting unit for the census, with an average size of around 100 households. It contains information about its location, the type of residence, the number of households and the total population. In rural areas, an EA is made up of one or more than one *mouza,* or a part of it. In urban areas, An EA is made up of a *mohallah* or a part of it. The distribution of the residential households by division and by type of residence is shown in Table 2.2 below.

As in the BDHS 2007 sample, the assessment was a representative sample for the country as a whole, for the urban and the rural areas separately, and for each of the country's six divisions.

Thus, the assessment had nine report domains in total:

A. Bangladesh
B. Urban areas of Bangladesh
C. Rural areas of Bangladesh
D. Barisal Division
E. Chittagong Division
F. Dhaka Division
G. Khulna Division
H. Rajshahi Division
I. Sylhet Division

Table 2.2.: Distribution of residential households by division and by type of residence

Division	Rural	Urban	Total
Barisal	1,395,841	224,152	1,619,993
Chittagong	3,272,768	1,084,327	4,357,095
Dhaka	5,354,901	2,660,128	8,015,029
Khulna	2,454,713	613,803	3,068,516
Rajshahi	5,622,302	962,116	6,584,418
Sylhet	1,196,195	162,970	1,359,165
National	19,296,720	5,707,496	25,004,216

2.3.2 Sample design

Household sample. Conditions among the urban versus rural population and between divisions would be expected to vary, given, for the assessment, the potential high intra-division variability in the outcomes of interest. Therefore, sample size was calculated per division, and by rural and urban on the basis of probability proportional to size. For this reason, sample areas were further stratified by separating each division into urban and rural areas.

First stage of sampling. Sample clusters were used as the first-stage sample, and 361 EAs were selected with probability proportional to the EA size. Some of the selected EAs were of a large size. Therefore, EAs having more than 300 households were further segmented and only one segment was selected for the assessment, with probability proportional to the segment size. Thus, a cluster was either an EA or a segment of an EA. Table 2.3 shows the sample allocation of the selected clusters by division and by area.

Table 2.3.: Sample allocation of clusters by division and by area, in Bangladesh

Division	Rural	Urban	Total
Barisal	32	16	48
Chittagong	38	24	62
Dhaka	42	36	78
Khulna	35	20	57
Rajshahi	46	23	69
Sylhet	32	15	47
National	**227**	**134**	**361**

Second stage of sampling. The sampling unit was defined as the "household" and therefore, household selection was the second stage selection for the sample. A household was defined as persons routinely sharing food from the same cooking pot and living in the same compound or physical location or dependent family member living home or abroad. Members of a household may not necessarily have been relatives by blood or marriage. If a polygamous family lived and ate together, they were considered to be one household.

After selecting the clusters (EAs or a segment of an EA), a household listing operation was carried out in all to obtain the sampling frame for the selection of households. Each household had an equal probability of being selected. Accordingly, the systematic selection of 30 households was achieved per cluster. A spreadsheet was prepared for the household selection with selected household numbers calculated for each cluster and a sampling interval established. Only the pre-selected households were interviewed. In order to prevent bias, no replacements and no changes of the pre-selected households were allowed. To ensure that the required number of children for estimating the prevalence of acute malnutrition, stunting, and underweight was met, a decision was made to increase the household numbers from 30 to 35 households in each of the clusters allocated per division.

If household members were not present during the assessment, the team returned to the household later to interview the missing household member, or when it was possible, community members were requested to find the missing household member and bring them personally to the house. Households were visited at least twice in an effort to identify household members, particularly if a household member had departed permanently or was not expected to return before the assessment team was required to leave the village. The minimum age of respondents for the assessment was 15 years of age. Occasionally, if a respondent felt he/she could not provide accurate information, houses were revisited. If accurate information could not be obtained on subsequent visits, those questions were marked as missing in the questionnaire. Table 2.4 shows the sample allocation of the selected households by division and by area.

Table 2.4: Sample allocation of households by division and by area, in Bangladesh

Division	Rural	Urban	Total
Barisal	558	96	654
Chittagong	1413	446	1859
Dhaka	2183	1059	3242
Khulna	1081	238	1319
Rajshahi	2296	376	2672
Sylhet	558	74	632
National	**8089**	**2289**	**10378**

The aim was to visit a total of 10,378 households, more than 100% of the minimum sample required in accordance to an estimated sample size calculated with support from the CDC in Atlanta, GA, USA. After the data was cleaned, all of the sampled areas (divisions, rural, urban, and national) exceeded the minimum sample sizes for all the indicators except for Barisal and Sylhet divisions. These two divisions attained 76.5% and 74% of the required samples for stunting and underweight respectively.

Traders' sample. The trader survey was conducted in the selected clusters to match with household catchments areas. However, due to resource constraints, only one-half (180) of the 361 clusters were surveyed. These markets were randomly and proportionally selected to the distribution of the clusters among rural and urban areas. If there was no market in the selected enumeration area, the market, where most of the households of the enumeration area usually went to, was visited. The decision to select such a market was made after consulting two to three key informants of the enumeration area (e.g. chairman, school head, civil servant, etc.). Once in the market, five traders were interviewed using a systematic random selection of two wholesalers and three retailers/shop keepers. If there was no wholesaler in the market, the interviewer selected five retailers/shopkeepers. If there were fewer than five retailers/shopkeepers in the market, the existing ones were interviewed. If there were many different types of traders (e.g. cereal traders, vegetable/fruits traders, meat/poultry traders, etc.) in the market, at least two out of five traders selected would be cereal traders.

2.3.3 Data collection

Data collection was undertaken by Mitra and Associates during the *Amman* harvest season, from November 11, 2008 to January 19, 2009. All interviews were conducted in Bangla or in a local dialect and data was recorded onto paper questionnaires.

Prior to actual data collection, a two-day training session was held, including both classroom training and real life pre-testing with actual traders in the field. This allowed for clarification of questions and procedures and led to some modifications in the finalization of the questionnaire. An interviewer's manual was created that was used as a key reference for the training. The manual covered all aspects of the interviewing and data collection processes, with guidance and tips tailored for specific modules and sections of the questionnaire. Sufficient time was dedicated to reviewing each of the questions on the questionnaire format. Trainers explained to enumerators the importance of completing all questions, and were instructed on how to manage the "no" answer or "no response" situations. The team leader and analyst presented trainees with the survey plan. A discussion session followed with questions and answers for clarification. The method, steps, and procedures for selecting traders to be interviewed were thoroughly explained.

During the survey field work, supervisors reviewed the completed questionnaires on a regular basis, providing guidance and feedback to the enumerators and ensuring data quality control. Responses that indicated a need for clarification were flagged and then clarified in a timely manner.

Macroeconomic performance analyses. The macro-level impact analysis utilized relevant secondary data sources and included a literature review. Critical events preceding the food price shock were reviewed within the context of macro-level food availability. Events and developments pertaining to public food stocks, imports, procurement (both domestic and international), and production were examined. Regional trade, including barriers to trade, price trends, and macroeconomic stability issues were also considered.

Market analyses. An analysis of market performance was conducted using a combination of primary data from the trader's survey and secondary price data. The analysis of the traders survey data focused on numerous topics including the availability of food on local markets, food flows (including volumes and quantities sold), prices (both actual and expected trends), and perceived reasons for price increases. Other topics analyzed were profit margins, access

to credit, constraints to trade, and the capacity of food markets to respond to increased demand.

Household food security. The analysis of the impact of high food prices on household food security relied primarily on an extensive household survey. A literature review of existing secondary data was also undertaken for the purpose of providing contextual analysis whenever appropriate (i.e. baseline information versus survey findings).

The analysis of the household food security survey data focused on numerous topics including changes in livelihoods and income sources, the effects of inflation on income, changes in wages, salaries and purchasing power, and changes in the "net seller or net buyer status" of agricultural households. The impact of higher food prices on food and non-food expenditures was also examined, as was the impact of other "shocks" and the seasonality and timing of such "shocks." Extensive analysis was undertaken on household coping strategies and food consumption, using a food consumption score. The score was based on both dietary diversity and the frequency of various foods consumed. The analysis of the food consumption scores was central to the overall household food security analysis. Households were grouped into various food consumption groups based on their scores, and a profiling of groups by food security status and socioeconomic characteristics was produced.

Nutritional status of children. Enumerators measured the weight, length/height, and mid-upper arm circumference of children and assessed for the presence of nutritional oedema. However after quality check methods were employed, due to unreliability of the collected data, a decision was made not to present the mid-upper arm circumference and oedema results. Children were weighed to the nearest 100 grams using an electronic UNICEF Uniscale. For children younger than two years of age, or less than 85 centimetres, their length was measured to the nearest millimetre in the recumbent position using a standard height board with a precision of 0.1 centimetres. Children that were two years of age, or equal or greater than 85 centimetres were measured in a standing position. A seasonal calendar was developed in order to estimate the child's age as accurately as possible.

The analyzed nutritional indices were:

a) Acute malnutrition: Weight-for-length/height Z-score (WHZ)
b) Chronic malnutrition: Length/height-for-age Z-score (HAZ)
c) Underweight: Weight-for-age Z-score (WAZ)

The nutritional statuses were defined as follows:

a) Severe malnutrition: < -3 Standard Deviations (SD)
b) Moderate malnutrition: < -2 SD and ≥ -3 SD
c) Global malnutrition: < -2 SD

Infant and young child feeding practices. Enumerators asked questions regarding infant and young-child feeding practices to all mothers with a child aged from birth to 23 months in the surveyed households. The indicators were related to breastfeeding practices and the introduction of complementary food in time, quantity, and quality (diet diversity). The following indicators are analyzed in Chapter 5:

- Exclusive breastfeeding
- Continued breastfeeding at one year and two years

- Proportion of infants 6 to 8 months of age who received solid, semi-solid, or soft foods
- Minimum meal frequency
- Minimum diet diversity
- Minimum acceptable diet

Nutrition and health status of women. Mid-upper arm circumferences were taken from the mothers of children aged from birth to 59 months of age or from pregnant women to measure their nutritional status. Information was also collected regarding micronutrient supplementation with Vitamin A post-partum and iron and folate supplementation during pregnancy. Vitamin A capsules and iron and folate tablets were shown to the women in order to avoid any misunderstanding.

Health of children. Caregivers were asked if the child had been ill during the two weeks prior to the assessment, what illness the child presented with, and if the child had been taken to a health facility. The coverage of Vitamin A supplementation in children from 9 to 59 months was also assessed. Vitamin A capsules were shown to the caregiver in order to avoid confusion.

Health of the general population. Households were asked if any household member had been ill in the two weeks prior to the assessment, the main cause of illness, and if treatment had been sought outside the house.

Mortality. Mortality was assessed using the retrospective household census method. Respondents were asked the following information:

- Number of persons in the family, and specifically, how many were children under five years of age;
- Number of deaths in the family in the six months prior to the assessment, and how many were children under five years of age;
- Presumed cause of death.

The death rate was calculated for the total population (crude mortality rate) and also for the children under-five years of age (under five mortality rate) as follows:

$$MR = n/[((n+N)+N)/2]$$

n = number of deaths during the period,

N = number of living people on the day of the assessment.

The mortality rate is expressed per 10,000 persons and per day:

$$MR/10,000/day = MR \times 10,000/\text{number of days in the period}.$$

Water and sanitation. The assessment was not specifically designed to investigate the water and sanitation situation in depth. However, with the aim to better support findings and interpretation of the nutritional data, a number of questions regarding access to safe water sources and the types of toilet facilities used were included. The same questions were used to describe the situation at the moment of the assessment and twelve months previously. The aim of this exercise was to identify any relevant changes in the household water and sanitation situation and any relevant differences in the households' behaviours. The assessment included only quality criteria and did not assess methods for collecting and supplying water.

The analyzed indicators were:

- Access to safe source of water
- Treatment of drinking water

- Use of toilet facility
- Sharing of latrine at household level

Response option analyses and programming recommendations. The analysis of response options and programming recommendations had two interrelated parts. Firstly, there was an analysis of the actual response to the high food price "shock" with a focus on Government of Bangladesh Social Safety Net assistance and priority needs, as identified by households. Secondly, conclusions and programming recommendations followed. The analysis of Social Safety Nets addressed issues such as:

- The percentage of the population participating/benefiting from major Social Safety Nets programs;
- The efficiency and targeting, including inclusion errors;
- The prevalence of food insecurity or malnutrition within the caseloads of various programs.

The subsequent analysis of needs looked at the types of needs identified by households and the related issues of prioritized needs.

2.3.4 Training and supervision

Training for assessment team members included five days of classroom instruction and practice and one day of pre-testing of all assessment procedures, including conducting interviews and anthropometric measurement. Emphasis was placed on sampling procedures, understanding of the questionnaire, and for the team leader/supervisor, accuracy of recording as they were given responsibility for this activity. Training of the enumerators included a general presentation on food security and nutrition and their linkages. The individual questions were reviewed through a classroom-based activity on the household questionnaires, the purpose of which was to assess understanding of the questions' rationale and potential possible answers. Anthropometric measurements were reviewed during a one-half day training session. Additionally, training included discussion of each assessment question, practice reading, and role playing. As a part of their training, interviewers assisted in the pre-testing and revision of questionnaire questions in order to ensure clarity and cultural appropriateness.

Using a convenience sample of children brought to the training site, all enumerators were taught to measure and record height, length, weight, MUAC, and nutritional oedema for children and to measure and record MUAC for women.

Issues regarding privacy and confidentiality were also covered during the training. Interviewers were instructed not to discuss any of the details of the interviews or any of the personal information obtained during the household interviews.

Twelve assessment teams were formed. Each team included five household interviewers (at least one of whom was a woman), two anthropometric measurers, and one supervisor. The supervision team consisted of two supervisors, six interviewers, six quality-control officers from Mitra and Associates, and a supervisory team composed of IPHN and WFP field staff. A field pilot testing was conducted in Dhaka.

2.3.5 Data entry and analyses

Following the field data collection period from November 2008 to January 2009, Mitra and Associates carried out data entry in February 2009. Data analysis was undertaken by WFP and

UNICEF utilizing two separate software systems: ANTHRO 2005 for the anthropometric data and SPSS 16 for the food security, market, health, additional nutrition variables, and water and sanitation data. The anthropometric indices were calculated and reported using WHO 2006 growth standards. Additionally, anthropometric findings calculated with NCHS/CDC/WHO 1977 references are reported in Annex 10.3, Table J.

To allow for the stratification of the sampling, the data was transferred to SPSS 16 with the module *Complex Samples* to calculate the confidence intervals at 95%. The analysis of the linkages of the malnutrition indices with the underlying causes of malnutrition was carried out using results based on the WHO 2006 growth standards. The statistical tests of Chi-square of Pearson and Anova were used to test these links. A p-value <0.5 was considered to be statistically significant.

A household weighting factor was used to correct the weight of each household for the division and urban and area assessments. The factor was also used to estimate the national prevalence, proportional to the weight of each division.

The following lower and upper SD boundaries were the set "flags" limits used to identify any extreme or potentially incorrect Z-score values for each indicator:

Figure 2.1: "Flags" for the anthropometric data

WHO 2006 growth standards

Indicator	Lower SD	Upper SD
WAZ	-6	+5
HAZ	-5	+5
WHZ	-5	+5

NCHS/CDC/WHO 1977 reference

Indicator	Lower SD	Upper SD
WAZ	-6	+6
HAZ	-5	+5
WHZ	-4	+6

Following these criteria, 63 cases for WHZ, 172 cases for HAZ, and 15 cases for WAZ were excluded for incorrect Z-score values (flags).

2.3.6 Consent

All respondents received a verbal explanation of the assessment for both the household assessment and the traders' surveys. At the beginning of each questionnaire, a paragraph requesting consent from the interviewee was read; consent or refusal was recorded on the form by the interviewer. Households were informed that the assessment was confidential. Participation was voluntary and household members had the right to refuse to answer any or all of the questions.

2.4 Limitations

The HFSNA 2009 results cannot be directly compared, statistically speaking, to the findings of previous assessments due to differences in seasons or periods of the years, sampling, and/or

issues related to the methodologies of data collection. For example, in the case of the anthropometric data, HFSNA 2009 sampled children aged 6 to 59 months whereas the BDHS 2007 sampled children aged 0 to 59 months. In the data collection for income and expenditures, the HFSNA 2009 was designed to facilitate comparisons with the HIES 2005 and earlier surveys. But, HIES surveys are based on more than one round of data collection over a 12-month period (in order to account for differences in seasonality). The HFSNA 2009 income and expenditure data was collected once during the *Amman* 2008/2009 season.

Global acute malnutrition rates excluded nutritional oedema cases. Due to poor recording or misclassification of oedema cases, the oedema data was thought to be unreliable. The assessment team required more practical training on the assessment of oedema than it had received. As this indicator had never been collected in previous assessments, the MUAC data for children was also not presented for the aforementioned reason.

In Barisal and Sylhet divisions, the response rates were low. Compared to the required/recommended sample size of at least 90%, as the assumption of the sample calculation had allowed for only a 10% non-respondent rate, the final sample sizes analyzed for the stunting and underweight indicators in Barisal and Sylhet were 76.5% and 74% respectively.

Collecting data during the *Amman* season, when food (particularly rice) is abundant, might have contributed to underestimations in the prevalence of food insecurity or malnutrition. Moreover, the survey was conducted approximately seven months after high-food prices had peaked. The findings, in all likelihood, do not reflect the most severe or acute period associated with the impact and "shock."

The specific threshold values used for the Food Consumption Score indicator likely contributed to an underestimation of food insecurity prevalence within the population. An IFPRI (June 2009) paper looked at estimates of food insecurity prevalence based on the Food Consumption Score indicator thresholds typically used by WFP, and compared these to estimates associated with the kcals/capita/day indicator. It found that the Food Consumption Score thresholds are low and are likely to contribute to an underestimation of food insecurity prevalence.

In addition to the high-food price "shock," households were given an opportunity to report on other "shocks" they had experienced during the 12-month period prior to the survey. Examples of other "shocks" included flood, cyclone, death of a household member, illness and related health expenditures, etc. For households reporting more than one "shock," a prioritization of "shocks" was recorded. Given that many of these "shocks" can be interconnected with one another – for example, a cyclone could be directly related to the death of a household member – interpreting the results of the "shocks" is both complex and challenging.

Findings, related to the response analysis, primarily address the main channels or programs through which assistance was provided and are not comprehensive regarding smaller programs. Due to the relative size and dominance of the Government of Bangladesh's Social Safety Net programs, this means that the findings primarily apply to these programs. Although the data collection allowed households to report assistance received from non-Government of Bangladesh sources, such as NGO programs, the number or percentage of such responses was relatively small, and these findings were not highlighted.

A second limitation linked to the response analysis was that the study of targeting efficiency focused mostly on inclusion errors, as opposed to exclusion errors. The process of quantifying

the number of people covered by any Social Safety Net program is difficult due to overlap of caseloads across programs and for other reasons related to data availability and data quality. Thus, estimates of exclusion errors and under-coverage were not addressed. Furthermore, the issue of estimated food or caloric gaps, vis-à-vis estimates of calories received in assistance packages, was not addressed.

Changes in income associated with higher-food prices were analyzed, but issues such as the relationships between land holding size (or area cultivated) and net-food-buyer or net-food-seller status could not be fully examined and reported in the time period of the assessment. Obtaining new information and a more thorough understanding of the economic impact of high-food prices on agricultural households that farm small plots is important. These households represent the majority of farmers in Bangladesh and a significant percentage of the poorer population.

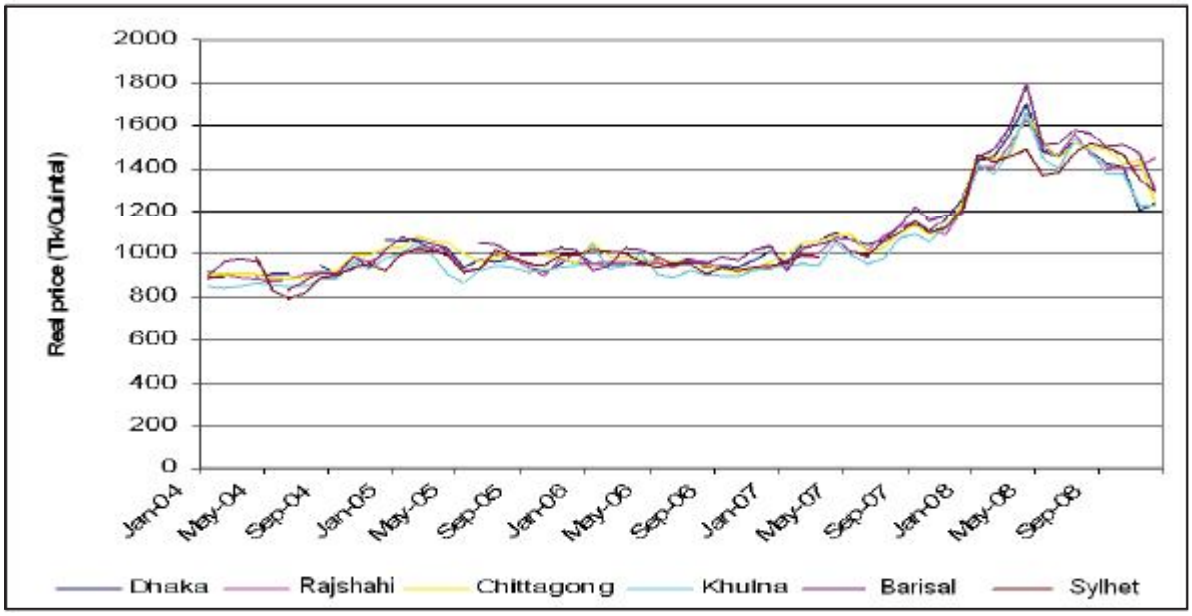
3. Market performance, price transmission and access to food through markets

In Bangladesh, the market is by far the most important source and determinant of access to food. Thus, obtaining knowledge of the dynamics of the food markets was essential for understanding the impact of high food prices on consumers. The analysis herein is based on both primary data, collected from the food markets survey, and on secondary data, obtained primarily from the Government of Bangladesh's Department of Agricultural Marketing.

3.1 Global price transmission and market integration

As the price of rice rose during 2007/2008, main wholesale markets of coarse rice remained integrated across the country. Prices were similar within Bangladesh's six administrative divisions, as shown in Figure 3.1 below. This market integration analysis does not use disaggregated data at district or village level. Therefore the findings cannot be generalized to local markets. The analysis is also limited to rice prices and does not imply that markets for other food commodities are integrated.

Figure3.1: Wholesale price movements of coarse rice, by division, in Bangladesh, 2004 to 2008



Source: Department of Agricultural Marketing

An analysis was undertaken with a focus on rice price integration between Dhaka division, as the country's central wholesale market, and the remaining five administrative divisions in the country. Divisional level wholesale rice price data were used for both the pre-shock period (2004 to 2006), as well as the "during shock" period (2007/2008). The results are shown in Table 3.1 below. Correlations between divisional wholesale prices were stronger during the price hikes (2007/2008), as compared to the "pre-shock" period. A correlation coefficient value of 1.00 would indicate that prices were perfectly correlated with prices in Dhaka. Prior to the "shock," correlation values ranged between a low of 0.53 in Sylhet division to a high of 0.8 in Rajshahi division. During the "shock," prices became more correlated with Dhaka division as indicated by the higher correlation coefficient values, all of which were greater than 0.9.

Table3.1: Spatial price integration indicators, by division, in Bangladesh, 2004-2008

Indicator	Period	Dhaka	Rajshahi	Chittagong	Khulna	Barisal	Sylhet
Correlation Coefficient from Dhaka	Pre-shock (2004-2006)	1.00	0.80	0.71	0.67	0.69	0.53
	During Shock (2007-2008)	1.00	0.94	0.96	0.99	0.96	0.94
Coefficient of Variation	Pre-shock (2004-2006)	0.05	0.04	0.05	0.06	0.06	0.06
	During Shock (2007-2008)	0.16	0.16	0.16	**0.18**	**0.18**	0.16
Beta Convergence Coeffcient	Pre-shock (2004-2006)	-	0.72	0.78	0.75	0.80	0.61
	During Shock (2007-2008)	-	0.91	0.94	**1.00**	**1.09**	0.88
Price Transmission Coefficient	Pre-shock (2004-2006)	0.00	-0.42	1.24	1.51	3.89	-0.36
	During Shock (2007-2008)	0.00	2.83	**0.49**	**1.02**	**0.71**	1.72

Source: Original source data from GoB MOA DAM

Price volatility was examined using the indicator *coefficient of variation*. In all divisions, price increases were accompanied by increased price volatility. During the "shock," the coefficient of variation was higher in Barisal and Khulna divisions. The fact that these divisions were the two most affected by Cyclone Sidr in 2007 likely played a role. The beta coefficient value in Barisal division was greater than 1 (See Table 3.1) indicating that a 1% price variation in Dhaka division was coupled with a greater than 1% variation in Barisal.

Price transmissions from Dhaka to other divisions varied significantly depending upon the region. Price transmission coefficient values were relatively minimal in the southern divisions of Chittagong and Barisal, indicating a lower degree of transmission vis-à-vis Dhaka. In Barisal, substantial Cyclone Sidr-related public assistance likely contributed to price stabilizing effects and the lower price transmissions from Dhaka. In the absence of such humanitarian assistance, price transmissions could have been higher and would likely have contributed to a more difficult post-Cyclone Sidr recovery. In the northern divisions of Rajshahi and Sylhet, the magnitude of the price transmissions increased significantly during the "shock." This is an indication that the impact of food price rises is likely to be high on net-food buyers in these divisions.

3.2 Impacts on trade performance

3.2.1 Trade performance

The assessment included an extensive survey of both wholesale and retail markets across Bangladesh and interviews with traders in 180 markets. The traders were asked to report on the main difficulties they faced while conducting their businesses. More than one-third of traders (35%) reported "low purchasing power of customers" as their main difficulty. Other prominent responses included "lack of capital" (26%) and "high cost of fuel" (11%). Findings were similar

for both wholesalers and retailers and are shown in greater detail in Table 3.2 below:

Table 3.2: Main difficulties reported by food traders in Bangladesh, 2007/2008

	Difficulties for trade					
	Wholesaler		*Retailer*		*Total*	
Type of Difficulties	N	%	N	%	N	%
High Cost of Fuel	92	11.4	197	10.2	289	10.5
Lack of credit	41	5.1	96	5	137	5
Lack of capital	176	21.8	536	27.7	712	25.9
High interest rate	44	5.4	95	4.9	139	5.1
Low purchasing power of consumer	265	32.8	689	35.6	954	34.8
Lack of storage	54	6.7	53	2.7	107	3.9
Lack of transportation	30	3.7	41	2.1	71	2.6
Other	13	1.6	24	1.2	37	1.3

The low purchasing power of customers reflects the actual high food price environment that prevailed during 2007/2008. The high cost of fuel was a compounding factor, as higher transport costs for food commodities also contributed to higher food prices. The lack of capital was a limiting factor for trade expansion in terms of investment, (e.g. storage and handling facilities) and it could have reduced traders' response capacities as they were only able to hold small stocks or adopt high turnover strategies.

Based on their perceptions, traders were asked to report on the major cause of food price increases. More than one-quarter of traders (28%) highlighted hoarding or stock-holding as the major cause of food price increases. Other key perceived causes included the high price of commodities from source markets (25%) and the increase in transport costs (14%). See Table 3.3 for further details.

Table 3.3: Main reasons for food price increases, as reported by food traders

	Local Rice			**Daal**			**Edible Oil**		
	Wholesaler	Retailer	Total	Wholesaler	Retailer	Total	Wholesaler	Retailer	Total
At the origin	20.3	25.3	23.4	16.8	26.2	23.5	19.9	27	25.2
Increase transport cost	14.2	9.7	11.4	12.3	11.7	11.9	14.9	13.9	14.2
Increased taxes	5.6	1.8	3.3	8.4	1.1	3.2	6.8	2	3.2
High interest rate	8.2	3.9	5.5	8.4	2.9	4.5	9.9	3.5	5.2
High storage/handling cost	7.3	1.8	3.9	7.3	3.2	4.3	9.3	5	6.1
Low availability	9.9	11.2	10.7	10.1	14.2	13	6.8	10.5	9.5
Hoarding/stock-holding	21.6	25.6	24.1	24.6	28.7	27.5	21.7	29.6	27.6
Production cost	11.6	15.7	14.1	9.5	9.5	9.5	8.7	6.8	7.3
Other	1.3	5	3.6	2.8	2.5	2.6	1.9	1.7	1.8

In the face of uncertainties regarding future price outlooks, stock-holding can be a coping strategy for traders. Export bans imposed by India may have contributed to such behavior in the rice market which was strongly integrated with the Indian market despite the prominence of the domestic production. Hoarding or stock-holding was also possible for *daal* and edible oil, which are mostly imported to Bangladesh.

Traders were asked to report on the sales of the main food commodities (i.e. local rice, pulses (*daal*) and edible oil). Local rice was the food commodity most commonly sold by 45% of traders and followed closely by pulses and edible oil (both 41%). Wholesalers were more specialized in the trade of cereals with 56% selling primarily local rice. Although local rice was also the top product for retailers (41%), they were relatively diversified with regards to other commodities: *daal* (42%) was their second most prominent product while the third most common product was edible oil (43%). Over one-fifth of retailers (23%) were also selling fortified whole wheat flour (*Atta*).Table 3.4 provides greater detail on the numerous commodities sold.

Table 3.4: Sales of food commodities reported by traders. Main food commodities sold.

	Top Product			Second Most			Third Most		
	Whsale	*Retail*	*Total*	*Whsale*	*Retail*	*Total*	*Whsale*	*Retail*	*Total*
	%	%	%	%	%	%	%	%	%
Atta	**15.0**	**22.9**	**20.8**	**0.0**	**0.6**	**0.4**	**1.2**	**1.9**	**1.7**
High priced atta	3.3	6.4	5.5	0.0	0.0	0.0	0.0	0.6	0.4
Medium priced atta	4.5	5.8	5.4	0.0	0.1	0.1	0.4	0.1	0.2
Low priced atta	7.3	10.8	9.9	0.0	0.4	0.3	0.8	1.2	1.1
Wheat flour	**5.3**	**4.0**	**4.3**	**0.8**	**0.3**	**0.4**	**1.2**	**0.4**	**0.7**
Local Rice	**55.7**	**40.7**	**44.7**	**9.3**	**14.2**	**12.9**	**1.2**	**1.2**	**1.2**
Local rice (low quality rice)	25.6	16.7	19.1	4.1	5.3	5.0	1.2	0.0	0.3
Local rice (medium quality)	28.0	21.9	23.5	3.3	7.8	6.6	0.0	1.0	0.8
Local rice (high quality)	2.0	2.1	2.1	2.0	1.0	1.3	0.0	0.1	0.1
Imported Rice	**2.0**	**1.9**	**2.0**	**0.8**	**0.3**	**0.4**	**0.4**	**0.1**	**0.2**
Imported rice (low quality)	1.6	1.5	1.5	0.8	0.3	0.4	0.0	0.1	0.1
Imported rice (medium quality)	0.4	0.4	0.4	0.0	0.0	0.0	0.4	0.0	0.1
Dal	**11.8**	**12.1**	**12.0**	**37.0**	**42.3**	**40.9**	**4.1**	**7.8**	**6.8**
High priced daal	4.9	6.7	6.2	18.3	16.1	16.7	1.2	2.4	2.1
Medium priced daal	3.7	1.3	2.0	11.8	14.8	14.0	1.6	3.6	3.0
Low priced daal	3.3	4.1	3.9	6.9	11.4	10.2	1.2	1.9	1.7
Potatoes	**1.6**	**2.1**	**2.0**	**2.4**	**5.3**	**4.6**	**0.4**	**3.7**	**2.8**
Edible oil	**6.5**	**12.0**	**10.5**	**24.8**	**24.6**	**24.6**	**35.8**	**43.0**	**41.1**
Milk				**0.0**	**0.6**	**0.4**	**0.4**	**0.1**	**0.2**
Egg	**0.0**	**0.3**	**0.2**	**0.0**	**0.6**	**0.4**	**0.4**	**0.7**	**0.7**
Sugar	**1.2**	**1.6**	**1.5**	**3.7**	**6.2**	**5.5**	**27.2**	**24.6**	**25.3**
Other products	**0.8**	**2.4**	**2.0**	**2.4**	**3.0**	**2.8**	**7.3**	**12.6**	**11.2**

The market survey included questions on volumes of sales in terms of value and quantities sold. For most traders, the food price increases hampered business in terms of weekly sales volumes. From December 2007 to December 2008, the average sales volumes for local rice and *daal* decreased by 8% and 9%, respectively. Sales volume increased slightly for edible oil (2.7%). The decrease in sales volumes over the 12-month period was greater for retailers than for wholesalers. In general, retailers faced higher decreases in quantities sold ranging from 4.8 % for *daal* to 4.9% for edible oil and 11.8% for local rice. A detailed accounting of changes in

weekly sales volumes is shown in Table 3.5 below:

Table 3.5: Reported changes in quantities of food commodities sold by traders

Weekly Volume of Sales (BDT)									
Current	Wholesaler (Kg)	% Change 6 Months	% Change 12 Months	Retailer (Kg)	% Change 6 Months	% Change 12 Months	Total (Kg)	% Change 6 Months	% Change 12 Months
Local Rice	1676.36	-3.84	-5.82	347.78	-12.48	-11.76	790	-6.56	-7.89
Daal	588.25	-1.66	-10.26	53.62	0.68	-4.81	183	-1.15	-9.28
Edible Oil	580.78	11.99	6.00	68.46	0.94	-4.85	187	8.66	2.72

Approximately 48% of traders experienced a reduction in quantities of rice sold for rice and 43% reported a sales decline in *daal*. However, the responses on edible oil were less certain with 36% of traders mentioning a decrease and 39% reporting that sales had not changed.

When asked the reason for a decrease in quantities sold, 23% of traders identified high food prices as the main reason; this is consistent with the findings that highlighted a lack of consumer purchasing power. However other factors like the favorable 2008 *Boro* rice harvest also contributed to a decrease for some traders. More than one fifth of traders (22%) reported consumer reliance on their own food production as the main reason for decreased quantities sold in the market.

When asked about the main consumer actions during the past 12 months, 90% of traders reported the changing behavior of customers. Nine of every ten traders interviewed (93%) reported that customers were shifting to cheaper food items. Similarly, more than 8 in 10 traders (84%) reported that customers were purchasing smaller quantities of food.

An overwhelming percentage of traders (90%) reported that the most sold commodities (local rice, pulses, and edible oil) were readily available throughout 2008. This finding provides further evidence that the acute food insecurity situation of early 2008 was not so much related to food availability (i.e. supplies) but to inadequate food access (i.e. high food prices and low consumer purchasing power).

The spread between selling prices and buying prices shrank due to price increases, especially for rice and *daal*. In the December 2007 to December 2008 selling period, gross price margins fell by 61% for rice from 2.3 BDT/kg to 1.0 BDT/kg and by 40% for *daal* from 3.4 BDT/kg to 2.0 BDT/kg. Edible oil traders saw an increase of margins by 63% from 3.7 BDT/litre to 6 BDT/litre. Gross price margins were analyzed for three time periods: at the time of the survey (December 2008), 6-months prior (June 2008), and 12-months previously (December 2007). This data is detailed in Table 3.6.

Table 3.6: Changes in gross price margins for food traders

	Purchase Price			Selling Price			Margin		
Current	**Wholesaler**	**Retailer**	**Total**	**Wholesaler**	**Retailer**	**Total**	**Wholesaler**	**Retailer**	**Total**
Local Rice	27.95	27.04	27.34	27.35	28.67	28.23	-0.60	1.63	0.89
Daal	68.71	68.81	68.79	72.26	70.38	70.83	3.55	1.57	2.04
Edible Oil	86.13	88.48	87.94	91.49	94.69	93.94	5.36	6.21	6.00
6 months back									
Local Rice	32.31	33.11	32.85	35.55	34.5	34.85	3.24	1.39	2
Daal	75.85	72.74	73.5	78.52	75.05	75.89	2.67	2.31	2.39
Edible Oil	97.59	99.28	98.89	100.92	104.72	103.8	3.33	5.44	4.95
12 months back									
Local Rice	29.25	29.13	29.17	32.97	30.7	31.46	3.72	1.57	2.29
Daal	66.28	60.3	61.74	63.62	64.03	65.14	2.34	3.73	3.4
Edible Oil	87.88	86.97	87.19	92.81	90.27	90.86	4.93	3.3	3.67

Traders were asked to identify their supply sources (i.e. from where they had purchased their supplies). The majority of traders (86%) identified wholesalers or millers as their sources for local rice. Retailers (87%) were slightly more dependent on this source than wholesalers (83%). Not uncommonly, wholesalers occasionally bypass other wholesalers, buying directly from farmers or importing from abroad.

For pulses and edible oil, wholesalers or millers were also the main source for supply purchase. Approximately 90% of retailers relied on this source while for wholesalers it was considerably lower (70%). It is unsurprising that wholesalers would depend more on direct imports as pulses and edible oil are import dependent. Accordingly, this lessens dependency on other domestic wholesale traders.

The majority of the traders (60%) reported that no major changes occurred in stock levels during the 12 months preceding the survey. However for those traders that did report stock decreases, these occurred more frequently during the second half of 2008. This is in-line with the reality of falling prices during the latter months of 2008, as more supply began to hit the markets. On average, the duration of stocks reported was less than two weeks (seven to ten days) implying limited storage capacity. The stock turnover time for retailers was only seven days while wholesalers reported a slightly longer turnover time of nine days, implying a larger although still limited storage capacity. The traders' response to price increases and "shocks" could have been undermined by limited storage capacity, however predicting hypothetical trader behaviour, had more capacity been available, is difficult at best.

An overwhelming percentage of traders (90 percent) reported that the most sold commodities, including local rice, pulses, and edible oil; were readily available throughout 2008. These findings provide further evidence that the acute food insecurity situation of early 2008 was not so much related to food availability (i.e. supplies), but that rather inadequate *food access* (i.e. high food prices and low consumer purchasing power) played a much larger role.

3.2.2 Credit: access and availability

Traders' access to credit is ensured mainly through supplier credit. Approximately 74% of the interviewed traders reported access to credit with 50% gaining access to credit from other

traders. For 26% of traders, the second major source of credit was the financial sector (banks, credit unions and co-operatives). There can be an overlap between the financial system and NGOs in Bangladesh, as some NGOs operate micro-finance wings. The proportion of traders sourcing credit from NGOs was 11.3% percent. Approximately 33% of wholesalers had access to credit through the financial system while the same was true for 23% of retailers. Retailers depended more on NGOs (14%) than wholesalers (5%) did. On average, 12% of traders depended on money lenders as a source of credit. Retailers (16%) were more dependent on this source than wholesalers (11%). Money lenders generally represented a less preferred source of credit due to associated higher interest rates. Table 3.7 provides details of the trader's credit sources:

Table 3.7: Sources of food traders' credit

Source of Credit	% Traders' Source of Credit					
	Wholesaler		*Retailer*		*Total*	
	N	%	N	%	N	%
Other traders: commodities	88	45.1	252	52.1	340	50.1
Money lenders	32	16.4	51	10.5	83	12.2
Bank, credit union, cooperative	64	32.8	112	23.1	176	25.9
NGO programme	10	5.1	67	13.8	77	11.3
Relatives	0	0	2	0.4	2	0.3
Other	1	0.5	0	0	1	0.1
Total	195	100	484	100	679	100

There were no major changes reported regarding the cost of credit. More than one-half of traders (60%) reported that credit costs were not applicable to them. However, it is likely that the majority of such cases involved credit being extended from the seller to the buyer. This is consistent with the related findings that one-half of traders rely on supplier credit and approximately one-quarter rely on financial institutions. In general, interest rates were found to be stable with approximately 80% of traders indicating that there were no rate changes in comparison to one year earlier. On average, interest rates were 10 to 12% and there was no significant difference between retailers and wholesalers in terms of the interest rates charged.

Credit sources remained stable for the majority of traders despite the food price hikes. Around 35% of traders reported that their access to credit remained unchanged with 9% reporting an increase of their access to credit and 8% reporting a decline. The proportion of wholesalers (45%) reporting unchanged access to credit was considerably higher than that of retailers (31%). Nearly all traders (95%) reported extending credit to customers to compensate for low purchasing power and low demand. (see Table 3.8) Credit was generally provided to customers in the form of deferred payments allowed. Traders were asked whether there had been changes in the frequency of customers asking for credit in comparison to one year earlier. About 42% of traders reported an increase, 31% reported a decrease, and 27% reported that the frequency of requests was about the same. This pattern was similar for both wholesalers and retailers, as shown in Table 3.9 overleaf.

Table 3.8: Changes in food traders' access to credit

	% Traders' change in access to credit					
	Wholesaler		*Retailer*		*Total*	
Change in Access	N	%	N	%	N	%
Same	111	45.1	211	31.2	322	34.9
Less than usual	15	6.1	56	8.3	71	7.7
More than usual	16	6.5	66	9.8	82	8.9
Not applicable	103	41.9	342	50.6	445	48.3
Other reason	1	0.4	1	0.1	2	0.2
Total	246	100	676	100	922	100

Table 3.9: Changes in households' requests for credit, in Bangladesh, 2007/2008

	% Traders indicate change in household request for credit					
	Wholesaler		*Retailer*		*Total*	
Change in Request	N	%	N	%	N	%
Same	65	27.3	168	26.4	233	26.6
Less are asking credit	76	31.9	197	30.9	273	31.2
More are asking credit	97	40.8	272	42.7	369	42.2
Total	238	100	637	100	875	100

3.3 Conclusions

Coarse rice markets remained integrated during the price shock although with increased volatility. The price shock was transmitted to all of Bangladesh's six administrative divisions although to a lesser degree for Chittagong and Barisal divisions. The considerable relief and recovery assistance provided to Barisal division in the aftermath of Cyclone Sidr likely had a stabilizing effect on prices. Rajshahi and Sylhet divisions witnessed the highest degrees of price transmission over the period 2007/2008. Those households within these areas that were net food buyers were subject to a relatively higher food price impact.

Traders reported a number of difficulties and challenges related to high food prices. Hoarding or stock-holding and high fuel prices leading to increased transport costs were the two major difficulties reported. Despite a comfortable availability of food commodities on domestic markets, more than one-third of traders (35%) highlighted the low purchasing power of consumers as the major constraint to a more dynamic or responsive market. Low purchasing power was also associated with reduced volume of sales and a substantial reduction in price margins. Considering the most sold commodities, the price spreads (selling price to buying price) shrank by 60% for local rice and 40% for *daal* over the 12 months from December 2007 to 2008. Increased extension of credit to customers was used as a strategy to maintain trade. Although credit and food were available on the market, constraints such as low consumer purchasing power and low stock levels of traders seem to have played a relatively more important role during the price hikes shock.

4. Impacts on household food security

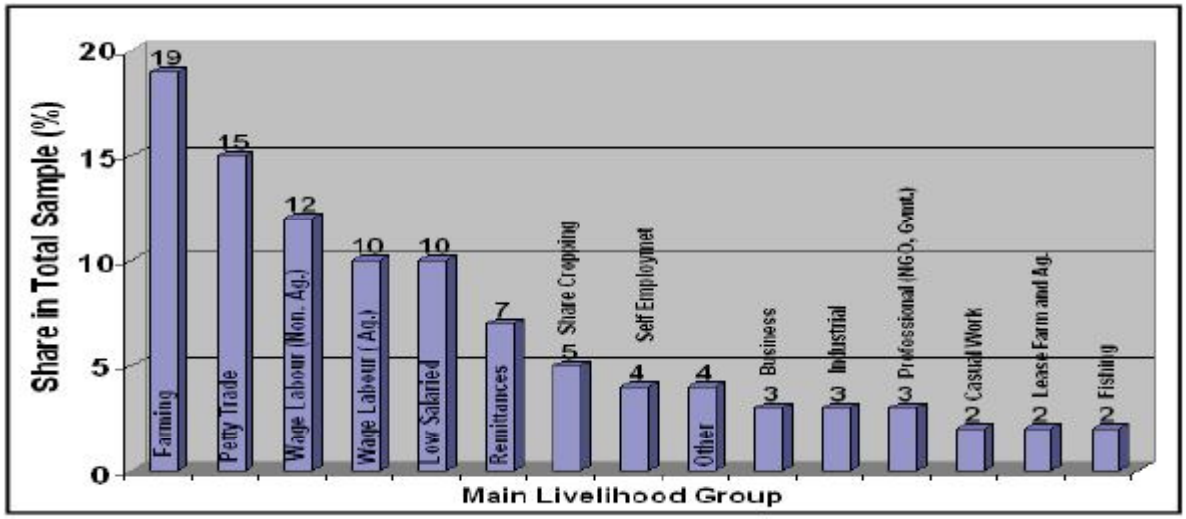
Obtaining a better understanding of the impact of high food prices on household food security was central to the assessment and study objectives. Although other sources have examined the impact in Bangladesh, an in-depth assessment of the situation using a statistically representative sample nationally had not been done. Thus, the assessment was designed in a manner that allowed for comparisons between the findings from the Government of Bangladesh's BBS Household Income and Expenditure Survey 2005 and key variables related to household food security. The 2005 survey serves as a critical "pre-shock" baseline reference, providing context and allowing for a better understanding of the impact of the high food price shock during the 2007/2008 period.

4.1 Changes in livelihoods and income sources

4.1.1 Changes in livelihood activities

Agriculture and agriculture-related activities were the main livelihoods for a large segment of the population. The agriculture sector constituted the main livelihood for over one-third of the population. Around 19% of the population made their living from farming, followed by agriculture wage labor at 10%, and share cropping at 5%. Petty trade was the second main livelihood reported, representing 15% of the population. Other significant main livelihoods were non-agriculture wage labor (12%), low salaried jobs (10%), and remittances (7%).

Figure 4.1: Main livelihood groups



SOURCE: HFSNA 2009

For 83% of the population, the main income source was stable compared to 9% with an irregular main income source (temporal, casual, or seasonal). In urban areas, 92% of households depended on a regular or stable main income source compared to 81% in rural areas. The findings also showed differences by gender and geography in the regularity of main income sources. More female-headed households (13%) lived on irregular first income sources than male-headed households (9%). Barisal and Rajshahi divisions accounted for the highest proportion of households depending on irregular activities compared to national average. Approximately 21% of the population depended on irregular activities as their main source of income.

4.1.2 Impact on income sources

The major sources of income remained relatively stable compared to HIES 2000 and HIES 2005. The livelihood groups from this assessment were aggregated for an approximate comparison with the HIES 2005 data. Generally, the distribution of livelihoods across the population was similar between 2005 and 2008, indicating no major shift in livelihood patterns. The highest percentage share of household income continued to revolve around professional wages and salaries with a contribution of 32% at the national level. This share was slightly above the reported shares in 2005 (31.3%) and 2000 (29.4%). The share of agriculture as a source of household income was 19% nationally, which was comparable to the findings of HIES 2005 and 2000.

Table 4.1: Percentage share of income of households by source of income

Current income sources	Current (Dec. 2008)	HIES 2005	HIES 2000	HIES Income Sources
Professional: Government NGO	3	31.3	29.4	Professional Wages and Salaries
Low Salaried	10			
Non agriculture wage labour	12			
Self -employment	4			
Industrial	3			
Business	3	23.1	25.9	Business and commerce
Petty trade	14			
Remittances	7	9.8	10.9	Remittances and gift
Atjricultuie Faimint)	18	20	18	Agriculture
Livestock Fisheries	1			
Shaie-ciopping	5	-	-	
Agricultural wage labour	10			
Leasing farm	1			
Fishing	2			
		6.7	7.8	Housing services
Casual work	2	8.7	8	Others
Others	5			
Total	100	100	100	Total

SOURCE: HFSNA 2009/2008 and GoB BBS Household Income and Expenditure Surveys; 2005 and 2000.

Nominal income increases occurred through income diversification, although there were differences found in diversification by gender. In general, female-headed households had lower levels of diversification versus their male-headed household counterparts. The number of income sources in female-headed households was 13 percent lower than that of male-headed households.

4.2 Income effects of inflation and food price rises

The loss of purchasing power, or income erosion, is generally the most important factor that increases vulnerability and food insecurity of poor populations during times of rising prices. This section explores the impact of general inflation and food price rises on households' real incomes.

4.2.1 Impacts on real incomes and wages

The estimated nominal income per household increased by almost 12% between 2005 and 2008 and continued to increase in 2007/2008, in line with the reported perceptions of the households. Although real income, after adjusting for inflation, saw a slight increase of 2% between 2007 and 2008, the real income per household in 2008 was approximately 12% lower than 2005 real income.

Table 4.2: Changes in household income; nominal and real

	HIES 2005	HFSNA 2007	HFSNA 2008	Percent Change 2008 vs. 2005
Nominal Monthly Income perHH(BDT)	7203	7251	8062	11.9
Real Monthly Income perHH(BDT)	4533	3917	4000	**-11.8**

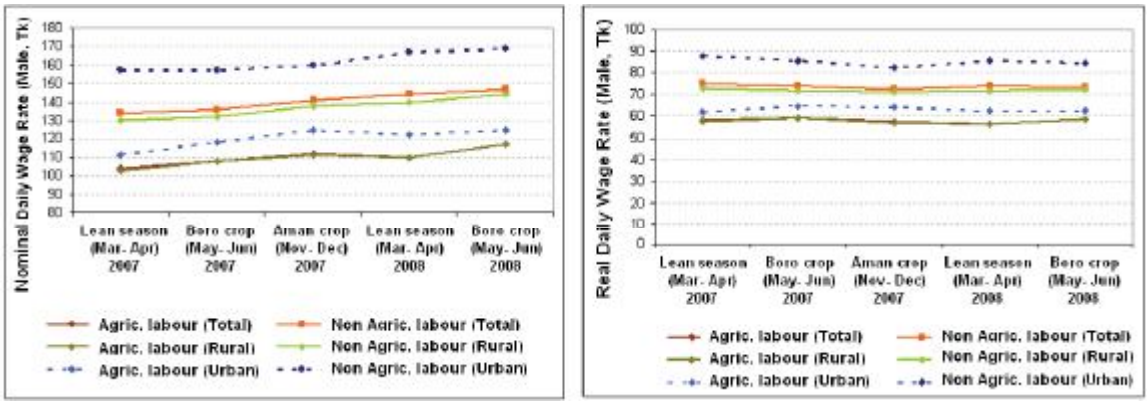
SOURCE: HFSNA 2009/2008 and GoB BBS Household Income and Expenditure Surveys 2005.

Real daily-wage rates remained stable as a result of an upward adjustment of nominal wages to offset the impact of general inflation. Wage labourers usually work under short duration contracts and wage rates are often negotiated on a daily basis. This flexibility allows the wage labourers to negotiate higher returns for their labor in the face of rising prices. In Bangladesh, both agricultural and non-agricultural wage rates increased by 13% and 10% respectively, from March 2007 to June 2008. These nominal increases compensated for overall inflation.

Non-agricultural wage rates are generally higher than agricultural wage rates by about 30%, in real terms. Urban daily rates are higher than rural rates by less than 10% in the agriculture sector and by about 20% in the non-agriculture sector. In the agriculture sector, the female daily wage rate is worth only about two-thirds of the male daily wage rate. In the non-agriculture sector, the daily wage rate of males can reach twice the daily rate of female daily workers, depending on the season, indicating an even larger gender disparity.

Although nominal wage rates were increased for both agricultural and non-agricultural workers during the food price shock in Bangladesh, the real wage rates for these same groups were generally flat or slightly downward trending.

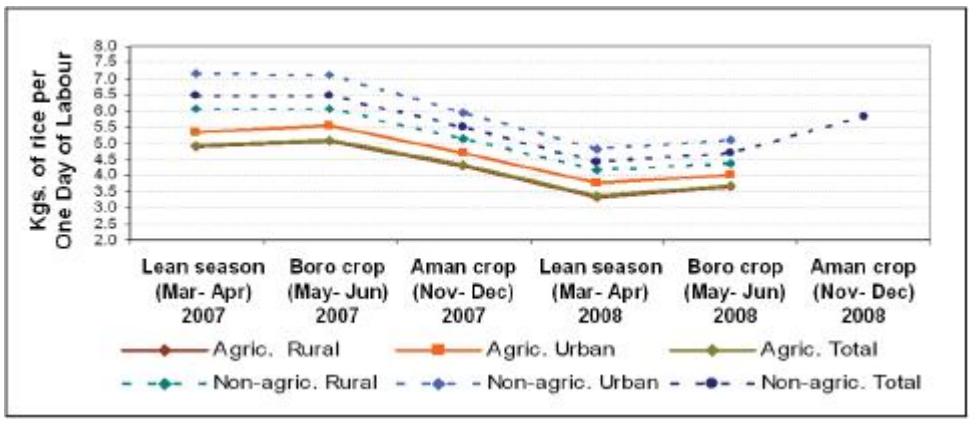
Figure 4.2: Nominal versus real daily wage rate patterns (March 2007-June 2008)



SOURCE: GoB Bangladesh Bureau of Statistics

Despite the upward adjustment of nominal daily wage rates, the purchasing power of agriculture and non-agriculture wage labourers worsened as a result of higher-food price increases, especially prices for coarse rice. The downward trend of the terms of trade was an indication that nominal adjustments in the daily wage rates were insufficient to maintain the food purchasing power of daily labourers. In March 2007, daily labourers were able to purchase five to seven kilograms of rice for one day of work. One year later, the same day's work purchased only 3.7 to 5 kilograms of rice. Although this amount of rice is sufficient to feed a household of five in one day, maintaining consumption levels meant less money would be available for other non-food expenditures.

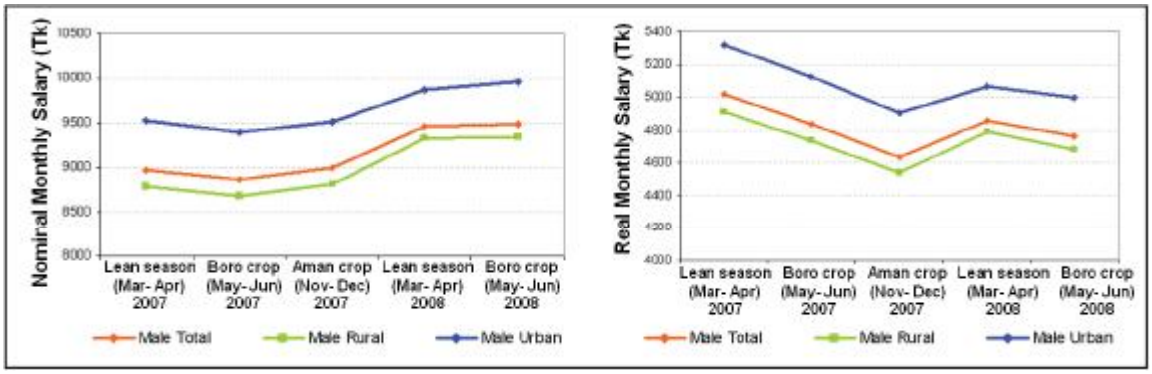
Figure 4.3: Terms of trade: wage labor and coarse rice price



SOURCE: GoB BBS.

Real incomes also decreased for salaried workers, particularly during 2007, as seen in the right graph in Figure 4.4 overleaf. Nominal increases occurred between 2007 and 2008, but remained low as seen in the left graph in Figure 4.4. Overall, the purchasing power of households fell during the food price "shock." The global financial recession, and its potential impact on remittances, exports, income, and other aspects of the Bangladesh economy remains a cause of concern for many.

Figure 4.4: Patterns of monthly salaries; nominal versus real (March 2007-June 2008)



SOURCE: GoB BBS.

4.2.2 Changes in the net-buyer/net-seller status of agriculture households

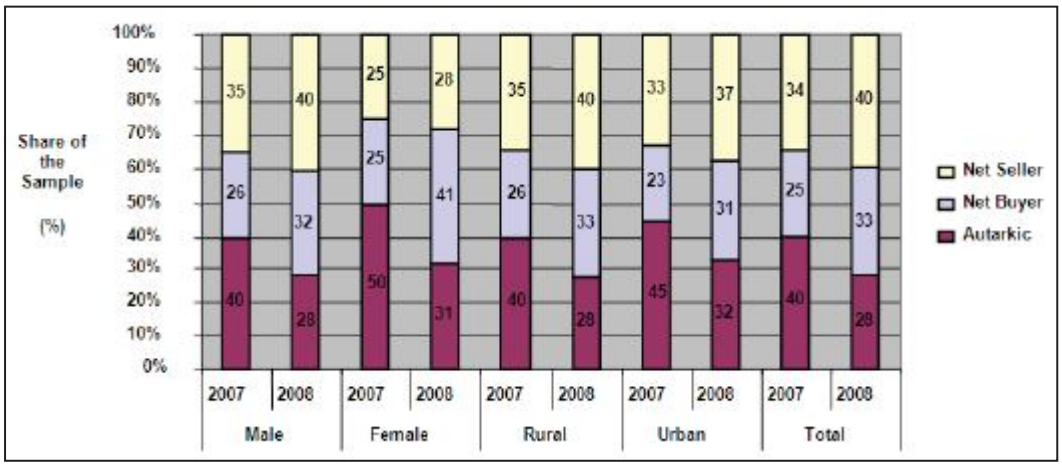
To assess whether a household is net-buyer or net-seller of food, the reported value of sales of all foods produced by a household is reduced by the reported value of all purchased foods

consumed by the household that could have potentially been produced "on-farm" (even if the household is not a farming household). This definition excludes manufactured foods for which households necessarily rely and obtaining in the market (e.g. oil, fats, sugar, beverages) and food purchased for eating outside of the household (e.g. street snacks, restaurant meals). A household is a net-buyer (or seller) of food, if over a given period (e.g. a year) it spends more (or less) to purchase food than it receives in the sales of food it produces.

For the approximate 40% of Bangladeshis that cultivate a home garden and/or other land (i.e. the focus group of this analysis), they can be categorized into three distinct sub-groups of households: net-buyers, net-sellers, and "autarkic" (households who purchase as much as they sell or simply those that do not participate in food markets).

Overall, the high food prices in Bangladesh resulted in a higher increase in the proportion of net-food buyers compared to net-food sellers. There was an increase of net-food buyers by 28%, fuelled by a 30% reduction of autarkic households from December 2007 to December 2008; the proportion of net-food sellers increased by 15% in the same time period. The proportion of net-food buyers was higher in urban areas (35%) than in rural areas (27%), and there was a much higher increase of net-food buyers among female-headed households (64%) compared to male-headed households (26%). In terms of livelihood, the highest increases in net-food-buyer households were among non-agriculture wage labourers (59%), remittances earners (53%), and casual workers (55%). Changes in the status for net-sellers, net-buyers, and autarkic households are shown in greater detail in Figure 4.5 overleaf.

Figure 4.5: Changes in net-seller/buyer status between 2007 and 2008



SOURCE: HFSNA 2009

At the divisional level, the food price rises resulted in substantial increases in the proportion of net-food buyers in Barisal and Sylhet divisions. Barisal, one of the divisions highly affected by Cyclone Sidr, showed a 38% decrease of autarkic households and a 25% decrease of net-food sellers, leading to a 38% increase of net-food buyers. The proportion of net-food buyers also increased significantly in Sylhet (59%) due to a large decrease in autarkic households (47%).

4.3 Impact on Food and non-food expenditures

4.3.1 Changes in expenditure levels

Nationally, the real *per capita* cash expenditures showed a 6% increase compared to 2005 figures from BDT 796 to BDT 842 (Bangladeshi Taka). The difference between cash expenditures of female-headed households and male-headed households was small (2%). Real cash

expenditures increased between HIES 2005 and this assessment, and were higher in rural areas (9%) compared to urban areas (4%). The absolute level of real expenditures in urban areas was much higher than that of rural areas (58%). This disparity was even greater in HIES 2005 with real expenditures of urban households 66% higher than that of rural households.

A comparison of the change in real expenditures from 2005 to 2008 showed that Rajshahi division faced the highest increase (35%). This data was consistent with the findings that net-food buyers in Rajshahi division most likely were more severely affected by the price shock due to the greater degree of price transmission between Dhaka and Rajshahi (See Table 3.1: Spatial price integration indicators) . Changes in nominal and real income for the available surveys are shown in Table 4.3 overleaf.

Table 4.3: Changes in per capita monthly expenditures

	HIES 2000		HIES 2005		HFSNA 2009	
	Nominal	Real	Nominal	Real	Nominal	Real
Male	—	—			1701	844
Female	—	—			1666	826
Rural	820	641	1088	685	1505	747
Urban	1430	1117	1808	1138	2379	1180
Barisal	—	—	1166	734	1756	871
Chittagong	—	—	1552	977	1577	782
Dhaka	—	—	1476	929	1960	972
Khulna	—	—	979	616	1518	753
Rajshahi	—	—	898	565	1540	764
Sylhet	—	—	1547	974	1693	840
National	942	736	1265	796	1698	842

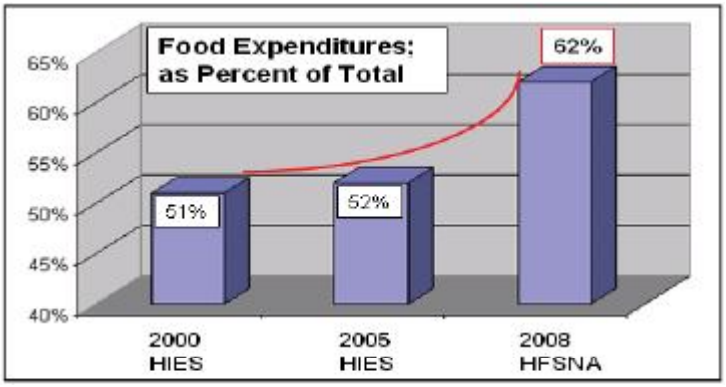
SOURCE: HFSNA 2009 and GoB BBS Household Income and Expenditure Surveys; 2005 and 2000.

4.3.2 Changes in expenditures on food and non-food items

The share of food in household expenditures increased to an unprecedented level of 62% by December 2008, due to the high food inflation rate. A cross-sectional survey in August 2008 covering the six divisions also showed a similar finding, with food representing 60% of households' total expenditures, a jump from 50% in 2006[58].

While households in Bangladesh had on average been spending just over one-half of their total expenditures on food during the pre-shock period, the considerably higher share of 62% is a cause for concern. The changes in percentage shares spent on food for the years 2000, 2005, and 2008 are shown in Figure 4.6.

Figure 4.6: Food expenditures as a percentage of total household expenditures



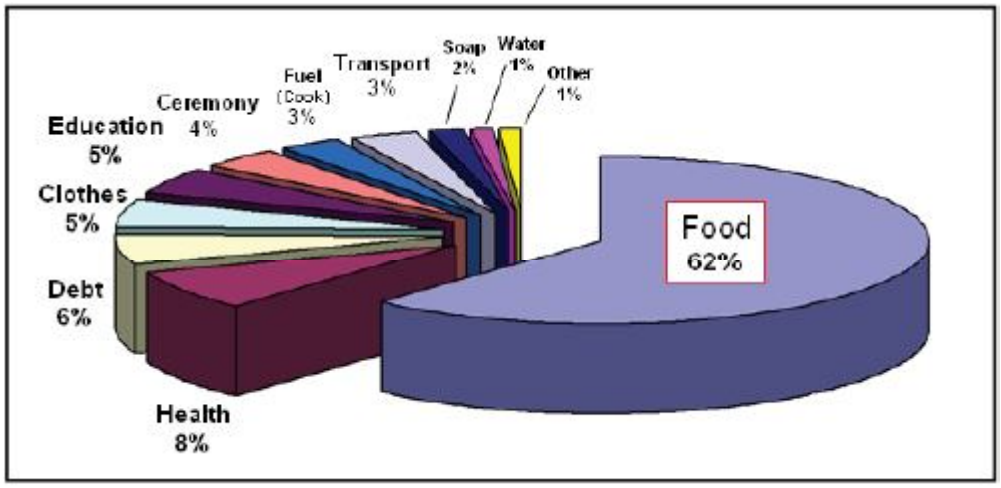
SOURCE: HFSNA 2009 and GoB BBS Household Income and Expenditure Surveys; 2005 and 2000.

At the divisional level, the highest food expenditure shares were in Sylhet (67.7%), followed by Chittagong (64%) and Dhaka (62.2 %). Female-headed households were spending 63.5% of their total expenditures on food, slightly more than the 61.5% of male-headed households.

The differences between urban and rural populations observed in the past appear to have been cancelled out by the food price rises. Although the absolute levels of total expenditures were higher in urban areas than rural areas by 58%, both urban households and rural households allocated 61% and 62% of their budgets to food, respectively. The increase of food expenditure shares in 2007/2008 reached 35% in urban areas compared to 6% in rural areas.

Data was collected for numerous expenditure types including food and non-food items. Food had by far the biggest shares of total household expenditure at 62% with the next larger proportion of expenditure shares being health or medical care (7.8%), debt (6%), clothing (5%), and education (5%). A breakdown of all the household expenditure shares is shown in Figure 4.7.

Figure 4.7: Household expenditure shares, by expenditure type

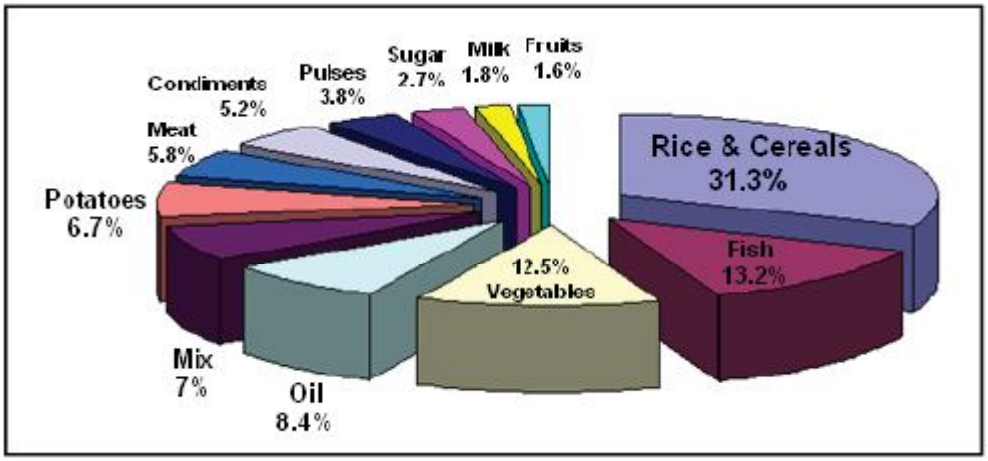


Note: all expenditure share estimates above were rounded to the nearest whole integer.
SOURCE: HFSNA 2009

In addition to estimates of actual expenditures, the assessment captured households' perceptions about changes in expenditures between 2007 and 2008. Overall, 85% of households reported an increase in food expenditures, followed by health expenses (78%), clothing (69%), transport (63%) and education (56%).

Within the broader category of total food expenditures, details of expenditures by specific food type were recorded. Amongst all food types, households were spending the largest percent share on rice and cereals (31.3%) followed by fish (13.2%), vegetables (12.5%), and cooking oil (8.4%). Figure 4.8 on the next page provides a detailed breakdown of percentage food category share expenditures.

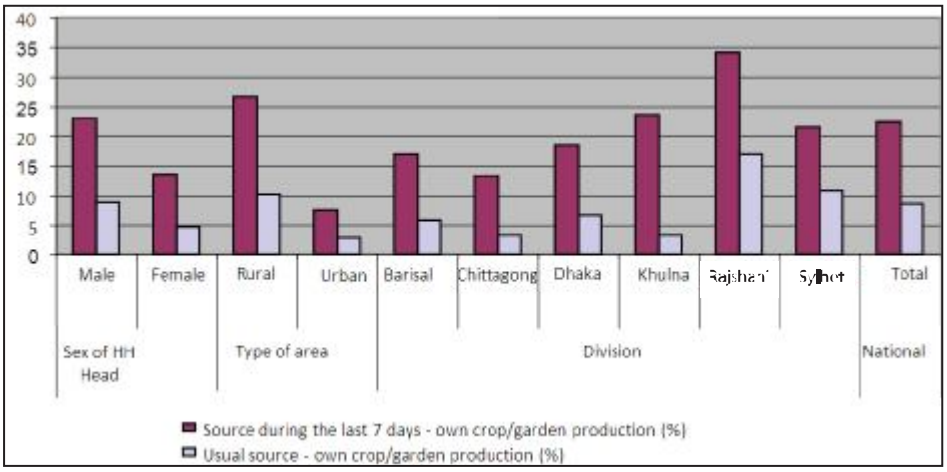
Figure 4.8: Food types, percent share of total food expenditures



SOURCE: HFSNA 2009

Compared to previous HIES surveys, the 2008 share of expenditures on vegetables, oil, fish, pulses and sugar increased whilst decreases were noted for rice, meat, dairy, mix and fruits. Rural areas were mostly accountable for the decrease in rice shares. The rice and cereals expenditure share for urban households remained relatively stable between 2005 and 2008 at around 30% percent, which is similar to the shares reported in earlier surveys (HIES 1995-1996, and HIES 2000). The substantial decrease in the rural households' expenditure on rice found in this assessment is likely related to seasonality, as the data was collected during the *Aman* rice harvest period, a period when buying on the market declines for many households when rice-producing households often consume part of their own production. There is strong evidence that own production contributed to lowering the share of rice in total food expenditure. Figure 4.9 below shows a significant shift towards own production as a major source of the rice consumed by households during the harvest season.

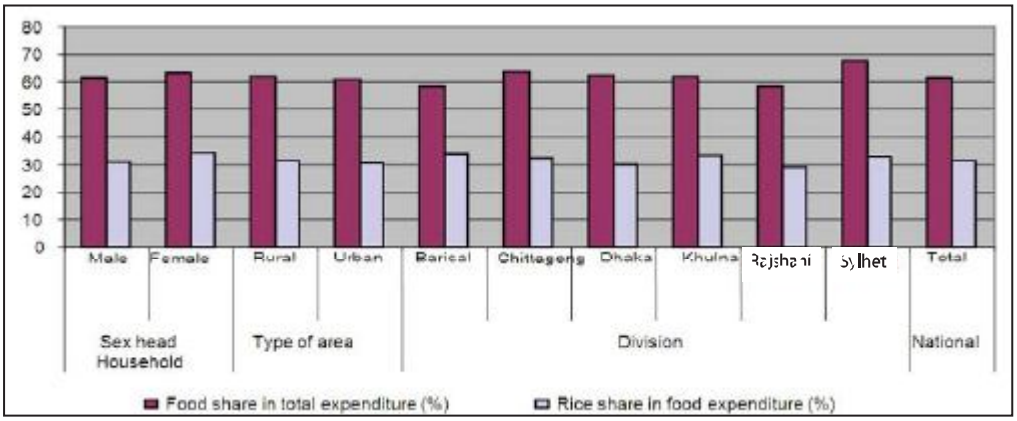
Figure 4.9: Source of rice: own production



SOURCE: HFSNA 2009

Historically, expenditures on rice and cereals constitute the largest food expenditures in Bangladesh. According to previous HIES surveys, between 38% and 44% of household food expenditures are dedicated to rice and cereals alone. However, this assessment found, at 31%, that the share of total food expenditure on rice was considerably lower. The reduced share is most likely related to the timing of the survey. The data was collected during the harvest season, when many farming households are reducing rice purchases and consuming some of their own production. Female-headed households spent 35% of their food budgets on rice. Barisal division showed the highest share of rice expenditure (34%), followed by Khulna division (33.5%), and Sylhet division (33.1%).

Figure 4.10: Percentage expenditure on rice



SOURCE: HFSNA 2009

Changes in expenditures between 2005 and 2008, for other major food commodities were also noted. Cooking oil and sugar expenditure shares increased in urban areas. On the other hand, 2008 shares for meat and mix decreased relative to 2005, and were closer to 1995-96 levels. The share of expenditures on dairy for both urban and rural households also went down, continuing a trend from 1995. For a more detailed account of how food expenditure shares have changed over time for major food items, see Table 4.4 below.

Table 4.4: Share of expenditure on major food items

	National				Rural				Urban			
	2008 09	2005	2000	95 96	2008 09	2005	2000	95 96	2008 09	2005	2000	95 96
Rice and cereals	31.3	39	38	43.9	31.5	42.3	41.2	47.8	29.9	31.3	28.9	31.1
Vegetables	12.5	8.3	9.2	8.8	12.5	8.3	9.4	9	12.2	8.5	8.6	8.6
Pulses	3.8	2.6	2.9	2.7	3.8	2.4	2.8	2.6	3.5	3.3	3.3	3.3
Oil	8.4	4.2	3.7	3.7	8.6	4.1	3.6	3.6	7.1	4.7	4	4.4
Sugar	2.7	1.5	1.3	1.4	2.8	1.5	1.3	2.2	2.3	1.6	1.5	3.4
Meat	5.8	8.5	8	6.2	5.5	7.6	7	5	7.3	10.6	11	10.2
Milk	1.8	3.7	4	4.8	1.5	3.5	3.6	4.1	2.9	4.4	4.9	7.1
Fish	13.2	12.2	12.5	11.7	13.1	11.5	12.1	11	13.7	14.1	13.7	14
Condiments	5.2	7.5	7.1	5.4	5.3	7.2	7.2	5.6	4	8.3	6.9	5
Fruits	1.6	3.2	3	2.4	1.4	3	2.6	1.9	3.3	3.8	4.1	3.7
Mix	7	8.3	8.3	6.7	7.1	8.3	7.6	5.7	6.8	8.2	10.2	5.6
Potatoes	6.7	-	-	-	6.9	-	-	-	5.8	-	-	-
Beverage	-	0.7	2	2	-	0.5	1.6	1.5	-	1.2	3.1	3.7

Source: HIES (2005, 2000, 1995) and HFSNA 2008-09 Survey Data

4.4 "Shocks" or difficulties encountered by households

Households were asked whether they had experienced difficulties or "shocks" during the past 12 months. The reported shocks varied in nature from natural disasters (e.g. floods, cyclones), economic disasters (e.g. high food prices, loss of employment), or to more personal disasters (e.g. death of a household member, sickness, and health expenditures). When more than one shock was reported, households were asked to prioritize their shocks. Sickness and health expenditures were reported by 40% of households as their first main difficulty. Food price rises were considered the second main difficulty by 30% of households.

Sylhet (41%) and Rajshahi (33%) divisions had the greatest percentage of households that perceived the price shock as their main difficulty. In contrast, the price shock was less of an issue compared to floods and cyclone in Barisal where a smaller proportion of households (19%) perceived food price rises as their main difficulty compared to floods and cyclone (39%). These findings corroborate the findings of the price transmission analysis at divisional level (See Chapter 3). Details of the most prominent shocks reported are presented below in Table 4.5.

Table 4.5: Main difficulties or "shocks" encountered in the past 12 months (% households)

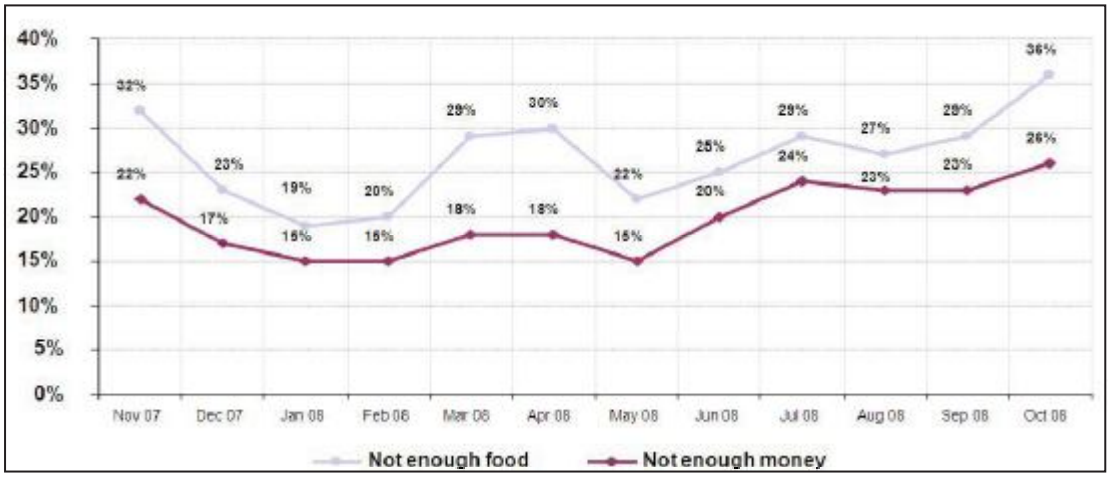
	Sickness/health expenditures %	Debt to reimburse %	High food prices %	Floods, cyclones %
Sex of household head				
Male	40	8	30	7
Female	39	7	32	5
Area				
Rural	40	6	29	9
Urban	41	4	33	3
Division				
Barisal	27	3	19	39
Chittagong	45	10	28	3
Dhaka	43	9	29	5
Khulna	38	8	28	12
Rajshahi	38	7	33	4
Sylhet	35	9	41	2
National	**40**	**8**	**30**	**7**

SOURCE: HFSNA 2009

4.4.1 Seasonality of shocks and difficulties

Households reporting shocks or difficulties were asked whether there were months during the period from November 2007 to October 2008 when they had insufficient food or money for other basic essentials. The specific months of the reported difficulties were recorded allowing for an analysis of seasonality. The line graph in Figure 4.11 illustrates the timing of difficulties encountered.

Figure 4.11: Percentage of households indicating "not enough food" or "not enough Money" by month



SOURCE: HFSNA 2009

Rice prices in Bangladesh peaked in April 2008, just prior to the *Boro* harvest. During the peak, approximately 30% of the population reported not enough food while 18% reported not enough money for other basic essentials. It is noteworthy that households perceived May 2008 as a brief period of respite when food shortages (22%) and money shortages (15%) were somewhat alleviated. This would seem linked to the *Boro* harvest and the beneficial labor and its associated income-earning opportunities. However, by the next lean season of September/October 2008, the reported unmet needs for food (36%) and money (26%) had risen to levels that were even higher than in April 2008. It is possible that actual shocks or burdens such as debts carried forward from previous hard times contributed to these higher figures in October 2008. These findings and other issues related to the seasonality of shocks and difficulties, represent further research and analysis opportunities.

The impact of the food price rises as perceived by households was also captured during data collection. Reported severity levels were captured using the following response options: severe, high, moderate, mild, or no effect. The results and proportion of respondents answering highly or severely affected are presented in Table 4.6 overleaf.

Table 4.6: Percentage of households reporting perceived severity of the impact of the food price rises

	Highly affected %	Severely affected %	Not enough food in the past 12 months %	Insufficient money for other basic expenditures in past 12 months %
Sex of household head				
Male	30	9	57	70
Female	34	14	61	59
Area				
Rural	32	10	61	47
Urban	28	7	46	39
Division				
Barisal	44	10	66	47
Chittagong	25	12	52	45
Dhaka	35	9	59	45
Khulna	32	8	62	53
Rajshahi	26	6	56	42
Sylhet	32	16	57	45
National	31	9	58	45

SOURCE: HFSNA 2009

Table 4.6 shows that 40% of households perceived the impact from high food prices as severe or high. The proportion was higher for female-headed households (48%) compared to male-headed households (39%) and for rural households (42%) compared to urban households (35%). Barisal and Sylhet divisions reported the highest perceived proportions at 54% and 48% respectively. For those households reporting insufficient money for other basic needs, the two most Cyclone Sidr-affected divisions, Barisal (66%) and Khulna (62%) had the highest figures.

4.5 Household coping strategies

To assess how households coped with food security-related difficulties, respondents were asked if any specific food-related coping strategies had been used during one month prior to the assessment. The question was not asked specifically in relation to the increasing food prices. A coping strategy index (CSI) was constructed, which assigned a severity score to each coping strategy (See Table 4.7). The score was multiplied by the frequency of the specific coping mechanisms reported. Higher CSI values indicate that the household adopted multiple coping strategies, or more severe strategies, to cope with the lack of food.

Table 4.7: Severity score of coping strategies

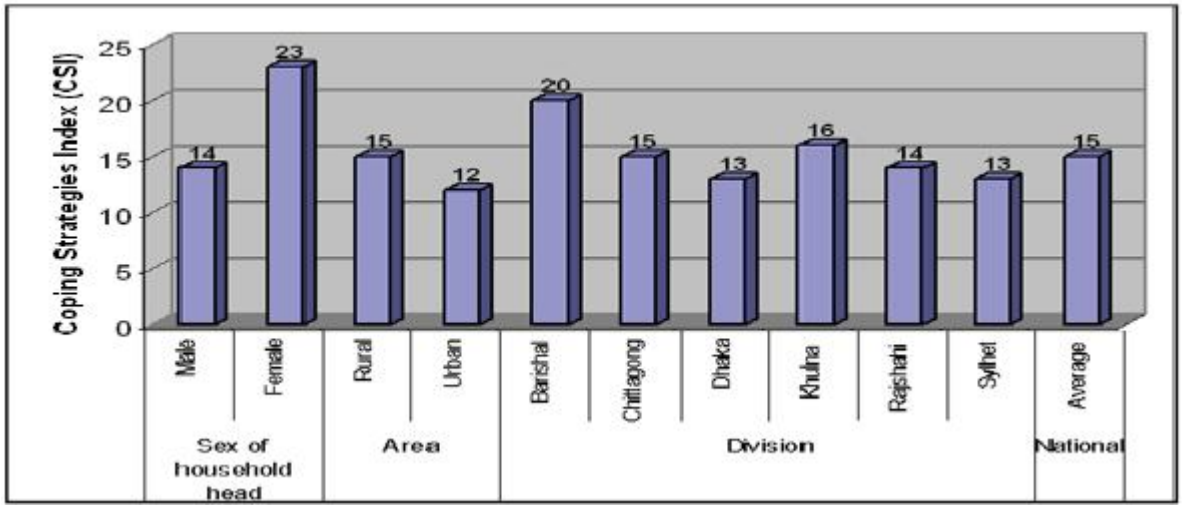
Coping strategy	Severity score	Coping strategy	Severity score
Rely on less preferred and less expensive food	2.5	Skip entire days without eating	3.8
Borrow food	2.6	Purchase food on credit, incur debts	3.1
Food gift, or rely on help from friends or relatives	2.6	Begging or gleaning food from field	3.9
Limit portion size at meals	2	Gather wild food	3.5
Restrict consumption by adults in order for small children to eat	1.9	Gather waste food from markets/restaurants	3.5
Reduce number of meals eaten in a day	2.7	Send household members to eat elsewhere	3

SOURCE: HFSNA 2009

Coping Strategies Index (CSI) values were calculated for various groups of households allowing a comparison between female-headed households and male-headed households, urban and rural households, and according to administrative areas in Bangladesh. These results are presented in Figure 4.12: Estimated coping strategy index (CSI) values by households in Bangladesh .

CSI scores for female-headed households (23) were very high relative to both male-headed households (14), as well as to the national average (15). The CSI score for female-headed households was 64% higher than that of male-headed households. Rural households (15) had somewhat higher scores than their urban counterparts (12). Differences in household location were more meaningful at the divisional level wherein Barisal division had a notably higher CSI value of 20, compared to the other five divisions (13 to 16). It is likely that the effects of Cyclone Sidr combined with the high food price shock contributed to this outcome.

Figure 4.12: Estimated coping strategy index (CSI) values by households in Bangladesh



SOURCE: HFSNA 2009

In the face of difficulties, the most common strategies adopted by households to meet their food needs were borrowing money from banks or friends and relatives, reducing expenditures on health care, and seeking alternative or additional jobs (See Table 4.7). On average, 34% of households needed to borrow money from friends or relatives to meet their needs in the 12 months prior to the assessment. About one-third of households (33%) also borrowed money from financial institutions. Use of negative coping strategies such as reducing expenditure on health care was reported by 22% of households; and 15% of households sought additional or alternative jobs to meet their food needs. Although it was not within the scope of the assessment to explore the issue of child labour, there is a risk that such a strategy could have led to engaging children in income-generating activities.

Table 4.7: Percentage of households using coping strategies, by sex of household head, by area, and by division, in Bangladesh

	Gender of household head		Area		Division						National Average
	Male	Female	Rural	Urban	Barisal	Chittagong	Dhaka	Khulna	Rajshahi	Sylhet	
Consumed seed: stocks held for next season	6.0	2.0	7.3	1.4	11.0	6.0	6.0	6.0	5.0	6.0	6.0
Decreased expenditures for fertilizer or pesticide	6.0	3.0	6.7	1.1	6.0	3.0	5.0	5.0	8.0	4.0	5.0
Sold domestic assets	1.0	1.0	1.0	0.8	1.0	2.0	1.0	1.0	1.0	2.0	1.0
Sold productive assets	2.0	2.0	2.0	0.8	3.0	2.0	2.0	2.0	1.0	2.0	2.0
Sold more animals than usual	8.0	6.0	9.0	2.7	11.0	6.0	6.0	11.0	8.0	8.0	8.0
Mortgaged productive assets	5.0	5.0	6.0	2.5	8.0	6.0	4.0	7.0	5.0	4.0	5.0
Decreased expenditures on health care	22.0	27.0	23.2	19.7	24.0	28.0	19.0	33.0	18.0	23.0	22.0
Took children out of school	6.0	8.0	6.6	5.8	6.0	10.0	6.0	7.0	4.0	10.0	6.0
Sought alternative or additional jobs	15.0	17.0	15.9	13.3	17.0	14.0	11.0	29.0	16.0	14.0	15.0
Increased HH members out migrating for work and/or food	4.0	8.0	4.8	3.5	8.0	4.0	3.0	5.0	4.0	5.0	5.0
Borrowed from bank or micro credit organizations	34.0	18.0	34.2	28.0	47.0	27.0	31.0	38.0	36.0	22.0	33.0
Borrowed from friends & relatives	34.0	33.0	35.5	29.4	41.0	37.0	34.0	35.0	30.0	35.0	34.0
Sold advanced labor	6.0	6.0	5.9	4.5	4.0	4.0	3.0	9.0	7.0	9.0	6.0

SOURCE: HFSNA 2009

The proportion of female-headed households (27%) that reduced expenditures on health was higher than male-headed households and the national average (both 22%). Furthermore, female-headed households sought more alternative jobs (17%) and borrowed less from financial institutions (18%) than male-headed households (15% and 34%, respectively). This could have been related to negative discrimination in lending practices.

A greater percentage of urban households utilized the following coping strategies: reducing health care expenditure (23%), taking loans from relatives (36%) or from financial institutions (34%), and seeking alternative jobs (16%). The highest proportions of households using these major coping strategies were in Barisal and Khulna divisions. Compared to the national average, the proportion of households that decreased health expenditure was particularly high in Khulna (33%), Chittagong (28%), and Barisal (24%) divisions. Alternative job seeking was also high in Khulna division at 29% of households compared to 15% of households nationally. Indebtedness was the highest in Barisal with 47% of households borrowing from the financial institutions and 41% from friends and relatives.

4.6 Food consumption and food security status of households

4.6.1 Method for measuring household food consumption

There is no single way to measure food security, and the concept of food security can be elusive. Food consumption as measured in kilocalories is one of the most theoretically grounded indicators for analyzing food security. However, measuring kilocalorie consumption requires the collection of detailed food intake data, which can be difficult and resource demanding. As a result, proxy indicators are increasingly being used for food security analysis. Such indicators generally capture diet diversity, which is a measure of how many different food types or food groups are included within a diet; they also capture food frequency which is a measure of how many food groups are consumed over a given period of time.

The World Food Programme has adopted the approach measuring dietary diversity and food frequency using an indicator known as the food consumption score (FCS). The FCS is a frequency-weighted diet diversity score that is calculated using the frequency of consumption of different food groups by a household during the seven days prior to a survey. The FCS is a relatively new food security indicator; and, as such, its reliability and accuracy are still under review. As recently as June 2009, a validation study of WFP's FCS indicator was published by the International Food Policy Research Institute (IFPRI).[59] One of the key conclusions from the IFPRI validation study is noted below:

> *"Overall, our findings on the usefulness of the dietary diversity and food frequency indicators tested in this study are encouraging. The associations with calorie consumption per capita are mostly as expected with regard to direction and strength (especially when small quantities are excluded from food frequencies). In two out of three study sites, food frequency scores are clearly superior to simpler measures of diet diversity (food or food group count)."(Wiesmann, D. et al., 2009)*

Other research has shown that there is a significant correlation between the diversity of a diet, and nutrition adequacy with children's and women's anthropometry, and socio-economic status[60]. This section reports on household food security in Bangladesh using the food consumption score (FCS).

4.6.1 Food consumption patterns and food consumption scoring

To examine the food consumption patterns, the sampled households were asked the number of days they had consumed a series of food items in the week prior to data collection, and the sources of the foods consumed. From a nutrition perspective, different food items are divided into a number of food groups of which a combination should be consumed on a daily basis to ensure a nutritionally adequate diet. The key food groups are:

- Cereals and tubers;
- Pulses;
- Animal proteins (meat, fish eggs);
- Vegetables;
- Fruits;
- Dairy;
- Sugar;
- Oils/fats, and
- Condiments.

For each food group, the frequency or the number of days an item of the food group was consumed is tabulated from 0 (never eaten) to 7 (eaten every day). A weight is assigned to each food group, representing the nutritional importance of the food group. The frequency obtained for each food group is multiplied by the weight of the group. The food consumption score (FCS) is the sum of the weighted food groups. The food groups and the weights are presented in Table 4.8: Key food groups and weights below.

Table 4.8: Key food groups and weights

	Food Items	Food Group	Weight
1.	Cereals: corn, wheat, sorghum, rice, bread roots and tubers, manioc, sweet potatoes, banana	Staples	2
2.	Pulses: peanuts, beans	Pulses	3
3.	Vegetables (including green, leafy vegetables, shoots)	Vegetables	1
4.	Fruits	Fruits	1
5.	Animal proteins: fish, meat, eggs	Meat & Fish	4
6.	Dairy / dairy products	Dairy	4
7.	Oils and fats	Oil	0.5
8.	Sugar	Sugar	0.5
9.	Condiments	Condiments	0

SOURCE: HFSNA 2009

Two standard thresholds were identified by WFP to distinguish different food consumption levels. A score of 21 was set as the minimum food consumption with an expected daily consumption of staple and vegetables[61]. A score less than 21 indicated that the household was *not* expected to eat, at the least, staples and vegetables on a daily basis. Therefore, this household was considered to have had "poor food consumption". The second threshold was set at 35, calculated by the daily consumption of staple and vegetables and complemented with frequent consumption of oil and pulses.[62] With a FCS between 21 and 35, a household was assumed to have had "borderline food consumption." Households that score above 35 were estimated to have had "acceptable food consumption."

Given the importance of oil and fish in the diet of the Bangladesh population, these thresholds were elevated. As a result, four food consumption groups were created for the analysis of this assessment:

1. Poor consumption (=28)
2. Borderline consumption (>28 and =42)
3. Acceptable consumption (>42)
4. An additional threshold was introduced to distinguish the acceptable households between acceptable low (43 - 52) and acceptable high (>52)

Households with poor or borderline consumption (FCS =42) were for the purposes of this assessment, considered to be food insecure. It is important to note that the use of FCS thresholds and cut-off points are evolving, as more studies and validation analyses become available.[63] The IFPRI June 2009 validation study makes this important observation with regards to WFP's global cut-off points:

> *"All these observations support the use of WFP's FCS for food security assessments. However, the cut-off points recommended by WFP to define poor, borderline, and adequate FCGs are far too low when the FCS classification is compared to estimates of calorie deficiency from our survey data and other sources."*[64]

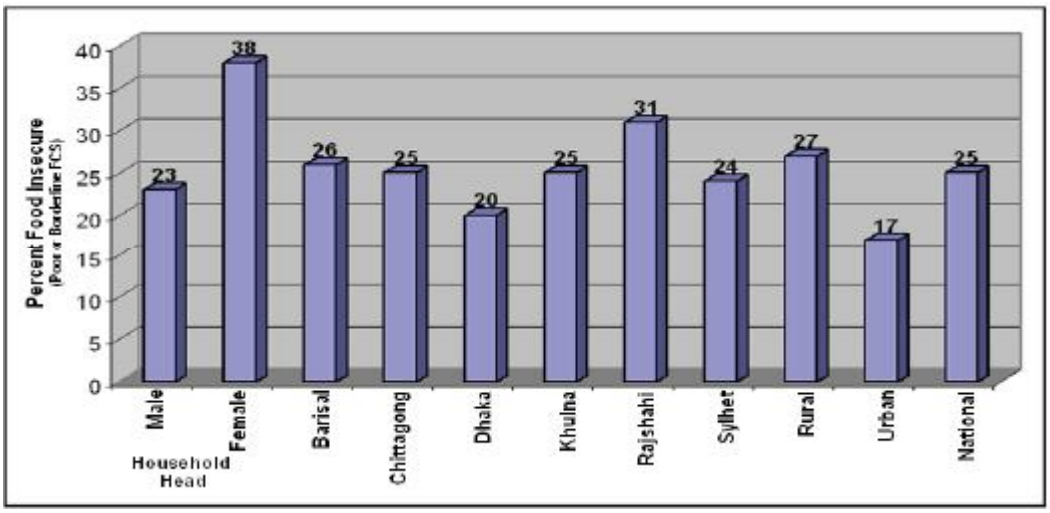
The same IFPRI analysis goes on to make a recommendation to adjust the cut-off points upwards, for the purpose of avoiding significant underestimates of food insecurity. The implication for the HFSNA results reported herein, are, that if anything, the thresholds applied might have resulted in an underestimate of food insecurity within the population.

4.6.2 Household food security: food consumption score results

Households with poor or borderline FCS values and considered to be food insecure represented one-quarter (25%) of the surveyed population. Within that group, approximately 5% had poor food consumption scores and were highly food insecure while an additional 20% had borderline food consumption scores.

The graph in Figure 4.13 shows further details of the proportion of the households that were found to be food insecure.

Figure 4.13: Proportion of food insecure households based on the food consumption score



SOURCE: HFSNA 2009

Female-headed households were strongly over-represented in the food insecure group with 38% of these households associated either with poor or borderline food consumption. The prevalence of food insecurity for male-headed households was considerably lower at 23%. Rural populations were also over-represented in the food insecure group with 27% of rural households having poor or borderline food consumption scores. A significantly smaller percentage of urban households fell into the poor or borderline categories, at 17%. The low proportion of urban households with poor or borderline food consumption scores was unexpected[65]. By division, Rajshahi and Barisal were the most food insecure based on the FCS results. Just under one-third (31%) of Rajshahi had poor or borderline food consumption and just over one-quarter of Barisal (26%) were similarly categorized. The proportion of food insecure households in Khulna division and Chittagong division were close to the national average. Barisal, Khulna and Rajshahi divisions are all historically the most food insecure divisions within the country, based on previous HIES data.

4.6.3 Household diets and diet diversity

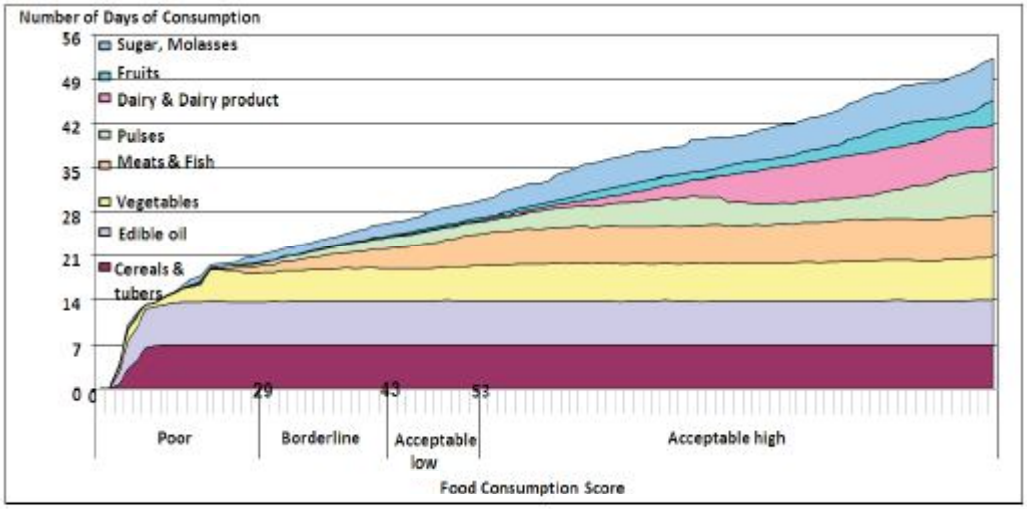
There was a general sense that the diet of poor households worsened with the price crisis, raising concerns about the impacts on the short and long-term nutritional status of children and vulnerable groups. The findings of this assessment supported these concerns.

The diet of most households in Bangladesh was found to be poor in dairy and fruits, except for households with the highest food consumption scores - households with 'acceptable high' food consumption scores had a lot more dairy and fruits within their diets. Households with 'acceptable low' food consumption scores consumed animal protein three to five times a week, sugar two to three times a week, and pulses twice a week. However even the diets of this relatively better off group were poor in dairy products and fruit. In addition to consuming fruits and dairy products more often, households with 'acceptable high' food consumption scores were more frequently consuming meat, fish, and pulses.

Food insecure households had very low diet diversity, with diets predominantly based on starchy staples (cereals and coarse rice) combined with edible oil and vegetables. The food insecure rarely consumed animal protein (only once or twice weekly) and ate almost no pulses, dairy and fruits. This pattern was unique as other studies have shown the same poor diet diversities.[66] The BRAC 2008 survey found similar results of very low levels of protein consumption amongst the poorest households. This study compared diets in 2006 ("pre-shock") with diets in August 2008 ("post-shock") and found that already low levels of protein consumption had fallen even further in the aftermath of high food prices.[67]

In general, the basic daily diet of households in Bangladesh was made of edible oil, vegetables and cereals, as shown in Figure 4.14 below.

Figure 4.14: Diet composition per food consumption group



SOURCE: HFSNA 2009

In addition to their poor diets, adults in food-insecure households were found to be consuming fewer than three meals per day. In nearly all households, children aged one to five years were eating almost four times or more per day. Notable exceptions were children from female-headed households, children within the poor food consumption group, and children from households in Sylhet division (See Table 4.9).

Households were asked about the number of meals recently consumed compared to their usual number of meals. Response options included "less," "same," or "more." More than three-quarters of households (78% to 88%) for all food consumption score groups reported the "same." The percentage of households reporting "less" for the poor food consumption score group was 16%, considerably higher than all other groups with higher food consumption scores. These and related findings are also shown below in Figure 4.9

Table 4.9: Number of meals taken per day

	No. of meals taken by adult 1- day prior to survey	No. of meals taken by children 1-5 years 1-day prior to survey	Meals taken by adult compared to usual (%)			Meals taken by children 1-5 years compared to usual (%)		
	Mean	Mean	Less	Same	More	Less	Same	More
Food Consumption Groups								
Poor	2.7	3.7	16	78	6	14	74	12
Borderline	2.9	4.0	7	85	7	7	77	16
Acceptable low	2.9	4.1	4	88	7	3	83	14
Acceptable high	3.0	4.3	2	88	10	3	80	17
Gender of household head								
Male	3	4.2	4	87	9	4	80	16
Female	2.9	3.9	9	83	7	10	76	15

SOURCE: HFSNA 2009

	No. of meals taken by adult 1- day prior to survey	No. of meals taken by children 1-5 years 1-day prior to survey	Meals taken by adult compared to usual (%)			Meals taken by children 1-5 years compared to usual (%)		
	Mean	Mean	Less	Same	More	Less	Same	More
Area								
Rural	2.9	4.1	5	87	8	4	81	15
Urban	3.0	4.2	3	87	10	4	78	18
Division								
Barisal	2.9	4.0	4	87	9	5	85	10
Chittagong	3.0	4.0	6	90	4	5	84	11
Dhaka	3.0	4.2	3	85	11	2	77	21
Khulna	3.0	4.6	3	92	5	5	80	15
Rajshahi	2.9	4.1	4	85	11	3	81	16
Sylhet	3.0	3.8	5	87	8	6	78	15
National	**3.0**	**4.1**	**4**	**87**	**9**	**4**	**80**	**16**

SOURCE: HFSNA 2009

4.6.4 Household food security profiles

The food security situation of households was determined by *per capita* expenditures, the share of food in total expenditures, income levels, asset ownership, the diversity of income sources, and coping strategies. Table 4.10 shows the results of a correlation analysis between the food consumption score and key food security indicators and provides insight into some of the main determinants of food security.

Table 4.10: Main Determinants of Food Security

Spearman's rho	Food Consumption Score		n =
	Correlation Coefficient	Sig. (2-tailed)	
Coping Strategy Index	-0.414 (**)	<0.01	10,829
Per capita expenditures (monthly)	0.431 (**)	<0.01	10,832
Percentage food expenditures (monthly)	-0.133 (**)	<0.01	10,822
Income per capita (current)	0.370 (**)	<0.01	10,759
Total asset score without animals	0.482 (**)	<0.01	10,832
Number of household members earning an income	0.125 (**)	<0.01	10,817
Number of different sources of income	0.118 (**)	<0.01	10,823

SOURCE: HFSNA 2009

The findings indicated that households that utilized coping strategies were more food insecure more often. An indication of increased food insecurity was the higher shares of expenditure on food in households. However, higher *per capita* expenditure, higher *per capita* income, and higher asset scores were all positively correlated with better household food security. These

results suggest that response options to high food prices should focus on increasing households' real income with attention to both the creation and maintenance of assets and to income diversification

Profile of the most food insecure households. The Bangladesh households most affected by the food price crisis were those belonging to the "poor food consumption" group. Although households in the "poor food consumption" group had lower family sizes, they had higher dependency ratios (45%) compared to the national average (40%). In the "poor food consumption" group, household heads were less educated with 70% reporting to have never attended school against a national average of 43.2%. These same households had fewer assets with an average score of 4 compared to the national average of 9.4. Additionally, more of the households were headed by females (17.8%) than the national average (7.9%).

In terms of livelihoods, the most food-insecure households had lower numbers of income earners with 1.2 members per household compared to national levels of 1.38 members per household. Additionally, the most food-insecure households depended more on agriculture wage labor, non-agriculture wage labor, and casual labor. Most were landless (48.6%) and net-food buyers (39.6%). The struggle that these households faced was most evident in their very high Coping Strategies Index scores, with the average CSI score for this group (35.8) approximately 2.5 times greater than the national average CSI score (14.5).

The "borderline food consumption" group was marginally better off than the extreme food-insecure households described above. They displayed many of the same characteristics as the "poor food consumption" group and their food expenditures as a proportion of total household expenditures were the highest (65%) of all groups. Their heads of households were less educated with 59% reporting to have never attended school. They had fewer assets (5.8) than the national average (9.4) and the female-headed households (10.8%) were considerably higher than the national average (7.9%).

Profile of food secure households. Households belonging to the "acceptable low" food consumption group in the assessment had many characteristics similar to the typical or national average household. Although food secure, these "acceptable low" food consumption households were clearly vulnerable to income shocks. These households depended less on casual work compared to food-insecure households. Nevertheless, wage labor, both in the agricultural and non-agricultural sectors, represents an important livelihood for numerous households in the "acceptable low" food consumption group. Such households are likely to be vulnerable or affected by a wide range of income-related shocks, including the global financial crisis.

Table 4.11: Household profile per food consumption group

Household Profile	Food Consumption Groups				National
	Poor	Border line	Acceptable low	Acceptable high	Average
Household characteristics					
Average household size	4.2	4.5	4.7	5.3	5.0
Dependency ratio (%)	45.0	42.0	41.0	39.0	40.0
Education (% HH head never at school)	70.1	59.4	47.2	33.8	43.2
Female-head of HH (%)	17.8	10.8	7.1	6.3	7.9
Asset score (excluding animals)	4.0	5.8	7.5	11.8	9.4
Livelihoods					
Number of household income earner	1.20	1.29	1.31	1.46	1.38
Non agriculture wage labor (%)	19.1	18.1	15.8	7.7	11.8
Agriculture wage labor (%)	23.7	17.0	13.6	5.4	10.1
Casual work (%)	5.2	4.8	1.9	1.0	2.1
Agriculture					
Landless (%)	48.6	38.3	26.7	22.1	26.1
Percentage net food buyer in 2008 (%)	39.6	39.5	37.3	29.2	32.5
Food Expenditure and Consumption					
Share of food expenditure (%)	63.8	65.0	64.3	59.4	61.6
Number of meals by adult per day	2.7	2.9	2.9	3.0	3.0
Number of meals by child under 5 per day	3.7	4.0	4.1	4.3	4.1
Coping strategy index					
Coping strategy index score	35.8	23.7	16.1	8.9	14.5

SOURCE: HFSNA 2009

The “acceptable high” food consumption households were clearly above the national average for many of the assessed food security and livelihood-related indicators. Although they had the largest families with an average household size of 5.3 compared to the national average of 5, this was offset by the fact that these households had more income earners. The majority of these households had literate heads of household (66.2%), and very few depended on agriculture and non-agriculture wage labor and casual labor (only 14.1%). They had more assets (11.8) than the national average (9.4) and spent slightly less of their budget on food (59.4%) than the average (61.6%), cushioning the household against shocks such as the high food prices. This was reflected by their less frequent need to employ food-consumption-related coping strategies compared to the other food security groups.

A detailed profile of the four food consumption groups constructed from the most relevant food security and livelihood indicators is shown in Table 4.11.

4.7 Conclusions

The food price shock clearly worsened the food security situation in 2008 with 40% of households in Bangladesh reporting that they were either “highly” or “severely affected.” Almost one-half of female-headed households (48%) reported the shock as high or severe. The situation was similarly characterized by more than one-half of the surveyed respondents

in Barisal (54%) and Sylhet (48%) divisions reporting being "highly" or "severely affected." The aftermath and lasting effect of other shocks like Cyclone Sidr and the floods undoubtedly contributed to continuing food insecurity.

Due to the higher food prices, a majority of households in Bangladesh lost their purchasing power. In 2008, the real monthly income per household decreased by 12% when compared to 2005 incomes. Real wage rates remained stable while the terms of trade (daily wage/rice price) further decreased in 2008. Moreover, expenditures (particularly for food) increased to an unprecedented level of 62% of the total expenditures for households.

Two-thirds of households in Barisal (66%) reported having insufficient money to purchase food during the 12 months prior to the assessment. Households entered into further indebtedness by borrowing from banks (33%) or taking loans from friends or relatives (34%). Some households resorted to negative coping strategies such as reducing their expenditures on health care (22%) while others sought additional or alternative jobs (15%).

Although the outcome in terms of food insecurity is difficult to compare with previous periods, there is a consensus in the literature that the food price crisis has sent a substantial number of households back to poverty after a decade of progress. The assessment findings suggest that one-quarter of the population of Bangladesh was food insecure as of December 2008, equal to the hardcore food poverty percentages of 1995-96.[68] At the divisional level, Rajshahi and Barisal, two chronically food-insecure divisions, were more affected with 31% and 26% food insecure households, respectively.

5. Nutrition and health impact

5.1 Nutritional Status of Children

5.1.1 Sample distribution by age and sex

Anthropometric measurements were analyzed[69] from a total of:

- 4002 children (weight-for-length/height)
- 3931 children (length/height-for-age)
- 4175 children (weight-for-age)

As shown in Tables 5.1, 5.2, and 5.3, the proportion of girls to boys was within 0.9 and 1.1[70] across all age groups[71] and equal to 1 in the total sample. The collected data was disaggregated as follows:

Table 5.1: Anthropometric measurements analyzed for weight-for-length/height

Age in months	Weight-for-length/height						
	Boys		Girls		Total		Ratio boy:girl
	N	%	N	%	N	%	
6 - 11	175	47.0	197	53.0	372	9.3	0.9
12 - 23	426	49.6	433	50.4	859	21.5	1.0
24 - 35	434	48.8	455	51.2	889	22.2	1.0
36 - 47	469	51.0	451	49.0	920	23.0	1.0
48 - 59	465	48.3	497	51.7	962	24.0	0.9
6 - 59	**1969**	**49.2**	**2033**	**50.8**	**4002**	**100**	**1.0**

SOURCE: HFSNA 2009

Table 5.2: Anthropometric measurements analyzed for length/height-for-age

Age in months	Length/height-for-age						
	Boys		Girls		Total		Ratio boy:girl
	N	%	N	%	N	%	
6 - 11	176	47.2	197	52.8	373	9.5	0.9
12 - 23	418	49.6	425	50.4	843	21.4	1.0
24 - 35	415	48.3	444	51.7	859	21.9	0.9
36 - 47	467	51.5	439	48.5	906	23.0	1.1
48 - 59	461	48.5	489	51.5	950	24.2	0.9
6 - 59	**1937**	**49.3**	**1994**	**50.7**	**3931**	**100**	**1.0**

SOURCE: HFSNA 2009

Table 5.3: Anthropometric measurements analyzed for weight-for-age

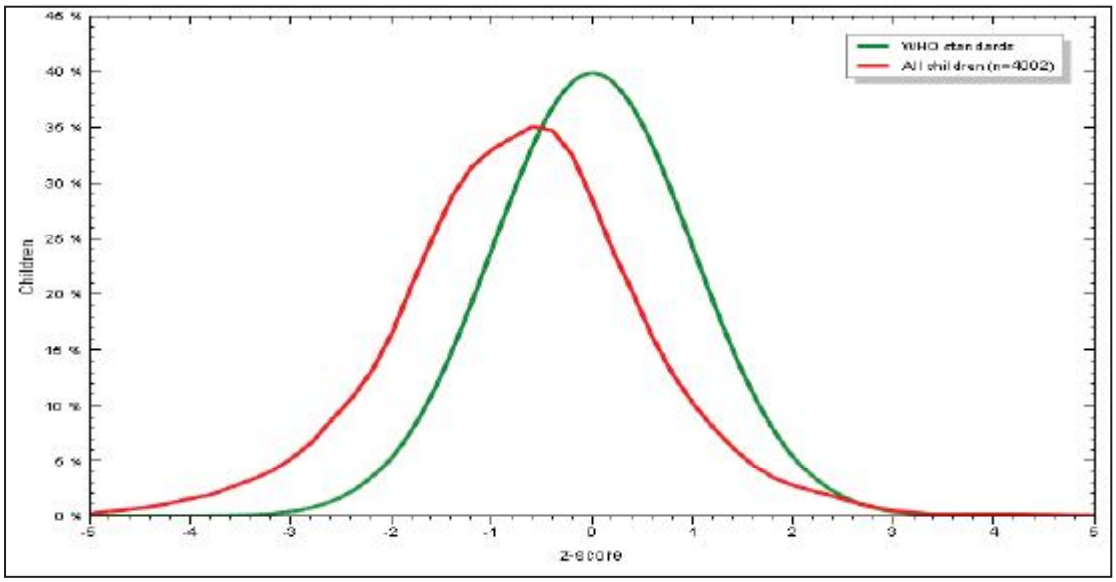
Age in months	Weight-for-age						
	Boys		Girls		Total		Ratio boy:girl
	N	%	N	%	N	%	
6 - 11	183	47.3	204	52.7	387	9.3	0.9
12 - 23	451	50.0	451	50.0	902	21.6	1.0
24 - 35	460	49.1	477	50.9	937	22.4	1.0
36 - 47	485	50.8	469	49.2	954	22.9	1.0
48 - 59	482	48.4	513	51.6	995	23.8	0.9
6 - 59	**2061**	**49.4**	**2114**	**50.6**	**4175**	**100**	**1.0**

SOURCE: HFSNA 2009

5.1.2 Acute malnutrition (wasting)

Weight-for-length/height index. Figure 5.1 below illustrates the curves of the weight-for-length/height distribution at national level (red curve). The green curve represents WHO 2006 growth standards. As shown, the red curve is shifted to the left indicating that the surveyed population presented higher acute malnutrition rates and that many more children were in the borderline of acute malnutrition as compared to the reference population. When the findings were further disaggregated by Geographical zone (national, rural, urban, and divisional areas), the means were all greater than -1 and shifted to the left of the reference population. Both the means and the standard deviations are shown in Table 5.4.

Figure 5.1: Distribution of weight-for-length/height index in children 6 to 59 months, in Bangladesh (WHO 2006 growth standards)



SOURCE: HFSNA 2009

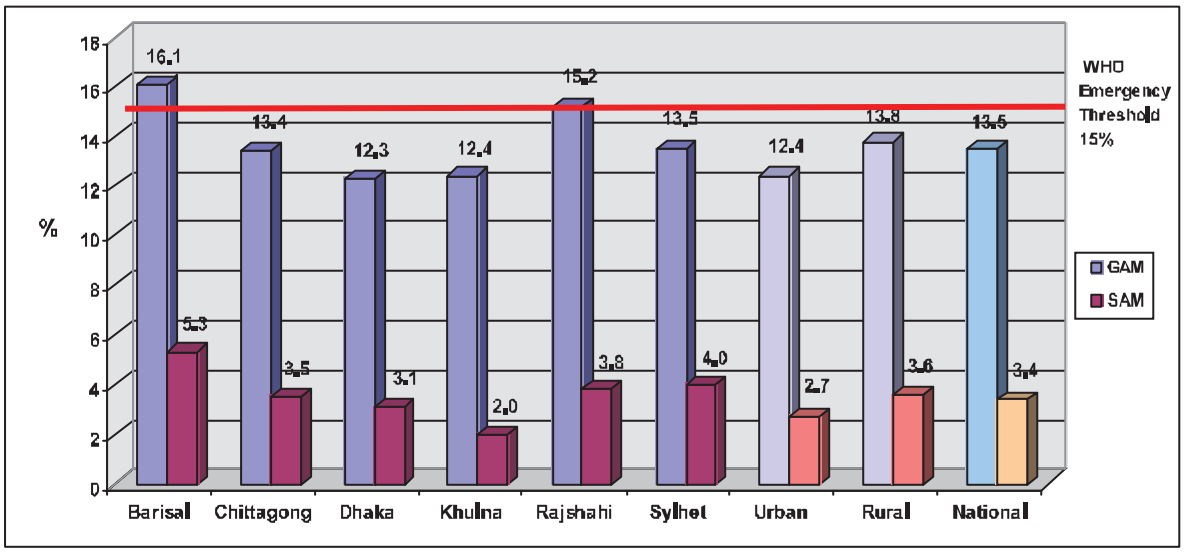
Table 5.4: Mean and SD of weight-for-length/height

Geographical zone	Mean	Standard Deviation
Barisal	- 0.91	1.20
Chittagong	- 0.75	1.25
Dhaka	- 0.68	1.21
Khulna	- 0.65	1.19
Rajshahi	- 0.76	1.21
Sylhet	- 0.69	1.32
Rural	- 0.75	1.22
Urban	- 0.63	1.25
National	**- 0.73**	**1.23**

SOURCE: HFSNA 2009

Prevalence of acute malnutrition.[72] The prevalence of acute malnutrition was analyzed at national level, by division, and by area and based on weight-for-length/height Z-scores. The reference used was the WHO 2006 growth standards. Figure 5.2 shows the prevalence of global acute malnutrition at national level, for the six divisions, and by area.

Figure 5.2[73]: Acute malnutrition in children 6 to 59 months by division, areas, and nationally (WHO 2006 growth standards) n=4002 (unweighted)



SOURCE: HFSNA 2009

National level. The prevalence rate of global acute malnutrition (GAM) was **13.5%** [95% CI 12.1-15] and the rate of severe acute malnutrition (SAM) was **3.4%** [95% CI 2.8-4.2] (*see*, Section 5.5.1 for comparison with previous surveys). Table 5.5 shows the global and severe acute malnutrition rates disaggregated by age at national level.

Table 5.5: Prevalence of acute malnutrition based on weight-for-length/height Z-scores by age group in Bangladesh (WHO 2006 growth standards)

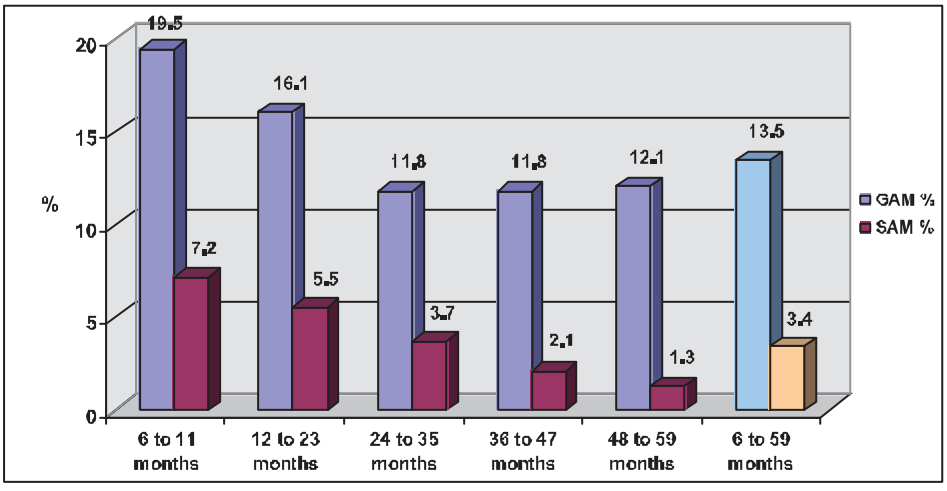
Age in months	N weighted	Global Acute Malnutrition (<-2 Z-score)		Severe Acute Malnutrition (<-3 Z-score)	
		%	95% C.I.	%	95% C.I.
6 - 11	347	**19.5**	15.3 - 24.6	**7.2**	4.6 - 11.1
12 - 23	864	**16.1**	13.3 - 19.2	**5.5**	3.9 - 7.4
24 - 35	877	**11.8**	9.3 - 14.7	**3.7**	2.5 - 5.3
36 - 47	904	**11.8**	9.5 - 14.6	**2.1**	1.3 - 3.6
48 - 59	944	**12.1**	9.8 - 14.8	**1.3**	0.7 - 2.3
Total	**3936**	**13.5**	**12.1 - 15.0**	**3.4**	**2.8 - 4.2**

SOURCE: HFSNA 2009

By sex. The global acute malnutrition rates did not significantly differ overall.

By age. The results showed that the most vulnerable groups were aged from 6 to 23 months as they demonstrated significantly higher global and severe acute malnutrition rates of 16.9% [95% CI 14.5-19.7] for GAM and 6% [95% CI 4.6-7.7] for SAM, as compared to children aged from 24 to 59 months with 11.7% [95% CI 10.2-13.4] for GAM and 2.2% [95% CI 1.6-3] for SAM [$\chi 2$ $p<0.000$]. This pattern is commonly found in nutrition surveys as these two age groups (6 to 11 months and 12 to 23 months) correspond to the age-periods when a child is introduced to complementary foods. The survey included simple questions on child-caring practices in order to identify possible contributing factors to the causes of malnutrition. Both the minimum meal frequency and introduction of complementary food indicators showed that this age group did not meet the minimum requirements (*see,* Section 5.2)

Figure 5.3: Prevalence of acute malnutrition based on weight-for-length/height Z-scores by age groups (WHO 2006 growth standards)



SOURCE: HFSNA 2009

At division level. All of the divisions showed global acute malnutrition rates above 10%. This is a *serious situation* according to the WHO classification for assessing the severity of acute malnutrition. Barisal and Rajshahi divisions had the highest global acute malnutrition rates

(16.1% and 15.2% respectively) and are classified by WHO as a *critical situation*. These results were consistent with the food security findings wherein the most food insecure households (i.e. poor/borderline food consumption groups) were found in these two divisions (*see*, Figure 4.13). These two divisions also accounted for the highest proportion of households depending on irregular income activities in comparison to national averages (*see*, Chapter 4.2.1). Moreover, Barisal division demonstrated the highest Coping Strategy Index scores (*see*, Figure 4.12) and Rajshahi division had the highest divisional price transmission degrees (*see*, Chapter 4.4.1).

Table 5.6: Prevalence of acute malnutrition based on weight-for-length/ height Z-scores by division, in Bangladesh (WHO 2006 growth standards)

Division	N weighted	Global Acute Malnutrition (<-2 Z-score)		Severe Acute Malnutrition (<-3 Z-score)	
		%	95% C.I.	%	95% C.I.
Barisal	246	16.1	12.8 - 20.0	5.3	3.5 - 8.0
Chittagong	895	13.4	10.5 - 16.9	3.5	2.3 - 5.5
Dhaka	1251	12.3	9.8 - 15.3	3.1	1.9 - 4.9
Khulna	410	12.4	9.4 - 16.3	2.0	1.1 - 3.7
Rajshahi	813	15.2	12.0 - 18.9	3.8	2.5 - 5.7
Sylhet	321	13.5	10.3 - 17.4	4.0	2.7 - 5.8
National	**3936**	**13.5**	**12.1 - 15.0**	**3.4**	**2.8 - 4.2**

SOURCE: HFSNA 2009

By area. Rural areas showed higher acute malnutrition rates than urban areas, with a significant statistical difference [$\chi 2$ $p<0.05$]. However, the global acute malnutrition rates in rural and urban areas were both above 10% reflecting a *serious situation* by WHO classification. As shown above, Barisal and Rajshahi divisions presented the highest rates of acute malnutrition; it is important to highlight that 85.3% and 85.9% respectively of the total households in these two divisions are in rural areas.

Table 5.7: Prevalence of acute malnutrition based on weight-for-length/ height Z-scores by area in Bangladesh (WHO 2006 growth standards)

Area	N weighted	Global Acute Malnutrition (<-2 Z-score)		Severe Acute Malnutrition (<-3 Z-score)	
		%	95% C.I.	%	95% C.I.
Rural	3116	**13.8**	12.1 - 15.6	**3.6**	2.9 - 4.6
Urban	820	**12.4**	10.7 - 14.5	**2.7**	2.0 - 3.7
National	**3936**	**13.5**	**12.1 – 15.0**	**3.4**	**2.8 - 4.2**

SOURCE: HFSNA 2009

Estimates of the numbers of acutely malnourished children. According to the global acute malnutrition estimation rates at division and national levels, the numbers of children suffering from acute malnutrition have been extrapolated as follows:

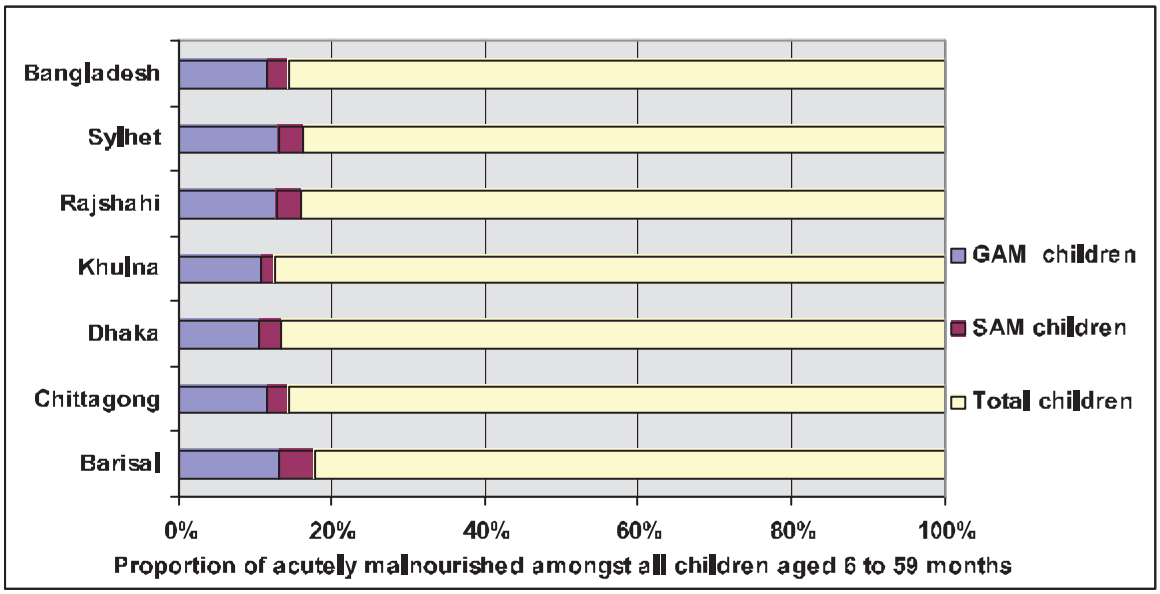
Table 5.8: Estimation of the number of children in Bangladesh with acute malnutrition according to the HFSNA 2009 results (WHO 2006 growth standards)

Geographical zone	Total Population[74]	Number of population 6 - 59 months (10.8%)[75]	GAM children	SAM children
Barisal	9,269,504	1,001,106	161,178	53,059
Chittagong	29,265,501	3,160,674	423,530	110,624
Dhaka	48,532,207	5,241,478	644,702	162,486
Khulna	17,200,602	1,857,665	230,350	37,153
Rajshahi	35,433,986	3,826,870	581,684	145,421
Sylhet	9,696,041	1,047,172	162,312	41,887
National	**149,397,840**	**16,134,967**	**2,178,221**	**548,589**

SOURCE: HFSNA 2009

The figures in Table 5.8 show that an estimated 2,178,221 children aged 6 to 59 months are suffering from global acute malnutrition in Bangladesh whilst 548,589 of these children are severely acutely malnourished. At divisional level, the divisions with larger populations presented higher numbers of malnourished children: Dhaka had most of the globally and severely acutely malnourished children (GAM 644,702; SAM 162,486) followed by Rajshahi (GAM 581,684 GAM; SAM 145,421) and Chittagong (GAM 423,530; SAM 110,624) divisions.

Figure 5.4: Estimation of proportion amongst all children 6 to 59 months of absolute number of globally acutely malnourished children by division, in Bangladesh



SOURCE: HFSNA 2009

5.2 Underweight

5.2.1 Weight-for-age index

Figure 5.5: Distribution of weight-for-age index in children 6 to 59 months, in Bangladesh (WHO 2006 growth standards) Figure 5.5 illustrates the curves of the weight-for-age distribution at national level (red curve), according to the reference population by WHO 2006 growth standards (green curve). The red curve is strongly shifted to the left, demonstrating that the surveyed population had a higher prevalence of underweight than the reference population.

Geographically (national, divisional and area), the means were all below -1 and were all displaced to the left of the reference population. The means and the standard deviations are shown in Table 5.9.

Figure 5.5: Distribution of weight-for-age index in children 6 to 59 months, in Bangladesh (WHO 2006 growth standards)

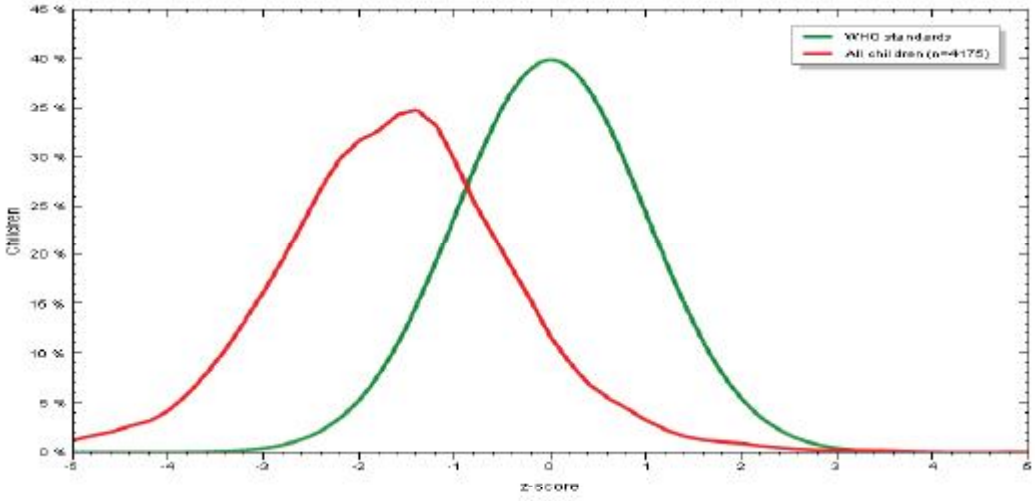


Table 5.9: Mean and SD of weight-for-age

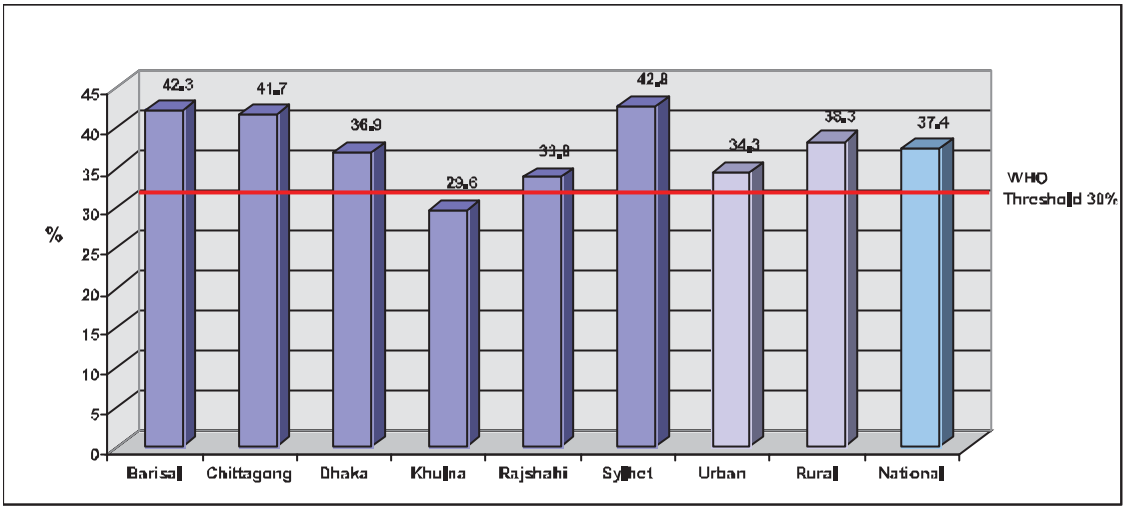
Geographical zone	Mean	Standard Deviation
Barisal	-1.81	1.20
Chittagong	-1.72	1.22
Dhaka	-1.61	1.31
Khulna	-1.37	1.21
Rajshahi	-1.55	1.12
Sylhet	-1.83	1.23
Rural	-1.68	1.21
Urban	-1.43	1.33
National	**-1.63**	**1.24**

SOURCE: HFSNA 2009

5.2.2 Prevalence of underweight[76]

The underweight prevalence was analyzed at national level, divisional level, and by rural and urban areas. All results are presented according to weight-for-age Z-scores using the WHO 2006 growth standards. Figure 5.6 shows the prevalence of underweight children at national level, in the six divisions, and by area.

Figure 5.6:[77] Underweight prevalence in children 6 - 59 months by division, area and nationally (WHO 2006 growth standards) n=4175 (unweighed)



SOURCE: HFSNA 2009

At national level. The prevalence rate of global underweight was **37.4%** [95% CI 35.4-39.5] whilst the rate of severe underweight was **12.3%** [95% CI 10.9-13.8]. Refer to Section 5.5.1 for comparison with previous surveys. Table 5.10 illustrates the global and severe underweight rates as disaggregated by age at national level.

Table 5.10: Prevalence of underweight based on weight-for-age Z-scores by age group, in Bangladesh (WHO 2006 growth standards)

Age in months	N weighted	Global Underweight (<-2 Z-score)		Severe Underweight (<-3 Z-score)	
		%	95% C.I.	%	95% C.I.
6 - 11	361	**25.2**	20.8 - 30.2	**10.2**	7.1 - 14.4
12 - 23	901	**35.4**	31.8 - 39.1	**10.8**	8.6 - 13.3
24 - 35	921	**38.4**	34.4 - 42.5	**13.2**	10.5 - 16.4
36 - 47	933	**37.5**	34.5 - 41.1	**12.5**	10.1 - 15.2
48 - 59	975	**42.8**	39 - 46.7	**13.4**	11.0 - 16.2
Total	**4091**	**37.4**	**35.4 - 39.5**	**12.3**	**10.9 - 13.8**

SOURCE: HFSNA 2009

By sex. Global underweight did not significantly differ overall.

By age. Only the group aged 6 to 11 months showed a lower prevalence in comparison to the children aged from 12 to 59 months [$\chi 2$ $p<0.000$]. This result was also found in previous national surveys in Bangladesh (CMNS 2005 and BDHS 2007). Despite this age group demonstrating the poorest infant feeding practices (*see* Section 5.2.4), the highest rates of underweight were found in older children.

At division level. All identified levels of underweight were above the 30% WHO threshold indicating a very high severity situation with the exception of Khulna division. Barisal and Sylhet divisions showed high rates of underweight and it is important to note that Barisal and Sylhet households had some of the highest rice expenditure shares (*see*, Figure 4.10).

Table 5.11: Prevalence of underweight malnutrition based on weight-for-age Z-scores by division (WHO 2006 growth standards)

Division	N weighted	Global Underweight (<-2 Z-score)		Severe Underweight (<-3 Z-score)	
		%	95% C.I.	%	95% C.I.
Barisal	257	**42.3**	37.5 - 46.0	**15.2**	12.2 - 18.8
Chittagong	931	**41.7**	37.6 - 46.0	**13.6**	10.9 - 16.8
Dhaka	1297	**36.9**	32.7 - 41.2	**13.1**	10.1 - 16.8
Khulna	431	**29.6**	26.0 - 33.6	**6.9**	4.7 - 10.0
Rajshahi	842	**33.8**	29.6 - 38.3	**10**	7.6 - 13.0
Sylhet	333	**42.8**	37.3 - 48.6	**16.2**	13.0 - 20.1
National	**4091**	**37.4**	**35.4 - 39.5**	**12.3**	**10.9 - 13.8**

SOURCE: HFSNA 2009

By area. The analyzed data showed higher underweight prevalence in the rural areas and these results demonstrated statistically significant differences [$\chi 2$ $p<0.001$]. In both the rural and urban areas, the global underweight rates were above 30% and considered *very high severity situations* by WHO. Sylhet, Barisal and Chittagong divisions had the highest underweight rates and it is noteworthy that 88.3%, 85.3% and 76% respectively of their households are situated in rural areas.

Table 5.12: Prevalence of underweight malnutrition based on weight-for-length/height Z-scores by area (WHO 2006 growth standards)

Area	N weighted	Global Underweight (<-2 Z-score)		Severe Underweight (<-3 Z-score)	
		%	95% C.I.	%	95% C.I.
Rural	3232	**38.3**	35.9 - 40.7	**12.9**	11.2 - 14.8
Urban	859	**34.3**	30.9 - 37.8	**10.1**	8.2 - 12.4
National	**4091**	**37.4**	**35.4 - 39.5**	**12.3**	**10.9 - 13.8**

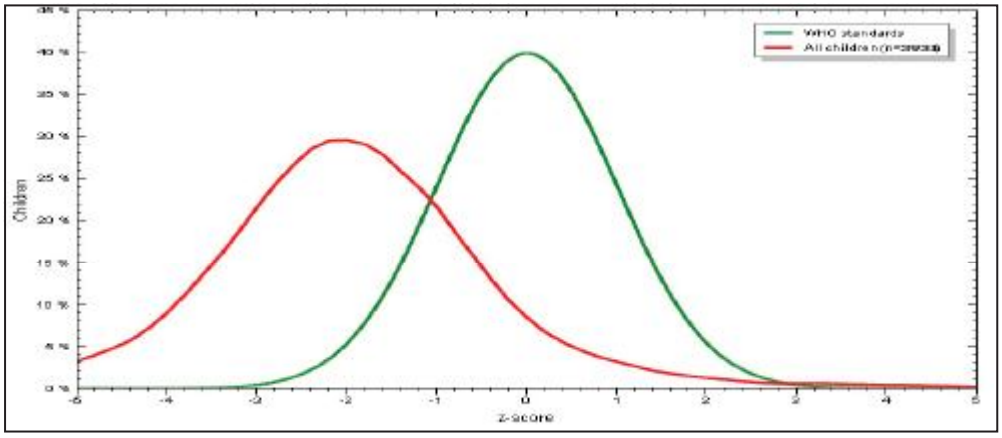
SOURCE: HFSNA 2009

5.3 Chronic malnutrition (stunting)

5.3.1 Length/height-for-age index

Figure 5.7 illustrates the curves of the length/height-for-age distribution at national level, according to the reference population (WHO 2006 growth standards). It is evident that the curve is shifted to the left indicating that the surveyed population had higher chronic malnutrition rates than the reference population. By geographical zone (national. divisional and area), all of the means were below -1 and all were displaced to the left of the reference population. The means and the standard deviations are shown in table 5.13.

Figure 5.7: Distribution of length/height-for-age index in children 6 to 59 months, in Bangladesh (WHO 2006 growth standards)



SOURCE: HFSNA 2009

Table 5.13: Mean and SD of length/height-for-age

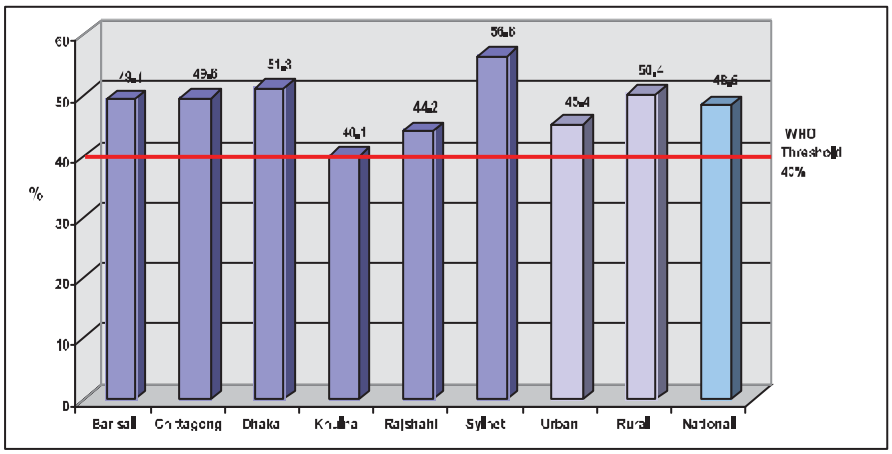
Geographical zone	Mean	Standard Deviation
Barisal	- 1.87	1.48
Chittagong	- 1.93	1.43
Dhaka	- 1.89	1.52
Khulna	- 1.63	1.39
Rajshahi	- 1.78	1.31
Sylhet	- 2.15	1.45
Rural	- 1.87	1.48
Urban	- 1.93	1.43
National	**- 1.87**	**1.44**

SOURCE: HFSNA 2009

5.3.2 Prevalence of chronic malnutrition

The prevalence of chronic malnutrition was analyzed at national level, by division and by area and results are presented according to length/height-for-age Z-scores with WHO 2006 growth standards. Figure 5.8 shows the prevalence of chronic malnutrition.

Figure 5.8: Stunting in children 6 to 59 months by division, areas and nationally (WHO 2006 growth standards) n=3931 (unweighted)[78]



SOURCE: HFSNA 2009

At national level. The prevalence rate of global chronic malnutrition was **48.6%** [95% CI 46.5-50.6] and the prevalence rate of severe chronic malnutrition was **20.1%** [95% CI 18.4-21.8]. shows the global and severe chronic malnutrition rates disaggregated by age at national level.

Table 5.14: Prevalence of chronic malnutrition in based on length/height-for-age Z-scores by age group, in Bangladesh (WHO 2006 growth standards)

Age in months	N weighted	Global Chronic Malnutrition (<-2 Z-score)		Severe Chronic Malnutrition (<-3 Z-score)	
		%	95% C.I.	%	95% C.I.
6 - 11	345	**20.2**	15.7 - 25.4	**7.2**	4.6 - 11.3
12 - 23	853	**48.7**	44.5 - 52.9	**23.8**	20.5 - 27.5
24 - 35	849	**48.4**	44.2 – 52.5	**20.8**	17.6 - 24.4
36 - 47	892	**53.2**	49.5 - 56.6	**21.1**	18.3 - 24.1
48 - 59	935	**54.6**	50.6 - 58.6	**19.8**	17.0 – 23.0
Total	**3874**	**48.6**	**46.4 - 50.6**	**20.1**	**18.4 - 21.8**

SOURCE: HFSNA 2009

By sex. Global chronic malnutrition did not significantly differ overall

By age. As the underweight prevalence showed, only the group aged 6 to 11 months showed a lower prevalence in comparison to children aged from 12 to 59 months [$\chi 2$ p<0.000]. Similar patterns were also found in previous national surveys in Bangladesh (CMNS 2005 and BDHS 2007). Despite this group age showing the poorest infant feeding practices (*see*, Section 5.2.4), the higher rates of stunting were not surprisingly found in the older age groups as stunting is a type of malnutrition that develops over longer periods of time.

At division level. The divisional levels of chronic malnutrition were all above the 40% WHO threshold of a *very high severity situation*. Sylhet and Dhaka divisions had the highest global chronic malnutrition rates (in particular Sylhet) with 56.6% and 51.3% respectively. Regionally, Sylhet has been associated to a very conservative culture with low education levels for women amongst other significant indicators[79]. As presented earlier, food security indicators in this assessment showed that Sylhet division had the highest shares of rice expenditures and, together with Rajshahi division, it was one of the divisions with the highest degree of price transmissions during 2007 to 2008 (*see* Chapter 3.2). Additionally, Sylhet division together with Barisal division had substantial increases in the proportion of the net food buyers. These combined factors could well have had a negative impact on the nutrition situation in the division.

Table 5.15: Prevalence of chronic malnutrition in children 6 to 59 months based on length/height-for-age Z-scores by division, in Bangladesh (WHO 2006 growth standards)

Division	N weighted	Global Chronic Malnutrition (<-2 Z-score)		Severe Chronic Malnutrition (<-3 Z-score)	
		%	95% C.I.	%	95% C.I.
Barisal	236	**49.4**	45.3 - 53.4	**20.3**	16.9 - 24.2
Chittagong	875	**49.6**	44.5 - 54.8	**21.8**	18.5 - 25.4
Dhaka	1237	**51.3**	47.3 - 55.2	**22.3**	18.9 - 26.2
Khulna	411	**40.1**	35.9 - 44.5	**14.6**	11.4 - 18.5
Rajshahi	808	**44.2**	40.3 - 48.3	**14.3**	11.8 - 17.2
Sylhet	307	**56.6**	51.7 - 61.4	**28.6**	24.7 - 32.9
National	**3874**	**48.6**	**46.5 - 50.6**	**20.1**	**18.4 - 21.8**

SOURCE: HFSNA 2009

By area. Data collected from rural and urban areas showed higher chronic malnutrition rates in the rural areas; these differences were statistically significant [$\chi 2$ $p<0.001$]. In both areas, the global underweight rates were above the WHO 40% threshold indicating a *very high severity situation*.

Table 5.16: Prevalence of chronic malnutrition in children 6 to 59 months based on length/height for-age Z-scores by area (WHO 2006 growth standards)

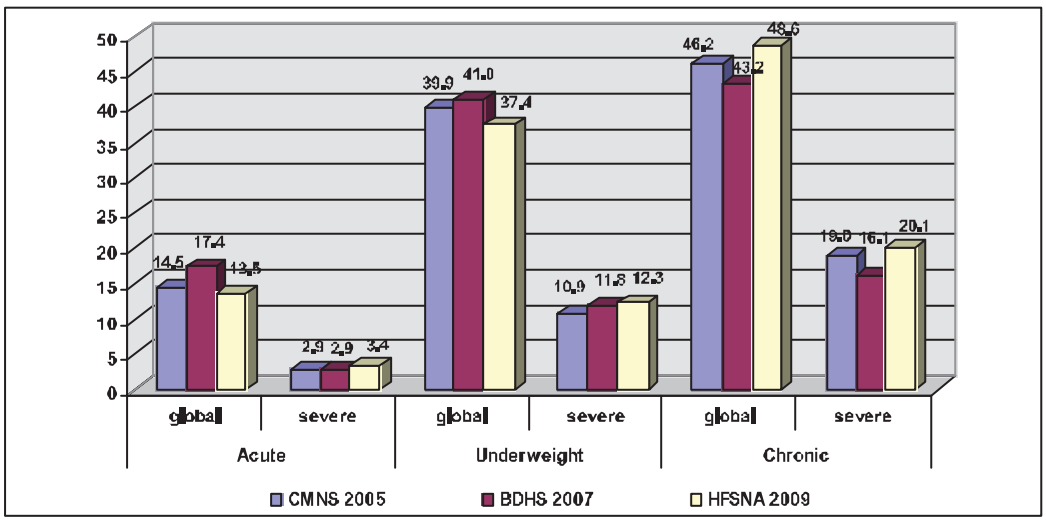
Area	N weighted	Global Chronic Malnutrition (<-2 Z-score)		Severe Chronic Malnutrition (<-3 Z-score)	
		%	95% C.I.	%	95% C.I.
Rural	3082	**50.4**	48.7 - 52.2	**22.7**	21.2 - 24.2
Urban	792	**45.4**	42.0 - 48.9	**16.5**	13.9 - 19.1
National	**3874**	**48.6**	**46.5 - 50.6**	**20.1**	**18.4 - 21.8**

SOURCE: HFSNA 2009

5.4 Comparison between the HFSNA 2009 malnutrition data and previous national surveys

Although statistical comparison amongst the previous national surveys is not possible due to the differing targeted populations and the different periods of the year (seasonality) in which these surveys were conducted, it is interesting to look at the trends of malnutrition in Bangladesh to better appreciate the current assessment results.

Figure 5.7: Comparison of acute malnutrition, underweight and chronic malnutrition from 2005 to 2009 in Bangladesh (WHO 2006 growth standards)



SOURCE: CMNS 2005, BDHS 2007, HFSNA 2009

At national level, global acute malnutrition decreased when compared to the BDHS 2007 but it remained without major changes when comparing to the 2005 and 2004 findings. However it is noteworthy that these surveys were carried out in different seasons, an important factor that affects the prevalence of acute malnutrition. The HFSNA 2009 was undertaken during the best period of the year in Bangladesh, the *Amman* harvest season, whilst the BDHS 2007 was conducted during the lean and *Boro* seasons. The underweight prevalence follows similar trends as found with the acute malnutrition comparisons albeit with a slight 'improvement'

although this can be explained by seasonality. Chronic malnutrition prevalence increased in the HFSNA 2009 but after comparing to the 2004 and 2005 results, it can be concluded that the stunting rate remained stable. Annex 10.3, Table J presents the nationally representative acute malnutrition, underweight and chronic malnutrition prevalence between 2004 and 2009.

5.5 Infant and young child feeding practices

To better support findings in the interpretation of nutritional data, questions regarding the caring practices of children under-two years of age were included in the assessment.

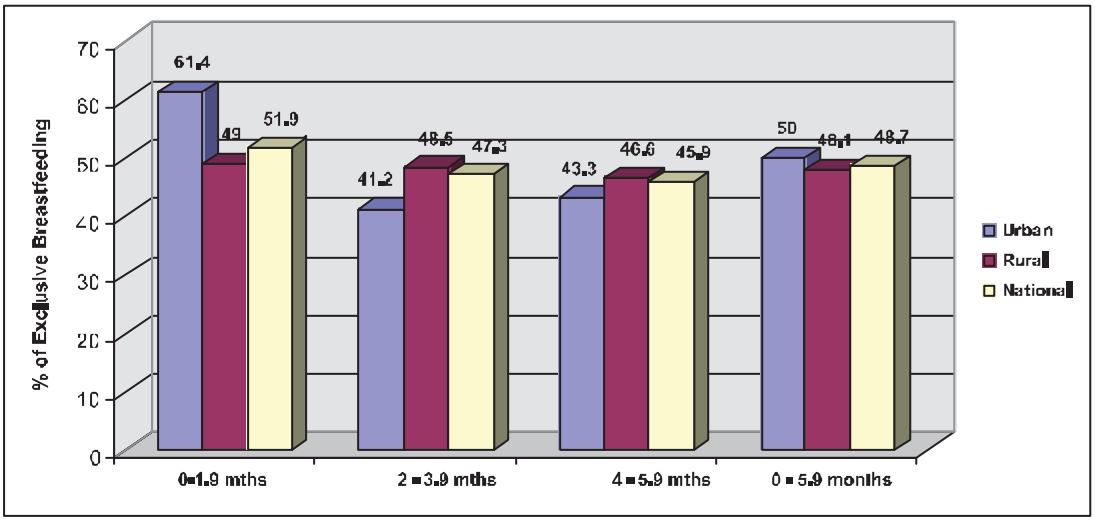
5.5.1 Exclusive breastfeeding

The exclusive breastfeeding indicator was assessed on a cross-section of children aged from birth to five months using maternal recall. Mothers were asked if they were breastfeeding any children. If any child younger than six months of age resided in the surveyed household, subsequent questions were asked to determine if the child received any other fluids or solid, semi-solid or soft foods. The results showed limited practices of exclusive breastfeeding for children up to 6 months of age (*Table 5.16* and *Figure 5.7*)

Overall, only 48.7% of mothers with children less than six months of age were exclusively breastfeeding their children. Variations by division were found ranging from 40% in Barisal division to 56.3% in Rajshahi division. By area, no important differences were seen. In previous national surveys (e.g. CMNS 2005), only 58% of children aged less than six months of age were exclusively breastfed and there were no significant differences between the rural and urban areas.

To ensure the optimal growth, it is widely recommended that infants should be breastfed exclusively until they reach six months of age. This practice is strongly correlated with the increased child survival and reduced risk of child morbidity and mortality. These findings suggest that programming efforts towards increasing the recommended exclusive breastfeeding coverage are needed.

Figure 5.8: Exclusive breastfeeding in children 0 to 5 months by age and area, in Bangladesh



SOURCE: HFSNA 2009

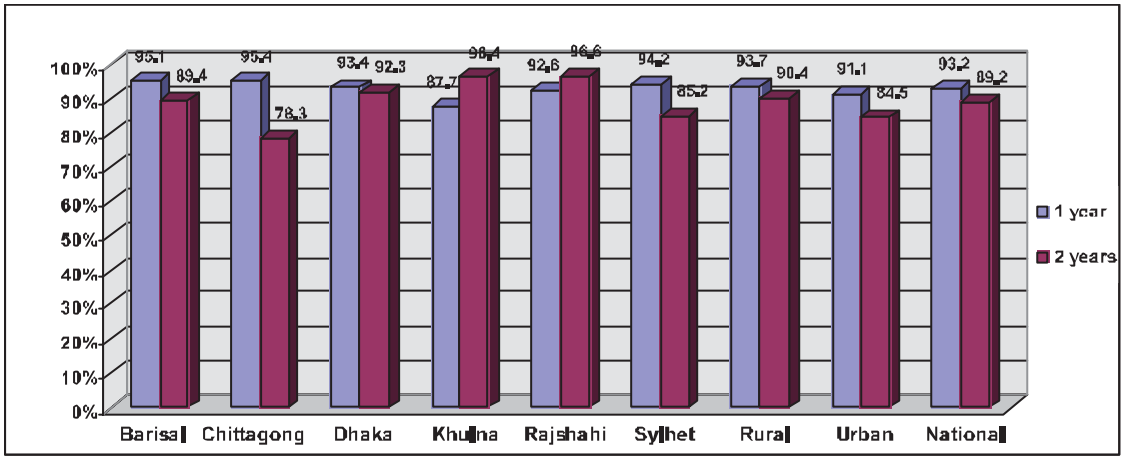
5.5.2 Continued breastfeeding

Two indicators were analyzed to determine the rates of continued breastfeeding after six months of age: [80]

1. Continued breastfeeding at one year: proportion of children 12 to 15 months of age who are fed breast-milk
2. Continued breastfeeding at two years: proportion of children 20 to 23 months of age who are fed breast-milk

At national level, the rate of continued breastfeeding at one year was 93.2% and the practice of continued breastfeeding up to two years was 89.2%. Both indicators showed a positive practice of the WHO recommendation for continued breastfeeding up to two years of age.

Figure 5.9: Continued breastfeeding at one year and at two years of age by division, by area and nationally, in Bangladesh

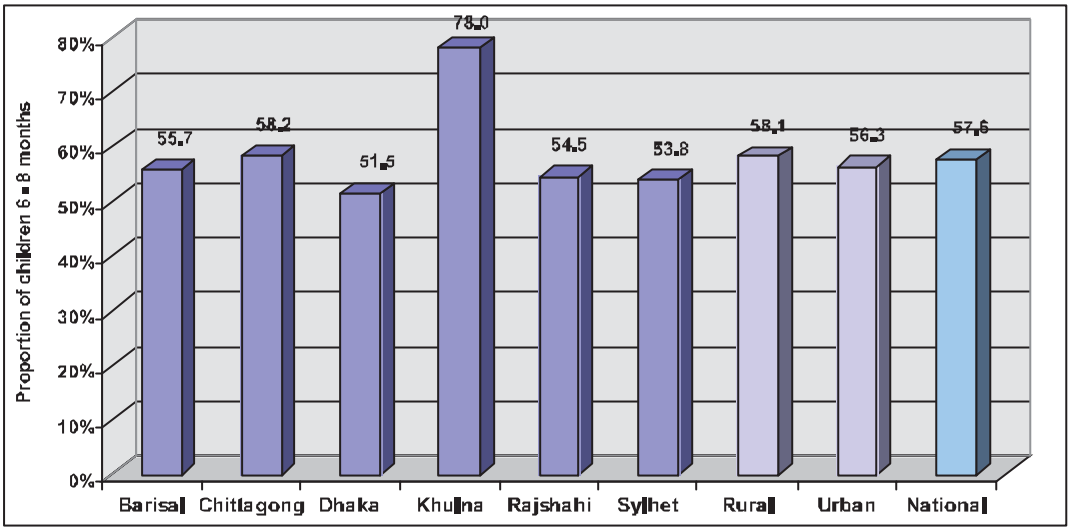


SOURCE: HFSNA 2009

5.5.3 Introduction of complementary foods

In order to establish the timing for introducing complementary food, mothers of children aged from 6 to 8 months were asked if the child had been given solid, semi-solid or soft foods in the previous day. As shown in Figure 5.10, only 57.6% of children aged from 6 to 8 months received solid, semi-solid or soft foods the day previous to the survey. These results showed that 42.5% of respondents were introducing complementary foods later than the recommended six months of age; this fact might contribute to the higher acute malnutrition rates found in children in the 6 to 11 months age group. The introduction of complementary foods at an appropriate time, the quality and quantity of complementary foods, feeding methods, and the frequency of feeding all contribute to child survival and development.

Figure 5.10 Proportion of infants aged 6 to 8 months of age who received solid, semi-solid, or soft foods, by division, by area and nationally, in Bangladesh



SOURCE: HFSNA 2009

5.6 Minimum meal frequency, minimum dietary diversity and minimum acceptable diet

Three indicators were used to assess the quality and quantity of diets in children aged 6 to 23 months:[81]

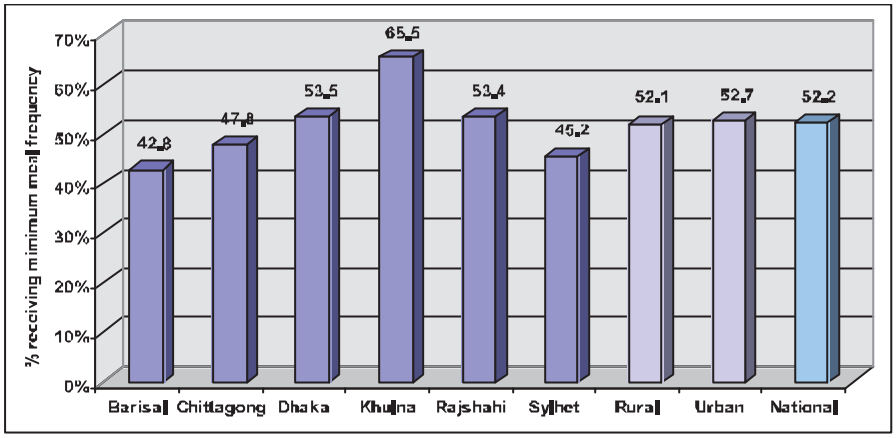
1. Minimum meal frequency
2. Minimum diet diversity
3. Minimum acceptable diet

The results are summarized in Table 5.18.

The "**minimum meal frequency**"[82] corresponds to the proportion of breastfed and non-breastfed children 6 to 23 months of age who receive solid, semi-solid or soft foods (but also including milk feeds for non-breastfed children) the minimum number of times or more. This indicator serves as a proxy for the caloric or energy intake from foods other than breast milk. The minimum meals are defined as: two times for breastfed infants 6 to 8 months, three times for breastfed children 9 to 23 months, and four times for non-breastfed children 6 to 23 months

Overall, only 52.2% of children aged from 6 to 23 months met the minimum meal frequency (Figure 5.11). Divisionally, this varied from 42.8% in Barisal to 65.5% in Khulna. By age group, the older the child, the better the minimum meal frequency was met as it varied from 36% in children aged 6 to 11 months, to 54.6% in children aged 12 to 17 months, and to 64.4% in children aged 18 to 23 months. During the period of complementary feeding, children are at high risk of undernutrition[83] , and it is crucial during this time to receive the minimum quantity and diversity of food. The low percentages of children meeting this minimum meal frequency may well have contributed to the higher acute malnutrition rates found in these vulnerable age groups.

Figure 5.11: Minimum meal frequency received by children from 6 to 23 months by division, by area and nationally, in Bangladesh



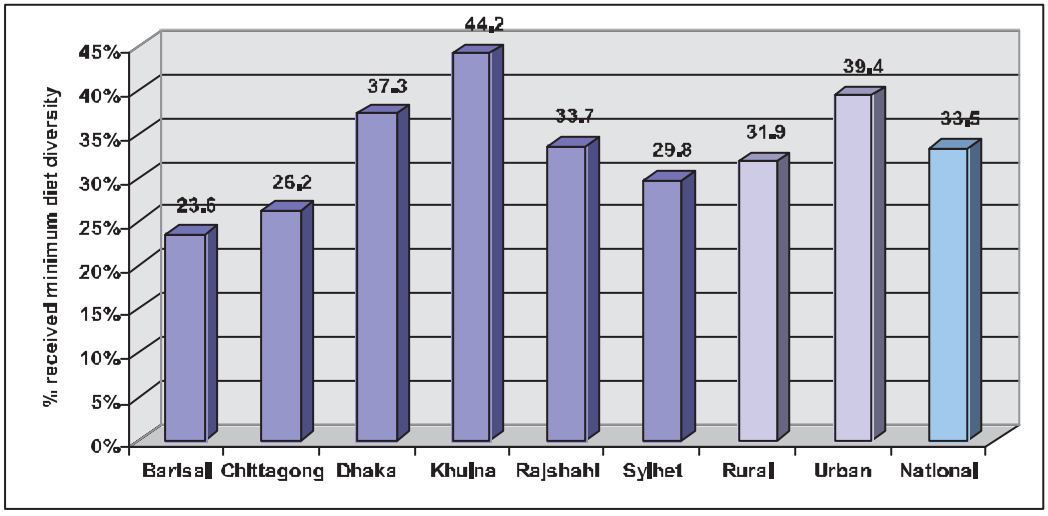
SOURCE: HFSNA 2009

The **"minimum dietary diversity"** corresponds to the proportion of children from 6 to 23 months of age who received foods from four or more food groups. The seven foods groups used for tabulation of this indicator were: i) grains, roots and tubers, ii) legumes and nuts, iii) dairy products (milk. yogurt. and cheese), iv) flesh foods (meat. fish. poultry and liver/organ meats), v) eggs, vi) Vitamin-A rich fruits and vegetables, and vii) other fruits and vegetables.

Overall, only 33.5% of children aged from 6 to 23 months met the minimum diet diversity (*Figure 5.12*). When analyzing the minimum meal frequency, Barisal division at 23.6% presented the lowest and Khulna division at 44.25% presented the highest. By age group, the older the child, the more likely the minimum meal frequency was met, it varied from 16.9% in the age group 6 to 11 months to 35.2% in ages 12 to 17 months and up to 46% in children aged 18 to 23 months.

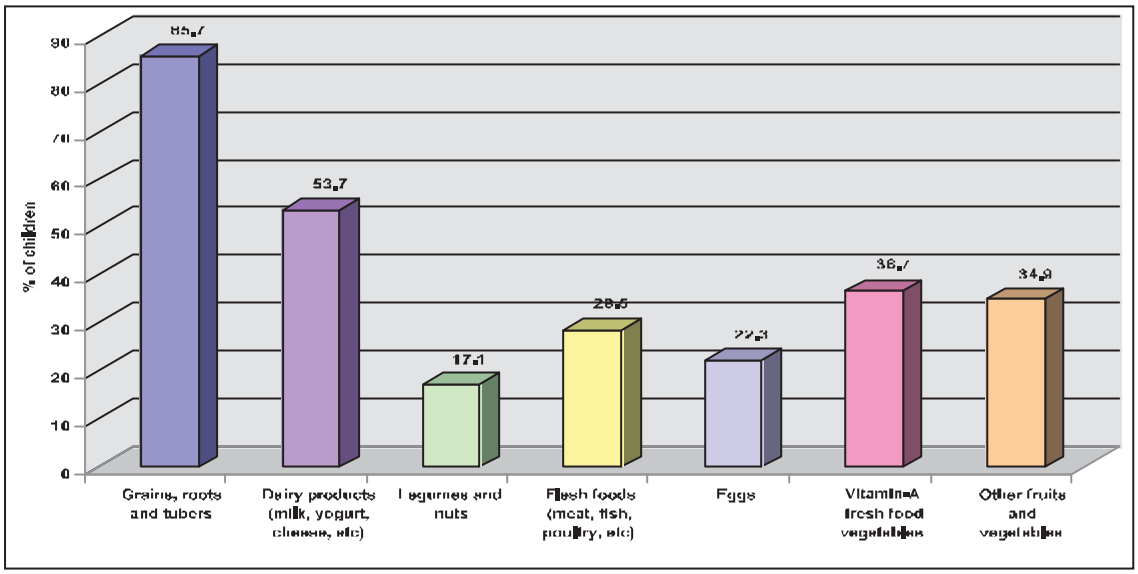
Grains, roots and tubers (85.7%) followed by dairy products as milk, yogurt, cheese (53.7%) and Vitamin A-rich fresh food vegetables (36.7%) were the three most frequently consumed food groups (Figure 5.11). Comparatively, the legumes and nuts food group were the least consumed at 17.1%. This diet pattern shows a low quality diet in which rice was dominant and as the children's diets lacked vegetables, fruits, and animal-source foods, the risks for a variety of micronutrient deficiencies are high.

Figure 5.12: Minimum diet diversity received by children from 6 to 23 months by division, by area and nationally, in Bangladesh



SOURCE: HFSNA 2009

Figure 5.13: Food-groups consumed in children from 6 to 23 months in Bangladesh



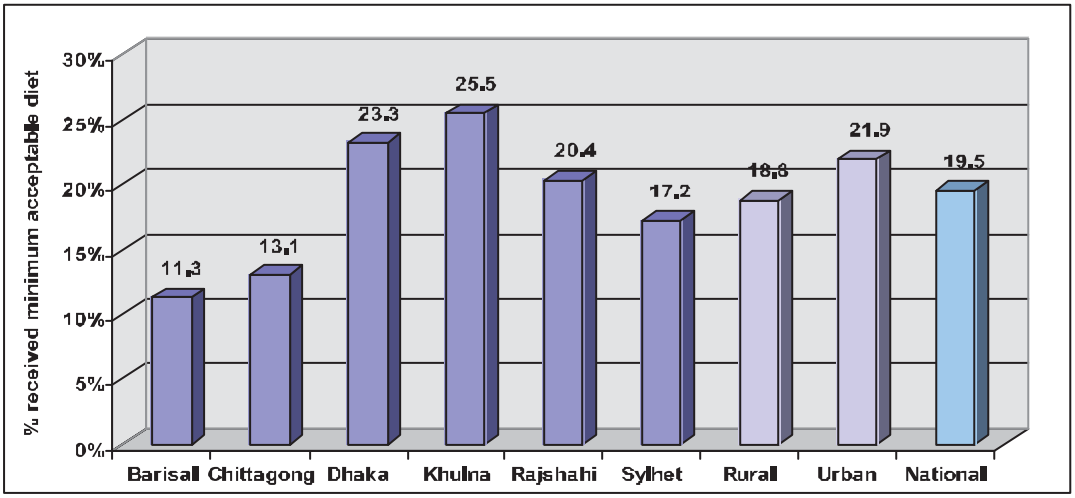
SOURCE: HFSNA 2009

The "minimum acceptable diet" is a summary infant and young child feeding indicator of the two previous indicators (meal frequency and diet diversity) and corresponds to the proportion of children between 6 to 23 months of age who receive a minimum acceptable diet (apart from breast milk).

Overall, only 19.5% of children from 6 to 23 months met the minimum acceptable diet (*Figure 5.14*). This varied from 11.3% in Barisal division to 25.5% in Khulna division. By age group, the older the child, the better the minimum meal frequency was met. It varied from 7.7% for children aged 6 to 11.9 months, to 21.7% in children 12 to 17 months, and up to 27.6% for the children aged 18 to 23 months.

Evidence shows that culturally adaptable feeding practices, food supplementation if necessary, and nutrition education and supporting maternal nutrition are likely to have the greatest impacts on the prevention of growth faltering in the first 18 months of life. Emphasis on appropriate infant and young child feeding practices require programming priority as they remain the key to the protection and promotion of growth and, ultimately, child survival.

Figure 5.14: Minimum acceptable diet met in children from 6 to 23 months by division, by area and at national level, in Bangladesh



SOURCE: HFSNA 2009

5.7 Nutrition and health status of women

5.7.1 Sample size

From 3943 eligible women, mid-upper arm circumferences were measured on 3868 mothers of children aged from 0 to 59 months or from pregnant women (data was missing for 75 women). After quality checks of the data, 16 cases were eliminated for incorrect recording resulting in the data from 3852 mothers (unweighted) being included for analysis.

Table 5.21: Sample size of mothers of children from 0 to 59 months or pregnant women by division, by area and nationally, in Bangladesh

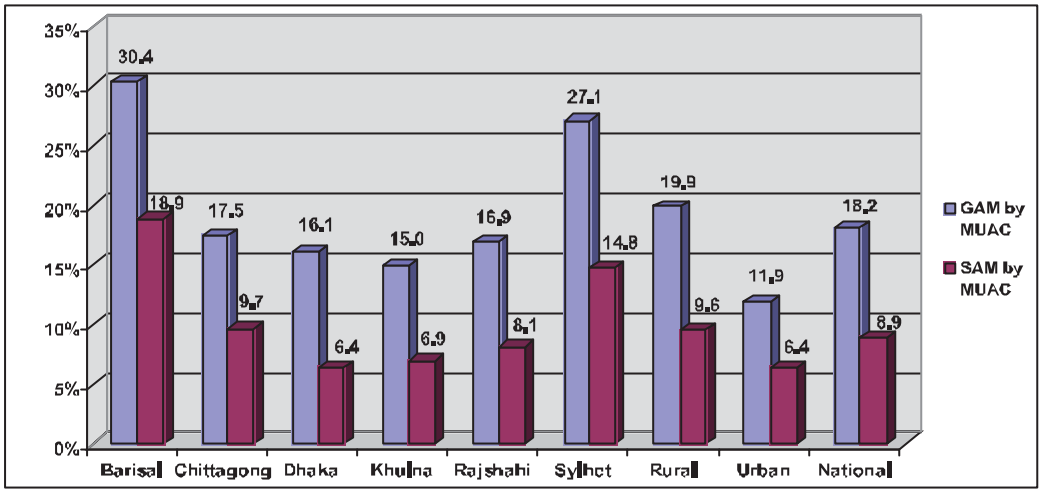
Geographical zone	N weighted
Barisal	237
Chittagong	839
Dhaka	1211
Khulna	429
Rajshahi	814
Sylhet	279
Rural	2994
Urban	815
National	**3809**

SOURCE: HFSNA 2009

5.7.2 Prevalence of global acute malnutrition by MUAC in women

The prevalence rate of global acute malnutrition in women by MUAC using a cut-off of less than 221 mm[84] was **18.2%** [95% CI 17-19.5]. The prevalence rate of women with severe acute malnutrition by MUAC using a cut-off of less than 214 mm was **8.9%** [95% CI 8-9.9]. Comparisons with previous survey data was not possible due to the different indicators used to measure women's malnutrition (i.e. body mass index). However, in the last national survey (BDHS 2007), the percentage of acutely malnourished women as defined by body mass index <18.5 was 29.7%. Table 5.21 shows the global and severe acute malnutrition rates in women by division, by area and at national level. The results varied by division and by area and followed the same pattern with the same most vulnerable zones as in the findings of nutrition status in children. Barisal division (GAM: 30.4%; SAM 18.9%) and Sylhet division (GAM 27.1%; SAM: 14.8%) presented the highest acute malnutrition rates whilst rural areas (GAM 19.9%) showed higher rates than the urban areas (GAM 11.9%). The differences between the divisions and types of area were statistically significant [$\chi 2$ $p<0.000$].

Figure 5.15: Prevalence of maternal global acute malnutrition by MUAC by division by area and nationally, in Bangladesh

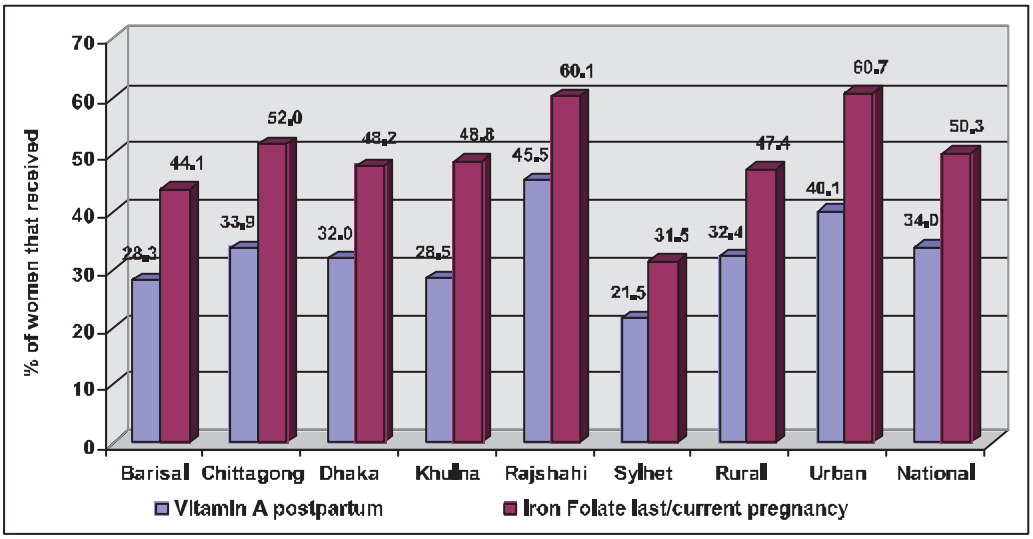


SOURCE: HFSNA 2009

5.7.3 Micronutrient supplementation of pregnant women

For this indicator, women were asked if they had received a Vitamin A capsule within six weeks after the birth of their last child and if they had taken iron and folate tablets during their last or current pregnancy. The Vitamin A capsules and the iron and folate tablets were shown to the mothers being interviewed. At national level, the Vitamin A supplementation for postpartum coverage was only 34% whilst the iron and folate supplementation coverage was just 50.3% (*Figure 5.xx*). The results showed low coverage for supplementation with both micronutrients, especially in Sylhet, Barisal and Khulna divisions (*Table 5.23*). When comparing this data with the CMNS 2005 survey, the coverage had increased by 18% for Vitamin A and by 43% for iron and folate supplementation.

Figure 5.16: Vitamin A and iron and folate supplementation coverage in women by division, by area and nationally, in Bangladesh



SOURCE: HFSNA 2009

5.7.4 Relationship between nutritional status of women and micronutrient supplementation

Globally acutely malnourished women by MUAC had statistically significant [χ2 p<0.0]) lower coverage (30.9%) of Vitamin A supplementation than non-malnourished women (35.6%). Globally acutely malnourished by MUAC women had statistically significant [χ2 p<0.000] lower coverage (44.5%) of iron and folate supplements than non-malnourished women (53.6%).

Table 5.24: Relationship between nutritional status of women and micronutrient supplementation of Vitamin A and iron and folate

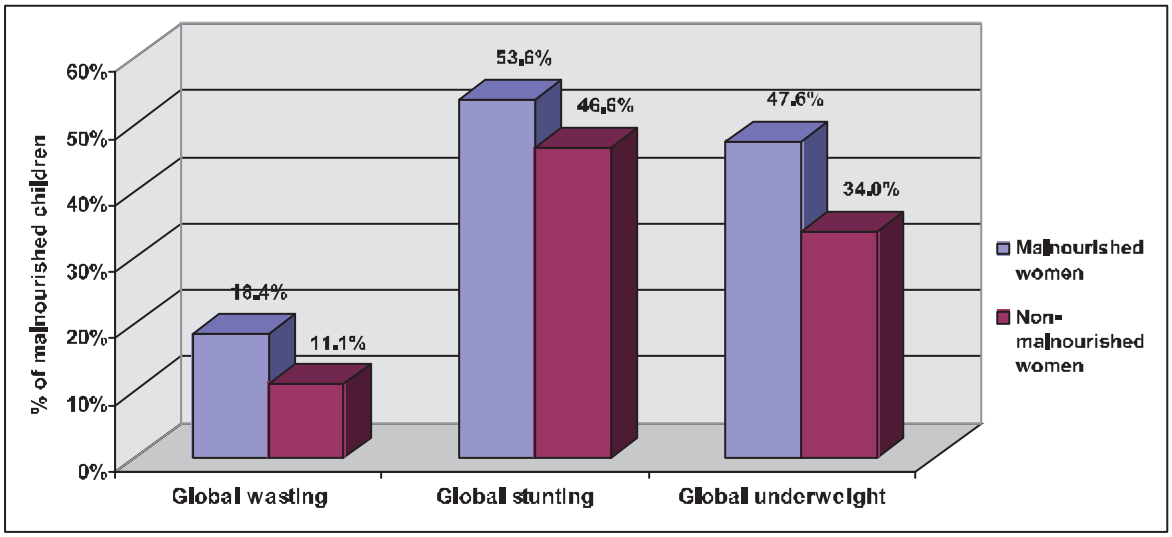
Mother's nutrition status	Vitamin A capsule within six week of delivery				Iron and Folate tablets during the last or current pregnancy			
	No		Yes		No		Yes	
	N weighted	%	N weighted	%	N weighted	%	N weighted	%
Acutely malnourished	353	69.1	158	30.9	284	55.6	227	44.4
Not malnourished	1620	64.4	897	35.6	1168	46.4	1347	53.6

SOURCE: HFSNA 2009

5.7.5 Relationship between maternal nutritional status and nutrition status of children

- **Wasting**: Children of mothers with global acute malnutrition by MUAC were 1.8 times more likely to suffer from acute malnutrition compared to those children of mothers with acceptable MUAC [OR=1.8. 95% C.I.: 1.4-2.3. p <0.000]
- **Stunting**: Children of mothers with global acute malnutrition by MUAC were 1.3 times more likely to suffer from stunting compared to those whose mothers had acceptable MUAC [OR=1.3. 95% C.I.: 1.09-1.59. p <0.001]
- **Underweight**: Children of mothers with global acute malnutrition by MUAC were 1.7 times more likely to suffer from underweight compared to those with mothers having acceptable MUAC [OR=1.7. 95% C.I.: 1.47-2.12. p <0.001]

Figure 5.17: Prevalence of global acute malnutrition, stunting and underweight amongst children by nutritional status of mother, in Bangladesh



SOURCE: HFSNA 2009

As shown in Figure 5.17 above:

- 18.4% of the malnourished mothers, had wasted children versus 11.1% of the non-malnourished mothers [χ2 p<0.000].
- 53.6% of the malnourished mothers had stunted children versus 46.6% of the non-malnourished mothers [χ2 p<0.00].

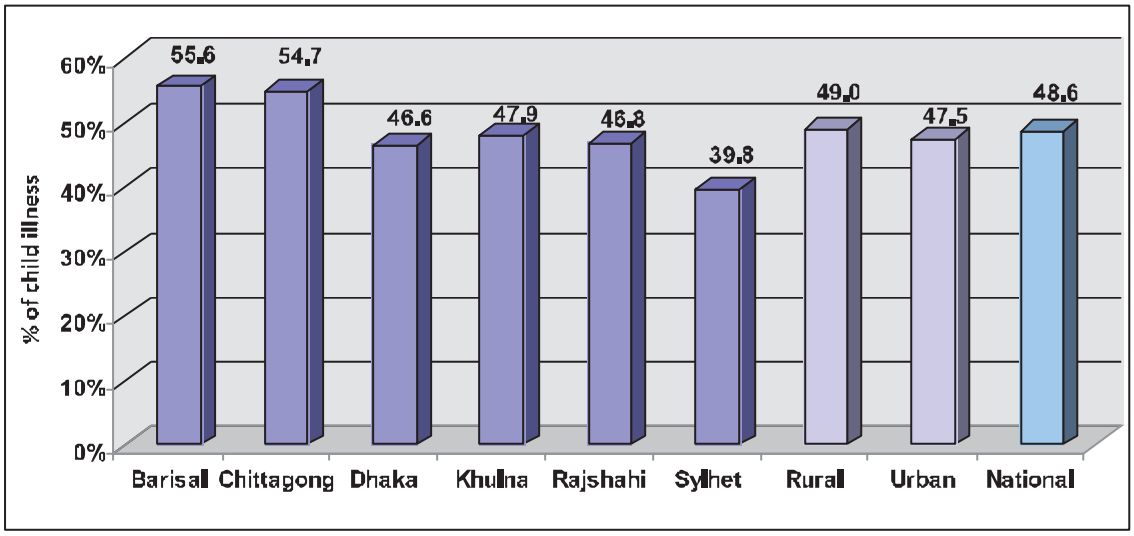
47.6% of the malnourished mothers had underweighted children versus 34% of the non-malnourished mothers [χ2 p<0.000].

5.8 Child health

5.8.1 Prevalence of common illnesses amongst children 6 to 59 months

Caregivers were asked if the child had been ill during the two weeks prior to the survey: 48.6% responded that their children were sick in the two weeks before the survey. As shown in Figure 5.14, Barisal (55.6%) and Chittagong (54.7%) divisions presented the highest percentage of illness; these differences were statistically significant [χ2. p<0.000]. Rural areas presented higher percentages of illness than urban areas but no statistical differences were found.

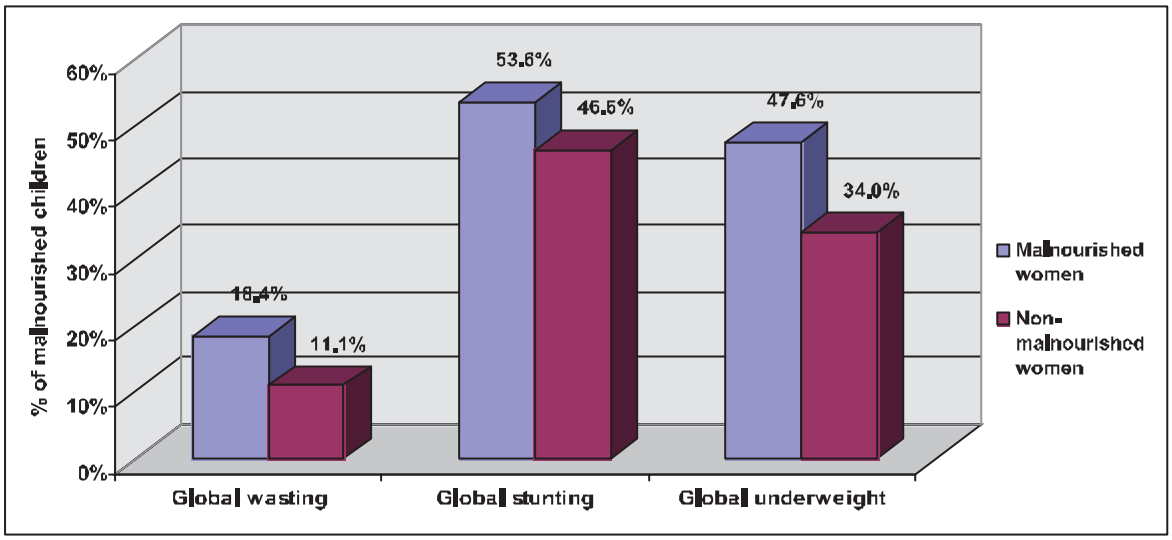
Figure 5.18: Child illness in children 6 to 59 months in the two weeks prior to the survey, by division, by area and nationally, in Bangladesh



SOURCE: HFSNA 2009

The survey specifically asked about fever, repeated coughs or breathing difficulties, diarrhoea and measles. Fever was the most commonly reported problem with 52.3% of all children having suffered from it at national level. Repeated coughs or breathing difficulties affected 21.1% of children while 15.9% were reported having diarrhea in the fortnight before the survey.

Figure 5.15: Main illness in children 6 to 59 months in the two weeks prior to the survey, by division, by area and nationally, in Bangladesh

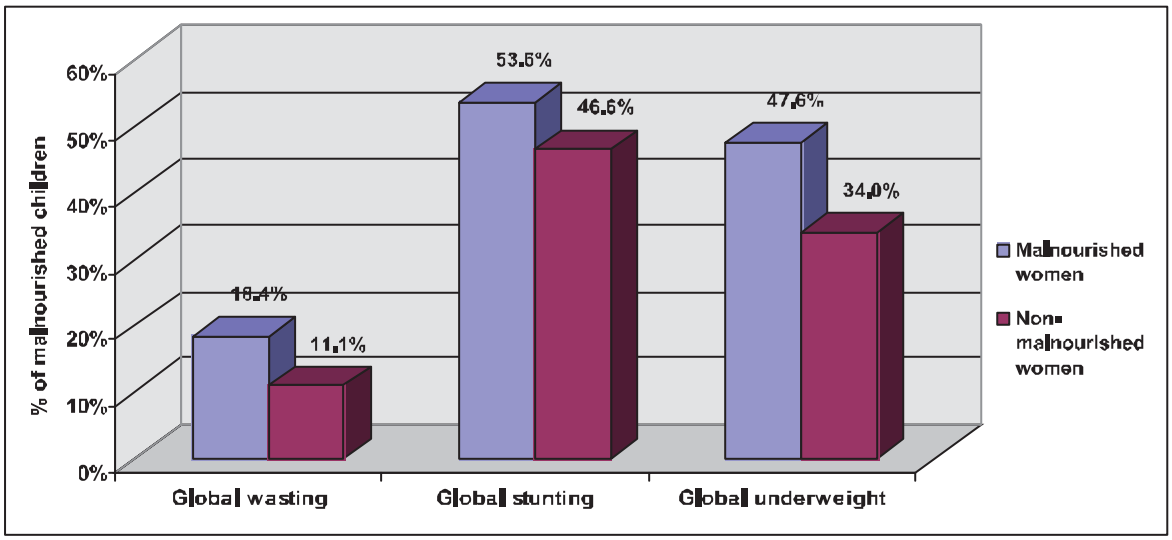


SOURCE: HFSNA 2009

5.8.2 Relationship between illness and nutrition status of children

The health of children was found to be significantly associated with both acute malnutrition [$\chi 2$ $p<0.00$] and underweight [$\chi 2$ $p<0.05$]. The prevalence of acute malnutrition and underweight were higher amongst children who had experienced illness over the two weeks prior to the survey, as compared to those that did not experience any illness in that period.

Figure 5.19: Prevalence of acute malnutrition and underweight by health of the child in Bangladesh



SOURCE: HFSNA 2009

5.8.3 Health service practices for children

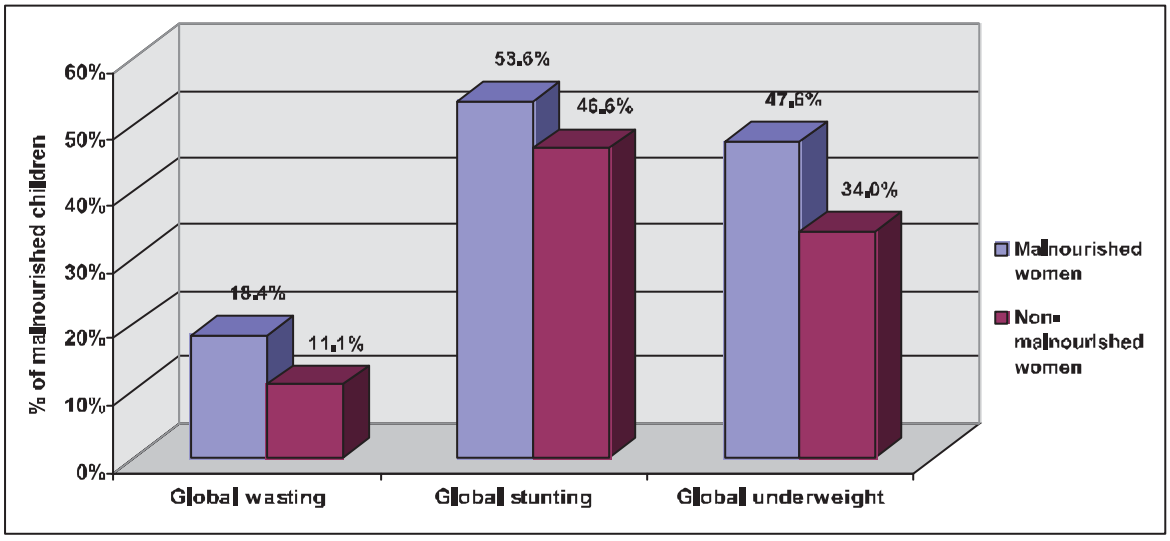
Caregivers were asked if their ill child had been taken to a health facility. The response showed 86.4% of the ill children were brought for health care (see, Annex 10.3 Table O); however, the quality of the health facilities or the care received was not assessed. Although the differences between the divisions were statistically significant [$\chi 2$ $p<0.000$], there were no relevant differences found between the rural and urban areas.

Of the 13.6% children that were not taken to a health facility, 45.5% of caregivers reported that it was due to a lack of money. Barisal (62.2%) and Sylhet (60.5%) were the two divisions that reported the most difficulties accessing health facilities for monetary reasons (see, Annex 10.3 Table P). Again, there were no significant differences found between the areas. Overall, the assessment found that households had reduced real income and purchasing money. Thus, as food expenditures increased, the households decreased their expenditures for other basic needs such as health care. This behaviour increases the risk of deterioration in nutritional status.

5.8.4 Coverage of Vitamin A supplementation

Nationally, findings showed that Vitamin A supplementation was received by 76.5% of children aged between 9 and 59 months, as verified either by a health card or the caregiver's recall. This figure varied between 63.9% in Sylhet division and 69% in Barisal division, with these divisions presenting the lowest coverage, up to the highest coverage of 81.5% found in both Khulna and Rajshahi divisions. Previous surveys showed higher national coverage (88.3%, BDHS 2007). As shown in Figure 5.17, disaggregated age groups between 9 to 11 months (64.8%) and 12 to 59 months (77.2%) had higher coverage than in the older age groups.

Figure 5.20: Coverage of Vitamin A supplementation in children aged 9 to 59 months, by division by area and nationally, in Bangladesh



SOURCE: HFSNA 2009

5.9 Health in the general population

5.9.1 Prevalence of common illness amongst the total population

Household members were asked if anyone in the house had been ill in the two weeks prior to the survey and 50.8% of the total households reported a sick member.

Barisal division (59.5%) and Chittagong division (61%) presented the highest percentages of household illness and these differences were statistically significant [$\chi 2$. $p<0.00$]. Rural areas also presented higher percentages of illness than urban areas, although no statistical differences were found. There were also no statistical differences between ill household members and malnourished children. These results are shown in Table 5.27 and Figure 5.18.

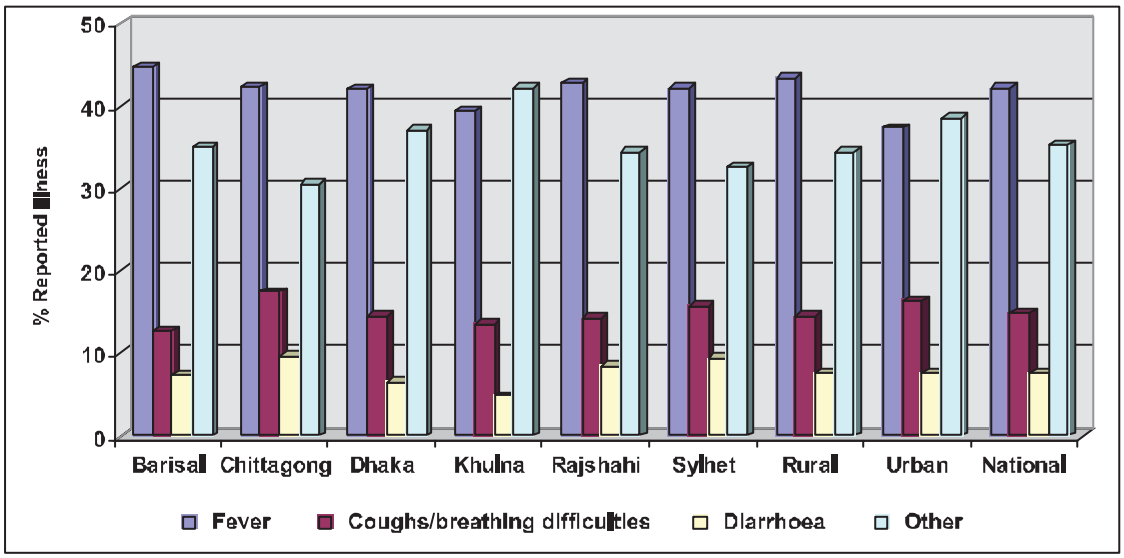
Table 5.27: Household illness in the two weeks prior to the survey, by division, by area and nationally, in Bangladesh

Geographical zone	Household illness	
	N weighted	%
Barisal	389	59.5
Chittagong	1134	61.0
Dhaka	1654	51.0
Khulna	646	49.0
Rajshahi	1164	43.5
Sylhet	288	45.6
Rural	4132	51.1
Urban	1144	50.0
National	**5275**	**50.8**

SOURCE: HFSNA 2009

The survey asked specifically about fever, coughs or breathing difficulties, and diarrhoea. The most commonly reported problem was fever (except in urban areas) with 42.1% of all the national level households reporting a member that experienced a febrile episode. Repeated coughs or breathing difficulties affected 21.1% of households while 15.9% of households had a member that reported diarrhoea in the fortnight before the survey.

Figure 5.21: Main reported illness in households in the two weeks prior to the survey, by division, by area and nationally, in Bangladesh



SOURCE: HFSNA 2009

5.9.2 Health care practices amongst the total population

Households were asked if their ill household members had been treated outside the house (the specific types of health care provision were not ascertained) and 85% answered that treatment had been sought. The type and quality of the treatments were not assessed.

The differences between divisions and areas were not statistically significant. However, from the 15% of households that did not seek treatment, 65.6% reported that it was due to a lack of money. Barisal (75.5%) and Khulna (79.9%) were the two divisions that reported the most

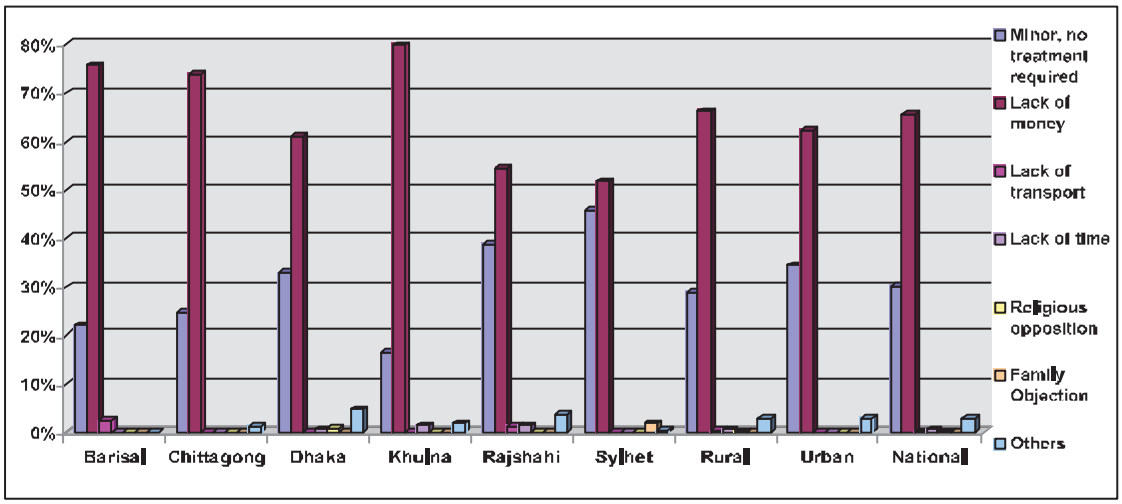
difficulties in seeking treatment due to limited access to money.

Table 5.28: Household illnesses treated outside the house, by division, by area and at national level in Bangladesh

Geographical zone	Treatment outside the house	
	Yes	
	N weighted	%
Barisal	313	80.5
Chittagong	963	85.1
Dhaka	1364	82.6
Khulna	564	87.3
Rajshahi	1030	88.5
Sylhet	246	85.5
Rural	3483	84.4
Urban	998	87.3
National	**4481**	**85.0**

SOURCE: HFSNA 2009

Figure 5.22: Reasons for households with an ill household member not seeking treatment, by division, by area and nationally, in Bangladesh



SOURCE: HFSNA 2009

5.10 Mortality

5.10.1 Crude and under-5 mortality rates

The analysis of mortality rates was derived from the total 10,378 surveyed households with a total of 51,591 individuals and 5,379 children aged from birth to 59 months. The recall period was six months. A total of 207 deaths were recorded during this time-period including 65 children under-five years of age and 142 persons over five years of age.

- The point prevalence estimates for the crude mortality rate (CMR) as a whole in Bangladesh were 0.22 deaths per 10,000 per day [95% CI: 0.21-0.23].
- The under-5 mortality rate (U5MR) was 0.66 deaths per 10,000 per day [95% CI: 0.64-0.68].

Both of these rates are below the defined emergency thresholds of 1/10,000/day (CMR) and 2/10,000/day (U5MR), respectively. (See, Table 5.29.)

Table 5.29: Crude and under-5 mortality rates (deaths per 10,000 per day), by division, by area and nationally, in Bangladesh

Geographical zone	Under 5 Mortality Rate (deaths per 10,000 children per day)		Crude Mortality Rate (deaths per 10,000 persons per day)	
	Rate	95% C.I.	Rate	95% C.I.
Barisal	0.66	0.61 - 0.71	0.1	0.09 - 0.11
Chittagong	0.72	0.69 - 0.74	0.22	0.21 - 0.23
Dhaka	0.71	0.69 - 0.73	0.34	0.33 - 0.35
Khulna	0.6	0.56 - 0.64	0.17	0.16 - 0.18
Rajshahi	0.58	0.55 - 0.61	0.30	0.29 - 0.31
Sylhet	0.61	0.56 - 0.66	0.08	0.07 - 0.09
Rural	0.65	0.64 - 0.66	0.26	0.25 - 0.27
Urban	0.71	0.68 - 0.74	0.14	0.13 - 0.15
National	**0.66**	**0.64 - 0.68**	**0.22**	**0.21 - 0.23**

SOURCE: HFSNA 2009

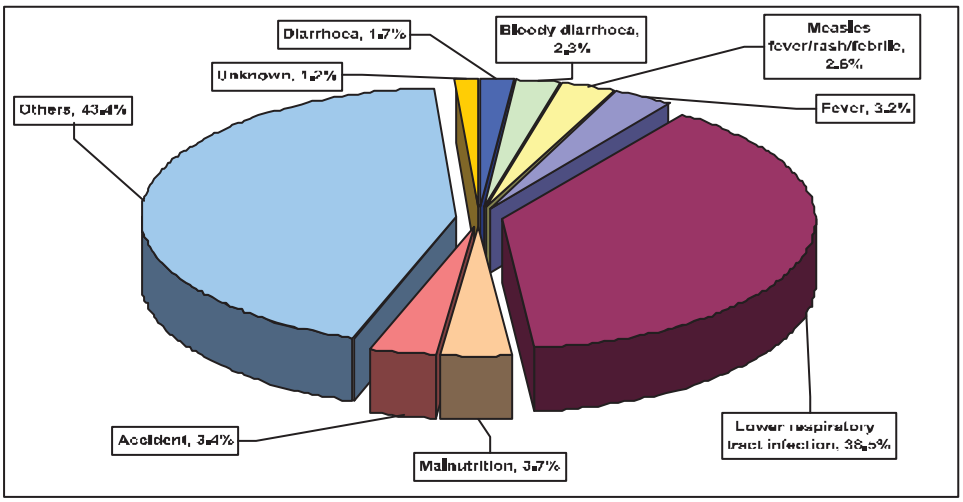
There were no significant differences found in the U5MR by divisions or by area. However, significant differences were shown in the CMR by area with rural areas having the highest rates and with Dhaka division presenting the highest rates at divisional level. Nevertheless, all of the divisions and areas were below the emergency thresholds and the assessment did not find any related impact on the mortality rates of the population.

5.10.2 Causes of death

The leading causes of death for the surveyed population were classified under “others” (43.4%), both for the whole population and for children under-five years of age (40.1%). These were followed in descending order but with substantially less reported incidence by lower respiratory tract infections, malnutrition and fevers.

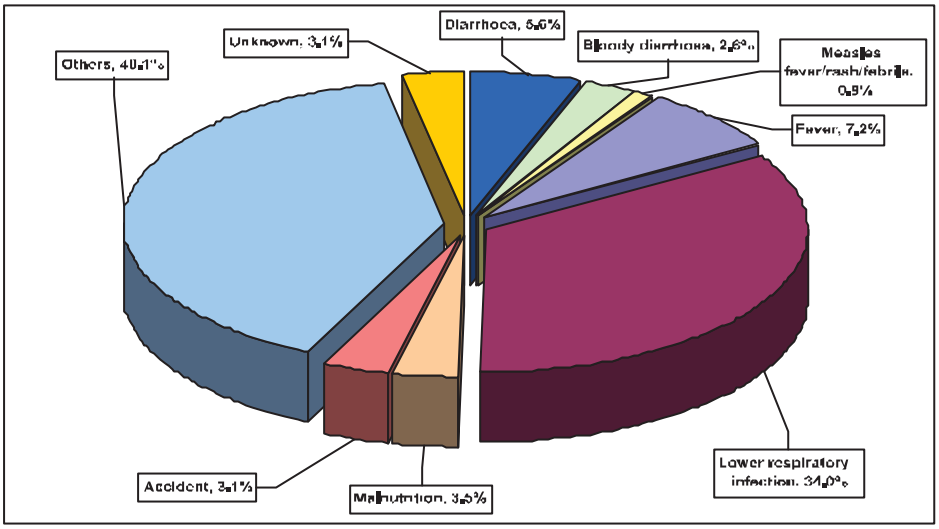
The figures for the pre-defined causes of death are shown below, as well as in Figures 5.20 and 5.21: Lower respiratory infection: general population (38.5%); children under-five years (34%) Malnutrition: general population (3.7%); children under-five years (3.7%); Fever: general population (3.3%); children under-five years (7.2%)

Figure 5.23: Causes of death amongst the general population, in Bangladesh



SOURCE: HFSNA 2009

Figure 5.24: Causes of death amongst children under-five years, in Bangladesh



SOURCE: HFSNA 2009

5.11 Conclusions

The food price hikes in Bangladesh have meant that vulnerable children and women are not being provided with the essential dietary requirements and micronutrients necessary to prevent detrimental impacts on their nutrition status (*see* Chapter 4). The households' expenditures on food purchases are insufficient to provide the quality diets necessary to meet optimum requirements for the growth, development and nutritional well-being of these children and women who are often already nutritionally compromised, indicating that the price hikes will have longer term impacts.[85,86] Accordingly, in the context of the high food prices, the assessment showed that the nutritional prevalence for acute malnutrition, underweight and stunting remained worryingly high. There have been no major improvements in relation to previous existing national data and there has been no measurable progress towards achieving the Millennium Development Goal 1 when looking at the trends from 2005 onwards.

The chronic and underweight malnutrition rates (48.6% and 37.4%, respectively) were both above the WHO thresholds indicating a *very high severity situation* whilst the prevalence of global acute malnutrition (13.5%) was only slightly below WHO *critical* emergency level and is classified as *an alert situation*. As the assessment was carried out during the *Amman* season, corresponding to the best period of the year wherein acute malnutrition rates are expected to be the lowest, it is highly likely that these figures would increase in the next lean season.

In relation to the location of the surveyed households, it was statistically significant that rural areas held higher rates of the three types of malnutrition (acute, chronic and underweight) than urban areas. Similar findings have been shown in past national surveys, as well as surveys carried out in rural areas.[87] [88] Strong associations between chronic malnutrition and poverty in rural areas have been established in multi-country studies although these relationships do not necessarily improve within urban environments, especially if purchasing power is also severely limited,[89] [90] nonetheless, whether in rural or urban areas, food prices and income remain the two most influential factors determining household food purchases.[91]

With reference to infant feeding practices, only 48.7% of mothers were exclusively breastfeeding their children to the recommended age of six-months. The BDHS 2007 and MICS

2006 reported the exclusive breastfeeding rates at 43% and 37% respectively whilst initiation of breastfeeding within the first hour was also low at only 36% according to MICS 2006. Breastfeeding confers short-term and long-term benefits on the child and mother, most importantly helping to protect children against a variety of acute and chronic disorders. Based on evidence of the effectiveness of interventions, achievement of universal coverage of optimal breastfeeding could prevent 13% of deaths occurring in children less than five years of age globally.[92] On the positive side, the assessment found rates of continued breastfeeding at one year were 93.2% and the practice of continued breastfeeding up to two years was 89.2%.

From the age of six months, an infant's need for energy and nutrients starts to exceed what is provided by breast milk and complementary feeding becomes necessary to fill the energy and nutrient gaps. If complementary foods are not introduced at this age or if they are given inappropriately, an infant's growth may falter. The period of complementary feeding from 6 to 23 months is the time of peak incidence for growth faltering, micronutrient deficiencies and infectious illnesses.[93] The assessment found that a high percentage of children aged 6 to 23 months had diets whose quality did not meet acceptable levels and that these children were more likely to be malnourished than children aged 24 to 59 months. The assessment showed a decrease in complementary feeding amongst children aged 6 to 9 months from 62% in 2004 to just 57.6% in 2009, a finding that indicates reassessing and strengthening the support for infant and young child feeding and caring practices is warranted.

As presented above, children aged 6 to 23 months were more likely to be malnourished than children aged 24 to 59 months and this was closely linked to the poor infant and young child feeding practices. Infant and young child feeding practices directly affect the nutritional status of children under two years of age and, ultimately, impact child survival. Improving infant and young child feeding practices in children from birth to 23 months is critical to improved nutrition, health and development of children. The assessment found that children aged from 6 to 23 months failed by significant numbers to achieve the minimum meal frequency (just 52.2 %), the minimum diet diversity (only 35.5%) and minimum acceptable diet (merely 19.5%), which is the summary infant and young child feeding indicator. These indicators provide information not just about whether complementary foods are being consumed by this vulnerable age group but also about the quantity and quality of those foods.

The BRAC 2009 survey on the impact of high food prices on the nutritional status of children and women also showed similar infant and young child feeding findings and further elaborated that as the family diets deteriorated due to decreasing household purchasing power, the (younger) children were unable to meet the minimum requirements needed to support their growth[94]. Based on the poor infant and young child feeding findings shown in this assessment it stands that supporting appropriate complementary feeding practices (age and culture specific) within the context of the food price hike deserve priority attention if optimal practices are to be sustained in Bangladesh for nutritional improvement.

Vitamin A supplementation of children aged 9 to 59 months was 76.5% in the prior six months, with just 64.8% children aged between 9 to 11 months and 77.2% of children aged 12 to 59 months receiving Vitamin A supplements, falling short of the recommended *minimum* coverage of 80%. The 2007 EPI coverage survey recorded Vitamin A coverage of 86%, thus a possible explanation could be that this current assessment was carried out *after* more than six months had elapsed from the previous national Vitamin A campaign in May 2008; the following Vitamin A campaign took place in November 2008, approximately three weeks after the data

collection began. Additionally, the Vitamin A supplementation program in Bangladesh do not presently include the vulnerable age group from six to eight months.

The control and prevention of micronutrient deficiencies remains a major nutritional challenge in Bangladesh when also considering the findings of low Vitamin A supplementation coverage in post-partum women (34%), as well as iron and folate supplementation in pregnant women (50.3%). These low coverage of post-partum Vitamin A and maternal iron and folate are linked to the capacity of health services to deliver the supplements, which is made more difficult in Bangladesh as most women do not seek or receive the recommended three antenatal visits and most choose to deliver at home. The MICS 2006 showed that only 48% of mothers who gave birth in the two years preceding the survey received antenatal care from a skilled provider and only 20% of the births were attended by medically trained providers. The majority of births (82%) took place at home. This situation is complicated by the existing high prevalence of anaemia especially among children under five year old and pregnant women.[95] [96]

Moreover, it is concerning that the assessment found almost one-fifth of mothers (18.2%) to be acutely malnourished by mid-upper arm circumference. These results support previous survey findings that measured acute malnutrition in women using body mass index. Although these two methods for measuring malnutrition in women are not directly comparable, the negative trends in maternal undernourishment and poor results in micronutrient supplementations are causes for concern. Maternal under-nutrition, poor foetal growth and stunting in the first two years of life lead to increased maternal and child mortality as well as causing irreversible damage throughout the course of life.[97] [98]

The assessment found that wasted, underweight and stunted children were more likely to have a malnourished mother, demonstrating the importance that having a healthy mother has towards decreasing the risk of under-nutrition in children. Children of acutely malnourished mothers were 1.8 times more likely to suffer from acute malnutrition, 1.3 times more likely to be stunted and 1.7 times more likely to be underweight. The findings also showed that the health status of children had an impact on their nutritional status. The rates of acute malnutrition and underweight were higher amongst children who had experienced illness as compared to those that did not. It is notable that lack of money was an important reason for not seeking medical care, a factor that has been highlighted in several studies on the effects of high food prices on household expenditures for basic needs such as health care[99].

When caregivers seek care for sick children in Bangladesh, they most often turn to non-formal service providers.[100] [101] [102] Although the assessment found that sick children were taken to health care providers, the types of services (professional or alternative) were not asked. In cases of serious illness, taking children to non-formal providers often precludes an appropriate referral and leads to inappropriate or delayed treatment. The MICS 2006 found that less than one-third of children under-five years of age with symptoms of pneumonia were taken to an appropriate health care provider. The BDHS 2007 found that only 28% of children with symptoms of an acute respiratory infection were taken to a health facility or trained provider. However, this marked a substantial improvement from the rate of 20% in 2004. Nonetheless, the assessment showed that mortality rates remained below the emergency thresholds and the findings did not show any related food security or nutrition factors impacting on the mortality of the surveyed population.

6. Water and sanitation

Although the assessment was not designed specifically to investigate in-depth the water and sanitation situation in Bangladesh, this type of information was deemed relevant to enable the analysis on the overarching relationship between malnutrition and water and environmental sanitation. Therefore, questions regarding access to safe sources of water and types of toilet facilities were included in the assessment. Household were asked about sources of water and sanitation during the period of the assessment and as to whether the water and sanitation situation had differed twelve months previously. The aim of this exercise was to identify any relevant changes in the household water and sanitation situation and to discern any relevant differences in the behaviours of households. Overall, the results showed that there were no statistically significant variations between the two time periods.

6.1 Access to safe source of water

6.1.1 Source of water

The findings showed that 94.8% of surveyed households in Bangladesh reported access to a safe source of water. This coverage demonstrated an increase from the previous 2008 estimates of 80%[103]. In all of the divisions and areas, the coverage of safe water appeared acceptable. However, whilst the definition of "safe water"[104] includes criteria of quality, quantity and sustainability, it is important to emphasize that this assessment included only quality criteria and did not assess methods for collecting and supplying water. As a result, households reporting safe water supply approaches could have actually used unsafe water. In the same sense, arsenic contamination[105] was also not assessed. A recent study that analysed arsenic contamination found that amongst drinking water samples collected from households, 75% met the Bangladesh arsenic standard and 25% did not[106].

At divisional level, Khulna presented the lowest coverage (88.6%) of safe drinking water sources used. The overall difference amongst divisions showed was statistically significant [$\chi 2$ $p<0.000$] (*Table 6.1*). After comparing rural and urban areas, the results showed that urban areas provided lower coverage of safe water sources (90.1%) than rural areas (94.1%). This difference was also statistically significant [$\chi 2$ $p<0.000$].

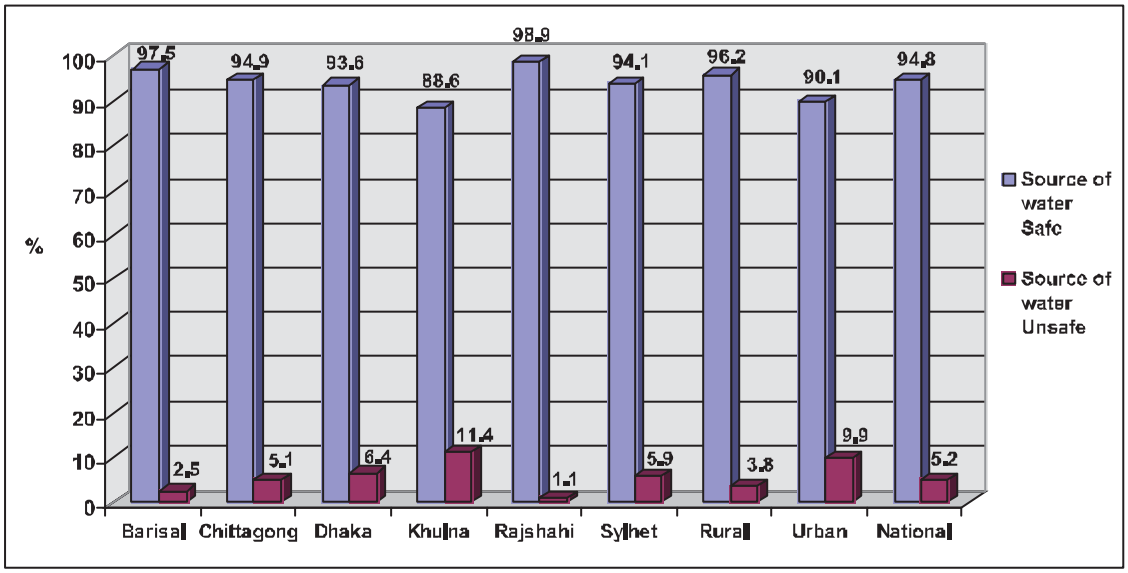
At the time of the assessment, 89.3% of the population used a tubewell or borehole as the main source of drinking water. Although not a nationally representative sample the UNICEF Cyclone Sidr report (2008) found similar results that showed 90.3% of households used tubewells as their main source of drinking water. This same source was the most common water supply system. Additionally, households in urban areas often used water that was piped into dwellings (18.7%) and into a yard or plot (8.9%) as water supply systems. The findings showed a significant disparity between rural and urban areas. Annex 10.4, Table Q, shows the main source of drinking water supply used at national level (*by division and by area*).

Table 6.1: Source of household drinking water by division, by area and nationally, in Bangladesh

Geographical zone	Source of drinking water	
	Safe %	Unsafe %
Barisal	97.5	2.5
Chittagong	94.9	5.1
Dhaka	93.6	6.4
Khulna	88.6	11.4
Rajshahi	98.9	1.1
Sylhet	94.1	5.9
Rural	96.2	3.8
Urban	90.1	9.9
National	**94.8**	**5.2**

SOURCE: HFSNA 2009

Figure 6.1: Source of drinking water source by division, by area and nationally, in Bangladesh



SOURCE: HFSNA 2009

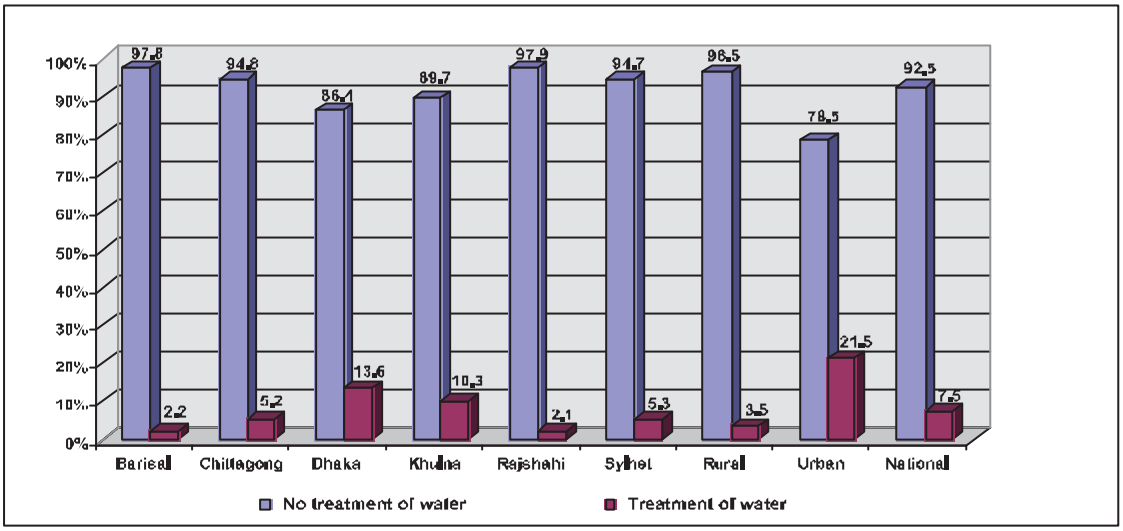
After taking into account the household water supply systems and comparing with the nutritional status of children, it was found that there was no statistically significant association between both sources of data; thus, it can be concluded that the household water supply sources had no relevant impact on the malnutrition rates.

6.1.2 Treatment of drinking water at household level

Household treatment of drinking water is a relevant indicator to evaluate the quality of water used at household level. Overall, only 7.5% of households reported that they treated their water (*Table 6.3*). This is one-half of the reported usage of water treatment in the Cyclone Sidr affected areas in a post-cyclone assessment[107]. In this assessment, over one-half (59.3%) treated their water by boiling and 26.1% by filtering it. In the urban areas, more households treated their water (21.5%) than the households (3.5%) treating their water in rural areas. Urban areas mainly made use of the boiling method (83%) whilst households in rural areas treated their drinking water mostly through a filtering system (52.4%). The difference between the areas was

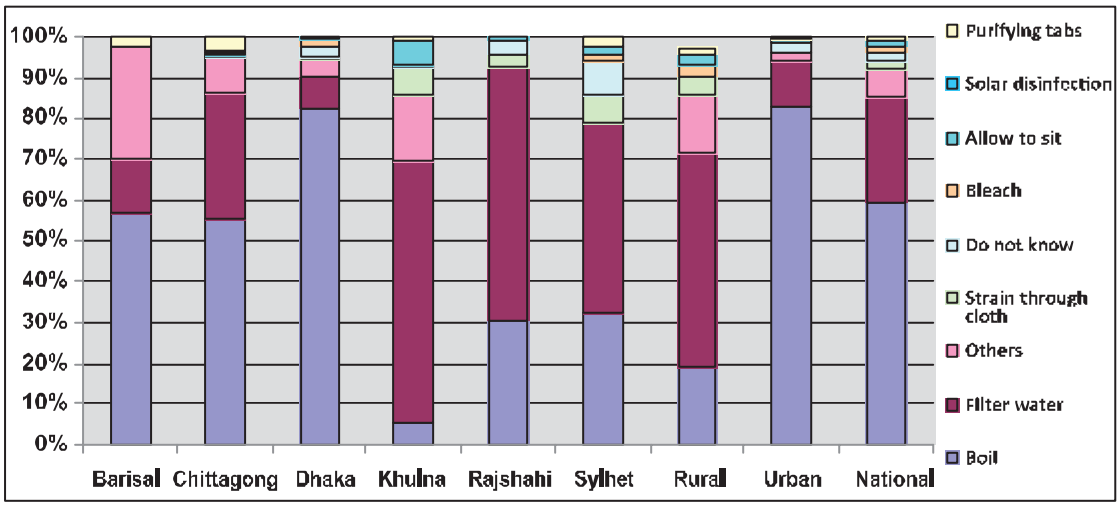
statistically significant [$\chi 2$ $p < 0.001$]. Discrepancies between water treatment at urban and rural areas may come from, firstly, the limited number of resources available to be used as power sources (e.g. firewood) in rural areas, and secondly, that households might prioritise using those limited and valuable resources for other daily domestic routines, such as for cooking and for lighting the houses.

Figure 6.2: Treatment of drinking water at household level by division, by area and nationally,in Bangladesh



SOURCE: HFSNA 2009

Figure 6.3: Methods of treating drinking water at household level by division, by area and nationally, in Bangladesh



SOURCE: HFSNA 2009

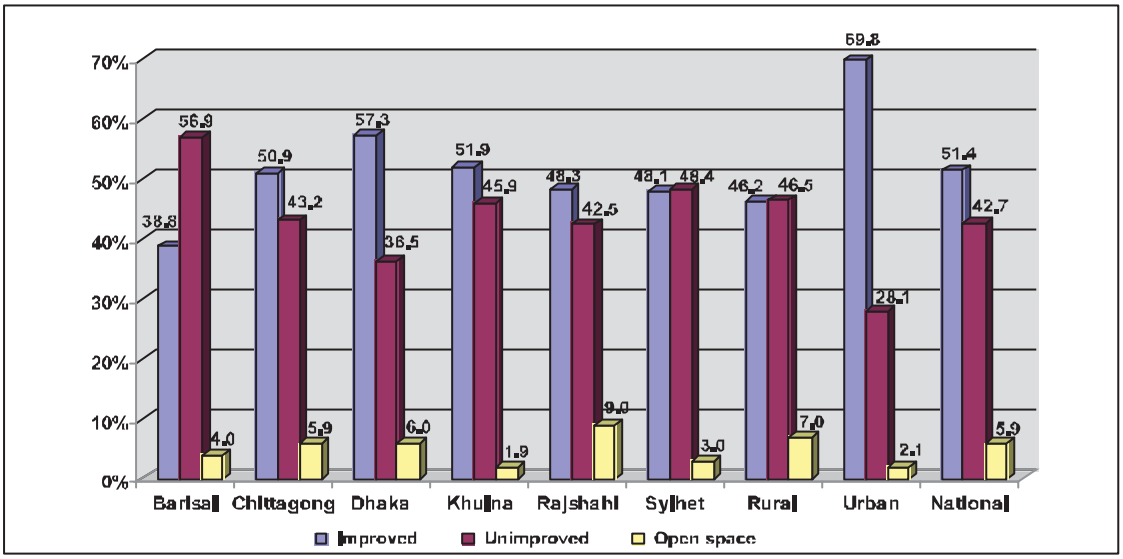
6.2 Sanitation

6.2.1 Use of toilet facility at household level

In looking at sanitation and good hygienic practices, the assessment found that 51.4% of the population used an improved toilet facility[108] (*Table 6.4*). A higher coverage of improved toilet facilities was found than in the last 2008 estimates that showed 36% coverage[109] . By divisions, Barisal (38.8%), Sylhet (48.1%) and Rajshahi (48.1%) presented the lowest coverages of access

to improved toilet facilities. Urban and rural areas also demonstrated the statistically significant differences shown above with rural areas presenting the lowest coverage (46.2%) in comparison to the urban areas (69.8%) [$\chi 2$ $p < 0.001$]. Overall, these results indicate poor levels of good sanitation practices.

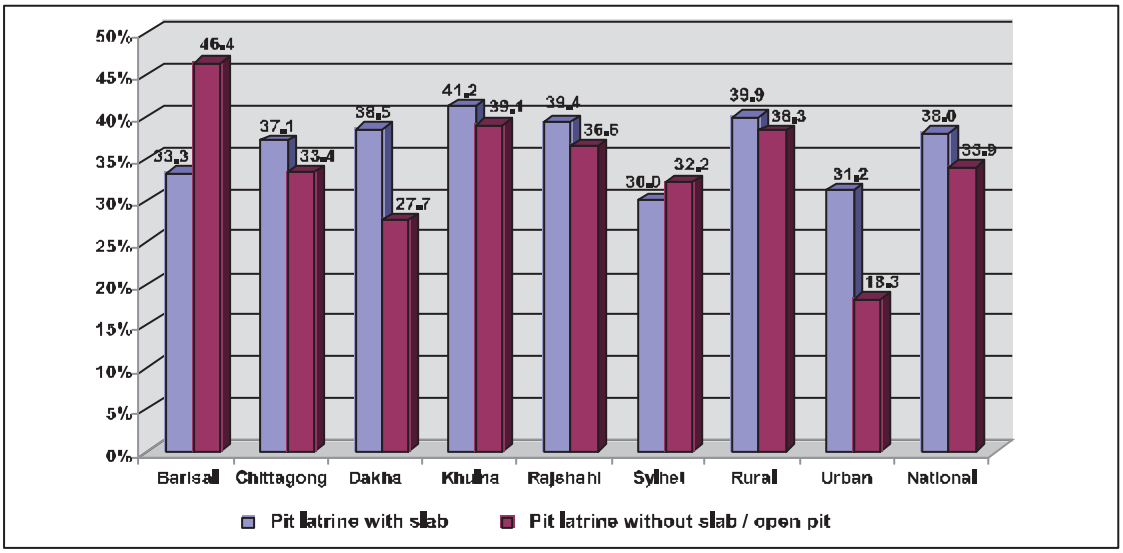
Figure 6.4: Status of toilet facility by division, by area and nationally, in Bangladesh



SOURCE: HFSNA 2009

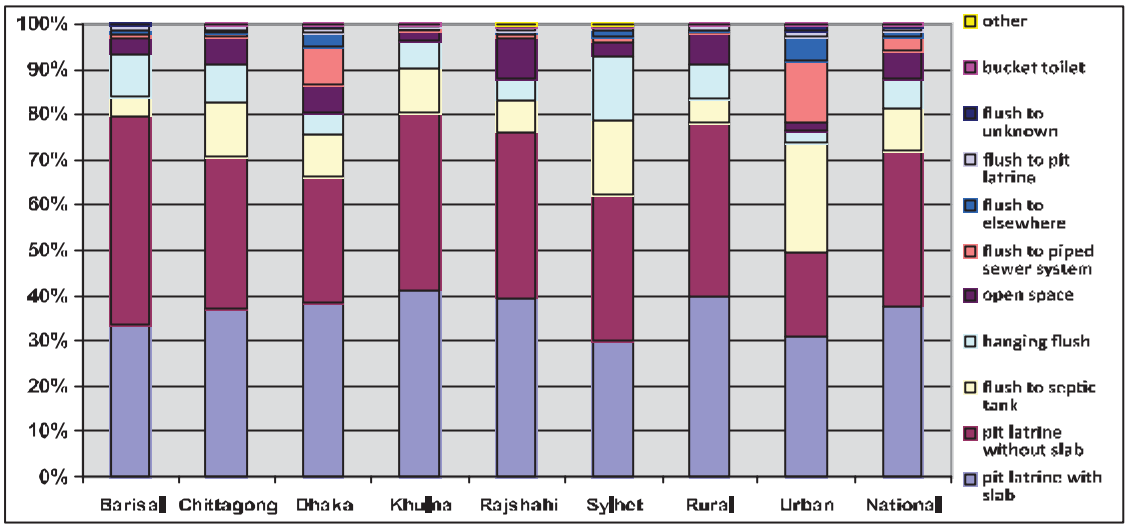
Latrines were the most commonly used type of toilet systems[110] nationally, by divisions, and by area (see, Annex 10.4, Table R). Pit latrines were used by 71.9% of the total population: 38% *with* slab and 33.9% *without* slab/open pit. There was no statistically significant link between the *type of toilet facility* at household level and the nutritional status of children. Thus, it can be concluded that none of the assessed sanitation aspects had an impact on the general malnutrition status. However other facets that were not studied, such as waste handling at household level, could have possibly demonstrated those linkages but these analyses were beyond the scope of the assessment[111].

Figure 6.5: Type of latrine used by division, by area and nationally, in Bangladesh



SOURCE: HFSNA 2009

Figure 6.6 Type of toilet facility by division, by area, and nationally, in Bangladesh



SOURCE: HFSNA 2009

6.2.2 Sharing of the latrine at household level

Amongst households using latrines, the following distributions were found: 66% of assessed households had access to *private* (not shared) facilities, 24.3% of the households shared latrines with two households, and 9.7% of the households shared latrines with three households. Access to private latrines remained more common in rural areas (68.3%) than in urban areas (58.5%). From a geographical perspective, the following divisions held the highest percentage of households possessing private latrines: Barisal (80.7%), Sylhet (70.5%) and Chittagong (70%). These figures (Table 6.6) illustrate how urban areas had a slightly higher ratio in the number of households sharing latrines (41.5%) than rural areas (31.7%).

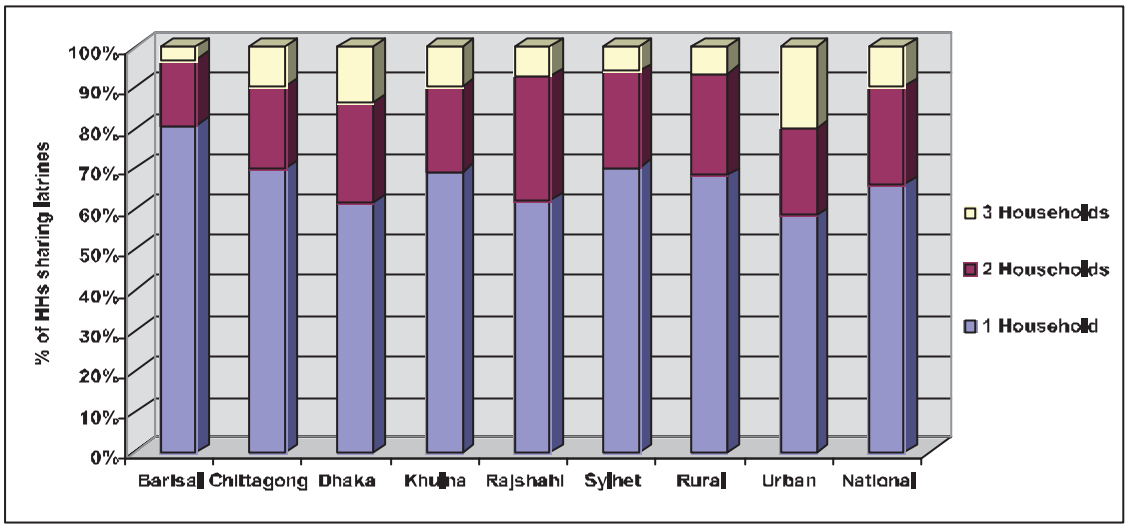
In Bangladesh, the UNICEF Water, Environment and Sanitation (WES) section uses the definition according to the Bangladesh National Sanitation Strategy 2005 of the Ministry of Local Government, Rural Development and Cooperatives, that the basic minimum level of latrine services that should be shared is a maximum of two households. Consequently, 9.7% of the households surveyed did not meet the minimum quality requirements.

Table 6.2: Households sharing latrines, by division, by area and nationally, in Bangladesh

Geographical zone	1 household %	2 households %	3 households %
Barisal	80.7	16.2	3.1
Chittagong	70.0	20.2	9.8
Dhaka	61.6	24.6	13.8
Khulna	69.3	21.0	9.6
Rajshahi	62.1	30.8	7.1
Sylhet	70.5	23.5	6.0
Rural	68.3	25.1	6.6
Urban	58.5	21.5	20.0
National	**66.0**	**24.3**	**9.7**

SOURCE: HFSNA 2009

Figure 6.7: Proportion of households sharing latrines, by division, by area and nationally, in Bangladesh



SOURCE: HFSNA 2009

6.3 Conclusions

Poor access to safe water and basic sanitation combined with unhygienic practices cause water and sanitation-related disease, especially diarrhoea, consequently contributing to malnourishment. Findings related to the population using improved drinking water sources in Bangladesh suggest a clear progress in relation to the last known figures. However, it is worth taking into account that the assessment methodology included collecting only quality criteria; it did not assess methods for collecting/supplying water or arsenic analysis. Bearing this in mind, it could well mean that households with safe water supply approaches used unsafe water. Moreover, the assessment did not look specifically into hygiene practices such as hand-washing. A 2008 baseline study in Bangladesh found that although the surveyed population reported good knowledge of hygiene practices and reported washing their hands routinely with soap after defecation, before preparing food and before eating, on observation, this was rarely practiced[112].

In relation to access indicators for improved sanitation, the findings showed there is still a poor level of good practices unlike previous nationally representative data, which indicated a positive trend on the population's access to improved sanitation facilities. By division, it is important to note that although there was no statistically significant association with the type of sanitation facility used and the nutritional status of children and women found, the three divisions most affected by malnutrition were the same ones that presented with the lowest coverages of sanitation facilities (Barisal, Sylhet and Rajshahi). In the 2006 Helen Keller International study in Bangladesh, sanitation facilities such as the type of latrine used were strongly statistically associated with chronic malnutrition: stunting was higher amongst children whose households used open latrines (45.3%) compared to those that used closed latrines (33.9%)[113].

Additionally, although rural areas showed the most vulnerability in assessed nutrition and food security indicators, they did not show this same pattern concerning water source indicators. The lowest coverage of safe water sources was amongst the urban area population. On the contrary, and as could be expected, rural areas showed the lowest coverages of good sanitation facilities. It is clear that promoting the use of safe water, good sanitation and hygiene is crucial

in resolving malnutrition. Integrated approaches to addressing malnutrition involve extending these services to both urban and rural areas that have unsafe drinking water, inadequate sanitation, and poor hygiene. The UNICEF conceptual framework illustrates how water, environment and sanitation factors are underlying causes of malnutrition. Thus, in order to reduce the associated morbidities that contribute to malnourishment in Bangladesh, integrated water, sanitation and hygiene promotion activities should complement food security and nutrition programming for sustained impacts.

7. Food security and nutrition linkages

Obtaining a better understanding of food security and nutrition linkages was an important objective underlying the HFSNA survey. As food insecurity is clearly acknowledged to be one of the underlying causes of malnutrition, there is a crucial need to better understand the linkages between food security indicators at household level and the nutritional status of children and women. This enables a comprehensive understanding of the relative contribution of food security to maternal and child malnutrition in Bangladesh. Therefore, this chapter provides an analysis of the impact of the key food security indicators on the nutritional status of children and women.

7.1 Gender of the head of the household and nutritional status of children and women

The gender of the household head was not directly linked with the nutritional status of children and women within the family.

7.2 Relationship between household food consumption patterns and nutritional status of children and women and young child feeding practices

This section explores the linkages between food consumption scores and food consumption groups with malnutrition amongst children and women, and infant and young child feeding practices. The food consumption score is a frequency weighted diet diversity indicator calculated using the frequency of consumption of the different food groups (staples, pulses, vegetables, fruits, meat and fish, milk, oils, sugar, and condiments) consumed by a household during the seven days prior to the assessment.

Using the food consumption scores, households were categorized into four food consumption groups; "Poor" food consumption, "borderline" consumption, "acceptable-low," and "acceptable-high." The households in these four food consumption groups were further classified into food insecure households, corresponding to "poor" and "borderline" food consumption groups or into food secure households, corresponding to "acceptable-low" and "acceptable-high" food consumption groups.[114] These are key indicators for determining the mid- to longer-term impact on a population's nutritional status.

As presented in Chapter 4, the findings showed that generally the basic diet of households was composed of edible oil, vegetables, and cereals (mainly coarse rice). Overall, but especially in the food insecure households, the diet was poor in dairy, fruits, animal protein, and pulses.

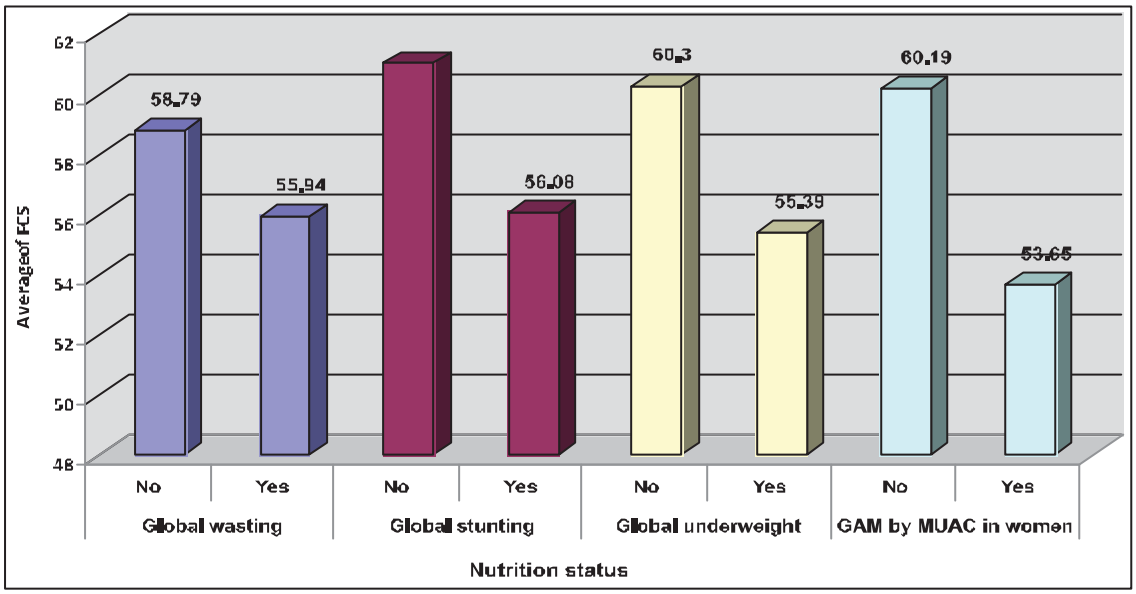
7.3 Relationship between food consumption score and nutritional status of children and women

The average household food consumption score was significantly lower among wasted [$F=8.588$, 1 d.f., $p<0.05$], stunted [$F=54.653$, 1 d.f., $p<0.000$], and underweight children [$F=53.647$, 1 d.f., $p<0.000$]. This was an expected finding as poor food consumption over a period of time is likely to lead to dietary and micronutrient deficiencies that might increase the risk of wasting, stunting, and underweight This finding was more significant in stunting and

underweight than in wasting and can be explained as low food consumption scores are unlikely to have the same short-term impact on the nutritional status of children as wasting would. A low food consumption score indicates poor food quality over a period of time with impacts seen on the nutritional status of children in the medium to long-term, as the underweight and stunting rates would indicate.

The average household food consumption score was significantly lower among wasted women [F=48.115, 1 d.f., p<0.000]. See Figure 7.1.

Figure 7.1: Food consumption score and nutritional status of children and women



SOURCE: HFSNA 2009

7.4 Relationship between food consumption score and young child-feeding practices

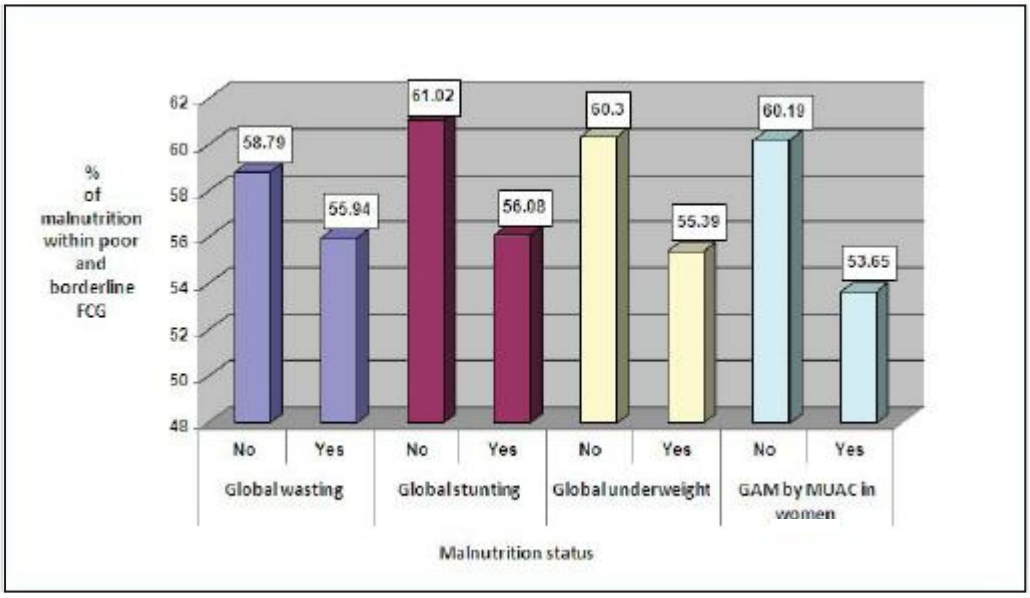
The average household food consumption score was significantly lower among households with young children who did not meet the minimum diet diversity [F=5.690, 1 d.f., p<0.000] and the minimum acceptable diet [F=2.093, 1 d.f., p<0.000] than in households with children who did meet the minimum requirements. As could be expected, this link shows that the quality and quantity of the diet at household level had an impact on the diet of the young children.

7.5 Relationship between household food consumption groups and nutritional status of children and women

Malnourished children were more widespread among the “poor” and “borderline” food consumption groups with 5.9% of acutely malnourished children in the “poor” food consumption group and 22.4% of acutely malnourished children in the “borderline” food consumption group compared to the findings of 4.9% of non-acutely malnourished children in the “poor” food consumption group and 17.7% in the “borderline” food consumption group. These findings were similar for both underweight and chronic malnutrition rates (*See* Figure 7.1). The p value was $\chi 2$ p <0.05 for wasting, $\chi 2$ p<0.001 for stunting and $\chi 2$ p<0,000 for underweight.

Malnourished women were over-represented within the "poor" and "borderline" food consumption group households and under-represented within the food-secure households [$\chi 2$ $p<0.00$]. *See*, Figure 7.1.

Figure 7.1: Household poor and borderline food consumption groups and nutritional status of children and women, in Bangladesh



SOURCE: HFSNA 2009

7.6 Relationship between Coping Strategy Index and nutritional status of children and women

The Coping Strategy Index indicator was used to assess how households were responding to their difficulties. Households were asked if they had applied any specific food-related changes or mechanisms during the past one month prior to the assessment. The coping strategies used are explained in Chapter 4 (Figure 4.10). The Coping Strategy Index is normally used to monitor short-term or transient food insecurity on population nutritional status. This assessment's findings were consistent with the acknowledged association shown with global acute malnutrition[115].

At national level, there was a strong association between acutely malnourished children and the household Coping Strategy Index score. Households with acutely malnourished children had adopted higher numbers of coping strategy mechanisms in the 30 days prior to the assessment [F=10.196, 1 d.f., p<0.001]. This finding was similarly demonstrated in the BRAC 2008 study, which found that children from households reporting greater numbers of coping strategies were more likely to be wasted.

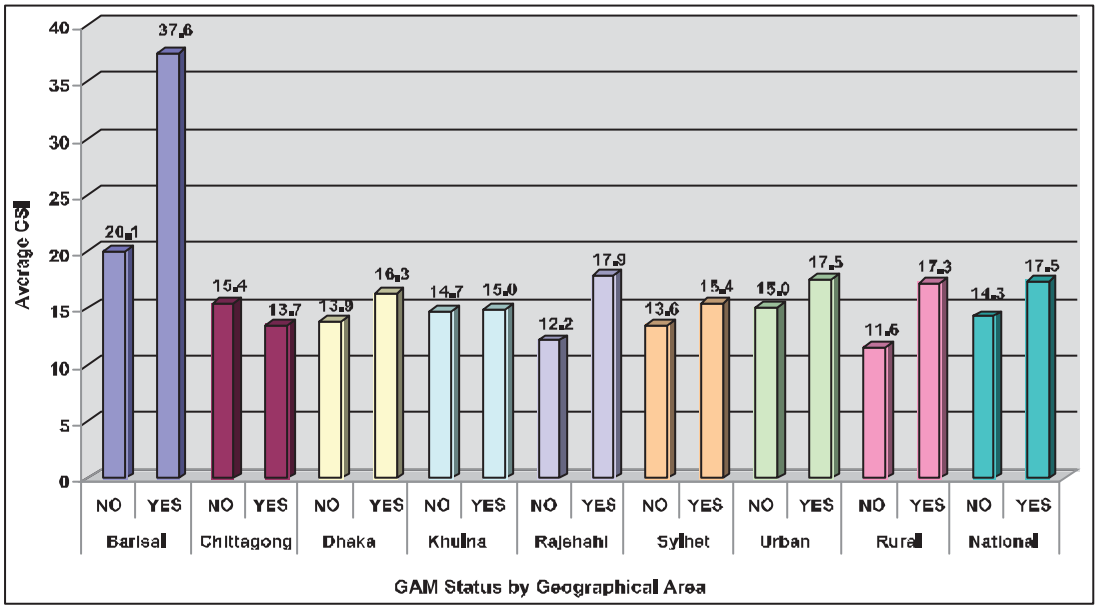
Acutely malnourished women had higher mean Coping Strategy Index scores than non-acutely malnourished women. Accordingly, these malnourished women had adopted more coping strategies in the past 30 days than the non-malnourished women [F=24.281, 1 d.f., p<0.000].

7.7 Relationship between Coping Strategy Index and nutritional status of children and women by area and by division

The assessment found that in rural areas, households with acutely malnourished children had adopted more coping strategies over the past 30 days [F=4.729, 1 d.f., p<0.05].

There was an association between acute malnourishment and Barisal and Rajshahi divisions. Acute malnutrition rates were higher in these two divisions, particularly in Barisal division, where the Coping Strategy Index score was significantly higher. As already shown in the food security findings (See Chapter 4), Barisal and Rajshahi were the two divisions with the most food-insecure households, as well as the two divisions with the highest acute malnutrition rates (See Chapter 5). It could be hypothesized that Barisal division, which was strongly hit by Cyclone Sidr in 2008, continues to use more coping mechanisms and that the children have not yet recovered nutritionally (See Figure 7.3).

Figure 7.3: Average CSI at household level amongst acutely malnourished children by division, by area, and nationally, in Bangladesh



SOURCE: HFSNA 2009

7.8 Relationship between most affected livelihoods and nutritional status of children and women

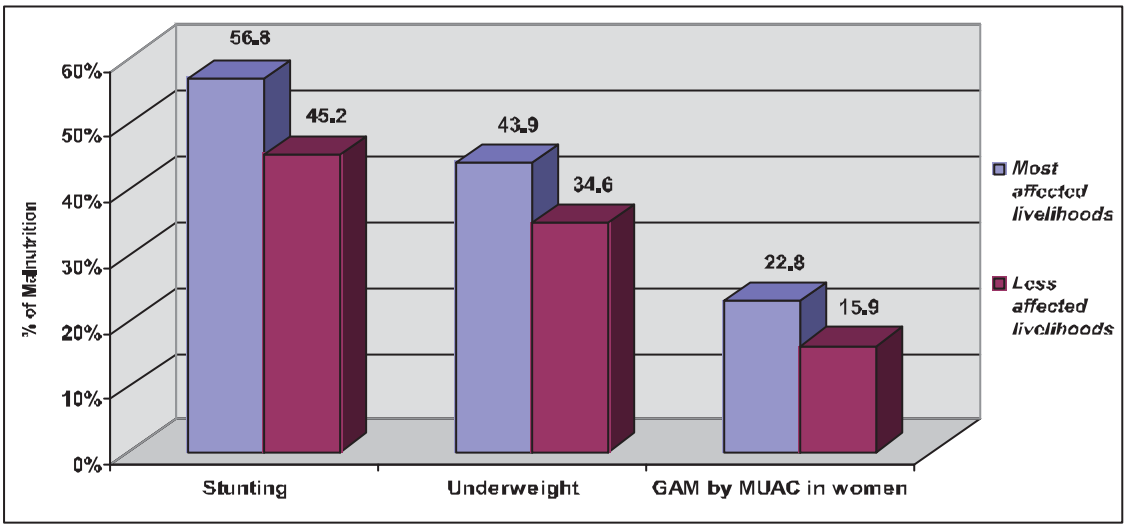
Three of the most food insecure and price shock affected livelihoods were non-agriculture wage earners, casual workers, and wage earners in the agricultural sector. These three livelihoods represented 24% of the total population. Stunting [$\chi 2$ p<0.000], underweight [$\chi 2$ p<0.000], and acutely malnourished women [$\chi 2$ p<0.000] were all strongly associated with households belonging to these most affected livelihoods.

At national level, the results showed that in the most affected livelihoods, the percentages of chronic malnutrition (56.8%) and underweight (43.9%) were higher than in the lesser affected livelihoods (45.2% and 34.3% respectively). The subsistence earnings and lifestyles of these households could be associated with insufficient purchasing power to sustain meal adequacy and frequency over periods of time. In such circumstances, it is probable that children from

these households would suffer from longer-term "under nutrition" and mothers might forgo meals in order to feed more to their families.

Overall, 34.4% of acutely malnourished women belonged to households from the most affected livelihoods compared to 25.2% of non-acutely malnourished women [p<0.000]. The most affected livelihoods had a higher percentage of acutely malnourished women (22.8%) compared to the lesser affected livelihoods (15.9%). Figure 7.4 clearly illustrates these findings.

Figure 7.4: Prevalence of stunted and underweight children and acutely malnourished women among livelihoods



SOURCE: HFSNA 2009

7.9 Relationship between percentage of food expenditures and nutritional status of children and women

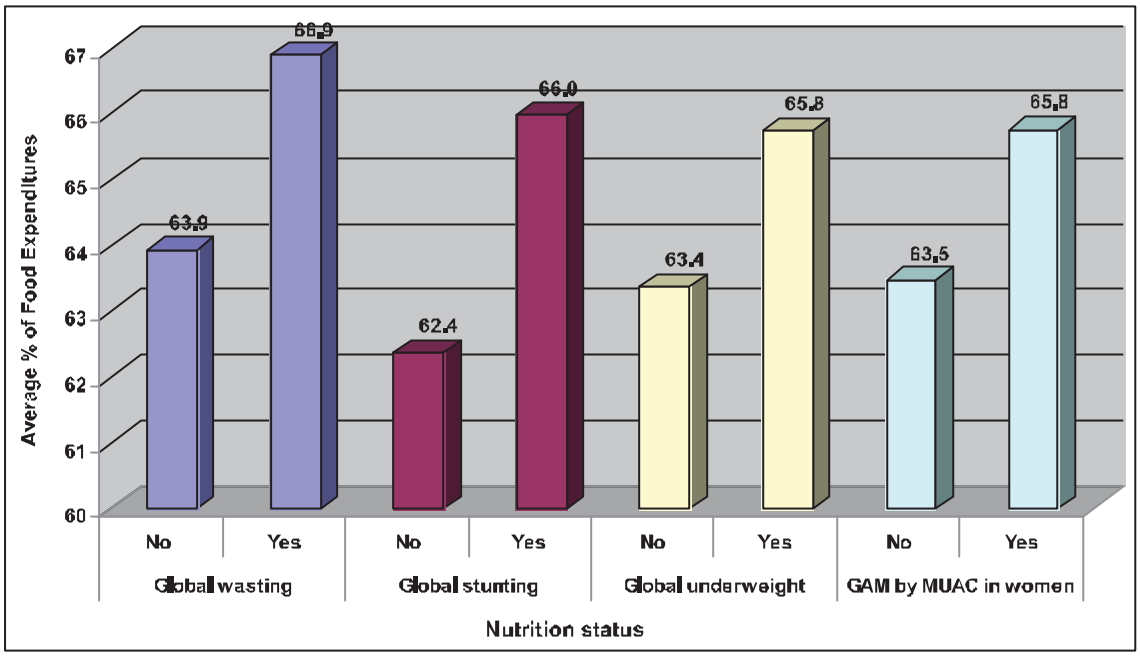
The assessment found that households were spending higher proportions of their income on food than previously reported, some 62% of their total expenses leaving households with less money for other basic needs. The indicator *proportion of HH's food expenditures to total expenditures*; was positively associated with malnutrition in children and women. The HKI/IPHN Nutrition Surveillance Project demonstrated similar relationships in 2006.[116]

Nationally, the proportion of food expenditures as a percentage of total household expenditures were significantly higher in wasting [F=8.256, 1 d.f., p<0.05], stunting [F=25.705, 1 d.f., p<0.000], and underweight [F=10.853, 1 d.f., p<0.001]. As expected, the association was stronger in stunting due to the relation of food expenditures to longer-term impacts.

In general, households with acutely malnourished women had higher percentages of food expenditures than households with non-acutely malnourished women [F=5.426, 1 d.f., p<0.05].

Figure 7.5 shows the above-mentioned linkages.

Figure 7.5: Average percentage of food expenditures at household level among malnourished children and women



SOURCE: HFSNA 2009

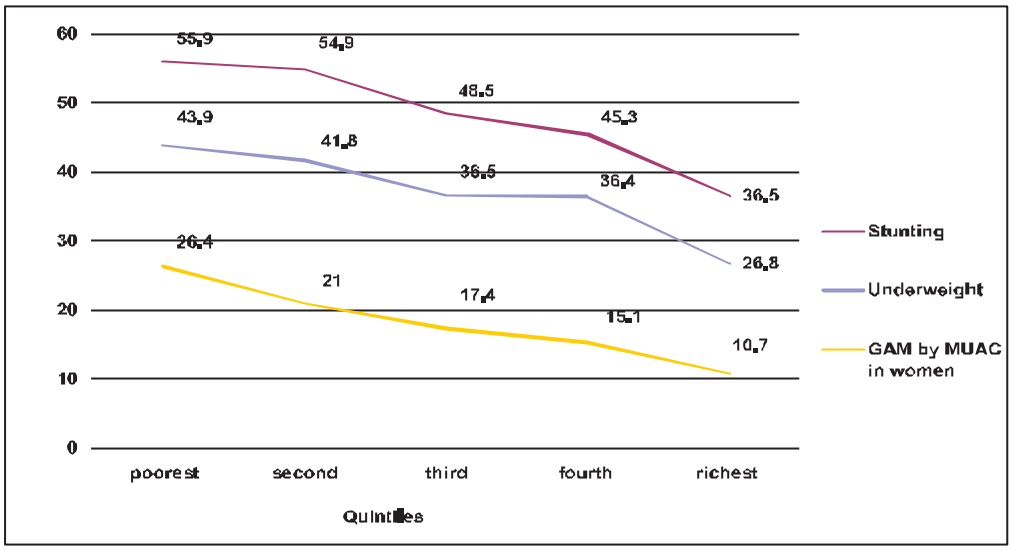
7.10 Relationship between wealth status and nutritional status of children and women

A wealth status assets indicator was created, incorporating both housing and productive assets.[117] The study found a statistically significant association between asset-based "wealth status quintiles" with stunting, and "underweight in children," and "acutely malnourished" women by MUAC ($\chi 2$ p<0,000).

In the poorest quintile, findings showed that 55.9% and 43.9% of children were stunted and underweight respectively while the richest quintile had 36.5% stunted children and 26.8% underweight children. The trend was the same for women with 26.4% of acutely malnourished women found in the poorest quintile and 10.7% in the richest quintile. Figure 7.6 illustrates the trend highlighting how the richest quintiles presented less malnourished children than the percentages found in the poorest quintiles.

Despite the trend clearly showing a decrease in the stunting and underweight rates towards the richest quintiles, the rates are still very high. The 2006 HKI/IPHN Nutritional Surveillance Project[118] had similar findings where 33.1% of children belonging to the richest quintile were stunted. The BRAC 2009 study also presented the same patterns.[119] These findings confirm that malnutrition levels in Bangladesh are worrying within all the wealth statuses.

Figure 7.6: Trend of stunted and underweight children and acutely malnourished by MUAC women amongst wealth status quintiles



SOURCE: HFSNA 2009

7.11 Relationship between households without enough food in the past 12 months and nutritional status of children and women

Households were asked whether there were months during the past year, when there was not enough food for the household. More than half (58%) of respondents claimed insufficient food at some point during the past year. The two traditional lean season periods, March through April and September through October, were in fact identified as months when shortages were most prevalent. October was the most common problem month when more than one third of households (36%) reported not having enough food.

The assessment showed a statistically significant association among those households that reported insufficient food for the past 12 months with stunting and underweight in children and acute malnutrition in women [$\chi 2$ $p<0.000$].

7.12 Relationship between decrease in health expenditures in the past 12 months and nutritional status of children and women

The study found no significant differences in the prevalence of child and maternal malnutrition among households who decreased their health expenditures and those who did not. However, as a reduction in health expenditures was one of the three most commonly reported coping strategies by households, this indicator should be continuously monitored in the existing surveillance systems. Bearing in mind the association between illness and nutritional status, degradation in the nutritional status of those affected households could be expected if the situation continues.

7.13 Relationship between monthly income per household and nutritional status of children

Household monthly income in nominal terms increased by 12% from 2005 to 2008; from 7203 (BDT) to 8062 (BDT). However, inflation-adjusted real income actually decreased by 13% over the same period, from 4533 (BDT) to 4000 (BDT). To check for statistical linkages, both the income and nutritional status of households were analyzed together.

The monthly average income was found to be significantly lower in households with stunted [F=1.563, 1 d.f., p<0.000] and underweight [F=1.263, 1 d.f., p<0.05] children. (See Table 7.2).

Table 7.2: Monthly income per household amongst households with stunted and underweight children in Bangladesh

Monthly income per household	Stunting		Underweight	
	No	Yes	No	Yes
	Average	Average	Average	Average
BDT	9,641	6,674	8,865	7,051

SOURCE: HFSNA 2009

7.14 Relationship between "informal borrowing" and nutritional status of children

The assessment asked households about informal borrowing from friends or relatives. A statistically significant association was found between households that had practiced this coping strategy of indebtedness during the past 12 months and a child's nutritional status [x2, p<0.05].

Overall, 51.8% of the households with a stunted child had practiced informal borrowing. The associated figure for households without stunted children was comparatively lower at 48.2%.

Overall, 59.6% of the households with an underweight child had practiced informal borrowing. The corresponding figure for households without underweight children was considerably lower at 40.4%.

7.15 Conclusions

The study found strong linkages between the key food security indicators related to food price increases and the nutritional status of children and women. The following were the most important food security indicators analyzed in relation to the high food price crisis:

- Food Consumption Scores
- Coping Strategy Index
- Food Expenditures
- Asset-based wealth status
- Household Income

An earlier study and analysis by Torelesse and Bloem (2003)[120] established statistical relationships between rice prices in Bangladesh and malnutrition. The association of underweight children with household expenditure on rice and non-rice foods suggests that food policies which affect rice prices have the potential to influence child nutritional status in Bangladesh. Findings from the *Nutrition Surveillance Project* in rural Bangladesh suggest that between 1992 and 2000, child nutritional status improved when rice prices fell because households were able to purchase and consume more non-rice foods, and thereby increase the quantity and quality of their diets. Other recent Bangladesh studies have reaffirmed these linkages by showing that rising food prices force food basket re-compositions that contribute to poorer nutritional situations, particularly in children older than 24 months. Additionally, a peculiarity that several existing nutritional datasets show[121] is that malnutrition rates are higher in poor socioeconomic households, but are also very high in the wealthiest Bangladesh homes.

7.15.1 Food Consumption

Increasing food prices have had an impact on household food consumption. Households with "poor" and "borderline" Food Consumption Scores had statistically significant and higher rates of childhood malnutrition. They also had the highest percentages of children without access to a minimum acceptable diet. These findings clearly show that food-insecure households with poor and borderline food consumption scores were more likely to have had poor infant and young child feeding practices and malnourished children without access to a minimum acceptable diet.

As highlighted by Trostle (2008),[122] high food price shocks are most acutely felt in countries like Bangladesh where a 50% rise in staple food prices can cause a 21% increase in total food expenditure. As households adjust, often by changing food expenditures in a manner which compromises and lowers diet diversity, the result is often inadequate intake of essential micronutrients needed to prevent chronic malnutrition. Other negative risks and consequences include micronutrient deficiencies such as anaemia and low birth weights.[123]

Recent research by the International Food Policy Research Institute has shown that the parameters used to classify the "poor" and "borderline" food consumption groups positively correlates with caloric intakes considerably less than the recommended 2100 kcal/person/day.[124] Bearing this in mind, it could well mean that "poor" food consumption groups are more vulnerable than expected and that even households in acceptable food consumption groups might consume less than 2100 kcal/person/day.

Thirty percent of households ranked food price rises as the second major difficulty faced in the past twelve months, with illness and health expenditures ranked first (See Chapter 4, Shocks and Coping Strategies). Analysis has shown that increasing food prices had a negative impact on household food consumption in Bangladesh. These food-insecure households presented with statistically significant higher malnutrition rates in their children and these same households also had the highest percentages of children without access to a minimum acceptable diet. The findings related to food consumption scores clearly illustrate how the quality and quantity of the diet at household level have affected infant and young child feeding practices and outcomes.

7.15.2 Coping Strategy Index

The food consumption patterns of surveyed households were mostly affected by their adopted coping strategy mechanisms, such as "reducing the number of meals eaten in a day," "limiting portion size at meals," or "relying on less preferred and less expensive food." A strong statistical association was found between a child's nutritional status (wasting) and households that had adopted higher numbers of coping mechanisms in the 30 days prior to the assessment. This finding is supported by the BRAC 2009 study, which also found a strong association between acutely malnourished children and food consumption.

The Coping Strategy Index estimates the severity of food insecurity at household level by looking at the different behaviours that households use to cope. These coping strategies, usually seen with major changes in food consumption and selling of assets, can adversely affect nutritional status, as well as health and productive capacity.[125] Studies have shown that when households reduce the amount of food given to infants and young children, or if the available food does not meet the minimum requirements, the resulting negative consequences are long

lasting and can affect future productivity.[126] In terms of programming, community-based preventive interventions to reduce nutritional deficits are more likely to mitigate the poor outcomes associated with these high malnutrition indicators.

7.15.3 Food Expenditures

Several recent studies have demonstrated the relationships between changes in food expenditure and the deterioration in the nutritional status of children.[127] The increase in food prices may change the overall expenditure pattern within the household. During difficult times, and in periods where food prices have increased, the household's tendency is to maintain food expenses as usual and to decrease other regular expenses for non-food and basic needs.

For example, a poor household faced with rising food prices, and without additional income or savings to adjust, might choose to forego necessary expenses on medicine for a sick member of the family. "Savings" might then be diverted to cover higher food expenses. Depending on the nature of the illness, foregoing the medicine might actually increase the risks of malnutrition.

Von Grebmer et al., (IFPRI 2008[128]) have shown the links between financial crises and changes in household expenditures. Households tended to both compromise diet diversity as well as expenditures on non-food essentials. Such strategies have been demonstrated in Asia and Africa, during past food price crises.[129] Households will begin to sell assets and reduce their expenditures on health care, which further affects the poor nutritional situation. This household strategy implies a high risk for deterioration in the household nutritional status.

Taking this into consideration, the assessment found an increase in the percentages of households diverting income away from non-food expenditures and towards food purchases. Significantly, these same households had the highest malnutrition rates.

7.15.4 Wealth status

In comparison to other countries, malnutrition rates are higher in Bangladesh than would be expected, considering in-country income levels.[130,131] This study confirms high malnutrition levels for all income quintiles. Similar findings from the literature (HKI/IPHN NSP 2006, and BRAC 2008) have been reported earlier. As a point of comparison with its Myanmar neighbour, malnutrition rates in the wealthiest quintile of Bangladesh, have parity with the national average in Myanmar.

This assessment substantiates these findings, showing a descending trend from the poorest households to the richest households; nevertheless, high rates of malnutrition still prevail in the wealthiest homes (e.g. stunting rates of 36.5%).

7.15.5 Income

Bangladesh households with seasonal or irregular income were more likely to have "stunted" and "underweight" children. Price and income are the two most influential factors determining food purchases.[132] Considering the association between low monthly income at household level and malnutrition in children, it is important to highlight these results. The findings showed how the majority of households lost their purchasing power when the real income of households diminished by 13% (compared to 2005). This is particularly relevant in the current

context, as the decreasing real income levels, in all likelihood, had an impact on maintaining acceptable levels of nutritional status.

Employment creation, economic growth, higher incomes, and higher purchasing power remains essential for improving food access and food security in general. Reducing poverty and malnutrition will also require adept macro-economic management, as well as effective policies and programs that emphasize or strengthen good governance and improved health care services.

Assessments of wage gaps in Bangladesh have highlighted the complexities that rising food prices have had in determining longer-term impacts.[133,134,135] To mitigate these impacts, Bangladesh will have to scale up income interventions with nutrition and food-based programs targeted to areas where poverty, food insecurity, and malnutrition are most prevalent.

8. Response and needs analysis

8.1 Social safety nets and humanitarian responses 2007-2008

Bangladesh has an extensive Social Safety Net with multiple programs and objectives. Most are administered by the Government of Bangladesh; however, NGOs and other non-government bodies also play significant roles as service providers. Primarily, assistance is in the form of food or cash-based transfers and is targeted at poor and vulnerable groups. Some programs are explicitly short term, such as disaster relief assistance, while others have longer-term, multiple year program cycles like those that focus on the alleviation of chronic poverty. In this chapter, the majority of programs discussed focus on poverty alleviation or improving food security and nutrition.

The largest social safety net programs typically operate in rural areas and are generally food based and government administered. Most are linked to the government's Public Food Distribution System. Although the Public Food Distribution System has numerous programs or channels through which food assistance is provided, the majority of assistance (e.g. approximately two-thirds of the total food distributed during fiscal year 2007/2008) is provided vis-à-vis Vulnerable Group Development, Vulnerable Group Feeding, Gratuitous Relief, Test Relief, Food-for-Work, and Open Market Sales.[166]

Surveyed households were asked whether they received SSN type assistance during 2007 and 2008. Interviewers recorded the quantity of assistance received, and from which program the assistance came. Questions were also included to ascertain whether the households were purchasing subsidized food via OMS or other government "fair price" outlets.

Table 8.1 provides a summary of the Social Safety Net programs surveyed and includes details on implementing organization, type of assistance, and percentage of households receiving assistance both for 2007 and 2008.

As presented in Chapter 1, one of the main mechanisms used by the government of Bangladesh in response to the high food price prices was Open Market Sales of low-price, subsidized rice and other basic staples. Open Market Sales and similar "fair price" outlets were established mainly in urban areas of the country. According to the National Food Policy 2006, subsidized food should be sold at below market prices during times of unusually high prices.[137] During the peak price period of late 2007 and early 2008, Open Market Sales were common.

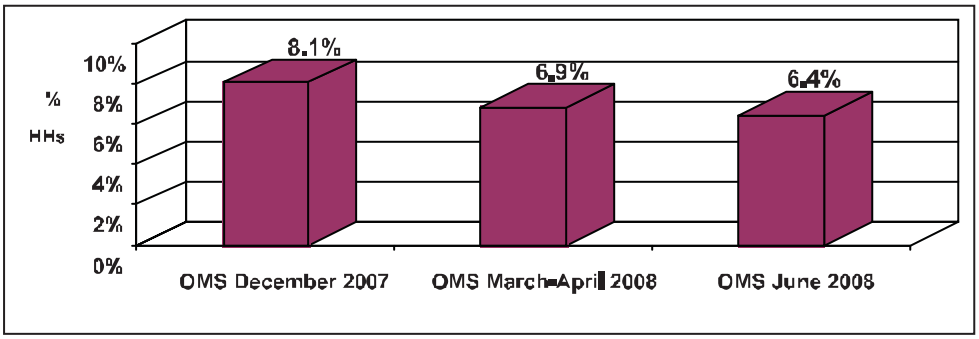
Table 8.1: Households receiving assistance by Social Safety Net programs, in Bangladesh, 2007 and 2008

Social Safety Nets	Implementers	Type of assistance	Household participation 2007		Household participation 2008	
			n	%	n	%
Primary education stipend programme	GoB	Cash	607	5.8	831	8.0
Vulnerable group feeding	GoB	Food	253	2.4	533	5.1
Vulnerable group development	GoB & WFP	Food	300	2.9	471	4.5
Test relief: employment generation, after disasters	GoB	Food	144	1.4	414	4.0
Relief: gratuitous relief & other relief to disaster prone areas	GoB & partners	Food & other materials	256	2.4	670	6.4
School feeding	WFP	Food	63	0.6	106	1.0
Food-for-work: employment generation for poor in dry season	GoB & partners	Food	24	0.2	45	0.4
Cash-for-work: including 100 days employment programme	GoB & partners	Cash	53	0.6	207	1.9
Microcredit	Development partners	Cash	29	0.3	67	0.6
Nutrition intervention	GoB & partners	Food	23	0.2	36	0.3
Free seed	GoB & partners	Agriculture input	24	0.2	80	0.8

SOURCE: HFSNA 2009

Households were asked whether they had purchased food at "fair-price" outlets between December 2007 and June of 2008. An estimated 6% to 8% percent of households throughout the country purchased at "fair-price" outlets, as shown in Figure 8.1. Although Open Market Sales continued through the second half of 2008, most sales took place between late 2007 and mid-2008.[138] From July 2007 and June 2008, some 268,000 metric tonnes of rice were distributed by Open Market Sales with most channeled during late 2007 to mid-2008. The decision to scale back the program after mid-2008 was taken based on a number of considerations and developments including less demand from consumers, a drop in prices at regular markets and a bumper *Boro* harvest.

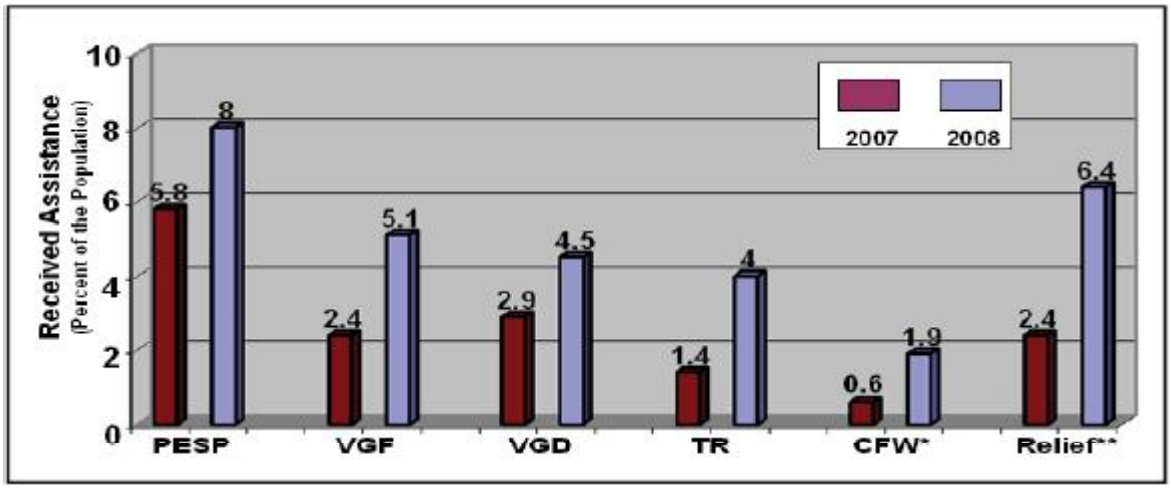
Figure 8.1: Household participation in Open Market Sales, in Bangladesh, 2007/2008



SOURCE: HFSNA 2009

During the peak of the high food price shock, other government social protection programs were scaled up in response. These included Vulnerable Group Feeding, Vulnerable Group Development, Test Relief, Cash-for-work, Relief/gratuitous relief, and the Primary Education Stipend Programme.[139] The expansion of these programs and the percentage of the population receiving assistance through them are shown in Figure 8.2.

Figure 8.2: Proportion of population receiving assistance by Social Safety Net Programs (SSNPs)



Notes: * CFW/Cash for Work refers mainly to the GoB's "100 Day Employment Programme" (2008).
** "Relief refers mainly to the GoB's Gratuitous Relief (GR) program for natural disasters.

SOURCE: HFSNA 2009

In addition to food assistance, one of the main government response mechanisms was the newly created 100 Days Employment Programme. The aim of this cash-for-work program was to guarantee 100 days of paid labour to poor, unemployed, and food insecure workers on mainly rural infrastructure projects. Despite plans to assist nearly two million households, HFSNA findings estimate that less than 2% of the population received assistance.[140] Anecdotal evidence from government sources stated that 1.9 million workers benefited from this project, which would correlate to approximately 6.9% of households in Bangladesh, far higher than the less than 2% findings reported by households in this assessment.

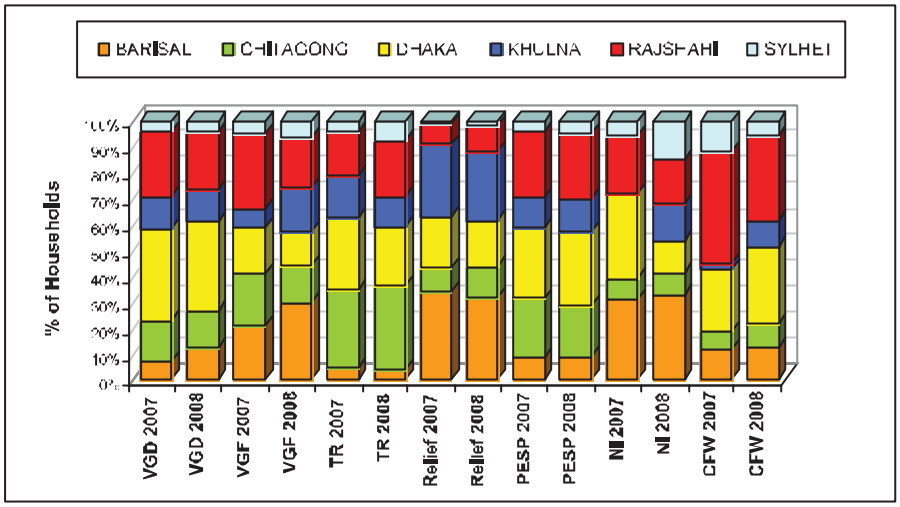
While the program was planned for implementation over two phases, due to administrative and management challenges encountered during phase one, the second phase was subsequently changed to a mostly food-for-work scheme.[141]

8.2 Targeting of Social Safety Net Programs, 2007/2008

8.2.1 Geographic targeting

The geographic targeting of programs with longer-term objectives generally utilizes poverty incidence data for prioritization and/or selection of areas to be assisted. Other sector specific indicators; for example enrolment rates for education programs, are also frequently used. Humanitarian responses including both relief and recovery assistance focus on disaster-affected areas. The graph in Figure 8.3 shows where Social Safety Net Programs in Bangladesh were concentrated in 2007/2008.

Figure 8.3: Major Social Safety Net Programs (SSNPs) by Division



SOURCE: HFSNA 2009

As shown in Figure 8.3, Barisal, Chittagong, Dhaka, and Rajshahi divisions received more assistance in 2007/2008 than Sylhet and Khulna divisions. The HIES 2005 and this assessment identified Barisal and Rajshahi as divisions with relatively higher rates of poverty and food insecurity. While some programs showed fairly large concentrations of caseloads within those two divisions, the pattern was not always consistent. Relevant factors that influenced the distribution of resources and assistance included not only poverty rates but also the absolute size of the poor population. This can help to explain why areas such as Dhaka, which is characterized by a relatively lower poverty rate but a larger poor population, received considerably greater assistance.

In 2007/2008, relief operations were concentrated in the areas most affected by Cyclone Sidr, particularly in Barisal and Khulna divisions. Of the total households that received 2008 relief assistance, more than one-third were from Barisal division and around one-third from Khulna division. Barisal and Rajshahi divisions received larger shares of assistance from Nutrition Interventions (NI), which would appear justified given the relatively higher rates of malnutrition as reported in these HFSNA findings (See Chapter 5). These two divisions had global acute malnutrition rates of 16.1% in Barisal division and 15.2% in Rajshahi division, both exceeding the WHO emergency threshold (>15%).

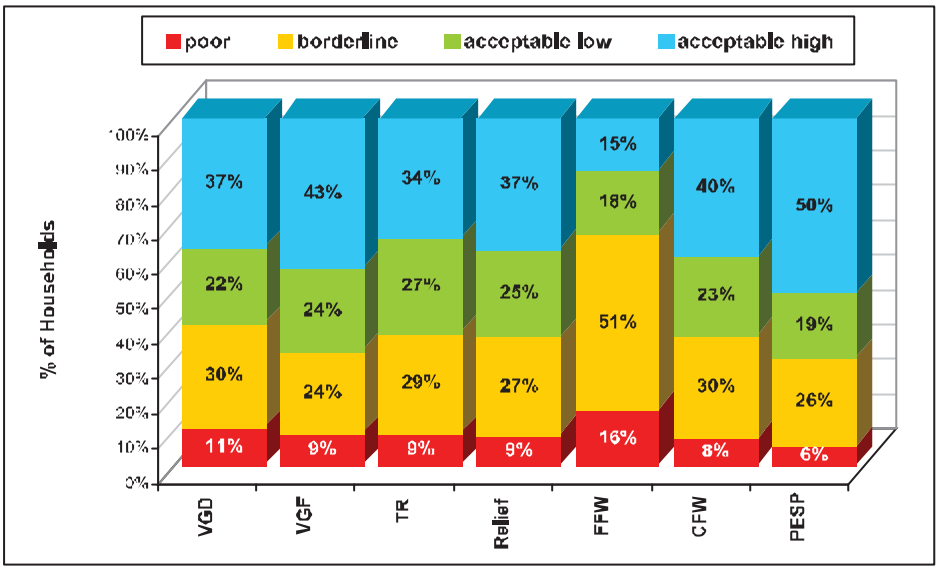
8.2.2 Beneficiary targeting

Effective and efficient targeting of Social Safety Net assistance to the poorest and most deserving households is an ongoing concern for numerous stakeholders. Many studies have reported substantial inclusion and exclusion errors associated with various safety net programs. A 2006 World Bank report estimated that 27% of Vulnerable Group Development beneficiaries and 47% of Primary Education Stipend Programme beneficiaries in Bangladesh were not poor.[142] More recently, a 2009 evaluation of the 100-Day Employment Programme found that although 67% of program participants were associated with the poorest 40% of the population, the remaining one-third were from middle income or better off families.[143]

Findings from the present assessment complement many of the earlier studies and further suggest that improving targeting efficiency should remain a high priority area for attention. Figure 8.4 shows the distribution of program participants according to the four food

consumption groups (i.e. households with "poor" food consumption, "borderline" food consumption, and "acceptable-low" and "acceptable-high" food consumption).

Figure 8.4: Participation of Food Consumption Groups in Major SSNPs, 2008

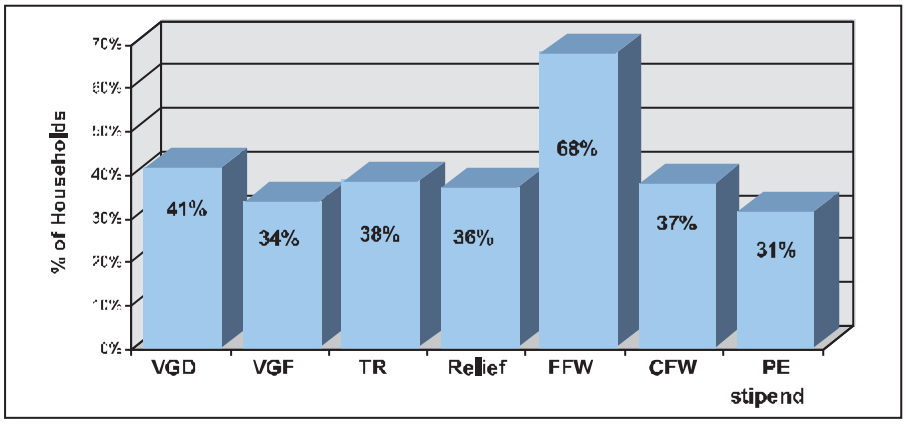


SOURCE: HFSNA 2009

As shown in Figure 8.4, more than one-half of program participants were found within food-secure households ("acceptable-low" and "acceptable-high" food consumption groups). The only exception to these findings was Food-for-work assistance programs wherein relatively fewer of program participants (33%) were from food-secure households.

The data were also analyzed by looking at the percentage of program participants from within the survey's 25% food insecure households (i.e. households with "poor" or "borderline" food consumption). These findings are presented in figure 8.5 below:

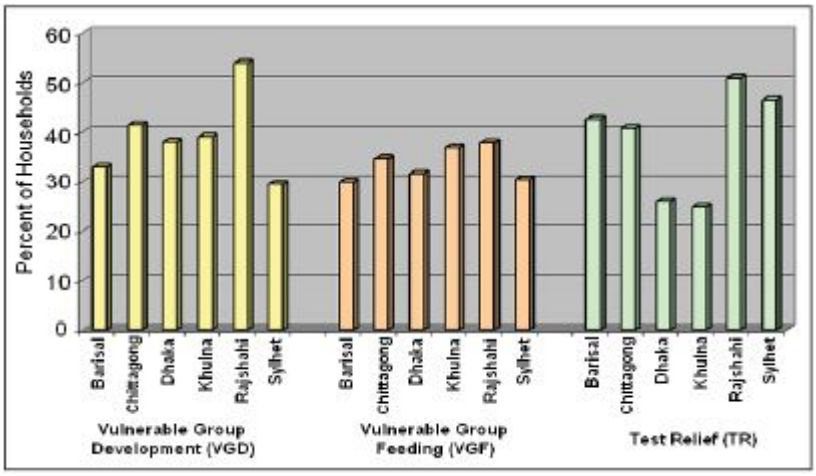
Figure 8.5: Percentage of SSNP participants from within 25% most food insecure households



SOURCE: HFSNA 2009

Regional targeting efficiency was examined for three programs: Vulnerable Group Development, Vulnerable Group Feeding, and Test Relief. Similar to the national level analysis presented above, the percentage of participants from food-insecure households was analyzed and these findings are shown in Figure 8.6.

Figure 8.6: Percentage of SSNP participants from within Food insecure households, by Administrative Division for VGD, VGF and Test Relief



SOURCE: HFSNA 2009

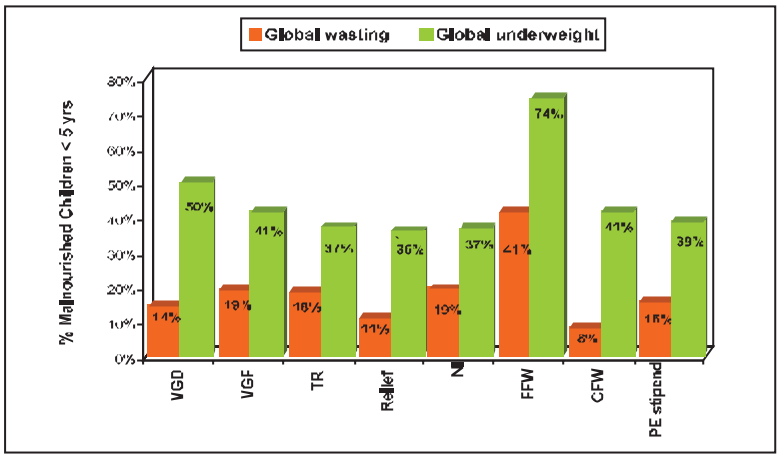
Figure 8.6 above allows stakeholders such as program managers to quickly ascertain where their programs are relatively better or worse targeted, from the perspective of reaching food-insecure households. Within the VGD program, Rajshahi is the best targeted; with approximately 54% of the caseload food insecure. By comparison, Sylhet has a much smaller percentage of VGD participants being food insecure, with only 29% of the caseload coming from households with “poor” or “borderline” food consumption scores.

Division level differences in targeting efficiency are less pronounced for the VGF program. Rajshahi had the highest targeting efficiency with 38% of the caseload food insecure, while Barisal had the lowest with approximately 30% food insecure. On the other hand, the Test Relief (TR) program had some of the largest division level differences in targeting efficiency. Over half (51%) of Rajshahi’s TR caseload was food insecure, while the associated figure for Khulna was much lower, at 24.7%.

8.3 Nutritional profile of households with Social Safety Net Programme support

Findings were analyzed to better understand the correlation between the prevalence of malnutrition and households receiving Social Safety Net assistance. The rates of global acute malnutrition and underweight for children under-five years from within households that participated in Social Safety Net Programs are shown in Figure 8.7.

Figure 8.7: Percentage of acutely malnourished and underweight children under 5-years for SSNP beneficiary households



SOURCE: HFSNA 2009

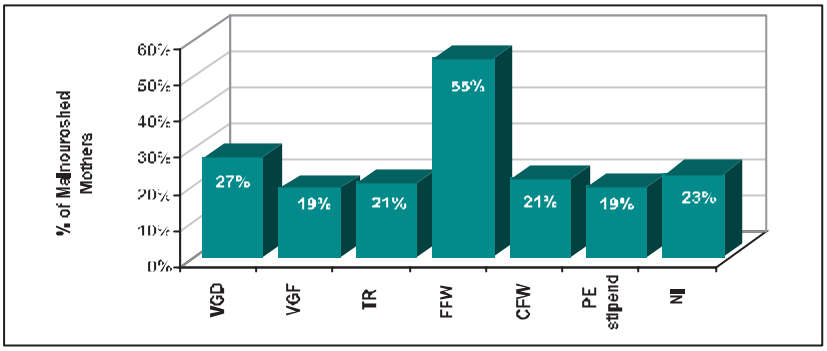
In Bangladesh, global acute malnutrition rates from earlier presented findings (See Chapter 5) were 13.5% for children aged six to 59 months. Almost 42% of acutely malnourished children were associated with households that received Food-for-work assistance. The proportions of acutely malnourished children were also high within households that received Nutrition Interventions (19%) and either Vulnerable Group Feeding or Test Relief (19%). In contrast, the proportions of acute malnourished children were considerably lower within households receiving relief (11%) and cash-for-work (8%) types of assistance.

The proportions of underweight children aged 6 to 59 months for the same Social Safety Net assisted households were also examined. A high proportion of children that were underweight were found within households receiving Food-for-work assistance (74%), Vulnerable Group Development assistance (50%), and Vulnerable Group Feeding assistance (41%). Only the Relief program (36%) was slightly below the national average (37.4%).

Statistically significant associations were found between global acute malnutrition in children aged 6 to 59 months and Food-for-work programs [x^2=7.53, 1 d.f. p=0.006<0.05]. Significant associations were also found between the prevalence of global underweight in children aged 6 to 59 months with Vulnerable Group Feeding [x^2=11.58, 1 d.f., p=0.001<0.05] and Food-for-work [x^2=7.67, df.1, p=0.006<0.05].

The majority of mothers (55%) participating in the “Food-for-work” program were globally acutely malnourished by MUAC (< 221 mm). Moreover, the Vulnerable Group Development, Nutrition Interventions, Cash-for-work, and Test Relief programs also had a significant proportion of women with acute malnutrition (over 20%). Maternal global acute malnutrition was statistically significantly associated to Vulnerable Group Development [x^2=12.5, 1 d.f. p=0.00<0.05] and Food-for-work households [x^2=13.98, 1 d.f. p=0.00<0.05].

Figure 8.8: Percentage of Malnourished mothers within SSNP beneficiary households (MUAC < 221 mm)



SOURCE: HFSNA 2009

Of all the programs reviewed above, Food-for-Work (FFW) clearly stood-out in terms of its statistically significant associations with malnutrition in both children and mothers. These findings would seem to be related to the conditional nature of the program that dissuades labourers of middle income or better-off households from participating. The IFPRI 2007 report on the relative efficacy of food and cash transfers showed similar findings in terms of higher concentrations of extreme poor within the Food-for-work or Food-for-assets programs.[144]

8.4 Priority needs of households

Additional to analyzing the assistance that was provided and the efficiency of targeting, the assessment looked at the prioritization of needs identified by the surveyed population. Households were asked to report on their first, second, and third priority needs, after considering a fairly extensive list of types of assistance (See Table 8.2). Just over one-half of households (51.2%) identified cash as their highest first-priority. Other relatively high ranking first-priorities included food (15.6%) and employment (6.9%). Second priorities had similar rankings with households identifying their needs as cash (21%), food (20.1%), and employment (11.6%). Food was the most frequently identified third-priority (14.5%), followed by health services (12.4%), and employment (11.6%). Details of all findings are presented in Table 8.2.

Table 8.2: Priority of needs identified by surveyed households

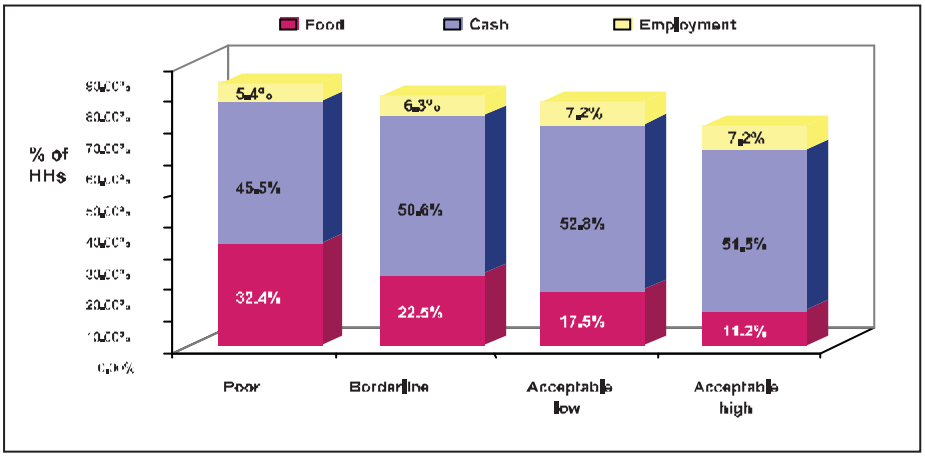
Type of needs	1st priority %	2nd priority %	3rd priority %
Cash	51.2	21.0	10.4
Food	15.6	20.1	14.5
Employment	6.9	11.6	11.6
Fertilizer	4.6	7.1	7.0
Health services	2.7	4.3	12.4
Credit	2.2	6.8	4.3
Seeds	1.8	4.5	3.0
Increased wage	1.5	4.9	5.1
Agricultural tools	0.8	1.8	3.0
Clothes, shoes	0.3	2.7	9.3
Irrigation	0.2	0.3	0.6
Fishing equipments	0.2	0.5	0.0
Pesticides	0.1	1.2	3.9
Fodder, animal feed	0.0	0.2	0.2
Veterinary services	0.0	0.2	0.3
Security	2.1	3.7	6.1
Other assistance	9.6	9.2	7.6

SOURCE: HFSNA 2009

The prioritization of needs was also examined by food consumption groups. The three most identified first-priority needs reported across all food consumption groups were cash, food, and employment. Cash was the most frequently identified first priority need and food was the second.

As might be expected, the relatively more food-insecure groups ("poor" and "borderline") more frequently identified food as a first priority versus the relatively more food secure groups ("acceptable-low" and "acceptable-high"). This descending stair-step down pattern can be seen clearly in the segments of the Figure 8.9.

Figure 8.9: Proportion of households identifying food, cash and employment as first priority needs, by food consumption groups, in Bangladesh, 2007/2008



SOURCE: HFSNA 2009

Among the other priority needs, credit was equally preferred by all four groups. Agricultural inputs such as fertilizer and seeds were identified as first priorities by a relatively smaller percentage of households (2% to 3%) and were associated with needs identified by the food secure consumption groups. Health service followed a similar pattern with the food-secure groups identifying it as a first priority (3.5%) and a relatively smaller number of food-insecure households (1.2%) giving it the same priority ranking.

9. Conclusions and recommendations

9.1 Food Security

In Bangladesh, the high food prices of 2007/2008 resulted in a serious deterioration of food security primarily due to inadequate household food access. Coping capacities were undoubtedly low even prior to the shock with two major natural disasters occurring only a few months prior to the price hikes (the 2007 floods and Cyclone Sidr).

Food imports into Bangladesh, a traditional safety valve in post-disaster situations, were more difficult to undertake due to global high food prices and regional trade barriers.

Recommendations

- Bangladesh and neighbouring countries should promote and adopt open-trade policies, particularly with regards to food and other essentials during times of crisis. Regional trade barriers on export bans or setting minimum export prices artificially high should be avoided at all costs.
- Dialogue on open trade and policies and commitments that respect free (regional) trade should be actively pursued in forums such as the South Asian Association for Regional Cooperation (SAARC) or in global forums like the World Trade Organization.

Although the majority of food grain consumed in Bangladesh is produced internally, imports play an important stabilizing role, particularly during periods of disaster. Given the importance of food imports during times of acute food insecurity, a review of international procurement and tendering arrangements is warranted. Dorosh and Farid (2003) have documented past failures in the procurement system in Bangladesh,[145] and the USDA's Foreign Agricultural Service highlighted similar shortcomings in the government's tendering processes (2008).[146]

Effective and timely public-sector food procurement in the domestic market is important to maintaining adequate stocks for the Public Food Distribution System. Sufficient stocks are needed both for food-price stabilization programs, such as Open Market Sales and more importantly for food-based Social Safety Nets that provide critical social protection during times of crisis. The Government of Bangladesh faced real challenges during 2008 in meeting its targets for public procurement of rice and wheat from the domestic market. The target for internal procurement of rice was initially set at 1.3 million metric tonnes for the fiscal year 2007/2008. By March 2008 with only one-quarter of the fiscal year remaining, only 22% of the target had been met with just 266,000 metric tonnes procured.[147] Although procurement later increased significantly, final achievement was low at only 69% of the target.[148] Much of the food that was procured and distributed via the Public Food Distribution System was obtained months after the most acute period of food insecurity. The delayed response was problematic not just for government but also for humanitarian actors. A combination of factors all played important roles regarding the delayed and inadequate response, including inadequate food security monitoring and assessment systems, ongoing Cyclone Sidr relief and recovery operations, a difficult procurement environment, and later challenges with resource mobilization. Procurement was hampered by the 2007 natural disasters, as well as a seller's motivation to delay sales while prices continued to rise. Nevertheless, the government prices were considerably below market price, especially during the *Amman* season, and this contributed to the low levels of procurement.[149]

Recommendations:

- Bangladesh should seek to update and streamline its food procurement procedures, policies, and tendering mechanisms to ensure timely and effective procurement on the international market.
- Improve the process whereby the procurement price and the quantity to be procured are set.[150] Ensure that the price is set at a level which provides enough incentive and profit for producers to sell, and takes into account prevailing market prices.

The challenge of maintaining adequate Public Food Distribution System stocks for public food stock managers was discussed in Chapter 1. When stock levels dipped below 400,000 metric tonnes at the height of the crisis during April 2008, food prices were peaking. The National Food Policy 2006 acknowledges the need to maintain 1.0 million metric tonnes of food grain, "in order to handle uncertainties of import arrival and emergency 'off take' requirements."[151] The policy implementation plan, also known as the Plan of Action, clearly acknowledges that seasonality needs to be taken into account with respect to optimal stock levels. It correctly calls for transparency, in terms of managing the stock.

Recommendation

- Public Food Distribution System stock levels should be optimally set for each month or quarter of the year and should take seasonality into account. This would ensure greater transparency in the management of the stock, for all concerned stakeholders.

The above recommendation is complementary to the government's existing plan to review public stock management as outlined in the National Food Policy 2006 Plan of Action[152].

In addition to monitoring public stock levels, much more needs to be understood about in-country private sector stocks, particularly because of their much bigger size and relevance to overall national food availability. Private sector stock levels play a significant role in influencing food prices and, by extension, food access. However, little is known in this important area due to research and knowledge base gaps. The government is aware of the need to gain a better understanding of the private sector food trade, not just with regards to stocks, but also with regards to infrastructure, market development, and regulatory issues. The National Food Policy 2006 Plan of Action highlights the need to monitor private storage and food supply practices and identifies other needed actions related to regulatory review, marketing and trade, and infrastructure development. The market survey findings from this assessment could provide invaluable resource material for those wishing to undertake new analyses and for addressing information and knowledge gaps.

Recommendation

- The HFSNA 2009 food markets survey data should be made easily accessible to researchers and other stakeholders in order to promote improved understanding of the food markets and food security in Bangladesh. Opportunities for collaboration should be explored.

The stability of Bangladesh's macro-economy was clearly tested during the 2007/2008 period. The import bill for Bangladesh became costlier as food and fuel prices on the global markets increased. Simultaneously, commodity prices for export items dropped in Bangladesh and the balance of trade suffered as a result. The deteriorating terms of trade brought pressure onto the Current Account Balance, raising concerns about both government fiscal deficits and access to credit for the private sector. International lending institutions such as the IMF and the World

Bank provided critical assistance in the form of soft loans and access to new credit lines, which created enough fiscal space for the government to navigate through a challenging period.

Given the realities of globalization and free trade, future commodity-related price increases are almost certain to be transmitted into the economies of South Asia and Bangladesh. As the global economy pulls out of the global recession, both fuel and food prices will in all likelihood rise again. Whether or not food prices rise quickly enough to constitute a new price shock during the short to medium term; is difficult to predict. Nevertheless, concerned parties and stakeholders that have either an interest or a responsibility to monitor and be prepared for possible future high food price shocks, need to do a better job of integrating macro-economic indicators into their food security monitoring activities and systems. While the Food Planning and Monitoring Unit of the Ministry of Food Disaster and Management regularly monitors traditional macro-economic food security indicators related to food availability, there is little evidence that broader macro-economic trends and indicators that can have a significant impact on food security such as trends with remittances or export earnings are incorporated into monitoring or analysis.

Recommendations

- Bangladesh needs a food security monitoring capacity that takes into account broader macro-economic trends and indicators, and their potential impact on food availability and food access. Reporting should be modified to reflect this broader monitoring perspective.
- Improved collaboration between public sector institutions that monitor food security and other public sector institutions that monitor the macro-economy is needed and justified.[153]
- Greater attention should be given to monitoring global and regional trade and its potential impact on food security in Bangladesh. Early warning indicators that can inform or trigger critical decisions on food procurement and public stock management should be reviewed and/or developed.

As food prices peaked in the period from March 2008 to April 2008, attention turned to the prospects for the 2008 May/June *Boro* harvest. A record harvest brought Bangladesh close to national self sufficiency with regards to rice availability. While increased availability later contributed to improved food access due to lower market prices, the effect of the bumper *Boro* harvest on market prices were not as immediate as many were expecting. As presented in Chapter One, rice prices actually increased in July/August 2008, one to two months after the *Boro* harvest. It was only in the last quarter of 2008 that prices dropped significantly. In contrast, July/August 2008 food distributions from the Public Food Distribution System were relatively light. By late-August, only 122,000 metric tonnes of wheat and rice had been distributed, representing about 4% of the annual target during a time when food prices were still quite high for much of the population.[154]

Recommendation

- Further analysis should be undertaken on the impact of food harvests on domestic food prices; such analysis is crucial for planning timely and effective food-based social safety net assistance.

As shown by Chapter 3 findings, the high food-price shock in Bangladesh was primarily associated with inadequate food access rather than inadequate food availability. From the market survey results, it is evident that food was available in Bangladesh, but it is equally clear

that for a large segment of the population, food was inaccessible due to the high food prices. The majority of traders (90%) reported that staple food commodities such as rice, pulses, and edible oil were readily available throughout 2008. Traders identified inadequate customer purchasing power as their main constraint during the year, substantiating the conclusion that inadequate food access and not food availability was the main factor contributing to the crisis.

As the price shock was transmitted from international markets to domestic markets, many consumers were forced to change their purchasing and food consumption habits. More than nine of ten traders (93%) interviewed for the market survey reported that consumers bought cheaper food items and more than eight in ten traders (84%) reported that consumers purchased smaller food quantities. These findings were confirmed and complemented by findings pertaining to household coping strategies. Two of the three most commonly reported food-based, household coping strategies were "relying on cheaper and less preferred foods," and "reducing portion sizes at meal time."

Market information systems and the food security monitoring systems that depend on these systems need to report on more than just food price changes. While the focus on food prices should remain central to monitoring food access, additional information on consumer buying patterns could help to significantly strengthen food security monitoring and early warning capacity. For example, information on volume or sales of cheaper or less preferred commodities and the typical quantity of food purchased would help to give a more comprehensive picture of changing circumstances.

Recommendation

- Market information systems and food security monitoring systems should go beyond the simple reporting of food prices. Changes in consumer buying patterns that reflect changing food security conditions should be reported. As necessary, data collection and analysis activities should be adapted to support such reporting for strengthened and comprehensive early warning and food security monitoring.

An analysis of market price integration between Dhaka division, as a representative wholesale market, and prices in the other five administrative divisions was undertaken to better understand correlation, volatility, and price transmission. Results confirmed that major wholesale coarse rice markets throughout Bangladesh were well integrated between Dhaka division and the other divisions. The findings also showed that markets and prices were better integrated more recently in comparison to a few years earlier. Prices were more synchronized with each other during the 2007/2008 shock, as compared to the pre-shock period of 2004 to 2006. Despite better integration across markets, price volatility increased during the food-price shock. Volatility was particularly high in the southern divisions of Barisal and Khulna where the impact of Cyclone Sidr likely contributed to the situation.

The degree of price transmission varied significantly between Dhaka division and other administrative divisions. Price transmission was higher for the northern divisions of Rajshahi and Sylhet, suggesting that net-food buyers in these areas were more exposed and more affected by the high food-price shock. Price transmission was lower in the southern coastal divisions of Chittagong and Barisal. Low transmission within Barisal could also be related to the fact that most Cyclone Sidr related food assistance was distributed during 2008, and this might have created its own dynamic dampening price transmission. This analysis suggests that without such assistance, price transmission to Barisal would have been higher. Accordingly, the impact of high food prices in this region would likely have been more severe had Cyclone Sidr assistance not been available.

The market price integration findings were valid only to the divisional level and applied just to wholesale coarse rice; thus, findings cannot be generalized for more local level markets or applied to other food commodities. Due to time constraints, the relatively rich food markets database, comprised of both primary data from the HFSNA 2009 field work and secondary data from the Department of Agricultural Marketing could not be fully analyzed. New and complementary analysis could shed light on a number of important unanswered questions such as how well prices are integrated for markets below the administrative divisional level, how volatile are prices in the smaller or more remote markets, and to what extent future price shocks might affect markets and the low-income consumers that depend on them.

Recommendation

- Analysts and researchers should explore possibilities for extended or new analysis on market price integration in Bangladesh to better inform food security programming and related investments in market or transport infrastructure.

Not all consumers were equally affected or impacted by the high food-price shock. Although income class and wealth were important determinants of a households' ability to cope with higher prices, other important factors related to livelihoods also played significant roles. For households engaged in agriculture, their participation as net-food buyers or net-food sellers was particularly important. Net-food buyers are penalized when food prices rise, while net-food sellers profit. For households that cultivated land (including home gardens), high food prices resulted in a higher increase in the proportion of net-food buyers compared to net-food sellers. The increase in the proportion of net-food buyers was higher for female-headed households as well as for non-agriculture wage labourers , casual workers, and for those who had a greater reliance on remittances. In terms of regional differences, food price rises resulted in substantial increases in the proportion of net-food buyers for consumers in Barisal and Sylhet divisions.

High food prices are often considered to be beneficial to farmers due to the assumption that most farmers or cultivators are net-food sellers as opposed to net-food buyers. In Bangladesh, the picture is less clear because of factors related to small landholding sizes and the non-economic viability of the multitudes of small farms. Although there are many important constraints within the agricultural sector, the inequalities of land distribution and land ownership are striking. An estimated 10% of farmers own one-half of the agricultural land.[155] More than one-half of farmers (60%) are functionally landless, working as share-croppers on land owned by others.[156] According to one source, small and marginal farmers represent 80% of all farmers.[157]

Many of these households were among the poorest and most food-insecure in Bangladesh, as the analysis has shown. For three of the most important food security indicators, agricultural labourers were the most food insecure. Nearly one-half (45%) of agricultural labourers had food consumption scores that were poor or marginal and associated with food insecurity. As a livelihood group, these households spent 69% of their total expenditures on food compared to the national average of 62%. Agricultural labourers more frequently changed their food consumption behaviour in order to cope with insufficient food for their households. Their coping strategy index scores were nearly twice the national average.

The extent to which the agricultural sector can be a driver of pro-poor economic growth is a critical question, given many of the constraints and challenges highlighted above. Because of the land constraint, strategies for economic growth focus on improving agricultural yields.

With higher food prices, more food marketed results in increased income for farmers and can stimulate demand and growth in other sectors. However, for many of Bangladesh's smallest farmers, yield improvements by themselves are unlikely to result in successful graduation out of poverty. A more diversified economic growth strategy that would transition non-viable, small-scale or functionally landless farmers away from agriculture could be more effective.

As mentioned in the *National Food Policy* 2006 and its related *Plan of Action* for 2008-2015, food prices in Bangladesh need to be high enough to ensure adequate income for farmers and to provide incentives for further growth. However, food prices should not be too high or they could contribute to or become the cause of increased food insecurity.

Finding the right balance with food prices requires that policy makers and planners have a sound understanding on a variety of issues including credible information on the combination of factors in terms of food prices, yields, land holding sizes, farm income, etc. that would allow a family of five to live at least above the poverty line or within the middle class. Given the 2007/2008 high food-price shock, it is important to better understand the distributions and prevalence of net-food buyers, net-food sellers, and autarkic households, according to land holding sizes cultivated and/or owned. Key questions such as, "for a marginal poor farmer, how much yield or production increase is needed to escape poverty" should be asked. In addition, data obtained from these questions and additional knowledge about farming systems and economic viability are surely needed. Although recent literature and studies focus both on the high food-price issue, as well as related issues of agriculture and pro-poor growth, none of these sources specifically address these important questions.[158]

While the National Food Policy 2006 clearly acknowledges the need to improve the productivity of smallholder agriculture, its associated Plan of Action for small and marginal farmers focuses primarily on issues related to extending credit and other inputs or to providing disaster insurance to cover losses associated with production failures. The research agenda does not seem to include studies that would address some of the critical questions. Similarly, this assessment did not address these issues but the HFSNA 2009 data, if used for new and complementary research, would likely shed light on many of these important questions.

Recommendation

- Analysis and research should be supported that can provide a better understanding of the economic viability of smallholder farming within the context of food prices, producer incentives and participation in food markets. The research outputs should be used to inform and influence policies and programs that are designed to address food and livelihood security as well as pro-poor growth and poverty reduction.

The findings on household food security clearly identified livelihoods with irregular income sources, as the most food insecure (See Chapter 4). Agricultural labourers , non-agricultural wage earners, and casual labourers consistently scored lowest for key food security indicators. Casual labourers were extremely food insecure. More than one-half (56%) of households that reported casual labor as their main income source were food insecure based on low and borderline food consumption scores compared to a national average of 25%. Casual labourers spent more than three-quarters (76%) of their income on food, significantly higher than the 62% national estimate. These families also changed their food consumption behavior more frequently to cope with insufficient food at home, as found by their coping strategy index scores that were nearly twice the national average.

Recommendations

- Livelihoods associated with irregular income such as agricultural labourers , non-agricultural wage earners, and casual labourers are generally more food insecure and should be given serious consideration for inclusion within food security assistance programs.
- For longer-term development solutions, such food security assistance programs should support the acquisition of marketable skills that can lead to stable and more regular employment.

Gender or sex discrimination in daily wage rates was clearly a major factor contributing to significantly higher rates of food insecurity for female-headed households. Within the agriculture sector, female daily wage rates were about two-thirds the rate paid to male workers. Within the non-agriculture sector, an even larger gender disparity existed where the daily wage rate of males reached twice the daily rate of female workers depending on the season. Such large disparities help to explain why female-headed households were particularly worse off than male-headed households for many food security indicators. Female-headed households were over represented among food-insecure households based on the food consumption score indicator with 38% of them falling into the poor or marginal food consumption groups versus a significantly lower 23% for male-headed households. Female-headed households more frequently adopted food-based coping strategies such as consuming cheaper or less preferred foods, or cutting meal portion sizes to manage household food shortfalls as shown by their significantly higher coping strategy index scores.

Recommendations

- Female-headed households are generally more food insecure and should be given serious consideration for inclusion within food security assistance programs.
- Such programs should contribute to the reduction of gender-based wage discrimination within the marketplace. Life skills training, with an emphasis on confidence building, and assertiveness when negotiating wages with employers, could contribute to longer-term food security. Complimentary awareness and advocacy programs within the community that emphasize equal pay for equal work principles should also be considered.

Food-insecure households with “poor” and “borderline” food consumption scores were profiled in order to get a better understanding of their demographic and socio-economic characteristics. In general, the heads of food-insecure households were less educated, with 70% reporting *never have attended school* against a national average rate of 43 percent. Food insecure households also owned fewer assets, as reflected in their lower asset index scores.[159] Somewhat surprisingly, they tended to have smaller than average household sizes, with slightly fewer members per family. The most food-secure households tended to have larger family sizes. Although they had “more mouths to feed,” they also had more income earners per household, and this contributed to their food security.

Recommendations

- Educational characteristics of the household, such as "whether the household head has ever attended school," can be a useful indicator for identifying most food-insecure households. As such, this indicator should be considered among others, for the process of beneficiary selection for food security programs.
- Asset ownership, not surprisingly, was associated with greater food security. Including asset ownership, within a beneficiary selection process that uses proxy means testing, can improve targeting efficiency. However, implementation needs to be well designed and well executed.
- Those responsible for designing new food security programs in Bangladesh need to give due consideration to program outcomes that emphasize asset building.
- Food security assistance programs using household size (i.e. larger household size) as a targeting indicator should reconsider such practice. The findings from the HFSNA survey found that the most food-insecure households tended to have below-average household sizes.

Households used a variety of coping mechanisms to manage their food insecurity and the impact of high food prices. Taking on debt was one of the most common coping strategies used, and one of the most damaging and lasting impacts associated with the high food-price shock. The two most common non-food related coping strategies were "borrowing money from family or friends" (34%) and "borrowing money from banks and micro-credit institutions" (33%). Households spent 6% of their expenditures on paying off debt. The percentage shares for basic needs such as medical care and education were not so different, representing 8% and 5% of total household expenditures, respectively.

The third most prominent non-food related coping mechanism utilized by 22% of households was "reducing health expenditures." This is a real concern and suggests that food security crises such as the 2007/2008 high food-price shock can have broader negative impacts on human capital and longer-term development. In other words, the Millennium Development Goal 1 goal related to poverty and hunger might be negatively impacted but so will other goals such as Millennium Development Goal 4, and Millennium Development Goal 5, with their emphases on reducing childhood and maternal mortality.

Households altered their food-consumption-related behaviour using numerous food-based coping strategies. The three most common were "relying on cheaper and less preferred foods" (56% of respondents), "borrowing food from friends or neighbours" (53%), and "reducing portion sizes at meal times" (31%). Relying on cheaper and less preferred foods often compromises the quality of the diet. For example, relatively cheap but carbohydrate-rich foods such as rice might be consumed more often while nutrient-rich foods like vegetables or high-protein foods such as meat and fish are reduced. Such changes can lead to inadequate intakes of essential micronutrients and contribute to higher rates of malnutrition.

The food-based Coping Strategies Index correlated well with other food security and nutrition indicators. Significant statistical associations were found between the Coping Strategies Index and the acute malnutrition indicator for children aged 6 to 59 months. Similarly, higher Coping Strategies Index values were associated with higher rates of acute malnutrition among women. Coping Strategies Index values were also higher for female-headed households and female-headed households were over-represented among food-insecure households with "poor" and "borderline" food consumption scores. Given these findings and the relative ease of collecting coping strategies data, the Coping Strategies Index indicator could be an appropriate tool for monitoring changing food security conditions in Bangladesh.

Recommendation

- The feasibility of including the Coping Strategies Index tool and indicator in existing or planned food security monitoring systems in Bangladesh should be seriously explored.

The findings on diet diversity showed that cereals, vegetables, and edible oil were prominent food types within the surveyed households. Diets were generally insufficient with regards to intake of milk/dairy products and fruit with only the highest food consumption score group consuming adequate quantities of these foods. Households with "poor" or "borderline" food consumption scores were categorized as food insecure and represented one-quarter (25%) of all households in Bangladesh.

Recommendation

- Food security interventions that include nutrition awareness trainings for program participants should continue to stress the importance of a diversified and well-balanced diet. Greater emphasis should be made on the increased consumption of animal protein, pulses, dairy and fruit.

Data pertaining to Social Safety Net program assistance received by households was collected and analyzed for a better understanding of how the government and its humanitarian and development partners responded to the crisis during 2007/2008. There was a general consensus within the humanitarian community that the assistance contributed to lessening what could have been a much larger humanitarian crisis. The findings on mortality rates showed that rates were below emergency thresholds and there was no evidence that the high food-price shock had an impact on the mortality rate of the population. Nevertheless, there was substantial evidence from this assessment as well as from other sources that the shock contributed to real hardships for numerous households across the country. The food consumption score findings showed that one-quarter of the population was food insecure. This estimate was likely to be conservative or low. The use and validity of the Food Consumption Score indicator as an indicator of food security can be a useful tool with further refinement in the use of the thresholds or cut-off points used for creating/defining food consumption score groups. Given the relative ease of collecting the data used to create the Food Consumption Score and the relative difficulty of data collection for more traditional indicators such as calories consumed per capita per day, the use of the Food Consumption Score indicator for future food security assessments and monitoring is warranted.

Recommendation

- Food security assessments and monitoring efforts should consider use of the Food Consumption Score indicator as a valid proxy measure of food security. More refinements of the indicator are needed and raising food security score thresholds would likely result in improved usage.

When asked to give their own perceptions on the degree to which they were affected by high food prices, 40% of households indicated that they were severely or highly affected by high food prices. The proportion was significantly higher for female-headed households (48%), as well as for households living within the divisions of Barisal (54%) and Sylhet (48%). Forty percent (40%) of households indicated that they were severely or highly affected. The proportion was significantly higher for female-headed households (48 percent), as well as for households living within the administrative divisions of Barisal (54%) and Sylhet (48%).

The findings on assistance received by households were analyzed together with findings on food insecurity, as determined by food consumption scores. The results allowed for a better understanding of the targeting efficiency of various social safety net assistance programs. The findings on targeting efficiency give serious cause for concern. For the nine social safety net assistance programs reviewed, nearly all had more than 50% of their program participants associated with relatively better-off food-secure households. Conversely, almost all had less than 50% of their beneficiaries associated with relatively worse-off food-insecure households. While it is possible that the assistance played a major role in transitioning beneficiaries from a pre-assistance status of food insecure to a post-assistance status of food secure, the likelihood of this scenario is low.[160] The social safety net assistance programs reviewed were Vulnerable Group Feeding, Vulnerable Group Development, Test Relief, Gratuitous Relief, the Primary Education Stipend Program, Food for Work, and various Cash for Work programs including the "100-Day Employment Program." Food-for-work assistance was the only type of assistance where targeting efficiency was significantly better than the results indicated above. Approximately two-thirds (67%) of Food-for-work beneficiaries were from food-insecure households. It is likely that the conditions placed on assistance, such as required labor, contributed to the relatively greater targeting efficiency. Since most households preferred to receive cash over food, the fact that Food-for-work uses food as in-kind payment also likely contributed to higher targeting efficiency.

Two of the larger food assistance programs, Vulnerable Group Feeding, and Vulnerable Group Development had 33% and 41% of its recipients, respectively, associated with food-insecure households. Two of the better known programs involving cash transfers had similar rates. Just 34% of beneficiaries in the "100-day Employment Program" were from food-insecure households and 32% in the Primary Education Stipend Program. The BRAC 2009 evaluation of the "100-Day Employment Program" included an evaluation of targeting efficiency. While the results are not directly comparable to the findings due to differences in methodology, the findings can nevertheless provide a comparison. BRAC found that 37% of participants in the program were associated with the poorest income quintile (i.e. the poorest 20% of the population).[161] Other sources have documented targeting efficiency estimates for various social safety net programs and inclusion error estimates from these studies have been lower than the estimates described above.[162] Why targeting efficiency rates worsened during the 2007/2008 period is difficult to say. Given that the high food price shock affected nearly everyone regardless of wealth class status, it is possible that this perception contributed to less rigorous and less restrictive beneficiary selection. Regardless of the cause, the findings on targeting efficiency should be a major cause of concern for stakeholder institutions including both those administering social safety net programs as well as those funding them.

Recommendation

- Those administering food or cash-based social safety net programs should rigorously review their targeting methods in order to improve efficiency and to reduce the prevailing high inclusion error rates.

9.2 Nutrition and health

Responding to the high price crisis and food insecurity in Bangladesh necessitates recommendations for programming and policy aimed at addressing the immediate needs as well as mitigating the subsequent nutritional effects. As the key findings of the nutritional analysis and the food security linkages have shown, there is a set of essential nutrition

interventions that can be recommended, including additional measures in the areas of food insecurity. Building these responses into existing policy and programming, advocating integrated national nutrition policies, and supporting the country to scale up community-based activities will improve access to vital nutritional support for vulnerable populations while at the same time, ensuring that progress is made towards achieving the nutrition and health-related Millennium Development Goals. Thus, the key nutrition and health recommendations from the HFSNA 2009 are as follows:

9.2.1 Child nutrition

The food price hike in Bangladesh clearly worsened the food security situation in 2008. Overall, the acute malnutrition (13.5%) and underweight (37.4%) indicators remained high and without major changes in comparison to the previous existing national data. There was a slight increase in stunting (48.6%) when compared to BDHS 2007 results but with no significant changes if compared to the CMNS 2005 findings. The rates for stunting and underweight were above the WHO thresholds of 40% and 30%, respectively, indicating *very high severity situations.* The prevalence of acute malnutrition was slightly below the WHO *critical* emergency level of 15% and is classified as *a serious* situation.

The rural areas were found to have had statistically significant higher rates of all three types of malnutrition (acute, chronic, and underweight) than the urban areas. As the assessment was carried out during the *Amman* harvest season when (acute) malnutrition rates are expected to be the lowest, it is likely that these figures would increase in the lean season. Even in this "stable" context, conservative estimates of case projections for the real numbers of acutely malnourished children are approximately 2.2 million children, of which more than one-half million of these children are severely acutely malnourished and at increased risk for mortality.[163]

Recommendations

- Given the large numbers of acutely malnourished children and the increased mortality risk, it is recommended that these large numbers be addressed by designing programmes that manage the severe acute malnutrition at both facility and community levels (i.e. community-based management of acute malnutrition. Such programs should initially be backed with data on programme and cost effectiveness within the Bangladesh context.
- Given the high cost of the therapeutic ready-to-use food used for treating severe acute malnutrition, it's important to ensure that such programs for the management of acute malnutrition build in the development of local production capacity for the ready-to-use food. Reductions in cost will eventually make these programs replicable at-scale, and will increase the possibility of future government allocated resources for sustaining the programmes.
- Given that acute malnutrition tends to increase during the "hungry" season, it is important to design and adapt preventive and therapeutic nutrition interventions taking seasonality into account. Such programming will go a long way in reducing the impact of seasonality by addressing increased levels of acute malnutrition and associated higher risks for mortality during the peak of the lean periods.

9.2.2 Infant and young child feeding

Of the acutely malnourished children, those aged 6 to 23 months were more likely to be malnourished than children aged 24 to 59 months. These findings were closely linked to the "poor" young child feeding practices and are likely to have serious consequences for their

growth and development. In fact, a high percentage of the children aged 6 to 23 months were found to have had a diet quality that did not meet acceptable levels. Overall, 52.2% of children aged 6 to 23 months received a minimum number of meals while just 33.5% had minimum diet diversity and only 19.5% met the minimum acceptable daily diet.

With reference to infant feeding practices, only 48.7% of mothers were exclusively breast-feeding their children to the recommended age of six months. From the age of six months, an infant's need for energy and nutrients starts to exceed what is provided by breast-milk and complementary feeding becomes necessary to fill the energy and nutrient gaps.[164] In spite of this, the assessment found that only 57.6% of children from 6 to 8 months received solid, semi-solid or soft foods in the day previous to the assessment. These results indicate that 42.5% of the caregivers were introducing complementary foods later than recommended. If complementary foods are not introduced at this age or if they are given inappropriately, an infant's growth may falter, increasing the risk of micronutrient deficiencies and infectious illnesses.[165]

Recommendations

- Support optimal infant and young child feeding through programming that emphasizes maternal and community participation, supporting early initiation and exclusive breast-feeding up to six months and provision of age-appropriate complementary feeding to two years of age.
- Design infant and young child feeding interventions based on a better understanding of why early initiation of breast-feeding, exclusive breast-feeding, and timely introduction of complementary food has not improved over the past decades in Bangladesh despite a number of programmatic efforts.
- Given the existing poor quality of diets consumed by children aged 6 to 23 months, the promotion of complementary feeding might not yield the desired results without enhancing the dietary quality of the food. It is therefore recommended that proven interventions such as supplementation with multiple micronutrients powder should be included together with the strengthened promotion of complementary feeding.

9.2.3 Maternal Nutrition

The assessment found that 18.2% of mothers were acutely malnourished as determined by mid-upper arm circumferences; these rates were especially high in Barisal and Sylhet divisions. The assessment also showed that malnutrition in mothers was statistically associated with all classifications of malnourished children: wasted, stunted, and underweight. The assessment found that children of acutely malnourished mothers were 1.8 times more likely to suffer from wasting, 1.3 times more likely to be stunted, and 1.7 times more likely to be underweight. Clearly, this high prevalence is evidence that many mothers still do not have enough food to eat.

Women who are undernourished before or during pregnancy are more likely to give birth to underweight infants. These infants face a disadvantaged future: they may grow poorly during childhood, do less well at school, and have less productive working lives. Moreover, infant girls with low birth weights are more likely to become undernourished mothers themselves, thereby perpetuating the cycle of "under nutrition" from one generation to the next. The long-term benefits to social and economic development in Bangladesh depend on programs that will improve the quality and quantity of mother's diets.

Recommendations

- Improve support to pregnant and lactating women through direct nutritional interventions such as targeted supplementary feeding and, as short term measures, with food assistance programs.
- Explore appropriate entry points to address the intergenerational effects of malnutrition leading to the longer-term maternal nutritional problems. These should include strengthening access to antenatal, postnatal, and neonatal health care, as well as maternal micronutrient supplementation.

9.2.4 Micronutrient supplementation

Young children and pregnant and lactating women are the most vulnerable to micronutrient deficiencies due to their relative greater needs. High-food prices and decreased purchasing power can contribute to these deficiencies as families reduce their intakes of micronutrient enriched foods. Globally, Vitamin A supplementation programs for children aged 6 to 59 months old have been shown to result in dramatic impacts on under-five child mortality. In countries at high risk of Vitamin A deficiency, like Bangladesh, research has shown that these programs reduce under-five child mortality by an average of 23%.[166] To date, the delivery mechanism that has been most effective in the majority of countries is a regular twice-yearly event or campaign.[167]

In Bangladesh, Vitamin A supplementation has contributed to reducing night blindness among children younger than five years from 3.76% in 1983 to 0.04% in 2005. This rate is well below the WHO cut-off point of 1%, a level indicating a public concern. While Bangladesh has demonstrated good results when supplementing children aged 9 to 59 months with Vitamin A, there is still room for improvement. The assessment found that 76.5% of children received Vitamin A supplementation in the prior six months, falling short of the recommended *minimum* coverage of 80%. Additionally, the Vitamin A supplementation programs in Bangladesh do not presently include the vulnerable age group from six to eight years.

Vitamin A supplementation also improves maternal status,[168] but the assessment found that only 34% of women in Bangladesh received Vitamin A within the recommended six-weeks after delivery of their last child. This finding is supported by the high prevalence of night blindness among pregnant (2.4%) and lactating (2.7%) women in Bangladesh. Moreover, the assessment found that just 50.3% of pregnant women received iron and folate tablets during their pregnancies. Acutely malnourished women by MUAC had statistically significant lower coverage of Vitamin A supplementation (30.9%) and statistically significant lower coverage of iron and folate supplements (44.5%) than non-malnourished women.

Iron deficiencies in pregnant women contribute to increased mortality risks for these women, a result of maternal haemorrhage. Iron deficiencies in pregnant women increase risks of delivering an underweight and mentally-impaired infant.[169] [170]. Successful iron and folate supplement programs have improved coverage from 23% to 59% (Nepal), and through community-based programming and wide-scale weekly supplementation have eliminated iron deficiency in the first and second trimesters (Cambodia, Vietnam, and Philippines).[171]

Recommendations

- Strengthen Vitamin A supplementation coverage and integrate programs to reach the globally recommended age groups with twice yearly national campaigns.
- Strengthen and scale-up maternal iron and folate supplementation through complementary strategies to regular programs such as community-based outreach programs and programmes targeting the hard-to-reach and marginalised.
- Strengthen the iron and folate supplementation mechanisms by evaluating the supply chain, capacity, and delivery systems in order to reduce blockages that hinder the achievement of good coverages.
- Emphasize the provision of micronutrient-enriched foods and the promotion of diet diversity within all food assistance interventions, and food security and nutritional programmes.

9.2.5 Child and general health status

The assessment demonstrated that the health status of children had an impact on their nutritional status. Nearly one-half of the children (48.6%) were ill in the two weeks previous to the assessment. As could be expected, the prevalence of acute malnutrition (15.3%) and underweight (39%) were higher among children who had experienced illness as compared to those that were healthy in the same time period. It is noteworthy that lack of money was an important reason for not seeking medical care for children (45.5%) and other household members (65.6%), one of the documented effects that high food prices have had on household expenditures for basic needs such as health care[172].

Seventy-eight percent of surveyed households reported an increase of their expenditures on health expenses in the past 12 months, and 22% adopted a reduction in their health expenses as the main strategy to meet their food needs. However, the assessment found that among households who decreased their health expenditures and those who did not, there were no statistically significant differences in the prevalence of malnutrition in children and women. However, as the decrease in health expenditures was a common coping strategy adopted by households, the decrease in seeking health care might increase the risks for deterioration in the nutritional status of ill household members.

Recommendations

- Support access to basic health services to prevent and treat diarrhoea, respiratory infections, and fever. WHO's *Integrated Management of Childhood Illness* (IMCI) approach is a promising entry point through which linkages between nutrition interventions and IMCI activities at both community and facility levels can be established.
- Monitor for decreased household health expenditures through regular food security and/or vulnerability assessments that are linked with targeted nutritional and food assistance programmes, especially in identified areas of high vulnerability.

9.2.6 Water and sanitation

No statistical linkages were found between water and sanitation indicators and nutritional status. Despite findings showing good access by the population to safe drinking water sources (94.8%), which suggests a clear improvement compared to past estimates (80%), the quality of water and household water management were not assessed. Consequently, no assumptions can be made on how safe the water actually was.

It is important to note that the coverage of sanitation facilities was low at 51.4%, but even lower in the primarily rural divisions that were also more affected by malnutrition. Rural areas presented the lowest coverage (46.2%) in comparison to the urban areas (69.8%). Any program aiming to reduce or prevent malnutrition must focus on increasing access to safe water and sanitation, thereby reducing the frequency of diarrhoea-related disease, respiratory infections, and fever.

Recommendations

- Increase the coverage of access to good sanitation and ensure continued access to safe water, including good quality and good management of household water.
- Strengthen health and hygiene promotion to prevent and treat diarrhoea-related illnesses, respiratory infections and fever.
- Establish linkages between hygiene practices with infant feeding practices and the impacts on malnutrition in future assessments.

9.3 Nutrition and food security

The food price hike has had a negative impact in the purchasing power of Bangladesh households. The assessment found a higher percentage of malnourished children in households with lower incomes and in the households that had increased their percentage of expenditures on food, consequently decreasing their expenditures on other basic needs.

The assessment did not find a great impact from the high food prices on household wealth status, as only a very few households sold their assets in the past year. Malnutrition in Bangladesh has been characterized by high malnutrition rates in all of the different wealth status quintiles, and this assessment demonstrated the same pattern wherein the malnutrition rates were progressively higher in the poorest wealth status households. However, they were also high in the richest households where both stunting and underweight was evident in children and acute malnutrition was evident in women. Furthermore, the surveyed households with seasonal or irregular incomes were more likely to have stunted and underweight children.

Household food consumption was affected by families who had to adopt coping strategies such as daily meal reductions, limiting portion size, or reliance upon cheaper and less preferred foods. Once more, a strong association was found between a child's nutritional status (acute malnutrition) and households that adopted a higher number of coping mechanisms in the 30 days prior to the assessment.

The divisions of Barisal, Rajshahi, and Sylhet (more than 85% of their households are in rural areas) were identified as priorities to monitor and support due to the poorest nutritional statuses of children and women in these divisions and the identified underlying causes associated to these same divisions. Barisal and Rajshahi divisions had the highest acute malnutrition rates (16.1% and 15.2%), Sylhet and Barisal showed the highest underweight rates (42.8% and 42.3%), and Sylhet was the division with the highest stunting rate (56.6%). Barisal and Rajshahi divisions had the two highest rates of food insecurity based on food consumption scores. These two divisions also accounted for the highest proportion of households that depended on irregular employment as main income sources (temporal, casual, or seasonal) in comparison to national averages. Furthermore, Barisal division had been adversely affected by several floods and by the recent Cyclone Sidr. It was also the division with the highest percentage of households adopting the most coping mechanisms.

Rajshahi division reflected the highest price transmission degrees while Barisal and Sylhet divisions showed high shares of rice expenditures. Sylhet division, traditionally culturally conservative and less well educated among its women, along with other significant indicators,[173] together with Rajshahi division, had the highest degree of price transmissions over the period 2007 to 2008. Additionally, Sylhet (together with Barisal) showed substantial increases in the proportion of the net-food buyers. All of these combined factors could well have had a negative impact on the nutrition situation in these three divisions: Barisal, Rajshahi and Sylhet.

Analyzing the causes of malnutrition demonstrated clear links that were statistically significant. Inadequate diets at household level showed a negative impact on the nutritional status of children and women, as did the quality and quantity of the diets in children from 6 to 23 months. Poor diets at household level as measured by the food consumption indicator found that children from households belonging to the "poor" and "borderline" food consumption groups (food insecure households) were more likely to be malnourished (wasted, stunted and underweight). Households belonging to poor and borderline food consumption groups were also more likely to have malnourished women and were statistically associated with households having young children from 6 to 23 months who did not receive the minimum diet diversity or the minimum acceptable diet.

Thus, the assessment clearly demonstrated that malnutrition in children in Bangladesh was strongly associated with the food insecurity indicators most related to the high price increases and, as other recent studies have also suggested, it can be concluded that the food price hikes contributed towards maintaining the persistently high levels of malnutrition in Bangladesh.

Recommendations

- Scale-up integrated food security and nutrition interventions with food-based and economic empowerment programs targeted to the poor and vulnerable and to the districts with the largest numbers of malnourished children.
- Strengthen food security and nutrition information systems to monitor the impact of food price rises and the global economic crisis on communities and on child growth.

9.4 Nutritional surveillance

Over the last several years in Bangladesh, there have been many national nutrition surveys undertaken by different institutions, and much data is available. However, not all of the surveys have addressed the same target populations, not all have used the same survey methodologies, and not all have taken into account the period of the year (seasonality) to allow for statistical comparisons with previous available data.

A national Nutrition Surveillance Project was implemented by IPHN and Helen Keller International from 1990 for more than 15 years but became inactive when faced with funding difficulties in 2006-2007. However, this program is presently being re-established through a partnership agreement between Helen Keller International and the BRAC School of Public Health. Thus, it will be providing much needed information and regular updates on the food security and nutrition situation in Bangladesh.

In order for policy-makers and others to assess the impacts of the food-price crisis in terms of food availability, access and quality, the U.N. Standing Committee on Nutrition recommends that the nutritional surveillance in developing countries be supported and scaled-up by ministries of health and other institutions to achieve the necessary coverage and quality.[174]

Given the results of the impact of the price hikes on food security and nutrition in Bangladesh, it is important to strengthen surveillance systems that monitor the health and nutritional status of the most vulnerable groups and evaluate the impacts of food price changes, in order to directly identify vulnerability and to focus additional monitoring and appropriate interventions.

Recommendations

- Support government to develop and implement standardized national survey guidelines to enable good data quality and comparability.
- Strengthen routine nutrition surveillance activities to allow early detection of changes in nutrition and health status and integrate nutrition surveillance systems into government structures, including food security monitoring indicators.

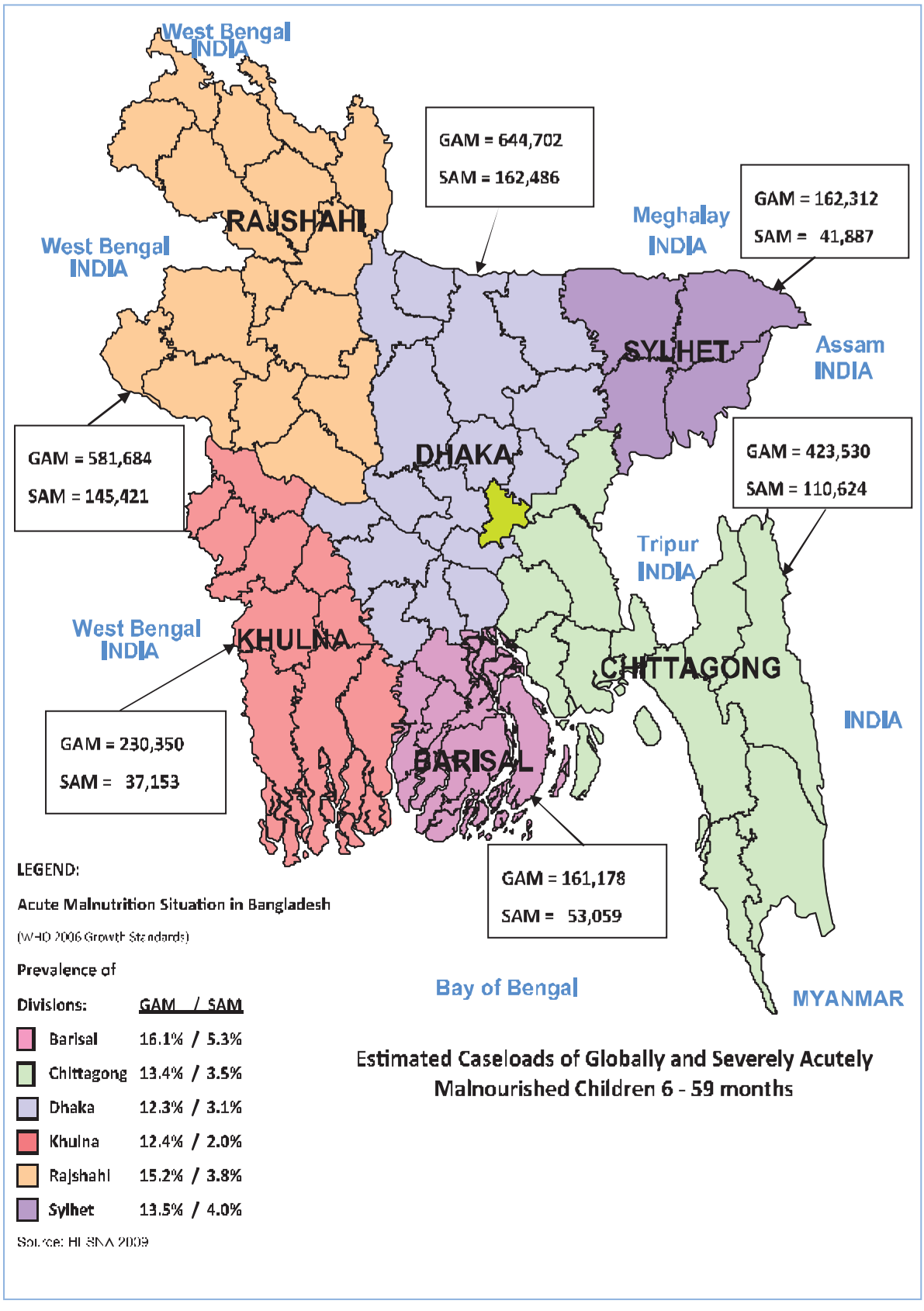
10. Annexes

10.1 General Annexes

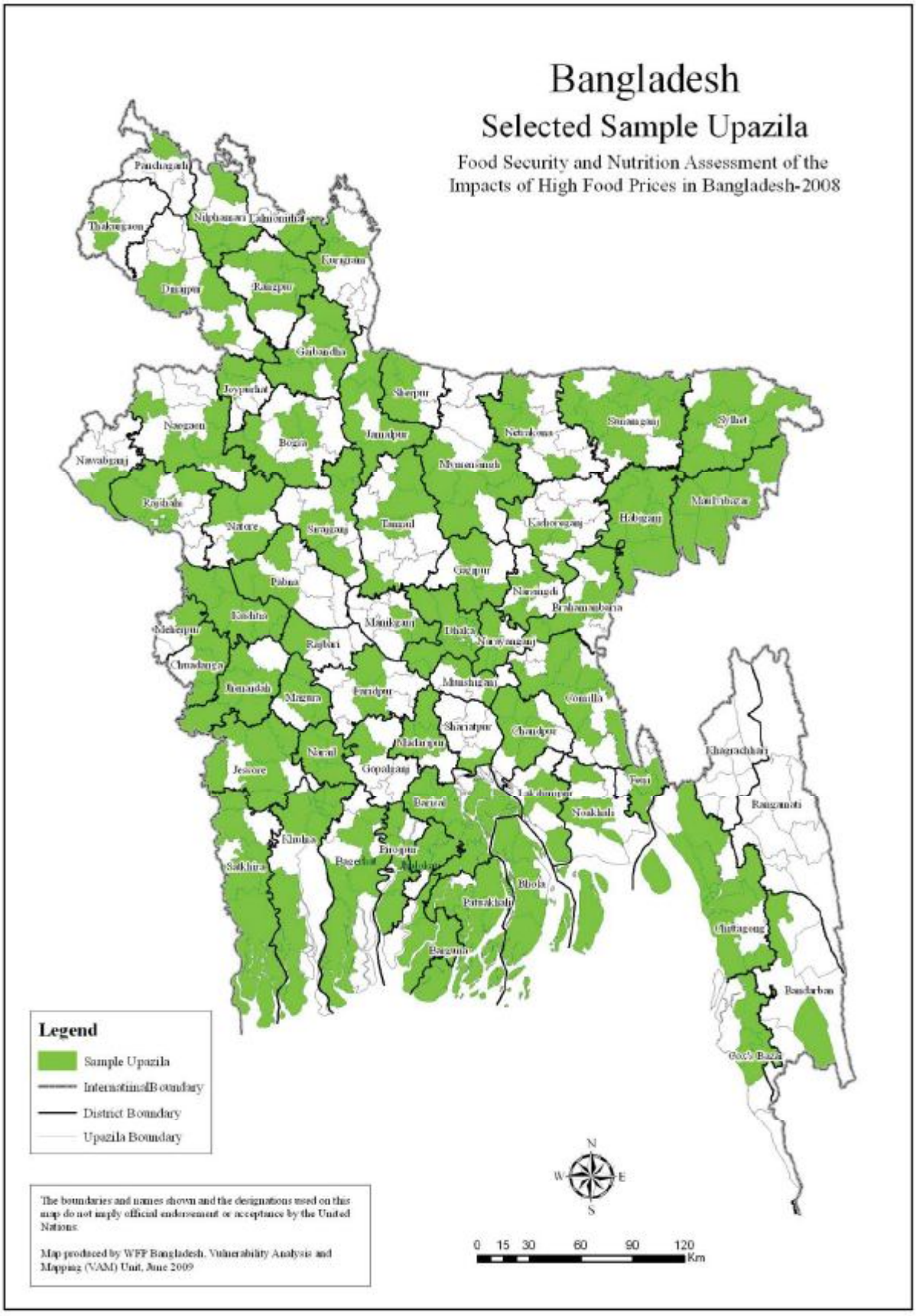
A. Summary of HFSNA 2009 Findings (National)

Indicator	%
Total no. of households assessed	10,378
Mean household size, average no. of persons	5
Proportion of female-headed households	8
Total no. of individuals assessed	51,591
Total no. of children 0-59 months assessed	5,379
Acute, global malnourished	13.5
Acute, severe malnourished	3.4
Underweight, global malnourished	37.4
Underweight, severe malnourished	12.3
Chronic, global malnourished	48.6
Chronic, severe malnourished	20.1
Proportion of malnourished women by MUAC	18.2
Proportion of severely malnourished women by MUAC	8.9
Children 9-59 months who received Vitamin A supplementation in past 6 months	76.5
Women who received Vitamin A supplementation 6 weeks postpartum	34.0
Women who received iron/folate supplementation in last/current pregnancy	50.3
Proportion of children exclusively breastfed to six months	48.7
Proportion of children being breastfed at one year	93.2
Proportion of children being breastfed at two years	89.2
Proportion of children who received minimum meal frequency	52.2
Proportion of children who received minimum diet diversity	35.5
Proportion of children who received minimum acceptable diet	19.5
Proportion of children reportedly ill 2 weeks prior to assessment	48.6
Proportion of children reportedly with diarrhoea 2 weeks prior to assessment	15.9
Proportion of children reportedly with respiratory illness 2 weeks prior to assessment	21.1
Proportion of children reportedly with fever 2 weeks prior to assessment	52.3
Proportion of households reporting illness 2 weeks prior to assessment	50.8
Under 5 mortality rate as deaths/10,000/day	0.66
Crude mortality rate as deaths/10,000/day	0.22

B. Map of estimated caseloads of globally and severely acutely malnourished children 6 - 59 months in Bangladesh



C. Sample upazilas where the questionnaire survey was conducted



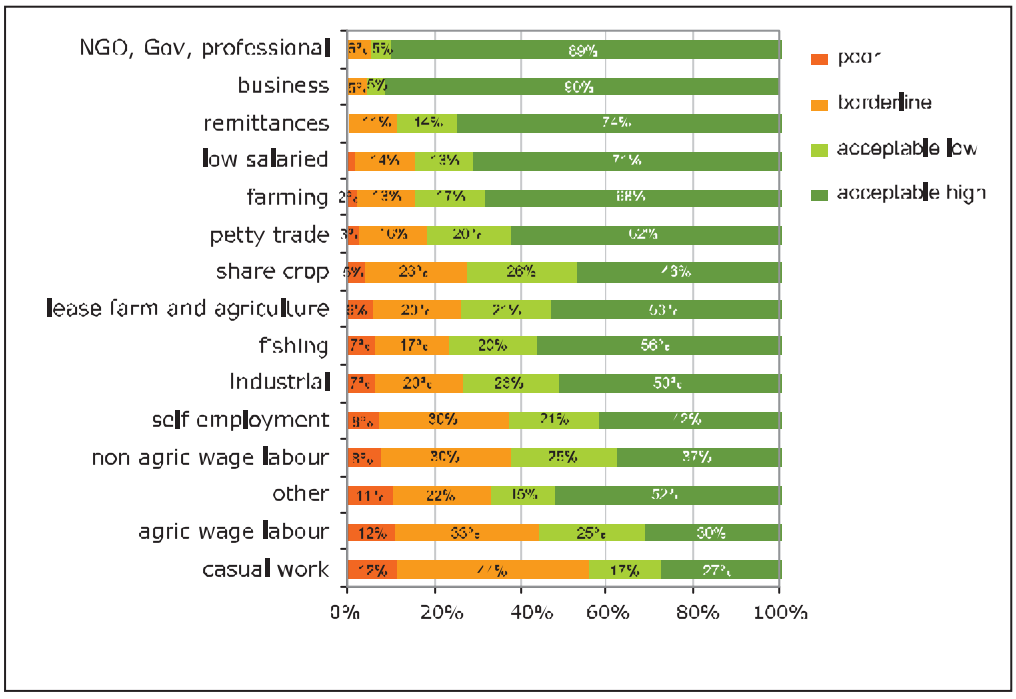
10.2 Food Security

D. Demographic characteristics of the sample households

	Percentage of dependent	Sex of household head		Education grade of the hh head
	Mean	Male	Female	Never attended
Food Consumption Groups				
Poor	45.1	82%	18%	70%
Borderline	41.5	89%	11%	59%
Acceptable low	40.7	93%	7%	47%
Acceptable high	38.7	94%	6%	34%
Type of area				
Rural	41	92%	8%	47%
Urban	36.2	91%	9%	30%
Division				
BARISAL	42.2	93%	7%	30%
CHITTAGO	42.8	88%	12%	38%
DHAKA	39.6	93%	7%	46%
KHULNA	38.7	93%	7%	43%
RAJSHAHI	37.7	94%	6%	46%
SYLHET	42.8	90%	10%	45%
Total	39.9	92%	8%	43%

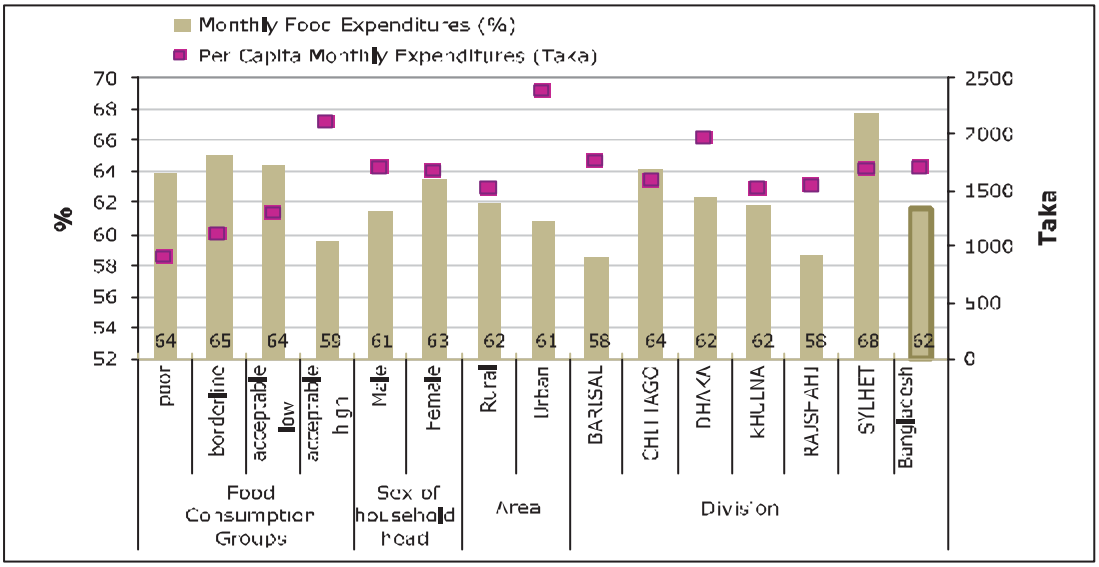
SOURCE: HFSNA 2009

E. Livelihoods by Food Consumption Groups



SOURCE: HFSNA 2009

F. Food expenditure and total expenditure



SOURCE: HFSNA 2009

G. Percentage of households owning assets

Asset	Food Consumption Groups 28 - 42				Sex of household head		Area	
	Poor	Border-line	Accept-able Low	Accept-able high	Male	Female	Rural	Urban
Dwelling house	93%	94%	95%	96%	96%	92%	98%	87%
Homestead land	98%	98%	98%	99%	99%	97%	99%	95%
Gold	73%	80%	87%	92%	89%	82%	88%	90%
Silver	55%	59%	72%	72%	71%	55%	71%	65%
Electric appliances (radio, fan, fridge, TV...)	17%	28%	39%	61%	48%	45%	40%	79%
Furniture (table. Beds, chairs...)	73%	84%	91%	95%	92%	83%	91%	94%
Kitchen utensils	98%	98%	99%	99%	99%	99%	99%	99%
Cereal stocks (production, purchase, gift, aid etc.)	87%	91%	94%	96%	95%	91%	95%	93%
Cow/Oxen/Buffalo	24%	29%	34%	39%	37%	16%	42%	12%
Goat/Sheep/Pig	19%	20%	22%	22%	22%	13%	25%	8%
Poultry(chicken/duck/pigeon)	49%	54%	59%	57%	57%	45%	66%	23%
Boat / Trawler	2%	3%	4%	5%	5%	1%	5%	2%
Rickshaw / Bicycle /Van/motor cycle	13%	19%	21%	28%	25%	9%	26%	17%
Fish pond	26%	29%	45%	52%	47%	32%	53%	20%
Shrimp gher	1%	7%	9%	10%	9%	7%	11%	3%
Agricultural land	51%	62%	74%	78%	75%	65%	80%	48%
Crop seeds	16%	25%	31%	35%	33%	11%	39%	9%
Trees / Orchard	55%	62%	65%	66%	66%	55%	72%	39%
Agriculture machinery	6%	11%	16%	22%	19%	7%	21%	5%
Agricultural tools (shovel, axe, rake etc.)	32%	42%	47%	50%	48%	28%	53%	26%
Fishing gear (nets, etc.)	8%	10%	15%	18%	16%	5%	18%	5%

SOURCE: HFSNA 2009

H. Food consumed by households over past seven days

Food items	National	Food Consumption Groups 28 - 42				Sex of household head	
		Poor	Borderline	Acceptable low	Acceptable high	Male	Female
Rice	6.95	6.79	6.96	6.98	6.95	6.95	6.92
Wheat	1.11	0.41	0.53	0.65	1.52	1.1	1.17
Other cereals	0.05	0.03	0.02	0.03	0.07	0.05	0.06
Potatoes	4.73	3.45	4.07	4.38	5.2	4.76	4.4
Edible oil	6.85	6.62	6.84	6.88	6.87	6.86	6.78
Vegetables	5.54	4.09	5.07	5.14	5.97	5.58	5.13
Fruits	0.78	0.03	0.11	0.29	1.24	0.79	0.69
Fish	3.84	0.31	1.97	3.4	4.95	3.89	3.28
Meat, poultry egg	1.51	0.03	0.3	0.91	2.25	1.52	1.4
Milk	1.63	0.01	0.06	0.16	2.8	1.66	1.2
Pulses	2.46	0.28	1.05	1.89	3.33	2.49	2.11
Sugar	3.1	0.8	1.38	2.35	4.16	3.13	2.85

SOURCE: HFSNA 2009

I. Percentage of households coping with food security related strategies

Major coping strategies	Seldom	Always	Total
Rely on less preferred and less expensive food	40.50%	15.20%	55.70%
Borrow food	39.20%	13.40%	52.60%
Limit portion size at meals	24.30%	7.00%	31.30%
Purchase food on credit incur debts	23.00%	6.60%	29.60%
Reduce number of meals eaten in a day	16.20%	5.10%	21.30%
Food gift or rely on help from friends or relatives	16.30%	4.70%	21.00%
Skip entire days without eating	10.90%	2.50%	13.40%

SOURCE: HFSNA 2009

10.3 Nutrition

J. Comparison of acute malnutrition, underweight and chronic malnutrition from 2004 to 2009 in Bangladesh (WHO 2006 growth standards and NCHS/CDC/WHO 1977 reference)

Indicator	Source[1]	Growth standards	Prevalence %	Target population (months)	Year	Period of the year/season
Global Acute Malnutrition	HFSNA 2009	WHO 2006	**13.5** [95% CI 12.1-15]	6-59	2009	Harvest period of *Aman* season November 2008-January 2009
	BDHS 2007	WHO 2006	**17.4**	0-59	2007	Lean and *Boro* season March-August
	CMNS 2005	WHO 2006	**14.5**	0-59	2005	All the seasons January-December
	HFSNA 2009	NCHS/CDC/WHO 1977	**13** [95% CI 12- 14]	6-59	2009	Harvest period of *Aman* season November 2008-January 2009
	BDHS 2007	NCHS/CDC/WHO 1977	**16.2**	0-59	2007	Lean and *Boro* seasons March-August
	CMNS 2005	NCHS/CDC/WHO 1977	**12.7**	0-59	2005	All the seasons January-December
	BDHS 2004	NCHS/CDC/WHO 1977	**12.8**	0-59	2004	*Aman* & lean and *Boro* seasons January to May
Severe Acute Malnutrition	HFSNA 2009	WHO 2006	**3.4** [95% CI 2.8-4.]	6-59	2009	Harvest period of *Aman* season November 2008-January 2009
	BDHS 2007	WHO 2006	**2.9**	0-59	2007	Lean and *Boro* season March-August
	CMNS 2005	WHO 2006	**2.9**	0-59	2005	All the seasons January-December
	HFSNA 2009	NCHS/CDC/WHO 1977	**1.6** [95% CI 1.2-2.1]	6-59	2009	Harvest period of *Aman* season November 2008-January 2009
	BDHS 2007	NCHS/CDC/WHO 1977	**1.2**	0-59	2007	Lean and *Boro* season March-August
	CMNS 2005	NCHS/CDC/WHO 1977	**1**	0-59	2005	All the seasons January-December
	BDHS 2004	NCHS/CDC/WHO 1977	**1.3**	0-59	2004	*Aman* & lean and *Boro* seasons January to May

[1] HFSNA 2009: Household Food Security and Nutrition Assessment; BDHS 2007/2004: Bangladesh Demographic and Health Survey; CMNS 2005: Child and Mother Nutrition Survey of Bangladesh

Indicator	Source[1]	Growth standards	Prevalence %	Target population (months)	Year	Period of the year/season
Underweight Malnutrition	HFSNA 2009	WHO 2006	**37.4** [95% CI 35.4-39.5]	6-59	2009	Harvest period of *Aman* season November 2008-January 2009
	BDHS 2007	WHO 2006	**41**	0-59	2007	Lean and *Boro* season March-August
	CMNS 2005	WHO 2006	**39.9**	0-59	2005	All the seasons January-December
	HFSNA 2009	NCHS/CDC/WHO 1977	**44.6** [95% CI 43.1-46.1]	6-59	2009	Harvest period of *Aman* season November 2008-January 2009
	BDHS 2007	NCHS/CDC/WHO 1977	**46.3**	0-59	2007	Lean and *Boro* season March-August
	CMNS 2005	NCHS/CDC/WHO 1977	**47.8**	0-59	2005	All the seasons January-December
	BDHS 2004	NCHS/CDC/WHO 1977	**47.5**	0-59	2004	Aman & lean and *Boro* seasons January to May
Chronic Malnutrition	HFSNA 2009	WHO 2006	**48.6** [95% CI 46.5-50.6]	6-59	2009	Harvest period of *Aman* season November 2008-January 2009
	BDHS 2007	WHO 2006	**43.2**	0-59	2007	Lean and *Boro* season March-August
	CMNS 2005	WHO 2006	**46.2**	0-59	2005	All the seasons January-December
	HFSNA 2009	NCHS/CDC/WHO 1977	**43.1** [95% CI 41.5-44.7]	6-59	2009	Harvest period of *Aman* season November 2008-January 2009
	BDHS 2007	NCHS/CDC/WHO 1977	**36.2**	0-59	2007	Lean and *Boro* season March-August
	CMNS 2005	NCHS/CDC/WHO 1977	**42.4**	0-59	2005	All the seasons January-December
	BDHS 2004	NCHS/CDC/WHO 1977	**43**	0-59	2004	*Aman* & lean and *Boro* seasons January to May

SOURCE: HFSNA 2009

K. Prevalence of maternal global acute malnutrition by MUAC by division, by area and nationally, in Bangladesh

Geographical zone	N weighted	Women Severe Acute Malnutrition (MUAC < 214 mm)		Women Global Acute Malnutrition (MUAC < 221 mm)	
		%	95% C.I.	%	95% C.I.
Barisal	237	18.9	13.4 - 26	30.4	23.4 - 38.3
Chittagong	839	9.7	7.7 - 12.2	17.5	14.4 - 20.9
Dhaka	1211	6.4	4.8 - 8.5	16.1	13.1 - 19.7
Khulna	429	6.9	4.9 - 9.6	15.0	12.5 - 17.9
Rajshahi	814	8.1	5.8 - 11.2	16.9	13.3 - 21.2
Sylhet	279	14.8	11.6 - 18.9	27.1	22.9 - 31.9
Rural	2994	9.6	8.2 - 11.1	19.9	17.9 - 22.0
Urban	815	6.4	4.9 - 8.2	11.9	9.9 - 14.3
National	3809	8.9	7.9 - 10.2	18.2	16.5 - 19.9

SOURCE: HFSNA 2009

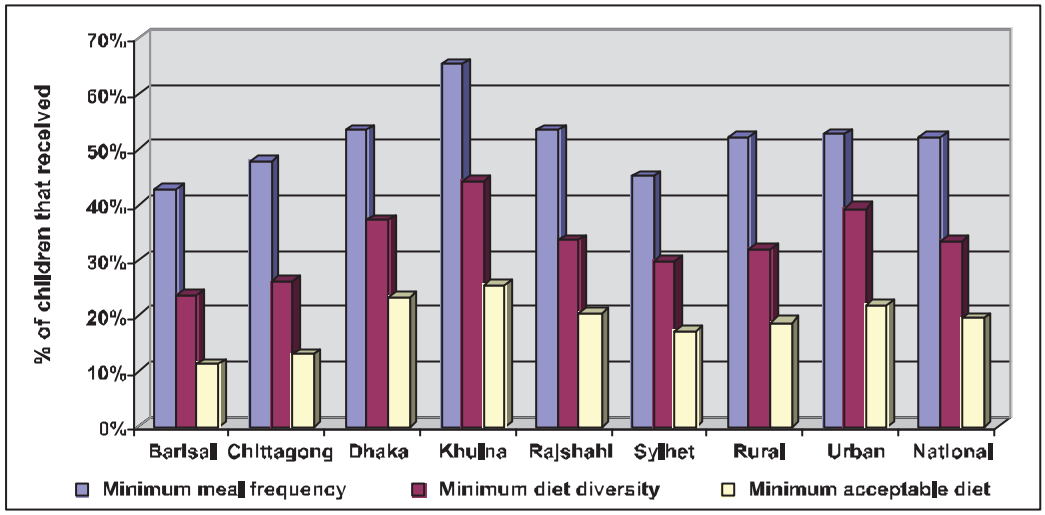
L. Vitamin A and iron and folate supplementation coverage in women by division, by area and at national level, in Bangladesh

Division	N weighted[2]	Vitamin A capsule post-partum				Iron/Folate tablets during pregnancy			
		No		Yes		No		Yes	
		N weighted	%	N weighted	%	N weighted	%	N weighted	%
Barisal	234	168	71.7	66	28.3	131	55.9	103	44.1
Chittagong	818	541	66.1	277	33.9	392	48.0	426	52.0
Dhaka	1194	812	68.0	382	32.0	619	51.8	575	48.2
Khulna	429	307	71.5	122	28.5	220	51.2	209	48.8
Rajshahi	833	454	54.5	379	45.5	332	39.9	501	60.1
Sylhet	271	213	78.5	58	21.5	186	68.5	85	31.5
Rural	2975	2012	67.6	963	32.4	1563	52.6	1412	47.4
Urban	804	482	59.9	322	40.1	316	39.3	488	60.7
National	**3779**	**2494**	**66.0**	**1285**	**34.0**	**1879**	**49.7**	**1900**	**50.3**

SOURCE: HFSNA 2009

[2] 99.2% of response rate (30 missing data)

M. Minimum meal frequency, minimum dietary diversity and minimum acceptable diet by division, by area and nationally, in Bangladesh



SOURCE: HFSNA 2009

N. Minimum meal frequency, minimum dietary diversity and minimum acceptable diet by Geographical zone and by age group, in Bangladesh

Age group (months)	Geographical zone	N weighted	Minimum meal frequency Yes %	Minimum dietary diversity Yes %	Minimum acceptable diet Yes %
6 - 11	*Barisal*	31	42.2	10.1	7.5
	Chittagong	83	35.9	15.2	4.7
	Dhaka	132	31.6	18.5	9.7
	Khulna	49	57.4	28.1	15.0
	Rajshahi	93	30.3	12.1	3.5
	Sylhet	39	32.8	17.7	8.0
	Rural	322	35.0	14.4	5.4
	Urban	105	39.0	24.5	14.8
	National	**426**	**36.0**	**16.9**	**7.7**
12 - 17	*Barisal*	24	46.8	26.1	7.7
	Chittagong	124	53.1	27.0	16.8
	Dhaka	191	51.8	38.3	23.9
	Khulna	60	68.8	47.3	29.7
	Rajshahi	115	58.3	33.7	22.2
	Sylhet	46	46.0	34.8	21.6
	Rural	444	54.0	32.2	20.4
	Urban	115	56.6	46.0	26.7
	National	**559**	**54.6**	**35.2**	**21.7**

Contd.

Age group (months)	Geographical zone	N weighted	Minimum meal frequency Yes %	Minimum dietary diversity Yes %	Minimum acceptable diet Yes %
18 - 23	*Barisal*	26	39.9	36.4	18.9
	Chittagong	120	50.4	32.6	15.1
	Dhaka	137	76.8	52.4	35.5
	Khulna	52	69.4	55.1	30.6
	Rajshahi	97	69.9	54.4	34.4
	Sylhet	32	59.1	36.3	22.0
	Rural	381	64.4	45.6	28.3
	Urban	84	64.5	47.7	24.2
	National	**464**	**64.4**	**46.0**	**27.6**
6 - 23	*Barisal*	81	42.8	23.6	11.3
	Chittagong	327	47.8	26.2	13.1
	Dhaka	460	53.5	37.3	23.3
	Khulna	159	65.5	44.2	25.5
	Rajshahi	305	53.4	33.7	20.4
	Sylhet	117	45.2	29.8	17.2
	Rural	1147	52.1	31.9	18.8
	Urban	303	52.7	39.4	21.9
	National	**1449**	**52.2**	**33.5**	**19.5**

SOURCE: HFSNA 2009

O. NCHS RESULTS

NATIONAL (weighted results)

Set 1: Sexes combined

WASTING

Age groups	unweighted children	weighted children	Weight-for-length/height (%)					
			% < -3SD	(95% CI)	% < -2SD	(95% CI)	Mean	SD
Total:	4021	**3950**	**1.7**	(1.3%, 2.1%)	**13.1**	(12%, 14.1%)	-0.89	**1.07**
(6-11)	371	345	1.5	(0.1%, 2.9%)	14.9	(11%, 18.8%)	-0.67	1.22
(12-23)	858	862	3.4	(2.2%, 4.7%)	19.8	(17.1%, 22.5%)	-0.99	1.24
(24-35)	890	878	2	(1%, 3%)	10.2	(8.2%, 12.3%)	-0.93	1
(36-47)	919	902	0.8	(0.1%, 1.4%)	10.5	(8.5%, 12.6%)	-0.89	0.93
(48-60)	983	963	0.7	(0.1%, 1.3%)	11.3	(9.3%, 13.4%)	-0.84	1.01

STUNTING

Age groups	unweighted children	unweighted children	Length/height-for-age (%)					
			% < -3SD	(95% CI)	% < -2SD	(95% CI)	Mean	SD
Total:	3968	**3903**	**15.5**	**(14.3%, 16.6%)**	**40.9**	**(39.3%, 42.4%)**	**-1.63**	**1.44**
(6-11)	377	348	4.1	(1.9%, 6.3%)	15.7	(11.7%, 19.7%)	-0.82	1.34
(12-23)	851	858	15.7	(13.2%, 18.2%)	42.5	(39.1%, 45.8%)	-1.67	1.49
(24-35)	873	858	13.4	(11%, 15.7%)	37.2	(33.9%, 40.5%)	-1.41	1.57
(36-47)	908	894	17.3	(14.7%, 19.8%)	42.1	(38.8%, 45.4%)	-1.78	1.34
(48-60)	959	945	19.7	(17.1%, 22.2%)	50.7	(47.5%, 54%)	-1.95	1.25

UNDERWEIGHT

Age groups	unweighted children	weighted children	Weight-for-age (%)					
			% < -3SD	(95% CI)	% < -2SD	(95% CI)	Mean	SD
Total:	4192	**4106**	**12.3**	(11.3%, 13.3%)	**43.5**	(42%, 45%)	-1.76	**1.17**
(6-11)	388	360	7.3	(4.5%, 10.2%)	26.5	(21.8%, 31.2%)	-1.27	1.28
(12-23)	910	907	13.6	(11.4%, 15.9%)	46.3	(43%, 49.6%)	-1.77	1.28
(24-35)	933	919	14.7	(12.4%, 17.1%)	44.5	(41.2%, 47.7%)	-1.8	1.23
(36-47)	952	931	10.7	(8.6%, 12.7%)	41.6	(38.4%, 44.8%)	-1.78	1.03
(48-60)	1009	989	12	(10%, 14.1%)	48	(44.8%, 51.1%)	-1.87	1.05

P. RURAL and URBAN NCHS RESULTS (weighted results) Overall, sexes combined by cluster

WASTING

Area	unweighted children	weighted children	Weight-for-length/height (%)					
			% < -3SD	(95% CI)	% < -2SD	(95% CI)	Mean	SD
Total:	4021	**3950**	**1.7**	(1.3%, 2.1%)	**13.1**	(12%, 14.1%)	-0.89	**1.07**
RURAL	2651	**3125**	**1.8**	(1.3%, 2.2%)	**13.3**	(12.1%, 14.5%)	-0.92	**1.05**
URBAN	1370	**826**	**1.3**	(0.5%, 2.2%)	**12.1**	(9.9%, 14.4%)	-0.79	**1.12**

STUNTING

Area	unweighted children	weighted children	Weight-for-length/height (%)					
			% < -3SD	(95% CI)	% < -2SD	(95% CI)	Mean	SD
Total:	3968	**3903**	**15.5**	(14.3%, 16.6%)	**40.9**	(39.3%, 42.4%)	-1.63	**1.44**
RURAL	2601	**3079**	**16.3**	(14.9%, 17.6%)	**41.9**	(40.1%, 43.6%)	-1.69	**1.42**
URBAN	1367	**823**	**12.5**	(10.2%, 14.8%)	**37.1**	(33.7%, 40.5%)	-1.43	**1.52**

UNDERWEIGHT

Area	unweighted children	weighted children	Weight-for-length/height (%)					
			% < -3SD	(95% CI)	% < -2SD	(95% CI)	Mean	SD
Total:	4192	**4106**	**12.3**	(11.3%, 13.3%)	**43.5**	(42%, 45%)	-1.76	**1.17**
RURAL	2751	**3245**	**12.7**	(11.6%, 13.9%)	**44.7**	(43%, 46.5%)	-1.82	**1.14**
URBAN	1441	**861**	**10.5**	(8.4%, 12.6%)	**38.8**	(35.5%, 42.1%)	-1.55	**1.28**

Q. DIVISION NCHS RESULTS (weighted results) Overall, sexes combined by cluster

WASTING

DIVISION	unweighted children	weighted children	Weight-for-length/height (%)					
			% < -3SD	(95% CI)	% < -2SD	(95% CI)	Mean	SD
Total:	4021	**3950**	**1.7**	(1.3%, 2.1%)	**13.1**	(12%, 14.1%)	-0.89	**1.07**
Barisal	521	**248**	**2.7**	(0.5%, 4.9%)	**15.5**	(10.8%, 20.2%)	-1.06	**1.01**
Chittagong	865	**900**	**1.7**	(0.8%, 2.6%)	**14.4**	(12.1%, 16.8%)	-0.93	**1.07**
Dakha	849	**1257**	**1.5**	(0.8%, 2.2%)	**11.1**	(9.3%, 12.9%)	-0.84	**1.09**
Khulna	508	**412**	**1**	(0%, 2.1%)	**11.7**	(8.4%, 14.9%)	-0.84	**1.1**
Rajshahi	595	**811**	**2**	(1%, 3%)	**14.8**	(12.3%, 17.3%)	-0.92	**0.99**
Sylhet	683	**322**	**1.6**	(0.1%, 3.1%)	**12.2**	(8.5%, 15.9%)	-0.83	**1.15**

STUNTING

DIVISION	unweighted children	weighted children	Weight-for-length/height (%)					
			% < -3SD	(95% CI)	% < -2SD	(95% CI)	Mean	SD
Total:	3968	**3903**	15.5	(14.3%, 16.6%)	**40.9**	(39.3%, 42.4%)	-1.63	**1.44**
Barisal	510	**242**	16.8	(11.9%, 21.8%)	**39.8**	(33.4%, 46.2%)	-1.67	**1.5**
Chittagong	851	**885**	17.5	(15%, 20.1%)	**42.7**	(39.4%, 46%)	-1.73	**1.44**
Dakha	840	**1240**	16.4	(14.3%, 18.5%)	**43.8**	(41%, 46.6%)	-1.62	**1.52**
Khulna	507	**412**	10.4	(7.3%, 13.5%)	**32.1**	(27.4%, 36.7%)	-1.38	**1.36**
Rajshahi	596	**812**	11.2	(8.9%, 13.4%)	**35.9**	(32.5%, 39.3%)	-1.55	**1.32**
Sylhet	664	**311**	22.8	(18%, 27.6%)	**49.3**	(43.5%, 55%)	-1.93	**1.46**

UNDERWEIGHT

DIVISION	unweighted children	weighted children	Weight-for-length/height (%)					
			% < -3SD	(95% CI)	% < -2SD	(95% CI)	Mean	SD
Total:	4192	4106	12.3	(11.3%, 13.3%)	43.5	(42%, 45%)	-1.76	1.17
Barisal	548	259	15.9	(11.3%, 20.6%)	48.1	(41.8%, 54.4%)	-1.94	1.14
Chittagong	893	936	13.8	(11.5%, 16%)	45.9	(42.7%, 49.2%)	-1.86	1.14
Dakha	880	1301	12.9	(11%, 14.8%)	44	(41.3%, 46.8%)	-1.73	1.26
Khulna	534	431	6.8	(4.3%, 9.3%)	33.3	(28.8%, 37.9%)	-1.51	1.17
Rajshahi	620	845	10	(7.9%, 12.1%)	41	(37.7%, 44.4%)	-1.7	1.06
Sylhet	717	334	15.5	(11.5%, 19.5%)	50.3	(44.8%, 55.8%)	-1.95	1.15

R. Ill children taken to a health facility, by division, by area and nationally, in Bangladesh

Geographical zone	Health facility			
	No		Yes	
	N weighted	%	N weighted	%
Barisal	35	22.9	117	77.1
Chittagong	51	9.2	502	90.8
Dhaka	111	17.1	537	82.9
Khulna	24	10.8	200	89.2
Rajshahi	53	12.6	364	87.4
Sylhet	17	12.4	121	87.6
Rural	241	14.2	1460	85.8
Urban	49	11.3	382	88.7
National	**290**	**13.6**	**1842**	**86.4**

SOURCE: HFSNA 2009

S. Reasons for not taking the ill child to a health facility, by division, by area and nationally, in Bangladesh

Geographical zone	Not serious		Far away/lack transport		Lack of money		Does not like/ distrust		Other source of treatment used		Other	
	N weighted	%	N weighted	%	N weighted	%	N weighted	%	N weighted	%	N weighted	%
Barisal	10	29.4	2	6.5	22	62.2	0	0.0	1	1.9	0	0.0
Chittagong	22	43.4	3	5.4	24	47.8	0	0.0	1	1.4	1	2.1
Dhaka	48	43.1	0	0.0	55	49.5	0	0.0	5	4.2	3	3.1
Khulna	13	54.1	0	0.0	10	42.5	0	0.0	0	2.0	0	1.4
Rajshahi	33	62.0	4	6.6	11	20.2	0	0.0	4	7.5	2	3.7
Sylhet	3	19.3	3	15.5	10	60.5	0	0.0	1	3.4	0	1.3
Rural	106	43.8	10	4.1	112	46.6	0	0.0	7	2.8	6	2.7
Urban	23	47.8	1	2.5	20	40.0	0	0.0	4	8.5	1	1.1
National	**129**	**44.4**	**11**	**3.9**	**132**	**45.5**	**0**	**0.0**	**11**	**3.8**	**7**	**2.4**

SOURCE: HFSNA 2009

10.4 Water and Sanitation

T. Main sources of drinking water by division, by area and nationally, in Bangladesh

Geographical zone	Safe sources							Unsafe sources					other %
	piped into dwelling %	piped into yard / plot %	piped public tap / tand-pipe %	tube well or bore-hole %	dug well protected %	spring pro tect-ed %	tanker truck %	dug well unprotect ed %	spring unpro tected %	rain-water %	cart with small tank %	sur-face water %	
Barisal	0.0	0.4	0.4	97.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	1.9	0.1
Chittagong	2.6	1.2	1.4	90.7	0.0	0.1	0.0	0.7	0.2	0.3	0.2	2.6	0.0
Dhaka	10.7	5.2	1.1	81.6	0.1	0.0	0.0	0.1	0.0	0.2	0.1	0.7	0.2
Khulna	0.7	0.2	0.4	87.3	0.2	0.0	0.0	0.1	0.0	1.2	0.0	9.8	0.1
Rajshahi	1.1	0.8	0.3	96.5	1.1	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0
Sylhet	1.6	0.9	0.3	89.6	1.5	1.1	0.0	0.6	0.4	0.1	0.0	3.9	0.0
Rural	0.2	0.2	0.1	95.3	0.5	0.1	0.0	0.3	0.1	0.4	0.0	2.8	0.0
Urban	18.7	8.9	3.2	68.1	0.0	0.1	0.0	0.0	0.0	0.0	0.3	0.5	0.3
National	**4.3**	**2.1**	**0.8**	**89.3**	**0.4**	**0.1**	**0.0**	**0.3**	**0.1**	**0.3**	**0.1**	**2.3**	**0.1**

SOURCE: HFSNA 2009

U. Type of toilet facility by division, by area, and nationally, in Bangladesh

Geographical zone	flush to piped sewer system %	flush to septic tank %	flush to pit latrine %	flush to elsewhere where %	flush to un-known %	pit latrine with slab[3] %	pit latrine without slab or open pit %	bucket toilet %	hanging toilet %	open space %	other %
Barisal	0.7	3.9	1.0	0.9	0.2	33.3	46.4	0.0	9.4	4.0	0.1
Chittagong	0.9	12.2	0.7	0.9	0.2	37.1	33.4	0.3	8.4	5.9	0.0
Dhaka	8.3	9.7	0.9	3.2	0.8	38.5	27.7	0.3	4.7	6.0	0.0
Khulna	0.7	9.7	0.5	0.2	0.1	41.2	39.1	0.1	6.3	1.9	0.1
Rajshahi	0.6	7.1	1.2	0.7	0.0	39.4	36.6	0.4	4.7	9.0	0.2
Sylhet	1.0	16.6	0.7	1.8	0.0	30.0	32.2	0.4	14.1	3.0	0.3
Rural	0.2	5.4	0.8	0.5	0.0	39.9	38.3	0.3	7.5	7.0	0.1
Urban	13.3	24.1	1.2	5.3	1.4	31.2	18.3	0.3	2.8	2.1	0.0
National	**3.1**	**9.5**	**0.9**	**1.5**	**0.3**	**38.0**	**33.9**	**0.3**	**6.5**	**5.9**	**0.1**

SOURCE: HFSNA 2009

[3]The assessment did not determine if the pit latrines with slabs were hygienic or not; therefore, all pit latrines with slabs were classified as an improved toilet facility.

10.5 Food Security and Nutrition Linkages

V. Household food consumption groups and nutritional status of children and women, in Bangladesh

Nutrition Status		Food Consumption Groups			
		Poor %	Borderline %	Acceptable Low %	Acceptable High %
Global acute malnutrition	No	4.9	17.7	18.8	58.6
	Yes	5.9	22.4	20.1	51.6
Global chronic malnutrition	No	4.3	17.6	17.2	60.9
	Yes	5.6	18.7	20.7	55.0
Global underweight	No	4.6	16.5	17.9	61.0
	Yes	5.8	21.6	20.3	52.3
GAM by MUAC in women	No	4.8	17.1	18.8	59.3
	Yes	5.8	25.5	20.4	48.3

SOURCE: HFSNA 2009

W. List of survey personnel who participated in the HFSNA 2009

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11. NOTES

[1]Stocks, expressed as a ratio of utilization, had fallen to 19.4% for 2007/08. FAO. *The State of Food Security in the World*. 2008.

[2] Government of Bangladesh; FFWC, *Annual Flood Report* 2008. Only 1988 and 1998 were associated with larger land areas flooded; 61% and 68% respectively.

[3] Government of Bangladesh; MoFDM, *Disaster Management Bureau*. http://www.dmb.gov.bd/pastdisaster.html.

[4] Government of Bangladesh MoFDM *Bangladesh Food Situation Report*; FPMU. Oct-Dec /07 Volume 71. www.mofdm.go.bd and FAO/WFP *Crop and Food Supply Assessment Mission/CFSAM report* (August 2008); both sources give an estimate of 1.4 million MTs loss.

[5] Government of Bangladesh MoFDM *Bangladesh Food Situation Report*; FPMU. April-September/07 Volume 70. http://www.mofdm.go.bd.

[6] In January of 2007, a military-led coup took place; resulting in a ruling interim Caretaker Government, that held power until January 2009, when the newly elected Awami League party won the elections and took office.

[7] Government of Bangladesh MoFDM *Bangladesh Food Situation Report*; FPMU. October-December '07. Volume 71. http://www.mofdm.go.bd. Note; text above modified (VGF and OMS abbreviations spelled out in full) for explanatory purposes. It is clear that the "distribution" referred to in the original text was intended to also refer to "planned" distribution. Vulnerable Group Feeding is a program which is used mostly for responding to victims of natural disasters, while the Government of Bangladesh's Open Market Sales program is designed to ensure easier access to food for poor- and low-income consumers when food prices are unusually high. OMS sales of food staples (mostly rice) at subsidized below market prices occur at special designated market outlets.

[8] See FAO/WFP *Food Supply Assessment Mission report* (August 2008), the Government of Bangladesh MoFDM's *Bangladesh Food Situation Reports*, and the *Fortnightly Food Grain Outlook* reports for 2007-08 produced by the Food Planning and Monitoring Unit (FPMU) with support from FAO's National Food Policy Capacity Strengthening Programme/NFPCSP. Also see "*Getting Agriculture Moving Once Again: Strategic Options for Post HYV Agriculture in Bangladesh*," by M. Asaduzzaman, Bangladesh Institute of Development Studies/BIDS (March 2009). "*Rethinking Food Security Strategy: Self-sufficiency or Self-reliance*," by Uttam Kumar Deb, Center for Policy Dialogue/CPD, Mahabub Hossain, BRAC, and Steve Jones, Independent Consultant (May 2009).

[9]"Vietnam Rice Prices Unchanged; New Export Deals Not Allowed." [Aug 1, 2007] Source: Dow Jones. http://www.riceexporters.net/Int%20news/News_2007/int_news_010807.htm

[10] India's Changing Minimum Export Price policy did not apply to high value Basmati rice, which India continued to export.

[11] "Bangladesh: Rice Crop Hit by Recent Cyclone." Source: United Nations Office for the Coordination of Humanitarian Affairs. Integrated Regional Information Networks (IRIN). 4th December, 2007.

[12] By November 2008, approximately 476,000 of the 500,000 MTs had been imported. MoFDM/FAO "*Fortnightly Food Grain Outlook*," Issue No. 8, 25th November 2008.

[13] This regional trade and price dynamic was highlighted in numerous FAO/NFPCSP presentations in Dhaka during the 2008 meetings held by the Local Consultative Group/LCG forum on Agriculture and Rural Development.

[14] *The 1998 floods in Bangladesh : Disaster impacts, household coping strategies, and response*. Carlo del Ninno [et al.]. IFPRI/International Food Policy Research Institute. Washington D.C. Research Report 122.

[15] Unlike India and Vietnam; Myanmar's decision to stop grain exports to Bangladesh was taken under unique circumstances. Following the devastating Cyclone Nargis that struck Myanmar on 3 May 2008, a decision was taken to cancel previously planned rice exports of about 600,000 MTs (FAO/WFP *Food Supply Assessment Mission* report of August 2008).

[16] FAO "*Food Outlook*" (June 2008). Prices doubled from USD 385 per tonne, to USD 898. The variety of Thai export rice referred to is Thai 100% B (Broken). This variety is often used as a representative variety, when discussing world rice prices.

[17] Fiscal year 2008 covers the period 1st July 2007 to 30th June 2008.

[18] LCs rise 29pc in two months on huge food import. *Daily Star*, Business Section, October 8th, 2007.

[19] All terms of trade examples are based on data and estimates from a Center for Policy Dialogue database

[20] Government of Bangladesh MoFDM *Bangladesh Food Situation Report*; FPMU. Apr-Jun /08 Volume 73. Total food grain import was 3.47 Million MTs during fiscal year 2008 vs. 2.42 Million MTs during fiscal year 2007.

[21] Government of Bangladesh MoFDM *Bangladesh Food Situation Rep*ort; FPMU. Apr-Jun /06 Volume 67.

[22] Rice price gone beyond tolerable level Food adviser admits. *The Daily Star*, 11 March 2008.

[23] Impact Of High Food, Oil Prices 50pc higher trade deficit projected. *The Daily Star*, 27 April 2008.

[24] World Bank article entitled "*South Asia can manage food price crisis with right actions*". 24 April 2008.

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[26] The FY2008 vs. FY2009 comparison is based on Government of Bangladesh Ministry of Finance budget tables; Social Safety Net Budget FY 2009.

[27] World Bank Press Release; April 8, 2008: Progress toward nutrition, health, education, and other development goals off track in South Asia. Climate change, high food and oil prices complicate prospects, say WB, IMF. Related concerns were also expressed by Dominique Strauss-Kahn, the IMF's managing director: "Developing countries need more foreign aid and domestic resources to reach the MDGs. High economic growth and a stable macroeconomic environment remain essential for reducing poverty and increasing investment in health and education."

[28] World Bank Press Release; June 17th, 2008. "World Bank Supports Bangladesh's Reform Efforts with US$320 Million."

[29] IMF Press Release No. 09/112 April 2, 2009. Statement of an IMF Mission at the Conclusion of the Staff Visit to Bangladesh.

[30] Ibid.

[31] Government of Bangladesh MoFDM *Bangladesh Food Situation Report*; FPMU. Apr-Jun '08 Volume 73.

[32] FAO/WFP *Food Supply Assessment Mission* report (August 2008)

[33] "*Rethinking Food Security Strategy: Self Sufficiency or Self Reliance*." Uttam Kumar Deb, Mahabub Hossain, Steve Jones. UK Department for International Studies (May 2009). See also *The World Food Situation: New Driving Forces and Required Actions*. von Braun, Joachim. International Food Policy Research Institute/IFPRI (2007).

[34] FAO/WFP *Crop Food Supply Assessment Mission* report (August, 2008).

[35] Ibid.

[36] Government of Bangladesh BBS *Household Income and Expenditure Survey*/HIES (2005).

[37] Rural Bangladesh Socio Economic Profiles of WFP Operational Areas & Beneficiaries, WFP-

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[41] Benson, T., Minot, N., Pender, J., Robles, M., von Braun, J. (2008) "*Global Food Crises: Monitoring and assessing impact to inform policy responses*," IFPRI, Washington, DC 2008.

[42] ACF/MSF (2008) "*One Crisis May Hide Another: Food Price Crisis Masked Deadly Child Malnutrition: Time for Refocus*" at Madrid Food Summit January 2008. A Briefing Paper by Action Contre la Faim and Médecins Sans Frontières on the occasion of the UN High Level Meeting on Food Se

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[58] Sulaiman M., M. Parveen and N. C. Das (2009): *Impact of the Food Price Hike on Nutritional Status of Women and Children*. Research Monograph Series No 38, BRAC, Dhaka.

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[62]Calculated by the daily consumption of staple and vegetables and complemented with frequent (4 days/week) consumption of oil and pulses (staple*weight + vegetables*weight + oil*weight + pulses*weight = 7*2+7*1+4*0.5+4*3=35)

[63] Wiesmann, D., Bassett, L., Benson, T., Hoddinott, J. *Validation of the World Food Programme's Food Consumption Score and Alternative Indicators of Household Food Security*. IFPRI Discussion Paper 00870: June 2009.

[64] Ibid.

[65] The low proportion of urban households with poor or borderline food consumption scores was unexpected. Although urban populations also fared better in terms of other indicators, such as the CSI scores, households' perceptions of food insecurity and perceptions of severity of the high food price shock, other indicators such as food expenditure as a proportion of total expenditure showed urban households as similar to rural households.

[66] See: FAO/WFP *CFSAM Repo*rt (August, 2008) and TANGO and WFP (2007): Rural Bangladesh: Socio-Economic Profiles of WFP Operational Areas and Beneficiaries. Dhaka.

[67] See Sulaiman M., Parveen, M., D, DC. (2009): *Impact of the Food Price Hike on Nutritional Status of Women and Children*. Research Monograph Series No. 38. BRAC, Dhaka.

[68] The 1995-1996 reference is to the GoB BBS HIES finding that 25.1% of the population were classified as hard core poor, based on the Direct Calorie Intake poverty line measure and associated with consumption levels of 1805 kcals/person/day or less.

[69] The distribution of age and sex per sample are presented using unweighted data.

[70] Acceptable values for the sex ratio are 0.8 and 1.2.

[71] In this report, age groups are described in intervals of months completed, e.g. a child 6 to 23 months has completed six months of age but has an age less than two years.

[72] The n cases and the analyses are presented with weighting factor.

[73] The red line highlights the WHO emergency threshold of 15%, indicating a critical situation. Source: the WHO Crisis Classification using prevalence rates of global acute malnutrition with Acceptable: < 5% GAM; Poor: 5 – 9% GAM; Serious: 10 – 14% GAM; Critical: > 15% GAM.

[74] UNICEF Expanded Programme on Immunisation (EPI) programming extrapolations to 2009 from 2001 national censu

[75] Percentage of total population 6-59 months (10.8%): source HFSNA 2009.

[76] The n cases and the analyses are presented with weighted factoring.

[77] The red line highlights the WHO threshold of 30%, indicating a very high severity situation.

[78] The red line highlights the WHO threshold of 40%, indicating a very high severity situation.

[79] In BDHS 2004 and BDHS 2007, Sylhet division had the highest rates of no education (40.8% in 2004 and 35.2 in 2007) and the lowest median of number of years of school attendance for women (0.7 in 2004 and 1.3 in 2007).

[80] The title of these two indicators reflects an approximation of the age ranges covered.

[81] WHO (2008) "*Indicators for Assessing Infant and Young Child Feeding Practices: conclusions of a consensus meeting held 6-8 November 2007*". World Health Organistation: Geneva, 2008.

[82] 'Meals' include both meals and snacks (other than trivial amounts). Frequency is based on caregiver report.

[83] Shrimpton R et al. (2001) *World-wide timing of growth faltering: implications for nutritional interventions*. Pediatrics, 2001;107(5):e75.

[84] For women: MUAC < 214 mm indicates SAM and MUAC < 221 GAM. Source: WHO Expert Committee on Physical Status: the use and interpretation of anthropometry. World Health Organisation: Geneva, 1995. Cited In: UNHCR/WFP (2009) "*Guidelines for Selective Feeding: The management of malnutrition in emergencies*" with collaboration of the UN Standing Committee on Nutrition and the World Health Organisation: May 2009

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[103] WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP) in the 2008 report

[104] For the purpose of the assessment and following WASH Cluster recommendations, a "safe source" of water included: piped into dwelling, a public tap/standpipe, a tube well or borehole, a protected well, a protected spring, and a tanker truck. An "unsafe source" included rainwater collection, unprotected spring, unprotected well, surface water (river / dam / lake / ponds / stream / canal / irrigation channel), and a cart with small tank.

[105] Naturally-occurring arsenic contaminated water was first detected in Bangladesh in 1993. The arsenic comes from arsenic-rich material in the region's river systems, deposited over thousands of years along with the sands and gravel which make up the land of Bangladesh

[106] ICDDR,B/UNICEF (2008) "*SHEWA-B Health Impact Study: one year behaviour assessment results*" The Sanitation, Hygiene Education and Water Supply in Bangladesh Programme (SHEWA-B)

[107] UNICEF/IPHN (2008) "*Health and Nutrition Baseline Assessment in Cyclone Sidr affected areas of Bangladesh, 2008*" The United Nations Children's Fund (UNICEF) and Institute of Public Health Nutrition (IPHN), Dhaka: September 2008

[108] An improved sanitation facility is defined as one that hygienically separates human excreta from human contact. For the assessment, it was the recommended definition used by UNICEF. The improved toilet facility has been defined as a flush to piped sewer system, a flush to septic tank, a flush to pit latrine, and a pit latrine with slab. The unimproved toilet An improved sanitation facility is defined facility has been defined as a flush to somewhere else, a flush to don't know

[109] WHO/UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation in the JMP 2008 report

[110] An improved sanitation facility is defined as one that hygienically separates human excreta from human contact. For the assessment, it was the recommended definition used by UNICEF. The improved toilet facility was defined as a flush to piped sewer system, a flush to septic tank, a flush to pit latrine and a pit latrine with slab. The unimproved toilet facility had been defined as a flush to somewhere else, a flush to don't know where, a pit latrine without slab, an open pit, a bucket toilet and a hanging toilet/hanging latrine. The open space was when no facility / bush /field were used

[111] It is not possible to compare existing data with other studies mainly due to the different indicators and classification system used to analyze general access to improved / unimproved toilet facilities

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[117] Originally animal assets were included; however because of their dominance within the overall asset scores, they were later excluded from the final asset scores indicator.

[118] Ibid

[119] Sulaiman, M., Parveen, M., Das, NC. (2009) Impac*t of the food price hike on nutritional status of women and children* Research and Evaluation Division, BRAC: Dhaka, Bangladesh, January 2009.

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[121] Nutrition Surveillance Project (HKI/IPHN) 2006, BRAC 2009, BDHS 2007.

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[133] Save the Children UK (2005) *A Study of the Relationship Between Household Economy and Nutritional Status in a Village in Kurigram ,Bangladesh*" Save the Children – United Kingdom, 2005.

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[135] Save the Children UK (2009) *How the Global Food Crisis is Hurting Children: The impact of the food price hike on a rural community in northern Bangladesh*, Save the Children – United Kingdom, 2009.

[136] FAO/WFP *Crop Food Supply Assessment Mission* report (August, 2008).

[137] See "*Consumers Price Support*" section 1.3.3 within the Government of Bangladesh National Food Policy 2006; Ministry of Food and Disaster Management.

[138] GoB MoFDM *Bangladesh Food Situation Reports*, FPMU Volumes 72-75.

[139] "Cash-for-work" refers mainly to the Government of Bangladesh's "100 Days Employment Programme" (2008); "Relief" refers mainly to the government's Gratuitous Relief programs for natural disasters.

[140] GoB MoFDM sources claim that 1.997 million worked under the project. If accurate, this would amount to approximately 6.9% of households in Bangladesh, far higher than the less than 2% reported via HFSNA.

[141] For a detailed review of Phase 1of the "100 Days Employment Programme," see Study on the first phase of the 100-Day Employment Generation Programme, NFPCSP and BRAC 2009. For an article on the discontinuation of the program after Phase 1, see Rice, not cash for job scheme, *The Daily Star*, Business Report, 30, March, 2009.

[142] *Social Safety Nets in Bangladesh: An Assessment*, Bangladesh Development Series, Paper No. 9, The World Bank, January 2006, p.22

[143] *Study on the first phase of the "100-Day Employment Generation Programme*," NFPCSP and BRAC 2009.

[144] IFPRI *Relative Efficacy of Food and Cash Transfers in Improving Food Security and Livelihoods of the Ultra Poor in Bangladesh* (2007).

[145] See Dorosh, P. A., and N. Farid. 2003. Implications of quality deterioration for public food grain stock management and consumers in Bangladesh. Markets, Trade and Institutions Division Discussion Paper No. 55. Washington, D.C.: International Food Policy Research Institute; as mentioned in IFPRI's FCND Discussion Paper No. 173, *Food Aid Distribution in Bangladesh, Leakage and Operational Performance*. (February, 2004.)

[146] USDA FAS GAIN Report; BG8001, February 2008.

[147] GoB MoFDM FPMU *Food Situation Report* Jan.-March 2008, Vol. 72.

[148] GoB MoFDM FPMU *Food Situation Report* Jan.-March 2008, Vol. 73.

[149] GoB MoFDM FPMU *Food Situation Report* Jan.-March 2008, Vol. 72.

[150] The GoB is aware of the need for effective procurement prices, and the need to review the process whereby procurement prices are set. The related recommendation and action point already included within the GoB's *National Food Policy Plan of Action* (2008-2015) are supported by WFP.

[151] GoB MoFDM, National Food Policy 2006

[152] GoB MoFDM Food Planning and Monitoring Unit/FPMU *National Food Policy Plan of Action* (2008-2015).

[153] For example the Bangladesh Bank and the Ministry of Finance, could support the MoFDM's FPMU in terms of integrating specific macroeconomic indicators into its food security and early warning analysis and associated reporting.

[154] *Fortnightly Food Grain Outlook*, Issue No. 3, 4th September 2008.

[155] FAO/WFP *Crop Food Supply and Assessment Mission* report (August 2008).

[156] Ibid.

[157] GoB MoFDM *Food Planning and Monitoring Unit*/FPMU *National Food Policy Plan of Action* (2008-2015).

[158] *Getting Agriculture Moving Once Again: Strategic Options for Post HYV Agriculture in Bangladesh*, by M. Asaduzzaman, Bangladesh Institute of Development Studies/BIDS (March 2009). *Rethinking Food Security Strategy: Self-sufficiency or Self-reliance*, by Uttam Kumar Deb, Center for Policy Dialogue/CPD, Mahabub Hossain, BRAC, and Steve Jones, Independent Consultant (May 2009). Both are part of a series of research monographs funded by DFID, on Market Volatility, Vulnerability, and Food Security.

[159] The assets score indicator that was used did not include animal assets, because their inclusion tended to dominate/skew the results.

[160] See FAO/WFP *Crop Food Supply Assessment Mission* report (August, 2008), and IFPRI's *'Relative Efficacy of Food and Cash Transfers in Improving Food Security and Livelihoods of the Ultra Poor in Bangladesh'* (2007).

[161] Study on the first phase of the 100-Day Employment Generation Program; NFPCSP and BRAC 2009.

[162] See FAO/WFP *Crop Food Supply Assessment Mission* report (August, 2008), and IFPRI's *'Relative Efficacy of Food and Cash Transfers in Improving Food Security and Livelihoods of the Ultra Poor in Bangladesh'* (2007).

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[168] WHO/WFP/UNICEF (2007) *Preventing and controlling micronutrient deficiencies in populations affected by an emergency: Multiple vitamin and mineral supplements for pregnant and lactating women and for children aged 6 to 59 months*. A Joint Statement WHO, 2007.

[169] UNICEF's the *State of the World's Children* 2009 states that 536,000 women die annually from pregnancy and childbirth-related causes and that 25% of maternal deaths are caused by hemorrhage.

[170] WHO (2009) Weekly iron–folic acid supplementation in women of reproductive age: its role in promoting optimal maternal and child health Position statement. World Health Organization: Geneva, 2009.

[171] UNICEF et al., *VMDs Programming: What Works in Scale* (unpublished), page 16 and Micronutrient Initiative, Annual Report 2007-2008, MI, Ottawa. Cited In: GAIN/UNICEF/WHO/WB/USAID/MI/FFI (2009) *Investing in the Future: A united call to action on vitamin and mineral deficiencies*. Global Report 2009: Inter-Agency Steering Committee May 2009.

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[173] In BDHS 2004 and BDHS 2007 Sylhet has the highest rate of no education (40.8% in 2004 and 35.2 in 2007) and the lowest median of number of years of school attendance for women (0.7 in 2004 and 1.3 in 2007).

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