

The Food Security Atlas of Bangladesh

Towards a poverty and hunger free Bangladesh

2004





United Nations World Food Programme

Acknowledgements

The Food Security Atlas of Bangladesh has been prepared as the final product of a collaborative effort between the Planning Commission, Bangladesh Bureau of Statistics and the UN World Food Programme.

The aim of this project, titled Mapping and Characterizing Food Insecurity and Vulnerability in Bangladesh, was to contribute to a better understanding of the spatial patterns of food insecurity, poverty and malnutrition in the country. This was achieved by generating food security indices and poverty and malnutrition estimates at the local level, and translating these user-friendly into maps. А compilation of these maps is presented here together with

background information, food security analyses, and a series of supporting thematic maps.

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Overall co-ordination was provided by Mr. Siemon Hollema (WFP) who was also responsible for the compilation and editing of the atlas.

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Food Insecurity and Vulnerability Information and Mapping Systems



Bangladesh has an estimated 30 million undernourished people (FAO, 2003). Almost every other child is malnourished, and more than 50 percent of pregnant women are suffering from anaemia. It is therefore of vital importance that progress in reducing these numbers is achieved. This has been echoed by the Government of Bangladesh through their commitment to the Millennium Development Goals.

FIVIMS is a tool with which progress towards one of the most important Millennium Development Goals, the poverty and hunger goal, can be measured. FIVIMS is a national system that aims to improve available food insecurity information in order to better utilise it for food security policies and improve action programmes.

FIVIMS aims to build up a network of agencies that are committed to the FIVIMS objectives, and support the Government of Bangladesh in improving food security policies, based on reliable, timely and consistent data. The Programming Division of the Planning Commission carries out the overall co-ordination of the FIVIMS programme in Bangladesh. The FIVIMS unit is located in the office building of Bangladesh Bureau of Statistics.

The Vulnerability Analysis and Mapping (VAM) of the World Food Programme has provided essential support in the establishment of a national FIVIMS programme in Bangladesh by acting as a technical centre of expertise in the area of vulnerability analysis and mapping. This Food Security Atlas is a contribution of the World Food Programme to the FIVIMS initiative.

FIVIMS plays a significant role in the preparation of the Poverty Reduction Strategy Paper by providing the necessary sub-national data on extreme poverty, food insecurity and malnutrition. I believe that the Bangladesh Food Security Atlas does exactly this and therefore provides an extremely valuable tool in the planning of development programmes.

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Contents

1	Foreword	1
2	Food security The concept of food security Spatial patterns in food security Profile of highly food insecure areas	2
3	Poverty Food insecurity and poverty Targeted income transfers to ensure food security	11
4	Nutrition Malnutrition Stunting Underweight	17
5	Food availability Food supply	21
6	Food access Sources of income Infrastructure and markets	23
7	Food utilization Public health Water and sanitation	25
8	Human capital Population and migration Ethnic communities and food security Education and food security	27
9	Sources of vulnerability Natural disasters and household vulnerability	31
10	Food-assisted programmes Targeting WFP-assisted programmes in Bangladesh	34
	Literature used	37
	List of maps	38

Towards a poverty and hunger free Bangladesh

Since independence in 1971, Bangladesh has made considerable progress in reducing extreme poverty and food insecurity. Large-scale famine such as the one that occurred in 1974 no longer poses a threat to the nation. The country has reached its self-sufficiency target in rice production, which is a remarkable achievement given that the population has almost doubled since independence. Real cereal prices have gradually been falling over the years, making food more accessible to the poor and as a consequence overall food consumption has increased. Food aid has played an important role in the past but with increased domestic production, food aid imports have declined and the role of food aid has shifted from general relief to focused development assistance, targeting the most vulnerable in the society.

But there is still a long way to go before Bangladesh is truly food secure. National availability of sufficient food does not mean that all households have access to sufficient food. Under nutrition indicators remain uncomfortably high and the inequality between the rich and the poor is growing. The UN Food and Agriculture Organization estimates that the proportion of undernourished people hardly decreased in the 1990s and that the number of undernourished people increased by 8 million in the period 1990-1992 to 1999-2001.

Poverty shows a declining trend, however the reduction in the incidence of absolute poverty does not keep pace with population growth resulting in a higher total number of people living in poverty. Reduction in hard-core poverty, defined as a consumption of less than 1805 kcal per capita per day, is on track to reach the I-PRSP goal of less than 5 percent of the population by 2015.

Bangladesh made considerable progress in the 1990s in reducing child malnutrition. However, in 2000 we still find almost one child in every two to be stunted or underweight (see graphs). attending school. Achieving food security is therefore of utmost importance.

In an environment of limited resources, it is important to target the most deprived and vulnerable areas to ensure the highest impact. Presenting geographic information in the form of maps provides an easy tool to assist policy decisions. Maps are easily understood and objectively verifiable; however need to be used with caution. A poverty or food insecurity map for example does not tell us the reason why a particular area is poor or vulnerable to food insecurity; neither does it provide an answer regarding the best course of action to address the problem. Food insecurity, poverty and malnutrition maps should therefore be used in a complementary manner with other maps, providing information on possible underlying causes, and upto-date local information that monitors changes in the food security or poverty status. GoB together with the development partners, stakeholders, food, agriculture and nutrition scientists will update the atlas every three years. Hopefully the next updated version of this Atlas will include topics like, gender and food security, NGO coverage in the field of development interventions, urban vs. rural food security and institutional capacity of the government to support the poor in crisis.

The Food Security Atlas of Bangladesh provides an analysis of the food security situation in Bangladesh on the basis of a series of thematic maps. It firstly presents the relative food insecurity map, which points us towards a number of areas that are likely to experience high food insecurity. Characteristics of these highly food insecure areas are described in the subsequent pages. As the map is based on a composite index of key indicators, it cannot tell us the extent of the problem. For this we need direct estimates of poverty and malnutrition. These maps are presented on pages 11 to 20. An analysis of the underlying causes of food security is given in pages 21 to 33, where the dimensions of food security, availability, access, utilization and vulnerability (see opposite page) are separately analysed and geographic data is presented on key factors that may contribute to regional variation in food security. It also includes an analysis of the variation in primary and adult educational needs across regions, the population dynamics, migration patterns and a description of the food security issues of the







indigenous communities and those living in the inaccessible areas of Bangladesh.

The final section provides an overview of the Government's targeted food aid programmes that are supported by the World Food Programme. WFP's priority areas for concentrated efforts to reduce food insecurity and malnutrition are presented as well as a targeting map for the Nutrition for Education programme.

We believe that food is not merely a commodity; its availability is one of the human rights. The Food Security Atlas of Bangladesh will contribute to a better understanding of food insecurity and poverty issues in the country and in this way will be a valuable tool in the programming of resources, working towards a poverty and hunger free Bangladesh.

Future effort by the Government of Bangladesh and its development poverty partners to reduce and malnutrition will be guided by the Poverty Reduction Strategy Paper (PRSP) and the Millennium Development Goals (MDGs). Failure to eliminate extreme poverty and hunger will also undermine efforts to reach the other MDGs. The government target of achieving universal primary education, for example, will be thwarted if millions of hungry children suffer from diminishing learning capacity or are forced to work instead of



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1



According to the World Food Summit (1996), "food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food which meet their dietary needs and food preferences for an active and healthy life".

The definition captures the complexity of the problem: food security encompasses many issues ranging from food production and distribution to food preferences and health status of individuals. There is therefore no easy way of measuring food security. To simplify, a conceptual framework has been used that distinguishes three distinct but inter-related dimensions of food security: food availability, food access and food utilization.

At the national or regional level, food needs to be available. This is achieved through ensuring that domestic production, net food imports and national food stocks are together national sufficient to cover requirements. However, even when aggregate food supplies are adequate, a number of factors may prevent poor households or individuals from accessing the food. Their income levels may be too low to purchase the necessary foods at prevailing prices on the market, they may not have access to land for own cultivation, or may lack the necessary assets or access to credit to help them through difficult times. Furthermore, they may find themselves outside any public assistance or other programme that provides them with inkind or cash transfers to supplement their food acquisition capacity.

National availability of, and household access to food alone are not sufficient to quarantee food security. It is also important how household members utilize the food. Women, children, the elderly and the disabled often suffer from inequalities in food distribution within a household: often they eat last and least. Access to proper sanitation and health care, general nutritional awareness, and caring practices are determinants important of an individual's capacity to absorb and utilize the nutrients in the diet and ultimately of his/her food security status.

Food insecurity has also a temporal dimension. It is defined as *transitory* when a population suffers a temporary decline in food consumption and as chronic when population а is continuously unable to acquire sufficient food. Transitory food

insecurity is associated with seasonal variation in food production and natural hazards such as floods, cyclones and droughts. Depending on its asset endowments, a household adopts different strategies to cope with these Copina behaviour events. often involves borrowing money, and the sale or consumption of productive assets. These practices may undermine the long-term productive potential of poor households and may eventually lead to chronic food insecurity or complete deprivation.



While transitory food insecurity, such as in its extreme form, famine, is more visible and draws more attention, chronic food insecurity is in fact a much larger problem and is closely related to structural factors associated with extreme poverty. People with a low income and no productive assets struggle on a continual basis to have access to sufficient food.

Households most vulnerable to food insecurity generally include those which lack productive assets and depend on irregular income from daily wage labour. Groups such as landless agricultural day labourers, casual fishermen and beggars fall into this category. Within households, children, the disabled, pregnant women and nursing mothers, and the elderly face relatively high nutritional risks.





households Other are vulnerable because they live in areas that are susceptible to natural disasters, or are inaccessible unsuitable or for agricultural production. Similarly, areas home to indigenous people often lack adequate services such as health facilities, appropriate schooling, and proper sanitation and are therefore frequently among the poorest of the country.

Food security



Spatial patterns in food security

Food security in Bangladesh is characterized by considerable regional variations. Factors such as tendency to natural disasters, distribution and quality of agricultural land, access to education and health facilities, level of infrastructure development, employment opportunities, and dietary and caring practices provide possible explanations for this.

Bangladesh has a long tradition in mapping the overall food security situation in the country, starting in 1975, just after the 1974 famine, when the Bangladesh Distress Factor System was set up. The system was based on reflecting indicators an area's susceptibility to natural calamities and formed the basis for planning relief operations. In 1983, the system was updated with the addition of socioeconomic indicators. A subsequent review was undertaken in 1991, and during the period 1995-1997, the Planning Commission in collaboration with the World Food Programme (WFP) developed a resource allocation map

Components of Food Insecurity	Issues	Key Indicators
Availability of food	Low agricultural production	 Proportion of area with bad cropping pattern Proportion of households not owning agricultural land
Access to food	Limited infrastructure / Market opportunities High incidence of poverty	 Proportion of area within 2.5 km from major roads Proportion of households having access to electricity Proportion of households with <i>pucca</i> and semi - <i>pucca</i> houses
	High seasonal unemployment	 Proportion of households with non-agricultural source of income
Utilization of food	Limited public and health facilities Unawareness regarding hygiene and sanitation practices	 Proportion of area within 50 minutes travel time to nearest hospitals Proportion of households with heads having completed Grade 5 education Proportion of households with <i>pucca</i> and semi - <i>pucca</i> sanitation
Vulnerability	Frequent occurrence of natural hazards	 Disaster prone areas (flood, drought, erosion and cyclone)

for food-assisted development activities. Up until recently this was one of the most widely used maps for the allocation of development resources. As a continuation of this initiative, the Planning Commission and the World Food Programme produced a

 Resource allocation map for boot assisted development
 District boundary
 River network ogramme produced a revised and updated relative food insecurity map during 2003-2004 with technical input from the Bangladesh Bureau of Statistics, as presented on the opposite page.

Indicators: The relative food insecurity map of 2004 is based on the concept of food security as explained in the previous section. It takes into account the availability of food, to food, access utilization of food and the vulnerability factors. Food security issues were identified for each of these four components through consultative а process. Subsequently, key indicators were selected and assigned each to issue, providing a measure the of magnitude of the problem for every upazila in the country (see table).

The consultative process involved experts from government, UN, donor and NGO agencies.

Sources of data: Household level data were generated by the Bangladesh Bureau of Statistics based on a five percent sample of the 2001 Population Census. Location specific indicators such as cost-distance calculations, cropping patterns and disaster proneness were derived by WFP using the GIS based datasets from the Local Government Engineering Department and the Bangladesh Agricultural Research Council.

Methodology: In order to produce a ranking of upazilas in terms of their relative food security status, an index was derived based on the 10 indicators, presented in the table above. Each indicator was standardized by ranking them from 1 to 511 (which equals to 470 upazilas and 41 urban thanas, BBS). By summing the rank values for each upazila a total score was derived. All 511 upazilas were subsequently classified into four equal categories reflecting their relative levels of food insecurity: very high, high, moderate and low.



There is a marked clustering of areas classified as having a high or very high level of food insecurity, which have been identified as the Sylhet haor basin, the Northern Chars, the Northwest, the Drought zone, the Coastal belt and the Chittagong Hill Tracts.

An area profile of each of these vulnerable clusters is provided in the following pages.







BAY OF BENGAL



Source: Government of Bangladesh / World Food Programme, 2004



Chittagong Hill Tracts Union-level relative food insecurity

Capturing perceptions of food insecurity in the Chittagong Hill Tracts

In the backdrop of Bangladesh, the Chittagong Hill Tracts (CHT) stands out with its unique topography and ethnic culture. Much of the region is inaccessible. This presents challenges in conducting surveys, let alone implementing a census. Secondary data sources are therefore not always reliable and do not necessarily capture the nature of the food security problems in CHT. The World Food Programme therefore initiated a consultative process to capture local perceptions of food insecurity in order to strengthen the analysis of available The consultation secondary data. involved representatives from the Regional and District Councils, Union Parishad, local NGOs, tribal leaders, educational institutions and civil society. It took place in two phases. In the first phase a series of workshops was organized in the three districts, Bandarban, Rangamati, and Khagrachari, to gather information on the status and causes of food insecurity in each union of CHT. This information was compared to GIS data and a five percent sample of the 2001 population census, to derive a map showing the relative food insecurity status of each union in CHT.

The following main causes of food insecurity were identified:

Availability of food	 Subsistence <i>jhum</i> cultivation leading to low production and depletion of forest resources. Limited arable land due to steep slopes and mountainous soil.
Access to food Utilization of food	 Insufficient infrastructure and market facilities. Limited employment opportunities. No or inadequate service facilities such as schools, growth centres, health care. Pockets of tribal settlements with no access to reserve forests. Limited or no public health facilities. Severe scarcity of safe drinking water.
Vulnerability	 Unawareness regarding hygiene and sanitation practices. Very low literacy rate. Unresolved land resettlement issue between different othnic groups and Rongali sattlers.



In a second series of workshops the results of the first phase were presented and validated and the union level food insecurity map was finalized. The map shows very high levels of food insecurity in the remote unions of Rangamati, Bandarban and Khagrachari districts.

Source: World Food Programme, 2004

Profile of highly food insecure areas

The North-west



The North-west region of Bangladesh is a slightly sloped plain at the foot of Himalayan the mountain range. It is bound in the east by the Jamuna river. The other main river is the Teesta, which crosses the area in north. The the North-west is a food

surplus production area, where agriculture is the principal source of employment.

Despite this, a large percentage of the population remains food insecure. This is primarily the outcome of poor food access resulting from unequal land distribution, low agricultural wages, and the impact of natural disasters.

Non-governmental organisations (NGOs) are common service providers throughout the North-west. The NGOs provide a variety of services, including micro-credit support, health services and development assistance.



Food availability

The North-west has excellent soil fertility and enjoys good crop production. Most of the agricultural land is used to grow rice, usually two harvests a year. Most of the domestic wheat supply is grown here. Cash crops are also abundant, particularly tobacco and potatoes.

farmers sharecrop the of absentee land landlords. The poorest people sell their labour to larger farms. The wage rate for agricultural labourers in the North-west is low compared to the rest of the country, which contributes to the food insecurity experienced by poor families.

Despite the good conditions for agricultural production, there is a very pronounced lean season, known as 'monga', from October to November each year. Food insecurity during this period has recently been aggravated further by a reduction in resources for seasonal Food-for-Work projects by the government and donors. As a result, there is a high level of in-country migration by heads of households during the monga period to seek employment in Dhaka city. However, other family members generally remain in the region and are particularly susceptible to hunger, malnutrition and illness. Many poor households survive through the monga by borrowing from local moneylenders at high interest rates, which contributes further to the poverty cycle.

There are no major industries located in this area to provide permanent employment. However, recent improvements in the road network and the new Jamuna bridge



Average daily wage of agricultural labour in the greater districts of the North-west



when illnesses arise takes up a considerable portion of the savings accumulated by poor families.

Sanitation facilities have traditionally been poor in this region, which has contributed to high rates of diarrhoea among both adults and children. The government has recently provided incentives to encourage the construction of sanitary toilets, which is hoped to improve the overall health situation of the ultra-poor.

Hazards

The North-west region tends to be disaster prone, which has a substantial impact on food security. It is particularly susceptible to flash flooding during the monsoon season. When the rivers overflow, the area floods; due to the slope of the land, the water does however drain quite quickly. However, the flooding can destroy crops and poorly built houses; these events occur almost every year to varying degrees.

In the winter months, cold weather usually causes deaths among vulnerable groups such as the homeless and the elderly.



There is a good road network that facilitates easy transportation of products to the markets. The construction of the Jamuna Bridge has had a great impact on the local economy by opening communication and transportation lines to Dhaka. Most of the locally produced rice crops are sold in paddy markets that are well developed and fairly efficient.

Food access

The majority of people in this area are agricultural workers. Better off families farm their own land, while marginal an interest from many companies to explore opportunities in this region.

Food utilisation

There is a low dietary diversity among the population in the North-west, which has led to a high prevalence of micronutrient deficiencies. Particularly during the lean season, many poor households survive by consuming wild roots and foliage, which leads to a varietv of stomach ailments. Malnutrition and illness among the food insecure population have consistently been a concern, contributing to reduced productivity and lost working days. The cost of using health facilities

The southern part of the North-west is also prone to drought, which can damage crop production and threaten the agriculturally-reliant population further.



The Northern Chars



The Northern Chars are unstable lands concentrated around the Brahmaputra and Jamuna rivers. These are very marginal lands, characterised by high levels of flooding, erosion and instability.

The population, of just less than two million people, is highly food

insecure. Moreover, the inhabitants are particularly vulnerable as the erosion of the land forces them to move on a regular basis. The soil is not very good for cultivation, there is very limited access to infrastructure and services, and the people are constantly susceptible to food shortages and natural disasters.

Food availability

The sandy soil is not suitable for cultivation. A few crops are grown during the winter months, usually rice, wheat, chillies, and peanuts. Crop yields are low.

The communication and transportation systems are poor. There are few roads through this area; river transport is primarily used, particularly during the rainy season.

Food access

Most of the people living in the Chars are functionally landless. They sharecrop the land of absentee landlords for which the rent is equivalent to about half their income. Most people are only able to consume about two meals a day, and during the lean season from October to November, many are only able to afford one meal comprised of rice and green chillies.

Unemployment levels during the nonagricultural season are very high. There is some migration to Dhaka; those who remain in the Chars have limited options for employment and often remain jobless throughout this period.

Food utilisation

Due to the transient housing facilities, there is poor access to proper sanitation and clean water in the char areas. This contributes to a variety of illnesses, particularly stomach ailments and diarrhoeal diseases. As many parts of the Chars are remote and unreachable, it can take hours or days to access health and medical facilities when they are needed.

Among the char population there is a high incidence of early marriage and little access to contraception, which has resulted in young mothers and larger families. Dowry is also a relatively common practice in the char areas.



Hazards

The Chars are prone to severe erosion, which reduces the land on which many of the poor are living and growing crops. When one area erodes, the inhabitants are forced to find another area to settle. As a result, there is a constant state of instability and movement among its inhabitants.

Additionally, as the Chars are on the banks of the Brahmaputra and Jamuna rivers, the area is also prone to flooding whenever the rivers overflow, destroying crops, livelihoods and homes.

The Drought zone



The Drought zone is concentrated in the westernmost parts of Nawabjanj, Rajshahi and Noagaon districts, just north of the Padma river. The weather in this part of the country tends

Most of the agricultural land produces rice, although the area is also known for the production of certain cash crops, including mango, jackfruit and sugar cane.

Food access

The land ownership pattern in the Drought zone is very unbalanced. There are a few wealthy landowners,

Access to clean water and proper sanitation facilities is limited, contributing to illnesses, particularly diarrhoeal diseases and stomach ailments.

Hazards

The main natural hazard in



to be extremely hot in the summer and

it experiences a relatively long dry season, both of which contribute to poor crop production.

Food availability

The soil is varied; although there are some fertile pockets, much of the area has a poor cropping pattern. Overall, there is a low cropping intensity, which is indicated by a low per acreage production level. Near the river the soil tends to be sandy, making cultivation particularly difficult. and a large number of poor agricultural labourers. The wage rates for agricultural labour are comparatively low in this area.

During the non-agricultural period, some people are able to find work locally pulling rickshaws or engaging in other types of day labour, but there is substantial out-migration to Dhaka in search of employment opportunities.

Food utilisation

The population in the Drought zone has a comparatively low diversity in its diet, which has led to a high level of micronutrient deficiencies. this area is drought, which occurs annually

during the hot season. A combination of high temperature, low annual rainfall and soil moisture deficiencies, have a devastating impact on agricultural production and threaten both smallscale farmers and labourers. Limited and expensive irrigation options exacerbate this problem further.

Profile of highly food insecure areas

The Sylhet haor basin



The Haor is a lowlying area that is under water for nearly half of the year. Although some crops are grown during the winter season, most of the agricultural fields and much of the road network is

submerged from May to October.

The population is scattered; the inhabitants live on small patches of raised land in the midst of waterlogged fields. They have limited access to infrastructure and services, including schools, health facilities and markets.

Food availability

There are two main industries in the haor area: rice cultivation and fishing. Only one crop of *boro* rice is grown annually, from November to April, when the waters recede. There are no vegetables or cash crops grown in this area.

Proportion of predominantly single cropping pattern area in hoar districts



usable roads in some areas. During the rainy season, most parts of the Haor are only accessible via the waterways, and it can take many hours to reach the remote regions.



Food access

Most household income is derived from agricultural production, usually on sharecropped land. Even in years where there is a good harvest, much of the household income is used to pay for the rent of the land.

During the rainy non-agricultural period, many men migrate to work as agricultural labourers in areas with *aman* rice crops. Those who remain in the haor area often work as day labourers for the larger fishing industries. A few engage in illegal independent fishing, but this is risky and provides irregular income.



facilities is very limited, particularly during this period. Often service providers are not available.

Hazards

There are different types of flooding that affect the Hoar. Flash flooding, which usually occurs at the end of the dry season in April can have a particularly devastating effect on the *boro* rice crops, which is the main livelihood for the poor in this area.

Flood types in haor districts





This area is also subjected to severe storms and nor'westers on an annual basis, which affects crop production and destroys marginal housing.

Source: BARC

Fishing is the main industry during the rainy season. However, large Dhaka based companies control the majority of the industry, providing very limited opportunities for smallscale fishermen.

The road network and communication system are very weak. Many of the main roads are submerged during the monsoon and are therefore only accessible during the dry season. The flooding creates high costs for road maintenance; as a result there are no

Food utilisation

It is difficult to maintain access to safe water and proper sanitation facilities in this area. There are few tube wells in the region and the population generally needs to walk great distances to access safe drinking water. Therefore most inhabitants of the Haor use the same water for washing, cooking and drinking, resulting in a high incidence of diarrhoeal illnesses, especially in the rainy season. Access to public health



The Coastal belt



This area is an active delta, where the lower Meghna empties into the Bay of Bengal. The region includes a number of both small and large islands, as well as char lands.

The Coastal belt was the former granary of Bangladesh, however the area has suffered

from river erosion, salinity, repeated natural disasters, and out-migration. The remaining population is highly food insecure and isolated from reliable communication and transportation systems. The poor infrastructure and relatively low concentration of service providers has made it difficult for the population to access basic facilities.

Besides the government and local government bodies there are very few NGOs operating in the Coastal belt, particularly in the realm of development assistance. The logistic challenges and costs associated with working this region in have discouraged many development NGOs from establishing programmes.



Food availability

The agricultural land that borders the Bay of Bengal does not have a good cropping pattern. Siltation and sand deposits on the land, combined with the intrusion of saline water limits the potential for agricultural cultivation. These conditions allow for just one rice crop a year and for chillies to be grown, but the lack of irrigation, fertilizers and modern equipment greatly limits production. As a result, a lot of the land in this area lies fallow.

throughout this area. Flooding renders roads impassable for much of the year, leading the local people to depend primarily on river-based transportation. This makes bringing goods to markets difficult and expensive, and discourages outside industry from setting up in the area. Particularly on some of the more remote islands, it can take hours to reach the mainland and days to travel to Dhaka.

Food access

The main occupation in this area is agricultural production, however more than half of the people are functionally landless and therefore rely on selling their labour to wealthy farmers. Fishing is a seasonal occupation for many of the people in the Coastal belt. Other opportunities for employment are very limited, as there are no factories or cottage industries in this area. However, some people are able to earn a living in the service industry, particularly in transportation.



typically return to the area in time for the harvest in December.

Food utilisation

Malnutrition, particularly among girls, is comparatively common in the areas. coastal



During the non-

men from this

area migrate to

period,

agricultural

many

Hazards

The Coastal belt is highly prone to a number of natural hazards, all of which have a substantial impact on food security.

Almost every year there is damage to



crops, houses and livelihoods from floods or tidal waves. As this area borders on the sea, any surges in water level have a large impact on the local population. Erosion is a key problem, as much of the land that is currently inhabited and cultivated is being worn away by the regular water movement and flooding.

Cyclones are common in this area, and occur on average every two to three The cyclones can devastate years. agricultural production, destroy houses and infrastructure, and result in deaths. The ultra-poor are generally most at risk, as their homes tend to be built with weaker materials and located on the most marginal lands.



Embankments have been built in some areas to protect the land from salinity and increase crop production, but most of these embankments are not maintained properly due to insufficient resource.

The transportation and communication network is very slow and unreliable

The diet of the food insecure, which consists predominantly of rice and fish, is lacking in key



micronutrients, which has led to a high prevalence of skin diseases and stomach ailments. When illness arises, access to health facilities and medical care is constrained by distance and slow river-based transportation.

There is limited access to clean drinking water and proper sanitation facilities, particularly among the most marginal groups, which exacerbates these health problems.

Food and Ministry of Disaster Management and Local Government Engineering Department have constructed a large number of cyclone shelters throughout the coastal belt with financial assistance from the development partners.

Although this effort has saved lives, many of the shelters are located a significant distance from the most affected communities. The shelters also do not offer a place for keeping livestock, which has discouraged many people from moving to the shelters inclement weather when arises.

Profile of highly food insecure areas

The Chittagong Hill Tracts



The Chittagong Hill Tracts (CHT) is a hilly, forested area in southeast Bangladesh that is distinct from the rest of the country. Its demographics include some 12 different tribal groups alongside nontribal population. Following more than two decades of politically motivated

armed conflict, a peace agreement was signed in 1997, which is still under implementation. The region, therefore, continues to be characterised by chronic insecurity and instability with a large number of internally displaced people in need of resettlement.

Much of the population is located in very remote areas, making access to basic services difficult. Additionally, although most people in the area are agricultural labourers, the lack of access to cultivable land means very low food production, which has a great impact on household food security.

Government organizations, local government bodies, UN agencies, as well as some of the international NGOs and a small but emerging network of indigenous NGOs are operating in the CHT.

Food availability

Access to cultivable land is a key issue in the CHT: much of the territory is composed of reserve forests. Land settlement issues particularly of returned refugees and internally displaced people have yet to be addressed following the signature of the Peace Agreement. It is often the smaller ethnic groups that live in the most remote and hilly areas where it is most difficult to cultivate the land. These people traditionally engage in shifting (*jhum*) cultivation. Although they are able to cultivate a diversity of crops, including rice, potatoes, sweet potatoes and pumpkin, the crop yields tend to be low. There is only one harvest per year, the timing of which is different from the rest of Bangladesh. For jhum farmers, the lean season is from May to September, when severe localised food shortages occur, and harvesting occurs in September and October.

Food access

The poor road and transportation system together with the terrain makes it almost impossible for the farmers to bring their produce to market. As a result, they are forced to sell their crops to a middleman, who pays a much lower price than would be received commercially. Market facilities are also generally limited.



A combination of the security situation, the poor infrastructure and the inadequate transportation system has discouraged private sector investment in the CHT.

During the non-agricultural period there is some migration to Chittagong, but most people tend homestead gardens, cut wood or bamboo from the surrounding forests or remain jobless. Unemployment is a particularly large problem throughout the year.

Food utilisation

Most people consume only two meals a day. Traditional eating practices include the consumption of '*atap*' or parboiled rice, which is in limited supply. The local diet tends to be comparatively diverse, which has lowered some of the micronutrient deficiencies compared to

women in CHT, which are the highest in the country.

Health and sanitation facilities and services remain extremely poor, both in infrastructure and staffing. The more remote areas are often totally lacking in services, forcing people to travel long distances for basic medical care. Access to clean water and latrines remains a serious problem; intestinal infections are an ongoing concern. Additionally, although the CHT only houses one percent of the country's population, more than twothirds of Bangladesh's malaria cases occur in this region. The disease is also a cross border issue with India and Myanmar.

Hazards

The peace agreement of 1997 has trimmed down the political instability in the region, which had its route in the pre-independence period and created an atmosphere conducive to development.

The region is earthquake-prone. Although there have been recent small earth tremors, there has not been a substantial quake in many years.

Crop production in the CHT, as with all agricultural work, is affected by storms and above or below-average rainfall.

Illegal excessive logging has lead to deforestation and soil erosion, increasing the area's vulnerability to landslides and reducing the availability of arable land.

Most of the food grown is for household consumption, although some excess is sold to obtain disposable income. Additionally, pineapple, some cotton and tobacco are grown as cash crops.

9

the other parts of the country. One exception is anaemia rates among

Jhum Calendar



Bush clearing Burning Planting Weeding

Harvesting



Food insecurity and poverty

Food insecurity at the household level is closely linked with poverty. Poverty can be a cause as well as an outcome of food insecurity. Households that are poor lack the means to acquire sufficient and nutritious food and so are likely to be food insecure. On the other hand, people that are food insecure may have to sell or consume their productive assets to satisfy their immediate food needs. This undermines their longerterm income potential and as a consequence they may become poor.

In Bangladesh the poverty problems are overwhelming, with approximately half the population living in poverty. The Bangladesh Bureau of Statistics uses two different approaches to measure poverty: the direct calorie intake (DCI) method, and the cost-ofbasic-needs (CBN) method. The DCI method measures the calorie intake per capita per day. If this is below 2,122 kcal, it is defined as "absolute poverty", whilst "hard-core poverty" refers to a calorie intake of less than 1,805 kcal per capita per day. In the poverty lines CBN method, are calculated based on the per capita expenditure required to meet basic food needs plus an allowance for nonfood consumption. Firstly a food poverty line is established which is equal to the cost of a fixed food providing bundle, the minimum nutritional requirement of 2,122 kcal per day. Then a non-food allowance is added: The "lower poverty line" adds an amount equal to the typical nonfood expenditure of households whose total expenditure is equal to the food poverty line. The "upper poverty line" adds an amount equal to the typical non-food expenditure of households whose food expenditure is equal to the food poverty line. Because prices vary among geographical areas, poverty lines are calculated separately for different regions. In this atlas, extreme poverty refers to those people living below the lower poverty line.

expected, there is a great deal of similarity between the poverty map and the relative food insecurity map. The poorest upazilas can be found in the north-west, the coastal belt, Mymensingh, Netrakona, Bandarban and Rangamati, as can be seen in the

Range of estimates of incidence

chart below. In terms of absolute numbers, districts with more than one million people living in extreme poverty include Sirajganj, Naogaon, Bogra, Mymensingh and Chittagong.

Range and number of extreme poor by district



Number of extreme poor

Sylhet Sunamganj Habiganj Maulvibazar Thakurgaon Sirajganj Rangpur Rajshahi Panchagarh Pabna Nilphamari Nawabdani Natore Naogaon Lalmonirhat Kurigram Joypurhat Gaibandha Dinajpur Bogra Satkhira Narail Meherpur Magura Kushtia Khulna Jhenaidah Jessore Chuadanga Bagerhat Tangail Sherpur Shariatpur Rajbari Netrokona Narsingdi Narayanganj Mymensingh Munshiganj Manikganj Madaripur Kishoreganj Jamalpur Gopalganj Gazipur Faridpur Dhaka Rangamati

Levels of poverty vary substantially across the country. To quantify the extent of variation, a variant of the small area estimation technique was applied (see box on page 16). This method produced estimates of the incidence, gap and severity of poverty at the sub-district (upazila) level for both the upper and lower poverty line (BBS/WFP, 2004). The map presenting the lower poverty incidence (shown on opposite page) captures most of the available information on the geographical distribution of poverty. As









Source: Bangladesh Bureau of Statistics / World Food Programme, 2004

Union level poverty map

Probability of high level of extreme poverty

At union level the standard errors of the poverty estimates become much larger than at upazila level, with in some cases very few data points available. In this map these standard errors have therefore been incorporated by showing the probability that a union has a lower probability that a union has a lower poverty incidence that exceeds 30 percent. Thus when targeting aid geographically, those unions having the greatest chance of exceeding the threshold poverty incidence of 30 percent, should receive priority.

> INDIA (Meghalaya)

INDIA (Assam) Poverty

(Tripura)

OTWALI)

INDIA





Source: Bangladesh Bureau of Statistics / World Food Programme, 2004

Poverty

Targeted income transfers to ensure food security

The main underlying cause of food insecurity in Bangladesh is the widespread existence of poverty, and in particular extreme poverty. Due to inadequate purchasing power, the poor simply lack the ability to acquire a sufficient amount of food. The table below compares per capita consumption of a non-poor household with a poor household.

Food intake (g/day)

		Household	
Food item	All	Poor	Non-
			poor
Food grain	477	439	504
Potatoes	64	52	72
Vegetables	149	122	169
Milk and milk products	32	12	47
Meat, poultry, eggs and fish	65	33	89
Pulses	24	19	29
Others	115	65	152
Total	926	741	1060
Kcal	2200	1900	2500

Source: Poverty Monitoring Survey, 1999

It shows that the food intake of a poor household is less for all major food items, including food grains. A poor household consumes on average 1900 kcal per capita per day compared to a non-poor household's intake of 2500 kcal per capita per day. It is the right of every citizen of Bangladesh to have sufficient food and it is therefore the obligation of the government to ensure access to food by all. Targeted income transfers to the poor provide an interim solution to the problem of household food insecurity by raising their ability to acquire not only a larger quantity of food but also of more nutritional value. attain this, the government То implements a number of social safetynet programmes such as Food-for-Work, cash transfers, Vulnerable Group Development, Vulnerable Group Feeding, Food for Education (now Cash for Education). Government also has some special programmes like allowance for elderly poor people (Bangladesh Economic Review, 2003). In 2001/2002, the total government budget for these activities was almost 20 billion taka. If Bangladesh were to have a social benefit system where every household with an income below the lower poverty line would receive income support equal to the gap between household income and the lower poverty line, an annual total of 5380 crore taka (~927 million US\$) would be required. If this could be administrated without any cost, it represents the annual amount required to immediately eliminate extreme poverty. The resource allocation map

on the opposite page shows the requirements per upazila in million taka per month. The largest share of resources should be targeted to upazilas the north-west, in Mymensingh, and the coastal belt in the south-east. It is apparent that despite a high incidence of poverty in some areas, such as the Chittagong Hill Tracts and Netrakona, relatively small amounts of resources are needed to eradicate extreme poverty. This is due to either a small poverty gap and/or a low population density in these particular areas. Resources are however scarce. Optimal use should therefore be made of the resources that are available, whether this is in kind or in cash. Food and cash have both their specific advantages and disadvantages as summarized in the table below.

Cash versus Food transfers

Food	Cash		
Advantages:	Advantages:		
 Food directly addresses nutritional deficiencies. Food has self-targeting element. Food is under control of women and has therefore a positive impact on intra- household distribution. Food is suited to the established government managerial and administrative 	 Cash is fungible and allows choice of utilization. Cash is more cost efficient. Cash encourages investment in productive assets. In surplus areas with well functioning markets, cash has a stimulating affect on the local economy (multiplier effect). 		
capacity.	Disadvantages:		
 Food provides households with a sense of security. Food is visible and risk of diversion is 	 Cash has a higher potential for losses given weak government institutional capacity 		
therefore less.	for monitoring.		
 therefore less. Food protects against a seasonal or sudden increase in food prices. Food immediately increases the availability in remote deficit areas. 	 It is more difficult to target individuals with cash, such as children, pregnant and lactating women. Utilization of cash is 		
 therefore less. Food protects against a seasonal or sudden increase in food prices. Food immediately increases the availability in remote deficit areas. Disadvantages:	 It is more difficult to target individuals with cash, such as children, pregnant and lactating women. Utilization of cash is often determined by more and is 		

primary concern is food. Once meeting one's family's food needs is no longer an all-consuming priority, provision of cash can be used to encourage investment in productive assets. Cash transfers therefore become more important following the transition from a situation of chronic food crisis to development. This process is depicted in the diagram below.



2. Desired outcomes

programmes where In improved nutrition is a major objective, food is likely to have a greater impact than cash as the transaction costs incurred in converting food to cash is a compelling argument for direct consumption.

3. Beneficiary's choice

The preference for food over cash by beneficiaries depends on a number of factors, such as the household's level of food security, the level of control they can exercise over the income transfer, the type of programme they are enrolled in, and the entitlements they are receiving. If food is transferred, wheat or wheat flour should be distributed rather than rice. Bangladeshis prefer rice to wheat and wheat therefore is self-targeting; only the poor are willing to accept it. Targeting individual household members is likely to be easier through the provision of food than cash. Supplementary feeding for pregnant women and nursing mothers and malnourished children is a good example of how food aid can be used effectively to directly address the

and handling.

- Food losses from spoilage and theft.
- Food is less easily exchanged for other essential items.

Introduction of large quantities of food into a local market may depress food prices, creating a disincentive for local production.

non-essential and non-productive items.

- Cash presents a higher security risk.
- Cash does not protect against food price fluctuations.

Apart from availability of resources, the choice between food and cash depends on six conditions.

1. The target population

Food security interventions should target extremely poor people whose particular needs of the most vulnerable household members.

4. Availability and access

Cash injections into a local economy can have a stimulating affect on food production and trade, and in a situation like Bangladesh where in most parts of the country commodity markets function well, cash may provide a more direct stimulus to development than food. However, Bangladesh, being a disaster-prone country, may require a food grain security stock in order to ensure adequate cereal supplies during emergencies when physical access to food is often severely hampered.



5. Local economic conditions

Seasonality plays an important role in the rural economy of Bangladesh. Wage income and food prices fluctuate according to the production cycle. Fluctuating food prices can be a justification for providing food transfers to poor households. Food transfers become a more valuable resource during periods of high food prices. On the other hand, injecting large quantities of food can have a negative impact on local production. Carefully targeted food aid programmes and appropriate ration scales should minimize these consequences.

6. Cost effectiveness

Cash is less costly to manage than food. It does not bear the cost of commodity handling, such as transportation, handling and storage. However, other factors such as likely level of leakage, institutional capacity, administrative charges and likely impact also have to be taken into consideration. Distribution of food is visible by way of transport and storage. Cash does not have this advantage and given the weak institutional capacity in Bangladesh visibility may be an important factor in preventing misappropriation. Introducing cash programmes for the ultra-poor would require the establishment of a transparent transaction and control system. To do so, there are some major financial management difficulties that need to be overcome.

Food alone will not be enough to lift people out of a situation of chronic crisis. Cash is needed to provide complementary support (e.g. capacity building and training) or can be used to increase the value of the food through for example fortification. On the other hand, food can complement cash, particularly when certain nutritional outcomes are to be achieved, or when vulnerable individuals, such as women and children, are to be targeted. In addition, food is required as an immediate response in emergency situations.



Small Area Estimation

Small area estimation is a statistical technique that can be used to derive poverty estimates at a small level of aggregation, by combining survey data with census data. Surveys provide direct indicators of poverty, such as household income and expenditure, however usually at an aggregated level, e.g. divisional or national. Census data, on the other hand, are available at the fine level, union or even household, but contain only a limited set of basic indicators. Census indicators do not necessarily provide insight into the magnitude of the poverty problem at the local level. By combining survey data with census data, direct estimates of poverty and malnutrition can be derived at the local level.

The first step is to identify a set of variables that are not only available in the survey but also in the census. These then form the basis for developing regression models with which, after substituting the survey indicators for the census data, local poverty indicators can be predicted.

In Bangladesh, the Household Income and Expenditure Survey (2000) was combined with a five percent sample of the population census (2001) to derive estimates for the poverty incidence, gap and severity at the sub-district level. Including indicators from the Child Nutrition Survey (2000) estimates for child malnutrition were derived, namely the incidence of stunting and underweight of children under five years of age.

For each small-area estimate a standard error is calculated, reflecting the uncertainty of that estimate. A rough rule of thumb is to take two standard errors on each side of the estimate as representing the range of values in which we expect the true value to lie.

As each small area estimate is surrounded by uncertainty, field verification is essential. This was done for the whole of Bangladesh by comparing the perceptions of upazila level deprivation by WFP field staff with the small area estimates. 81 percent of the upazilas with an estimated incidence of extreme poverty of 30 percent or higher were also identified by WFP field staff as deprived.



Source: Bangladesh Bureau of Statistics / World Food Programme, 2004

Nutrition

Malnutrition

The nutritional status of an individual not only reveals much about her history to date but also about her future potential and well-being throughout her life. An infant born to a mother that is undernourished will likely be low in weight. If the infant survives, her growth will be more likely to falter. The stunted child has a limited ability to learn in school and to acquire other essential skills that will pay off in the labour market, in the community or at home. She will be more susceptible to chronic diseases in later life and her productive ability and earning capacity will be reduced. During her childbearing years, she will give birth to low-weight children herself and so the intergenerational cycle of poor nutrition and illness continues, putting a heavy cost on the society as a whole¹. Half of the children in Bangladesh face this scenario.

The intergenerational cycle of malnutrition



Status of nutrition

Low birth weight	30-50 % of live births
Children under five	
Stunting	49 %
Underweight	51 %
Wasting	12 %
Mothers BMI<18.5	45.5 %
Anaemia rates	\pm 50 % of pre-school children,
	women of reproductive age
	and adolescents
Vitamin A status	80 % of pre-school children
	receive vitamin A supplement
Iodine status	43 % of population is iodine
	deficient

rates of micronutrient deficiencies (in particular iron and iodine) remain at very high levels.

The incidence of malnutrition is geographically concentrated. Children in rural areas are more likely to be malnourished than in urban areas. To obtain a detailed picture of the geographic dimension, the Bangladesh Bureau of Statistics and the World Food Programme made an effort to map out the nutrition status of children at the upazila level (see box on page 20). Two maps have been prepared showing the probability of high prevalence of stunting and underweight at the upazila level. Broadly two clusters where high levels of child malnutrition can be expected were identified: (1) the coastal belt, extending from Jhalokati via Bhola and Noakhali to Cox's Bazar, and (2) the northern

> border districts, extending Kurigram from to Sunamganj. The chance of finding more than half of the children malnourished is more than 75 percent in these areas. The regional concentration of malnutrition means that geographic targeting of nutrition interventions can have a high pay off in achieving the largest reduction in the number of malnourished children.

Poverty is no doubt an important determinant of the nutritional status. Because low income results in low purchasing power for food, we can expect a strong association between nutritional status and income levels. However, the relationship is not as strong in Bangladesh as one would expect. More than one third of the richest 20 percent of children - a group likely to have good access to food - are

malnutrition, while some areas with a low incidence of poverty, such the districts of Jhalokati, Lakshmipur, and Noakhali along the south-eastern coast, experience high rates of child malnutrition. This suggests that there are other factors that play an important role in determining the nutritional status of children.

Causes of child malnutrition

Malnutrition is determined by a set of factors at several levels other than access to food. The immediate causes of child malnutrition are poor diet and infections, and the interaction of the two. These factors in turn are determined by the underlying factors, which can be classified into household food security, care and the health environment. Basic factors include power relationships and socio-economic conditions that are not specific to nutrition but can have powerful impacts.

UNICEF, 1998

Perhaps the single most important factor basic that determines malnutrition in Bangladesh is the inability of women to claim their rights. Data from Helen Keller International suggests that when women are in control of household resources they spend more on food and medical care and provide a more diverse diet, despite their lower income status. As a consequence they and their children have a better nutritional status. Education is another important factor in determining the nutritional status. Children of mothers with no schooling are two to three times more likely to experience malnutrition. severe Education improves nutrition through a number of ways: (a) it teaches parents, boys and girls about the importance of a nutritious diet, (b) it develops skills necessary for undertaking income generating

activities and in this way increases the household's income potential, (c) it delays age at first marriage for girls and hence age at first birth. Spatial characteristics of access to education are presented on page 30. The availability of food, particularly fresh vegetables and pulses on the local market may also have a profound impact on nutrition. Variation in food prices across regions may also explain some of the regional variation in malnutrition rates (see page 24). Further improvement in infrastructure and transportation that leads to more market integration are likely to reduce the regional variation in malnutrition. Providing appropriate care, hygiene and feeding practices depends on knowledge, resources available, mental

Malnutrition rates in Bangladesh are among the highest in the world. Approximately percent 50 of children under five years of age are stunted underweight. and Malnutrition among women has long been recognized as a problem of significant magnitude. 45.5 percent of mothers of children under five years of age have a body mass index (BMI) less than 18.5. The



Child malnutrition rates (%) by per capita expenditure quintile



This is also evident when comparing the child nutrition maps with the poverty map. Several areas with a high incidence of poverty such as Dinajpur, Rangpur, Noagaon, Rajshahi and Bandarban have lower rates of

continued on page 20



¹ The World Bank estimates the current cost of malnutrition in Bangladesh at US\$ 1 billion annually. This section relies heavily on Lawrence Haddad et.al., January 2004



and physical ability of caregiver, and social and family support. In a poor Bangladeshi family many of these factors are often compromised. Of particular importance is the nature and duration of feeding practices, including breastfeeding. A common and harmful feeding practice is the early termination of exclusive breastfeeding, often due to a mother's perception that they do not produce enough milk, in part because of their poor nutrition and heavy workload. Cultural believes often lead women to restrict their food intake

during pregnancy in fear of complicated Weaning childbirth. diets in Bangladesh are often inadequate and as a consequence child malnutrition rates increase drastically from around 10 percent at 6 months of age to more than 50 percent at 12 months of age.

Access to safe water, proper sanitation and adequate health facilities are other important determinants of the nutritional status. In Bangladesh the quality of drinking water (besides the huge problem of arsenic) is not a main

cause of malnutrition. Rather it is the use of unsafe water for bathing, washing clothes and kitchen utensils that is an important cause for diarrhoeal and other infections.

The use of open space as a toilet is associated with the highest rates of malnutrition. A spatial overview on major infectious diseases, access to health facilities, adequate sanitation and sources of drinking water is provided on pages 25 and 26.

Estimating child malnutrition at local level

Using a variant of the small area estimation technique, the Bangladesh Bureau of Statistics jointly with the World Food Programme, derived two indicators of child malnutrition based on measurements of a child's height and weight, namely stunting and underweight. Stunting or low height-for-age is defined as having a height at least two standard deviations below the median height for a reference population. Underweight or low weight-forage is similarly defined. The data used as a reference standard in these definitions was established in 1975 by the National Centre for Health Statistics/Centre for Disease Control in the USA (the NCHS reference). Stunting can be regarded as evidence of chronic malnutrition. Underweight reflects both chronic and acute malnutrition. A third indicator of child malnutrition, wasting, or low weight-for-height, reflects short-term acute hunger. Wasting rates vary according to the season and are significantly lower than underweight and stunting rates, at an annual average of approximately 12 percent. For this reason, estimates of wasting were not calculated. In order to estimate stunting and underweight, a five percent sample of the 2001 population census was combined with data from the 2000 Household Income and Expenditure Survey (HIES) and the Child Nutrition Survey (CNS). Despite the fact that the CNS contains a wealth of information only two additional indicators could be added to the ones used for the poverty estimates, namely age and sex. Due to limitation in the number of variables that could be used and the lack of local level indicators on health, care and hygiene practices, a satisfactory predictive model for malnutrition could not be found. To improve results, the country was divided into six relatively homogenous zones (Chittagong Hill Tracts, North-east, Coastal, Eastern, Central and Northern) and a separate model was fitted for each zone. Unfortunately, a few zones had only small numbers of sampled households in the survey data and so only simple models could be fitted. The average standard error was about 6 percent, which is perhaps a little too high for a reliable comparison to be made between upazilas. The standard errors were therefore incorporated by calculating the probability of stunting and underweight in children under five exceeding 50 percent in a particular upazila. The probabilities were then

classified into four classes and mapped. For the reasons described above, the resulting child malnutrition maps should be regarded as tentative. To a certain degree the maps are validated by comparing them to the UNICEF MUAC measurements at district level. MUAC is the measurement for the mid-upper arm circumference. Children with a mid-upper arm circumference less than 12.5 cm are considered malnourished. The measurement is not without its problems and should be interpreted carefully. Averaging the data from Progotir Pathey (UNICEF, 2000 and 2003) shows a similar spatial pattern of malnutrition as the small area estimation results for stunting and underweight, with high incidences of malnutrition in the Sylhet haor basin and along the coast in the south-east of the country. Further field verification is however required.

> Average malnutrition status Boys and girls (12-59 months)



The CNS dataset was too small to allow disaggregation of malnutrition rates by sex. There is however a persistent gap between girls and boys' malnutrition rates, with girls being generally worse off. However, regional variation exists with some areas having even better malnutrition outcomes for girls than boys, as is evident from the map below based on MUAC measurements from 2000 and 2003.

> Malnutrition gap Girls minus boys (12-59 months) MUAC < 12.5 cm







Stunting map Probability of high prevalence of stunting Kali ganj (children under five, rate > 50 %) RANGPUR Mithapukur DINÁJPUF INDIA INDIA (West Bengal) BAND (Meghalaya) QALABHY Gobindaganj Patnitala 🤇 m AL AOGAONBa BOGRA menshi Balaganj Fench MENSI Kulaura VIBAZAF ssamper Karimgan Mithamain Kishoregan KISHOREGANJ SIRAJG ANJ kar INDIA (Assam) GAZIPI INDIA PARIA (West Bengal) Pabna GhiotMANI DHAKA INDIA HENAIDAH (Tripura) HANDPUR chhar HAGRACHHA JESSORE irang M ngarh RANGAMATI Rampal BAGERHA AIKHIRA elaichl

Nutrition



Source: Bangladesh Bureau of Statistics / World Food Programme, 2004



Source: Bangladesh Bureau of Statistics / World Food Programme, 2004



Food availability

Food supply

Since independence in 1971, Bangladesh has made remarkable progress in domestic food grain production. The production increased from around 11 million metric tons in the 1970s to more than a projected 25 2003/2004. million in In correspondence with this, the inflow of food aid slowly decreased from as high as 20 percent of the total food supply in 1974 to a marginal 2 percent in 2000.



Since 1999 Bangladesh claims to be self-sufficient in food grains, i.e. it produces more than the requirement level of 16 ounces (~454 gram) per capita per day. The self-sufficiency concept is useful for planning purposes but it does not reflect the actual supply and demand conditions prevailing in the market and which determine people's access to food. Self-sufficiency is not a pre-requisite for attaining national food security. As long as food grains can be imported without putting undue pressure on the foreign exchange reserves to meet domestic requirement there is no problem. However, reliance on food imports faces two hurdles: (i) constraints in foreign exchange, relying mainly on the Ready Made Garment sector, and (ii) unfair competition to domestic farmers who do not enjoy the level of subsidies available to Indian farmers.

The total national food grain supply is made up of domestic production, food imports (including food aid) and changes in the reserve stock (both private and public). Despite increased domestic production, private imports have grown substantially from zero in 1990/91 to almost 3 million metric tons in 2002/03. With national supply increasing ahead of population growth, the prices of food grains have been in long-term decline. This has helped the rural as well as the urban poor in meeting their energy requirements, still leaving however about 27 million hardcore poor, unable to purchase sufficient amounts of food. The typical diet of a Bangladeshi is predominantly rice based and on average 75 percent of the daily energy intake is derived from food grains. As a consequence, the real demand for food grains is above the fixed requirement level of 454 grams

and amounts to an average of 476 grams per capita per day. Using this higher requirement level and adjusting local production estimates for seeds and post-harvest losses, food grain surplus and deficit areas were determined, as shown on the adjacent map. When this map is compared with the relative food insecurity map on page 4, it is obvious that there is no relationship between the local food security status and food grain production. Food grain deficit areas are primarily located in the central-eastern part of the country, which has been identified as having a relatively low food insecurity status. However, pockets of high food insecurity may be found in areas where non-availability of food grain can be expected as a result of the combination of high food grain deficit and poor or non-existent road and market infrastructure (see map on page 24). Such pockets, where people do not have easy access to marketed food, can be found in the Chittagong Hill Tracts, remote char lands, Sylhet haor area and coastal zone.

Food supply varies according to the season, with domestic food supply the lean being scarce during seasons in March-April and October-November, prior to harvesting. The lean seasons are characterized by a lack of agricultural employment opportunities, low agricultural wages and high rice prices. An annual phenomenon is the occurrence of "monga" (hunger), particularly in the north-western region of the country during this time (see page 31).

The dominant cropping patterns of Bangladesh are shown on the opposite page. Most areas allow three crops a year with the exception of the Sylhet hoar basin, the drought prone areas in the west and the coastal areas. Rice is grown throughout the country with the exception of the Chittagong Hill Tracts. Wheat is predominantly grown in the north-west and in districts along the The main vegetable Padma river. producing areas are in the west around the town of Jessore. The availability of fresh vegetables here may be an important explanatory factor for the low incidence of child malnutrition in this area.



Source: WFP's own calculations based on data from DAE year 2001 -2002 $% \left(1-2002\right) \left(1$

Production of pulses is concentrated in the central south-west. Pulses together with fish used to be the two most important non-cereal crops for the poor in Bangladesh. However, fish stocks are being depleted and the per capita availability of pulses fell by 27 percent between 1987/88 and 1998/99. The drive towards self-sufficiency in food grains has substituted the winter rice crop (*boro*) for pulses.

Food prices relative to rice



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The real price of lentils, the most common pulse, relative to rice increased by 86 percent during the period 1982-2002. Prices of other foods rich in micronutrients are also gradually increasing. The poorest households have reacted by substituting cereals for more nutrient rich foods.

Cropping Calendar (rice and wheat)







Food access

Sources of income

Labour is the most important and often only productive asset that the poor have. Employment opportunities and the income it provides, have therefore an important bearing on reducing food insecurity. Within rural areas, most of the income of a poor household is derived from agricultural wage employment. However, household members may be engaged



Source: BBS, Population Census, 2001

in a whole range of different activities over time and across seasons. Dependency on agricultural wage labour leaves a household vulnerable to cyclical food insecurity as agricultural employment opportunities vary according to season. During the lean season, in March-April and October-November, prior to harvesting the main rice crops, opportunities are iob low, resulting in low wage rates, while food prices are at their highest. Income derived from non-agricultural sources provides a possible safeguard against the cyclical nature of agricultural income and therefore can improve household food security. The non-farm sector as a source of income for the poor has risen importance. The latest in surveys suggest that almost 40 percent of a poor household's income is being derived from such as industrial sources employment, services, construction, small-scale enterprises and remittances. The map to the left shows that the share of income derived from non-farm sector activities varies considerably across geographic regions.

Remittances are an important source of income for households in the Sylhet and Comilla areas, where a high share of femaleheaded households can be found due to husbands working overseas (see page 27).

Overlaying the non-farm sector income map with the relative food insecurity or poverty map, shows that households living in highly food insecure areas are more constraint in finding gainful employment in the non-farm sector.



Agricultural daily wages vary by location (see map above). This in part reflects the differences in cost-ofliving between areas, however, the number of landless families agricultural competing for employment and the availability of alternative non-farm sector employment are other important factors.

The Public Food Distribution System (PFDS)

The Government of Bangladesh maintains a national food security reserve of around 800 thousand metric tons of food grains of which about 450 thousand metric tons is intended for food security purposes. The aim is to (i) make food available to poor households, who otherwise would have insufficient access to food, (ii) provide a timely response to emergency situations, and (iii) stabilise food grain prices to prevent excessive price hikes. The PFDS is made up of 5 silos, 13 central storage depots and 578 local storage depots, which are located in each upazila of the country. The map on the right depicts the storage capacity and cereal stocks held by district as per July 2004. Off-take for food security purposes consists of targeted food distribution programmes, emergency and disaster response and open market sales. Targeted food distribution programmes, such as Vulnerable Group Development, Food-for-Work, Test Relief, and Gratuitous Relief, with their dual objective of relief and development, address the failure of markets to provide food for the impoverished as a consequence of their lack of purchasing power. Through open market sales, the government seeks to prevent large fluctuations in rice prices as a means to enhance the overall food security status of the poor. The stock composition of the PFDS has implications for how the different objectives can best be achieved. Rice price stabilisation can primarily be achieved through rice stocks while the objectives of targeted food distribution can be achieved at lower cost with the provision of wheat or fortified whole wheat flour (atta). This would however require sufficient wheat stocks. The availability of grain reserves has the great advantage that it enables humanitarian programmes to be readily initiated during times of emergency. However, release of food grain for targeted programmes and relief do not generate income, as is the case with open market sales, with which subsequent market purchases can be made. Government or donor agencies will therefore have to make available additional funds to replenish the stock.





Infrastructure and markets

Availability of infrastructure is an important factor in determining food security in Bangladesh. It is a prerequisite for the development of a nonfarming sector and, in addition, provides incentives to local farmers to diversify crop production into higher value-added crops for sale in urban markets. If food products can easily be transported in and out of a particular area, price variations between local markets will be less. Industries, businesses and services - small and public large – all depend on infrastructure for their routine daily activities. Strong links exist between access, market facilities, rural employment opportunities, social development and poverty alleviation. The rural market network, covering over 8000 markets (hats), facilitates products, trade in agricultural agricultural inputs, as well as consumer goods. A large number of these markets lack basic facilities, such as paved areas, clean water, drainage, garbage disposal and toilet facilities, resulting in unhygienic and inefficient conditions for marketing produce. The government has designated nearly 2000 markets as "growth centres" for priority development. They consist of the larger category of rural markets providing the thrust for rural economic growth, employment creation and marketing opportunities. Generally 3-5 large rural markets are designated as growth centres per upazila, which are supposed to be connected to the arterial road network. The map at the top of the page provides information on the average travel time to the nearest growth centre by upazila, taking into account the local rural transportation network. In most of the country it takes upto 1 hour to get to the nearest growth centre. Areas



Source: WFP's own calculations based on LGED data

less well connected can be found along the upper Jamuna river, and within the haor basin of Sylhet, where it can take up to 2 hours to reach the nearest growth centre. Worst off areas where it can take more than 2 hours to reach the nearest major rural market include the Chittagong Hill Tracts and the coastal zone. Most of these areas are deficit in food grain and are therefore dependent on markets for their food supply.

Comparing the coefficient of variation of the rice price in these districts with Dhaka district reveals that prices in areas with limited market integration are likely to fluctuate more. Research has shown that this is likely to be an important cause for depressing child nutrition levels.

There is a strong relationship between the availability of electricity in a particular area and its poverty status. Household's access to electricity is mapped out below. Comparing this with the poverty map on page 12 shows that areas where less than 20 percent of households have access to electricity belong to the poorest of the country. The Household Income and Expenditure Survey reveals that in localities where electricity connections are available, it is more than four times as likely to have small cottage industries as a main economic activity than in areas without electricity.

Infrastructure is also an influential factor regarding delivery of services to the poor. An NGO for example is more likely to place its officers in areas with better access to transportation, availability of electricity and means of communication.





24

Food utilization

Public health, water and sanitation

Ill health undermines food security directly by reducing the ability of the body to absorb required nutrients from food consumption, and indirectly by reducing people's ability to work or for children to go to school. In addition, it increases the amount of private and public resources spent on health care, which could be used for alternative purposes.

The incidence of disease in Bangladesh is high (see table). Among the leading causes of morbidity and mortality among children under five are respiratory illnesses (colds, coughs, pneumonia and asthma), diarrhoea and nutritional problems.

Incidence of diseases

Diarrhoea Acute Respiratory Infections (ARI)	20.8 % 18.3 %
Measles	8 %
Tuberculosis	2.21/1000
Malaria	1.5 %

Malaria is no longer a major cause of death in Bangladesh and is largely confined to the Chittagong Hill Tracts. HIV/AIDS has not yet emerged as a major disease, with an estimated prevalence rate of 4 percent among the injection drug users and less than 1 percent among the high-risk groups like sex workers, truck drivers, rickshaw pullers, launch workers and STI patients (MOHFW, June 2003). However, given the high prevalence neighbouring rate in countries, together with a low awareness of HIV/AIDS, and high percentages of migrant workers, there is a major concern that HIV/AIDS will emerge as a serious threat in the future with subsequent critical implications for household food security. Considerable progress has been made in the eradication of tuberculosis. However, in some parts of the country tuberculosis is still common. Another disease that silently exists in the rural community is visual impairment. An overview of the rural disease pattern by location for diarrhoea, acute respiratory infections, tuberculosis and malaria is provided in the maps on the following page.

coastal zone with the exception of Chittagong district, the haor area in Sunamganj district, and the char lands in Kurigram difficulty district. The in accessing the nearest upazila health complex is depicted in the adjacent map. Other factors stopping women using available health facilities include: no confidence in services provided, absenteeism and attitude of the service providers towards women, lack of money for treatment and transportation, and not receiving permission from male members of the household.

Unsafe drinking water and lack proper sanitation of are important causes of diarrhoea other and infections in Bangladesh. In turn, when these infections affect child а repeatedly, they become a cause of malnutrition. We would therefore expect a strong correlation between availability of adequate sanitation and safe drinking water, incidence of persistent diarrhoea and child malnutrition rates.

Without considering the worrying situation of ground water arsenic contamination, the problem of access to clean drinking water is to largely confined the Chittagong Hill Tracts and the northern part of Sylhet district. The coverage of adequate sanitation facilities is greatest in the area east of Dhaka, where more than 40 percent of households have access (see map bottom right).

As expected there is a broad relationship between the mainutrition estimates (see stunting and underweight maps on pages 18 and 19), and a household's access to proper sanitation. The relationship with the prevalence of diarrhoea according to MICS 2000 and 2003 data is less clear. This may be due to other important seasonal factors that determine diarrhoea prevalence among young children. According to Helen Keller's Nutrition Surveillance System, peaks in diarrhoea cases normally occur around the June-August period coinciding with the monsoon and flooding season.





The Bangladesh Demographic and Health Survey of 1999-2000 shows that 80 percent of women feel that the lack of nearby health care facilities is their main obstacle in accessing necessary health care. Access to health facilities is particularly troublesome in more remote areas such as the Chittagong Hill Tracts, most of the

25





Yearly average over 6 year period, 1998 - 2003





Source: BBS / UNICEF, Protogir Pathey, 2003



Source: Health information unit, DGHS / WHO Cases in 1999 Source: Health information unit, DGHS / WHO Yearly average over 6 year period, 1998 - 2003

Human capital

Population and migration

The estimated population of Bangladesh in 2004 is around 136 million people (BBS, 2004). The relatively higher population growth rates from 1951 to 1991 have started to decline, most notably in the 1990s (see chart below). The decline in the population growth rate is a reflection of declining mortality and fertility rates and an increasing migration trend.



espite the reduction in the population growth rate over the past 10 years, the annual incremental increase of the population will remain large due to a high proportion of women between 15-44 years of age (47.7%), resulting in a high number of births each year (see graph below on age composition of the population). This aggravates one of the key underlying causes of food insecurity in Bangladesh, i.e. a limited and degraded resources base on which an ever-increasing number of people have to make a sustainable living.





The findings of the 2001 population

education and health facilities, and as a strategy to maximize the family's income. In order to gain some insight into the spatial pattern of migration in Bangladesh, data on the sex ratio were used to determine areas of outand inmigration. A low sex ratio (more women than men) would indicate an area of outmigration, while a high sex ratio (more men than women) would indicate areas of inmigration. This is presented in the map in the bottom righthand corner. The main areas to where people migrate are Dhaka, the district headquarters, Mongla, the Chittagong Hill Tracts and on a seasonal basis the hoar areas. The main area of outmigration lies south-east of The poor migrate Dhaka. from here to Dhaka and the Chittagong Hill Tracts; the better off go overseas, leaving behind their wives and children. High population pressure on limited land, leading to landlessness and unemployment is a possible explanation for high migration from the districts in this area. However, the relatively good infrastructure connecting the area to Dhaka may well be the principal reason. Migration from rural areas to nearby towns is often due to a lack of vear-round employment and/or a result of natural calamities such as floods and cyclones. Studies have shown that on average 40-45 percent of a temporary urban or overseas migrant's income is remitted to their families in rural areas. In certain parts of





census regarding population density by upazila are presented in the map in the top right-hand corner. Particularly important aspects of the population dynamics in Bangladesh are the rate of urbanization and internal migration. The rate of urbanization in Bangladesh is high with an annual growth rate of 3.15 percent (BBS, 2004) and estimates predict that fifty percent of the population will reside in urban areas in 2030 (see box on urban food security on page 28). Rural to urban migration is the main factor behind the growth of urban areas. People migrate due to economic hardship, shortage of farming jobs, lack of

the country remittances have therefore become an important part of the income of a rural household. This is consistent with the information depicted in the non-farm sector income map on page 23 which shows that a large share of the households in areas with high out-migration have income sources other than agriculture, which is likely to be from remittances.

Source: BBS, Population Census, 2001



Ethnic communities and food security

Ethnic or indigenous groups in Bangladesh represent just over one percent of the total population. According to the 1991 population census, the total tribal population is 1.2 million. The exact number of ethnic groups is also uncertain. Officially, there are 29 different ethnic groups spread out across the national territory, with concentrations in the north and north-east areas bordering India and the forest areas of the central-north region, but the greatest density is in the Chittagong Hill Tracts (CHT) in the south-east.

It is believed that most of the ethnic groups are of Sino-Tibetan origin. Centuries ago they crossed the borders and/or Tibet India into from Bangladesh to flee from political instability, conflict, colonization and taxation. Several of the ethnic groups in CHT, such as the Marmas, Khyang, Mro, Khumi and Bawm, are believed to have migrated from the Kingdom of Arakan (now in Myanmar). The origin of the Chakmas, one of the largest ethnic groups in Bangladesh, is widely debated and remains a mystery; their presence in CHT is however recorded as early as the 12th century.



Urban Food Security

The urban poor in Bangladesh continue to experience substantial challenges in both food access and utilisation. The overall cost of living in urban areas is higher. It is estimated that urban dwellers pay up to 30 percent more for their food than those in rural areas and that a greater percentage of the household income is used to purchase food (60-65 percent). The urban poor are also more vulnerable to changes in market conditions and to fluctuating commodity prices as they need to purchase their food on a daily basis.

Over 85 percent of the urban poor are employed in the informal sector, mostly as lower technical workers in the industries, manufacturing transport workers (particularly rickshaw pullers), unskilled manual labourers, and as small traders and hawkers. Similar to the rural areas, these jobs experience seasonal variations and many urban dwellers must take on more than one job to provide adequate income for their families. Most of the urban poor live in crowded slums, with limited access to clean water and sanitation facilities. However, there remain variations between the different urban centres throughout Bangladesh. Generally slum dwellers in Dhaka are better off than those in other urban centres. They have a slightly higher income on average, a higher household energy intake and have better access to sanitation, particularly closed latrines.

Across the globe, indigenous or ethnic groups figure amongst the most foodinsecure and suffer from unequal access to land, education, health, sanitation and social services.

Traditionally, the livelihoods of such groups are based on their access to the surrounding natural environment and its resources: livelihoods that are being eroded as subsistence economies are replaced by market economies, to which ethnic groups often do not have equal access.

Conditions in Bangladesh are no exception: ethnic communities constitute part of the ultra-poor and live in highly food insecure areas. More than 80 percent of the ethnic population live in rural areas and depend on agriculture for their survival.

Education and food security

Children who do not attend school will most likely grow into adults unable to read, write or do simple numerical sums. With limited life and marketable skills, their income-earning potential will be low, and hence their access to food, in terms of weak purchasing power, may be compromised. In addition, they will have limited awareness on issues such as basic legal rights, health and nutrition, household economics and market opportunities, which will further contribute to their and their family's vulnerability to food insecurity. In turn, they may not be able to afford to send their children to school, or their children may go to school hungry, affecting their ability to concentrate and do well in school. In this way, the cycle of poverty, food and insecurity low educational achievements continues.

In Bangladesh, approximately one in five children are not enrolled in school. Drop-out rates are high with more than 25 percent of children not completing primary school, and barely 60 percent of children attend school on a regular basis. As a consequence, only around 29 percent of children achieve a satisfactory level of competency in reading, writing, numeric and life skills. Poor educational performance in the past has resulted in 62.6 percent (DPE) of the Bangladeshi population, aged 7 and over, being illiterate. Less than a third of the civilian labour force has received any form of formal education.



areas of the country. Variation in the availability and quality of education may explain some of the regional differences. Given the scarcity of funds available for educational purposes set against the overwhelming demands for education services, it is important that resources are directed to those areas relatively lower with educational achievements to have the highest impact. To identify these areas, two educational indices were developed: (i) an index of primary education needs, and (ii) an index of adult education needs.

Index of primary education needs

The success of primary education in a particular upazila depends primarily on two factors:

- 1. the availability of a primary school nearby; and
- 2. the quality of the education provided.

In most parts of Bangladesh, the availability of schools is not the main problem as virtually all villages have their own primary school. Government has also launched programmes like Food for Education and Stipend for the Poor Students to enhance literacy among the poor. In addition there is an extensive network of NGO schools catering to the specific needs of children from poorer households. However, schools may be inaccessible during monsoon time, or simply lacking in numbers. The quality of education is problem: classrooms are big а crowded, there is a lack of learning material, and teaching hours are short. In addition, teachers may be frequently absent, are untrained, or unenthusiastic. Above all the parental perception that involving their children in work is more effective than sending them to school may be one of the main reasons for low attendance, late entry and high drop-out rates. Late entry and duplication of classes means that a sizeable fraction of school-going children are a grade behind their target-age grade. This is an important indicator as the proportion of drop-outs rises steadily after the age of eleven. Noteworthy is that Bangladesh has more or less achieved gender parity in primary education.

available at district level. Therefore in these cases, all upazilas within a district were assigned the same value. Missing data and outliers from the upazila-level dataset from the Directorate of Primary Education (DPE) were replaced by the average value of the adjacent upazilas.

Issue	Inc	licator	Source
Access to schools	1.	Net enrolment rate	MICS, 2003
	2.	No. of schools within 1.5 km of major roads	WFP, I GED
Drop-out	3.	% of households with at least one member who has completed Grade 5	BBS, 2001
	4.	% of households with at least one member who has completed secondary education	BBS, 2001
Quality of education	5.	Literacy rate (aged 7 and over)	BBS, 2001
	6.	Attendance rate	DPE, 2003
Duplication and late entry	7.	Difference between gross and net enrolment	DPE, 2003
-	8.	Children between 6-10 years not enrolled	MICS, 2003

Each indicator was ranked and assigned a value from 1 to 511 (which equals to 470 upazilas and 41 urban thanas, BBS). A total score was then derived for each upazila by summing across all eight indicators, giving equal weight to the indicators. The total scores were subsequently classified into four equal categories and mapped out. Those with the lowest total scores have the highest educational needs and hence should receive priority for support. The resulting map is presented on the opposite page. Areas in the Chittagong Hill Tracts, the haor and around the northern part of the Jamuna river were shown to have the highest primary education needs.

Index of adult education needs

Data from the 2001 population census were used to provide insight into the geographic variation in the adult education needs. The index is based on the percentage of: (i) head of households who are literate, (ii) head of households who have completed Grade 5, (iii) spouses who have completed Grade 5, (iv) female adults who have completed Grade 5, and (v) households with at least one member who has completed technical or vocational training. The index was derived by combining these five indicators in a similar way to the method used for primary education needs. The final scores are presented in the map opposite showing the Chittagong Hill Tracts and areas in the north to have the highest adult education needs.

There are large geographic disparities in educational achievements. Literacy rates for example are considerably higher in the south-west than in other Indicators were assigned to these issues, as far as data limitation would allow. In order to provide an indication of the magnitude of each issue in a particular upazila. Eight indicators were selected as presented in the table (top right). Data from the Multiple Indicator Cluster Survey (MICS) were only





Source: World Food Programme, 2004

30

Natural disasters and household vulnerability

In Bangladesh damage caused by natural disasters is one of the main sources of crisis for poor households. Every year calamities such as floods, cyclones, erosion, and droughts cause extensive damage to crops, homes, and household and community assets, which can lead to illnesses or even deaths, decreasing the livelihood opportunities of the poor. At the same time, disasters hamper physical access to food as food stocks and crops are destroyed and markets are temporarily dysfunctional which may also lead to an increase in the price of essential foods. Natural disasters therefore directly affect the household food security status by undermining their asset base as well as indirectly through a loss of employment opportunities, an increase in health expenditure and an increase in necessary food expenditure.

The likelihood of a particular type of natural hazard taking place can be seasonal (see chart). The main hazards are:

• **River floods:** Floods are an annual phenomenon with the most severe occurring during the months of July-August. The floods of 1988, 1998 and 2004 were particularly catastrophic, resulting in large-scale destruction and loss of life. Women, children and the extreme poor are especially vulnerable. By combining estimates on the incidence of extreme poverty with flood severity, priority areas for WFP assistance were determined for the 2004 flood.





• **Flash floods:** Flash floods are premonsoon, sudden-onset floods caused by heavy and sustained rainfall. Early flash-floods cause a particular risk to the *boro* crop in the Sylhet haor area.

• **Droughts:** Prolonged droughts are not common in Bangladesh. However, dry spells or "crop droughts" can imply enormous suffering for the poor, especially for those depending on rainfed-subsisting farming. Much of the western part of the country can be affected by droughts, with the northwest being the most commonly affected.

• **Erosion:** Riverbank erosion causes a severe threat to the livelihoods of poor people living along the Jamuna, Brahmaputra, Padma, and Meghna rivers. People living on the chars are particularly vulnerable and are forced to move frequently due to river erosion.

 Cyclones and tornadoes: Cyclones affect the coastal districts of Bangladesh and cause tremendous damage to / loss of: housing, agricultural crops, draught-animals, food stocks and sources of drinking water. Fisherman and those with poor housing conditions are most likely to suffer injury or death. In recent years, improved cyclone preparedness has led to a considerable reduction in loss of life. Bangladesh also suffers from tornadoes and nor'westers, which mostly occur in the central and northwestern area of the country during the pre- and post-monsoon period.

region of Bangladesh, such as in the vast char lands of the Kurigram and Gaibandha districts. The main reason for the occurrence of monga is the preharvest acute employment crisis among poor agrarian communities during the months of October and November in areas dependent on the traditional agriculture. Monga is characterized by high prices of essential commodities, lack of work for agricultural day labourers, hunger and malnutrition, sale of livestock and household belongings, advanced sale of labour, migration of adult males, and increased money lending against very high interest rates. The occurrence of natural disasters in the preceding months exacerbates the intensity of monga.

• **Cold spells:** During the winter season, cold weather causes suffering among the elderly, homeless, young children and vulnerable poor. The northern part of the country is particularly affected.

• **Earthquakes:** Bangladesh is divided into three earthquake seismic zones with the highest seismic activity in zone I, covering the northern districts from Kurigram to Moulvibazar. Experts have been forewarning a 6-7 magnitude earthquake to occur at any time which would cause unimaginable destruction and death in a country that is ill-prepared for such a disaster.

• **Diarrhoea:** The incidence of diarrhoea is high throughout the year but the crisis period is from July-September and is exacerbated by receding floodwaters.

• **Monga:** *Monga* refers to a near famine situation faced by many poor households, particularly in the northern

• Arsenic contamination: The latest data indicates that 59 out of 64 districts have wells with arsenic levels above the safe limit, exposing about 75 million people to this toxic substance on a daily basis. The deteriorating health of arsenicosis patients puts a heavy burden on their families contributing to economic hardship, social exclusion and food insecurity.

The occurrence of a natural or manmade hazard does not necessarily result in a disaster.

continued on page 33







Sources of vulnerability

The vulnerability of a community or household to such a hazard in terms of food insecurity depends on:

- the nature of the shock or stress;
- the temporal dimension of the shock or stress, *i.e.* frequency, sudden or slow onset, and duration;
- the spatial dimensions, *i.e.* widespread or localized;
- the degree of preparedness within the household, community or state;
- the household's asset endowments, insurance, and coping mechanisms.

Poor people are often constrained to live in areas most likely to face a range of hazards. This is also the case in Bangladesh where a higher incidence of poverty can be found in areas prone to natural disasters. This is evident by looking at the maps displaying areas prone to flood, riverbank erosion and drought on the previous page, and comparing them to the poverty map on page 12.

Poor households adopt a range of different strategies to cope with such hazards. The sequence of responses that poor households typically employ in Bangladesh when faced with a crisis is presented in the diagram below.



Household vulnerability

As a first response households typically reduce the number and the quality of meals consumed, and/or switch to cheaper but less preferred foods, such as wheat instead of rice. Often elderly and female members of the household are the first to reduce their food intake allowing the men and children to eat as normal. Gathering wild vegetation for consumption, such as water lilies ("shapla") and aram ("khachu"), which are not part of their regular diet, is a common practice during periods of food scarcity.



As the crisis persists, households increasingly adopt more drastic methods of coping. Female members of the household, who for cultural reasons normally do not engage in work, have no choice but to take up manual labour. In addition, children are taken out of school to engage in income-generating activities, and male members migrate to urban areas in search of employment. A widely practiced strategy for reducing food insecurity includes taking loans from relatives and moneylenders as well as salary advances from employers. This is often followed by consumption and sale of animal and household assets. At this point the household's vulnerability position is extremely high. If the situation doesn't improve, the households sell any land they own as a last resort and at this point, they become destitute.

33



Targeting WFP-assisted programmes in Bangladesh

The majority of the Government of Bangladesh's social safety net expenditure goes to targeted food transfer programmes. The Government manages a number of targeted food aid programmes, each with its own objective and target group (see table). homestead raising, maintaining embankments, digging canals, developing ponds, and building and maintaining rural roads. In addition it provides skills training and gives nutritional support and education to the rural poor.

Programme	Objective
Food-for-Work (FFW)	Employment generation for the poor during the dry season.
	Development and maintenance of rural infrastructure.
Vulnerable Group	Assistance to disadvantaged women in rural areas; awareness
Development (VGD)	raising and training in income-generating activities.
Vulnerable Group Feeding	Disaster relief, mainly as response to natural disasters.
(VGF)	
Test Relief (TR)	Employment generation, similar to FFW, but with lighter labour
	activities during the rainy season.
Gratuitous Relief (GR)	Disaster relief.
Nutrition for Education (NE)	Promote school enrolment and attendance, reduce drop-out,
	and address short-term hunger to improve learning ability.

The UN World Food Programme provides support to the Vulnerable Group Development (VGD) programme, Integrated Food Security (IFS) which falls under the Food-for-Work programme, and the Nutrition for Education (NE) programme. In addition, it provides relief assistance emergencies, humanitarian during assistance refugees, to and rehabilitation support in the Chittagong Hill Tracts.

Vulnerable Group Development (VGD) started in 1974 as relief feeding for the hungry poor, and has evolved over the years, increasing participants' self-reliance with a focus on nutritional improvements. It targets too poor women to participate in the normal development programmes of the Government and NGOs, and aims to lift them out of a destitute situation onto a sustainable path of self-reliance. Participants are provided with fortified whole wheat flour (atta) or wheat exchange for grains in their participation in training in income generating activities, health and nutrition, civil and legal rights and literacy and numeracy. The selection of beneficiaries follows a two stage targeting approach. The higher an upazila's density of extreme poor households (see map) and level of relative food insecurity (page 4), the more VGD food ration cards are allocated for that upazila. The cards are then evenly distributed to all unions in the upazila. According to a set of inclusion and exclusion criteria, women belonging to the most vulnerable and poorest households in the union are selected.

IFS focuses on ultra poor households, pregnant women and nursing mothers, and malnourished children in areas there are high levels of where poverty, food insecurity and child malnutrition. A convergence map was prepared in order to identify such area clusters. This provided five priority areas for the WFP assisted IFS programme: (i) the Northern cluster, including the Sylhet hoar basin, (ii) the North-western cluster, including the Northern Chars, (iii) the Western cluster, including the Drought zone, (iv) the Southern cluster, including the Coastal belt, and (v) the Chittagong Hill Tracts. Within each of these area clusters, priority areas were identified for community-based Food-for-Assets Maintenance activities and by combining data on the density of poor households with data on the severity of natural disasters. The targeting of



mother and child nutrition activities was established by using the probabilities of child malnutrition (see stunting and underweight maps, pages 18 and 19). Within these priority areas, IFS participants are selected through an extensive participatory assessment undertaken by the local partner NGO.

Nutrition for Education (NE) is implemented by WFP in partnership with the Government of Bangladesh. Primary school children receive 75 grams of high-energy biscuits per day when attending school. The objectives are (i) to increase enrolment, improve attendance and reduce drop-out rates; and (ii) to address short-term hunger, improve learning capacity and contribute to the alleviation of micronutrient deficiency. NE targets Government and NGO primary schools in highly food insecure areas with low educational achievements. These areas were identified by overlaying the primary education needs map (page 30) with the relative food insecurity map (page 4) and the underweight map (page 19). The resulting Nutrition for Education targeting map is presented on page 36. In addition, urban slum areas are targeted as survey data has revealed that educational achievements and the malnutrition status in urban slums are extremely poor.

Rehabilitation of livelihoods in the Chittagong Hill Tracts uses food as an income transfer to ethnic groups whose traditional livelihoods have been eroded. Its core activity is a rural road maintenance programme coupled with food relief for extremely vulnerable families that are unable to participate in Food-for-Work activities or suffer acute food shortages during seasonal famines. Nutritional support is provided to pre- and primary school children and pregnant women and nursing mothers. The operation targets the poorest and

Integrated Food Security (IFS) is part of the Government's Food-for-Work programme. It includes community-based activities such as most food insecure communities according to the food insecurity map presented on page 10. Selection of participants takes place through comprehensive community assessments.

Relief assistance during emergencies, such as the response to the July 2004 flood, targets extreme poor households who have suffered the most from the impact of the disaster. Priority areas for assistance following the July 2004 flood were determined by combining estimates on the incidence of extreme poverty with flood severity (see map on page 31).





Source: World Food Programme, 2004

WFP priority areas









Source: World Food Programme, 2004

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List of maps

	Title of map	Page no.
1.	Resource allocation map for food-assisted development	3
2.	Relative food insecurity map	4
3.	Proportion of predominantly single cropping pattern area in hoar districts	7
4.	Flood types in hoar districts	7
5.	Proportion (%) of upazila affected by severe cyclones	8
6.	Chittagong Hill Tracts – Union-level relative food insecurity	10
7.	Poverty Map – Proportion of population below the lower poverty line	12
8.	Union level poverty map – Probability of high level of extreme poverty	13-14
9.	Resource allocation map – Resource required by upazila to eliminate extreme poverty (million taka per month)	16
10.	Perception of food insecurity	16
11.	Stunting map – Probability of high prevalence of stunting (children under five, rate > 50 %)	18
12.	Underweight map – Probability of high prevalence of underweight (children under five, rate > 50 %)	19
13.	Average malnutrition status – boys and girls (12-59 months) MUAC > 12.5 cm	20
14.	Malnutrition gap – boys and girls (12-59 months) MUAC > 12.5 cm	20
15.	Deficit/Surplus areas – Food grain	21
16.	Dominant cropping pattern map	22
17.	Distribution of Rice – Year 2002-2003	22
18.	Distribution of Wheat – Year 2002-2003	22
19.	Distribution of Vegetables – Year 2002-2003	22
20.	Distribution of Pulses – Year 2002-2003	22
21.	Non-farm sector income – Percentage of households deriving income from non-agricultural activities	23
22.	Agricultural wage rate – Taka per day (without food)	23
23.	PFDS – Storage capacity and stocks by district – July 2004	23
24.	Average travel time to nearest growth centre	24
25.	Household access to electricity	24
26.	Access to nearest upazila health complex	25
27.	Adequate sanitation and safe drinking water	25
28.	Diarrhoea	26
29.	Acute respiratory infection	26
30.	Tuberculosis	26
31.	Malaria	26
32.	Density of population	27
33.	Migration pattern	27
34.	Indigenous groups in Bangladesh	28
35.	Literacy rate	29
36.	Primary education needs map	30
37.	Adult education needs map	30
38.	Priority areas for assistance – July 2004 flood	31
39.	Flood and river erosion	32
40.	Droughts	32
41.	Cyclones	32
42.	Earthquake zones	32
43.	Arsenic contamination	33
44.	Density of extreme poverty	34
45.	WFP priority areas map	35

- Nutrition for Education targeting map 46.



The Food Security Atlas of Bangladesh

Since independence in 1971, Bangladesh has made considerable progress in reducing extreme poverty and food insecurity. Large-scale famines such as the one that occurred in 1974 no longer pose a threat to the nation. The country has reached its self-sufficiency target in rice production, which is a remarkable achievement given that the population has almost doubled since independence. Food aid has played an important role in the past but with increased domestic production, food aid imports have declined and the role of food aid has shifted from general relief to focused development assistance, targeting the most vulnerable in the society.

Despite these encouraging trends, there is still a long way to go before Bangladesh is truly food secure. A large part of the Bangladeshi population does not consume sufficient food or survives on a diet lacking in micronutrients. Poverty is the main obstacle in achieving food security but factors such as natural disasters, high incidence of disease, poor hygiene and caring practices, and limited nutritional awareness also contribute.

The Food Security Atlas of Bangladesh provides an analysis of the food security situation in Bangladesh using a series of thematic maps. A relative food insecurity map is presented, along with a poverty map and child malnutrition maps. Underlying reasons for food insecurity are explored following the food security concept of availability, access, utilization and vulnerability, and geographic data in the form of supporting maps and tables are presented on key factors that may contribute to regional variation in food security.

Future efforts by the Government of Bangladesh and its development partners to reduce poverty and malnutrition will be guided by the Poverty Reduction Strategy Paper and the Millennium Development Goals. To reach the targets set in these plans it will be necessary to target resources towards the most deprived and vulnerable areas to ensure the highest impact. *The Food Security Atlas of Bangladesh* contributes to a better understanding of food insecurity in Bangladesh and as such will prove to be a valuable tool in the programming of resources working towards a poverty and hunger free Bangladesh.

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