Food Security in Bangladesh

Papers Presented in the National Workshop

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Ministry of Food and Disaster Management
Government of the People's Republic of Bangladesh
&
World Food Programme-Bangladesh

“Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life”

World Food Summit – 1996

Food security is given the topmost priority in Bangladesh. Side by side with domestic food production, greater importance is given to ensure access to adequate and safe food by all people at all times for maintaining an active and healthy life.

Unlocking the Potential: National Strategy for Accelerated Poverty Reduction (PRSP)

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PREFACE

The Ministry of Food and Disaster Management organized the first-ever National Workshop on Food Security in Bangladesh in collaboration with the UN World Food Programme on 19 and 20 October 2005 in Dhaka. The key objective of the workshop was to take stock of the food security situation in Bangladesh and draw future plan of actions.

The challenge of food security in Bangladesh is huge. In spite of making considerable socio-economic progresses over the years, Bangladesh still has the third largest number of poor after China and India, a segment of which is chronically malnourished, suffering from silent disaster. Such large-scale malnutrition results in preventable sufferings, diseases and losses of productive potential of the toiling mass.

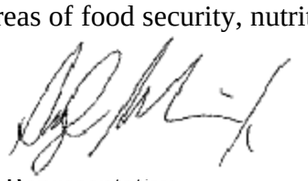
According to the joint GoB and United Nations Country Team Report on Bangladesh's progress towards the MDGs (February 2005), although some progress has been made in reducing income and hunger poverty, achieving the MDGs within the next decade will require Bangladesh to develop and implement more ambitious and effective strategies. Halving the proportion of people suffering from hunger is a challenging task and it is inextricably related to reduction of poverty. Hence, policies enhancing food security or promoting hunger reduction have to have a substantial thrust on poverty reduction. A twin track policy that aims at increasing per capita income growth and providing a targeted safety net programme is needed for increased household food intake and enhanced food security.

In view of the above, it was very important and timely to organize the workshop. About 140 participants from the key Government ministries and departments, NGOs, civil societies and UN/development partners attended the workshop. The workshop covered the key issues of food security, i.e. availability (production and import), access and utilization (including nutrition and food safety) with focus on the current status and challenges, strategic approach for the future, and the suggested actions required to achieve the objectives and outcomes.

A total of seven papers were presented in the workshop including the "Key Note Paper", "Availability", "Access", "Utilization/Nutrition and Food Safety", "Setting a Standard Cereal Intake", "Regional Food Security Experience: Lessons Learnt from India and Timor Leste", and a paper on the "Challenges in Addressing Hunger and Poverty in Bangladesh: The Case for Twin Track Approach". The authors, both from the country and abroad, were selected from among the key experts in the relevant filed. All the papers were rich in content.

As a part of the workshop decisions, we are pleased to publish these important papers for future reference and action.

We are confident that this publication will be useful for the national and international planners in the areas of food security, nutrition and poverty reduction.

Doug 
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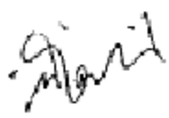
Md. Abd  ***r***
Secretary
Ministry of Food and Disaster Management

CURRENT FOOD SECURITY AND CHALLENGES: ACHIEVING 2015 MDG HUNGER MILEPOST

Usha Mishra[1] and Sk. A. K. Motahar Hossain[2]

The paper presents an overview of national food security situation and identifies key issues, challenges and areas of development in policy and planning. The analysis uses various data sources and reports including PRSP, UNDAF[3] and the World Bank and the GoB-UN MDG Reports.

Food Security Status and Challenges

Food security situation in Bangladesh has improved, especially on the availability side[4], and further improvements on access and utilisation, to be sustainable and large-scale, needs renewed efforts from the government, civil society (including media) and the development partners. Records say in 70s', 70% people were under the food consumption poverty line. Today this is down to under half of the population.

Today, though people are not dying, they are going hungry and becoming stunted with reduced mental and physical capacity. They are suffering. The hungry population of over 60 million people is larger than most other global cases- the third largest poor population in any country after China and India[5]. Nearly half of Bangladesh's children are underweight, making it one of the most severe cases of malnutrition in the world. While Bangladesh has definitely got more food than it had thirty years back, yet almost half of Bangladesh is still far from being **food secure.**

The World Bank and GoB-UN in their respective reports on MDGs, put the target of 34% children being underweight as non-attainable at present rates of progress. Much will need to be done to achieve the 2015 MDG target of halving the proportion of people who suffer from hunger and malnutrition. Demographic changes in upcoming years are likely to affect poverty and hunger in adverse ways.

While **poverty** is an overall denominator of this food insecurity in the country, the additional intensifiers are **disability** (gender, age, and physical challenge) and **location** (disaster proneness, access to the market, etc) as well as other aspects related to utilization (education, awareness, cultural practices, etc). Issues of governance and accountability further thwart attempts at providing targeted safety nets and price stabilisation.

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[2] Director General, Food Planning and Monitoring Unit (FPMU), Ministry of Food and Disaster Management (MOFDM)

[3] United Nations Development Assistance Framework

[4] Average per capita dietary energy supply has improved from 1800 Kcal in 70s to 2100 kcal in 2000

[5] GoB-UN MDG Report, UNDP, 2005

Achieving the MDG targets within the next decade will require Bangladesh to develop and implement more ambitious and effective strategies. Speeding up per capita income growth and pursuing targeted safety net programmes are needed for the expansion of household food intake. A comprehensive programme to address hunger would include interventions in the following areas[6]:

- Promoting food security by sustaining strong growth of domestic food production and implementing a liberalized regime for food imports
- Designing and implementing interventions to promote food security
- Supporting safety nets for protection against natural disasters
- Promoting change in food habits for increasing nutritional intake of vulnerable
- Promoting improved infant feeding practices, including breast-feeding practices
- Supporting maternal schooling and hygienic practices
- Improving access to safe drinking water, especially by addressing the threat of arsenic contamination of underground water
- Improving access to sanitation
- Improving access to basic health facilities
- Promoting partnership among the Government, private sector and NGOs

Aspects and Issues of Food and Nutritional Security

Availability

On national scale, Bangladesh has obtained food through domestic production, imports and food aid. The first two sources have increased while food aid decreases[7].

The role of food production in food security cannot be overemphasised given the country's low income, recurrent natural calamities and increasing international prices of food commodities. The draft National Food Policy and the National Agricultural Policy promote attaining food-grain self-sufficiency as well a reasonable non-grain sufficiency.

The latest figures from the government put cereal food production levels (including maize) for 2004/5 at 27.35 million MTs[8]. However although rice productions are largely sufficient, self-sufficiency in other food-items is still to be achieved. For example among non-cereal food, 70% of the pulse requirements get imported and Bangladesh produces only 34% of its edible oil. Here we are still talking about effective demand and not really that required[9]. Estimation of requirement, demand and supply (availability) of other food items- vegetables, pulses, fruit etc should be systematically carried out and the National Food Policy, the Import Policy and the Agricultural and the Nutrition Policy should address these requirements in a planned, integrated fashion.

6 GoB-UN MDG Report, 2005

7 Food Aid declines from about 600,000 MT in 90s to about 300, 000 MT in 2004

8 A combined production of rice, wheat and maize, source BBS, estimate by DAE

9 Nutrition and Agriculture Position Papers for the National Food Security Workshop

Growth of crops will be compromised (with no changes in current practices) by agricultural land decreasing at 1% per annum[10] and the impact of **climate changes**, which are still being understood. Any growth must come from increased productivity and that demands higher investment in agricultural research and education[11] in collaboration with agencies like FAO and the World Bank.

Estimates on Food Gap, both present and future vary. While the government figures do not show any food gap, self-sufficiency ratio[12] calculated as per FAO's method puts this self-sufficiency at about 90%. (See the box and the figure below.)

Self Sufficiency Ratio (SSR)

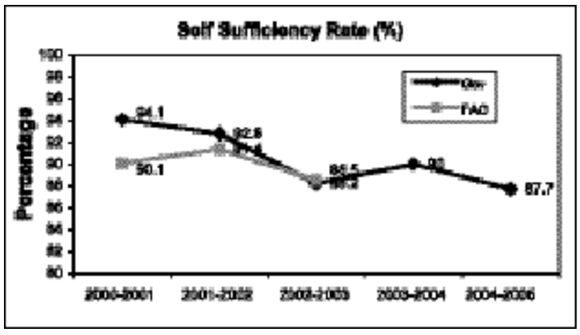
The self-sufficiency ratio expresses magnitudes of production in relation to domestic utilisation. It is another way of expressing the food deficiency in the country. SSR is defined as:

*SSR = Production/(production + imports - exports) * 100*

Based on the official and private food grain production and import figures the food grain SSR for Bangladesh is gradually declining (*figure 1*). The lowest self-sufficiency rate is found in 2005, which could be attributed to the crop damage during the severe flood in 2004.

Considering the estimates on food grain gap and self-sufficiency ratio it can be deduced that Bangladesh has a food grain gap of 1 to 2 million metric tons and an average SSR of about 90 to 91 percent.

Figure 1



Note: FAO statistics on import figures not available after 2003
For SSR calculation zero export has been considered

[10] World Bank

[11] Currently it stands at 0.2% while WB and FAO recommend 2% of GDP

[12] Food Balance Sheet- A Handbook, FAO, Rome, 2001

According to the projections of BARC (Bangladesh Agricultural Research Council), in 2015 there will be a surplus of 1.2[13] m MT of food grains but an overall deficit of all others food items. Still according to another estimate, at the present population and agricultural growth rate, the food gap could be upto **5 million mt**[14]**.** This variation in estimations of present and future Food Gap underscores the need for a more thorough, precise and regular tracking.

There are several factors for lack of a consensual estimation of the food gap. One of these is the use of different required dietary calorie intake. While the government assumes 452 grams of food grains per capita, FAO recommends 504 gms. Another factor is the size of population taken for calculation. Also, estimates on availability and consumption and the related food gap do not include the use of rice in industries for e.g. as starch and in restaurants, bakeries and fast food places. Yet another is the estimation of wastage and use of the food grains for poultry and cattle feed. Present methods of estimating these are based on a rather out-dated 1991 report and need to be reviewed.

It is not often enough spelt out that this food gap is mostly about cereals. The consumption poverty line is defined in terms of calories, leaving out minimum levels and requirements of vitamins and minerals. These do not contribute to calories but are vital for the nutritional security (well being/health) of the population.

Access

While the accurate determination of food gap is a challenge, lack of access is largely responsible for over 60 million people going hungry everyday. This is primarily due to a lack of purchasing power (poverty), although there are other less central factors with a seasonality and spatial dimension-market access and market functionality along with gender and levels of human assets. Considerable intra-household disparity and discrimination in food consumption persists. Girls and women are overwhelmingly more malnourished than boys and men[15].

The World Bank MDG report has an important analytical insight into the correlation between levels of poverty and that of child malnutrition. It says that Bangladesh has far higher levels of child malnutrition than would be expected at its levels of per capita GDP. This further underscores that access to the available food is seriously limited.

There are approximately 27 food security and social safety net programmes in the country[16] but the coverage is inadequate.[17]. Most of these programmes are also inflexible, unable to absorb

[13] The paper on 'Availability' for this Workshop

[14] Dorosh, Ninnon and Shahabuddin in '*The 1998 Floods and Beyond*',' 2004

[15] In the 1-4 age group, female mortality is about a third higher than male mortality.(PRSP)

[16] Planning Commission Fact Sheet on Social Safety Nets

[17] Less than 1% of GDP is allocated to various SSNPs; far less than the average allocation of 5% of GDP in south Asia and even less that 2% of allocation in Sub-Saharan Africa (WB's Assessment of SSNPs in Bangladesh, 2004). Approximately 10% of the poor and 5% of the ultra poor are covered by any SSNP. 50% of eligible old age people are not covered by the pension scheme.

transitory poor[18] (at risk communities) and the effectiveness undermined by leakage and misappropriation.[19] However, there are examples of successes as well and there is a need to build upon these successes under an overall **National Food Security Policy and Plan**

Over 700,000 MT of food was distributed through various food-based safety net programmes in 2004/05 PFDS. Food aid resources supplied about 30% of total PFDS distribution in years of normal harvest from mid nineties through 2001/02 and a there is a danger that decline in food aid could ultimately lead to a cut in targeted distribution programs that increases real incomes of poor households and thus their access to food.

Utilisation

The challenge of nutritional security is much bigger than that of attaining the minimum calories. It has the quality and safety aspects which merit greater attention.

While the average (national level) calorie level food security has improved, the gains in nutritional intake have not been so impressive and large-scale malnutrition persists. Consumption of protein has remained practically unchanged. 80% of Dietary Energy Supply of Bangladeshis still comes from cereal. The per capita consumption of meat and eggs by the urban consumers is almost equal to the desirable, but for rural consumers, consumption of these items falls far short of the requirement. The high consumption of cereals but low intake of pulses and other animal-based proteins results in a high level of anaemia and other micro nutrient deficiencies.

Substantial improvements `in the Bangladesh diet will require greater diversification of agricultural production. *Paul and Ninno*[20] have analysed and concluded that production of most non-rice crops is economically efficient. Rice yields must be improved to facilitate expansion of non-rice crop areas while maintaining adequate rice production. Similarly, storage loss should be reduced to reduce the risk to perishable products like fruits and vegetables. However, it must be admitted that constraints to diversification need much better understanding.

WFP VAM (Vulnerability Analysis and Mapping) tells that correlation between malnutrition and poverty may not hold. Additional and often stronger determinants of this may be lack of awareness and inappropriate cultural practices[21]. Given the weak link between income and consumption of micro-nutrition, increases in households` income without nutrition education may not result in major improvements in nutrition.

Poor access to water and sanitation and increasing arsenic contamination (which is linked to the over-exploitation of water tables) may further aggravate this.

Bangladesh has yet to devise an operational definition of nutritional food security or in simple, localised menus. Goals of desired national physical attainment (weight and height) and Physical Activity Levels should be determined and made actionable through specific, time bound targets.

[18] One third of the vulnerable owe this to a natural disaster. Similarly health related emergencies, as found in a study in India turn a sizeable section into ultra poor.

[19] World Bank ‘s Assessment of SSNPs in Bangladesh, 2004

[20] Dorosh, Ninnon and Shahabuddin in *‘The 1998 Floods and Beyond’,’* 2004

[21] CHT paradox, WFP-BBS Food Atlas, where children are less malnourished than expected at the given levels of poverty and food insecurity

Based on these attainment goals and the GDP growth rate, nutritional standards should be drawn and this should be integrated in the various food, nutrition and agriculture policies. This requires again an inter-sectoral cooperation among economists, nutritionists and agriculturists. It is indeed a welcome measure that a taskforce has been set up under the stewardship of FPMU to estimate the desired amount of food intake. This initiative needs to be strengthened.

Food Safety has attained recently a higher profile, which should hopefully result in strengthening and streamlining of regulations, standards and enforcement mechanisms.

Institutional Challenge

Food security is a multi-sectoral, multi-ministerial issue. There is a need to develop an integrated policy and action plan, bringing together all the diverse players and stakeholders as well as making them accountable to contributing their bit to the overall challenge of improving Food Security. National Food Policy Capacity Strengthening Programme, the new FAO-FPMU project is expected to provide a strategic lead on developing this approach.

Conclusions: Strategic Options

Faced with the challenges of an increasing population[22], natural subsidence (on account of the ascent of the Himalayas) decreasing availability of agricultural land, increasing costly food prices, the options before Bangladesh include:

1. Increasing **productivity**-an all out effort in this regard; learning from some recent experiments in rice production[23]. Cutting down the wastage- the yields loss in Bangladesh is colossal (30-40%)
2. **Diversification** of the food basket with an aim to attain minimum self-sufficiency in the non-cereal food grains.
3. Strengthening analysis and monitoring of needs and Food Gap
4. Improve **access** through expansion of the PFDS/ safety net programmes without compromising on the targeting and leakage. Successful interventions need to be replicated and expanded. While sustainable improvements in the food security status of the poor are welcome, as these would act as the safety ladder, but safety nets (with core focus on access to food and nutrition) are important as well. While conditional transfers (like School Feeding, VGD), etc are useful, provisions have to be there for those who cannot participate in any conditional transfer (like the handicapped, elderly etc)
5. Improve **utilisation** through improving nutrition education and availability and access to safe cereal and non-cereal foods. Huge improvements in food security can be achieved through improving knowledge on food-based nutrition (right methods of cooking, balanced diet, from locally and cheaply available food stuffs)
6. Promote fortification of foodstuff as it provides a proven and cost-effective strategy of dealing with micronutrient deficiencies.

[22] One of the most pressing of the challenges; the MDG fertility rate target of 2.2 by 2015 looks daunting

[23] The SRI (Systematic Rice Intensification) experiments in rice cultivation which are being tried out globally. Some NGOs in Bangladesh are also promoting it.

FOOD SECURITY IN BANGLADESH: FOOD AVAILABILITY

M.M. Rahman[24] and S.I. Khan[25]

1.0 Background

1.1 Food availability is one of the three conditions of food security as defined in the World Food Summit. The other two conditions are access and utilization. This paper focuses on the availability of food as an essential element of the concept of food security. In addition to rice and wheat that constitute the staple food of Bangladesh, the paper deals with the production and availability issues of other major food commodities, such as potato, pulses, oilseeds, vegetables and fruits, and fisheries and livestock products. Maize has not been considered as it is still a minor cereal in terms of human consumption. Availability is a function of domestic production, imports, food aids and security stock. Of these, domestic production is critical in ensuring food availability at both national and household levels. Therefore, domestic production of food grains is a major concern of every Government and all efforts are made to boost production of rice and wheat to ensure food security. However, in recent years, the Government is putting additional efforts to increase production of other important food crops as well as fisheries and livestock.

1.2 ***Domestic production:*** Food grain production, particularly rice production has doubled in the last two decades with the use of Green Revolution technology (high yielding varieties, fertilizer, irrigation and pesticide) coupled with growth of institutional infrastructure and a positive shift in public policy and market forces. As a major staple, rice occupies 71 percent of the gross cropped area and accounts for over 94 percent of food grain production. Its contribution to total per capita calorie and protein intake is 74 percent (Hossain et al, 2004). Rice thus occupies the centre stage of food security and continues to draw major attention of the Government for further increasing the production.

1.3 Rice production continues to increase, but wheat production is showing a declining trend in recent years. Remarkable progress has been made in rice production during the last ten years. In 1994-95, rice production was 16.83 million tons, which has steadily increased to 26.19 million tons in 2003-04 (Table 1). Rice production estimated for the year 2004-05 is 25.16 million tons. Wheat production also increased from 1.25 million tons in 1994-95 to 1.91 million tons in 1998-99. It then started declining and the production has come down to 0.97 million tons (estimated) in 2004-05. Similarly, pulses and oilseed production steadily declined mainly because of the loss of areas under these crops to Boro rice and other remunerative winter crops. Production of vegetables and fruits has increased, but at a slow pace from 1.21 million tons and 1.41 million tons in 1994-95 to 1.61 million tons and 1.55 million tons in 2002-03 respectively. But the production of vegetables jumped to 6.13 million tons in 2003-04 and 7.28 million tons in 2004-05 according to the Department of Agriculture Extension (DAE). Fruit production has also jumped to 4.60 million tons in 2004-05. Spectacular success has been achieved in the production of potato. It has made a quantum jump from 1.47 million tons in 1994-95 to 5.95 million tons in 2004-05 (Table 1). Production of non-cereals such as pulses, oilseeds, vegetables and fruits,

[24] FAO Consultant

[25] Research Director, FPMU, MOFDM

which are the chief sources of protein, mineral and vitamin, still remains far below the actual requirements, making it difficult to provide balanced diet for all.

1.4 Fish production increased from 1.17 million tons in 1994-95 to 2.10 million tons in 2003-04 (Table 2). Meat, milk and egg production has also increased significantly over the last ten years (Table 2). But the shortage is still wide. The current per capita intake of animal protein is less than 2g per day against the FAO recommendation of 28g per day. Similarly, domestic milk production accounts for only 14% of the minimum requirement (DLS, 1999). Per capita availability of milk is approximately 30 ml per day against the FAO recommendation of 250 ml.

Table 1: Domestic production (gross) trend of food grains, potato, pulses, oilseeds, vegetables and fruits (1994-95 to 2004-05)

(**000 MT)**

Year	Food grain		Potato	Pulses	Oilseeds	Vegetables	Fruits
	Rice	wheat					
1994-95	16833	1245	1468	535	480	1214	1414
1995-96	17687	1369	1492	524	471	1254	1431
1996-97	18880	1454	1508	525	478	1290	1418
1997-98	18862	1803	1553	518	482	1306	1403
1998-99	19905	1908	2762	499	476	1526	1359
1999-00	23067	1840	2933	394	406	1529	1357
2000-01	25085	1673	3216	377	394	1472	1406
2001-02	24300	1606	2994	355	392	1599	1467
2002-03	25190	1507	3386	345	369	1605	1547
2003-04	26189	1253	4855	332	286	6133	1619
2004-05	25157	976	5948	527	566	7278	4600

Source: BBS, DAE

Table 2: Fish, meat, milk and egg production trend (1994-2005)

Year	Fish (MnT)	Meat (MnT)	Milk (MnT)	Egg (Million)
1994-95	1.17	0.48	1.52	2400
1995-96	1.26	0.54	1.57	2830
1996-97	1.36	0.58	1.58	3020
1997-98	1.46	0.62	1.62	3250
1998-99	1.55	0.66	1.66	3510
1999-00	1.66	0.70	1.70	3990
2000-01	1.78	0.75	1.74	4097
2001-02	1.89	0.78	1.78	4424
2002-03	1.99	o.83	1.82	4777
2003-04	2.10	0.91	1.99	4780
2004-05	-	1.06 (est.)	2.14 (est.)	5625 (est.)

Source: Memento, National Fish Week, 2005; DLS

1.5 ***Growth:*** Crop sub-sector growth has been highly unstable varying from – 1.7% in 1994-95 to 1.67% in 2003-04 (Bangladesh Economic Review, 2004). The highest growth rate of 8.1 percent was registered in 1999-00, followed by 6.4 percent in 1996-97 and 6.2 percent in 2000-01. This shows that it is possible to enhance growth of crop agriculture with appropriate use of

production inputs under favourable climatic conditions. On the other hand, growth instability in certain years indicates that crop agriculture is highly vulnerable to natural disasters and unpredictable climate behaviour. Growth of crop agriculture also depends on input availability, input quality and input-out price. Growth potential is high in livestock sub-sector. According to partial figures from the Bangladesh Bank (2003), the livestock growth rate in 2003 was the highest of any sub-sector at 4.5% compared to 3.2% for crops and 2.3% for fisheries sub-sector. Bangladesh Economic Review 2004 also reports steady growth of livestock compared to crops, fisheries and forestry. Fisheries registered a rapid growth in the first half of the decade; in the second half, the growth has slowed.

1.6 ***Per capita availability:*** In estimating the per capita availability of food items, BARC based its calculation on the population size of 119, 130 and 139 million for the year 1994-95, 1999-00 and 2004-05 respectively and the per capita food intake figure published by BBS in 2003 (Household Income and Expenditure Survey, 2000). Accordingly, per capita availability of cereals (rice and wheat) has been found to increase from 374 gm/day in 1994-95 to 464 gm/day in 2004-05 (Table 3). Sharp increase in per capita availability of potato, fruits and vegetables is seen in the last two years, while the per capita availability of pulses and oilseeds has remained stagnant or declined. Availability of meat, milk and egg has also increased as shown in Table 3. Fish availability increased from 27 gm in 1994-95 to 41 gm in 2003-04.

Table 3: Production and availability of major food items (1994-2005)

Food Items	Production (million tons)			Availability (gm/capita/day)		
	1994-95	1999-00	2004-05	1994-95	1999-00	2004-05
Cereals	18.08	24.91	26.13	374	472	464
Potato	1.50	2.93	5.95	32	57	108
Pulses	0.53	0.39	0.53	11	8	10
Oilseed	0.48	0.40	0.56	10	8	10
Vegetable	1.21	1.53	7.28	21	24	108
Fruits	1.41	1.36	4.60	24	22	68
Fish	1.17	1.66	2.10*	27	35	41*
Meat	0.48	0.70	1.06	11	15	21
Milk	1.52	1.70	2.14	35	36	42
Egg (million)	2400	3990	5625	2.76	4.20	5.54

Source: BBS, DAE, DLS, DOF, BARC; * 2003-04 figure

1.7 ***Import:*** For the sake of convenience, public import and food aid data are taken together for discussion as the volume is not large compared to domestic production and private import. Import of food grains either by the private sector or by the public sector does not follow any pattern or trend (Table 4). It depends on the gaps in production created by flood damage or damage due to other natural disasters (of course, private sector import can be affected, if the Government imported stock is sold in the open market at a subsidized price). The total import (private and public), on average, is 2.56 million tons per year (estimation based on Table 4), with substantial increase in imports in years following poor harvests due to flood and drought or other natural disasters. Table 4 shows that with gradual increase of private sector import, public sector import of food grains has decreased. Public sector import is expected to level off with further

increase of private sector import which is more likely to happen in the future. In the domain of import either by the Government or by the private sector, quality, price and timing of import are important parameters that need to be taken into account in ensuring food security.

1.8 No fixed trend is observed in public distribution and domestic procurement of food grains. In some years, both distribution and procurement of food grains increased and in other years, it decreased. This indicates that public distribution and procurement of food grains are guided by the level of domestic production and availability in a given year. Domestic procurement gradually increased during 1994-95 to 1999-00, with the highest volume of increase in 2000-01 and 2001-02; procurement then declined in the following years. The domestic food procurement data gives a signal that the food procurement policy needs to be stream lined, based on production forecast, weather forecast, and in relation to import policy.

Table 4: Private import and public import of rice and wheat, public distribution and domestic procurement (1994-05)

000 MT

Year	Private Import (Rice & Wheat)	Public Import + Food Aid (Rice & Wheat)	*Public Distribution	Domestic Procurement
1994-95	1014	1555	1573	278
1995-96	850	1584	1794	400
1996-97	237	730	1392	615
1997-98	1135	798	1621	617
1998-99	3480	2006	2134	753
1999-00	1234	869	1900	967
2000-01	1063	491	1774	1088
2001-02	1289	509	1463	1053
2002-03	2966	254	1423	952
2003-04	2480	305	975	843
2004-05	2982	380	1356	950

Source: BBS, MOFDM (provided by MOFDM)

* Includes World Vision direct distribution

1.9 ***Current availability and gaps:*** The total requirement of cereals in 2004-05 is estimated to be 23.03 million tons, based on 487 gm/capita/day consumption (BBS Household Income and Expenditure Survey 2000) for a population size of 139 million. Against this, production of cereals (cleaned rice and wheat) in 2004-05 is estimated at 23.52 million tons after deduction of 10% for seeds, feed and wastage, showing a surplus of 0.49 million tons. Potato production is reported to be surplus by 1.01 million tons. Gaps between requirement and production of other important food crops and livestock products are wide. According to BARC estimate, the current deficit (2004-05) of pulses and oilseeds are 1.12 million tons and 2.26 million tons respectively. Similarly, shortage of vegetables and fruits is estimated as 2.24 million tons and 2.70 million tons respectively. The national deficit of milk and meat is 10.38 million tons and 4.95 million tons respectively, and of egg is 8645 million (DLS, 2005). The present national requirement of fish is estimated at 2.30 million tons, showing a deficit of 0.20 million tons (DOF, 2005). These gaps are likely to widen by 2015, if appropriate policy and development interventions are not taken with urgency.

1.10 ***Projected requirement and production in 2015:*** According to the projected level of requirements and production of important food crops estimated by BARC for the target year 2015 of meeting the millennium development goals (Table 5), there will be a marginal surplus of 1.20 million tons of food grains and 2.03 million tons of potato. The projected requirement of cereals was estimated on the basis of 156 million people in 2015 by using the current consumption rate of 487 gm/capita/day. If the rate of consumption varies in the future, which is likely with the change of population growth rate, income level, food habit and consumption pattern, the requirement will also vary. However, deficit will continue to persist in pulses, oilseeds, fruits and vegetables. Food availability at the national level in terms of cereals has certainly increased to keep pace with the population growth in recent times. But considering the highly volatile nature of cereal production, caused due to disastrous flood and drought, one cannot predict with any amount of certainty increasing growth in cereal production in the future to feed the growing population. Major efforts will be needed to boost production of food grains to the projected level and to even out the deficit in other food crops to meet the millennium development goals. This is a task that has to be achieved against shrinking land resources, declining soil productivity and competing demand for land by other sectors. Even within agriculture, Boro rice, high value crops (fruits and vegetables), fodder cultivation, pond fisheries and even fruit tree and first growing forest tree cultivation are competing with each other for land. On top of this, inefficient water and fertilizer use, input-output price distortion and inefficient marketing system (inadequate market infrastructure, inefficient market management) will, as usual, have a negative influence on production.

1.11 The national requirements of meat and milk as estimated by DLS for the year 2015 are 6.86 million tons and 14.29 million tons respectively, and of eggs 16297 million. The deficit is large - 4.41 million tons for meat, 9.75 million tons for milk and 5245 million for egg. This is a huge gap. Radical changes in institutional setting in the public sector, greater involvement of the private sector, higher investment, extended coverage of veterinary services and market development will be essential to hit the target projected for 2015. The total requirement of fish in 2015 will be 2.57 million tons, with a deficit of 0.47 million tons from the current level of production. This gap can be filled by increasing the production at an annual growth rate of 3% only. This may be possible by harnessing the potential of inland open water fisheries.

Strong coordinated efforts by both the public and the private sectors, non-governmental and community based organizations will be needed to increase food production for achieving the millennium development targets. This would require stronger GO-NGO-private sector partnership, with effective coordination and monitoring system in place at both the national and local levels.

Table 5: Projected requirements and production of major food items in 2015

Food Items	Food Production in 2004-05 (mT) (less 11.58%)	Requirements in 2015 (mT) (less 11.58%)	Production in 2015 (mT) (less 11.58%)	Surplus (+) Gaps (–) (mT)
Rice & wheat	26.13	27.85	29.05	+ 1.20
Pulses	0.53	1.85	0.97	- 0.88
Oilseeds	0.56	3.17	0.90	- 2.27
Vegetables	7.28	10.72	9.82	- 0.90

Fruits	4.60	8.22	5.15	- 3.07
Potato	5.95	5.56	7.59	+ 2.03
Fish	2.10*	2.57	2.73**	+ 0.16
Meat	0.91	6.86	2.45	- 4.41
Milk	1.99	14.29	4.54	- 9.75
Egg (million)	4780	16297	11052	- 5245

Source: BBS, DAE, BARC, DLS, DOF

* 2003-04 figure

* *Estimated @ 3% annual growth

2.0 Problems and Issues

2.1 ***Technical problems:*** Some of the persisting problems of increasing crop production, particularly cereal production using the available HYVs are decreasing soil productivity, inefficient water and fertilizer use, inadequate supply of quality seeds, imbalanced use of fertilizer, low labour productivity, and higher input price. These factors are restricting realization of full yield potential of HYVs, resulting in lower yield of cereals in the farmers' field compared with much higher yield obtained in the research station. The major concern is how to reduce this yield gap by improving soil, water and labour productivity, optimizing fertilizer use and reducing input price. Declining land resources and competing demand for limited land is a major concern for future agriculture. New technological breakthrough, appropriate development interventions and a robust land use policy will be needed to address the problems.

2.2 Smallholder dairy and poultry development, which has the highest potential for reduction of rural poverty, is seriously affected due to acute shortage of feeds and veterinary services, including disease diagnostic facilities. High price of feeds and chicks, and marketing of milk in the rural areas are also limiting progress in this area. One of the critical constraints limiting development of livestock is the absolute lack of quality control. In the absence of legal and regulatory framework, livestock development in the private sector is taking place in an indiscriminate manner, which has already created serious problems of quality control in livestock products, drugs, vaccines, feeds, and breeding materials. The main problems of fisheries sub-sector is the internal and trans-boundary environmental degradation and manmade hazards. In recent years, complaints are heard about the degrading quality of fingerlings (not genetically true to types) affecting pond fisheries, and disease infestation in shrimp culture. Destruction of fish breeding grounds is also a major problem restricting production of native fish species. Despite the declining quality of fingerlings, pond aquaculture is reported to have reached the optimal level of production. The major challenge of the sub-sector is to harness the huge potential of inland open water fisheries.

2.3 ***Institutional problems:*** Institutional capacity of the research, extension and seed production systems in terms of facilities and human and financial resources has weakened and are not geared to address the emerging problems. Weaknesses also persist in planning, coordination, monitoring, inter-institutional linkages, resource management and partnership with the private sector and NGOs. These problems are overwhelming in the livestock sub-sector compared to crops. DLS still continues to provide some of the services that can be better done by the private sector. They are doing very little in quality assurance, disease investigation and surveillance, and

veterinary public health. Institutional reform is long overdue to tune up the systems and build the capacity to face the new challenges.

2.4 Institutional capacity of the Ministry of Food and Disaster Management in assessing, planning, monitoring and implementing the policy and development interventions to effectively deal with the food security issues is relatively weak due to shortage of skilled manpower. The capacity of the Food Policy and Monitoring Unit (FPMU) in terms of professional strength and skill mix is also weak. Inter-ministerial coordination and interaction on food security, research capacity and the process of having regular dialogue with the private sector and civil society are lacking. There is a need to develop the planning, coordination and monitoring capacity of the Ministry, and improving inter-ministerial interaction to deal with the food security issues related to production, access and utilization.

2.5 ***Funding:*** Investment in agriculture (crops, fisheries and livestock), in general, has been drastically reduced from 14.0% in 1976-81 to 4.5% in 2000-01 (Raisuddin, 2002). ADP share has also declined from 31% in 1971-72 to less than 3% in 2003-04. Donor funding in agriculture has also declined significantly, although one of the conditions for attaining MDG is the commitment of extended donor support in agriculture. Livestock sub-sector is affected most due to low budget allocation. Annual revenue allocation to the Department of Livestock Services has declined from 0.57% of the annual national budget in 1997-98 to 0.38% in 2003-04 (DLS and Bangladesh Economic Review 2004). Annual operating cost available for DLS from revenue budget is only 4.7% and for BLRI is 5.6% (DLS and BLRI) 2005). Funding situation in fisheries is slightly better. However, without substantial increase in budget allocation to agriculture, it will be next to impossible to attain the production target projected for the year 2015 to meet the millennium development goals.

3.0 Policies/Interventions in Place

3.1 The Ministry of Agriculture has prepared a comprehensive agricultural policy in 2004 and started implementing the policy to address the problems of improving land, water and labour productivity by promoting balanced use of fertilizer, small scale mechanization, quality seed production, irrigation interventions in drought-prone areas, crop diversification, and improving water use efficiency and supply of agricultural inputs. These interventions are currently made through 19 development projects. Some of the institutional problems and issues are also being addressed by MOA with own resources, and efforts are being made to address the others that will require external funding. The World Bank is actively considering assistance in strengthening the agro-technology system; and JICA is reviewing the need for strengthening the Central Extension Resources Development Institute through reorganization and redefining its charter. The process of strengthening the Seed Wing of BADC and revitalizing the Seed Certification Agency is on-going.

3.2 The Ministry of Fisheries and Livestock has also prepared fisheries and livestock policy. The National Livestock Policy is still in a draft form. It is expected to be finalized within this year. The major policies include: (a) promotion of smallholder dairy and poultry development; (b) development of goat, buffalo and duck in high potential areas through special projects; (c) institutional reform of DLS and enactment of laws and regulations for quality control of drugs,

vaccines, feeds, chicks and breeding materials; (d) privatization of veterinary services of private good nature; and (e) explore all alternatives for producing fodder. In addition to routine activities of providing extension services, animal health service, supply of inputs, artificial insemination, and feed analysis, DLS has 9 on-going development programs/projects on production of vaccine, smallholder livestock development, artificial insemination and embryo transfer, breed up-gradation, modernization of Central Cattle Breeding Station and Dairy Farm, establishing regional duck breeding farm with hatchery, and training program for small scale dairy.

3.3 National Fisheries Policy was formulated in 1998, with the following objectives: (a) enhancing fisheries resources and production; (b) generating self employment for poverty alleviation of fishers; (c) meeting the demand of animal protein; (d) increase foreign exchange earnings through export of fish and fisheries products; and (e) maintain ecological balance, conserve biodiversity and improve public health. The Ministry is thinking to revisit the policy of 1998. Fisheries Department has developed a strategy and action plan to implement the 1998 fisheries policy, taking into account the likely changes to occur over the next 10 years. The policies are being implemented through a range of revenue and development projects. Revenue projects include extension service to farmers, Fish Act implementation and Jatka protection. As many as 12 development projects supported by different donors are under implementation, covering aquaculture development, Brood Bank establishment, resource development and management, supporting coastal fishing community, fish inspection and quality control and development of Shrimp Seed Certification.

3.4 The Ministry of Food and Disaster Management has formulated a National Food Security Policy that includes access to and utilization of food, coordination, food policy analysis, short- and long-run forecast of domestic and world supply and trade. In order to achieve these objectives, a multi-donor supported project, entitled “National Food Policy Capacity Strengthening Program” is ready to be implemented. The broad objective of the project is to strengthen the capacity of FPMU for performing the new tasks of access to food, its utilization and nutrition, in addition to the current function of monitoring food availability and food assistance. The new functions also include improving inter-ministerial collaboration and coordination, food security related research and policy analysis, strengthening GO-NGO cooperation and encouraging dialogue and research capacity building of the civil society.

4.0 Project Implementation Problems

4.1 Implementation of development project is not satisfactory in all cases. The Finance Minister himself expressed dissatisfaction with the overall progress of implementation of the development projects. There are problems, but they cannot be generalized. Some problems are project-specific. In this paper, some of the common problems are highlighted. Delayed commencement of project implementation due to administrative and procedural problems, procurement and staff recruitment problems, delayed recruitment of consultant, frequent transfer of project Directors and cost overrun are some of the general problems affecting project implementation. Weak organizational capacity of the line departments and low implementation capacity in terms of technical knowledge and managerial skills is also a major problem. In most cases, program planning at the local level, including preparation of work plan, site selection and organization of, say, demonstration and training program is poor. Record keeping and reporting

ability is also poor. Development of work plan and training program, in many cases, are not based on needs assessment; training curricula are not updated; and resource persons are not properly selected. Delivery of services has governance problems at the local level. In certain cases, technical program is not locally designed; it is pushed down the level from the headquarters. Fund allocation is also done from the headquarters, although according to project agreement, the whole process is supposed to be a bottom up approach. GO-NGO linkage is very poor. Internal monitoring and evaluation is also very poor. Accessing credit for small farmers/farmer groups remains as difficult as before. The critical constraint in implementing the development project with multiple components is poor coordination at all levels. Even within a Directorate, interdepartmental coordination remains weak. This problem deepens, if two or more Ministries are involved in the implementation of a given project.

5.0 Conclusions

5.1 All policy documents on crops, livestock, fisheries and food are recently prepared in the context of changes in global and domestic social, economic and trade environment. The policies are sound, but if they are not implemented in totality, it will not be possible to achieve the food production target estimated for the year 2015. In the past, it was seen that the policies that require fundamental changes like institutional reform were always bypassed. As a result, only partial success was achieved. Achieving the millennium development target will rest on the following conditions: (i) substantial increase in public and private investment, (ii) institutional and management reform, (iii) close inter-institutional and inter-ministerial cooperation, (iv) GO-NGO-private sector partnership, (v) good agricultural governance, particularly at the local level, and (vi) commitment of the Government.

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FOOD SECURITY AND ACCESS TO FOOD: PRESENT STATUS AND FUTURE PERSPECTIVE

Md. Ruhul Amin[26] and Naser Farid[27]

1. Introduction:

1.1 Agriculture sector contributed to about 22% of total GDP, out of which crop sector shared 73%, fisheries 10%, livestock 10% and forestry 7%. The growth of agriculture sector in the Fiscal Year July 97-June 98 was 3.1% which was lower than the projected growth of 4%. The food grain production in the year 2003-04 was 27.44 million tons, 2.8% higher than the historical highest record achieved last year, which met approximately 90% of national food grain requirement. The estimated production for 2004-05 is 26.9 million metric tons i.e. 2% lower than the previous year. However, food insecurity among the poor; a half of the population remained as a major concern. The growth during the Fiscal Year 2004-05 would be lower due to mainly the loss of 2.2 million tons of food grain production and other damages caused by floods.

1.2 The Government of Bangladesh has identified Food Security as an important factor contributing to its socio-economic stabilization and development. Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life. To discuss food security, three important aspects must be considered e.g. availability of adequate food, stability in food supplies, access to food, and nutrition security. Bangladesh have made a steady progress in the expansion of food production. But because of the increasing population pressure there has been an extensive use of land to meet the growing demand for food. Despite the growth in food production and its availability, food insecurity is still a major problem mainly because of the lack of purchasing power and thus of access to food, especially for the ultra poor community. A major portion of the rural population is landless, and as labours they depend on casual earning for their livelihood. Due to the seasonal variation in agricultural employment and limited employment opportunities in non-farm sector, millions of people suffer from chronic and transitory food insecurity. The average Bangladesh diet is deficit in energy by about 15 percent. It is seriously unbalanced with an inadequate intake of fat, oil, fish/animal protein, fruit and vegetable.

1.3 The 1996 World Food Summit definition of food security is “food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life”.

2. Different kinds and dimensions of food security

2.1. A very important factor in determining food security is to identify the nature of food security problem and it is common to draw a distinction between the chronic and transitory food insecurity.

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2.2. When individuals or groups of people suffer from food insecurity all of the time, then they can be said to suffer from chronic food insecurity. In other words, chronic food insecurity is a continuous inadequacy of diet caused by the inability to acquire food. It affects households that persistently lack the ability either to buy or produce enough food. Hence poverty is considered the root cause of chronic food insecurity.

2.3. Transitory food insecurity occurs when households face a temporary decline in access to enough food. Transitory food insecurity can be further divided into temporary food insecurity and cyclical or seasonal food insecurity. Temporary food insecurity occurs when sudden and unpredictable shocks, such as drought or flood, affect a household's entitlements. Famine is the worst form of transitory food insecurity, which can result from one or more causes like, flood, drought, crop failure, market failure, loss of real purchasing power by group of households etc. For urban households, sudden unemployment may also be a cause of transitory food insecurity. Seasonal food insecurity occurs when there is a regular pattern of inadequate access to food.

2.4. Transitory food insecurity may lead to chronic food insecurity, depending on how severe it is and how frequently it occurs. If a household suffers two drought years in a row, and is forced to sell some of its assets to survive, then it may move from a situation of transitory food insecurity to one of chronic food insecurity.

2.5. All of these types of disruption to food supplies can trigger crises by threatening a population's access to food. They are the immediate causes of famine but these precipitating triggers lead to famine only where particular groups of people are already exposed to it.

3. Measuring Food Security and Insecurity

3.1. In order to understand better the nature and extent of the food security situation and the possible ways to improving it, it is important to distinguish between food security at the national, local, household and intra-household level. The ultimate goal is to meet the food requirements of the people at all levels.

3.2. Food security at the national level is determined by the availability of enough resources for the whole population. The most widely used indicators are quantities of available food compared with needs, as well as import requirements compared with the country's capacity to import.

3.3. At the sub-regional levels, food security can be measured by comparing regional nutritional requirements with availability of dietary calories per head. Furthermore, the problem is increasingly being used in terms of seasonal or local level.

3.4. At the household level, food security is dependent on a household's access to enough food. Thus it is closely linked with the issue of poverty, access, sufficiency, vulnerability and sustainability. At the household level, food security is measured by actual dietary intake of all household members using household income and expenditure surveys. It is important that changes in socio-economic and demographic variables be monitored continuously over time.

3.5. A food poverty indicator shows the number of individuals living in a household whose access to food is sufficient to provide a dietary intake adequate for growth, activity and good health**.** Individual food security implies an intake of food and absorption of nutrients sufficient to meet an individual's needs for activity, health, growth and development. The individual's age, gender, body size, health status and level of physical activity determine the level of need.

4. Identifying the Food Insecure

4.1. Food security at the national level is perhaps best described as a satisfactory balance between food demand and food supply at reasonable prices. Food security at national level, i.e., self-reliance in food at the national level does not necessarily mean food security at the household or individual level. We have to disaggregate simply because we may be food secure at the national level, but have a considerable number of food insecure households. Food insecure households will generally be identifiable in regional or socio-economic terms.

4.2. It is important as a first step in developing an appropriate strategy for enhancing food security to identify the nature and level of food insecurity problems. Although some household problems can be tackled at the national level, and some national level problems will respond to an increase in household entitlements, the interaction between the different levels of food security are critical in devising an effective response. To visualize the role of the government in clear terms it is necessary to develop mechanisms to take background research and analytical exercises and disseminate results.

4.3. We have argued that food security at national level, i.e., self-reliance in food at the national level does not necessarily mean food security at the household or individual level. Thus overall production or availability of foodgrain may be a bad indicator of what the vulnerable groups in the population can actually acquire. Food may rank highest among basic human needs, but it will not be reflected in the market as long as it is not adequately backed up by purchasing power (effective demand).

4.5. Even when aggregate food supplies are adequate, a number of factors may prevent poor households or individuals from acquiring enough food. Income levels of the poor may be insufficient to enable them to purchase the necessary foods at the prices prevailing in the market. These households may also lack the necessary assets or access to credit to help them get through difficult times**.** Moreover, they may find themselves outside any public assistance or other program that would provide them with transfers in-kind or as cash to supplement their food acquisition capacity**.**

4.6. Poverty and hunger**,** as we know, are not simply economic problems in the narrow sense, but more importantly it has social and political dimensions as well. Since the market does not care about the food security needs of the food deprived population, the government will have to play the caring role if the objective of ensuring food security of the citizens is to be achieved in Bangladesh because of so high incidence of absolute poverty and un(under)employment**.**

4.7. Moreover, adequate food availability at the household level does not necessarily mean that all members of the household enjoy access to enough food. In particular, women and children

often suffer from inequalities in intra-household food distribution. Protein-Energy-Malnutrition (PEM) describes a spectrum of clinical disorders and is the most important public health problem. However, investigations further suggest that when commonly consumed cereal diets meet energy needs, they meet protein requirements as well. Balanced diet is a food security related problem, which is not directly related with poverty in Bangladesh.

5. Overview on Poverty and Access to Food Situation

5.1. According to latest Household Income and Expenditure Survey (HIES 2000) of Bangladesh Bureau of Statistics (BBS) the malnutrition problem is desperately serious for the poorest 14% of the rural population consuming fewer than 1600 calories per capita per day, levels barely adequate for survival. Another 10% consume between 1600 and 1800 calories per day, while roughly 23% consume more than 1800 calories but less than the minimum caloric requirement set in Bangladesh at 2122 per day. (For purposes of discussion, these groupings are described respectively as “ultra food deficit,” “hard-core food deficit,” and “moderately food deficit,” using locally familiar nomenclature).

5.2. In all, roughly half of the country’s rural households would be considered food insecure and also fall below established poverty lines. Although these percentages are considerably less severe than those which existed two decades ago -the percentage of the rural population consuming less than required calories in 1981 was 73% - improvements have not continued during the 1990s during which average caloric intake has actually fallen.

5.3. It has been evident that increased domestic production, supplemented by imports and overall public food management contributed to relatively adequate availability of food at national level over the recent past years. However, as has been mentioned, the fundamental spirit of food security is to ensure availability and consumption of food at individual level. Even when aggregate food supplies are adequate, a number of factors may prevent households or individuals from acquiring enough food. The overall productivity of the poor producers may be low or their income levels may be insufficient to enable them to purchase the necessary foods from the market at the ruling prices. Households may also lack the necessary asset or access to credit to overcome the period of hardship. They may also remain outside the food assistance programmes that would provide them with cash or kind income to supplement their food acquisition capacity.

5.4. Food security at household level is closely linked with poverty. These poverty and food security problems are massive, with approximately half of the population lacking the resources to acquire enough food and consequently remaining below the poverty line. Two approaches are generally used for measuring the incidence of poverty: direct calorie intake (DCI) method and cost of basic need (CBN) method. The Bangladesh Bureau of Statistics (BBS) has estimated the extent of poverty using the DCI method through its successive Household Expenditure Surveys (HES). In addition, the CBN method of estimation has also been introduced in the household expenditure surveys.

Table 1: Poverty situation in Bangladesh as measured by the cost of basic need (CBN) method

Locations	Percent of population below poverty line					
	Upper poverty line			Lower poverty line		
	1991-92	1995-96	2000	1991-92	1995-96	2000
National	58.8	51.0	49.8	42.7	34.4	33.7
Rural	61.2	55.2	53.0	46.0	38.5	37.4
Urban	44.9	29.4	36.6	23.3	13.7	19.1

Source: Household Income and Expenditure Survey, 2000, Bangladesh Bureau of Statistics.

5.5. Table 1 shows a picture of the incidence of poverty from 1991-92 to 2000, as measured by the CBN method. It appears that the percent of people falling below absolute poverty line decreased from 58.8 percent in 1991-92 to 49.8 percent in 2000. The hard-core poverty level also decreased over the period, from 42.7 percent in 1991-92 to 33.7 percent in 2000. Both rural and urban poverty levels decreased during the period.

Table 2: Regional incidence of poverty, as measured by the cost of basic need (CBN) method

Regions/ Division	Percent of population below poverty line					
	Upper poverty line			Lower poverty line		
	National	Rural	Urban	National	Rural	Urban
		2000				
Barisal	39.8	40.0	37.9	28.8	29.6	19.5
Chittagong	47.7	48.4	44.0	25.0	25.3	23.3
Dhaka	44.8	52.9	28.2	32.0	41.7	12.0
Khulna	51.4	52.2	47.1	35.4	36.8	27.5
Rajshahi	61.0	62.8	48.1	46.7	48.8	32.3
Bangladesh	49.8	53.1	36.3	33.7	37.4	19.1
		1995-96				
Barisal	49.9	50.2	44.4	39.1	39.6	29.5
Chittagong	52.4	54.0	40.8	28.6	30.3	16.7
Dhaka	40.2	48.5	18.4	27.8	35.5	7.6
Khulna	55.0	56.0	48.7	36.4	37.8	27.4
Rajshahi	61.8	65.0	36.8	46.9	50.4	18.6
Bangladesh	51.0	55.3	29.5	34.4	38.5	13.7

Source: Household Income and Expenditure Survey, 2000, Bangladesh Bureau of Statistics.

5.6. Table 1 also shows the incidence of poverty from 1991-92 to 2000, as measured by the CBN method. The two levels of poverty measures used in the CBN method are “upper poverty line” which roughly corresponds to the absolute poverty line and “lower poverty line”, corresponding roughly to the hardcore poverty line in the DCI method.

5.7. It appears from Table 1 that the incidence of poverty falling below both upper and lower poverty line decreased from 1991-92 to 2000. Both rural and urban poverty decreased during the period. However, for urban areas incidence of poverty decreased from 1991-92 to 1995-96 and then increased in 2000. It would be important to note that the overall incidence for poverty was higher in the CBN method than in the DCI method.

5.8. The incidence of poverty calculated by the CBN method, disaggregated into rural-urban and 'divisional' levels for 1995-96 and 2000 are presented in Table 2. In relation to both upper and lower poverty lines, both national and rural poverty decreased from 1995-96 to 2000. However, urban poverty increased from 195-96 to 2000, both in relation to upper and lower poverty lines.

5.9. Levels of poverty showed substantial variation across regions of the country. As would be evident from Table 2 in relation to upper poverty line, both rural and urban poverty was highest in Rajshahi region in 2000. While rural poverty was lowest in Barisal region, urban poverty was lowest in Dhaka region.

5.10. The high incidence of poverty in the Rajshahi region apparently goes in odd with our earlier evidence which revealed Rajshahi to be the highest surplus producer of foodgrains in the country. The production pattern in the region is characterized by concentration of production in the hands of relatively small number of large land holders whose surplus products are channelled out of the area through internal trade. This situation corroborates the importance of demand side consideration as opposed to production or supply aspect in the determination of food security.

5.11. In relation to lower poverty line also, both rural and urban poverty was highest in Rajshahi region. While rural poverty was lowest in Chittagong region, urban poverty was lowest in the Barisal region.

6. Long Term Outlook of Food Supply and Demand

6.1. Although Bangladesh has achieved considerable success in augmenting domestic production and thereby ensuring stable supply of food over the past years, sustainability of production and hence availability of food is a big issue which is being raised very strongly. The overall production, availability, requirement and food security situation can be analyzed by taking into account population growth, income growth and the consequent food demand patterns. Bangladesh has achieved moderate success in checking population growth. The annual growth of population declined from around 3% in the 1960s to 1.5% in the year 2001 (BBS 2001). An important aspect of population growth which will have important implications for the pattern of food demand is the rate of growth of urban population.

6.2. According to World Bank projection, urban population will increase to about 46.4 million by 2005 to constitute about 30 percent of the total populations. With national income growing at a rate of 4 percent per annum, per capita income is expected to grow at about 1.9 percent per annum under the medium population growth scenario. Under the optimistic population growth scenario, however, per capita income will grow by 2.4 percent per annum. If national income grows at a rate of 5 percent per annum, per capita income would increase at a rate of 2.9 percent per annum under the medium population growth scenario and 3.4 percent per annum under the low population growth scenario (Hossain 1989).

6.3. A drastic change in the pattern of food demand would occur if per capita income growth could be accelerated to between 3.0 and 3.5 percent per annum. The demand for cereals, vegetables would increase at a much slower rate, while the demand for livestock products would increase at a higher rate than the growth of national income. With higher increase in urban population, the demand for cereals will proportionately decline while the demand for fishery and livestock products will continue to rise.

6.4. The projection of annual increase in the demand for various types of food under alternative growth scenarios is presented in Table 3. Demand would grow at an annual rate of less than 3% for foodgrains; 3-4% for vegetables, pulses and edible oils; 4-5% for fish, milk and sugar; and at more than 5% for meat. With population growing at 1.5% per annum, demand for grains would grow only at 2.3% even if the GNP growth accelerates to 5% per annum. Under this scenario, demand for livestock products would grow at nearly 5.6% and the demand fro fish at 4.2% (Hossain 1989).

6.5. A picture of projection of total requirement of major food items under alternative development scenarios is presented in Table 4. The 'business as usual (BAU)', scenario assumes a growth of national income at 4.5%, while a growth rate of 6.5 is assumed under the 'accelerated growth' scenario. The table shows that rice consumption requirement is expected to reach 29.72 million tons in 2010 and 31.1 million tons in 2020 under the accelerated growth scenario. A sharp increase in requirement is observed for non-cereal items such as vegetables, meat and milk.

6.6. Thus both under 'BAU' and 'accelerated growth' scenarios, Bangladesh will require about 35 million tons of foodgrains per annum by the year 2020. If all or most of this quantity is to be produced domestically, this will have to be done under conditions of declining availability of the two crucial resources such as land and water.

Tabel 3. Average annual rate of growth of expected demand of various types of food 1985-2010.

Type of food	Annual average growth rate of demand under			
	Scenario A	Scenario B	Scenario C	Scenario D
Grains	2.76	2.89	2.33	2.33
Vegetables	3.30	3.75	3.02	3.45
Pulses	3.26	3.64	3.78	3.26
Fish	3.67	4.40	3.57s	4.21
Meat and Eggs	4.44	5.58	4.51	5.60
Milk	4.17	5.09	4.13	4.97
Edible Oil	3.45	4.03	3.25	3.78
Sugar/gur4.22	4.22	5.20	4.23	5.17

Note : Scenario A: Business as usual
Scenario B: Medium Population-high income growth
Scenario C: Low population-low income growth
Scenario D: Low Population-high income growth
Source: Hossain 1989

Table 4. Projections of the requirement for major food items under alternative development scenarios, 2010 and 2020

Food Items	Actual consumption (million tons)	Projected requirements (million tons			
		Businesses as usual		Accelerated growth	
	1992	2010	2020	2010	2020
Rice	19.60	27.83	31.95	29.72	31.11
Others cereals	1.83	2.74	3.44	3.10	4.03
Pulses	0.75	1.23	1.68	1.16	1.67
Edible oils	0.43	0.91	1.28	1.16	1.67
Potato	1.85	3.17	11.62	10.62	13.18
Other vegetables	5.74	9.05	11.62	10.62	13.18
Fish	1.47	2.57	3.60	3.20	4.31
Meat and eggs	0.55	1.29	1.92	1.93	2.88
Milk	0.88	1.74	2.61	2.52	3.89

Notes: Business as usual : assumes a growth rate of national income at 4.5% per annum.
Accelerated growth: assumes a growth rate of national income at 6.5% per annum
Source: Hossain and Shahabuddin (1999)

7. Access to Food: Intervention for Enhancing Current Status

7.1. Effective implementation of the targeted food safety net programmes

7.1.1. In the absence of direct transfers of food or cash with which to purchase food, private markets sometimes fail to provide food for the impoverished, especially the hardcore poor who are exposed to severe nutritional risk throughout the year. Moreover, in a country where about half of the people live below the poverty line, there are many households who face seasonal food insecurity, i.e. face hunger and deprivation during the lean season.

7.1.2. A well-targeted safety net programme may increase the real income and food consumption of the target group without providing those benefits to non-needy members of the population. Hence successful targeting requires minimizing leakage to non-target households. Leakage increases cost and reduces cost-effectiveness of targeted interventions. While careful targeting to the most-needy will reduce the fiscal cost of transferring income, it may increase the cost per beneficiary, because a sharp targeting entails considerably more managerial skill and administrative costs. Hence cost-effective program must find a balance between cost of leakage and cost of targeting.

7.1.3. Identifying vulnerable households is a challenge given their considerable mobility over time. Study results suggest that, natural crises accounted for about one-third of this movement, while life-cycle and structural factors accounts for remaining two-thirds. More important is the fact that, within households, some population groups are at greater nutritional risk than others. Under-nutrition is widespread in Bangladesh. Amidst this pervasive hunger, pregnant and lactating women, infants, and pre-school children are the population groups facing the most acute nutritional risk.

7.1.4. Among the vulnerable groups, urban slum dwellers and rural landless confront the greatest hardships. Because of low income and poor sanitation coverage in urban slums, urban malnutrition is especially acute. Among the distressed rural population, malnutrition is acute and widespread among landless household members. Other occupational groups at particular risk include day labourers, fishermen, and boat pullers. Geographic targeting also allows intervention to specific, distress areas of the country, this may include the concerns of less employment opportunities, lower level of infrastructural and agricultural development and in particular the incidence of natural calamities. Incorporating all these concerns, flood prone areas - particularly zones affected by land erosion along the major river banks - and urban slums appear to be most nutritionally distress areas of the country.

7.1.5. One important issue relating to access to and consumption of food is the distribution of food among members of the household. Even though households have enough food at their disposal, there is no guarantee that all individuals in the households have equal access to food. Conventional food intake patterns suggest that women and children have less access to food than adult males. Results of recent household survey have shown that non-pregnant and non-lactating women consumed approximately the same percentage (more than 90 percent) of their requirement as men, but children upto 6 years of age received, on an average, only 68 percent of their calorie requirement (Ninno and Dorosh, 1998).

7.2. Intervention for Improving Food Market Efficiency

7.2.1. An efficient food market will ensure unhindered flow of goods and services across time and space. There are large number of buyers and sellers in the food market of Bangladesh. But the dispersal of small producers over vast areas, lack of proper transport, storage and communication system, formal and informal restriction on movement of goods and faulty grading system seriously affect the competitive environment.

7.2.2. Improving market environment calls for measures like improvement of market infrastructure, unrestricted storage and movements for private trade, provision of incentives for private sector such as non-discriminatory credit, enforcement of quality standard and selective non-distortionary public food market intervention for price stabilization.

7.2.3. Bangladesh experiences two periods of price hike in rice, one during September to November (before T. aman harvest) and the other during March and April (before Boro harvest) as national stock goes down. During these periods, food prices are at their highest level but agricultural wages are at their minimum. So, both food availability and accessibility are worst during these periods, affecting the landless, marginal and even small farm families (who together constitute more than 60 percent of the rural population). As a result, prevalence of malnutrition and other nutritional disorders rises also to the peak at these times of the year. Around 7.7 million rural household are living virtually landless. They neither can produce adequate food for themselves nor purchase the food they need. Per capita availability of food for the last four years i.e. 2000-01 to 2003-04 have although been more than 530 gm. per day as per estimation of MoFDM even then there is a question of how much portion of poor people have their access to a minimum intake. The sustainable annual and seasonal variation in food prices is the major cause

of sustainability. Market price for course rice is the prime indicator of price situation in the country. The price index for course rice is the political issue in this country.

8. Improving Food Security: Policies and Actions

8.1. Improving Availability of Food

8.1.1. The four components of food availability are domestic production, commercial import, food aid and stock adjustment. The Ministry of Agriculture and other related bodies focus on production policies that influence medium and long term availability. The Ministry of Food aims to ensure mainly the short run availability through various market interventions.

8.1.2. The policies pursued by the government to increase domestic production include provision of incentive price to the growers, implicit and explicit subsidy on major agricultural inputs including credit and investment in agricultural research for generation of new technologies. However, in procuring foodgrains from domestic producers the government does not offer any floor price, and the quantum of procurement is generally limited by physical and financial resources. Thus the programme does not often yield desired results in the form of price stabilization and thereby provision of incentives to the growers. Regarding investment in agricultural research, available evidence suggests that the country grossly under-invests in agricultural research, inspite of the fact that return to agricultural research is very high in Bangladesh. Investment in agricultural research constitutes less than 0.5% of agricultural GDP, against the minimum requirement of 1% suggested by international agencies. In order to increase overall domestic production, the government needs to promote production of non-foodgrain corps and non-crops food products, increasing productivity of rain-fed farming, providing agricultural credit, improving market infrastructure and reducing post-harvest losses.

8.1.3. Regarding import, significant policy changes occurred from the early nineties. Private import of foodgrain has been allowed from 1992, and tax/tariff structures have been made flexible. In view of increased domestic production of foodgrains, government commercial import has been reduced substantially. Also, because of policy changes in the global context, aid import has also diminished over the past years. The private sector has so far played an important role in maintaining stability in the food market.

8.1.4. Public foodgrain stock plays an important role in responding to emergency food situation in the country. The current policy of the government is to maintain stock of about 1 million tons to cater to the needs to normal distribution and emergency requirement. The Ministry of Food & Disaster Management ensures quick disbursement of foodgrain to affected areas in times of disaster. The public foodgrain stock provides a substantial degree of cushion in maintaining overall food availability in the country.

8.2. Improving Access to Food

8.2.1. The government of Bangladesh uses two broad approaches to increase access to food, particularly for the poor:

a. The short-run approach in which direct transfer of food or cash is provided through a number of programmes; and

b. The long-run approach, through which the government designs policies, implements programmes, and invests in development projects with a view of raising incomes of the poor and their capacity to acquire food through employment generating activities. Although relief distribution remains an important objective, most targeted food programmes have gradually shifted in emphasis from relief to development.

8.3. Measuring Effectiveness of Food Programmes

8.3.1. While all the food programmes aim to help the poor, they vary considerably in their specific objectives, and also in their effectiveness in accomplishing the desired objectives. An important indicator of the effectiveness of the short- run relief programme is the speed at which resources are delivered to the people who are actually in need. An important dimension of analyzing performance of food programmes is to perform cost-effectiveness analysis. The cost of running the programmes and the benefits received by the target households depend to a large extent on the methods in which the programmes are implemented.

8.3.2. An important consideration would be to measure the development impact and incorporate it in the cost effectiveness analysis. Again, while payment in the form of food is likely to contribute directly to consumption of food and nutrients, cash payment would contribute to food/nutrient consumption through marginal propensity to consume food. One can also argue that payment in food does not necessarily ensure food consumption as the recipients may resort to the practice of arbitrage and thereby resale grains to obtain cash. Thus the job of increasing access to food is fraught with a host of interrelated problems which need to be solved through careful and integrated approach.

8.3.3. Bangladesh has so far been able to raise domestic production and maintain availability of foodgrain upto the level of aggregate requirement, as defined by certain stipulated per capita requirement. However, distribution of availability/intake shows substantial deficit for a large segment of the population. For non-grain crops and non-crop food items, the deficits are even larger, both at aggregate and disaggregate levels. The existing consumption also falls far short of long term requirement for most of the food items.

8.3.4. Regarding intake of nutrients, per capita calorie and protein intake for the average rural and urban population appear to be sufficient in relation to per capita requirement. However, distribution of consumption according to classes to people point to serious deficiency for a large proportion of the population. The most vulnerable groups are women and children. The deficiency in the intake of micronutrients including iron and vitamin is more acute, particularly among women and children.

8.3.5. Increasing poor peoples' access to food requires improvement of earning capacity of the poor and vulnerable sections of the population, and successful implementation of targeted food programmes in the cost-effective manner. Besides, well coordinated health and nutrition programmes are warranted for ensuring effective utilization of food.

8.3.6. An important dimension of food security is to address the issues of availability, access and utilization of food across location, group of people and over future periods. Agricultural

production environment in Bangladesh is characterized by frequent occurrence of natural disasters. Thus emergency preparedness is needed to mitigate the transitory food insecurity caused by natural disasters. Diversification of production, proper targeting for distribution and public stock management will continue to play important role in coping with uncertainties and mitigation of the effects of disasters.

9. Incorporation of both Supply and Demand-based approaches to analyze food security

9.1. Policies to improve food security need both supply and demand-based approaches. Food supply determines availability and food demand is an expression of the ability to gain access to food. Both access and availability along with proper utilisation of acquired food - have to be ensured at the same time to achieve food security. This applies to individuals within households as well as household and national levels.

9.2. Major factors determining food availability are:

- the volume and stability of food production (subsistence and market oriented production);
- available food stock (farm-level, trade level, and government sock)
- food import and export (commercial, food-aid import and export of raw or processed food)

9.3. Major factors determining access to food are:

At the household level-

- the purchasing power, or level of real income, for all those who depend, fully or partially on the market as their source of food supplies. The level of real income depends, again on a variety of factors such as wage levels, employment, prices etc.
- the productive assets available to those who depend on subsistence production or market supply and non-market transfers.

At the national level-

- access to food depends on the availability of foreign exchange to pay for food imports, if required to complement domestic supplies at an affordable prices and food aid receipts.

10. Pathway of interaction Poverty, Growth and Food Security in Bangladesh

10.1 Conceptual Framework of Food Security in Bangladesh Context

10.1.1. Food security is an essential dimension of human security and fundamental to economic development. But food security is not the only dimension of human security, and even as such, it overlaps with the notion of economic security, health security, etc. Food security is an essential precondition for faster growth and economic development necessary for poverty reduction. Ultimately, the building blocks of an economy are at the households and community levels, and unless they feel food secure, no national or international “tinkering” will result in economic development. The following concerns are important to develop a conceptual frame in our context (Figure-1).

10.1.2. Subsistence producers/consumers by definition live hand to mouth existences and until the poor feel secure in their access to food, they will remain highly risk-averse to alternate, including the path for sustainable production strategies. The situation worsen further when the food insecure resort to environmentally-damaging coping strategies, of which the widespread deforestation, and subsequent erosion is but one living example.

10.1.3. Roughly 6 million households (one-fourth of total) fall under abject poor status (about one-third of which are headed by elderly, disabled or widows). For part of the year rest of the poor households are also unable to access market-based opportunities to avoid nutritionally deficient intake. Therefore, some form of real income transfer, coupled with whenever applicable income generation assistance is necessary.

10.1.4. Both women and men produce and eat food, and in certain situations at risk of becoming vulnerable of not having enough to eat and satisfy their dietary requirement. Certain factors make risk of food insecurity gendered. Educating women and ensuring women's access to credit schemes can have many positive impacts on women's and girl's food security. Gender dimension of food security are yet to be recognized by most of the programme designers. Educational attainment affects food security. If a family is literate, especially women, they are more likely to engage in behaviours that protect family health, including good sanitation, breast-feeding and achieving a nutritionally balanced diet including sufficient micronutrients. Women's responsibilities to protect and maintain family and households are compounded during and after disasters and thus increase their workload. These issues are and should be linked to food insecurity, vulnerability and vicious cycle of inter-generational poverty. There are varieties of mechanism that can ensure gender related food security issues to be at the right place in prioritizing development agenda.

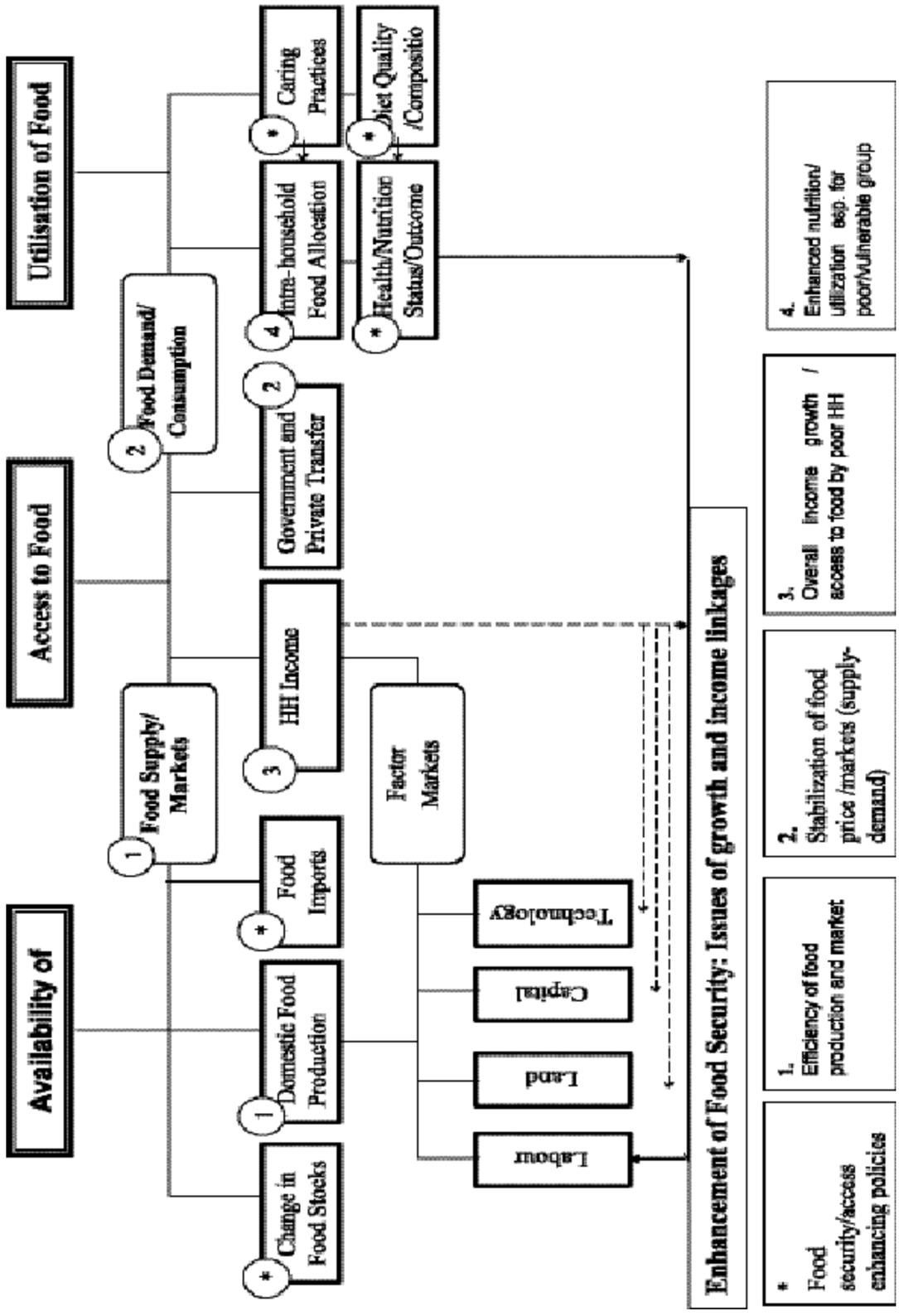

Figure-1: Food Security Components and Growth/ Poverty Linkages

10.2. Efficiency of Food Production and Marketing Systems

10.2.1. Green Revolution technology in rice and wheat (improved seeds, expansion of irrigation, and increased use of fertilizer) has enabled Bangladesh to reduce the national level "cereal gap" between a per capita availability target and net domestic production. However, achieving true food security requires non-foodgrain availability to be enhanced even while foodgrain availability is maintained. This challenge is particularly difficult given continued population growth and little potential for the expansion of more cultivated land. Continued efforts are required to sustainable intensification of cropping systems and enhancing the efficiency of food production and marketing systems.

10.2.2. This broad issue require support in areas related to food production and marketing systems like- (i) improving agricultural technology and its adoption in major cereal and non-cereal production systems, (ii) diversification of cropping systems, (iii) efficient use of water resources, and (iv) a reduction in input and output market distortions. These are discussed below:

10.2.3. Improved agricultural technology can result in sustainable intensification of cropping systems and improvement of crop yields (output per unit of land) as well as enhancement of economic efficiency (value of output per total cost of inputs).

- Crop diversification can help address the nutritional imbalances regularly found in Bangladesh diets. These imbalances, which can have serious health consequences for the poor, are largely determined by the limited diversity that is typical of domestic production systems. Diversification of these systems may best be achieved by focusing on areas where agro-ecological conditions are less suitable for rice, especially winter season rice.
- Improvements in water use efficiency can help the country better manage its limited water resources during the boro season and to avert crop damage from seasonal water shortages. Expansion of wheat and maize area (generally are not irrigated) can help in this regard. Improved water use efficiency must be tied to improved agronomic and economic efficiency of production systems.
- Distortions in input (fertilizer, credit, seeds, etc.) and output (especially non-cereals) markets can inhibit farmer use of improved technology, as well as reduce farmer incomes through low producer prices. Output market distortions, including those caused by high storage losses, lack of information and high transport costs, can be important for fruits and vegetables, pulses and other non-grains.

10.2.4. New technology options will be attractive to farmers only when conditions are right in product and input markets. For this reason, the efficiency of food production and marketing systems must be taken together, if the multiple goals described above are to be met. Thus, technology development and policies (especially policies that affect markets) must be integrated.

10.3. Stabilization of Food Markets and Public Food Distribution System (PFDS)

10.3.1. The major objective of the Public Food Distribution System (PFDS) market interventions is stabilization of foodgrain market. Achieving this objective requires not only sufficient buffer stock and budgetary resources, but also effective policy implementation. This requires efforts in

four key areas:

- efficient cereal stock policy;
- appropriate market intervention strategy to protect producer and consumer's interests as well as to promote well-functioning markets;
- effective trade and tariff policy; and
- development of non-cereal food markets.

10.3.2. Since external and domestic supply, demand and market conditions are constantly changing, an efficient public stock policy (in terms of level, composition and cost) requires constant monitoring and analysis.

10.3.3. Timing and modalities of market interventions (public procurement and distribution), are crucial in bringing impacts on market and target households.

- Liberalisation of private sector foodgrain imports in the early-nineties has aided the government's efforts through providing a ceiling on domestic prices equal to the import parity price from the lowest cost external supplier. In this regard, effective trade policy can reduce the quantity of public food stocks needed to stabilize markets. But, concerns remain regarding possible changes in policies and market conditions in potential sources of import for Bangladesh. Though the private sector imports can keep domestic prices from rising above a ceiling equal to the unit cost of imports (the import parity price); since large-scale rice exports are not currently feasible, export parity prices do not provide domestic price floors for cereals.
- Finally, development of non-cereal food markets is crucial to both agricultural diversification and diet diversification. The government does not directly intervene in these markets, monitoring and analysis of these markets can inform public investments in infrastructure, and institutional support of food trade (such as the development of appropriate grades and standards).

10.4. Promoting Income Growth for the Rural Poor

10.4.1. Increased incomes of the poor and ultimately ensuring sustainable livelihoods, requires that their asset base be enhanced —including physical capital (e.g. infrastructure), natural capital (e.g. water resources delivered through new infrastructure), human capital (through improved health and education), financial capital (through savings and credit programs); and social capital (through training and income earning activities that increase connections among people). Building such assets goes beyond current income, to enhance the productive base and make households less vulnerable to income fluctuations in the future.

10.4.2. Numerous programmes are designed to increase this asset base of the poor and thus enhance their access to food. Food-based interventions such as Food/Cash For Work (C/FFW) are designed to increase access to food by providing employment while building infrastructure to support rural development. Other programs, including Vulnerable Group Development (VGD) are designed to augment participants' incomes on a more sustainable basis by providing training as well as short-term employment and food transfers. Cash/Food for Education (C/FFE) aims to improve food security of the poor in the short-run through direct transfers of food/cash, as well

as enhancing future income through developing human capital in the long-run. Likewise, the National Nutrition Programme of Ministry of Health and family Welfare aims to increase sustainable incomes of the poor by improving nutrition (thereby increasing labour productivity) and small-scale household income earning activities.

10.4.3. The effectiveness of these programs in increasing access to food by programme participants in both the short and medium terms are contingent upon achievements in two major areas:

- Improving the impact of food and non-food supported employment and infrastructure-building programs on household incomes and access to food
- Improving the impact of food and non-food supported training programs and primary education programmes on household incomes and access to food.

10.4.4. The impact of these programs on increasing access to food by the poor depends not only on the operation of the programmes themselves, but also on the economic, social and political environment in which they operate. For example, constraints in the labour, credit or product markets caused by lack of physical infrastructure, lack of demand for labour or products, or other factors, may inhibit the ability of program participants to maintain increased incomes once the program is finished.

10.4.5. The infrastructure, skill enhancement, and agriculture/non-agricultural sector initiatives can help in bringing more positive impacts of food and non-food supported employment for infrastructure building, skill and training programmes on the incomes of the poor.

10.5. Enhancing Nutrition for Vulnerable Groups through Targeted Intervention

10.5.1. Sufficient availability and access to food do not guarantee good nutritional outcomes. Intra-household food distribution, consumer choice of foods, (influenced by consumer tastes, as well as nutrition education), preparation of foods, and overall health conditions (particularly the presence of illness or diseases that inhibit the body's absorption of nutrients) all affect nutritional outcomes.

10.5.2. Enhanced nutrition and utilization of food through implementation of various interventions require special efforts and attention in following areas:

(i) Improving the impact of targeted nutrition programs, particularly for women and children;
(ii) Increasing the effectiveness of food supplementation and fortification;
(iii) Enhancing quality and safety aspects of food for the urban poor; and
(iv) Promoting balanced diets.

10.5.3. In order to improve the impact of targeted nutrition programs, special attention should be attached on factors responsible for nutritional stress (e.g., weather-induced variability in production, unequal access to resources and markets, seasonal fluctuations and regional variations in employment opportunities, rural-urban migration, etc.).

10.5.4. Addressing these factors require continuous monitoring of food consumption and nutritional status of programme participants for assessing the effectiveness of the interventions and to suggest possible new instruments to combat this nutritional stress. Special emphasis should be ensured regarding improving nutritional status for women and children, given their special nutritional needs and widespread malnutrition in Bangladesh.

10.5.5. Effective food supplementation and fortification are possible short-term solutions to the serious micro-nutrient deficiencies that persist in Bangladesh where over 90 percent of Bangladeshis have low iron intakes and vitamin-A, a serious problem among pregnant and lactating women. One option is to test the fortification of wheat flour distributed through targeted food aid programs. Since migration from rural areas continuously adds to the urban population, there is a growing need for programs aimed at enhancing food security for the urban poor. Such programs need to be carefully designed and targeted to ensure maximum benefits to the needy from available resources.

10.5.6. Finally, promoting balanced diets is perhaps the best strategy in the long-run to handle the problem of malnutrition in Bangladesh, particularly micronutrient deficiencies. Diet improvement activities may involve both increasing the availability of foods other than rice through increases in production incentives, improved technology and more efficient marketing, as well as appropriate nutrition education and other measures (such as safe and nutrient dense food processing/distribution) to increase household demand for diverse foods.

11. Key to Long-term Food Security: Access to Sufficient Income and Resources

11.1. The households can make use of the resources available to them as well as the level of those resources depends to some extent on the nature of the environment within which they operate, and the specific forms of the institutions which regulate the relations between the various economic agents.

11.2. Entitlement Factors influencing Access to Food and Poverty**:** An approach to take account of the following entitlement factors may be useful.

Trade-based entitlement - which describes what an individual can buy with the commodities and cash they own.

Production-based entitlement - which describes the right to own what one produces with one's own resources.

Own-labour entitlement - which describes the sale of one's own labour power, and the resulting trade-based entitlements.

Inheritance and transfer entitlement - which refers to the right to own and what is willingly given by others as remittances, gifts or bequests, as well as transfers from the state such as social security, pensions, food distribution.

11.3. All these entitlements give an individual control over resources which they can use, within the rules and regulations laid down by society, to satisfy their needs, including the very basic need of food. This goes rather further than a purely economic analysis of prices and income, insofar as

it allows for consideration of both traditional community and state institutions when analysing how people meet their food requirements.

11.4. Risk and Vulnerability Issues: The risk factors which create food insecurity must come into consideration. There are two approaches which can be taken to this. The first is to look at the characteristics of the vulnerable groups in a society. The second is to examine the sources of risk to their entitlements. Both approaches give useful insights: the first helps identify vulnerability and the second illustrates how that vulnerability may change over time.

11.5. The food insecurity is not only confined to those who have food deficient diets at a given point in time. They include those whose access to food is insecure or vulnerable, those who are in danger of inadequate diets. Vulnerable groups can be classified according to a number of criteria:

- Geographic/regional: administrative zone, urban, rural
- Ecological: by climatic conditions, accessibility
- Economic: occupation, level of income, formal or informal sector, size of landholding types of crop grown, migrant labourer, female-headed household etc.
- Demographic: female, pregnant, lactating, pre-school children, school-aged children, elderly etc.

11.6. Therefore, it is necessary to distinguish more clearly the "development programmes targeted at the extreme poor" from "safety nets" or "social protection" which would be limited to welfare or relief only. Given the size of extreme poverty in Bangladesh, it cannot be addressed by safety net approaches only. Extreme poverty and hunger are not only the result of shocks, but also of structural conditions. Therefore, in addition to reactive interventions, pro-active actions are necessary.

12. Enhancement of Access to Food through Public Food Distribution System (PFDS)

12.1. Food Price Stabilization and Consumption Smoothing of the Poor

12.1.1. Government of Bangladesh attempts to stabilize foodgrain market prices for the simple reason that foodgrain prices are a crucial determinant of welfare for both producers and consumers particularly for the poorest groups in Bangladesh. Instability in producer prices of foodgrains increases farmers' uncertainty and discourages much-needed private investment in irrigation and agricultural machinery. Large increase in consumer price significantly lower real incomes of poor households, for whom foodgrains account for over 70 percent of their total spending. For the poorest, large price increases force them to reduce their food consumption, threatening their very lives.

12.1.2. Targeted food distribution programs are one method to increase household food security for the poor, and the Government in cooperation with development partners, uses programs like Integrated Food Security (IFS), Vulnerable Group Development (VGD), Food-For-Work and Cash/Food-For-Education to reach some of the poor. But given limited government resources,

there are simply too many poor households who are nutritionally at-risk to include all needy households in these programs. Preventing large increases in market prices through Open Market Sales (OMS) operation is an alternative mechanism for increasing food security for these people.

12.1.3. Carrying out a foodgrain price stabilisation policy is not easy, especially given rapid changes in international markets, variations in domestic production, and periodic weather-related disasters. In its market interventions and management of foodgrain stocks, the government attempts to balance competing producer and consumer interests, so as to sacrifice neither agricultural growth nor household food security for the poor.

12.1.4. There is room for debate over how much price stability is desirable, and the most efficient methods for stabilizing prices. Nonetheless, the potential costs of large variations in foodgrain prices for the people of Bangladesh necessitate some form of price stabilisation policy.

12.2. The Public Food Distribution System (PFDS) Functions

12.2.1. The function of PFDS is to provide a first line of defence in the event of a food emergency. In addition to the chronically food insecure, the section of population that are vulnerable to periodic food emergencies fall into two broad categories and may have been benefited by PFDS offtakes.

12.2.2. The first are those who are normally dependent on the market for their supplies, i.e. the urban population. Urban dwellers would normally have the resources to purchase their food needs from the market, but they can be vulnerable to shortfalls in market supplies and/or exceptionally high prices, which in a free market, are a reflection of supply shortfalls. When shortages start to appear in the market, or when prices reach unaffordable levels, this group can normally be catered for by ensuring that additional supplies are released into the market, e.g. through imports or Open Market Sales (OMS) from the PFDS stock, thereby augmenting supply and exerting a downward pressure on prices.

12.2.3. The second group comprises those people in the rural areas much of those are normally self-sufficient but, in times of food shortages resulting from poor harvests or damage to their on-farm stocks, do not have the resources necessary for purchasing their additional food needs from the market. This is the typical situation of the vulnerable population groups in Bangladesh, which has a rural subsistence economy. For these groups releasing grain into the market does not resolve their plight, as due to a lack of purchasing power, they are unable to gain access to it. Under these circumstances special relief programmes such as food-for-work, vulnerable group feeding, gratuitous relief, test relief and feeding programmes, are required to provide food supplements for these people.

12.2.4. The availability of a public foodgrain reserve would enable such humanitarian programmes to be rapidly initiated, however, unlike market releases of grain from the reserves, releases of grain for relief do not generate income with which the reserve can be replenished by subsequent market purchases. To replenish the grain, government will either have to make additional financing available, which is in many instances problematic, depending on the severity of damages due to catastrophes.

12.2.5. Bangladesh's PFDS supply operation is rationalized on the ground that it addresses key aspects of market failure, such as:

- making grains available to poor households those would not otherwise have access to adequate food,
- distributing food during emergency situations, such as natural disaster, and
- stabilising market prices to prevent excessive price hike.

12.2.6. Implementation of successful policy reforms, including foodgrain trade liberalization and abolition of ration channels, clearly suggests that achieving these objectives has indeed been the central focus of public sector foodgrain operation over the last 10 years.

12.2.7. With an annual distribution of more than 1.0 million metric tons and an average stock level of 0.7 to 1.0 million tons of foodgrain, the PFDS plays an important role in food and agricultural sectors of Bangladesh. While policy justification of PFDS operation is relatively clear, ensuring efficient delivery of program food to the beneficiaries is a dynamic process. The annual PFDS operation plan, involves an extensive process of consultation with relevant ministries, development partners, and other stakeholders. It is important to note that coordination among the institutions involved in formulation and execution of the plan can critically affect the efficiency of PFDS operation. Decision on optimal security stock, scheduling of commercial import and food aid grain, can all influence losses, quality, and costs of PFDS.

12.3. PFDS: Operational Demand and Supply Factors

12.3.1. The annual cereal demand for PFDS depends on three broad factors:

- size of the food aid supported programs,
- food-based market intervention for price stabilization, and
- non-food aid supported targeted programs

12.3.2. The demand for food aid supported programs—such as Integrated Food Security (IFS), Vulnerable Group Development (VGD), Rural Development (RD), School Feeding and humanitarian relief programmes—are estimated using the WFP allocation plan, which is normally prepared for a five-year time period. The GOB-financed food programs can be classified into three major groups. The first group of programs, which includes Food For Works (FFW), Test Relief (TR), and Gratuitous Relief (GR), are designed with dual objectives of development and relief, the second one is grain price stabilization programme (OMS) and rest are for supplies for the priority groups in emergency jobs.

12.4. PFDS: Optimal Stock, Stock Rotation and Strategic Storage Capacity

12.4.1. "National Food and Nutrition Policy" statement of the government determined the level 800,000 tons as the minimum stock position, of which 450,000 tons was for food security. The minimum stock should be maintained through local procurement and import to meet emergency requirements after drought, flood, and cyclone leading to crop damage. The document stressed the importance of stock rotation, "Proper rotation of emergency food stocks should be provided so that they remain safe".

12.4.2. The Cabinet of the government of Bangladesh takes the decision on the level of national foodgrain stock. This stock level, however, changes occasionally and the latest decision of the Cabinet reflect maintaining 1.0 million metric tons of public stock is preferable. A public foodgrain stock level with 0.3 to 0.4 million tons as security reserve plus 3-4 months of distribution requirement, appear to have become acceptable to the authority.

12.4.3. In practice, the PFDS stock level varies within the range of 0.5 to 1.2 million metric tons. This is because the fact that to satisfy government's willingness to provide production incentive to foodgrain producers, especially for the single highest (12.5 million metric tons) boro rice crop, the quantity of procurement exceeds 0.75 million metric tons. This procured quantity added to existing grain stock pushes the PFDS stock level at a very high level and creates pressure to the system for its outlet within 9-12 months. iv. The average safe shelf-life of PFDS food stocks is about 8 months that implies roughly that public distribution be equal to 1.5 times the average stock in the hands of the government.

12.4.4. Compulsory disposal of old stock in a relatively stable or depressed market price situation require very careful decision on disposal timing, location, size, quality-check and price setting. All above causes make use and maintenance of PFDS stock a complicated task. Exploring various cost-effective options for food-assisted development activities, nutrition intervention and safety nets are valid concern. In many cases use of poverty targeted PFDS channels are considered very effective as vehicle for fortification/ supplementation of micronutrients (e.g. VGD-NNP) initiatives. Usually PFDS distribution under targeted channels are managed by development partners' supplied wheat and government contribution (if any) are in the form of domestic rice or cash.

12.4.5. The composition of foodgrain stocks affects the capacity of achieving alternative objectives. While rice price stabilization can be achieved primarily with rice stocks, food security objectives can be achieved at lower cost primarily with wheat stocks. If, on the other hand, rice price stabilization is the primary objective, then stock interventions should be conducted with rice. This is due to reason that the cross-price elasticity of rice demand with respect to wheat price is very low, implying that movements in wheat prices have little influence on rice.

12.4.6. The political costs of high rice prices are very high. The government is under pressure to stabilize prices unless it wants to risk a political upheaval. The political economy of grain stock indicates small and organized pressure groups that benefit from high level of stocks.

12.5. Private Sector's Role in Food Trade and Price Stabilization

12.5.1. Government has therefore to make a value judgment of the additional benefits, which could be obtained from broadening the role of the reserve against the likely lesser marginal cost. With a long history of suppression of the private sector and government intervention in the market, it is to be expected that private sector traders will, for some time, be suspicious of government's intentions with respect to the use and operation of a public stock and thus be wary of being too exposed in the event of an unexpected government intervention in the market.

12.5.2. To allay these concerns government needs to adopt a transparent approach to the management and operation of the reserve by keeping traders fully informed of its intentions and avoiding actions involving use of the reserve in ways, which could undermine confidence amongst traders.

12.6. Coping with Food Emergencies

12.6.1. Over the last thirty years we have experienced food emergencies of varying severity on several occasions, the most common cause of which has been flood, cyclone and drought. While the area has always been susceptible to erratic rainfall, the frequency with which the rains have failed in recent years appears to have increased with two or three poor rainfall years occurring together.

12.6.2. People may be able to cope with a single year of flood or drought they face increasing difficulty in sustaining themselves over a period of sequential catastrophes as occurred in the 1970s and mid-1990s. Although flood and drought is the dominant cause of food emergencies, the country is also susceptible to other events, which can lead to food shortages either on a localised, national or regional scale. These include: localized floods, drought and pest attack which destroy the production base and/or the distribution structure.

13. Access to Food Strategy and the Public Food Distribution System

13.1. Bangladesh's current Food Access Strategy: The food access strategy is being designed to address all aspects of food security i.e, availability, access and utilization, at different levels - national/regional, household and individuals (intra-household) and nature of food security – chronic, transitory. The long and short-term objectives and strategies of food security strategy are discussed below.

13.2. Access to Food objectives linked to strategies and activities

The long and short-term objectives and strategies of Access to Food are as follows:

13.2.1. Long-run Access to Food

13.2.1.1. **Objectives**

Access to Food strategy aims, over the long run, to achieve overall food security – that is, access by all citizens to an adequate intake of food

13.2.1.2**. Strategy**

Access to Food requires action on two fronts. First is assurance of a continuous, low-cost food supply. Second is an income distribution that places adequate purchasing power in the hands of the poor.

13.2.1.3. **Instruments**

Bangladesh aims to ensure an affordable food supply by prompting efficiency in production, distribution and trade. Efficient domestic production will require sustained investment in agricultural research, extension of new technologies, and unconstrained access by farmers to productivity – enhancing inputs such as fertilizer, pesticides and irrigation equipment. Efficiency in distribution will require access to trade credit by private traders, removal of legal impediments to food grain trade, and access to international market for import and export of food grains. To increase incomes of the poor will require sustained employment generation economic growth.

13.2.2. Short-run Access to Food

13.2.2.1. Objectives

Periodically consumers face acute nutritional stress because of natural disasters, weather-induced

variability in production, and consequent fluctuations in both income and food prices. So, as a first short run objective, Access to Food strategy aims to smooth this short run fluctuation in food consumption. Second, it aims to support from prices in periods when prices fall below a level deemed necessary to sustain production incentives.

13.2.2.2. Strategy

Access to Food Strategy aims to protect consumers and producers from short-run fluctuations through the following actions:

- security stocks and disaster relief ;
- targeted relief for vulnerable; and
- price stabilization, to protect farmers and consumers from abnormal seasonal price movement

ACCESS TO FOOD: Objectives, Strategies, Instruments and Activities

Objectives	Strategies	Instruments	Activities
Long run 1. Access to adequate food by all	a. Assure low-cost food supply	1) Private food imports 2) Increased farm productivity 3) Assured input availability 4) Agricultural trade liberalization 5) Sustainable Agricultural intensification/diversification through introduction of new technology	† remove restrictions (MoC, NBR, MoF) † invest in agricultural research and extension (MOA) † deregulate input supply (MoA, MoI, MoFin) † expand production credit (BB, MoFin.) † introduction of yield enhancing technologies (MoA) † export oriented agricultural development (MoA)
	b. Increase purchasing power of the poor	1) Employment generating economic growth in farm and non-farm sector 2) Support to processing and trade 3) Fiscal and monetary policy	† focus investment in labour-using sectors (MoI/PC) † infrastructure development (MoC, MoLGRD&C) † low cost and uninterrupted energy supply (MoEMR) † easy access to credit and fiscal incentive (MoFin, BB)
Short run 1. Smooth fluctuations In food consumption	a. National Security stock	1) Private stocks 2) Government security stock	† remove restrictions (MoC, MoF, MoLaw) † ensure credit (BB, MoFin) † promote storage facilities (BB, MoFin, MoF) † monitor private stocks (MOF) † identify requirements (MoF) † hold in likely distress areas (MoF) † distribute during disasters (MDMR, MoLGRDC)
	b. Targeted food operation	1) Food transfer: VGD, VGF etc. 2) Cash transfer : RMP 3) “For work” Schemes 4) Sustainable income generation	† hold, deliver, monetize food (MoF) † target and distribute food/ cash to distress people, regions/seasons (MDMR, NGO, Donor, MoF) † income generating activities for the poor (GoB)

Objectives	Strategies	Instruments	Activities
	c. Price stabilization 1. Dampen peaks to protect consumers 2. support farm price when 'too low'	**Natural stabilizers** 1) Free import and export 2) private stocks 3) expand rabi production **Government intervention** 4) Open market sales (OMS) 5) Government procurement 6) Credit to farmers and traders	† remove restrictions (MOC, NBR, MF) † ensure credit (BB< Banking Div.) † agricultural research and extension (MOA, MF) † sale at peak prices (MOF) † procure at harvest time (MoF) † formal (BB, MoFin.); informal (NGO)

13.2.2.3. Instruments:

Government will depend on the following instruments to achieve the above short-run objectives and strategies.

13.2.2.3.1. Security Stocks:

It is the policy of the Government to encourage private stocking of foodgrain by farmers, traders and millers. Access to trade-credit, build/hire/lease of storage space and removal of laws that inhibit private sector grain storage will all enhance private sector food grain trade. Given the rapid increase in privately held foodgrain stocks over the past two decades and given improvement in food grain importation process, Government intends to hold 800 thousands metric tons of foodgrain as national security reserve.

13.2.2.3.2. Price Stabilization:

Like the public sector (PFDS) the private agents can promote price stabilization. Free access to international markets provides a buffer against both upward and downward movements in food prices. Trade allows exports in times of low domestic prices and imports when prices are high. Private stocking similarly serves to stabilize seasonal price movements. Traders and millers buy when prices are low and they sell when prices are high, thereby dampening lean seasons price spikes. In addition, improving productivity in dry season agriculture will continue to dampen seasonal price fluctuations, over the past two decades, expansion of boro and introduction of HYV rice production has cut seasonal price spikes in half. Government will promote natural price stabilization by encouraging private grain stocks and by continuing to support agricultural technology development and input expansion necessary for expanded rabi crop production. Government will intervene in the market to support farm prices only when fall below producer's incentive level. Government will sell-off public stock to depress lean season consumer price hikes.

13.2.2.3.3. Targeted Food Distribution for Vulnerable:

This unlike others is exclusively a government obligation. In the absence of adequate purchasing power, the private market will fail to provide food for the impoverished. Through income transfer, direct food distribution and labour intensive public works schemes, Government will target the population groups, regions and seasons where nutritional stress is most acute.

13.2.2.3.4. Promotion of Private Trade

Government is promoting increased involvement of private sectors in the foodgrain market especially in the import trade. Care should be taken in programming public sale of rice and wheat, so that it does not cause any disincentive for the private sector.

14. Conclusion:

Access to food is very vital particularly in a country like Bangladesh where about 50% of population live below the poverty line. The income of the poor does not permit them to have sufficient food intake.

The strategic goal of the national policy would be to improve the 'access' concerns for an effective food security situation in the country. Increasing poor peoples' access to food requires improvement of earning capacity of the poor and vulnerable section of the population and successful implementation of the targeted food programmes in a cost effective manner.

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FOOD SECURITY IN BANGLADESH: UTILIZATION, NUTRITION AND FOOD SAFETY

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1.0 Introduction:

To most people food security means a stock of cereals that can be used to meet an unforeseen food crisis. Food certainly is not cereal alone, neither its security is just a sufficient amount of cereal stock. Food means balanced diet and its security refers to availability of such diet at a reasonable price. The Plan of Action of the World Food Summit, 1996 defines "Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life". The term has gone beyond food supplies to include access, sufficiency, vulnerability and sustainability (Maxwell, 1996). Thus comprehensive food security is defined as availability, access, and utilization by all people at all times to enough food for an active, healthy life. Domestic production, external trade and efficiency of distribution through markets and other channels determine availability of food. Household's income and govt. transfers, assistance from relatives and friends, remittance from abroad and assistance from NGOs determine access to food. Where as utilization of food is determined by individual food preferences, health, and environmental factors affecting absorption of food.

Ensuring food security for all is one the major challenges that Bangladesh faces today. Despite significant achievement in foodgrain production and food availability, food security at national, household and individual levels remains a matter of major concern for the Government mainly due to natural calamities. Since independence, Bangladesh has made substantial progress in increasing domestic production of foodgrains. The food production of the country both rice and wheat, was 10.46 million metric tons in the year 1971-72. Bangladesh attained self-sufficiency in food production in 1999-2000 with a gross production of rice and wheat of 24.9 million metric tons which marginally met the country's requirement of 21.4 millions metric tons for the population of 129 million, taking 453.6 gm per capita per day requirement. The gross production was 26.8 & 25.9, 26.7 and 27.5 million metric tons in 2000-01, 2001-02, 2002-03 and 2003-04 respectively.
Net availability of meat, fish, milk & milk products, egg and pulses were 624000, 1584000, 1656000, 3470000 and 615000 metric tons and 673000, 1726000, 1751000, 4177000 and 587000 metric tons in 1996-97 and 1999-00 respectively.

2.0 Food consumption

Average per capita daily intake of major food items (in group) in the country was 886.2 grams in 1991-92, which increased to 913.8 grams in 1995-1996 but it reduced to 893.1 grams in 2000. In rural area average food intake was 878.1 grams in 1991-92, 910.5 gram in 1995-96 and 898.7 grams in 2000. In urban area food intake reduced over the years. It was 938.40 grams in 1991-92, 930.80 grams in 1995-1996 and 870.7 grams in 2000.

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In 1985-86 average calorie intake was 2191 K.cal in 1988-89, it increased to 2215 K.cal in 1991-92, it further increased to 2266 K.cal but in 1995-96 it dropped to 2244 K.cal and again dropped to 2240 K.cal in 2000.

In the rural areas, it was 2203 K.cal in 1985-86, increased to 2217 K.cal in 1988-89, further increased to 2267 K.cal in 1991-92, slightly reduced to 2251 K.cal in 1995-96, but increased to 2263 K.cal in 2000. But in urban area, the intake of calorie shows ups and downs over the periods. It was 2107 K.cal in 1985-86, increased to 2183 K.cal in 1988-89, further increased to 2258 K.cal in 1991-92, but sharply reduced to 2209 in 1995-96 and further reduced to 2150 in 2000. The calorie intake may be compared with the WHO bare minimum requirement of 2122 k.calories and the FAO minimum for a normal working person of 2310 k.calories.

Apart from being calorie deficient, the Bangladeshi diet is very unbalanced. About 75% of energy comes from cereals when according to FAO the proportion ideally should be around 55%.

Protein intake during 1985-86 to the year 2000 moves within the range 62.50 grams to 64.96 grams with a high intake of 64.96 grams in 1995-96 to a low 62.50 grams in 2000.

The intake over the years ranges between 61.88 grams to 64.45 grams with a low intake of 61.88 grams in 2000 and a high intake of 64.45 grams in 1995-96 in the rural area, but in the urban area, the intake ranges between 64.96 grams to 68.27 grams with a low intake of 64.96 grams in 2000 and a high 68.27 grams in 1988-89.

Intake of edible oil has been increased from 10.1 gm in 1991-92 to 12.82 gm in the year 2000.But it was 9.8 gm in 1995-96.

3.0 Nutrition Situation

Malnutrition is one of the major public health problems in the country. 30% children born each year weigh below 2.5 kg. Child Nutrition Survey, 2000 revealed that among the preschool age children only 11.5 % of are nutritionally normal where 2.4% children are severely malnourished, 34.7% are moderately malnourished and 50.7% are mildly malnourished. The survey also revealed that the national prevalence of wasting, stunting and underweight in preschool age children are 11.7%, 48.8% and 51.1% respectively. These figures were significantly higher in Child Nutrition Survey 1995-96 i.e. wasting, stunting and underweight were 16.6%, 51.4% and 57.4% respectively. In CNS, 2000, it was to be found that 12% of the boys and 11.4% of the girls were wasted, Prevalence of underweight was 51.4% in boys and 50.9% in girls. Rural children are significantly more malnourished than that of the urban children. Bangladesh Demographic and Health Survey,2004 shows that 43% of children under 5 are considered to be stunted and the prevalence of stunting increases with age from 10% of children under 6 months to 51% of children age 48-59 months. Rural children are more like to be stunted than urban children.Furthermore,13% children are wasted and 48% children are underweight. Study revealed that in 1996-97 54% mothers were suffering from chronic energy deficiency, which decreased to 38% in 2003 and 37.9% in 2004.Survey revealed that only 60% pregnant ,65% lactating and 67% non lactating non pregnant women are non anaemic.

It is reported that the prevalence of night blindness among children of 12-59 months of has been reduced from 3.5 % in 1982-83 to 0.62 % in 1997-98, 0.21% in 2001 and 013% in 2004, which is below the WHO cut-off level. The Iodine Deficiency Disorders Survey, 1993 revealed that the prevalence of goiter was 44.7%, 50.7% and 45.6% in the hilly, flood prone and plain land respectively and about 69% people of this country were biochemically iodine deficient. But IDD survey 1999 revealed that the prevalence of goiter came down and the figures are 19.8%, 13.7% and 20.4% in the hilly, flood prone and plain land respectively and the biochemically iodine deficient population was 43%.

4.0 Food Safety: Dimensions and Status

Bangladesh since independence has made significant achievements in improving the health of the people, and services to its ever-growing population. Inspite of these achievements, malnutrition is still an important public health problem in the country. Though malnutrition can not be fully eliminated, however, by increasing safe and quality food supply the complex problem of malnutrition could be reduced to some extent. But food safety issues receive less attention and, not infrequently, it has been mostly overlooked except some recent development in the country.

The International Conference on Nutrition, 1992, in its Plan of Action mentioned that, achieving food security has three dimensions. First and important one is to ensure a safe and nutritionally adequate food supply both at the national and household level. The Plan of Action of the World Food Summit, 1996 also echoes with this aspect. So, it is well documented that food safety has been a clear and important dimension of food security and without ensuring food safety and quality the objective of the food security is not achievable.

Food Safety is defined as the all conditions and measures that are necessary during the production, processing storage, distribution, and preparation of food to ensure that it is safe, sound, wholesome, and fit for human consumption" (WHO,1984). Food may be contaminated with microorganisms, chemical substances or physical substances, which may cause acute to chronic illness, from diarrhoea to cancers, as well as it may cause poor physical and mental growth of children.

Food-borne illnesses may have serious social and economic consequences, including losses in productivity, income and income-generating capacity. People who consume unsafe food and/or suffer from food-borne diseases are less productive. This means lower incomes, less access to safe food and increased food insecurity. The application of good agricultural and hygienic practices (GMP and GHP) in food production, processing and distribution improves food safety and at the same time reduces food losses, thereby increasing food availability and food security at the national and international level. Countries that are able to ensure safe food can take advantage not only in reducing the incidence of food-borne diseases also promote international trade opportunities in food and agricultural products and promote tourism and thereby increase income levels and household food security.

Food safety and quality situation in Bangladesh is a much-discussed issue now a days, which has also been depicted both in printed and electronic media. It is aggravated in recent days more in the capital and other metropolitan cities. Findings of a study conducted in 2003 in Dhaka city by

the Institute of Public Health (IPH), Dhaka with support from the World Health Organization (WHO), revealed that out of its 400 sweetmeat, 250 Biscuit, 50 Bread and 200 Ice cream samples, 96.8% of sweetmeats, 24% Biscuits, 54% Breads, 59% Ice Creams are adulterated. In another study conducted by the Institute of Public Health (IPH) in 1994 supported by WHO, it was found that out of 52 street vended food samples, all were contaminated with different types of disease producing microorganisms. Over the last decade, it was found that some 50% of the food samples tested in IPH laboratory were adulterated. Another report shows that some 71% food samples of the Dhaka City are adulterated. The Sanitary Inspectors collect the samples from the Upazilas (sub-districts) and Municipalities of the country and sent to IPH. Though the samples were not seemingly representative, the adulteration statistics stated above put immediate as well as effective intervention from the stakeholders.

Evaluation of Universal Salt Iodization in Bangladesh, 1999 shows that 45% salt samples out of 2043 samples collected from 2064 house-holds (1560 from rural, 324 from urban non slum and 180 from urban slum) contained less than 15 ppm iodine, which is below the standard limit or requirement which almost similar with the study conducted in 1996. BSTI report shows that about 90% of iodized salt samples collected in March, 2005 were found to be below standard. A recent preliminary report from IPH shows that some 50% iodized salt did contain iodine at the required level. A number of survey reports of Consumers Association of Bangladesh also reveal that a good number of different food items available in the market are not upto the standard and that some do not have BSTI approval.

The Govt. of Bangladesh is well committed to ensure safe and quality food to its people. In Bangladesh, the food safety and quality control framework consists of Laws, Regulations & Standards; Administration & Inspection and Laboratory analytical services. Considering the alarming Food safety and quality situation, the Govt. has enacted the Bangladesh Pure Food (Amendment) Act, 2005. The Govt. through MOFDM has just completed a programme of “Strengthening National Food Safety and Quality System” under FAO TA. The Govt. is also strengthening the Bangladesh Standard Testing Institution (BSTI)-an Institute, which is responsible for the standardization, testing, metrology, quality control, grading and marking of goods. The BSTI Ordinance, 1985 has been amended as The Bangladesh Standards and Testing Institution (Amendment) Act, 2003. Currently, BSTI is developing a ‘Policy on Labeling’. BSTI is the Codex Focal Point for Bangladesh. The Government has also enacted “The Iodine Deficiency Disorders Prevention Act, 1989 for universal salt iodization & banned non-iodized salt from market, aimed at virtual elimination of IDD from the country. Other Acts like the Radiation Protection Act, 1987, the Essential Commodity Act, 1990, Fish and Fish product (Inspection and Quality Control) Rules, 1997 etc. There are also a number of policies National Agricultural Policy, 1999, Integrated Pest Management Policy, 2002 etc are linked with the country’s food safety and quality control initiatives. The present anti-adulteration drive is highly appreciated by all corners of the society.

Under the Bangladesh Pure Food Rules, 1967, there are only 107 different generic, mandatory food standards and there are 50 mandatory generic food standards under BSTI Ordinance. In addition, there are some 250 optional standards for different foodstuff. BSTI is also adopting Codex standards.

On the issue of administration, inspection & testing system of food safety and quality, a number ministries viz. Ministry of Health and Family Welfare (MOHFW, Ministry of Local Government, Rural Development and Co-operatives (MOLGRD) Ministry of Food and Disaster Management: Ministry of Industry, Ministry of Agriculture are directly or indirectly responsible for enforcement of food laws, rules and regulations.

Under the Bangladesh Pure Food (Amendment) Act, 2005, the Government has provisioned a Food Safety Advisory Council which will advise the Government on food safety and quality issues. Laboratory Accreditation Act is also under active consideration of the government. It is to mention that a good number of laboratories under different Ministries are involved in quality control of food.

The Ministry of Health and Family Welfare is implementing Food safety programme in the country in collaboration with the WHO aimed to human resource development, strengthening public health laboratory of IPH, development of mass awareness involving different professional groups and community leaders as well as conduction of some research works on food safety and quality. A follow-up Technical Assistance project is expected to be under formulated by MOFDM.

5.0 Food and Nutrition Policies, Plan, Strategies and Programmes of Bangladesh

Policies and Strategies

Bangladesh is one of the signatories of unanimously adopted “World Declaration and Plan of Action for Nutrition” in International Conference on Nutrition (ICN), 1992 - jointly organized by FAO and WHO and Declaration and Plan of Action of the “World Food Summit, 1996” organized by FAO.

Article 15 (a) of the Constitution of the People’s Republic of Bangladesh declares the fundamental responsibility of the state is to secure its citizen to the provision of the basic necessities of life including food. On the other hand Article 18(a) of the Constitution outlines “the state shall regard the raising of the level of nutrition and improvement of public heath as among its primary duties”.

As follow-up of activities of ICN the documents prepared in Bangladesh are: (a) Bangladesh Country Paper (BCP) on Nutrition: Updated, 1995; (b) State of Nutrition in Bangladesh, 1995; (c) National Plan of Action for Nutrition: Some Projects from Selected Themes, 1996; (d) National Plan of Action for Nutrition (NPAN) 1997 following the adoption of Food and Nutrition Policy in 1997 e) National Health Policy, 2000. The World Food Summit Plan of Action guided the country in preparing “Report on Comprehensive Food security Policy for Bangladesh, 2000” and “Food Insecurity and Vulnerability Information and Mapping System (FIVIMS), 2004”. The NPAN has not been revised since its first formulation in 1997 (which is now under process of evaluation and review by NNC and MOHFW). The Interim Poverty Reduction Strategy Papers (i-PRSP) and draft PRSP (December 2004) have also duly emphasized the nutrition issue as part of development. Moreover, very recently ECNEC approved PRSP in October 2005 after a rigorous consultation process. A “Draft National Food Policy” is under consultation stage, which will definitely incorporate MDG and PRSP goals (related to utilization and nutrition), targets and policy agenda.

Programmes

National Nutrition Project (NNP)

Regarding the nutrition related programmes of the Government, one of the remarkable and significant endeavour was: Bangladesh Integrated Nutrition Programme (BINP, 1995-2002). BINP was introduced in 59 Upazillas in four phases. National Nutrition Project (NNP, 2000-2004) was designed in the light of BINP experience. Following revisit in design, NNP was introduced in a new manner in January 2003 and fielded in Nov-Dec. 2003 and presently being operated in 105 upazillas. From July 2004, NNP has been continued as part of Nutrition Sub-sector under Health, Nutrition and Population Sector Programme (HNPSP) in a programme approach. NNP renders services for nutrition both in national and community level services. Community Nutrition activities are organized around Community–donated Community Nutrition Centres (CNCs), established for a population of 1000 to 1500 and run by part-time female contract workers, called Community Nutrition Promoters (CNPs). CNPs are supervised by Community Nutrition Organizers (CNOs). In addition, Village, Union, Upazila and District Nutrition Management Committees are established for community mobilization and inter-sectoral co-operation. Area Based Community Nutrition Core Services are (a) Children's Services, (b) Maternal (Pregnant and Post-partum) Nutrition Services, (c) Newly Married Couples Nutrition Services and (d) Adolescent Girl's Nutrition Services for Girls Aged 13 to 19 Years**.**

Govt. has other programmes like Vitamin-A supplementation, Salt Iodization programme etc. to improve the nutritional status of the people.

Food Assisted Programs

Vulnerable Group Development (VGD) and Integrated Food Security (IFS) Programme are nation wide programmes being implemented in rural upazillas covering 7,50,000 ultra poor women of the country. Capacity building through provision of a "development package" consisting of group formation, awareness raising on legal, social, health and nutrition issues, functional education, training on marketable income generation skills, savings and provision of credit. Together with the above interventions, the VGD also has some nutrition oriented complementary interventions called:

i. Atta Fortification in Milling and Fortification Units (MFUs) and
ii. VGD-National Nutrition Project NNP) Collaboration

Other programmes are-School Feeding Programme (SFP); Women Training Centre Programme (WTC); Vulnerable Group Feeding (VGF); Food for Work (FFW); Test relief and Gratuitous relief etc. having important implications on nutritional status of the population.

5.0 Issues and Challenges:

Now the issues regarding food utilization & nutrition are that policies/plans are not updated, there are seasonality in consumption pattern due to seasonality in prices specially in the poor people; unconvincing socio-economic status of the household; weak monitoring and evaluation system; coverage of sanitation are not yet full; though IMR, MMR etc. have improved over the years,

improvement in other indicators are rather slow and not speedy enough to achieve the goals/targets; programmes in place are seemingly inadequate reflecting the scarcity of resources; food based programmes for specific groups (e.g preschoolers) are virtually negligible as compared to the need; economy, efficiency and effectiveness of the programmes are questionable etc. Issues for food safety are: poor institutional mechanism of co-ordination; non-existence of unified food safety administration; capacity to enforce laws and regulations; number of food under mandatory standards; slow pace of harmonization; weak analytical capabilities in judging the implications of stringent standards on the poor; inadequate and un-coordinated lab facilities; overlapping of responsibilities; resources (specialized manpower, testing equipment, and of course money) constraints; farm to fork approach not yet established; lack of food safety database and weak research in food safety etc.

5.0 Recommendations and Conclusions:

Recommendations

1. Expansion of community based nutrition programme should be considered with utmost importance.
2. Targeted safety net programmes for the poor and ultra poor should be continued and made more effective.
3. Supports should be expanded for income generating activities for the rural poor.
4. Supports should be continued for the marginal farmers to enhance agricultural production.
5. Community based health and nutrition education should be strengthened.
6. Proper enforcement of laws and regulation related to food safety and quality should be ensured.
7. Food standards as well as standards for inspection, testing, labeling, packaging should be harmonized with that of international standards.
8. Monitoring and surveillance of food products in the market should be strengthened.
9. NPAN should be reviewed and updated with the recent developments.

Conclusions

Improving nutritional status have a significant impact on survival as well as physical and cognitive development and productivity and thus an essential input for economic development. It is observed from different studies and literatures, that food consumption and nutritional status have improved, but daunting task are ahead to achieve the MDG targets. Food safety situation is also needed to improve significantly to improve food utilization and nutrition component of food security.

After formulation of the NPAN as a follow up of ICN, Bangladesh has been pursuing multi-sectoral approaches to render the health and nutrition services to its population. Statuses of MDG indicators are being monitored and MDG thoughts and targets are accommodated in the PRSP draft revised in January 2005. Special emphases have also been given on food security, vulnerability and nutrition in the draft PRSP. Now the task ahead is to revise the NPAN in line with the PRSP vision, mission and policy matrices and continue integrated efforts to achieve the

goals and objectives in the anticipated time. This is also required to pull and make the resources available in time of need, as GOB-DP initiatives will necessarily be centred on PRSP mission. The international community can extend their cooperation in this regard as part of their overall development assistance efforts.

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SETTING A STANDARD CEREAL INTAKE FOR BALANCED NUTRITION IN BANGLADESH

Harun K.M. Yusuf, Ph. D[32] and Asadul Islam[33*]

Introduction

The issue of quality of diet has received little attention in the food security debate at all levels. Defining food insecurity in terms of hunger may address its most obvious and distressing manifestation, but it is the qualitative issue that should receive its due attention. This is particularly true for a country like Bangladesh, where further progress in reducing the main anthropometric indices of malnutrition are likely to be increasingly constrained unless quality diet is adequately ensured. Therefore, nutrition strategy should be a part of a national food policy with achieving food security for all people of a country as the central objective. These are also important to attain the Millennium Development Goals (MDGs) and proper implementation of Poverty Reduction Strategy Paper (PRSP) to reduce the number of people below poverty line and to improve infant, child and maternal mortality situation. Achieving MDGs and PRSP would require ensuring a nutritionally adequate and safe food supply at both national and household levels, a reasonable degree of stability in the supply of food during the year and from year to year, and access by each household to sufficient food to meet the nutritional demands of all members of the family.

Improving nutrition quality can have a significant impact on survival as well as physical and cognitive development of children and productivity of adults (Yusuf, 1992). Good nutrition, comprising adequate quality and quantity of food intake and reduction of illness is also a basic human right and is an essential input for economic development. Rice and other cereals (wheat, maize) constitute the main source of nutrition for the general masses of Bangladesh. The preponderance of cereals, particularly rice (currently over 470 g/person/day) in the diet is so high that their contribution to total dietary energy nears about 75-80%, which far exceeds the recommended contribution of 55-60% and therefore is not conducive to proper growth and maintenance (Yusuf, 1997). The prevalence of high degree of malnutrition among different sections of the population, despite consumption of cereals even in excess of the set amount of 453 g/person/day (Planning Commission) is a clear indication of the inadequateness of our diet from nutritional point of view.

The present paper is an attempt to set a standard quantity of cereals to be consumed by the population, along with adequate quantities of all other food items, so as to get balanced nutrition in terms of energy, protein and the micronutrients (vitamins and minerals). It also examines per capita calorie intake trend and pattern and the relative importance of some socio-economic and demographic factors that affect the dietary intake.

The nutritional status of an individual is the outcome of a complex interaction of a broad range of host and environmental factors. The environmental factors encompass physical, biological, and

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especially cultural influences. This paper therefore stresses the importance of setting a standard average cereal intake for balanced nutrition of a population. In this regard, the information about a number of entities such as (1) *total dietary energy requirement, (2) physical activity level of various groups of people, and (3) the present dietary intake pattern and energy gap in the diet* needs to be determined. The paper analyses these issues and identifies per capita food requirement at aggregate as well as individual /household level. The aggregate level analysis is required to see whether the average households have the purchasing power and are adequately spending their income for the balanced food basket. The analysis also offers to understand the overall trend and pattern of food consumption and energy intake. Household/individual level analysis helps us in determining the indicator for achieving balanced food intake and thereby identifying the appropriate interventions at the household and individual level to secure balanced nutrition.

The paper uses available secondary information from BBS, INFS and other relevant sources. It observes that there is immediate need to intervene from policy perspectives in order to reduce the difference between desired and trend level of consumption pattern. The paper concludes with some immediate policy implications and outlines some strategies to achieve the balanced diet bundle within a reasonable time frame.

Total Dietary Energy Requirement

The energy requirement of an individual is that level of energy intake from food that will balance energy expenditure when the individual has a body size and composition and a level of physical activity, consistent with long term good health, and that will allow for the maintenance of economically necessary and socially desirable physical activity (FAO/WHO/UNU, 1985; IDEG, 1996). In children and pregnant or lactating women, the energy requirement includes the energy needs associated with deposition of tissues or secretion of milk at rates consistent with good health. Energy requirement is principally determined by energy expenditure, which has two major components: *Basal Metabolic Rate (BMR) and Physical Activity Level (PAL).* BMR is multiplied by the PAL factor to get the total energy expenditure (factorial method). Special allowance is then made for pregnant and lactating mothers.

Unfortunately, no national average value of energy requirement has yet been set up on consensus for Bangladeshi population. Various figures ranging from 2150 to 2400 kcal/person/day are available from various sources (individuals or organizations). The main problem in determining this value is the determination of correct BMR and the correct PAL.

BMR is calculated from the body weight (in kg) using different formula for different age and sex groups (Department of Health, USA, 1991). A general tendency in calculating BMR in Bangladesh has been to use existing height and the expected weight for that height. Calculated on the basis of the expected weight of 61.7 kg for existing height of 162 cm for men and the expected weight of 49.2 kg for existing height of 148 cm for women, and also the existing body weight of children under 10 years, which is nearly 20% less than the desired weight, the BMR of an average Bangladeshi stands at 1274 kcal/day. When this value is multiplied by an average PAL value of 1.6 (weighted) (children 1.2 and adults 1.8), then the average energy requirement stands at 2038 kcal/person/day (Jahan and Hossain, 1998). But, when BMR is calculated on the expected weight of 68 kg for desirable height of 175 cm for men and the expected weight of 55 kg for desirable

height of 160 cm for women and taking the desirable weight of the children for their age (up to 10 years), the average BMR rises to 1465 kcal/day. When multiplied by the PAL factor of 1.6, the average national energy requirement takes the value of 2344 kcal/person/day, which is midway between the values suggested by WHO (2310 kcal) and FAO (2400 kcal). In the present paper, the composition of a balanced diet with a right amount of cereals in the diet has been formulated based on this proposed dietary energy requirement (2344 kcal/person/day).

Standard Requirement of Cereals and the Balanced Diet

In developing countries, people derive most of their nutrients from plant sources. Cereals, being the staple food, are the highest providers, particularly energy. However, energy is also obtained from other non-cereal carbohydrate rich food (roots and tubers, plantains), oils (vegetable oils) and proteins (mainly plant sources). For efficient utilization of energy, the internationally recognized norm is that no more than 60-65% of energy should come from carbohydrates (around 55% from cereals), 10-15% from proteins and 25-30% from fat. Otherwise, imbalances can occur in the use of energy.

Bangladesh has also problems in having data on food intake. The two major sources of dietary consumption data, namely the Bangladesh Bureau of Statistics (BBS) and the Institute of Nutrition and Food Science (INFS) of Dhaka University (DU) provide data which are highly conflicting. Thus, while the nutrition surveys conducted by Biochemistry Department and INFS of Dhaka University in 1962-64 (USDHEW, 1966), 1975-76 (INFS, 1977), 1981-82 (INFS, 1983) and 1995-96 (Jahan and Hossain, 1998) show a persistent decrease in total energy intake (from 2118 kcal/person/day in 1962-64 to 1868 kcal/person/day in 1995-96) (Figure 1), mainly due to decrease in total food intake (Figure 2), BBS data show a much higher level of energy intake and little change in the intake over the period between 1991-92 (2266 kcal/person/ day) and 2000 (2240 kcal/person/day) (Figures 3 and 4) (BBS, 1993, 1997, 2003). However, one thing is common in the two sources and that is that carbohydrates contribute nearly 80% of total dietary energy, which makes the diet unacceptably imbalanced. For people in the bottom 20% expenditure quintile, this is 90% or more.

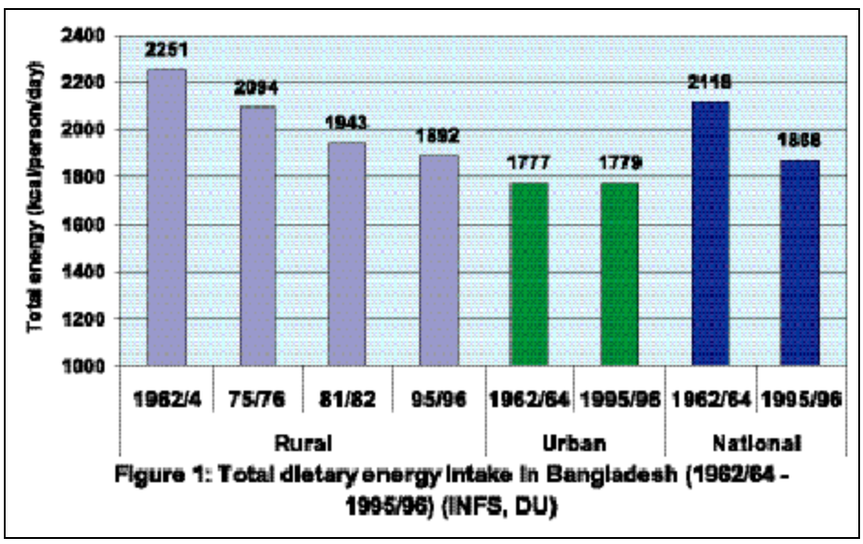


Figure 1: Total dietary energy intake in Bangladesh (1962/64 - 1995/96) (INFS, DU)

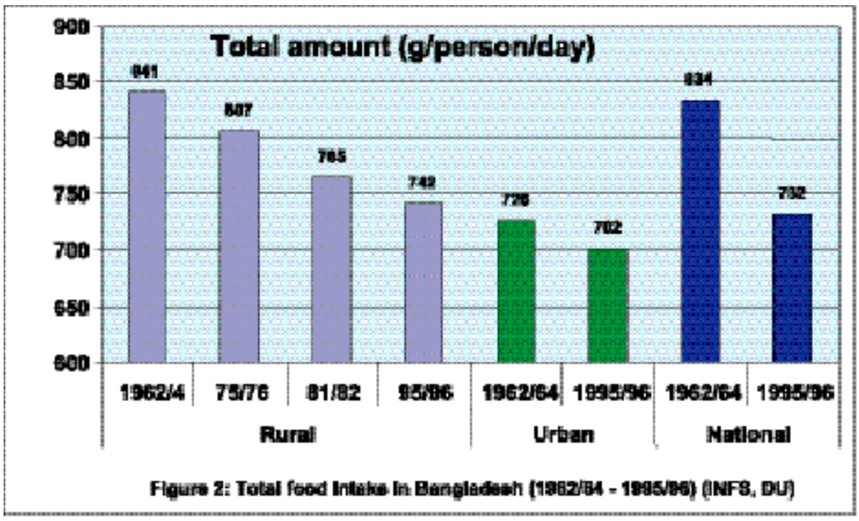


Figure 2: Total food intake in Bangladesh (1962/64 - 1995/96) (INFS, DU)

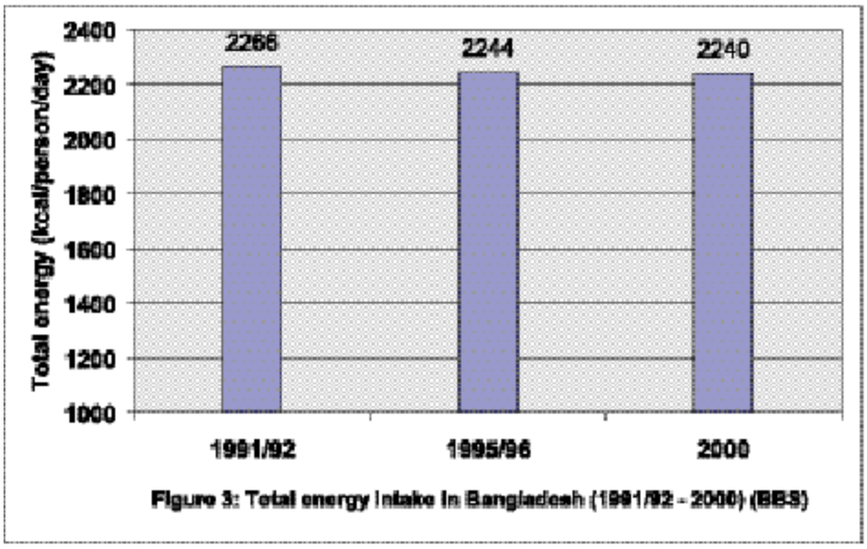


Figure 3: Total energy intake in Bangladesh (1991/92 - 2000) (BBS)

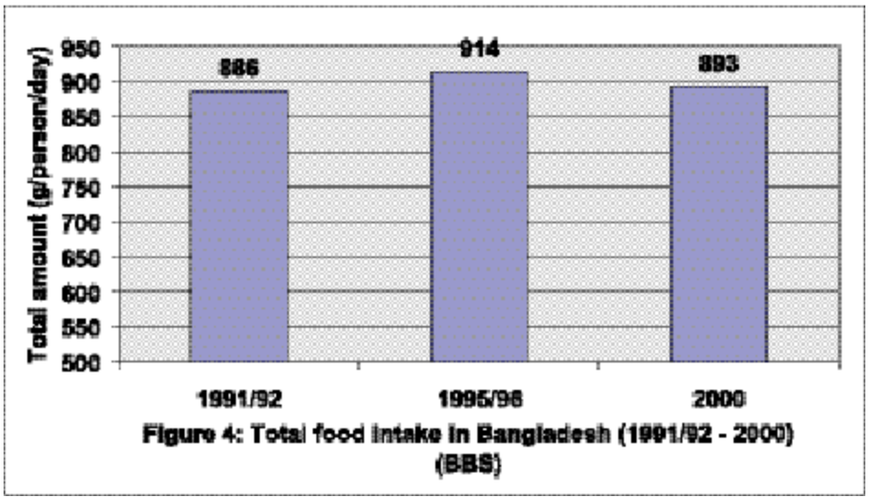


Figure 4: Total food intake in Bangladesh (1991/92 - 2000) (BBS)

According to BBS, the total food intake in Bangladesh in 2000 was 893 g/person/day, of which cereal intake was 476 g. By energy, cereals contributed 74.4% of total dietary energy of 2240 kcal. Obviously, the intake of cereals was as always too high, and the diet, with lower quantities of non-cereal items, was not only deficient in energy (by about 5% taking 2344 kcal as the requirement) but also highly imbalanced and deficient in vitamins and minerals. Consumption of such a diet would produce physiological deficiencies of both energy and protein, leading to protein-energy malnutrition (PEM) as well as micronutrient malnutrition.

To overcome these deficiencies, a balanced diet is suggested with 372 g cereals (312 g rice and 60 g wheat) and 581 g non-cereals, the total being 953g, only 60g more than consumed currently (Table 1). The total energy content of the diet is 2345 kcal, contribution of cereals to which is 55%. The carbohydrates of food items like roots and tubers, pulses and some fruits and vegetables would contribute another 10%, so that total carbohydrate contribution to total diet energy would be 65%, the maximum recommended contribution to be made by carbohydrates.

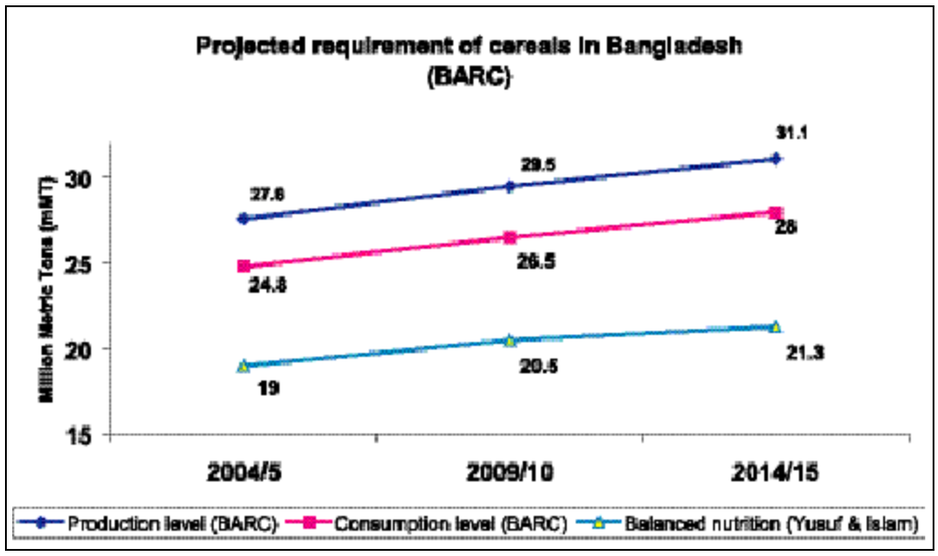
Table 1: Proposed dietary composition for balanced nutrition in Bangladesh

	Actual intake (BBS 2000)			Desirable intake* for balanced nutrition		
Food item	g	kcal	% Energy	g	kcal	% Energy
Cereals	**476**	**1656**	**73.9**	**372**	**1295**	**55.2**
- Rice	450	1566	69.9	312	1086	46.3
- Wheat	26	90	4.0	60	209	8.9
Non-cereals	**417**	**584**	**26.1**	**581**	**1050**	**44.8**
Pulses	16	55	2.5	66	228	9.7
Animal products	85	124	5.5	126	176	7.6
Fruits	28	20	0.9	57	41	1.7
Vegetables (leafy and non-leafy)	181	116	5.2	180	113	4.8
Potato and sweet potato	55	49	2.2	80	71	3.0
Added oil	14	126	5.6	36	324	13.8
Sugar and gur	21	84	3.7	22	88	3.8
Spices	17	10	0.5	14	9	0.4
Total	**893**	**2240**	**100.0**	**953**	**2345**	**100.0**

*To be achieved in phases by 2015. Thereafter, modification in the composition will be made to make the diet more balanced by providing more of oils and fats and less of the cereals.

The amount 372 g of cereals seems too low, but would not be so if the consumption of the non-cereals could be increased. This is, however, not easy for a country like Bangladesh and it is not achievable overnight. But somehow or other this must have to be achieved, slowly, over a period of, say 20 years in phases, if malnutrition has to be eradicated or at least reduced to a level not considered as a public health problem any more.

The population of Bangladesh is projected to increase from the present 139.1 million (2004-05) to 156.7 million in 2014-15. The requirement of cereals in the country will increase accordingly. BARC (Bangladesh Agricultural Research Council) has made a projection of increase in food requirement (rice and wheat) from the present 27.589 m MT (26.03 m MT rice + 1.559 m MT wheat) to 31.08 m MT (29.293 m MT rice + 1.787 m MT wheat) in 2014-15. Cereal requirement in these projections was taken as 512 g/person/day for rice and 31g/person/day for wheat (total cereal 543 g/person/day) at the production level, i.e. total 488 g/person/day at the consumption level (Figure 5), taking into consideration the post-harvest loss of around 10%. For balanced nutrition, the cereal requirement in 2014-15 would be 21.276 m MT (taking 372 g/person/day as the requirement) as against 27.972 m MT (31.08-10% m MT) projected requirement of BARC. If Bangladesh can achieve production according to the projected requirement of BARC, then there will be a surplus of 6.696 m MT of cereals in the country, which will not only ensure food security but also create opportunities for export to earn foreign exchange. This will contribute to economic development as well as to deliver the desired balanced food basket for the country.



Trend and Pattern of Food Intake:

As mentioned above, the existing food intake pattern is biased towards the cereals- the amount of cereals consumed by average households is higher than the nutritionally required food basket. However, over time the cereal intake is declining and we see a corresponding change in the non-cereal basket of consumption in the foreseeable future. But the trend in increase in consumption of non-cereal items is too slow to achieve the desired basket of consumption. There are also some inconsistency in the level of consumption of pulses and edible oil- both of which are decreasing in terms of per capita intake while they should be increasing according to the suggested bundle.

When we observe the consumption expenditure of food by different income groups of household, we see that the lowest income groups have been able to increase their consumption expenditure with the given level of income. Over time the consumption expenditure of these groups of household shows an increasing trend (Figure 6). However, it might be due to the increase in food prices as Household Income and Expenditure Survey (HIES) accounts expenditure of food by current market prices. Thus it remains questionable whether these households have been able to increase their consumption and, more importantly consumption towards the desired basket.

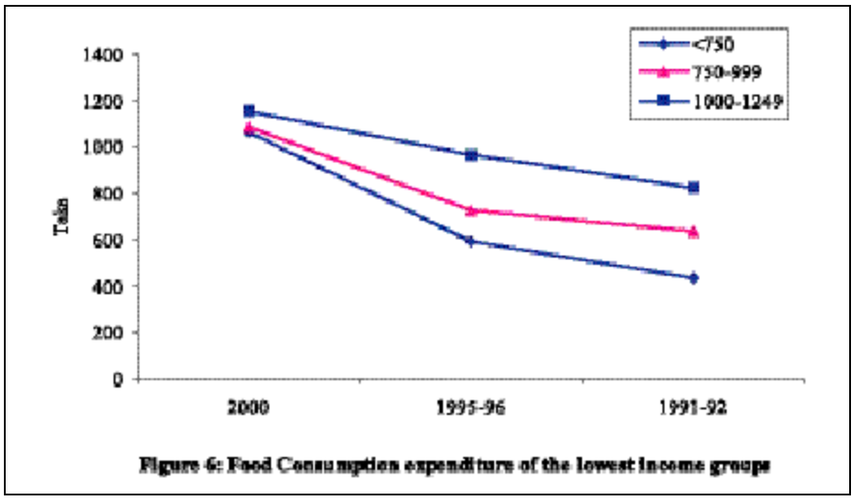


Figure 6: Food Consumption expenditure of the lowest income groups

However, one thing is clear - there have been changes in selected food security indicators - both income poverty and extreme poverty decreased by 1.5 percent and 3.2 percent respectively, per year in 1990-2000 and there was a corresponding increase in life expectancy. The indicators such as infant and under-5 mortality rates and the percentage of children underweight or stunted also decreased substantially (Table 2).

Table 2: Changes in selected food security indicators 1990–2000

Indicator	1990	2000	Progress 1990–2000 (% per annum)
Income-poverty (% of population)	59	50	-1.5
Extreme poverty (% of population)	28	19	-3.2
Infant mortality rate (%)	94	66	-3.0
Under-5 mortality rate (%)	108	94	-1.3
Maternal mortality rate (%)	480	320	-3.3
Life expectancy (years)	56	61	0.9
Underweight (% of children)	67	51	-2.4

Our suggested consumption basket implies that households need to spend more on non-cereal items, especially the animal food items. This then means that there is additional income required to achieve the suggested bundle as the animal foods and other non-cereal items are costlier than

the cereal food. If we take the poverty line income per person per day of Taka 800, then a household size of five would require taka 4000 to graduate out from poverty. Since the poverty line income is calculated using the food basket that is sufficient to meet the energy requirement of 2122 kcal/person/day, the same household would require roughly Taka 1000 more to achieve our suggested basket[34]. According to the direct calorie intake method (2122 kcal/person/day), there were 52.5 percent urban and 42.28 percent rural people (44.3 percent on average) under the poverty line in 2000. The recent evidence suggests that there is almost 1 percent decline in poverty rate per year. Therefore, there is nearly 40 percent of population who are at present below the poverty line as defined by 2122 kcal/person/day. Thus our estimates of balanced diet suggest that about 50 percent of people are currently under the required level of income to achieve the basket.

Determinants of Nutrient Intake

To evolve an appropriate policy to address the prevailing nutrition problems, it is essential to assess not only the magnitude of the problem but also the factors affecting it. The most important factors that determine the nutrient intake are Income, Education, Occupation and employment status, Family/household size, Number of young siblings, Sex, Female participation in economic activities and time spent on food preparation/cooking, Male participation in economic activities and Living conditions (place of residence, region, etc).The expected relationship between each of the above variables and dietary intake and dietary adequacy is discussed below.

Income: Positive relationship between income and dietary intake and dietary adequacy of a household because with the improvement of a household's income, absolute expenditure on food is also likely to go up, and so is the calorie and protein intake of the household.

Education: Education is associated with greater awareness of the importance of nutrition, the nutrient content of food, and nutrition options from market purchases or from home production. Better-educated parents should be able to provide more nutritious diets at any income level due to their ability to identify the nutrition values of food

Occupation: Income along with nature and status of job is needed to ensure the quality food intake, as better-employed persons are more likely to have better level of awareness about the dietary intake for a given level of income.

Family/household size: The allocation of food per member is likely to decrease with the increase in the number of household members, which, in turn, may have a negative affect on per capita nutrient intake. In Bangladesh, family size may itself indicate higher economic status. In this case, larger families may not lead to a reduced nutrient intake by members of the household.

Number of young siblings: The presence of many young siblings, i.e., the occurrence of close birth intervals may have an adverse effect on the nutrient intake and nutritional status because (1) nursing children are likely to be displaced earlier from the breast with the birth of a closely spaced sibling (2) closer birth intervals make a mother nutritionally more vulnerable, which may affect both quality and quantity of breast-milk, (3) a child in a family with a large number of siblings is likely to receive less food because the entire family may be short of food.

[34] Remember that our suggested basket requires more energy (2344 kcal/day/person) and changes in consumption bundle from food to non-food items, which demands an increase in expenditure.

Sex: In traditional patriarchal societies like that in Bangladesh, male children are considered more valuable than female for a variety of reasons: they are seen as an important source of labour on the family farm; they are expected to provide economic and social security for their parents when the father is old or incapacitated and in times of distress; also, the family name is carried on by sons. For these various social and economic reasons, there is a definite preference for male children in Bangladesh. Therefore, a higher nutrient intake for male children compared to female intake would be expected. This will be measured by introducing sex dummies in the model.

Female participation in economic activities and time spent on food preparation/cooking: Greater involvement by women in home production is likely to be positively associated with the nutritional adequacy of a household. Studies indicated the negative effect of the mother's market activities on the overall nutritional status of a household. Even with the same amount of money for food, some families are able to meet their nutritional needs, others exceed theirs, while yet others fail. These variations depend, among other things, on the time used in preparing food and housewives' knowledge and skills. In turn, knowledge and skills determine, to a large extent, how much money and time are needed and how well they are used.

Male participation in economic activities: The relationship between numbers of hours worked in productive activities and nutrient adequacy of a household is somewhat complex. In subsistence economy such as that in Bangladesh, family labour, particularly male labour, is important in determining the economic condition of a household. The higher the participation in productive activities, the higher the income of a household, which in turn is likely to increase the nutrient intake of the household.

Living conditions: The place and region of residents plays an important role in determining the nutrition intake. Inclusion of these variables facilitates economic analysis in light of interactions among food supply, dietary habits, climate, geography and agricultural technology. (Technology determines the nature of economic activity and the degree to which an area could supply its population density).

Policy Recommendations

1) Improving socio-economic status of the household.
2) Transferring knowledge about balanced diet and its usefulness to the household, especially to the mother.
3) Improving the status of girls education
4) Incorporation of calorie intake and other issues in the text books at school level.
5) Focus agricultural research on dietary quality (research on non-cereal crops).
6) Improving technology and legislation for micronutrient fortification.
7) Food price policy for increasing the quality and quantity of food.
8) Supportive policies for agriculture input.
9) Commercial and homestead promotion of poultry and fruits/vegetables.
10) Addressing growing income inequality and effective and equitable social interventions.
11) Looking into intra-household discrimination in food allocation.

Conclusions

- The national dietary energy requirement is proposed to be 2344 kcal/ person/day.
- A standard cereal intake of 372 g/person/day (312 g rice, 60 g wheat) is proposed for balanced nutrition.
- A balanced diet is proposed which is expected to result in increase in height and weight of Bangladeshi population to desirable levels and reduce malnutrition to such levels below public health magnitude, in a time span of 15-20 years.
- To achieve the proposed balanced diet, both income and other socio-economic variables shall have to be improved.

Research needs

This paper concludes that the existing nutrition and food security is inadequate and an in-depth study which would have a detailed field survey is needed to determine (1) the national average daily dietary energy requirement, (2) the physical activity levels of population of varying professional occupations, (3) the means of achieving the prescribed level of balanced diet basket and (4) the factors underlying the household consumption of different nutrients. It would also help remove the anomalies in food intake data provided by BBS, INFS and other sources. Therefore, an independent survey should be conducted to determine present dietary intake in the country.

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REGIONAL FOOD SECURITY EXPERIENCE: LESSONS LEARNT FROM INDIA AND TIMOR LESTE

Bal Paritosh Dash[35]

Section I: Introduction

The Millennium Development Goals (MDGs) target a reduction of negative developmental indicators by half by 2015. Eradication of poverty and hunger is the major goal of the MDG targets. In consonance with the MDGs, the World Food Summit (1996) set a target of reducing the total number of hungry people by half no later than 2015. Unfortunately, however, at the international level, current trends indicate that the number of undernourished is falling at an average rate of only 6 million each year, far below the rate of 22 million per year needed to reach the MDG target. International Food Policy Research Institute's researchers Mark W. Rosegrant and Sarah A. Cline stated that at current pace the world would need another 35 years to fulfill the World Food Summit goal (Global Food Security – Challenges and Policies, Science, December 12 2003).

The number of undernourished people in the world is estimated as 842 million (FAO-2005) of which about 798 million alone are in the developing countries. Unfortunately, about 60 percent of undernourished population, i.e. 505 million people alone are residing in Asia. Within Asia, however, the absolute number of undernourished population is largely concentrated in highly populated countries like India, China and Bangladesh, the three together constituting about 80 percent, i.e. approximately 400 million undernourished people among the total undernourished population in Asia. India alone is home to about 214 million undernourished people, which is about 21 per cent of the total population in the country. Nonetheless, in Asia, even though relatively smaller countries like Democratic Republic of Korea, Magnolia, Cambodia, Timor Leste, etc. have smaller absolute number of undernourished population, the percentages of undernourished population in these countries are alarmingly high. The high incidence of malnutrition in these relatively smaller countries is understandably due to underdevelopment itself, especially in the areas of agriculture, health and nutrition, etc. as also due to lack of governmental capacity to handle larger food based programmes. Fragile political situations have also highly influenced the levels of undernourishment in some of these relatively small countries. What is intriguing, however, is that India has very high incidence of malnutrition despite the fact that the country has achieved self-sufficiency in food production and has the largest food based safety nets in the world.

Although headway has been made and some striking success stories exist in individual countries and communities, much remains to be done to eradicate poverty and hunger. This paper tries to understand the food security situations of two countries in Asia, viz. India and Timor Leste and systems of food based safety nets thereof. With this major objective, the paper has been divided into five sections. Section two follows this section, which presents the concept and framework of food security. Section three presents an analysis of food security situations in India and Timor Leste. Section four presents an overview of food based schemes in both the countries. Section five presents the lessons learnt from food security experiences in the two countries.

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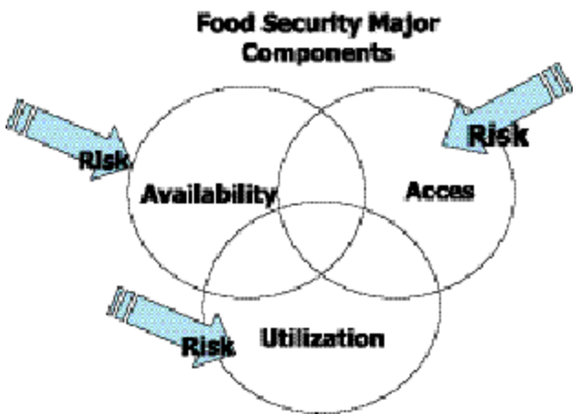
Section II: The Framework of Food Security

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

Food security may be chronic or transitory. Chronic food insecurity refers to a situation in which people consistently consume diets inadequate in calories and other essential micro nutrients. This often happens due to inability to access food by production, purchase, gift or aid. Transitory food insecurity is a temporary shortfall in food availability and consumption. Factors like fall in income, increase in food prices, shortage of production, temporary shortfalls due to natural disasters like floods, droughts, and other natural calamities, etc. lead to temporary food insecurity.

Food security is multi-dimensional having interrelationships with vulnerability indicators; it cannot be captured by any single or specific indicator. It would therefore be important to understand the essential dimensions of food security – Availability of food, Access to food and Utilization of food. The interactions and combinations of these dimensions represent food security together. There is a fourth exogenous dimension that has significant interface with food security, i.e. the natural and man-made disasters. The natural disasters affect all the three dimensions of food security.

Food availability may be hampered by low levels of production or inadequate inflow of food into the area. Low levels of production may be due to limitations such as markets, credit, technology and natural resource base. It may also be due to lack of price incentives for production. Both private trade in food grains and government supported food grain distribution systems normally ensure adequate inflow of food into a region. In some areas, infrastructure bottlenecks and lack of purchasing power necessitates government supported measures to ensure adequate food supply.



Nonetheless, food availability by itself does not ensure adequate access to food, though it is a necessary pre-condition for access to food. If people have access to livelihood, they would have better or improved access to food and nutrition. For example, those who are employed on a casual basis or underemployed would have limited economic and physical access to food. Persons with a low asset base and those engaged in non-viable enterprises tend to remain poor.

Rural infrastructure and agricultural and non-agricultural employment enhance livelihood opportunities and food access thereof. Furthermore, social and gender related factors might prevent access to livelihood as well as individual's access to a balanced diet. Poor physical access to food leads to poor consumption and poor nutrition. Levels of food consumption depend mainly upon food availability and food access. Expenditure on food taking the major share in household consumption expenditure, food prices also play an important role in determining the ability of the

households, especially among the poorer sections, to access adequate diet for filling up the daily calorie requirement. The poorer households, for example, often spend high percentages of their income on food and still get very little to eat – let alone a balanced diet. For the poorer sections, thus, food insecurity and livelihood insecurity go together.

Food utilization relates to assimilation of food into the body to yield the nutritional requirements like calorie, protein and other micro-nutrients. The intake of nutritional components like carbohydrate, protein, fat and other basic nutrient intake may occur if people do not consume balanced diets. This is guided by food preferences and habits as also knowledge of nutritional values from various kinds of food items. For example, deficiency of micro-nutrients like iron, calcium, vitamin, iodine is largely prevalent in underdeveloped communities in Asia because of lack of knowledge or lack of access to food rich in these nutrients. The lack of fortified food to compensate for lack of natural food adds to the problem of micro-nutrient deficiency. Furthermore, intra-household food distribution is also an important determinant of access to nutrition among the members of the household.

Besides the knowledge on micro-nutrient and a balanced diet, the assimilation of food into the body to yield the requisite micro-nutrients depends on availability of health services, water supply, sanitation and hygienic living conditions. The negative implications of poor absorption of food leads to an unhealthy population with growth disorders, high levels of morbidity, high Infant Mortality Rate and Child Mortality Rate, Low birth weight, stunting and wasting among children, etc.

Food availability, food access and food absorption are not separate phenomenon but are inter-linked. Food production is linked to livelihood access and food consumption. Livelihood access in turn influences the demand for food and better prices and production thereof. Better livelihood access also leads to improved living standard, better education, better knowledge on health and hygiene, etc.

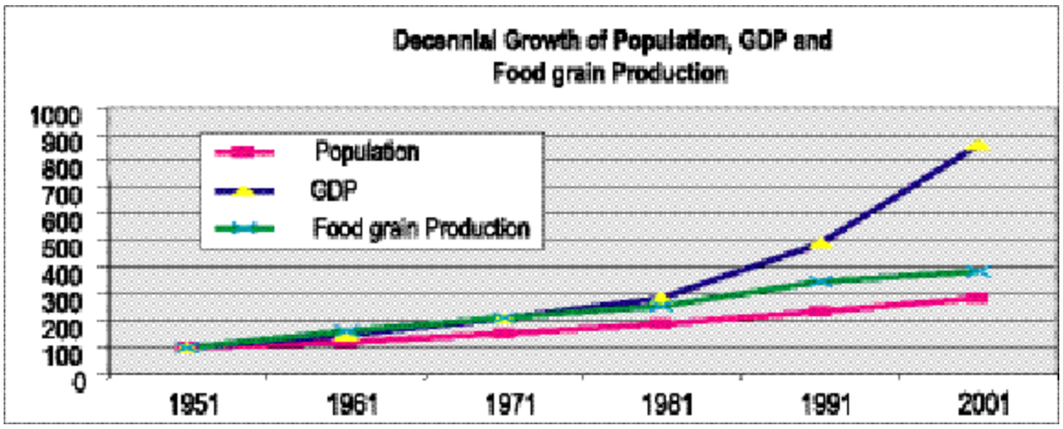
At any point of time, natural disasters have a direct bearing on all the three dimensions of food security. If a location is food secure in terms of all the three dimensions but prone to natural disasters, the balance in Availability, Access and Utilization might well be disturbed thus affecting the food security of the whole or sections of populations.

Section III: Food Security Situations in India and Timor Leste

Food Security in India:

In India, according to FAO report (2005), the percentage of population estimated as food insecure has declined from 25 percent in 1990-92 to 21 percent in 1999-2001; a fall of just 4 percentage points. The limited reduction in percentage of undernourishment has been more than counter balanced by population growth, resulting in stagnation in the absolute number of undernourished. The number of food insecure population in India has thus remained around 214 million during 1990-92 to 1999-2001, majority of them being women and children.

All these have happened despite the fact that the growth in production of food-grains has been higher than that in population. This has resulted in a comfortable stock of food grains in the Food Corporation of India (FCI) godowns. In 2001, the FCI had a surplus stock of more than 50 million tones. As a result, the per capita availability of food grains has surpassed the per capita requirement of foodgrains.



The above trends clearly indicate that the major factors contributing to food insecurity in India are those linked to lack of access to food among the poor population and poor health and nutrition and water supply and sanitation facilities. This is reflected in the fact that two out of every ten children in the world are living in India. But 4 out of 10 malnourished children are also from India. Thirty per cent children have birth weight less than 2.5 kg and about half of the women in the age group of 15-49 years and three-fourth of the children have been found to be anaemic. These are serious social costs for India, not only for today but for the years to come. An unhealthy child born today can never attain its full potential as a productive and healthy citizen. With limited livelihood opportunities, the purchasing power and hence accessibility to sufficient food for a healthy life gets limited.

Table: Food Insecurity and Malnutrition in India

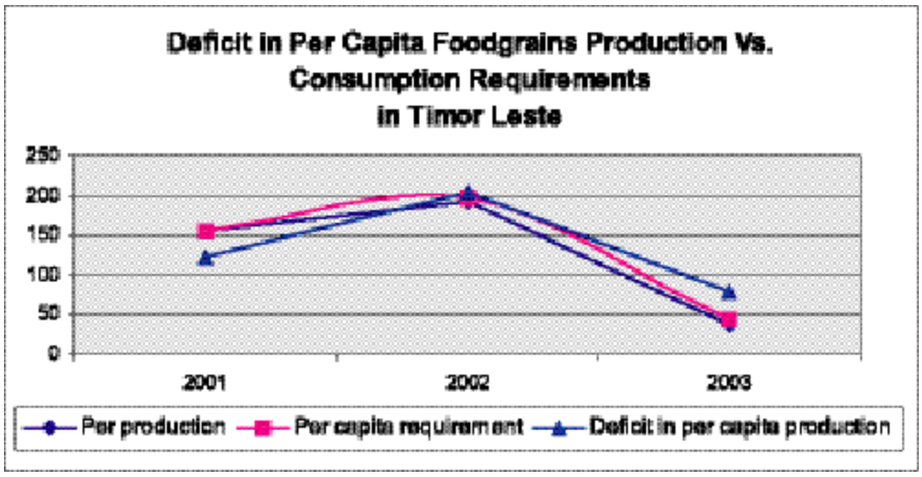
Indicator	Percent/Nos.
Population below poverty line (Planning Commission)	250+ million
Number of undernourished population (FAO)	214 million
Population in lowest (three) MPCE classes consuming <1890 Kcal/per capita/day (NSSO – 1999-00)	46.3 percent
Population with Micro Deficiency (Percent) (NFHS-II)	30+ percent
Low Birth Weight (Percent) (NFHS-II)	33 percent
Undernourished under-3 Children (%underweight) (NFHS-II)	47 percent
Chronically undernourished under-3 children (%Stunted) (NFHS-II)	45.5 percent
Infant Mortality Rate per thousand live births(NFHS-II)	68 per 1,000
Percent children 6-36 months children with anaemia (NFHS-II)	74.3 percent
Percent women with anaemia (NFHS-II)	51.8 percent
Maternal Mortality Rate per 100,000 live births (NFHS-II)	407

Food Insecurity in Timor Leste

Unlike India, Timor Leste is a very small country in the Asia Pacific with less than a million population. The country has a very weak macro-economic situation with ups and downs in the GDP in late nineties through 2002-3. This could largely be attributed to weak infrastructure base and large-scale devastation caused by the militia activities during the struggle for independence. Construction, manufacturing and tertiary sector activities being very limited in number, majority of the population are engaged in agricultural activities.

Agriculture in the country is mainly rain-fed and most of the areas produce only one crop a year. Erratic rainfall, absence of irrigation facilities and absence of mechanized development has led to subsistence farming amongst most of the farmers. As a result, various estimations show that there has been a recurrent deficit in production of food at the national level, continuously during 2001-2 to 2003-4. The deficit in food production reflects in a usual period of hunger for about – 5 months every year. (See VAM Report, WFP-2005).

Due to deficits in production of food grains, Timor Leste imports a major share of its food requirement from neighbouring countries. Notwithstanding the problems of availability of food, however, the country has major problems of access and utilization of food. If poverty is used as a proxy for the chronically food insecure people consuming less than 2,100 Kilocalorie per day, Timor Leste is one of the most vulnerable countries in Asia with about 40 percent of the population living below the poverty line. Besides deficit in production, lack of employment and purchasing power is one of the major factors that have contributed to the high level of poverty.



The lack of availability and accessibility of food reflects badly on the nutrition and health status of the people, especially of those of children and women. Timor Leste is considered as one of the countries in Asia, which is most vulnerable to malnutrition with very high rates of stunting, wasting and underweight among children under the age of five. The two major surveys, viz. Demographic Health Survey (2004) and MICS (2002) indicate that both stunting and underweight are more than 40 percent and wasting is around 12-14 percent. Malnutrition is thus a serious problem in the country and needs immediate attention and intervention for preventing the situation from deteriorating further to an irrecoverable situation.

Table: Food Insecurity and Malnutrition in Timor Leste

Indicator	Percent/Nos.
Population below poverty line	40 percent
Low BMI among women	33 percent
Undernourished under-5 Children (%underweight)	43 percent
Chronically undernourished under-5 children (%Stunted)	47 percent
Infant Mortality Rate per thousand live births	88 per 1,000
Child Mortality Rate up to the age of 5	120 per 1,000
Maternal Mortality Rate 100,000 live births	420
Percentage of people having access to safe drinking water	50 percent
Percentage of people having access to sanitation facility	40 percent

The poor state of predicament in health and nutrition among people in general and children in particular could be directly attributed to poor health facilities and bad qualities of water supply and sanitation services. Furthermore, poor knowledge of health and hygiene and nutrition education have also a high bearing on high levels of malnutrition. Especially, mother and child health care facilities are very weak with only a little more than 50 of the women getting ante-natal care and only about 5 percent children receiving all doses of immunization. Further, only about 35 percent of the children under the age of 5 years have received vitamin-A supplementation. The absence of safe drinking water and sanitation facilities, has further implications on the health status of the people in general and children and women in particular. About 50 percent of the population drinks water from unsafe sources. The common diseases among the children are diarrhoea, stomach upset, malaria and cough & cold, besides malnutrition.

Natural disasters like droughts, floods, heavy winds, etc. are recurrent in most parts of country affecting all the three dimensions of food security. Among the disasters, the slow onset disaster like drought and failure of crop is common in the country because of erratic and delayed rainfall since the entire country was hit by El-Nino in 2003. This seriously affects both the macro and household availability of food. Besides, heavy winds are a regular phenomenon in most of the mountain areas and are disastrous close to the time of harvest of a crop. In the event of a delayed harvesting (due to delayed rain and delayed plantation of crops), therefore, most of the mountain areas sustain heavy loss of crop, leading to prolonged hunger periods. Heavy winds and land slides not only affect physical infrastructure but also other livelihood activities of the people, especially among the poor, including loss of assets like housing units and livestock. Floods impact not only loss of crops but also loss of live stock, housing units and most importantly impact the health, hygiene and nutrition because of outbreak of diseases like malaria, diarrhoea, cough and cold, especially among children.

Community level Dynamics of Food Security in India and Timor Leste

People's livelihood mechanisms being extremely diversified in any country of diverse culture or diverse socio-economic conditions, generalizations such as all communities and groups of

population are equally worse or all better off across all geographical locations is a difficult proposition. The capabilities of communities and households to attain food security is highly linked with vulnerability and risk factors like socio-economic conditions, environmental conditions and natural resources, natural disasters, health conditions and availability of services thereof, pure economic situations, socio-political conditions, access to labour and credit market, etc.

Keeping the above factors in mind, WFP undertook community level food security analyses in both India and Timor Leste. These studies tried to analyse risks plus the ability of the communities and households to withstand risks and food insecurity using qualitative tools like participatory focused group discussions with communities and key informant interviews.

Notwithstanding the cultural differences, studies in both the countries identified the female headed households, bigger size households, old, widows, destitute, physically handicapped population as food insecure. Besides specific population groups like women and children, especially pregnant and lactating women were found as most vulnerable to malnutrition and consequences thereof. Low productivity among the poor households, and lack of access to productive employment and purchasing power thereof were found as the major causes of food insecurity. In Timor Leste most of the locations experience a usual food shortage of 4 to 5 months of shortage of food whereas in India, the same was identified among the poorest and scheduled caste and scheduled tribe populations. Besides household level availability and access to food, poor nutrition and health education as also lack of health and water supply and sanitation facilities were also identified as major causes of food insecurity.

During times of food shortages, the communities and households resort to various coping mechanisms like reducing the meals per day, substituting staple food by less preferred or low quality food, etc. This happens so in general among most of the communities in the rural areas of Timor Leste. This is so largely because of homogeneity of social and economic characteristics of the communities in Timor Leste. In India, however, this happens among the most food insecure households among backward and vulnerable communities. At times, the vulnerable communities in both the countries sell their cattle to cope with the food shortage. Most often than not such communities lose bargaining power on the price of the cattle because of lack of market facilities. On the other hand, the prices of food in the market go up during the periods of food shortage. In normal times, thus, if the price of one cattle could buy two sacks of rice, the sale of same cattle fetches only one sack of rice during the period of food shortage. In case of a delayed rainfall and loss or failure of crops, people resort to eat wild plants and roots as well, seriously jeopardizing their health safety. The relatively poorer households even withdraw their children from school and get them to engage in work activities. During periods of food shortage, people also engage in wage labour activities at unacceptably low wage rates. In most of the communities facing periods of food shortages, the heads of the households, especially the female members in the households adjust the intra-household distribution of food during such periods. The productive members within such households take the major share in the distribution of scarce food at the expense of nutritional intake of female members of the households. In both the countries, it was observed that at the time of shortages of food, in the absence of availability of productive employment, people also resort to temporary migration. This affects the education of children and also results in exploitation of labour. It is therefore, important to take into consideration the community level problems of food insecurity, preferences for food and coping mechanisms thereof while designing

and planning any food based intervention. It is very important to involve the communities themselves about the felt needs for achieving household level food security.

Section IV: Overview of Food Based Interventions in India and Timor Leste

Although poverty and vulnerability are not synonymous, the understanding that poor are more vulnerable has a number of implications. Poverty and food insecurity are related problems. We know that addressing poverty, people's resilience to shocks is likely to improve, thus reducing their propensity to become vulnerable and food insecure. However, not all poor are in fact food insecure or would require food aid. Similarly, not all food insecure are poor and the causes of their food insecurity can be very different from lack of food like, for example, inadequate care and eating habits due to lack of education. It is thus necessary to carefully distinguish between the chronically poor (e.g. hungry poor), for whom long-term policies and programs should be designed and where the food-aid component has a comparative advantage, and the transient poor or vulnerable for whom safety net programs are appropriate and food aid can have a role to play. This is apparent in the paradox of millions of hungry population under heaps of surplus food - typical of India. This calls for a closer look of the policies and programmes of the government for poverty and hunger alleviation in the country.

Food based Interventions in India

India has the largest food safety nets network in the world covering almost a third of country's total population. The major initiatives that have been taken up by the government of India for achieving food security could be classified into three categories. **One:** measures for stabilizing prices of food-grains across regions as also providing incentive for increasing production of foodgrains. **Two:** food based interventions launched by the government of India to provide food safety nets to the poorest of the poor through provision of free food or subsidized food. Government of India has launched a number of food based programmes like Public Distribution System (PDS), National Programme for Nutritional Support, Integrated Child Development Services, Anna Antyodaya Yojana, Annapurna Yojana, Grain bank scheme, etc. **Three:** food based interventions integrated with those of poverty alleviation programmes. Poverty alleviation programmes are mainly seen as schemes raising purchasing power among the poorest of the poor through employment generation plus generating basic infrastructure for enabling the output and employment benefits to be realized in optimum scale. The employment generation programmes for poverty alleviation are largely categorized as (i) Wage employment programme and (ii) Self employment programmes. The food-based interventions in this category are largely concentrated in the wage employment categories through food-for-work activities. This section presents an overview of some major food based interventions in India.

Public Distribution System (PDS)

PDS means distribution of essential commodities to a large number of people through a network of FPS on a recurring basis. The essential commodities distributed through the PDS are wheat, rice, sugar, edible oil and kerosene. The present PDS is a producer price support as well as consumer subsidy support programme. The scheme has evolved as a major instrument of the Government's economic policy for ensuring availability of foodgrains to the public at affordable prices as well as for enhancing the food security for the poor. It is an important constituent of the strategy for poverty eradication and is intended to serve as a safety net for the poor whose number

is more than 330 million and are nutritionally at risk. The PDS with a network of about 4.78 lakh Fair Price Shops (FPS) is perhaps the largest distribution network of its type in the world.

The PDS is operated under the joint responsibility of the central and state governments. The central government has taken the responsibility for procurement, storage, transportation and bulk allocation of foodgrains, etc. The responsibility for distributing the same to the consumers through the network of Fair Price Shops (FPSs) rests with the State Governments. The operational responsibilities including allocation within the State, identification of families below poverty line, issue of ration cards, supervision and monitoring the functioning of FPSs rest with the state governments

The programme was universally accessible to the whole population of the country till 1997. The major aim of the programme was to ensure availability of food in food deficit regions as also to achieve stability in the prices of staple food items. The programme was thus not seen as a poverty alleviation scheme. The large chunk of subsidy provided by the government was thus going to the relatively richer classes than the poorer sections. As a result, in 1997, the programme was revamped to Targeted Public Distribution System (TPDS) with separate issue prices of food for Above Poverty Line (APL) and Below Poverty Line (BPL) households, to cater to the special needs of the poorest sections as also for the poor to benefit most from the government subsidy provided to the scheme. The scheme distributes both rice and wheat that takes care of regional food preferences.

The PDS being the single largest food distribution in the country, it has often been drawn into debate among policy makers and researchers on its successes and failures. One of the studies by Tata Economic Consultancy Services indicates that about 36 percent of wheat, 31 percent of rice and 23 percent of sugar is diverted in the form of pilferage to commercial hands. Furthermore, at the national level, only 22 paise of every rupee spent on the poor through PDS reaches the poor. Similarly, another study found that poorer states have benefited less from the scheme than the richer states. Data generated by the country's database agency, the National Sample Survey Organisation (NSSO) of India suggests that PDS has had an effect on poverty only by 2.4 percent. (Mahendra Dev – 2003).

The study by Radhakrishna and others found that the cost of per rupee income transfer through PDS is very high calculated at Rs. 5.37. Furthermore, the PDS has been fraught with weak cost benefit analysis thereby, the scheme having helped the FCI more than helping the poor. With heavy public stock of food-grains of about 50 million MTs. since 2001-02, the major share of subsidy to the scheme meant for the consumers has been used for storage and transport of food-grains to and across go-downs.

Integrated Child Development Services (ICDS):

India has around 137.4 million children, who are below the age of 6 years, constituting about 13.5% of India's total population (2001 census). A large number of them live in poor economic and social environment, which impede their physical and mental development. These conditions include poverty, poor environmental sanitation, disease, infection, inadequate access to primary health care, inappropriate child caring and feeding practices, etc. The government of India launched a National Policy on Children in August 1974 providing the required framework for assigning priority to different needs of children. In follow up of the policy, the Integrated Child Development Services (ICDS) was launched in 1975 with an integrated delivery package of early

child and mother care services. The major objectives of the programme are to (i) improve the nutritional and health status of pre-school children in the age-group of 0-6 years; (ii) lay the foundation of proper psychological development of the child; (iii) reduce the incidence of mortality, morbidity, malnutrition and school drop-out; (iv) achieve effective coordination of policy and implementation amongst the various departments to promote child development; and (v) enhance the capability of the mother to look after the normal health and nutritional needs of the child through proper nutrition and health education. The objectives were envisaged to be achieved through providing a package of services including supplementary nutrition, pre-school education, immunization, health check-up, referral services and nutrition & health education. The identification of beneficiaries is done through surveying the community and identifying the families living below the poverty line.

The programme provides an integrated approach for converging basic services through community-based Anganwadi Workers (AWW)[36] and helpers, supportive community structures/women's groups – through the Anganwadi Centre (AWC), the health system and the community. Besides this, the AWC is a meeting ground where women's/mother's group can come together, with other frontline workers, to promote awareness and joint action for child development and women's empowerment.

The ICDS Programme has achieved many milestones since its inception in 1975. It is one of the world's largest community based programmes for growth and development of women and children. Universalization of ICDS was originally contemplated to be achieved by the end of 1995-96, through expansion of the services all over the country. Out of 5614 sanctioned projects till 1996, only 4200 could become operational by the end of eighth Plan and the same position continued even during the fist two years of Ninth Plan. The process of universalization was expected to be completed by the end of Ninth Plan by covering all the 5652 blocks/wards spread all over the country. However, only 4608 blocks could be operationalized by the end of Ninth Plan period due to paucity of funds. By September 2003, a total numbers of 5068 projects become operational. The tenth five year plan (2002-07) envisages to universalize ICDS in the country and expects to cover 54.3 million children and 10.9 million mothers.

The ICDS scheme has also been expanded in activities with additional schemes like Adolescent Girls Scheme, Balsevika training programme, Creches/Day Care centres for children, National Creche fund, early childhood education, Balbadi nutrition programme, etc.

The Adolescent Girls Scheme is a special intervention devised for adolescent girls, using the ICDS infrastructure. This intervention focuses on school drop-outs girls in the age group of 11-18 years to meet their needs of self development, nutrition, health, education, literacy, recreation and skill formation. This scheme attempts to mobilise and enhance the potential of adolescent girls as social animators. It also seeks to improve their capabilities in addressing nutrition and health issues - through centre-based instructions, training camps and hands-on learning as well as sharing of experiences. Furthermore, in an effort to improve the effectiveness of delivery of services, special initiatives are also concurrently underway to train ICDS functionaries at all levels such as Anganwadi Workers, Supervisors and Child Development Project Officers (in-charge of ICDS project).

[36] The ICDS workers are females chosen from among the communities to who are responsible for running the Anganwadi Centre for delivery of services. The AWWs are assisted by helpers in delivery of services.

The ICDS is globally acknowledged and recognized as one of the most successful community based programmes. However, a joint assessment of the scheme by the World Bank and Government of India in 1997 revealed that ICDS is one of the most successful schemes but is still fraught with problems in the areas of coordination and management. It was noted, for example, that the scheme has failed in the prevention, detection and management of undernourished children and mothers. Similarly, the outreach of the programme was also found inadequate in the study. It was found that a large section of children, especially in the age group of 6-24 months as well as lactating and pregnant women did not come to the AWC nor did they get food supplement. Furthermore, the study found that the available food was shared between mostly 3-5 years old children irrespective of their nutritional status and entitlement thereof. Also, management of severely undernourished children was poor arising mostly out of poor or non-existent child-care education of mothers. Another study by the Government of India noted poor inter-sectoral coordination in the programme.

Antyodaya Anna Yojana:

In 1999-00, the National Sample Survey Organisation (NSSO) estimated that about 5 % of the total population in India go to bed without two square-meals a day. In order to improve the food intake of this section of the population, the scheme of "Antyodaya Anna Yojana" (AAY) was launched in December, 2000 for 10 million poorest of the poor families. AAY contemplates identification of these poorest people amongst the families that are below the poverty line and are covered under Targeted Public Distribution System for the BPL (Below Poverty Line) households. The programme provides foodgrains at a highly subsidized rate of Rs.2/ per kg. for wheat and Rs. 3/ per kg for rice to the poorest of the poor. The entitlement of foodgrains per family under this scheme initially started with 25 kg per family per month and has been increased to 35 kg per family per month with effect from 1st April, 2002. The States/UTs are required to bear the distribution cost, including margin to dealers and retailers as well as the transportation cost. Thus the entire food subsidy is being passed on to the consumers under the scheme. The AAY Scheme has been expanded in 2003-2005 by adding another 10 million households from amongst the BPL families.

In a survey of destitution in five states viz. Andhra Pradesh, Chhatisgarh, Jharkhand, Rajasthan and Uttar Pradesh, it has been noted that the performance of the programme is much better in comparison to that of PDS and targeting of the programme is quite efficient. (Dreze – 2002). However, the study found that many households selected for the programme have been deprived of their entitlements due to siphoning off of food under the programme by fair price shop dealers.

Mid-day Meals Scheme:

The mid-day-meals (MDM) scheme was launched nationwide in the year 1995 as a centrally sponsored scheme, with the dual objective of improving the educational indicators like enrolment and attendance rate and reducing drop out rate and improving the nutritional status of primary school children. Food grains (wheat and rice) are supplied free of cost at the rate of 100 grams per child in the 6-14 years age group per school day or 3 kg of food-grains per month, in any primary school run or aided by the government or run by local bodies.

There are however shortcomings in the programme. The central allocations of food grains have fallen short of entitlement. Moreover, many state governments do not even spend the norm of

Rupee one per child per day fixed by the central government for states. According to Saxena (2004), the programme can be made effective if the schemes were to adhere to the simple features like providing clean space separately for storing and cooking with hygienic food items and clean water. Saxena further proposes that these could be accomplished by utlising the employment programmes for constructing kitchen sheds, giving the task of food preparation to self-help women groups and supplementing the meal with micronutrients like iron, vitamin A, and iodine, etc. Some of these suggestions are applicable to the ICDS too. (Radhakrishna – 2005)

Food-for-Work

The food-for-work programme was launched in January 2001 but was discontinued in March 2002. Nonetheless, the programme has been allowed to continue as a special component of the wage-employment scheme of the poverty alleviation programme called Sampoorna Gramin Rozgar Yojana, especially to support the families in the drought prone areas.

In 2004, however, in addition to food-for-work component of the Sampoorna Gramin Rozgar Yojana, a scheme of National Food-for-Work Programme has been launched in October 2004. The programme is being implemented in 150 backward districts of the country. The scheme aims at generation of supplementary wage employment and providing food security through creation of need based economic, social and community asset in these districts. The scheme is largely targeted to the districts and areas with high percentage of tribal population. The scheme targets to provide 100 days of employment at minimum wage for at least one able-bodied person from each household in the country.

The advantage of FFW is that the scope for leakage is not as high as in the case of other wage employment programmes. Secondly, even when the supervisors fudge the muster rolls, they have to sell the misappropriated foodgrains which increases supply of food grains and are usually available at a little higher than BPL prices. As a result, the poor could have easy access to foodgrains. However, the programme is fraught with many administrative bottlenecks. A large number of poor who are willing to work go back disappointed as often the works are not started in time and often the payments are not made in time to those who work due to delay in allocation from the central government go-downs. Some of the states like for example, Chhatisgarh managed this problem by making payments in terms of paddy procured by the state government during surplus production. The quantity of paddy thus disbursed were replaced by food grains received from the central government on a later date.

National Rural Employment Guarantee Act (NREGA)

Recently during 2004-05, the GOI has for the first time in the history of poverty alleviation interventions, initiated a measure to guarantee employment as a right. This is proposed to be enacted as a bill in the parliament called National Employment Guarantee Act. By virtue of this proposed Act, every household in rural areas of India shall have a right to at least 100 days of guaranteed employment every year for at least one adult member pr hosuehold, for doing casual manual labour at the statutory minimum wage and to receive wage thereof within seven days of the week during which work has been done, in accordance with the provisions of this Act and the programme made there under. If the applicant is not provided with employment within 15 days of applying, he or she shall be entitled to a daily unemployment allowance, unless the applicant or his/her households has already received 100 days of employment during the running financial year. Furthermore, if the applicants are not provided employment within 5 kilometers of the

village where the applicant resides at the time of applying, it must be provided within the block and transport and daily living allowances are to be paid in accordance with the programme rules.

The activities to be undertaken in the programme are suggested to be participatory in nature with the Panchayat having been assigned as the nodal agency for planning of projects taken up under the programme. Priority shall be given to works recommended by Gram Sabha and Gram Panchayat. The Gram Panchayat shall allocate employment opportunities among the applicants and ask them to report for work.

The Act leaves scope for flexibility on the state governments in the norms of rural areas, minimum 100 days employment per household and number of members to participate in the activities under the Act. The Act says that the state governments could decide to implement the Act in any area beyond rural areas as also could raise the number of days of employment per family beyond 100 days and may also keep a provision for employment of more than one person per household.

A couple of debate papers analyzing the proposal in the NREGA have noted some weaknesses in the programme. One of the major criticisms of wage employment programmes as noted above is "contractry raj" and large scale corruption. The NREGA still have left the scope for involvement of contractors in carrying out the activities, although on a case to case basis. Secondly, the programme targets only rural areas and as a result, the poor in the small and medium towns with very low standards of living or below the poverty line will be left out of the ambit of the programme. Furthermore, the activities to be chosen under the programme do not focus in specific on social and human development and concentrate only on creation of productive assets. This would lead to a improved standard of living among the poor households getting employment under the programme but adequate facilities in education and health and nutrition will not be available effectively. Also, the programme largely concentrating on manual labour activities, the female participation may not be expected to improve and secondly, even if the females participate in large numbers, they will continue to work in hard manual labour activities in detriment to their health.

Nonetheless, the programme looks to be promising by conferring the unemployed, the light of employment. Also, the programme being participatory with a major role given to the Gram Panchayat, the monitoring of activities is expected to be more effective. However, the success of the programme will rest on how much of financial management power of the programme is delegated to Gram Panchayats and what monitoring mechanism of financial administration of the programme is in place.

Grain Banks:

The major problem of community and household level food security owes to the problem of lack of availability of food at local level even though there might be surplus of food at the macro level or lack of access to food. At the time of harvesting, in order to repay debts, the small and marginal farmers sell their produce, often at a very low price and subsequently fall short of foodgrains later in the year. The number of months of food gaps are even higher in the areas where agriculture is rain-fed and crop failure is recurring. Because of lack of food, the nutritional status of these people is usually weak thus making them less productive or productive at the cost of their health. To ensure reach of food grains by poor households, the concept of grain bank has been promoted among the communities all over the country, especially in the areas that are prone to crop failure and drought.

The target groups for food bank are ideally a group of 10-15 land less families. These families by definition are located in rain-fed regions, mostly prone to drought and other natural disasters characterized by subsistence agricultural activities generating few wage employment opportunities. Such groups are homogeneous in their economic profiles and are prone to endemic hunger. The food bank is usually formed by such groups through the concept of SHGs, especially among women, with all the members of the groups having equal stakes in contributions and entitlements. The members of the SHGs put an initial contribution of grains to the bank in amounts as decided by the SHG members. The amount of food contribution of the members is the basis for calculation of the entitlement for withdrawal of food by the members at any given point of time. Sometimes, the initial contribution for the seed capital is made on a matching basis by external agencies or governments who are facilitating or promoting food bank in a particular region. WFP in India has been providing the initial corpus of food grains in some of the most food insecure parts of the country. The replenishment of the bank's food grains resources are made as per interest and repayment plans worked out by all the members of the SHGs. Such groups are also encouraged to take up economic activities through the banking activities.

The bank concept of food banks has been successful in improving the access of the poorest households to fill in their food gaps during times of shortages and has often saved the members from falling to the clutches of indebtedness. However, a number of studies have observed lack of integration of the scheme to other developmental schemes in the villages. Furthermore, the members of groups, forming such banks, lack in skills for managing documentation and principles of banking. It would therefore be important to provide training to the people forming such groups for managing food banks.

Besides the above major programmes there are also few other food based interventions like Nutritional Programme for Adolescent Girls, Annapurna Yojana (for old, infirm and destitute), etc. meant for specific target groups. The following table gives the details of beneficiary and tonnage coverage of various programmes in India.

Food Based Schemes in India: Tonnage and Beneficiary Average

Name of Scheme	Implementing Authority	Total Food Tonnage/ Annual (Million MT)	Beneficiaries (Million)
Targeted Public Distribution System (TDPS)	GoI	34.5	160 (families)
Integrated Child Development Service (ICDS)	GoI	NA	41.5
Antyodaya Anna Yojana	GoI	8.4	20 (families)
Samporna Gramin Rozgar Yoajana (FFW)	GoI	5.83	NA
Annapurna Yojana	GoI	0.2	1.7
Grain Bank Scheme	GoI		
Nutritional Programme for Adolescent Girls	GoI	0.03	3.5
National Programme for Nutritional Support	GoI	2.75	106
Emergency Feeding Programme	GoI	1.4	0.2
Total (Approx)	GoI	54	Not Additive

Source: Ministry of Food and Public Distribution, Government of India

The United Nations World Food Programme's (WFP) Approach in India:

In India, the major goals of the WFP are to play a catalytic role in the country's efforts to reduce vulnerability and eliminate hunger and food insecurity among the targeted hungry poor. WFP is trying to realize this objective through promoting and demonstrating models that provide immediate and longer-term food security in the most food insecure districts in the least developed states of the country. Associated with these goals is the role of advocacy for the government's objective of a "Hunger-free India".

In pursuance to the above objectives, WFP focuses its intervention in the following priority areas; (i) Improving the nutritional status of children and women through supply of nutritious and fortified food supplements to ICDS beneficiaries. In this programme, WFP targets to increase the outreach of malnourished expectant and nursing mothers and of children up to 6 years of age, with special attention paid to children below 3 years of age. (ii) Investing in human development, with special emphasis on girls through Food-for-Education (FFE). Majority of the students in rural areas, especially among the poorer and backward sections like Scheduled Caste (SC) and Scheduled Tribes (ST) go to the school with very little food or in empty stomach. As a result, the children are not able to concentrate in studies in the classroom. To fill in this gap as also to improve the nutritional status of children, a mid-morning snack of micronutrient-fortified food (Indiamix) is provided to the children in the schools run by the tribal and social welfare departments of the sate governments. This model aims at complementing and enhancing the effectiveness of the existing National Midday Meal Scheme. A take-home ration isalso provided exclusively to the girl students as an incentive for them to go to the school. (iii) Improving food security through disaster mitigation and the preservation and creation of assets through food-for-work (FFW) activities**.** The WFP supports a range of assetcreation and disastermitigation measures through FFW under a comprehen sive sustainable livelihood approach. In addition to WFP resources, the objective of the programme is also to leverage state and district level investments to complement FFW activities through joint forestry management (JFM) and watershed management as the basis for implementing village micro-plans.

The WFP operates on a five year country programme cycle in India that by and large corresponds to the Government of India's five year plan periods. Given WFP's objectives to develop replicable models in India, WFP has extended support through its current country programme (2003-2008) in eight states with various degrees of intervention.

Besides the Country Programme, the WFP has also taken a number of initiatives for technical support to the Government of India. One of these is the pilot project on micro-nutrient fortification of food in collaboration with governments. The project is supported by CIDA and provides technical expertise for micronutrient fortification of food. This has led to the popularization of fortified food like India-mix, Raj-mix, Ori-mix, etc. and has supplemented the government's food based interventions. Similarly, Iodine Deficiency Disorder (IDD) is one of the major problems in India with only 50 percent of the population using iodised salt, the intake of same being much less of about 35-40 percent among the vulnerable groups like lower income groups and poor schedules caste and scheduled tribes. WFP has thus been providing technical support for production of iodised salt at small farming level on a pilot basis in Rajasthan. The project has achieved significant results in increasing the volume of production of iodised salt at micro-level in the state.

One of the major initiatives in recent years that has been taken up by WFP in management of food based interventions is through the concept of Food-for-Human Development. The project focuses on human development and social capital enhancement through strengthening the social networks for taking collective action. WFP's key objective in this project is to contribute towards building a replicable model of human security using food as resource and creating meaningful employment that builds on human capacity and ingenuity of the poor; to empower women to become equal agents to contribute in community capacity building and to build, link and develop social community assets to strengthen local institutions to ensure better livelihood. Women Self Help Groups are seen as the major actors of change in the programme. This would ensure larger participation of women in wage activities for human development. The advantage of this programme is that the existing FFW activities could be modified to generate employment and social and community assets directly and to enhance the level of literacy and quality of health and nutrition through improvement in services. WFP has also been collaborating with International Fund for Agricultural Development (IFAD) along with the governments of India for improving the livelihood opportunities at community level.

Food Based Interventions in Timor Leste

As mentioned before, Timor Leste is the newest member of the United Nations in the new millennium. The first government was formed in the year 2002. The government is functioning with the new bureaucrats and politicians with support from the United Nations. Due to lack of resources and expertise, the government did not have any structured food based intervention although there have been some food distribution at various places from time to time on a piecemeal basis by both government, non-government and other agencies.

There has been recurring crop failures in the country. The enormity of the problem was severe during 2003 drought, which was followed by the El Nino climatic phenomenon. The WFP has been supporting the government to help the poor survive hunger during periods of crisis since 1999. During this period, WFP's Emergency Operation provided food assistance for over 67,000 households. Given high levels of food insecurity and malnutrition in the country, WFP has shifted its approach in the country from short term emergency operations to medium/long-term safety-net support through a Protracted Relief and Rehabilitation Operation (PRRO) for two years which is likely to be extended in the medium run. The aim of the operation is not only to help the poor households to survive immediate hunger and malnutrition but also to build capacity for developing an institutional system in the government for delivery of services to the malnourished and for prevention of malnutrition and food insecurity.

The Project comprises of two major components viz. "Safety Net" and Emergency Preparedness. It provides the "Safety Net" to the most vulnerable population who are to continue suffering until the realization of results of the National Development Plan (NDP) and dealing with NDP's priority activity, i.e. basic services including primary education and health care as a key for poverty reduction.

On the health and nutrition of mothers and children, the project through its Safety Net component will help the government of Timor Leste in providing nutrition support to malnourished women and children. The delivery of nutritional support has been deliberately made at health posts run

by the Ministry of Health so as to integrate it with health and MCH facilities and health and nutritional education, including reproductive child health facilities provided at the health posts. The integration is also expected to address the issues related to low immunization rates, high rates of infant and maternal mortality and poor nutrition.

Furthermore, after independence, most of the children are highly enthusiastic to go to schools. However, because of high food insecurity at the households level, most of the children go to school in empty stomach or very little food whereby they are not able to concentrate in studies. The project has, therefore, a component of food-for-education in which children will be provided mid-morning snacks in the school. The project is thus assisting, along with other partners and factors, in raising the enrolment, attendance and concentration/performance rates of primary school children, especially of girls, as well as improving their nutritional status.

Besides poverty and purchasing power, the household food insecurity in Timor Leste is affected by the natural disasters. It is thus proposed to have an "Emergency Preparedness and Response". The PRRO is providing both capacity and technical assistance to deal with natural disaster risks before, during and after the event through a contingency plan and pre-positioning of food at strategic locations. The project is also committed to develop capacity in the government for a food security and emergency monitoring system of indicators like market prices, rainfall and crops, nutritional indicators, practice of coping mechanism etc.

All the above activities in the project are very well targeted. The geographical locations and beneficiary vulnerable groups were identified through a vulnerability analysis and mapping exercise. The sub-district level selection of locations and vulnerable groups was worked out through a participatory method. The project is jointly managed by Government of Timor Leste and WFP. While the planning and overall project monitoring is being done at the national level by the Project Management Committee/PMC, the implementation, monitoring and reporting is conducted through a Management Unit/PMU at the district level. The PMC consists of national level nodal ministries and UN agencies, the PMU consists of all concerned line departments at the district level. For emergency preparedness component, the government has formed a National Disaster Committee (NDC) at both national level and district level for the purpose of coordinating, monitoring and managing the implementation of project activities.

For the analysis of the project achievements, a baseline information has been generated jointly with the nodal ministries on the basic indicators, such as children reported to Health Posts (HP) and received food, PLW reported to HP and received food as output level indicators, as well as weight for height (wasting) among children as outcome level indicators.

WFP Research and Analysis in India and Timor Leste

Although some of the programmes discussed above have been successful in improving household level food security among the vulnerable groups in India, in most of the programmes, the major cause of failure to attend food security and nutrition for all is lack of proper targeting and monitoring. Having noted this from research literature on food based programmes in India during the seventies, eighties and nineties, WFP initiated measures for capturing food security for identifying the most food insecure locations and communities. Since 2002, WFP has prepared

three atlases viz. Food Insecurity Atlas of Rural India, Food Insecurity Atlas of Urban India and Food Sustainability Atlas of India in collaboration with M. S. Swaminathan Research Foundation. All these atlases have been able to identify the extremely food insecure areas in rural and urban areas of the country. The states were classified into various food security categories by preparing indices by combining various food security indicators in all the three dimensions of food security, viz. food availability, access and utilization. Separate indicators were chosen in the rural and urban atlases. After identifying the most food insecure states, a district level analysis was also done in the most food insecure states. WFP is currently implementing its programmes across eight states in India as identified in the food Insecurity Atlases (please see Food Insecurity Atlas of Rural India).

Timor Leste is one of the newest countries with a nascent government with the capacity in the making for governmental interventions for alleviating hunger and achieving food and nutritional security. In the recent years, however, it was observed by one of the analysis by WFP Timor Leste that the food based interventions involved distribution of food on a piece-meal basis without taking into consideration the most food insecure areas and communities. Based on the experience from India and other countries, thus, WFP undertook a vulnerability analysis and mapping exercise in Timor Leste. The study identified the most food insecure districts and vulnerable communities. (See VAM Report, WFP Timor Leste) Subsequently, the food based interventions were launched by WFP in collaboration with the government of Timor Leste in the areas that were identified as most food insecure in the country.

Besides the analysis of food insecurity through indexing and mapping, WFP also undertook studies to understand the community level dynamics of food insecurity and the coping mechanisms thereof. The following section presents the findings of the community level analysis of food insecurity.

Section V: Lessons Learnt from Food Security Experience of India and Timor Leste

Given the level of poverty in India as 26 percent, about 260 million people fall below the poverty line. These populations need 3 kilograms of extra cereals per person per month or say about 36 kilograms of cereals per annum. The additional requirement of food that could push them above the poverty line works out as 9.36 million MTs of foodgrains. (See Saxena – 2003). Interestingly, in 2001, the amount of food stocks with the Food Corporation of India was about 60 million MTs. Secondly, food based interventions in India amounts to more than 50 million MTs of food distribution per annum. Unfortunately, however, the level of food insecurity and malnutrition in India continues to be high.

From the above, two things are apparent that availability is a necessary condition for achieving food and nutrition security but not a sufficient condition. First of all, it is important to achieve sustainable production of food grains, taking into consideration the population growth and changing patterns of consumption of food among population groups. Furthermore, the other factors that need attention and important considerations are to (i) improve accessibility of food among the poorest of the poor and (ii) provide proper health and nutrition and water supply and sanitation facilities for proper assimilation of food into the body. This has also been noted in the food security experience in Timor Leste that besides food availability, access and utilization of

food are important factors that determine the level of food and nutritional security in a country. Secondly, putting in place a huge food based safety nets alone is not sufficient but what is important is to have efficient system of food based interventions with special focus needs of various target groups.

Concerning food based safety-nets, it is important to devise right types of interventions with special interventions for specific target groups and communities. For this, it is important that the vulnerable locations and groups are identified through a scientific analysis of food security indicators and indices. WFP's vulnerability analysis and mapping tools discussed in the previous section are important tools for this exercise. Once these groups are identified and their specific needs are identified, various programmes should be devised to integrate such needs. What is important is to integrate the programmes into all the dimensions of food security, viz. (i) empowering the vulnerable groups through their participation in the process of preparation and implementation of models for food based interventions, (ii) generating productive employment opportunities and improving purchasing power among the most vulnerable communities, (iii) improving health and nutrition knowledge among the women and providing mother and child care and water supply and sanitation facilities in the remotest and most backward regions with the participation of the communities.

Indebtedness and migration are important hazards of food insecurity among the poorest of the poor. It is thus important to help the vulnerable communities, especially in the drought prone areas for formation of food/grain banks so that the communities could plan and manage their foodrgain stocks for all the months in a year. This would not only help the vulnerable communities to fill in their months of food gaps but also save them from falling trap to indebtedness due to food shortage. Furthermore, it would be also important to create assets through employment activities for raising purchasing power among the poorest. If a minimum number of employment could be assured per family as a matter of right, the food insecurity status of the poorest households would not get recurrently worst. The NREGA is a landmark step taken by the government of India in this regard. It is however important that the activities for generation of wage employment are women friendly that could encourage their participation. Secondly, it is also important that such activities are targeted to create social assets, especially in the schools, services delivery mechanism, etc. in active participation of community members, especially women. This would have a double impact of social human development besides improvement in household food security due to improved factor of purchasing power.

It has been observed that often, there is a lack of coordination among various food based interventions at the block and village level in India. As a result, the synergetic impact of all the programmes together does not become plausible. Often, there is duplication of beneficiaries receiving food aid or assistance from various projects whereas, many of the poorest of the poor get missed out of the programmes. It is therefore important to develop a coordination mechanism at the block and village level. This was felt as an important requirement in both India and Timor Leste. Adequate coordination mechanisms have now been developed in both the countries concerning this aspect.

One of the important learning from Timor Leste is that in the absence of an institutional mechanism for disaster mitigation and emergency preparedness and response, the toll of disasters

is high on the vulnerable groups, especially women and children. In Timor Leste, it was observed that there is need of a well-designed contingency planning with sectoral integration of various departments catering to various needs at the time of a disaster. The country is in the process of preparation of a contingency plan. Furthermore, it was observed that because of hilly tract and poor road infrastructure, often it has not been possible to deliver food to the most vulnerable population at the locations affected by disasters. With the active support of WFP, the government has now placed high energy ready to eat fortified food at various strategic locations with adequate logistics plan to reach the food to any vulnerable location within a short notice.

For better targeting and monitoring the impact of the programmes, it is important to have a sound database system with information on food and nutrition related indicators and access to food based programmes available at the lowest level of disaggregation. WFP has undertaken two pilot projects in India for generation of data on such indicators at lower levels of geographical disaggregation. The National Sample Survey Organisations (NSSO) of India collects data on food and nutritional intake only at the state level. WFP collaborated with NSSO to generate food security indicators and the access to food by various expenditure groups at district level in six districts. WFP in India also undertook another project to generate village level data on poverty and child malnutrition in collaboration with India Development Foundation. These data were generated for all the villages in the state of Uttaranchal by combining Census and household survey data. The data thus generated would be useful in targeting the food based interventions. Similar initiatives are also currently being undertaken by WFP in Timor Leste.

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CHALLENGES IN ADDRESSING HUNGER AND POVERTY IN BANGLADESH - THE CASE FOR A TWIN TRACK APPROACH

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Introduction

Bangladesh is at the cross-roads in its efforts to combat poverty and achieve food security for its people. The full Poverty Reduction Strategy has just been completed, recognizing that *"food security is the core element in the struggle against poverty"* (GED 2005) and setting out a number of policy priorities that will inevitably influence the availability, access and utilisation of food. A National Food Policy has been drafted and is expected to be approved soon. Whilst earlier five-year plans emphasized accelerated food production and expansion of employment opportunities in rural areas as the main strategy to achieve food security, the new National Food Policy builds on a more comprehensive understanding of the food security challenge in Bangladesh which includes, in addition to availability, access and utilization considerations.

Bangladesh has risen from the last decade of the 20th century with a relatively successful record of economic growth and poverty reduction. The real annual consumption per capita growth rate more than quadrupled from an average of 0.6 per cent between 1983-84/1990-91 to an average of 2.7 per cent in the period of 1991-92 to 2000. Poverty headcount has been reduced from 63 per cent of the population in 1983-84 to 50 per cent in 2000.

It is well known that chronic hunger is a result and a key manifestation of abject poverty. However, there is much evidence to suggest that hunger is a major cause of poverty. Hunger deprives individuals of the ability to learn and work to full potential. It makes them vulnerable to disease and premature death and, when it occurs at critical parts of an individual's lifetime, it may lead to permanent cognitive or physical disabilities. The implication is that an effective poverty reduction strategy requires measures to target hunger directly.

This paper has two messages: Firstly, the continued high level of food insecurity has a high cost for Bangladesh both in human and economic terms. Secondly, agricultural growth has been instrumental in reducing poverty both through increases in availability but also access to food. The implication is that a twin-track strategy is needed in Bangladesh, tackling food insecurity from two angles: I) sustainable agricultural and rural development to support and enhance the livelihoods of the poor and vulnerable groups; and II) through targeted interventions and programmes to enhance immediate and direct access to food and nutrition by the most needy to allow them to take advantage of opportunities offered by development. Bangladesh is doing a lot already on both those areas of intervention. In this paper in is claimed that more should be done for an accelerated pace for meeting MDG1.

[37] All authors are staff of the Agricultural and Development Economics Division, FAO Rome. This paper was prepared as part of National Food Policy Capacity Strengthening Programme, implemented in collaboration with FPMU and with the financial support of the EC and USAID.

2. Hunger and malnutrition in Bangladesh

Historically, growth of food availability as measured by daily per capita dietary energy supply (DES) has been low compared to other countries in South Asia. DES was 2093 in 1961-62, being increased only to 2190 Kcal/day/person in 2000-02, a growth of only 0.14% per year (FAOSTAT 2005). DES in Bangladesh in 2000-02 level was 9.5 per cent lower than in India, 12 per cent below the level on Pakistan and 8 per cent below the level of Sri Lanka.

Despite the reduction in the prevalence of undernourishment from 35% in 1990/92 to 30% in 2000/02, the absolute number of undernourished people actually grew by 3.3 million people to reach 42.5 million (FAO 2004) in the same period. Unless urgent and targeted action is taken, the MDG hunger target of bringing the prevalence of the number of undernourished to 17.5 per cent would not be reached and the World Food Summit (WFS) target will not be met.

Bangladesh has made impressive gains in nutrition during the last 15 years. Table 1 shows that the decline in child underweight rates which has been particularly steep: since the early 1990s and between 1992 and 2000, underweight prevalence dropped from 68% to 51%, implying an annual decline of 3.6%. Stunting fell from 64 to 49 percent with an annual decline of 3.4%, and wasting from 17 to 12%, a 30 percent decline for the whole period.

Table 1: Trends in Food production Index, undernourishment child malnutrition, and health, Bangladesh 1990 - 2002

Indicator		1990-1992	1995-1997	2000-2002	MDG 2015 Target
Food Production Index[1)]	(2000-2002=100)	91	86	100	N.A
-of which rice		73	74	100	
Prevalence of undernourishment[1)]	(Percent)	35	40	30	17.5
Number of undernourished[1)2)]	(Million)	39.2	50.4	42.5	19.6[2)]
Stunting*	(% of children < 5)	64.2	51.4	48.8	32
Wasting*	(% of children < 5)	16.7	16.6	11.7	8
Underweight*	(% of children < 5)	68.3	57.4	51.1	34
Mortality rate, under 5	(per 1,000)	144	116	82	50
Infant mortality rate	(per 1,000)	96	75	54	32
Life expectancy	(Years)	55	60	62	73

Source: WDI2005, 1) FAO2005 2) WFS target

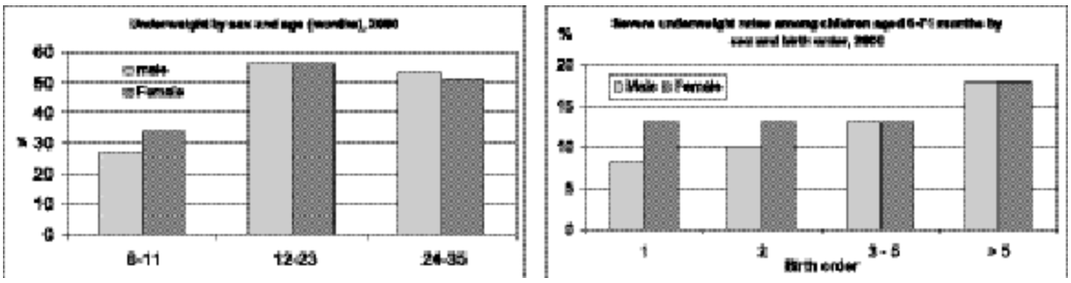
* Period, 1992, 1995-96 and 2000

Gender differences in malnutrition are most pronounced at young ages. Girls between 6-11 months are significantly more likely than similarly-aged boys to be underweight (Figure 1), but between the ages one and three years, there is virtually no gender difference in underweight rates. The apparent lack of gender disparity in malnutrition at older ages may be explained by the higher rate of mortality of female relative to male children between 1-5 years.[38] The surviving cohort of female children aged 12-35 months is likely to show lower levels of malnutrition than similarly aged boys, since the most severely underweight girls in this age group are the ones most likely to die (and drop out of the sample).

[38] Mortality rates are higher for male than for female infants in Bangladesh, but the mortality gap reverses after age 1.

There is another dimension in which a child's gender matters to child malnutrition, and that is its interactive association with birth order. As seen in Figure 1, first-born females are significantly more likely to be severely underweight relative to first-born males, reflecting the strong cultural preference in Bangladesh for having a first-born son (World Bank 2005).

Figure 1: Underweight by sex and age (months) and birth order, 2000



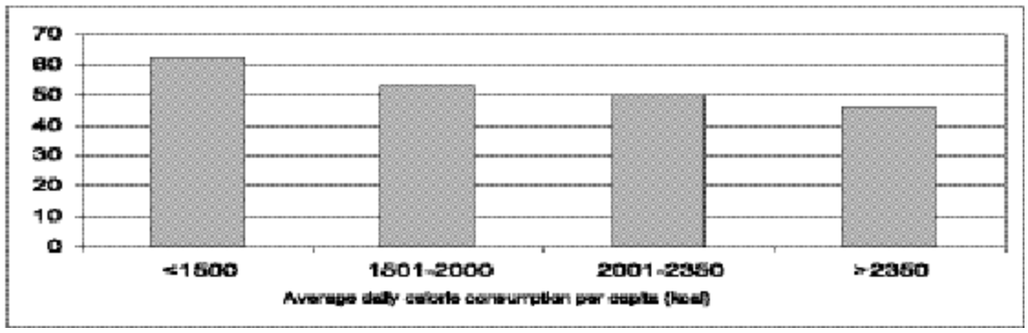
Source: World Bank 2005

The gender disparity in underweight rates progressively diminishes with birth order, and, among children of birth order six or greater, there is no gender difference in rates of severe malnutrition (as, both sexes suffer of high rates of severe malnutrition).

Adult and child malnutrition are closely connected. To address child malnutrition, it is essential to improve the nutritional status of adolescent girls and mothers. Lack of access to adequate amounts and variety of food places pregnant women at greater risk of complications during pregnancy and delivery. Many infant and young-child deaths in developing countries are attributable to the poor nutritional status of their mothers. In addition, malnourished mothers are much more likely to have babies with low birth weight and children who remain malnourished throughout their lives.

Figure 2 demonstrates the link between adult and child food security in a different way; as household calorie consumption per capita falls, child malnutrition rates increase. This inverse association of calorie intake and malnutrition is much stronger for severe than for non severe (moderate and mild) malnutrition rates. For instance, children aged 6-71 months in households with an average daily calorie intake per person of less than 1,500 kcal. are 41% more likely to be stunted and 69% more likely to be severely stunted than children in households with an average daily calorie intake of more than 2,350 kcal (World Bank 2005).

Figure 2: Underweight (%) among Children, 6-11 months by average daily calorie consumption per capita of household, 2000



Source: Word Bank 2005

Rural child malnutrition is above urban levels. More than 50 percent of the rural children are stunted or underweight and around 12 percent wasted, compared to respectively 38, 42 and 11 per cent in urban areas. Malnutrition has a strong regional concentration: three of the fourteen regions (Chittagong, Dhaka and Rajshahi) account for 50 per cent of all underweight children in the country and six regions account for three-quarters of all underweight children (Hossain 2004).

2.1 The cost of hunger

Considerable evidence suggests that malnutrition affects human performance, health and survival, including physical growth, morbidity, mortality, cognitive development, reproduction, physical work capacity and the probability of suffering several adult-onset chronic diseases. Perhaps the most obvious costs are those related to dealing directly with the damage it causes. These include the medical costs of treating both the problem pregnancies and deliveries of anemic, underweight mothers and the severe and frequent illnesses of children whose lives are threatened by malaria, pneumonia, diarrhea or measles because their bodies and immune systems have been weakened by hunger. A very rough estimate, apportioning medical expenditures in developing countries based on the proportion of disability-adjusted life years (DALYs) attributed to child and maternal undernutrition, suggests that these direct costs add up to around US$30 billion per year – over five times the amount committed so far to the Global Fund to Fight AIDS, Tuberculosis and Malaria.

However, more significant are the indirect costs of reduced productivity and forgone income caused by premature death, disability, absenteeism and lower educational and occupational opportunities. Provisional estimates suggest that these indirect costs range into the hundreds of billions of dollars at the global level.

The value of people's lifetime income stream is affected by their nutritional status because nutrition:

- Affects their lifespan – for example, the latest WHO estimate shows that about 3.7 million child deaths are attributable to those children being underweight;
- Is likely to affect the number of healthy years they can expect to live (because malnutrition affects the state of health);
- Affects their ability to perform manual labor and also school attendance;
- May affect their cognitive ability (e.g. because of severe iodine or iron deficiency), hence their ability to benefit from education;
- May reduce their willingness to undertake risky but potentially profitable investments because the consequences of failure could be catastrophic to a person who is already malnourished.

Estimates of the indirect costs of hunger are generally based on studies that have measured the impact of specific forms of malnutrition on physical and mental development and have established correlations with reduced productivity and earnings. Some conclusions of these studies suggest that:

- Low birth weight (LBW), stunting and micronutrient deficiencies are associated with reduced school attendance – and every year of missed schooling during childhood cuts deeply into lifetime earnings;

- Reduced cognitive ability, measurable in lower scores on IQ tests, leads to reduced productivity and earnings;
- Iodine deficiency, which affects an estimated 13 percent of the world's population, has been associated with losses of 10 to 15 points on IQ tests and 10 percent in productivity;
- Switching one LBW infant to non-LBW status could yield almost US$1,000 in benefits over a lifetime. With about 20 million LBW children born every year in developing countries, the costs of doing nothing for one more year add up to around US$20 billion.

The estimates of the cost of hunger are subject to wide margins of error. However, even partial and provisional estimates make it clear that the costs of hunger are extremely high. Take the low end of the estimated range of lost productivity and earnings for each individual form of malnutrition; then, adjust for the likelihood that there may be considerable overlap among them. Even with these conservative assumptions, the present discounted value of the combined costs of protein-energy malnutrition (PEM), LBW and micronutrient deficiencies would add up to at least 5 to 10 percent of GDP in the developing world – roughly US$500 billion to US$1 trillion[39].

In their attempt to estimate the cost of hunger, the Academy for Educational Development (AED) has developed a methodology and software for quantifying both the costs of various forms of malnutrition and the benefits of action to reduce or eliminate it.

FAO calculations based on data provided by AED show that the discounted present value of income losses at current levels of iron deficiency anemia in Bangladesh is 8 per cent of GDP, compared to 6% in India and more than 5% in Pakistan.

These figures represent the discounted present values of costs imposed over a life time by a specific form of malnutrition. Thus, in the case of Bangladesh for instance, it does not mean that anemia slashes output by 8 per cent every year. Rather it means that for every year that the prevalence of anemia remains unchanged, the present value of costs spread over the lifetimes of the current generation of five-year-olds amounts to 8 per cent of one year's GDP, or roughly US$ 4.4 billion[40].

3. Agriculture and the Rural Space in Bangladesh

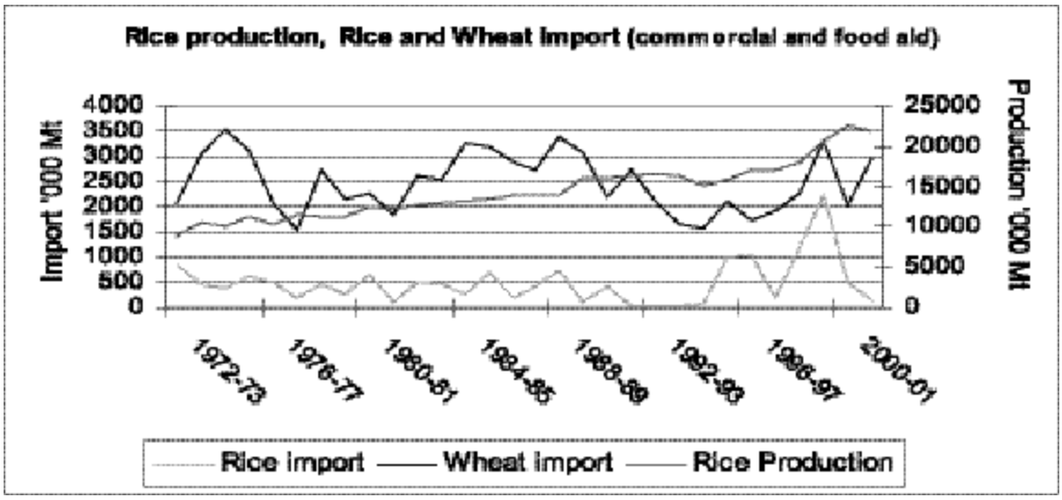
Three-fourths of the Bangladeshi population live in rural areas. Although the share of agriculture in GDP has fallen from close to 50 percent in the 1970s to just over 20 percent (WDI 2005), the sector is the principal source of income and livelihood of the population, employing approximately 66 percent of the total labor force.

The country has managed to sustain a respectable growth in rice production over the last three decades. The growth in rice production kept pace with population growth in the 1980s, and surpassed population growth by a significant margin in the late 1990s.

[39] None of these estimates present anything like a full accounting of the costs of hunger. Among other limitations, the calculations: take account only of market activities, ignoring the value of work performed inside the home; fail to take account of the fact that wages are likely to grow over time; generally do not include the transmission of malnutrition from one generation to the next, as undernourished mothers give birth to LBW babies; depend on somewhat arbitrary discount rates to calculate the present value of costs spread over a lifetime. The choice of rates is difficult to determine and can make a big difference in the estimated benefits.

[40] Calculated from 2004 GDP valued at constant 2000 US$

Figure 3: Trends in Rice Production, Availability, and imports (commercial + food aid)



Source: Hossain, M., Naher, F., Shahabuddin, Q. 2004.

This growth occurred despite the declining availability of arable land and the predomination of small farmers and non-land owning agricultural laborers.

Marginal and small farms dominate the agrarian structure of Bangladesh. The average size farm holding declined from 1.70 ha in 1960 to 0.61 ha in 1987 and further to 0.53 ha in 2000. As can been seen in table 2, almost half of the rural households are functionally landless (owning up to 0.2 ha of land), while this group has increased between 1987 and 2000. In addition, the share of household that own more than 1 ha of land has been falling, but their shares of land have had a small increase during the same period.

The proportion of households owning more than 2.0 ha declined from 8.3 to 5.2 percent, which is a decrease of 37%, and their share of land has decreased 12 percent, from 41.7 to 36.6 percent.

Table 2: Changes in the distribution of ownership, 1987 and 2000

Landownership (ha)	% of households			% share of land		
	1987	2000	% change 1987-2000	1987	2000	% change 1987-2000
up to 0.20	46.5	49.9	7%	3.9	4.7	21%
0.21 to 0.40	11.9	15.0	26%	5.6	8.2	46%
0.41 to 1.00	21.9	19.5	-11%	22.8	23.4	3%
1.01 to2.00	11.4	10.4	-9%	26.0	27.1	4%
2.01 and above	8.3	5.2	-37%	41.7	36.6	-12%
Total	**100**	**100**		**100**	**100**	
Average size of land ownership (ha)				0.61	0.53	-13%

Source: Hossain et al. 2003

Poverty in Bangladesh is mostly a rural phenomenon. As Table 3 shows, the incidence of poverty is higher in rural areas. Given that agriculture is the main activity in rural areas, it should not come as a surprise that poverty is more frequent among farm households, especially small farms. By occupation, poverty is highest among households headed by agricultural laborers and small farmers (households that own less than 1 acre) 77 and 57% respectively. These figures compare, for example, to a poverty rate of 36% among salaried employees, as can been seen in Figure 4.

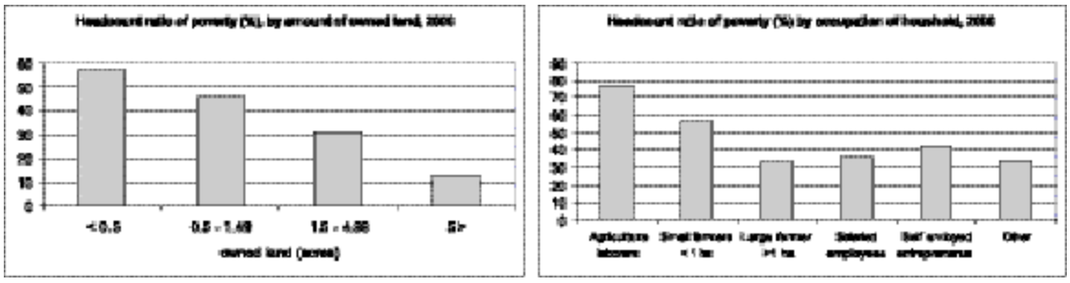
Table 3: Evolution of Poverty

Year	Total		Urban		Rural		% of Poor that are rural
	% Poor	Persons (Millions)	% Poor	Persons (Millions)	% Poor	Persons (Millions)	
1983-84	63	58.4	68	7.3	62	51.1	88
1991-92	59	65.5	45	10.2	61	55.3	83
1995-96	51	59.4	29	7.7	55	51.7	84
2000	50	68.0	37	11.8	53	56.2	81
2015 **(MDG Target)**	**30**	**54.4**					

Sources: World Bank 2005, Ecosecurities 2002.

Poverty is also correlated with agricultural land holdings (Figure 4). Households with less than ½ an acre of land have a poverty rate of 57%, households that own between ½ an acre and 1.5 acre have a poverty ratio of 46%; and poverty reduces to 31% for households that own between 1.5 and 5 acres, and 13% for those that own more than 5 acres.

Figure 4: Headcount poverty (%) according to occupation and owned land



Source: World Bank 2005

The average rural household income increased from US$889 in 1987 to US$1151 in 2000 (Hossain et al. 2003), indicating a rate of growth of 2.1 percent per year. Per capita income has increased faster, at 2.7 percent, because of the reduction in household size. Over the period, the share of non-agriculture income grew from 39 percent in 1987 to 51 percent in 2000 (Hossain et al. 2003), partly driven by increasing income from trade activities as well as remittances, whilst the importance of agricultural income fell comparably.

Chuta and Liedholm 1979, Shand 1986, Ranis and Stewart 1993, Rosegrant and Hazell 2000, Reardon et al. 2001 conclude that the income from rural non-farm activities has been increasing at a faster rate than that from agriculture since the early 1980s. This support the general observation that the rural non-farm economy accounts for an increasing proportion of rural employment and incomes with the development of the overall economy.

4. The Role of agricultural and rural development in addressing food security

This section discusses the potential role of agriculture in addressing the access dimension of food security and of achieving (*faster*) poverty reduction. As in most other countries, economic growth has been accompanied by a reduction in the relative size of agriculture. This is one of the most well accepted and established stylized facts of development. Figure 5 shows that the share of agriculture in total GDP has behaved as a mirror image of real per capita GDP; as real per capita income has grown the share of agriculture has been consistently declining from nearly 50% in the mid 1970's to less than 25% towards the end of the century.

Figure 5: The Evolution of GDP and the Share of Agriculture in GDP

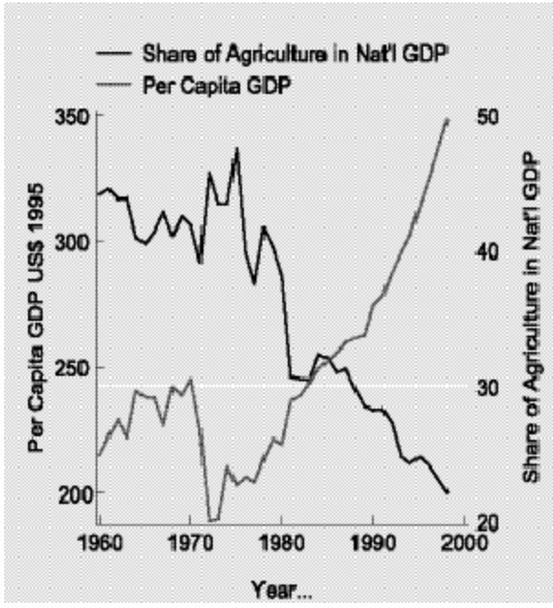


Table 5: Rural Agricultural Income

Year	% of Total Rural Income Derived From Agriculture
1963	82[1]
1973	78[1]
1976	82[1]
1982	92[1]
1988	64[2]
2000	48[2]

[1] Source: SOFA 1998.
[2] Source: Hossain, 2002.
Note: the two data sources may not be compatible

As shown in table 5, although agriculture is still a principal source of rural income, there has been a major shift toward increasing non-farm income. Another sign of this structural change can be seen in Figure 5. Between 1960 and 1980, the share of agriculture in national GDP jumped between 40 and 45% due to good and bad crop years. From 1980 onwards, the share of agriculture in national GDP has rapidly and steadily decreased, accompanied by real income growth. Rashid 2002, provides an additional sign of this change. Using time series on agricultural wages and the price of rice, he shows that the elasticity of agricultural wages to the price of rice is significant and relatively high as expected, around 0.7. However, from the perspective of these time series

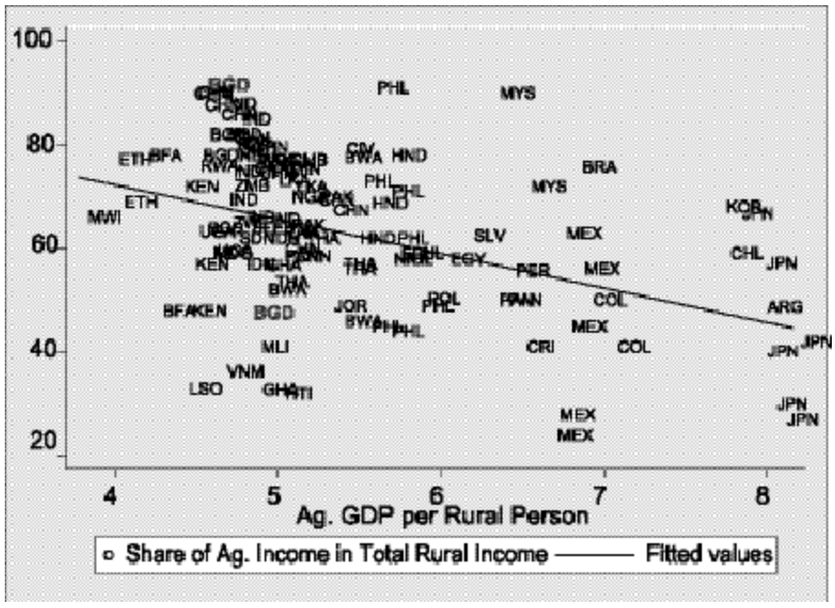
there is a change around 1980, after which the price of rice is not statistically significant in explaining agricultural wages. Finally, Table 5 shows that with ups and downs due to different methodologies (figures are obtained from different studies) and good and bad crop years, agriculture was the source of 80 to 90% of rural income until 1982; the share of non-farm income has been rapidly and steadily increasing after that.

Hossain 2002 suggests that the fall in the share of agriculture in total rural income during the 1990's is explained by a fast growth of non-agricultural income by 6.8% per annum during the period 1988-2000 compared to a rate of growth of rural agricultural income of only 1.4%. However, agriculture grew at a healthy 3.5% per year during the 90's which is one of the main drivers of the successful growth rate of non-farm income during the same period.

4.1 Comparing the Linkages of Agriculture in Bangladesh

Using the FAO expanded database on farm and non farm rural income shares, which contains the share of rural non farm income for more than 120 country-year combinations from developing countries representing the whole world, the position of Bangladesh on rural income indicators can be compared. Figure 6 shows that like in the case of national income, the share of agricultural income in the rural economy tends to decrease with rural development. Bangladesh (highlighted as BGD) earlier had a share of agricultural income well above what was predicted for its income level. However, the latest figure of 48% is now significantly below the roughly 60% that would be predicted for its level of development.

Figure 6: Rural Agricultural Income and Development



Economists usually refer to the economic connections between sectors as "linkages", and differentiate between "forward" and "backward" linkages. "Forward linkages" of sector A refers to the connections that sector A has with other sectors by serving as an input to those other sectors. The backward linkages of sector A refers to the connections of sector A as a purchaser of inputs

(or services) from other sectors. In the case of agriculture, the forward linkages are mainly in the agricultural and food processing industries (i.e. rice mills), and in the service industry with the restaurant and hotel industries.

Similarly, the main backward linkages are with the agricultural processing industries that produce animal feed; with the chemical and mineral industry for purchased fertilizers; with the transportation and commercialization (trade) service industry; and depending on the degree of sophistication of the agricultural sector with the financial and business services sector and the industry of machinery manufacture, such as irrigation equipment.

As the agricultural sector becomes more developed, its backward linkages increase, by requiring more financial services, machinery and other purchased inputs. Also, the forward linkages are more important in a more developed economy, where there is an existing and more developed food industry, and equivalently a hotel and restaurant industry.

The place where the linkages between sectors are recorded in an economy is the input-output (I-O) matrix, which countries usually develop as a key component of a sound national accounts system. The input matrix shows how the part of total output of each sector that is used as an input is distributed among sectors. Hence, the I-O matrix provides sufficient information to determine the size and extent of the forward and backward linkages of the agricultural sector[41].

Using I-O matrices for other developing countries, the forward and backward linkages can be internationally compared. To make results comparable, we measure the value of forward and backward linkages as percentage of GDP[42]. The results are interesting. Backward linkages, contradicting "common wisdom" are much higher at *earlier* stages of development and not later (see Figure 7)[43]. On the other hand, forward linkages seem to be larger at medium income levels for our sample, and the fitted line in Figure 7, is not significant. This latter result is consistent with countervailing effects in the value of forward linkages as countries develop. On one hand both forward and backward linkages fall because the relative size of agriculture in total output is shrinking and so does the value of the linkages. However, as the country develops, industry usually develops and this includes the industries linked to agriculture, namely the food processing industry, which usually becomes more sophisticated generating more value added.

Figure 7 reveals that Bangladesh has particularly high backward linkages for its development stage, only surpassed by Zimbabwe. Development economists usually focus on backward linkages, because in a sense it reflects the ability of one sector to "pull" other sectors of the economy with its growth. The forward linkages of the Bangladeshi agricultural sector are also high for its development stage, but not as high as the backward linkages. Altogether the high linkages of the agricultural sector reveal a potential for the sector to "pull" and "push" the rest of the economy with its development.

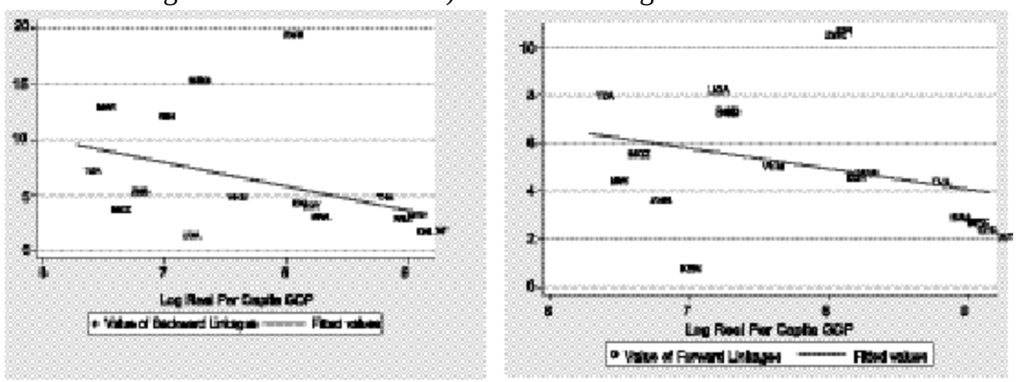
41 Please see the Appendix for details on how we computed the value of forward and backward linkaeges.

42 The main source for I-O matrices was IFPRI's database of Social Accounting Matrices (SAMs), publicly available at http://www.ifpri.org/data/dataset.htm. We commend this effort. The Input Output Matrix is one of the accounts in the SAM structure.

43 The negative slope of the OLS fitted line is statistically significant.

Figure 7: Value of the Linkages of Agriculture

a) Backward Linkages b) Forward Linkages



4.2 Multiplier Analysis[44]

When one sector of the economy expands, it needs inputs from other sectors of the economy, forcing them to expand; although at a lesser rate, those other sectors also need inputs from yet some other sectors, which will force a yet smaller increase in those latter sectors. This process has a limit, which is called the multiplier of a sector, and can be obtained by inverting a transformation of the I-O matrix[45]. The expansion in any sector also increases the returns to the factors of production in the sector, which is the increase in the value added of a sector. The way in which the value added of each sector is distributed among factors of production (like different types of labor capital and land) and taxes is recorded in the Social Accounting Matrix (SAM). Furthermore, the SAM also records how the gains from labor are distributed between different types of households.

For the present analysis we focus on the households that have the higher incidence of poverty. Table 6 present the high poverty incidence households using the subdivision present in the 1994 Bangladesh SAM. These households represent 70% of the Bangladeshi households, all of them with poverty incidence above the national level. In the case of the Non-Agricultural Poor households, all are poor (100% incidence).

We simulate an exogenous increase in final output of 1% in each of the 42 sectors of the I-O matrix and examine its effect on household income. Since the assumed expansion is 1%, the expansion in the respective household income can be interpreted as an income elasticity for each sector. Table 7 presents the sectors with the highest income elasticity, and the estimated elasticity, for each of the household types with high poverty incidence.

[44] Both the linkages and multiplier analysis are based on the 1994 Bangladeshi I-O matrix. The use of later I-O matrix may change the results somewhat. We must stress two main caveats of this analysis. The I-O matrix is a picture of the economy at a particular point in time , the nature of the interactions between sectors varies constantly as relative prices in the economy change, and different sectors expand and contract at different rates. The multiplier analysis relies on the fixed relative prices implicit in the matrix. If sectors expand, relative prices are likely to change and therefore the rates of changes are only valid on the margin around the equilibrium reflected in the matrix.

[45] See for example, Sadoulet and de Janvry, 1995 for details.

Table 6: Households with High Poverty Incidence and Their Prevalence

Household	Definition	Share % of total households
Agricultural landless	Rural agricultural households who own no land	1.5
Agricultural marginal	Rural agricultural households who own up to 0.49 acres	17.3
Agricultural small	Rural agricultural households who own between 0.5 and 2.49 acres	17.4
Non-agricultural poor	Rural households that are engaged in agricultural activities, and who own less than 0.5 acres of land	16.4
Urban illiterate	Urban households whose head have no schooling	10.6
Urban low educated	Urban households whose head's education is 'I-V class' (Labor Force Survey definition)	7.2

Source: Fontana and Wobst, 2001.

The results in the table are surprising, as it is usually not expected for an agricultural sector to have such a high multiplier effect. The rice paddy sector is the 3rd sector with the highest multiplier effect, and in the case of small farmers, the sector with the highest income elasticity. These results confirm the high linkages of the agricultural sector already described, but more precisely identify the sub-sectors that are driving these results, namely the rice sector, and to a lesser extent the livestock sector, and not other traditional sectors like jute. The fact that two service sectors (trade and transportation) appear with the highest elasticities is not unexpected, but the rice sector has an elasticity which is roughly 2/3 of the trade sector. Interestingly, the rice sector also has a high elasticity even for urban households. This result indicates that the rice sector is so interconnected with the rest of the economy that an expansion in its output would even benefit poor urban families. These results are consistent with the high income effects for the rice sector found by Arndt et al. 2002.[46]

Table 7: Household Income Sector Elasticities

Landless	Trade Services	0.220	Marginal Land Holdings	Trade Services	0.225
	Transportation Services	0.160		Transportation Services	0.154
	Rice	0.139		Rice	0.135
	Other Services	0.077		Other Services	0.080
	Livestock	0.048		Livestock	0.047
Small Farmers	Rice	0.154	Non-Agricultural Rural Poor	Trade Services	0.245
	Trade Services	0.148		Transportation Services	0.138
	Transportation Services	0.082		Rice	0.120
	Other Crops	0.077		Other Services	0.081
	Fishing	0.055		Livestock	0.042
Urban Illiterate	Trade Services	0.220	Urban Low Education	Trade Services	0.278
	Transportation Services	0.159		Transportation Services	0.134
	Rice	0.137		Rice	0.112
	Other Services	0.076		Other Services	0.083
	Livestock	0.047		Rural Building	0.042

Source: Authors' Calculations Using 1994 SAM.

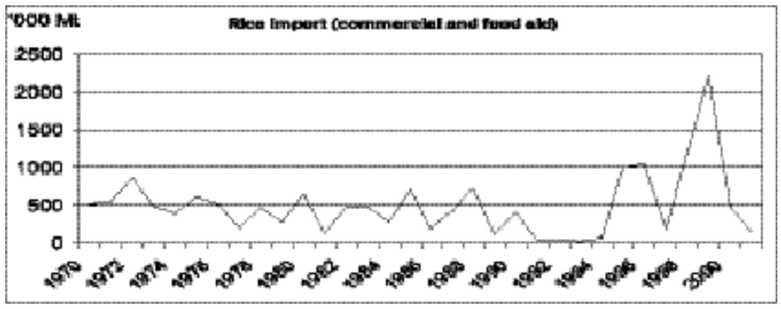
[46] These authors use the same I-O coefficients, in a Computed General Equilibrium model, so the general consistency is expected.

In the long run, households tied to agriculture will move to sectors with a higher long-term productivity growth like the services industry. However, in the short and medium run, where most poor households are tied to agricultural activities, and given the high income elasticity of households with respect to specific agricultural sectors and in particular rice, the fate of agriculture will to a large extent determine if the poverty Millennium Development Goals will be met in 2015[47].

4.3 Prospects for increasing rice supply

From the perspective of markets, the rice industry may have space to grow. Bangladesh has historically been a net importer of rice.

Figure 8: Rice Import



Source: FAOSTAT 2005

Given the high income elasticity of the rice sector, expansions in output will be accompanied by expansions in demand. With population growing at 1,5 per cent per annum, rice supplies need to grow at least at this rate to keep up with the growth in local demand.

Furthermore, the international rice demand has proven to have a high income elasticity as shown by the fall in demand with the "Asian Crisis" at the end of the last century[48], and its recovery during the early years of the current century. So as other Asians countries develop, the international rice market is likely to grow at a higher rate than population growth. However, competitiveness of Bangladesh rice production vis-à-vis neighboring producers may limit the potential for rice exports, at least in the short run, even if Bangladesh since the trade reforms of early 1990's has had domestic prices at or slightly below the international price (Hossain et al. 2004)[49].

Conclusions and implications

Collaborative work of FAO, WFP and IFAD suggest that to address chronic hunger in a sustainable manner, a twin-track approach is needed. Long term availability and access to nutritious food is promoted through sustainable agricultural and rural development which creates employment and income opportunities for the rural poor. Agricultural growth can also reduce the price of food in local markets thus increasing the real income of poor households.

[47] In the above analysis we have only included production linkages. Some authors (Haggblade and Hazell, 1989) argue that consumption linkages of the farm sector are even more important (in ratio of 80 to 20 for poor countries like India). The logic behind this result is that when the income of poor farmers grows, most of this expansion is spent, with a high multiplicative effect for the rest of the economy. This effect is higher for poor farmers than wealthier individuals that have a higher marginal propensity to save.

[48] See Gulati and Narayan 2002.

[49] Shahabuddin and Dorosh 2002, show that rice is not the most profitable crop, but argue that in the context of food insecurity and crop insecurity the country should aim for a low annual export surplus.

On the other hand, and until the benefits of such longer term interventions materialize, targeted interventions and programs to enhance immediate and direct access to food and nutrition by the most needy are necessary (FAO, 2003).

Investing in improved food security has a high return. AED's estimates at the country level demonstrate that the costs of action to reduce or eliminate malnutrition are much lower. For the 25 countries for which AED data were made available, the benefits of interventions to reduce PEM outweighed the costs by a factor of 7.7 to 1, on average. For actions to reduce iron and iodine deficiencies, the benefits averaged 9.8 and 22.7 times the costs respectively.

This paper shows that agricultural development, perhaps more so in Bangladesh than in many other places, is an essential part of reducing (mainly rural) poverty and improving food security. The most direct role of the agricultural sector relates to ensuring the availability of food and to maintaining low prices in local markets. However, the development of the agricultural sector with its high multiplier effects, results in increased agricultural income which is, in turn, an important driver of rural growth and thus key to improved access to food in rural areas.

Finally, whilst the paper shows that the rice sector is effective in creating growth, the agricultural sector plays a key role in addressing the need of ensuring a more balance diet in Bangladesh. This role entails improving the incentives for producing non staple food, including vegetables, fruit, pulses, oils and animal food, but also in increasing the nutrient density of rice (Roos et al, 2004).

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Appendix: Assigning Value to Forward and Backward Linkages

The valuation of the forward and backward linkages requires the value of the intermediate transactions between sectors and the value added of each sector. To value the forward linkages we propose:

$$FLV = \sum_{j=1} \frac{X_{1,j}}{\sum_i X_{i,j}} \cdot VA_j \qquad (1),$$

where denotes intermediate demand of inputs of sector *i* by sector *j*; sector 1 obviously represents agriculture; and denotes value added by sector *j*[50]. Equation (1) indicates that we value as forward linkage only a portion of the value added of sector *j*. That portion is equivalent to the ratio of agro-livestock inputs, sector 1, to the total inputs used in sector *j*. Furthermore, to value the backward linkages we propose:

$$BLV = \sum_{i=1} \frac{X_{i,1}}{\sum_j X_{i,j}} \cdot VA_i \qquad (2),$$

The portion of value added of sector *i* that is considered as a backward linkage is the share of intermediate demand from the agro-livestock sector to total intermediate demand of sector *i*.

[50] Note that inputs are not measured as physical quantities in the matrix, but rather by their monetary value.

Action Plan for Availability of Food

Objective	Key targets	Time frame	Activities	Responsibility
Assuring required food supply	- Increase farm productivity - Assure input availability - Introduce new technology - Continue agricultural trade liberalization	Short term, Medium term, Long term	Agri. Policy & programme, Subsidies in input, Review of livestock & fisheries, Distribution from public stock	MOA, MF, LG Division, MoCoM, MOFDM, Other GO & NGO
	Crop and Food Diversification Sustainable Agricultural intensification/Diversification through introduction of new technologies	Short term, Medium term	- Awareness among producer/incentive - Develop marketing facilities - Extension services - Processing & store facilities development	MOA, MOFL, LG Division, GO & NGO
	Coordination Strengthening coordination among different institutions and organizations	Short term	- Expansion of FPMC - Formation of different appropriate committee at different level	MOA, MOFDM, MOLAW, MOLAND, MOIND, Other allied
	Marketing, Monitoring & Evaluation - Price Support to farmers - Market development - Develop infrastructure - Development of Transport network - Development of Information Technology	Short term, Medium term	Initiate major sector review of agriculture including marketing and extension. Connect all market place with modern IT communication	MOA, MOFDM LG Division, MoCom

Action Plan for Access of Food

Objective	Key targets	Time frame	Activities	Responsibility
Increased physical, social and purchasing power of the poor	**Shock management** a. Strengthened measures for effective shock management b. Effective management & maintenance of food security stock c. Augmented food supply and price stabilization involving private sector	**Short to medium term**	a. Initiate special programme for disaster mitigation for agriculture b. Undertake emergency distribution from public stock c. Encourage private sector initiatives to augment domestic food supplies	MOFDM, MOA, MO Finance MOFDM, MO Finance MOFDM, MO Finance, MOC
	Effective implementation of targeted intervention programme a. Targeted food distribution b. Targeted cash transfer	**Short to medium term**	a, Targeted transfer to the most needy b. Conditional income transfer to the poor	MOFDM, MO Finance, MOWCA MOFDM, MOSW, MOLGRDC, Mo Finance
	Employment generating income growth a. Public investment in transport and communication b. Education, marketable skill & human resource development c. Support to women in income generating activities d. Promote rural and agro-based industries and enterprises e. Broad-based economic growth	**Short, medium and long term**	a. Investment in productivity enhancing appropriate technology with linkages b. Undertake extensive public education and marketable skill development programme c. Initiate more gender responsive programmes to promote women development d. Undertake productivity enhancing programmes for rural and agro-based enterprises e. Maintain macro-policy environment to ensure enhanced income for the poor	MOC, MOA, MOI, MOSICT, MOLGRDC MOWCA, MOSICT MOWCA, MOI MOLGRDC, MOI, MOA, MOFLS MO Finance, MO Commerce

Action Plan for Utilization and Nutrition

Objective	Key targets	Time frame	Activities	Responsibility
Enabling framework for Utilization and Nutrition	Implement National Food and Nutrition Policy, 1997 and associated Plan of Action. Implement recommendations of the Report of the Task force on Comprehensive Food Policy for Bangladesh, 2000	short, medium & long term	† Appropriate budgetary allocation for specific programmes † Draft National Food Policy is to be finalized † NPAN is to be updated † Formulate National Food Safety Council † Formulate a separate policy for food safety and hygiene † Set-up Unified Food Safety Administration † Establish a separate cadre of professional for nutrition within an organizational structure	M o F D M , MoHFW, BSTI, MOLGRD
Improvement in consumption of balanced diet	i)Determination of standard for balanced food intake ii)Planning for Improvement in consumption of balanced diet iii)Surveys and studies at five years intervals	short, medium & long term	† Set desirable targets for gradual achievement for ensuring consumption of balanced diet towards developing a nation with appropriate physical and mental ability † Determination of average per capita calorie requirement with respect to age, sex, statute, and occupational aspect of the population † Determine per capita cercal demand with respect to requirement and socio-economic aspects into consideration † Prepare and update dependable food balance sheet - Mobilize financial resources, hire experts (a pool of availability expert, consumption economist, nutritionist, macro & micro policy analyst/economist) and conduct studies	A. PC, BBS, FPMU (MoFDM), MoHFW, INFS, NNC, BIDS, MOA, Different CSO engaged in research B.Task Force

Objective	**Key targets**	**Time frame**	**Activities**	**Responsibility**
Adequate macro and micro nutrients and enhanced nutrition for vulnerable group	Improvement in nutritional indicators of women, disabled, children, and the poor	Regular interval In every five years Short, medium and long term	Identify and locate the vulnerable group using VAM, FIVIMS and other tools KAP survey - Increase empowerment - Knowledge - GO-NGO coordinating mechanism in implementing programmes - Social safety nets- Enhance effective targeted food distribution - Home gardening - Institutional feeding (pre-schoolers through community & school feeding) programme † Measured supplementation & micro-nutrient fortification	PC, BBS, FPMU. MoHFW, INFS, ICDDRB & other research org. MoFDM, MoHFW, MOSW, MOWCA, MOFinance, MOLGRD, MOInf., MOEdu
Ensure balanced diet for all; no under or over nutrition	Reduced prevalence in anthropometrics and other indicators of malnutrition (attain MDG and PRSP targets)	Short, Medium and Long term	† Nutrition education programme-school syllabus, mass media campaign † Crop diversification † Diet diversification † Effective food supplementation and fortification	MoHFW, MOA, MoFDM, MOEdu., MOLGRD, NNC, MOWCA, MOInf., MOLGRD, NGOs
Universal sanitation and safe drinking water for all	Reduced prevalence of water and food borne diseases Improvement in water quality-reduction in arsenic level in drinking water	Short, Medium and Long term	† Health education including proper care and sanitary practices † Infrastructure development - Public investment in water supply (community tube-well and water cleansing) and sanitation facilities † Maintenance of existing public facilities	MOLGRD, MOHFW, MOA, MOEdu., MOInf., NGOs

Objective	**Key targets**	**Time frame**	**Activities**	**Responsibility**
Safe and quality food supply	Reduced prevalence of water and food borne diseases Reduction in double burden of diseases Reduction in double burden of malnutrition Reduction in health care cost	Short, Medium and Long term	† Invest in safe storage, safe market places & safe handling facilities † Harmonization of standards of food products † Develop and enforce grades, standards and quality † Develop and enforce proper labelling and packaging rules/standards † Adopt GAP, GHP, HACCP † Food safety database † Food safety research † Establish effective food borne disease surveillance system † Awareness build-up programmes † Co-ordinating mechanism to control indiscriminate use of harmful additives, preservatives, emulsifiers or toxic elements in food production, processing and marketing chain † Study of economic impact of (intringent) standards	MOFDM, MOA, MOHFW, MOLGRD, MOI (BSTI), MOEdu., MOFinance, MOHA, MOLJPA
Adequate health status	Implement HNPSP Increased doctors, hospital beds, and other facilities for health services Increased private health care services	Short, Medium and Long term	† Programme of immunization (EPI) † Control of ARI † Prevention and control of dirreahoeal and other intestinal diseases † Nutrition programme involving community mobilization † Community based nutrition services-children, reproductive aged women † Control non-communicable diseases (NCD)	MOHFW, MOEdu., MOLGRD, NNC, MOInf., MOFDM, Private ent., NGOs

Objective	Key targets	Time frame	Activities	Responsibility
Promote healthy life style	Increased KAP	Short, Medium and Long term	† Invest in nutrition and mass awareness programme † Invest in upholding social capital † Initiate networking of nutrition research capacity † Establish a national Institute of Food, Nutrition and Human Health for research and training in nutrition, food safety and hygiene	MOHFW, MOSW, MOFDM, MOEdu., MOLGRD, NNC, MOInf., MOLGRD, MOYS, NGOs