Seventh Five Year Plan Preparation

Background Paper on Food Security and Nutrition

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Acronyms

ARI	Acute Respiratory Infection
BARC	Bangladesh Agricultural Research Council
BBS	Bangladesh Bureau of Statistics
BCCRF	Bangladesh Climate Change Resilience Fund
BDHS	Bangladesh Demographic and Health Survey
BCCSAP	Bangladesh Climate Change Strategy and Adaptation Plan
BIDS	Bangladesh Institute of Development Studies
BMI	Body Mass Index
BRRI	Bangladesh Rice Research Institute
BSTI	Bangladesh Standard Testing Institute
BSTD	Bangladesh Standard Testing Department
BINA	Bangladesh Institute of Nuclear Agriculture
BWDB	Bangladesh Water Development Board
CBN	Cost of Basic Needs
CCA	Climatic Change Adaptation
CDMP	Comprehensive Disaster Management project
CHT	Chittagong Hill Tracts
CIP	Country Investment Plan
CLP	Char Livelihoods Programme
CSI	Coping Strategy Index
DAE	Department of Agricultural Extension
DLS	Department of Livestock Services
DoF	Department of Fisheries
DRM	Disaster Risk Management
ECRRP	Emergency Cyclone Recovery and Reconstruction Project
FAO	Food and Agriculture Organization
FAOSTAT	Food and Agriculture Organization Statistics
FPC	Fair Price Card
FPMU	Food Policy Monitoring Unit
FPWG	Food Policy Working Group
FSNSP	Food Security Nutritional Surveillance Programme
FYP	Five Year Plan
GED	General Economics Division
GDP	Gross Domestic Product
GHI	Global Hunger Index
GR	Gratuitous Relief
HACCP	Hazard Analysis at Critical Control Point
HIES	Household Income Expenditure Survey
HPNSDP	Health Population and Nutrition Sector Development Programme

IPCC	Intergovernmental Panel on Climate Change
IYCF	Infant and Young Child Feeding
Kcal	Kilo calorie
LCG	Local Consultative Group
MoFD	MMinistry of Food and Disaster Management
MT	Metric Tonne
MDG	Millennium Development Goals
MFSFP	Modern Food Storage Facilities Project
NAPA	National Adaptation Programme of Action
NCD	Non-communicable Diseases
NFP	National Food Policy
NGO	Non-government Organization
NPNL	Non Pregnant Non Lactating
NNS	National Nutritional Services
NSPS	National Social Protection Strategy
OFSP	Orange Flashed Sweet Potato
OMS	Open Market Sale
PFDS	Public Food Distribution System
PG	Poverty Gap
PGR	Plant Growth Regulator
PMTI	Provisional Maximum Tolerable Intake
RMG	Readymade Garments
RNI	Recommended Nutrient Intake
SFYP	Sixth Five Year Plan
SOFA	State of Food and Agriculture
SPS	Sanitary and Phytosanitary Standards
SSNP	Social Safety Nets Programme
TK	Taka
TRM	Tidal River Management
USAID	United States Agency for International Development
VAD	Vitamin A deficiency
VGF	Vulnerable Group Feeding
VGD	Vulnerable Group Development
WHO	World Health Organization

Seventh Five Year Plan Preparation

Background Paper on Food Security and Nutrition

1.Introduction

The National Food Policy (NFP) 2006 of Bangladesh provides strategic guidance for achieving food and nutrition security in the country. The goal of the NFP is to ensure dependable food security for all people of the country at all times. Three indicators have been used to monitor progress towards the goal: prevalence of undernourishment, child underweight and child stunting. These indicators are complemented by another four food security indicators included in the Results Framework of the Sixth Five Year Plan (SFYP). These are growth of agricultural GDP, government spending on social protection, change in poverty rate and change in rice wage. Bangladesh reached the MDG target of undernourishment in early 2000s. Underweight and stunting also declined between 2007-08 and 2012-13, albeit slowly. Agricultural GDP growth weakened for the second consecutive year, reaching 2.17% in 2012-13; and spending on social protection as per cent of GDP continued to decline, reaching 2.23% in 2012-13 – both falling short of targets. Poverty rate declined satisfactorily, reaching 31.5% in 2010. This trend of decline along with the per capita GDP growth rate suggests that the poverty head count in 2012-13 may have already reached around 27%, against the MDG target of 29% by 2015. The rice wage also got increased by 5.8% which is 17 % above the target for 2012-13 (FPMU 2014).

It is this backdrop in respect of progress and status of broader aspect of food security against which the Government of Bangladesh is set to formulate the new 7th Five Year Plan. The purpose of this paper is to review progress of the detailed dimensions of food security under the 6th Five Year Plan and set the food security goal, objectives, targets and implementation strategy under the new 7th Five Year Plan (FYP). Attempt is also made to make an outline of the new National Food Policy, to be aligned with the 7th FYP, in line with the terms of reference for preparing the paper.

2. Review of Current Food Security Status

2.1 Food Availability

2.1.1 Availability of Foodgrains

Bangladesh has made remarkable progress in domestic food production over the past four decades. There has also been substantial improvement in the availability of food. As can be seen in Table 2.1, per capita availability of foodgrains increased from around 444 grams per day to around 598 grams during the period under review. Since 1998-99, per capita availability of

foodgrains remained more than 508 grams.[1] Exception is observed in 2001-02 when per capita availability was marginally below the requirement (Table 2.1).

Table 2.1: Foodgrains (rice and wheat) production and availability in Bangladesh

Year	Net domestic production ('000 m.tons)	Private import ('000 m.ton)	Public distribution ('000 m.ton)	Internal procurement ('000 m.ton)	National availability ('000 m.ton)	Import as % of total availability	Per capita availability (gm/day)
1	2	3	4	5	6=2+3+4-5	7	8
1991-92	16999	0	2345	1016	18328	8.5	444
1995-96	16769	850	1795	422	18992	12.8	430
1998-99	19195	3200	2273	781	23887	23.0	515
1999-00	21918	1234	1900	967	24085	8.7	512
2001-02	22797	1289	1460	1053	24493	7.3	506
2003-04	24151	2480	975	843	26763	10.5	533
2007-08	26201	2916	1329	870	29576	11.7	555
2008-09	28306	2217	2129	1483	31169	9.7	578
2009-10	29239	2899	1961	805	33294	10.4	609
2010-11	30371	3109	2292	462	35310	15.0	641
2011-12	30698	1240	2095	1426	32607	7.0	582
2012-13	30886	1419	2086	1404	32987	5.7	582
2013-14	31377	2137	2220	1439	34295	8.9	598

Note: Net production is estimated after 12% deduction for seed, feed, waste etc.
Source: FPMU: Database on Food Situation, MoFDM, Dhaka.

2.1.2 Availability of other Foods

Table 2.2 presents information on production and availability of different food items at three points of times: 1994-95, 2004-05, and 2010-11. In general, both production and per capita availability of food items is on the increasing trend. Per capita availability of potato, pulses, oilseeds, vegetables, meat, milk and egg increased notably from 2004-05. This improvement might be due to release of land from major crops and productivity increase. Though per capita availability increased, the country is grossly deficit in relation to requirement for all the food items except potato. For instance, the country imported 16,098 MT of onion during 2010-11, which was worth Tk. 445.15 million (BBS, 2011). During 2012-13, the country imported oilseeds and edible oil worth Tk. 1,932 crore and Tk. 11,185 crore respectively (Bangladesh Bank, 2014).

[1] 508 grams/day/capita is regarded as the norm of per capita food grain requirement in the country.

Table 2.2: Production and availability of other food items (1994-2011)

Food Items	Production (million tons)			Availability (gm/capita/day)		
	1994-95	2004-05	2010-11	1994-95	2004-05	2010-11*
Potato	1.50	5.95	8.30	32	108	153
Pulses	0.53	0.31	0.72	11	10	13
Oilseed	0.48	0.56	0.84	10	10	15
Vegetables	1.21	6.50	11.19	21	108	207
Fruits	1.41	4.60	3.56	24	68	65
Fish	1.17	2.10	2.89	27	41	53
Meat	0.48	1.06	1.90	11	21	35
Milk	1.52	2.14	2.95	35	42	54.60
Egg (Million)	2400	5623	6078	19**	41**	41

Source: BBS 2011, DAE, DLS, DOF, BARC * Population 148.69 million in 2011, ** per year. (adopted from Kashem and Faroque, 2011)

2.1.3 Sources of Availability

Although domestic production of foodgrains persistently increased over the past decades, leading to apparent surplus situation, import constituted significant proportion of availability. Table 2.1 shows that except for the year 1998-99 and 2010-11, import constituted around 10% of total availability of foodgrains for most of the years under review. To manage the crop damage due to 1998 devastating flood, the Government imported large quantity of foodgrains from the international market during 1998-99. In 2010-11 government could procure very little amount from the domestic market as the price was quite high. For public distribution programme, the Government had to rely heavily on import. It is also important to note that while public import represented an important component of total import during 1990s (even after foodgrains trade liberalization), private import increasingly dominated total import over the years of the current decade.

2.1.4 Future Outlook

Bangladesh has one of the highest levels of rice consumption in the world. Although per capita consumption decreased from 1991-92 to 2010, total consumption increased due to population increase. However, due to rapid urbanization, people are expected to go for consumption diversification by substituting rice with non-rice food items. The population growth will be the main driver of the increase in aggregate demand for rice.

Hossain and Deb (2011) projected growth in demand and supply of major food items. The annual demand growth is estimated at 1.5% for cereals; 3 to 4% for pulses, vegetables and spices; over 5% for oils, sugar and fruits; and over 8 % for fish and livestock products. However, meeting the demand with domestic production might be challenging due to declines in availability and quality of natural resources (especially land and water) and climate change impacts.

The annual loss of agricultural land in Bangladesh during the period 1976-2010 is estimated at 33140 ha which represents annual land loss of 0.172, 0.416 and 0.244 percent during 1976-2000,

2000-2010 and 1976-2010 respectively (Hasan et al. 2013). Factors contributing to the loss are increasing demand for habitation, industrial and commercial establishment, transport infrastructure, river erosion and intrusion of saline water in the coastal areas. The likely solution in this situation is to increase productivity through better and efficient use of available resources and replace traditional varieties with modern high yielding varieties. The two stimulating rice varieties BRRI Dhan 28 and 29 have contributed enormously to rice production over the last two decades. These two varieties are destined to be degenerated over the coming years. Although a number of new rice varieties have been developed by BRRI and BINA, some with special traits, no one has so far demonstrated to be good replacement of BRRI Dhan 28 and 29 from the point of view of field level yield performance. Research efforts need to be continued for developing stimulating rice varieties. Extension service has a key role to play for diffusion of such varieties.

Soil fertility is declining due to high cropping intensity and un-balanced use of chemical fertilizers. Dependency on ground water during the dry season needs to be reduced through utilization of surface water for which massive public sector investment is required. Over exploitation of ground water for irrigation relative to annual recharge of aquifers is often alleged to be the cause of arsenic contamination in drinking water.

Bangladesh is one of the countries to be most seriously affected by climate change and sea level rise. The agricultural land availability in the costal belt may gradually reduce due to inundation from sea water and intrusion of saline water inwards. Erratic monsoon will increase risk in rain fed rice farming, leading to greater dependency on ground water. Exposure to floods and droughts are likely to increase. All these may encourage farmers to use inputs at sub-optimal levels in crop farming in the monsoon season. Ultimately, adoption of improved crop varieties may be hampered as these are input-intensive. Excessive and indiscriminate uses of pesticides in the upstream lands are seriously affecting cultivation of high value crops such as vegetables and fruits in the downstream areas due to runoff effects. All these factors pose serious threat to increased domestic production of the food crops under review.

2.2 Food Access

Peoples' access to food has three dimensions – economic, physical and social. Economic access is largely determined by income, price and the resultant purchasing power. Lack of purchasing power inhibits poor peoples' access to food. While major public initiatives are visible in the form of various food and cash based programmes, private sector is also expected to play increasing role in making food available to those who cannot buy from the market. Access to food may also be physically constrained due to breakdown of transport and communication infrastructures resulting from severe natural disasters.

2.2.1 Poverty Profiles and Access to Food

Food security at household level is closely linked with poverty. Table 2.3 shows the incidence of poverty from 1991-92 to 2010, as measured by the CBN method. Though notable progress is

observed in reducing poverty, still 31.5% of the population is below the upper poverty line. Compared to 1991-92, poverty in 2010 declined by 25.1 and 23.4 percentage points in upper and lower poverty line respectively. For lower poverty line, the reduction was more pronounced in urban than in rural areas.

Table 2.3: Head count rate of incidence of poverty, 1991-92 to 2010 (CBN method)

Residence	Upper poverty line					Lower poverty line				
	2010	2005	2000	95-96	91-92	2010	2005	2000	95-96	91-92
National	31.5	40.0	48.9	50.1	56.6	17.6	25.1	34.3	35.1	41.0
Rural	35.2	43.8	52.3	54.5	58.7	21.1	28.6	37.9	39.4	43.7
Urban	21.3	28.4	35.2	27.8	42.7	7.7	14.6	20.0	13.7	23.6

Source: HIES 2005 and 2010.

2.2.2 Regional Differences in the Incidence of Poverty

The HIES 2010 Report showed poverty profile of the country disaggregated by eight administrative Divisions. The estimates of the head count rate using the upper poverty line show that in 2010 Rangpur Division had the highest incidence of poverty, estimated at 46.2% followed by Barisal (39.4%) and Rajshahi (35.7%). In the earlier HIES, Barisal had the highest incidence of poverty (52.0%). On the other hand, Chittagong Division had the lowest incidence poverty (26.2%) in HIES 2010 (Table 2.4).

The lower poverty line estimates for 2010 showed that Chittagong Division had the lowest incidence of poverty of 13.1%, closely followed by Khulna and Dhaka Divisions with poverty levels of 15.4% and 15.6% respectively (Table 2.4). The notable feature was the remarkably lower urban poverty of Chittagong and Dhaka, estimated at 4% and 3.8% respectively (HIES 2010). This may be attributed to higher income earning opportunities and higher incidence of government and non-government interventions with various safety net programmes in the two metropolitan city areas.

Table 2.4: Regional incidence of poverty as measured by CBN method

Region/ Division	Percent of population below poverty line					
	Upper poverty line			Lower poverty line		
	2010	2005	2000	2010	2005	2000
Barisal	39.4	52.0	53.1	26.7	35.6	34.7
Chittagong	26.2	34.0	45.7	13.1	16.1	27.5
Dhaka	30.5	32.0	46.7	15.6	19.9	34.5
Khulna	32.1	45.7	45.1	15.4	31.6	32.3
Rajshahi	35.7	51.2	56.7	21.6	34.5	42.7
Rajshahi (new)	29.8	-	-	16.8	-	-
Rangpur	46.2	-	-	30.1	-	-
Sylhet	28.1	33.8	42.4	20.7	20.8	26.7
National	31.5	40.0	48.9	17.6	25.1	34.3

Source: HIES 2005 and 2010.

2.2.3 Poverty Gap (PG)

The Poverty Gap (PG) estimates showed that in relation to the upper poverty line, PG in 2010 was 6.5%, whereas it was 9.0% and 12.8% in 2005 and 2000 respectively. In relation to the lower poverty line, the decline was from 7.5% in 2000 to 3.1% in 2010 (Table 2.5). The decline was more pronounced for urban than for rural households. All these reductions of PG indicate that the average income and consumption level of the people living below the poverty lines improved during the period from 2000 to 2010.

Table 2.5: Change in poverty gap levels by rural urban locations (in percentage)

Poverty gap by poverty line	2000	2005	2010
Using upper poverty line:			
National	12.8	9.0	6.5
Rural	13.7	9.8	7.4
Urban	9.1	6.5	4.3
Using lower poverty line:			
National	7.5	4.6	3.1
Rural	8.3	5.3	3.7
Urban	4.1	2.6	1.3

Source: HIES Reports 2005, 2010

Interestingly, incidence of poverty was found more for the male headed households than the female headed ones. In HIES 2010, the incidence of poverty with respect to upper poverty line for the male headed households was 32.1%, compared to 26.6% for the female headed households. In relation to the lower poverty line, 17.9% and 14.6% of the male and female headed households were found to be under poverty line. The lower incidence of poverty for the female headed households may be attributed to migration (internal and overseas) and remittance of the male members of the households.

Although income poverty declined appreciably over the last decade, little change occurred in income distribution during the period. The overall Gini coefficient slightly increased from 0.451 in 2000 to 0.467 in 2005 and then marginally decreased to 0.458 in 2010, reflecting marginal improvement from 2005 to 2010. While in urban areas income distribution situation improved (Gini coefficient decreasing from 0.497 to 0.452) during the period 2000-2010, in rural areas the situation worsened as was evident through increase of Gini coefficient from 0.393 to 0.431 during the same period. However, Gini coefficients were persistently lower in rural than in urban areas, reflecting relatively better income distribution situation in rural than in urban areas (HIES 2005 and 2010).

2.2.4 Social access to food

The Government has been spending sizeable amount of money through social safety net programmes (SSNPs) to improve food security status of the poor people. The Government

successively increased social safety net spending from Tk. 21,975 crore in 2011-12 to Tk. 23,098 crore in 2012-13 and to Tk. 26,654 crore in 2013-14. However, allocation for safety nets as percent of national budget and GDP decreased over the past years. Safety net spending as per cent of total annual budget decreased from 13.63% in 2011-12 to 12.20% in 2012-13. In the revised budget of 2013-14, safety net spending constituted 12.33% of the total budget. The successive budget documents also showed that safety net spending as per cent of GDP decreased from 2.40% in 2011-12 to 2.33% in 2012-13 and then to 2.26% in 2013-14, all of which fall short of the target of spending 3% of GDP on social safety nets by 2015. According to HIES Report 2010, 24.6% households at national level received safety net benefits from at least one type of programme. The proportion of households receiving benefits was much higher in rural (30.12%) than in urban (9.42%) areas. In monetary term, average benefit received from safety net programmes in 2010 was estimated at Tk. 483 per household at national level.

2.2.5 Public food distribution

Public food distribution plays an important role in improving food security of the poor. After the food price crisis in 2007-08, the Government geared up public food distribution by maintaining adequate public stocks. Public distribution of foodgrains increased from 1.30 million tons in 2007-08 to 2.13 million tons in 2008-09. The higher level of distribution was retained in subsequent years and the record high distribution was made in 2010-11 during which total foodgrain distribution reached 2.29 million tons of which distribution through Open Market Sale (OMS) and Fair Price Card (FPC) alone accounted for 1.20 million tons. It is widely held that this magnitude of OMS/FPC distribution contributed substantially to stabilization of coarse rice price during that time. A total of 2.22 million tons of foodgrains was distributed through the public food distribution systems (PFDS) in the fiscal year 2013-14. Government's food operation is sometimes constrained due to inadequate and inefficient storage facilities. The Government has therefore taken initiatives to expand and improve foodgrain storage facilities by building modern grain silos in the country.

2.2.6 Ensuring Peoples' Right to Food

The right to food implies that the society/government should be obliged to provide people with food for survival when they are deprived of access to food for reasons beyond their control. The right to food is established in Article 11 of the 1966 International Covenant on Economic, Social and Cultural Rights.[2] In Bangladesh, right to food is incorporated in Article 15(a) of the National Constitution whereby the Government is committed to implement the basic provisions of the rights to food.

The Government has adopted policies and programmes to address chronic food insecurity and to deal with food crisis at times of natural disasters. However, these do not constitute right-based

[2] http://en.wikipedia.org/wiki/Right_to_food

approach. The process of policy formulation, the contents of policies and the monitoring of policy implementation needs to be consistent with the requirements of the right-based approach (Sahabuddin 2010). Attaching legal framework to the right-based approach also deserve consideration.

2.3 Utilization of Food

Improving availability of and access to food are necessary conditions but not sufficient to ensure that people will be secured of food in the sense of leading an active and healthy life. Utilization of food is governed by a number of factors such as peoples' food preference, general health condition and the overall environment under which food is prepared and consumed. All these factors have an impact on the absorption of food and the consequent nutritional status of people.

2.3.1 Determinants of Food Consumption

2.3.1.1 Income

Table 2.5 shows changes in per capita income of rural, urban and all households in Bangladesh over the last decade. While per capita monthly income more than doubled for rural and all households, for urban households income approximately doubled between 2000 and 2010. For all the survey years, urban income was significantly higher than rural income. Although the nominal incomes of both rural and urban households increased rapidly over the past years, there was little improvement in income distribution situation. Income inequality, as measured by Gini coefficient, improved very marginally as has been discussed earlier.

Table 2.5: Changes in monthly per capita income of Bangladeshi households

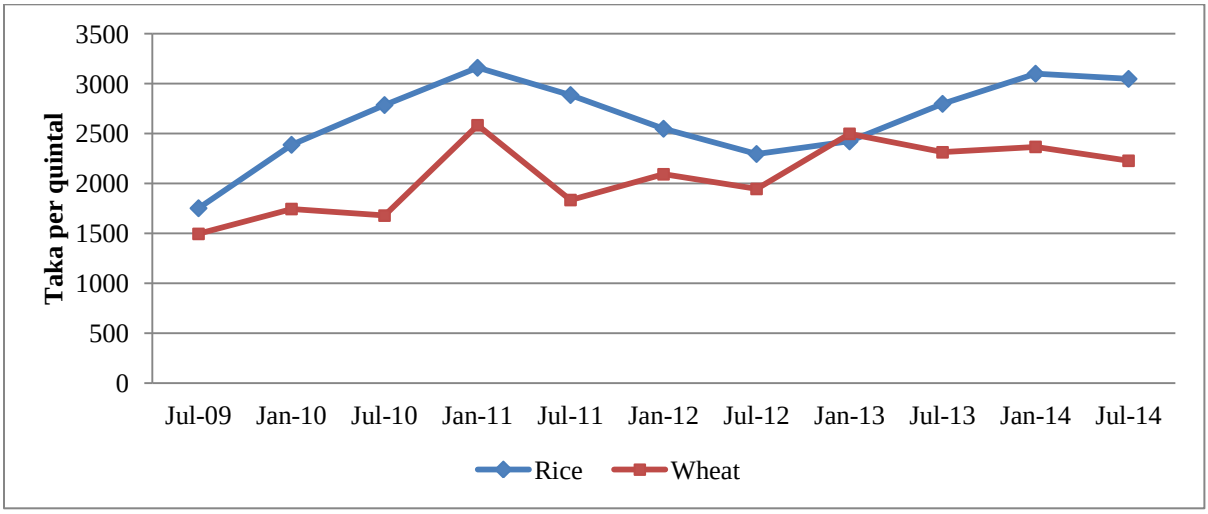
Survey Years	Monthly per capita income (Tk)			Gini coefficient (National)
	National	Rural	Urban	
2010	2553	2130	3740	0.458
2005	1485	1246	2217	0.467
2000	1128	928	1926	0.451

Source: HIES 2005 and 2010.

2.3.1.2 Price

Figure 2.1 shows changes in monthly national wholesale price of coarse rice and wheat. Rice price reached its peak during January 2011 and then showed downward trend, but again started increasing from January 2013. In July 2014, price of coarse rice was 3,047 Taka per quintal which was slightly lower than the price of January 2014 (3,099 Taka/quintal). Wheat price had more fluctuation and remained lower than rice price until January 2013. After January 2013, wheat price had a moderate upward trend while rice price had slightly downward trend which remained up to July 2014.

Figure 2.1: Monthly national average wholesale price of coarse rice and wheat

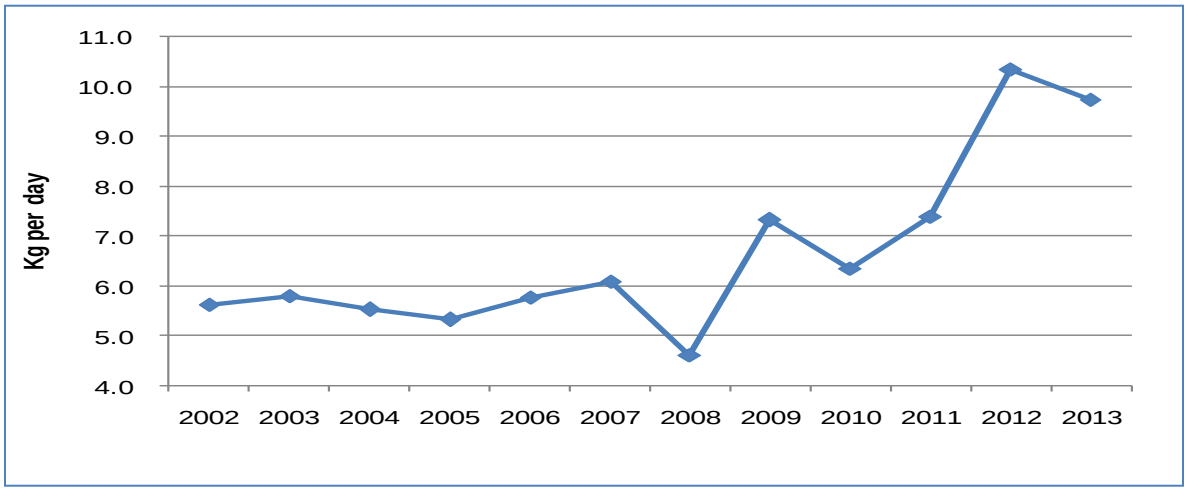


Source: Department of Agricultural Marketing.

2.3.1.3 Real wage and purchasing power

Purchasing power of people, particularly of the wage earners, can be assessed by comparing their nominal wage with price of staple food such as rice. Figure 2.2 shows the pattern of change in the rice wage of agricultural laborers over the last decade. Rice wage remained well above 5 kg of rice per day of work during 2002-2007 period. It had a deep plunge in 2008 due to spiraling of rice price compared to relatively stable nominal wage of agricultural labourers. After 2008, rice wage had a sharp increase, reaching more than 7 kg of rice in 2009, then having a moderate drop in 2010 and again rising and reaching more than 10 kg of rice per day of work in 2012. The persistent increase in the nominal wage of agricultural labourers contributed to the sharp increase in their real wage of kilograms of rice per day of work.

Figure 2.2: Rice wage of agricultural labor 2002 to 2013



Note: For 2013, rice wage is calculated with data as of Feb-2013.

2.3.2 Determinants of Food Utilization

2.3.2.1 Dietary Imbalance and Health Status

Dietary imbalance and unavailability of micro-nutrients are the major factors responsible for poor nutritional outcomes. High consumption of cereals, but low intake of edible oils, vegetables and fish result in a low level of absorption of micro-nutrients and a high level of anemia and other ailments. The effects of poor nutrition are more severe among children and women. For example, under-five mortality rate is still 41 and maternal mortality rate is 1.98 per 1000 live birth. Recent evidence suggests that 15.3% children are severely stunted while another 10.4% are severely underweight. Low birth-weight and poor nourishment reduce the resistance power of children against infectious diseases (BDHS 2011).

2.3.2.2 Food Preference

Food preference plays an important role in the determination of nutritional status of people. Food items generally have two types of characteristics: objective and subjective. Nutrient content of food is generally considered as objective characteristics. Subjective characteristics comprise a wide of range of attributes such as taste, size, shape, volume, color, aroma etc. The social value attached to consumption also falls within the range of subjective characteristics. If, for the same quantity of food (containing the same amount of nutrient), some people pay more than others, the former group will be considered to have preferred subjective as opposed to objective characteristics of food.

This behaviour has implications for food security in that food and income transfer programmes are generally designed to improve nutritional status of poor people. But if people, out of their preference for quality or subjective characteristics, pay more for the same quantity or in other words buy less nutrients for the same money, the phenomenon leads to leakage of some kind from programme point of view. From consumers' point of view, it may lead to lesser food security and reduced nutritional welfare (Talukder 2008).

2.3.2.3 Storage, Processing and Cooking Practices

Quite often the available and accessed foods are not properly utilized due to loss of volume, quality and hence nutritional values from improper storage, processing and cooking practices. Loss of quantity and quality of grains under government storage is a very common phenomenon. The reasons are attributed mainly to conditioning of grains before and during storage and ageing of stocks. Storage losses at farmers' level are also of substantial magnitude which needs to be measured precisely. The major storage loss occurs in the case of vegetables, fruits and spices.

Processing also greatly affects physical and chemical properties of food, having implications for quantity and quality of the available food consumed. As for rice, the major processing activities center round converting paddy into rice. The major processing activities are parboiling, drying and husking. Parboiled rice has the quality of retaining more nutrients during husking, cleaning, washing and cooking. Utilization of food is also affected by cooking practices. Although food

items need to be properly washed before cooking, excessive washing often cause huge loss of food values. Cutting vegetables into too much tiny pieces (often with skin off) and boiling in water results in serious loss of nutrients. Also, too much of heating often impairs colour, flavor and nutritional value of food.

All these aspects need to be taken into consideration in the comprehensive food security policy because even if food is available and people have access to food both in physical and financial terms, food security may not be properly ensured due to lack of utilization of food.

3. Review of Achievement of Targets under the 6th Five year Plan

Attainment of foodgrain self-sufficiency and food security remain the stated objectives of the national food policy and strategies. The objective contents of the food sub-sector in the Sixth Five Year Plan were stated as follows:

- Ensuring food security for all and elevating nutritional status of the people living below poverty line;
- Preservation and maintenance of security stock of food grains to meet any natural calamities, production shortfalls and supply hazards;
- Development of social safety net programs for vulnerable groups with special focus on women and children through improvement and enlargement of targeted food distribution;
- Maintenance of price stability within a band to protect interests of producers and consumers;
- Expansion of private sector storage, distribution and trade of foodgrains; and
- Development of sound quality control, grading and standardization system of foodgrains and other food products.

Progress achieved in respect of the above objectives during implementation of the Sixth Five Year Plan is discussed as under:

3.1 Ensuring food security for all

Ensuring food security for all people at all times is the overarching objective of the National Food Policy, in line with the prime food security objective of the Sixth Five Year Plan. The successive HIES Reports have shown that average per capita food consumption increased over the past years, reaching 1001 grams per day, according to HIES 2010. However, as can be seen from Table 3.1, per capita daily food consumption of the lowest income group was about 40% lower than consumption of the highest income group. The reason for almost similar volume of food consumption by rural and urban households, despite differences in their income, may be explained by the Engle's law phenomena of spending lesser proportion of incremental income on food with rising income. Also, the successive HIES Reports show that there has been

compositional changes in food consumption over the past years. For example, per capita daily rice consumption decreased by 35 grams for urban households during 2000-2010 period, compared to a decline of 18 grams for rural households during the same period. For some high value food items such as meat, fish, milk and edible oil, consumption increased both for rural and urban households, but the magnitude of increase was higher for urban than for rural households (HIES 2010). By analyzing the HIES 2010 data, the World Bank Report (2013) showed that 38.4% households were suffering from moderate calorie deficiency (calorie intake less than 2122 kcals/capita/day), while 16.1% were severely calorie deficient (calorie intake less than 1805 kcals/capita/day). Thus food security for all people at all time is yet to be achieved.

Table 3.1: Per capita daily food intake (gram) by monthly household income groups, 2010

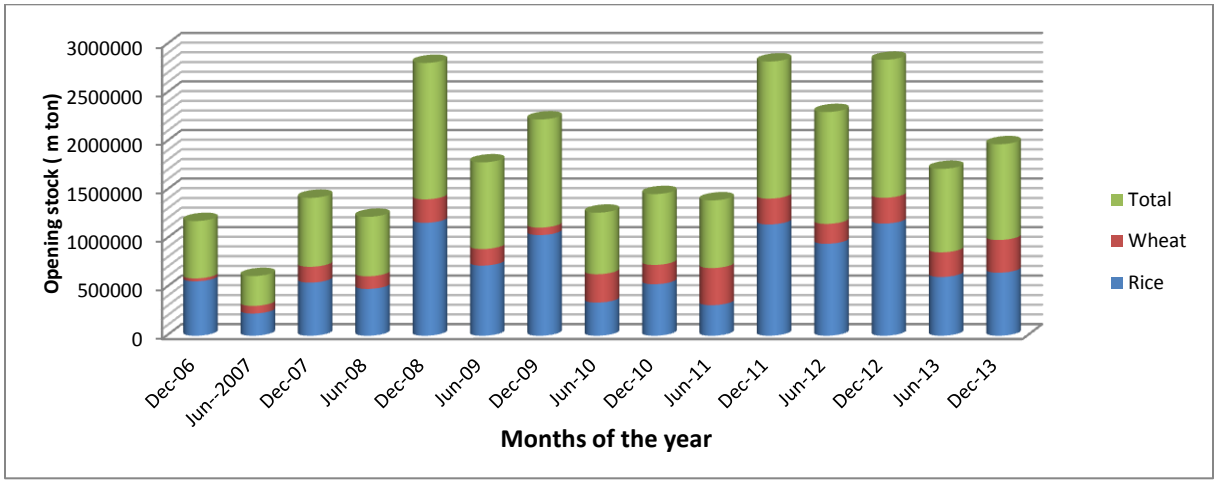
Monthly household income group (Tk.)	Per capita food intake (gram/day)		
	National	Rural	Urban
Less than 1500	929	935	849
3000-3999	1088	949	891
6000-6999	1173	982	948
10000-12499	1233	1037	983
20000-24999	1487	1103	1013
Above 35000	1339	1203	1114
Total	1001	1019	997

Source: HIES 2010.

3.2 Preservation and maintenance of food security stocks

Government stock serves multiple purposes. They may be an instrument for price stabilization. At the same time, stocks held for price stabilization or for targeted distribution programmes may cushion temporary supply shortage created by recurring natural disasters, floods, droughts, cyclones and tidal bores. Assuming 15 million population, a relief operation of 45 days and consumption requirement of 508 gram per capita per day, a security stock requirement of about 343,000 tons has been estimated. By adding consideration for transportation and other losses, a figure of 400,000 to 425,000 tons may be arrived at. If one adds another 175,000 tons to this estimate as dead stock, the total quantity of security stock ranges from 575,000 to 600,000 tons, which may be held either in rice or wheat or both (BIDS 2012).

Figure 3.1: Public opening stock of rice and wheat over time



Source: FPMU 2014.

In addition to the security stock, the Government needs to maintain a sizeable foodgrain stock for running some routine distribution operations and stabilization of market prices. Figure 3.1 shows a picture of total foodgrain stock maintained by the government at different points of time. Total public opening stock (rice and wheat) had always been higher in December than in June of every financial year because of higher stock building in December for dry season food operations. Opening stocks fluctuated at different points in time during December 2006 and December 2013. Rice dominated the opening stock at all points in time except in June 2011.

Table 3.2: Construction of foodgrains storage capacity under way by the Ministry of Food

Name of the food storage project	Implementation period	Capacity ('000 MT)
Construction of grain silos in Mangla port	Jan/10 – Jun/14	50
Construction of food godowns	Jul/10 – Mar/14	135
Construction of food godowns at Halishahar CSD premises	Jul/10 – Mar/14	84
Construction of silo under Modern Flour Mill Project at Postogola	Jul/10 – Jun/15	10
Construction of Multistoried warehouses at Santahar grain silo	Jan/12 – Jun/15	25
Construction of new food godowns	Jul/13 – Jun/15	105
Food Storage Facilities Project	Jan/14 – Jun/20	535
Total additional foodgrain storage capacity		944

Source: FPMU 2014.

In the event of going for larger food operations, the Government would require expansion of modern foodgrains storage facilities. Table 3.2 shows a picture of initiatives taken by the Government to expand modern food storage facilities. Effective foodgrains storage capacity has increased from 1.57 million tons in 2010-11 to 1.62 million tons in 2011-12 and to 1.69 million tons in 2012-13. This increasing trend of the accommodation is mainly due to government effort to increase foodgrains storage and handling capacities after the foodgrain price rise of 2007-08, so as to reinforce the capacity to cope with market price volatility and natural disasters that are expected to occur more frequently as a result of climate change. The government aims to

increase storage capacity to 2.2 million tons by 2015 and to 3.0 million tons by 2021. Considering the projects already underway, it is expected that storage capacity will reach 1.99 million tons by 2015 and 2.63 million tons by 2021. The major augmentation in the storage capacity will occur through the new World Bank financed Modern Food Storage Facilities Project (MFSFP) which will add storage capacity by 0.54 million tons by 2020 (MFSP 2013). Besides establishing new capacity, the rehabilitation and maintenance of the existing storage facilities are under way which will play important role in sustaining the grain storage capacity.

3.3 Development of social safety nets

Spending on social safety nets as per cent of GDP shows fluctuation. The beginning of the 6th FYP marked an improvement over the previous year but subsequently in 2011-12 and 2012-13, expenditure on safety nets as per cent of GDP reduced from 2.40% in 2011-12 to 2.23% in 2012-13. Spending on safety net as per cent of the total budget also steadily declined for three consecutive years – from 16.07% in 2010-11 to 13.63% in 2011-12 and to 12.20% in 2012-13, and then marginally increased to 12.33% in 2013-14. In nominal terms, the total budget for safety net increased from 220 billion Taka in 2011-12 to 230 billion Taka in 2012-13 and further to 266 billion Taka in 2013-14 (Budget documents, Ministry of Finance).

Table 3.3: Progress towards achievement of institutional development for more effective safety nets

Indicators	2009-10	2010-11	2011-12	2012-13
Budgeted coverage of VGF (lakh person)	366.67	122.22	88.00	85.00
Budgeted coverage of VGD (lakh person month)	88.33	88.33	88.13	90.33
Safety net programmes expenditure as % of GDP	2.42%	2.64%	2.40%	2.23%
Budgeted coverage of employment generation programme for the poor (in million person month)	4.5%	4.2%	4.2%	4.2%
Quantity of VGF and GR distributed (in MT)	285,354	147,853	304,000	304,000

Source: Budget documents, Ministry of Finance.

The budgeted coverage of VGD steadily decreased from 122 lakh persons in 2010-11 to 85 lakh persons in 2012-13 due to price and climatic instabilities. However, the quantity of food distributed under VGF and GR increased from 1.48 lakh MT in 2010-11 to 3.04 lakh MT in 2012-13. The VGD is typically development oriented and includes a training/schooling component. VGD coverage increased marginally to 90 lakh person months in 2012-13 after staying stable at 88 lakh person months for the preceding three years (Table 3.3).

Since 2009/10, anti poverty spending, a broader concept of social protection that includes infrastructure and other pro-growth investments, has declined as a share of total government spending. While the National Social Protection Strategy (NSPS) has proposed consolidation of food based programs into cash based transfers, there is serious need to maintain food transfer programs as an emergency response and price stabilization tool through open market sales. Food can be maintained as a variable share of wages for participants in cash for work programmes to allow for rotating public stock, when necessary.

3.4 Maintenance of price stability

After galloping inflation in 2007-08, resulting from the global food, fuel and fertilizer price crises, domestic prices had a plunge in mid 2009 and then reached a new high record levels in April 2011 for food, and March 2012 for non-food products. Since then, they declined towards new minima.

Food inflation has generally been above non-food inflation, with the main exception observed between December 2011 and January 2013, when food inflation was lower than non-food inflation. The 12 month point-to-point inflation for non-food decreased from 11.7% in June 2012 to 7% in June 2013, and increased for food from 7.1% to 8.5% (Bangladesh Bank 2013). Higher food inflation has continued into 2014, with point-to-point food inflation reaching 9.0% in December 2013 and 8.84% in February 2014, compared to non-food inflation of 4.9%, and 5.4% respectively (BBS 2014).

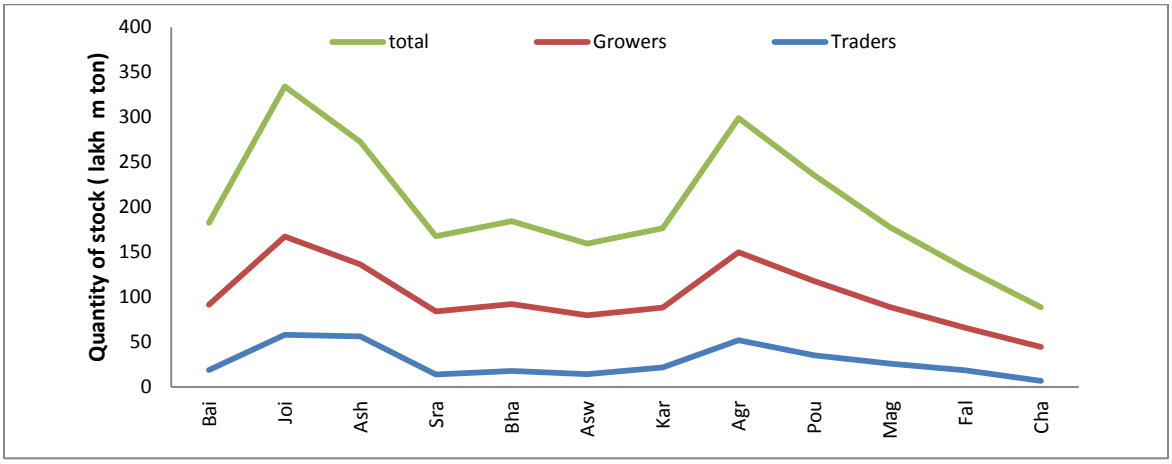
Given the high proportion of food expenditure in the total expenditure for both rural and urban poor households (respectively around 71% and 75%), higher food prices would negatively impact poor households in the short run.

3.5 Expansion of private sector storage

Private sector storage plays an important role in the overall food supply in the country**.** Private stock kept by different traders as well as growers vary across months. The highest private stock made by the growers were in the month of *Joisto* (31.5% of gross production, and 35.09% of net production) and lowest in the month of *Choitra* (10.87% of gross production and 12.24% of net production). In case of paddy farmer groups, the minimum private stock keeping months were *Joisto* (39% of gross production) and *Kartik* (12% of gross production) (BIDS 2012).

Figure 3.2 displays the total private sector stock maintained by all traders and all growers in 2011. Of all stock keepers, growers maintained the lion's share of the total private stock of paddy. About 72% of the private stock was maintained by the growers and only 28% was maintained by different traders. The minimum stock of growers was 44 lakh metric tons kept in the month of *Choitra* while the highest stocked quantity was 149 lakh metric ton in the month of *Agrahayon*.

Figure 3.2: Estimate of total private stock of paddy in 2011



Source: BIDS (2012)

3.6 Development of quality control, grading and standardization

Consumption of unsafe food and the consequent illness impact personal health, childhood development and earning capacity. Consumption of unsafe food by children younger than five more readily leads to mortality, resulting in at least 18% of deaths in that age group compared to 10% among adults (FPMU 2014).

Table 3.4: Development of quality control, grading and standardization

Indicator	2009-10	2010-11	2011-12	2012-13
No. of compulsory food items standardized by BSTI	64	64	58	58
Prevalence of diarrhea under 5 children (in two week period)	na	Na	5%	12%
Proportion of population served with safe water supply for domestic use	98%	98%	98%	98%
Proportion of population having access to safe water in arsenic affected areas	86%	87%	88%	98%

Source: FPMU 2014.

The progress towards achievement in sound quality control, grading and standardization of food products measured through some indicators is presented in Table 3.4. The number of compulsory food items standardized by BSTI shows no improvement between 2009-10 and 2010-11. In both the years, the number of standardized food items was 64. However, the condition deteriorated in two subsequent years when standardized food items were found to be only 58 (Table 3.4). Standardization and certification of foods are essential for safeguarding consumers. However, weak enforcement has meant that many foods are sold without standard bearing seals or with false seals. The implementation of the Bangladesh New Food Safety Act 2013 will strengthen enforcement and supervision to maintain compliance of food standards.

4. Poverty and Food Security: Linkage and Dimensions

4.1 Poverty and Food Security Linkage

The concept of food security is interlinked with poverty. According to McClelland (2000) poverty exists when people have unreasonably low living standards compared with others; cannot afford to buy daily necessities and experience real deprivation and hardship in everyday life. The concept is related with a person's material resources, especially income, living standards and activities. Reducing poverty may not necessarily lead to eradication of food insecurity. Although people living in poverty are at risk of food insecurity, it cannot be assumed that they are food insecure. On the other hand, all persons above the poverty line cannot be assumed to be food secure. Reasons like ill health, disability, sudden job loss, high living expenses may affect the food security of the persons above the poverty line.

4.2 Food Poverty and Hunger: Dimensions and Manifestation

Bangladesh has achieved progress in poverty reduction and is on track for attaining the MDG goal of halving poverty by 2015. But the country may fall short in achieving some of the hunger- and nutrition-related MDG targets. For instance, though the country is likely to meet the first calorie target, MDG 1.9a (i.e. 14 percent or less of the population experiencing severe food deficiency), it is unlikely to meet the second calorie target, MDG 1.9 (i.e. 24 percent or less of the population experiencing moderate food deficiency). Table 4.1 shows that proportion of population with moderate and severe deficiency in calorie intake reduced from 40.4% and 19.5% in 2005 to 38.4% and 16.1% in 2010 respectively. Poverty has reduced in both rural and urban areas in both the dimensions.

Poverty reduction varied across regions. The World Bank analysis with HIES (2010) data showed that the Western divisions (Barishal, Khulna, Rajshahi) experienced larger reductions in poverty during 2005-2010 period, so also was the change in Eastern region (Chittagong, Dhaka and Sylhet). Exception to this pattern was the Northern region, especially Rangpur which had over 42 percent of the population living below the upper poverty line (World Bank 2013).

Table 4.1: Percentage of population with moderate and severe deficiency in calorie intake

Year	Moderate deficiency (<2,122 kcal/person/day)			Severe deficiency (<1,805 kcal/person/day)		
	Rural	Urban	National	Rural	Urban	National
2000	42.3	52.5	44.3	18.7	25.0	20.0
2005	39.5	43.2	40.4	17.9	24.4	19.5
2010	36.8	42.7	38.4	14.9	19.7	16.1

Source: World Bank 2013.

Bangladesh has made some progress in reducing hunger as is reported in the Global Hunger Index (GHI) 2014. Compared to the score in 1990, Bangladesh is identified as one of the countries showing biggest improvement. Bangladesh improved its GHI ranking from 58 last year

to 57 in the current year (2014). According to the report, the success is due to the country's progress in social indicators, and its very active non-governmental (NGO) sector and public transfer programs which helped in reducing child undernutrition among the poorest. The report also recognized the country's commitment to regular monitoring of children's nutritional status and success in reducing percentage of underweight children compared to that of 1990. But still 37% of the under-five children in the country remain underweight.

4.3 Review of Evidence on Perception based Poverty

Food security and poverty is also measured using perception level data. According to Migotto et al. (2005) household's perception can indicate relative food security based on past situations and thus also indirectly capture the vulnerability dimensions. A study conducted in the Chittagong Hill Tracts Region (Jamaluddin et al. 2010) showed that a good portion of both the ethnic and non-ethnic respondents had worries about supply of their next meal. The study measured food security using a Coping Strategy Index (CSI). In the surveyed areas, 61.5% ethnic and 70.0% non-ethnic respondents reported that they 'never' could afford to take balanced meals. Compared to the non-ethnic community, food insecurity was more severe with the ethnic community.

Rahman (2010) focused on the ultra poor household's flood copping strategies in two flood prone regions (Brahmaputra-Jamuna flood prone region and Haor region) of Bangladesh. The study defined ultra poor as those who do not have any significant productive asset or do not have regular occupation for securing basic needs. The study found that the poor households had relatively better food security in the months of May and June, the months coinciding with *boro* rice harvest in the areas. The situation gets worse on the onset of the flood season (mid July). Again, the situation gets slightly better in the months of November and December, when farmers can harvest the winter rice (*aman*) and the labourers have opportunity to work in farms. Animal protein (in terms of meat, fish, egg and milk) was almost absent in ultra poor household's daily menu list. Their consumption of vegetables and pulses were also found very low and they could manage these items only for some days in a month.

Kazal et al. (2010) also used perception analysis along with other methods for analyzing food security in the Haor regions of Bangladesh. The study showed that about 45% of the respondents remained anxious about food and among them three-fifths faced the problem for sometimes and about 29% faced it for most of the times. About one in every three respondents reported to be taking less than three meals in a day. Nearly one-fifth of the respondents reported to sleep with hunger during last three months prior to the survey.

Mallick and Rafi (2010) analyzed perception based data from 2,550 households living in the CHT region and found that about 72% of all households in the CHT did not have food security. Compared to the male headed households, higher proportions of the female headed households were food insecure. Further analysis showed that higher proportion of female headed households suffered from chronic food insecurity, whereas higher proportion of the male headed households

suffered from transitory food insecurity. Comparing the differences in food security between male and female headed households of different ethnic groups, the study concluded that the Bengali is the only ethnic group in the region that had significantly higher percentage of food insecure female-headed households. Among the indigenous ethnic groups, the study did not find significant differences in food security between male and female headed households. Thus the conventional notion that female-headed households are more vulnerable to food security was not prevalent in the ethnic tribal communities.

Akter and Basher (2014) explored longitudinal survey data of 1,800 rural households from 12 districts of Bangladesh over the period 2007–2009. In the survey, household's food security status was self-assessed through a module. Household's coping strategies in case of food shortage were skipping meals, consuming less in quantity and quality. The study found that 45% of the households interviewed experienced food shortages at least once during the three preceding years of the survey. Seasonality existed in food shortage incidences and was related to the agricultural lean period, i.e. March–April and September–October.

All these evidence suggest that food security of households vary according to season, region and ethnic status of households.

4.4 Developing Resilience to Climate Change Impacts

Climate change impacts

Climate change will affect food security in the country in different dimensions. Some of the climate change impacts have already started to be visible. According to IPCC (2007) prediction, crop production will be reduced by 30% in the current century due to different climate change effects. By the year 2050, rice and wheat production in Bangladesh is predicted to be reduced by 8% and 32% respectively. Additionally, moisture stress may force the farmers to reduce area under boro cultivation.

The CDMP (2008) and other analyses done at the Climate Change Cell of the Department of Environment suggest that 10-15% land in the country will be inundated due to sea level rise of 45 cm by 2050, creating 30 million climatic refugee/migrants from coastal regions. About 75% of the area of Sundarbans will be affected by the same level of sea-level rise. Awal et al (2013), by analyzing HIES 2010 data, showed that among the seven Divisions of the country, greater percentage of households from Rangpur and Khulna Divisions experienced climate shocks.

Adaptation and resilience

Both short- and long-term initiatives would be required to develop resilience to climate change. Awal et al. (2013) estimated that about 47% of the poor households affected by climate change shocks received benefit from various social safety net programmes throughout rural Bangladesh. Khulna Division received the highest coverage of poor households (about 73 percent) while

Rajshahi Division received lowest (about 22 percent). The study identified the CLP as a good example of integrating disaster risk management (DRM) programmes and climate change adaptation (CCA) strategies and recommended spreading the programmes in other char areas.

Table 4.2: Different agricultural interventions practiced by the climate stressed Bangladeshi people

Adaptation to water logging	Adaptation to salinity	Adaptation to drought
• Floating agriculture • Crop production with Kandi or Sorjan method • Rice cultivation by expelling standing water • Alteration in livelihood	• Cultivation of saline tolerant crop varieties • Rain water harvest • Shrimp or crab culture	• Digging of mini-pond for rain water harvest • Adjustment of cropping pattern

Source: Adapted from Awal et al. (2013).

The World Bank (2010) emphasized the importance of continuing promotional activities and policies to help households to build resilience. Of these, some important suggestions are: diversify household income sources; improve crop productivity; support greater agricultural research and development; promote education and skill development; increase access to financial services; enhance irrigation efficiency and overall water and land productivity; strengthen climate risk management; and develop protective infrastructure.

Household-level silos or grain storage bins were developed under the 2007 Emergency Cyclone Recovery and Reconstruction Project (ECRRP) following the Cyclone Sidr. The silos are designed to contain 40 kg paddy and can prevent water intrusion and chemical contamination. FAO coordinated distribution of 20,000 silos at the household level. Motivated by the success of the project, initiative has been taken through the Modern Food Storage Facilities Project (MFSP) under the Bangladesh Climate Change Resilience Fund (BCCRF) to make these silos available at the household level at a subsidized price.

Tidal River Management (TRM) practices should be adopted in a planned manner as a strategy for long term climate resilience. TRM allows silt bearing flood tides to inundate floodplains unhindered, resulting in sedimentation of the land. Ebb tides take the water back out to the Bay, remove the upper layer of the riverbeds and increase the depth of the river. This natural process has historically been welcomed by the local people. Flood tides raise the flood plains by new land formation, while ebb tides deepen riverbeds (Chowdhury, 2009). But the TRM did not function on the lower coastal region due to existence of many polders and embankments, but can be made functioning by minimizing the engineering interventions (Awal et al, 2013).

Government initiatives to address climate change impacts

To address the adverse impacts of climate change, the Government developed the National Adaptation Programme of Action (NAPA) in 2005. Subsequently, the Government prepared and adopted Bangladesh Climate Change Strategy and Adaptation Plan (BCCSAP) in 2009. This Plan includes actions to increase the resilience of vulnerable groups, including women and

children, through scaling up of community-level adaptation, livelihood diversification, better access to basic services and social protection. It will also support activities such as the development and implementation of climate change resilient cropping, fisheries and livestock systems to ensure food security at household and national level.

Implementation of the BCCSAP is being facilitated through contribution from the multi-donor Bangladesh Climate Change Resilience Fund (BCCRF). The plan is being implemented in six programme areas: food security, social protection and health; comprehensive disaster management; building resilient infrastructure; increasing the knowledge base; mitigation and low-carbon development; and capacity building and institutional strengthening.

5. Food Consumption and Nutritional Outcomes

5.1 Levels of Food Consumption

Consumption of food and nutrient is the real indicator of access to food by different socioeconomic groups of people. Table 5.1 shows that per capita daily consumption of all foods increased from 1991-92 to 2010 for rural, urban and all households except in 2000 when food consumption decreased compared to the previous years. Per capita total food intake in 2010 was marginally higher in rural than in urban areas.

The higher average per capita food intake conceals the fact that per capita food consumption varies widely across income classes of people. As has been shown in Table 3.1, per capita consumption of the lowest expenditure group was about 40% lower than that of the highest expenditure group.

Table 5.1: Per capita daily food intake (grams) in different survey years

Years	Per capita food intake (gram)		
	National	Rural	Urban
2010	1000	1001	986
2005	948	946	952
2000	893	899	871
1995-96	914	911	931
1991-92	886	878	938

Source: HIES 2010.

5.2 Consumption of Food by Major Food Groups

Table 5.2 shows per capita consumption of foods disaggregated by types of foods for the three survey years: 2000, 2005 and 2010. Consumption of cereal foods, dominated by rice, decreased during the period, though it is still higher than the desirable intake level. Consumption of potato, vegetables, milk/milk products, edible oil, meat and fish increased during the period, although the levels of consumption were far below the requirement. Increase in consumption is notable for

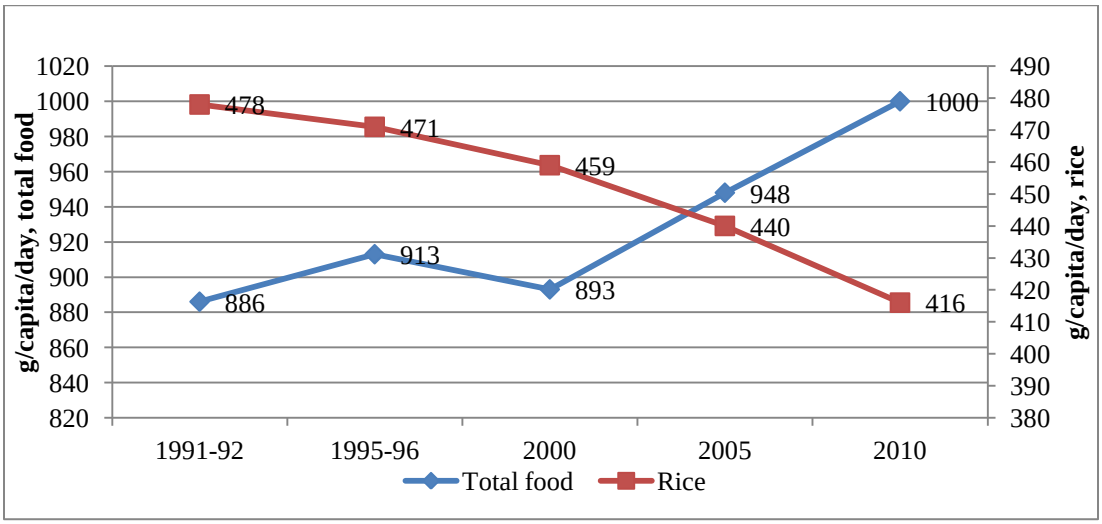
products like fruits, animal and poultry products and spices. Figure 5.1 shows that while total food consumption increased, consumption of rice decreased between 1991-92 and 2010.

Table 5.2: Per capita (gram/day) food intake by food items

Food items	2000	2005	2010	Desirable intake	
				Gram/day	% energy
Cereals	486.7	469.2	463.9	400	56
Rice	458.5	439.6	416.0	350	49
Potato	55.0	63.3	70.3	100	4
Vegetables	140.5	157.0	166.1	300	4
Fruits	28.4	32.5	44.7	100	3
Pulses	15.6	14.2	14.3	50	6.5
Milk/milk prod.	29.7	32.4	33.7	130	3.5
Meat, poultry, egg	18.5	20.8	26.2	70	4
Edible oil	12.8	16.5	20.5	30	11
Fish	38.5	42.1	49.5	60	3
Spices, candy	50.0	53.4	66.2	20	2
Sugar/gur	6.9	8.1	8.4	20	3
Miscellaneous	10.0	38.2	36.5	na	na
Total	893.1	947.7	1000.0	1280	

Source: HIES 2010. Desirable intake is obtained from Desirable Dietary Pattern for Bangladesh. NFPCSP/FAO study, 2013.

Figure 5.1: Change in rice and total food intake in Bangladesh, 1991-2010



Source: HIES 2010 data.

5.3 Consumption Pattern of Nutrients

The pattern of calorie and protein intake is presented in Table 5.3. Per capita calorie consumption decreased from 1991-92 to 2005 for rural, urban and all households but increased in 2010. Protein consumption increased marginally in 2010 after remaining relatively stable over the last two decades. However, the levels of per capita calorie and protein consumption were well above the absolute poverty line calorie (2122 kcals/day) and recommended level of protein (58 grams/day) intakes respectively. Interestingly, while per capita protein consumption for all the survey years was more than requirement, calorie intake persistently fell short of requirement.

Table 5.3: Per capita calorie and protein intake for the Bangladeshi households

Survey years	Calorie intake (Kcal/cap/day)		Protein intake (gram/cap/day)	
	Actual	Desirable	Actual	Desirable
2010	2318	2430	66	58
2005	2239		63	
2000	2240		63	
1995-96	2244		65	
1991-92	2266		63	

Source: HIES 2005 and 2011.

Average per capita protein intake increased marginally from 63 grams in 2000 to 66 grams in 2010. Protein intake was higher for urban (69 grams) than for rural people (65 grams) (HIES 2010). Average per capita protein intake (66 grams) was well above the normative requirement of 58 grams per capita per day (Table 5.3).

5.3.1 Adequacy of nutrient intake

Energy and nutrient content in foods consumed were calculated using the food composition tables for Bangladeshi foods updated by INFS (Shaheen 2013). The nutrient content of all 14 days food consumption was calculated and the mean consumption of energy and nutrients were calculated. As has been shown in Table 5.3, the mean energy requirement for Bangladeshi adults was calculated as 2430 kcals. Therefore, according to the HIES 2010 data, the current intake is deficient by 112 kcals. But compared to the intra-household energy distribution according to adult male equivalent factor, it could be stated that there was no energy deficiency for Bangladeshi adults (18 years and above) (Nahar et al. 2013).

Mean vitamin A, riboflavin and calcium intakes are also deficient compared to requirements in the diet of Bangladeshi population on the basis of HIES 2010 data. Diets of more than 70% of the population are deficient in Vitamin A, calcium and iron, and about 50% of the population consume less zinc than the requirement. Although it seems that vitamin C intake is sufficient, more than 18% of the population still consume less than the requirements (Nahar, et al. 2013).

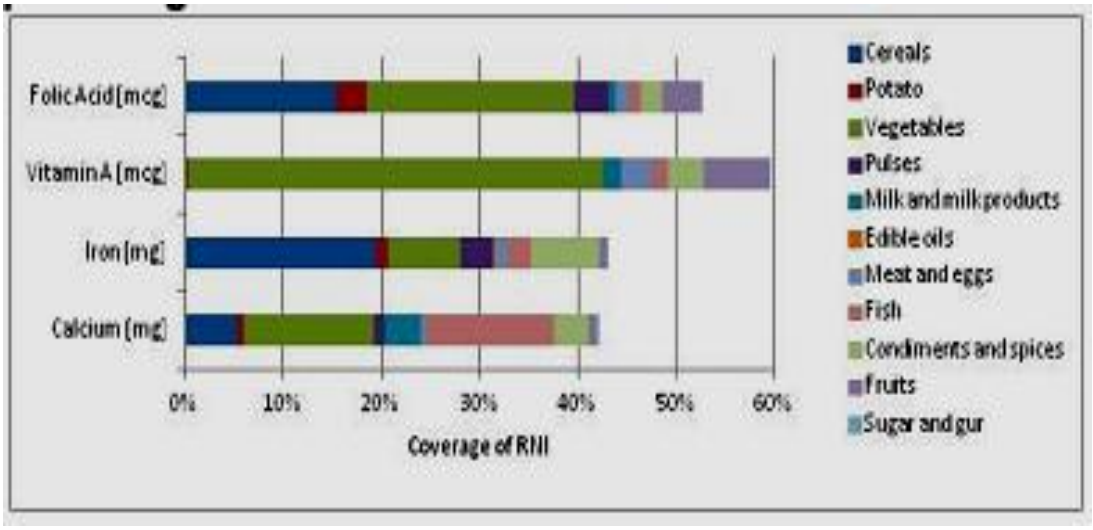
Intra-household discrimination between men and women in terms of food security also exist in Bangladesh. It is still the practice in rural Bangladesh that mothers and wives take food last in the family. Also, girl children are given less food than boys in the households. All these factors make women largely food insecured (Muzdalifa 2012).

5.4 Dietary Imbalance: Implications for Nutrition and Health Status

Dietary imbalance and unavailability of micro-nutrients are among the major factors responsible for poor nutritional outcomes. High consumption of cereals, but low intake of edible oils, vegetables and fish result in a low level of absorption of micro-nutrients and a high level of anemia and other ailments. About 70% of the total calorie comes from cereal of which rice alone contributes 62 % (HIES 2010). Contributions of other food groups to calorie are edible oil (7.9%), vegetables (3.8%), potato (2.8%) and spices (2.9%). The share of rice in total calorie intake was substantially higher in rural (65%) than in urban (53%) area which is consistent with higher rice consumption of the rural people. Although the share of cereal in the total calorie intake decreased from 73% in 2005 to 70% in 2010, according to nutritional norm the share should not exceed 60% (FPMU 2014).

Although apparent protein consumption of average people appears to be higher than nutritional requirement, net protein intake greatly depends on the calorie protein interaction in the dietary intake. A person with gross protein intake higher than requirement can be rendered protein deficient in net term if his/her calorie intake is inadequate. In absence of adequate calorie intake, excess protein is converted into calorie so that a person with gross adequate protein intake can become protein deficient in net term.

Figure 5.2: Contribution of different food groups to the total daily intake of selected micronutrients as percent of RNI.



Source: FPMU 2014

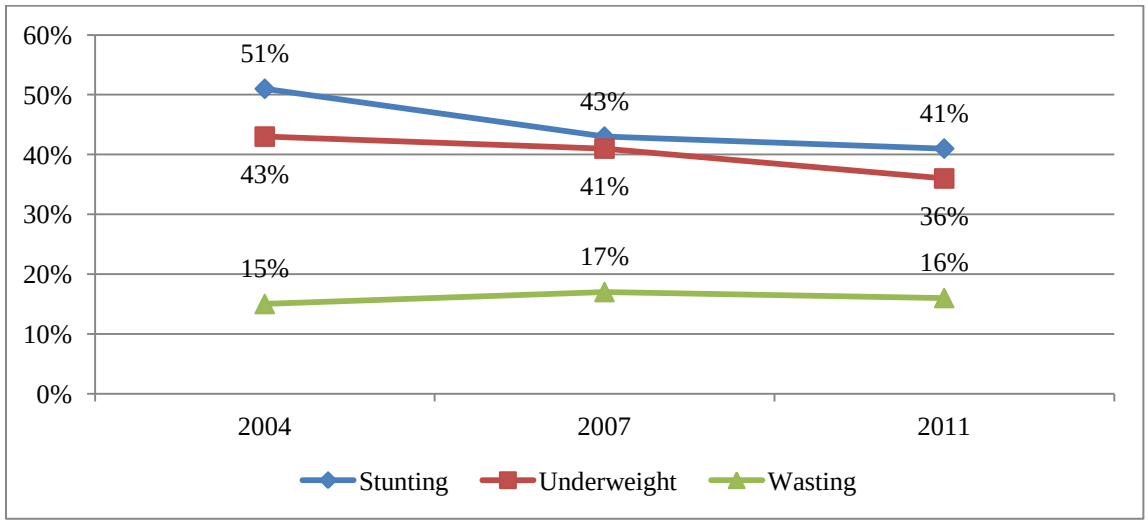
Access to and consumption of more diversified food is a key for combating problems of micronutrient deficiencies and hidden hunger. The contribution of different food groups to the total daily intake of selected micronutrients as percent of Recommended Nutrient Intake (RNI) are shown in Figure 5.2.

The per capita dietary intake of four micronutrients *viz*., vitamin A, iron, folic acid, and calcium in particular play a vital role in growth, physical and cognitive development. However, inadequate consumption of food from animal sources leads to reduced availability of protein, vitamin A and iron. Inclusion of wide variety of green leafy vegetables and locally available 'sak' in household's diet may increase the folate intake. On the other hand, availability of animal foods might ensure minimizing zinc and B_{12} requirements.

It also needs to be mentioned that many people consume excess foods and become victims of obesity. Overweight and obesity (BMI over 25) is gradually increasing among women from 12 percent in 2007 to 17 percent in 2011 which is alarming. Therefore, prevalence of under-nutrition and consumption of energy dense food create a double burden of malnutrition in Bangladesh. While under nutrition makes high prevalence of communicable disease like pneumonia, diarroheal disease and tuberculosis, energy dense food is responsible for rapid increase of non-communicable diseases (NCD) like diabetes and cardiovascular disease.

The child under-nutrition (stunting) trend declined during 2004-11. It was 51% in 2004, followed by 43% in 2007 and 41% in 2011. Also, 41% of children under the age of five were stunted, 36% were underweight and 16% were wasted in 2011 (Figure 5.3).

Figure 5.3: Trends in children's nutritional status



Source: BDHS 2011.

The prevalence of anemia among the children (under 5) since 1975-2004 was around 82% which declined to 47% (aged 6-59 months) during 1997-2001. Its prevalence is highest (79 percent) in the age group 9-11 months, a period when complementary feeding practices are poor, and diets often lack food from animal source which provides most of the iron and protein required for

producing hemoglobin. Approximately 16.5 million women of child bearing age in the country suffer from anemia (BDHS 2011).

5.5 Nutrition-Sensitive Agriculture and Food-Based Approaches

Nutrition-sensitive agricultural development and food-based approaches are sustainable strategies for eradicating hunger and malnutrition including micronutrient deficiencies. FAO advocates for the incorporation of explicit nutrition objectives into agriculture, health, education, economic and social protection policies in developing countries. Nutrition-sensitive food and agriculture-based strategies including food production, dietary diversification and food fortification ensure sustainable food and nutrition security, improve diets, combat micronutrient deficiencies, and raise levels of nutrition (FAO 2014).

5.5.1 Food-based strategies

Food-based strategies promote production of micronutrient-rich foods such as vegetables, fish, poultry and fruits, either for commercial sale or for primary consumption by the producing households themselves (e.g. home gardening). Food-based strategies to address Vitamin A deficiency (VAD) and iron deficiency, which include food fortification, encompass a wide variety of interventions that aim to increase (1) production/availability of and access to micronutrient-rich foods, (2) consumption of foods rich in vitamin A and iron and (3) bioavailability of these micronutrients in the diet.

Vegetables as a component of food-based strategies

Vegetables are the most affordable and sustainable dietary sources of vitamins, trace elements and other bioactive compounds. Improved vegetable production and consumption is the most direct, low-cost method for many of the urban and rural poor to increase micronutrients in their diet. Vegetable legumes as a protein source are recommended for populations with low-protein intakes. Leguminous crops can include mung bean, vegetable soybean or cowpea, depending on the environment and palatability acceptance. Vegetables, especially tomatoes and leafy vegetables, serve as sources of vitamin A.

Fortification and bio-fortification of foods to tackle malnutrition

Bangladesh pioneered in accepting advanced technologies for bio-fortified agriculture. The country's first bio-fortified rice variety (enriched with zinc) namely BRRI dhan 62 has been released. This rice has a zinc content of 20 to 22 mg/kg and this is capable to fighting diarrhoea and pneumonia-induced childhood deaths and stunting. International Potato Centre adapted and developed orange fleshed sweet potato (OFSP) locally called "Komola Sundury." It is easy to produce in small areas like pond dykes, requires minimal labour, fertilizer and pesticides. Presently, almost 60% of marketed edible oils are fortified with vitamin A (FPMU 2014). More

food items like atta (wheat flour), biscuits etc. need to be included in the nationwide fortification agenda.

The Government programme Ekti Bari Ekti Khamar (EBEK) (one house one farm) for sustainable diet and health

The Bangladesh Government took initiative to introduce 'Ekti Bari, Ekti Khamar (One House, One Farm) to establish a household farm into productive enterprise by 2013 in all 85,000 villages of the country. Farmers have been growing different types of vegetables in the homestead, crops in the field, and fish in the pond and have been rearing poultry, duck and livestock. These will help women empowerment and up-scaling the nutrition intake in addition to income generation.

The initiative made appreciable contribution to upscale the nutritional intake of small and marginal householders and showed dramatic changes in the health of the family members and income and socioeconomic status of the farmer. The contribution of the project drew attention from the international community for specific role of fighting malnutrition among the children and women, and as recognition of its contribution; the project was awarded the "Manthan Award Asia Pacific-2013"[3]. This project needs further attention and strengthening for deriving greater benefits.

5.5.2 Developing strategies for improving nutrition

Given the current food and nutrition situation, to scale up and accelerate action within the food and agriculture sector and across sectors to improve nutrition, the following strategies and actions need to be adopted:

- Develop time bound joint action plan involving all stakeholders and all relevant ministries
- Mainstream nutrition messages and interventions with agriculture, food, education and all other program
- Focus on 1000 days and scaling-up IYCF intervention nation wide
- Develop national campaign on food diversity, safe food preparation and consumption
- Strengthen implementation of National Nutrition Services through better multisectoral coordination;
- Enhance the production and consumption of non-cereal food items
- Promote food safety and hygiene
- Strengthen biodiversity for healthy diets and nutrition, including indigenous foods and species;
- Promote school feeding and school gardening;
- Strengthen fortification initiatives and the National Fortification Alliance.

[3] See, http://manthanaward.org/section_synopsis.asp?id=418

In summary, nutritional outcomes will have to be achieved through direct (child feeding, immunization, curative health care) and indirect (poverty reduction, nutrition-sensitive agriculture, women's empowerment) interventions. Bringing both direct and indirect interventions together and targeting them during key periods of opportunity will maximize benefits (Sen et. al. 2010).

5.6 Gender Status in Agriculture, Food Security and Nutrition

The global food economy has been both gender-blind and male-biased in terms of undervaluing women's roles in land use, production, processing, distribution, market access, trade, investment, and food availability. Women are involved in all aspects of production, processing and distribution. They work as unpaid family workers, self-employed producers, on- and off-farm employees, entrepreneurs, traders, and providers of services, technology developers, and caretakers of children and the elderly (Catherine 2011). On average, 43% of agricultural laborers in developing countries are women who are also the majority of food providers (SOFA 2011).

5.6.1 Women in agriculture and food security

In Bangladesh, women constitute about 46% of the total farming population. Women participate in crop cultivation, livestock and poultry rearing, homestead gardening and fisheries. Women in rural areas are generally responsible for most of the agricultural work in the homestead, ranging from selection of seeds to harvesting and storing of crops. About 60-70% of women from landless and near-landless households work as agricultural wage labourers.

The officially recorded share of women in the total economically active population is 39%, indicating a relatively lower economic participation by women. Gender discrimination stems from social restrictions that forms the underlying structural cause of women's food insecurity and malnutrition. It limits their control over economic assets, creates barriers against generating income, excludes them from household decision making, impedes their mobility and eventually restricts their access to food. Women of Bangladesh are victims of inequality, abuse, oppression and exploitation, leading to their lack of employment opportunity which restricts the total integration of women in the mainstream development activities in Bangladesh (Marufa 2007).

Results from Bangladesh Integrated Household Survey (BIHS) 2011-12 data showed that education and income had positive relationship with empowerment in agriculture for both men and women. However, for both the variables, the rate of increase in empowerment was higher for men than for women. As for education, percent of women respondents empowered increased from 23.20% for less than primary level to 29.41% for University or above level of education (an increase by 6.21 percentage points). In the case of men respondents, the rates increased from 37.69% to 51.35% for the respective education levels (an increase by 13.66 percentage points). For the income variable, the rate of increase in empowerment with increase in income was even higher for men than for women respondents. Thus women with higher education and higher

income similar to men may still remain less empowered than men in respect of decision making in agriculture, as this is considered a male domain (Sraboni et al. 2013a).

A separate analysis using the same data set revealed that empowerment of females and their group membership were positively correlated with per adult equivalent calorie availability and dietary diversity. Increase in the number of groups in which women actively participated had positive impact on household food security outcomes. Women's decision making concerning credit was also positively correlated with food security outcomes. Women's ownership and their rights over assets had a role to play in improving household food security (Shaboni et al. 2013b). Another study by Hallman (2003) demonstrated that greater control over resources by women was associated with improved child health. Likewise, Kumar and Quisumbing (2010) showed that interventions targeted to women's group increased women's status and improved the nutritional status of women and girls.

Jaim and Hossain (2011) using panel data from 62 villages showed that participation of women in agriculture remained almost the same in 1988 and 2000 (59% and 58% respectively); but compared to 2000, women participation increased by about 8% in 2008. About 79% adult males were engaged in crop cultivation in 1988 which dropped to only about 42% in the year 2000. However, there was some increase in male participation in crop cultivation in 2008 (53%). Involvement of male labor in crop cultivation has reduced in more recent past years as many of the farm operations (i.e. tillage, irrigation, threshing of paddy, etc.) are now fully or partially mechanized.

Pilot projects have shown that empowerment of women in agriculture contributes to improvement of health and nutritional status of women and children (Talukder et al., 2010). One micro level study found that women carry out significant work around plantation activities in the home garden, including watering (65%), fertilizing (52%), weeding (56%), and fencing (53%). Women also spend most of their time in pre-harvesting activity with the average time in home gardening being 6-8 hours per week, and have a major role in food processing, cooking and preservation at the household level (Akhter *et al*. 2010).

The Bangladesh National Women Development Policy 2011 makes comprehensive provisions for women's rights and empowerment through land ownership, earned property, health, education, training and technology, credit facilities and income generation with a vision of improving nutrition. In addition, there are government programmes that are not intended to be nutrition interventions but impact community nutrition. The Secondary School stipend, School Feeding Programme, Vulnerable Group Feeding Programme and Food-for-Work Programmes are some examples.

Evidence from an integrated food and nutrition project in Bangladesh shows that engagement in homestead poultry rearing can increase egg production and consumption by children and reproductive-age women. Similarly, in a vegetable and polyculture fish production programme, there was an increase in vitamin A consumption, improvements in weight-for-age for children, a

decrease in stunting by 28 percentage points among girls and 43 percentage points among boys (www.iycn.org).

5.6.2 Persisting wage difference between men and women

In spite of so much effective involvement of women in agriculture and non-agricultural activities, the wage difference between men and women in agriculture remains very high, at around 40%. Major involvement of women in agricultural work is concentrated in the Hill Tract areas and in some areas of Rangpur, Dinajpur, Mymensingh and Jamalpur districts. However, a good part of post-harvest activities are carried out by women, generally at household premises, all over the country. In 2012-13, the wage differential between men and women in agriculture was estimated at 40% which was a reduction by 8 percentage points from what was observed in 2007-08 (FPMU 2014).

Kapsoss (2008) found that women earn an average of 21% less per hour than men. Controlling for differences in age, educational background, industry, occupation and geographic location yields an estimated gender wage gap of 15.9%, but including the effects of industrial and occupational segregation into the estimate yields an estimated wage gap of 23.1%. Gender-based occupational segregation increases the gender wage gap in the construction, financial intermediation and manufacturing industries, but mitigates it in the education, hotels & restaurants and other services industries. Thus increased education has an important role to play to lower the gender wage gap in Bangladesh.

5.7 Ensuring Food Safety through Food Chain

Consumption of unsafe food represents a major threat to public health in Bangladesh. The nature of hazards present in the food chain ranges from pathogenic microorganisms and their toxins to a vast array of chemical contaminants including heavy metals, agricultural and industrial chemicals, environmental contaminants and deliberate admixtures of harmful substances. The effects of contamination can be serious and life threatening for babies, elderly people, pregnant women and people with compromised immune systems. Over time, mercury released from industrial processes is settled in earth's waterways and absorbed into the food chain. Processed food products occasionally become contaminated with unknown allergens when manufacturing process let them come into contact with ingredients from a different product.

5.7.1 Heavy metal contamination

Food chain contamination by heavy metals has become a major health hazard in recent years because of their potential accumulation in the bio-system through contaminated soil and water. Industrial discharges, fertilizers, fossil fuels and municipal wastes are the major sources of heavy metal contamination in soils and subsequent uptake by crops.

Uptake of heavy metals by crops through soil and irrigation water enters into the food chain which leads to long term health hazards. Islam et al. (2005) studied concentration of heavy metals in 24 different types of vegetables grown in the Chapai Nawabganj district of Bangladesh and found wide variation in the concentration of arsenic, lead and cadmium in the vegetables grown in the area. Alam et al. (2003) analyzed vegetable samples from a village of Jessore district. Lady's finger had the highest and 'ash gourd' had the lowest level of zinc concentration.

Empirical evidence (Islam et al. 2013) found the presence of at least one or more heavy metals (cadmium, arsenic, lead, mercury, antimony, nickel, aluminium and lithium) in 5 out of 16 food groups (cereals, fish, meat, vegetables, spices). Mineral (calcium, magnesium, sodium and potassium) and trace element (iron, manganese, copper, zinc, molybdenum, cobalt and selenium) concentration varied widely across the foods. The concentration of heavy metals in rice appeared to be high. Puffed rice had higher concentrations of sodium, potassium, iron, manganese and aluminium than ordinary rice. Arsenic content was found higher in fine rice than in coarse rice. Cadmium was present in wheat flour, hilsha, prawn, katla, pangas and dry fish. All households were at high risk of violating the FAO/WHO (2010) "zero" provisional tolerable weekly intake of arsenic.

Heavy metals are very harmful because of their non-biodegradable nature and their potential to accumulate in body parts (Sharma et al. 2007). Heavy metals have been reported to produce mutagenic and carcinogenic effects even at very low concentration (Waalkes et al. 1999). Human beings have also been reported to develop several diseases like cardiovascular and nervous disorders due to metal toxicity (WHO 1996).

5.7.2 Use of chemicals and hormones in vegetables and fruits

Farmers use chemical fertilizers and pesticides to regain soil fertility and control pest attacks, and quite often they make excess use of these inputs. Chemicals and hormones are also used for regulating size and shape of products. Sometimes farmers harvest and sell vegetables and fruits immediately after spraying chemicals and pesticides which pose serious threat to human health. The marketing agents also quite often use chemicals, ripening agents and preservatives which are dangerous for human health.

A number of FAO sponsored studies in Bangladesh found evidence on indiscriminate use of chemicals and hormones in the production and marketing of vegetables, fruits and fish (Bhuiyan et al. 2009, Hassan 2010, Alam 2010). Bhuiyan et al. (2009) studied the incidence of use of chemicals and hormones in the production and marketing of vegetables and banana in 3 districts of Bangladesh. The results showed that farmers used Liston and Okozim as plant growth regulator (PGR) for vegetables and banana cultivation. Majority (58%) of the vegetable farmers were the low users of PGR. About 41% of banana farmers were low users of PGR and 31% were medium users. About three-fourth (74%) of the banana wholesalers used different types of ripening agents for quick ripening of banana. Some wholesalers soak banana in liquid mixture of

calcium carbide for quick ripening and having attractive colour. Soaking banana into formalin mixed water was also reported in the study. The study by Hassan et al. (2010) showed that 4-20% mango growers used calcium carbide for ripening mango. The study also found that 8-20% of the big traders (Beparis) used different types of chemicals for ripening fruits.

Alam (2010) assessed quality loss of fish species for chemical and microbial parameters. Quality loss was very high for salted Ilish (60%). For sun-dried ribbon fish and Bombay duck, quality loss was 17-20%. Dyes, likely to be toxic, were found to be used in the range of 29% to 55% in Rohu, Catla, Silver carp, Tilapia and Snakeheads in Dhaka city markets. Chemical pesticides (DDT, Nogos and Ribcod) were used in most of the dried and fermented fish products.

5.7.3 Safety of street foods

Street foods consumed by low income people represent another health risk in the particular context of Bangladesh. A recent FAO sponsored study (Faruque et al. 2010) conducted microbial analysis on 75 street food samples collected from 3 locations of Dhaka city and found that in two popular food items namely Lassi and sandwich, total bacterial count was higher than the acceptable limit set by the International Commission on Microbiological Specification for Foods (ICMSF). Drinking water served with street food was also found to be unsafe in terms of total bacterial count, enteric bacterial count and total coliform count. The study concluded that it is likely that bacterial contamination results from the use of contaminated water as well as from the unhygienic conditions under which street foods are prepared and sold.

A huge number of food items available in the market are not up to the Bangladesh Standard Testing Institute (BSTI) standards. The BSTI also till now could introduce standards of only about 58 food commodities. Many of the existing standards are not in compliance, rather uncontrolled hazardous chemicals, additives and preservatives are being widely used for early ripening and preservation.

The practices are serious threats to human health and increasing the proportion of non-communicable diseases. The issue is a serious concern and requires immediate measure, medium and long term plan for improving the situation. The priority issues for improving food safety and quality in the food chain should include the following:

- Implement SPS (Sanitary and Phytosanitary Standards) compliance
- Build a comprehensive baseline identifying the markets where food is at higher risk of contamination, tracing the potential entry, hazard analysis at critical control points (HACCP) of contamination across the food chain
- Develop rice varieties that accumulate less arsenic and cadmium to minimize the transfer or arsenic from irrigation water to the grains and from grains to the body
- Define and enforce regulations and controls of industrial effluents' treatment and disposal to minimize heavy metal contamination in food

- Expedite formulation of Food Safety Authority and implementation of the Food Safety Act (2013).

6. Review of the Development Policies related to Food Security

The initiatives on food policy formulation in the country started with preparation of the **National Food Policy of 1988**, the goal of which was to ensure food security for all people by increasing food production and attaining self-sufficiency. The focus was therefore nearly exclusively on maintaining a balance between aggregate supply and total requirements, overlooking the other key facets of food security. The **National Food and Nutrition Policy** formulated in 1997 by the Ministry of Health and Family Welfare was a first attempt to address this shortcomings by including food diversification, health and nutrition as key areas of intervention for the national food security system. In the **Development Forum** meeting held in **Paris** in 1999, it was suggested that the Government of Bangladesh needs to develop a Comprehensive Food Security Policy. A Joint Task Force was subsequently formed in 1999 to address the issues of availability, access and utilization in the food policy formulation. After thorough review of the existing policies and programs, the Task Force produced a **Comprehensive Food Security Report (July 2000),** which outlined a set of key recommendations for building a dependable food security system. The initiatives continued and after a series of consultations, a draft policy document was prepared in 2001 and after further revision in 2004, the **National Food Policy (NFP)** was finalized in 2006.

The NFP 2006 provides strategic guidance to address the key challenges facing Bangladesh in achieving food security in all its dimensions including food availability, access and utilization of food for better nutrition. The NFP has taken into cognizance core development policies in its preparation, implementation and monitoring.

To implement the objectives of the National Food Policy, a **Plan of Action (2008-2015**) was developed towards achieving its three core objectives through 26 strategic areas of intervention and more than 300 action agenda to be undertaken in short term, medium and long term over the period 2008-2015. The Plan of action also identified responsible actors (government and non government) and suggested a set of priority targets and indicators for monitoring progress. It also provided a set of guidelines regarding inter-ministerial coordination, sectoral planning and budgeting with a view to promoting implementation effectiveness. To this end, the **Country Investment Plan (CIP)** for Agriculture, Food Security and Nutrition laid out a coherent set of 12 priority programmes that have been anchored in the policy, programmatic and investment framework of Bangladesh and these have been consistent with the Sixth Five Year Plan. Three monitoring reports of the NFP POA and CIP have been produced on an annual basis since 2012 as a collaborative effort of 13 Ministries led by the FPMU, Ministry of Food.

There are also other different policies and programmes in Bangladesh, which are being implemented by different Ministries/Agencies to ensure food security and nutrition. These need

to be harmonized in a way to complement each other and strengthen delivery on food security and nutrition. Further updating of these policies/programs is required to better serve formulation and implementation of the 7th Five Year Plan. These policies and programs are described below:

National Agriculture Policy 2013: Recently the Government of Bangladesh has revised and approved 'National Agriculture Policy 2013'. The main objective of the policy is to ensure food and nutrition security for all and improve the quality of life for rural people through increased productivity and agricultural diversification. One of the important objectives of this policy is to promote high value nutrient enrich crops to fulfil the nutrition requirement of the people. National Agriculture Policy 2013 could help to achieve the targets of the 7th FYP.

HPNSDP (2011-16): In Bangladesh, Ministry of Health and Family Welfare is the key ministry to implement direct or nutrition specific interventions through its unique nationwide network of facilities and services in a sector wide approach. Health Population and Nutrition Sector Development Programme (HPNSDP 2011-16) is the current sector plan that sets nutrition mainstreaming into health and family planning services as key strategy. One of its Operational Plans named National Nutritional Services (NNS) is leading nutrition implementation technically and logistically; whereas ten other operational plans are also playing implementation role. The HPNSDP (2011-16) could also be revised to make it more aligned with the 7th FYP.

The Ministry of Health and Family Welfare has also drafted '**National Nutrition Policy 2014'** and '**National Strategy on Prevention and Control of Micronutrient Deficiencies (2014-2023)'**. Both of these two documents could also play an important role to eradicate malnutrition through providing guidelines on nutrition specific and nutrition sensitive interventions as well as to achieve the targets of 7th FYP.

National Fisheries Policy 1998: The National Fisheries Policy was approved in 1998 for the first time which sets out the policy framework for directing the management of the fisheries sector. The objectives of the policy are: a) enhancement of the fisheries resources and production; b) poverty alleviation through creating self-employment and improvement of socioeconomic conditions of the fishers; c) meet the demand for animal protein, d) achieve economic growth and earn foreign currency by exporting fish and fisheries products; e) maintain ecological balance, conserve biodiversity and improve public health. For long time since the formulation of national fisheries policy in 1998, it has not been revised or reformulated. However, a number of fisheries strategies have been developed for the implementation of national fisheries policies. Finally, a formal fisheries strategy came into being in 2006. The policies and strategies need to be updated and a viable action plan needs to be prepared to address the upcoming emerging issues.

Livestock Development Policy 2007: High quality animal protein in the form of milk, meat and eggs is extremely important for the proper physical and mental growth of human being. In Bangladesh, around 8% of total protein for human consumption comes from livestock. Hides and

skin of cattle, buffaloes, goats and sheep are valuable export items, ranked third in earnings after RMG and shrimp.

Shortage of quality inputs, inadequate services and physical infrastructure, institutional weaknesses in terms of weak regulatory framework and enforcement, limited skilled manpower and resources, and inadequate research and technological advancement are all continuing to act as constraints to livestock development. To improve the performance of the livestock sector, the new National Livestock Development Policy was formulated in 2007. This policy needs to be updated to address the emerging issues which would be embedded in the 7th Five Year Plan.

National Nutrition Policy: Given the cross cutting nature of nutrition problems, interdependent interventions across diverse sectors such as agriculture, health, education, water and sanitation, and food and disaster management are being implemented. The draft National Nutrition Policy 2014 sets the vision to curb malnutrition and promote nutrition security for all citizens of Bangladesh with strong recognition of multisectoral efforts for nutrition sensitive interventions as well as overarching coordination mechanism for relevant sectors.

In this context, there is a need to revise the current National Food Policy as National Food and Nutrition Security Policy giving more emphasis on nutrition interventions. Accordingly the NFP-PoA and the CIP will be revised in line with the post MDG targets and will be aligned with the Seventh Five Year Plan. The goal of the revised food policy and seventh five year plan will be to achieve food and nutrition security for all through mitigation of the under nutrition challenges.

7. Development Vision, Goal, Objective and Target for the Seventh Five Year Plan

Vision

The Perspective Plan of Bangladesh 2010-2021 (GED 2012) envisions Bangladesh to be a middle income country by 2021, where poverty will be drastically reduced, citizens will be able to meet every basic need and development will be on fast track with accelerated rate of economic growth. The number of poor people will be reduced from about 45 million in 2013 to 22 million in 2021. Improved food security and nutrition will ensure a productive and healthy nation towards accomplishment of the development agenda.

Goal

In alignment with the goal of the National Food Policy, the food security goal of the 7th Five Year Plan will be to ensure dependable food security system for all people of the country at all times. The goal applies at national, household and individual levels with particular focus on mothers, children and other vulnerable groups.

Objectives

Food security objectives under the 7th Five Year Plan has to be in line with the three objectives of the National Food Policy (NFP 2006) namely (i) ensure adequate and stable supply of safe and nutritious food, (ii) enhance purchasing power of people for increased food accessibility and (iii) ensure adequate nutrition for all. The NFP 2006 identified 12 broad strategies and 32 sub-strategies with more than 100 action agendas. The National Food Policy Plan of Action (2008-2015), in alignment with the NFP, identified 26 key areas of interventions with more than 300 action agenda of which some were prioritized. The specific food security objectives under the 7th FYP can be identified as under

- Ensure food availability and access for all people at all times, particularly for women, children and other vulnerable groups of people;
- Eradicate poverty and hunger by strengthening economic and social access to food;
- Sustain self-sufficiency in rice production and promote diversification of agricultural production with high value crops, livestock and fishery products;
- Promote nutrition sensitive agriculture for improving food consumption and nutrition
- Improve health status, sanitation and hygiene for people for better utilization of food;
- Promote non-farm employment through increased mechanization and agricultural activities;
- Ensure gender parity in agricultural and non-agricultural wage earnings;
- Increase women empowerment for ensuring greater role of women in decision making with respect to farm and non-farm production, children education and intra-household food allocation;
- Develop social safety net programmes for vulnerable groups with special focus on women and children to cope with natural disasters and other vulnerabilities;
- Expand improved storage facilities for foodgrain and other food items by enhancing public-private partnership;
- Synchronize public stocking of food and food-based safety programmes with the newly formulated life-cycle focused social protection strategy;
- Further promote agro-processing facilities and facilitate marketing and trade of agro-processed products;
- Ensure food safety through the food chain by developing regulatory and enforcement framework;
- Develop resilience to climate change impacts through dissemination of production, storage and processing technologies, particularly in the disaster prone areas.

Targets

Food security targets under the 7th FYP can be set in line with the Perspective Plan which in turn would reflect the provisions of Vision 2021. Table 7.1 shows a schematic picture of targets against the benchmarks corresponding to selected indicators.

Table 7.1: Targets of selected food security indicators under the 7th Five Year Plan

Sl. No.	Indicator	Benchmark 2013	Target 2021
1.	Real GDP growth rate (%)	6.01 (2012/13)	10 (PP)
2.	Share of agriculture in GDP (%)	17.07 (2012/13)	12 (PP)
3.	Per capita income (US$)	1040 (2013)	2000 (PP)
4.	Head count poverty rate (%)	31.5 (2010)	14.4 (PP)
5.	Percent of calorie derived from cereal	70 (2010/11)	55 (PP)
6.	Income inequality (Gini ratio)	0.46 (2010)	0.27 (LMI, PP)
7.	Investment GDP ratio (%)	28.39 (2012/13)	37.5 (PP)
8.	Adult literacy rate (%)		
	Male	62 (2011)	89 (UMI, PP)
	Female	53.4 (2011)	87(UMI, PP)
9.	Net enrollment in primary school (%)	98.7 (2011)	100 (PP)
10.	Infant mortality rate (per 1000 live birth)	33 (2012)	8 (PP)
11.	Public foodgrain storage capacity (million mt)	1.69 (2012/13)	3.0 (MoFood)
12.	Difference between food and general inflation (3 years moving average)	0.22% (2012/13)	0% (FPMU)
13.	Safety net spending as % of GDP	2.33 (2012/13)	3.0 (New target proposed)
14.	Change in national wage in kg of coarse rice (3 years moving average)	5.84% (2012/13)	0.5+per capita GDP growth (FPMU)
15.	Wage difference between male and female in agriculture	40% (2012/13)	20% (New target proposed)
16.	Share of employed rural labour force in rural non-farm activities	45.4 (2010)	50% (New target proposed)

Notes:
PP=Perspective Plan (2010-2021)
LMI=Lower Middle Income country assumption. It is assumed that Bangladesh economy will reach the level of low middle income country by 2021.
UMI= Upper Middle Income country assumption
MoFood= Ministry of Food
FPMU= Food Planning and Monitoring Unit.

8. Strategies for Improving Food Security

The strategies to be followed for improving food security pertain to the three broad objectives of the National Food Policy. The major strategies to be pursued corresponding to the three food policy objectives are presented below:

8.1 Ensure adequate and stable supply of safe and nutritious food

Making food production efficient and sustainable: The prime consideration in making food production efficient is to make judicious use of land, water and other critical inputs. Rice production will be intensified by making lesser use of land and greater use of improved technologies. Diversification will be strengthened by including high value crops in the cropping pattern and expanding production in the fishery and livestock sectors. Integration of crop-livestock-fish enterprises will be promoted. In selecting crop and crop combinations, cost-effectiveness of the enterprises will be determined. Research and extension activities will be strengthened to develop and disseminate new and efficient technologies. In making use of of the agricultural technologies, utmost care will be taken to preserve the environment, water and soil quality, and bio-diversity.

Strengthening agricultural diversification: An integrated approach to diversification will call for strengthening research and extension for non-cereal crops and non-crop agricultural products including fisheries and livestock. Acknowledging the multiple constraints and variables that need to be taken into account, a clear work plan is to be developed for increasing production of high value crops by 25 percent and introducing modern varieties of pulses, oilseeds, maize, vegetables and fruits, while continuing with the on-going programmes for scaling up fish, poultry and livestock production. Special thrust will be given for developing and expanding integrated crop-livestock-fish farming system. This strategy will try to ensure that small and marginal farmers will be able to meet their diversified consumption needs from own production so that their nutritional welfare will be maximized.

Making food market efficient: For making food market more efficient, improved market connectivity will be established at local, regional, national and international level. Improved private storage and transportation facilities are very important for ensuring spatial and seasonal availability of foods. Growth centers, hats/ bazars, women market centers, roads, bridges, culverts and railway networks will be improved. Market monitoring will be strengthened to curb adulteration and other malpractices through marketing regulations and ensuring their compliance. All physical facilities of markets such as water, electricity, market spaces, storage facilities will have to be made available. Adequate measures will be taken to ensure that marketing cost of the products are reduced through minimization of travel time and elimination of extortion of money by unauthorized agents. Market integration will also be strengthened.

Non-distortionary foodgrain market intervention for price stabilization: Public procurement of foodgrains, price supports after harvest, public stock for distribution are some of the tools

used by the Government to support producers and consumers. The Government plans for a non-distortionary foodgrain market intervention programme to accelerate market price stability, encourage market competition and improve food security, yet not discouraging private sector trade and storage. Measures like maintaining improved public stock management, keeping adequate pubic storage facilities and enhanced effectiveness of Open Market Sale are the important strategies for maintaining a non-discretionary foodgrain market.

8.2 Enhance purchasing power of people for increased food accessibility

Agricultural disaster management: An important consideration in agricultural disaster management is to strengthen the effectiveness of post-disaster rehabilitation programmes in agriculture. Public and private efforts will need to be strengthened for providing seeds/seedlings and other agricultural inputs following disasters. To satisfy the emergency distribution needs, public foodgrain stock equal to three months of emergency requirement along with relief system to distribute food, clean water, medicine and other essentials are to be maintained. Research efforts will be continued to develop weather, submergence and disease tolerant crop varieties. Effective early warning systems will be developed to provide sufficient lead-time information about occurrence of impending disasters. Introduction of agricultural insurance schemes is a special consideration in this regard.

Effective implementation of targeted food programmes: Targeted distribution of food through Vulnerable Group Feeding (VGF) programme, distribution of foodgrain as wages in Food-for-Work (FFW), direct distribution of food to poor households participating in training and development activities (as in the Vulnerable Group Development (VGD), and expansion and effective implementation of the social safety nets for the ultra-poor and the underprivileged population are some of the strategic means to improve food security of the poor and ultra poor households. Improving targeting effectiveness, ensuring cost effectiveness, reducing leakages in the distribution are the strategies to be followed for improving overall effectiveness of the targeted food programmes.

Promoting agro-processing and small scale rural enterprise: In line with the agriculture-led growth approach to food security, adequate support needs to be provided for expanding agro-processing activities. This strategy will be accomplished through selection of appropriate technology, compliance with quality standards, training and skill development, and access to finance. In line with the Small and Medium Enterprise (SME) policy, value chain approach will have to be followed by integrating input providers, traders, processors and service producers. In implementing the strategy, care will have to be taken to expand support for the activities in more backward areas.

Employment-generating income growth: To promote income growth of the poor, the Government has undertaken numerous development projects such as (i) support to women and the disabled in income generating activities; (ii) promoting investment in employment enhancing technology; (iii) providing incentives for development of agro-based industries; (iv) special

assistance for expansion of rural industries; (v) education and skill development programmes; and (vi) broad-based growth promoting macro-policy. Implementation and monitoring of these activities will have to be strengthened to achieve higher income growth from these employment generating activities. The coverage of the Employment Generation Programme for the Ultra-poor will be enhanced to achieve desired results in this direction.

8.3 Ensure adequate nutrition for all

Promoting balanced diet containing adequate micronutrients: In addition to adequate intake of carbohydrates, protein, fats and oils, intake of diets rich in iron, vitamin A and other micronutrients for better health of the Bangladeshi are also necessary. To attain this, cost-effective public health interventions and nutrition education programmes need to be undertaken. Other potential and sustainable strategies are development of iron and vitamin A rich staple crops through conventional plant breeding for bio-fortification. In the interim, effective programmes for micronutrient supplementation and food fortification (with established standards and regulatory mechanisms) need to be explored as cost-effective approaches. Considering the long lasting negative effects of micronutrient malnutrition, the Government will undertake programmes to increase availability and accessibility of balanced food.

Provision of safe drinking water and improved sanitation: Unsafe drinking water and poor sanitation results in diarrhoeal and other waterborne diseases. Of high priority among the existing and the planned facilities is the testing and control of water quality (especially the arsenic content of drinking water). Facilities for safe drinking water and sanitation should be made available for everybody. The Government policies and programmes to improve water safety and sanitation are:(i) health education, including proper child-care practices, and provision of safe drinking water and sanitary practices for prevention of diseases; (ii) infrastructure development, including public investments in water supply (e.g. community tube wells) and sanitation; and (iii) expansion of the existing public facilities for testing water quality (particularly for arsenic content).

Safe and quality food supply: With increasing supply and consumption of processed food, the need for special care is increasingly emerging to maintain the quality of foods at all levels of marketing (e.g. assembling, cleaning, sorting, processing and packaging). Priority will have to be given to assessment and prevention of risks involved in the distribution of safe food along the entire channel from production to consumption. Steps undertaken to ensure supply of safe and quality food through formulating new regulations are:(i) formulation of uniform arrangement, development of testing techniques, setting of standards and their application and compulsory enforcement; (ii) investment in development of packaging and safe storage facilities; (iii) expansion of laboratory facilities and imparting practical knowledge for development of the quality of food and food products; (iv) training for concerned officials and institutions in protecting the grades and standards of food products; (v) campaign for nutrition enhancing quality and safe food; and (vi) development and enforcement of appropriate regulatory

mechanism to control indiscriminate use of harmful additives, preservatives and toxic elements in production and in the marketing chain for foodstuffs.

Adequate health status: Disease control not only contributes to raising nutritional status, but also helps in improving the health condition. With regard to nutrition and proper utilization of food, the Government of Bangladesh has instituted various programmes including the Health, Nutrition and Population Sector Programme (HNPSP) in cooperation and coordination with the NGOs. The following issues are included in the programme: (i) extended programme for immunization (EPI), control of acute respiratory infection (ARI),and prevention and control of cholera and other diarrhoeal diseases; (ii) implementation of the reproductive health programmes; and (iii) implementation of the National Nutrition Programme involving community mobilization and community-based nutrition service delivery, targeted to children and women of reproductive age suffering from persistent weakness and micronutrient deficiencies.

9. Current and Future Challenges:

Undernourishment: Bangladesh met the MDG target for undernourishment in the early 2000s. Undernourishment declined a little more thereafter, and then flat-lined for much of the past decade until it started to rise in the last three years, reaching 16.3% in 2012/13. The number of undernourished population increased from 23.7 million in 2011/12 to 24.8 million in 2012/13.

Reducing poverty to 14% by 2021: The Perspective Plan (2010-2021) sets the target of reducing poverty to 14 % by the year 2021 which will remain a challenge for the 7th FYP. A projection exercise done at the Planning Commission suggests that poverty rate declined to 23.4% by 2014. It remains to be seen how the poverty rate decline in future so that the target of 14% will be achieved by 2021.

Sustaining food production: Bangladesh has made remarkable progress in food production, particularly in the production of rice and potato. As has been mentioned, future production will have to occur inevitably under conditions of declining availability of quantity and quality of land, water and other critical inputs. Increasing and sustaining rice production to feed the rising population will require significant breakthrough in the development and diffusion of stimulating rice varieties. Also, for sustaining production of rice, potato and other high value crops, farmers will have to receive remunerative prices. For maintaining price stability of both inputs and products, dynamic policy approaches will have to be pursued including rationalization of subsidies and improvement of storage, processing and marketing facilities of products. Above all, the overarching negative impacts climate change will have to be tackled. Thus sustaining food production in the future would really be a matter of formidable challenge.

Developing resilience to climate change impacts: The adverse consequences of climate change looks inevitable. Developing resilience to the climate change impacts will remain a challenge. In

fact, some of the impacts have started to be visible. Changing pattern of rainfall and temperature, and increasing incidence of salinity in the southern region are largely attributed to climate change phenomena. Although Government has taken several initiatives to strengthen adaptation measure, more interventions would be required to develop resilience to climate change impacts.

Strengthening integrated homestead farming: Family farming for household nutrition needs to be promoted amidst the challenges of declining land and climate change. Nonfarm employment and promotion of nutrition related activities will need to be strengthened in the future. Dietary guidelines for balanced nutrition, appropriate food preparation, processing for nutrition and value addition for semi commercial ventures are areas for attention. To this end, targeting and prioritizing interventions on pregnant and lactating women, infants and young children would be the key for improving nutrition while addressing the continuum across the life span.

Strengthening value chain of food products: Consumption of food is constrained by inefficiency in the marketing system and consequent rise in prices. Improvement of value chain will ensure fair price for the producers and affordable price for consumers. Developing marketing and storage infrastructures, and thereby reducing quantity and quality losses of perishable products remain as a real challenge.

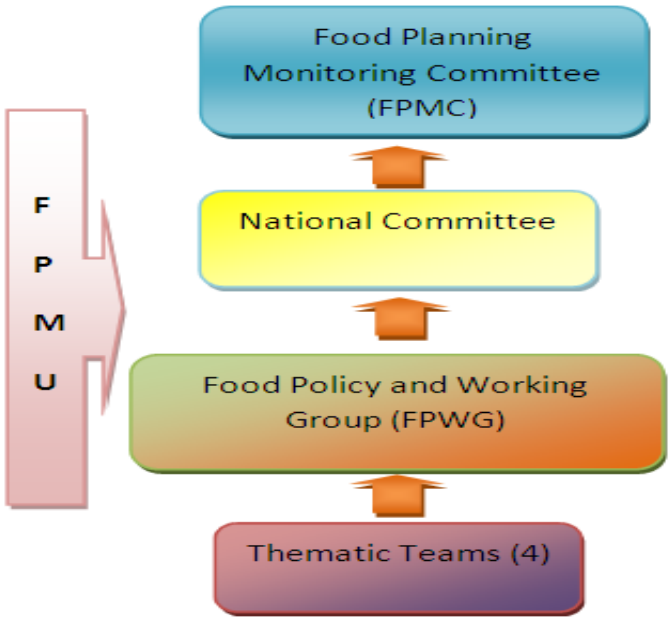
Food safety and quality improvement: Consumption of unsafe food and the consequent illnesses impact personal health, childhood development and earning capacity. Consumption of unsafe food by children younger than five needs to be averted because it more readily leads to mortality, resulting in at least 18% of deaths in that age group compared to 10% amongst adults. Notably, prevalence of parasitic infections, diarrhoea, food borne illnesses, and presence of heavy metals in food are still challenging areas that need to be addressed.

Meeting the challenges of zero hunger: The challenge of zero hunger includes: (i) zero stunting of children less than 2 years, (ii) 100% access to adequate food all year round, (iii) all food systems are sustainable, (iv) 100% increase in small holder productivity and (v) zero loss or waste of food. According to FAO, one in every eight people in Asia and the Pacific suffers from chronic hunger, and nearly two-thirds of the world's chronically hungry people live in the region. Addressing the zero hunger issue would be a real challenge during implementation of the 7th Five Year Plan.

10. Institutional Mechanism for Monitoring Progress of 7th FYP Implementation

Bangladesh has a composite institutional structure for coordinating, implementing and monitoring the NFP and the CIP (Figure 9.1). This includes at its top the Cabinet level Food Planning and Monitoring Committee (FPMC), chaired by the Food Minister and with membership of Ministers and Secretaries from 12 Ministries/ Divisions.. This Committee provides strategic orientation on food security issues and establishes a high-level commitment to inter-sectoral collaboration. The National Committee (NC), also chaired by the Food Minister is composed of the Secretaries of the various concerned divisions, Heads of Universities/Research Institutions, DPs, private sector and other Non Governmental Organizations (NGOs). Among other tasks, the NC oversees food policy implementation and monitoring processes. The Food Policy Working Group (FPWG) is the mechanism for coordinating collaboration at the technical and operational level through the four Thematic Teams (TTs) that carry out the monitoring process of the NFP PoA and the CIP consistently with monitoring of progress towards MDG-1 and Sixth Five Year Plan.

Figure 9.1: Institutional framework



The FPMU provides support to these institutions by acting as the Secretariat of the various Committees and provide technical and operational support to the Food Policy Working Group (FPWG) and the TTs. In addition to this, GoB agencies involved in running programmes pertaining to the CIP (over 30) and the DPs collaborating under the Local Consultative Group (LCG) for Agriculture, Food Security and Rural Development provide inputs towards financial monitoring.

11. Recommendations

Strengthen research and extension for development and dissemination of technologies

Sustaining food production by developing eco-friendly technologies has been identified as a key challenge for improving food security. For increasing productivity, new seeds of crop, fish and

breeds of livestock need to be developed. For sustaining production and maintaining self-sufficiency in rice, new high performer rice varieties must be developed for replacing BRRI Dhan 28 and 29 which are on the verge of degeneration. The proliferation of fish hatcheries with production of low quality fish seeds should be stopped and measures should be taken for increasing good quality fish seeds. Appropriate breeds of livestock also need to be developed. Improved cultural technologies also deserve special attention. For dissemination of technologies, research-extension-farmer linkages need to be strengthened.

Intensification of rice production and diversification of agricultural production

Rice production needs to be intensified by making lesser use of land and greater use of technology. Rice production needs to be increased and sustained up to the level of self-sufficiency. Although self-sufficiency is to some extent a political commitment, several studies (Sahabuddin, 2000; Sahabuddin and Dhorosh, 2004) indicate that Bangladesh has comparative advantage in domestic production of rice for import substitution. Intensification of rice production will release some land from rice to allow diversification towards production of high value nutritious crops and non-crop foods including fisheries and livestock. The strategy of diversification will ensure that the small and marginal farmers, who have lesser ability to buy high value foods from the market, will be able to meet their diversified consumption needs from own production to maximize their nutritional welfare. For selling surplus products at fair prices, the small and marginal farmers need to be well integrated with the domestic and international markets.

Ensure access to food, particularly for the poor and vulnerable groups

To ensure greater access to food, purchasing power of the poor needs to be increased. Although there has been substantial decline in poverty over the last two decades, about 50 million people in the country still remain poor. Per capita food consumption of the lowest income group remains about 40% less than that of the highest income group. There has been little improvement in income inequality, reflecting persistent lesser share of the poor in the income growth. For improving poor peoples' access to food, pro-poor growth strategy will have to be pursued. This will call for increasing employment opportunities, particularly in the rural non-farm sector. Food price volatility will have to be minimized, and the trend of food inflation remaining above non-food inflation will have to be reversed to bring it in favour of the poor who spend larger share of income on food. For improving social access to food, public foodgrain stocking and distribution systems will have to be aligned with the new Social Protection Strategy.

Focus nutrition intervention on critical priority groups

It is important to strengthen and expand nutrition specific interventions among pregnant and lactating women, new-born babies, under-5 children and adolescent girls. Mainstreaming of interventions in water and sanitation, health and hygiene covering agriculture, livestock and fisheries sectors should be high in the agenda. Empirical evidences have shown that food and nutrition programmes along with behavior change communication (BCC) yield better results. It

is recommended that BCC can be integrated with programmes to improve dietary diversity, sanitation, and infant and young child feeding practices.

Promote nutrition sensitive agriculture

Nutrition sensitive agricultural interventions and food-based approaches are sustainable strategies for eradication of hunger and malnutrition. Food-based strategies include a wide variety of interventions that aim to increase (i) production and availability of and access to micro-nutrient rich foods, (ii) consumption of foods rich in vitamin A and iron, and (iii) bio-availability of these micronutrients in the diet. The specific intervention methods include: (i) increasing micronutrients, (ii) strengthening research for developing such foods, (iii) introducing fortification and bio-fortification in agricultural production and processing activities, and (iv) increasing bio-availability of micronutrients thorough home processing techniques such as fermentation, germination etc.

Eliminate gender disparity in agricultural wage, food consumption and household decision making

Empirical evidences show that women get much lesser wage than men in agricultural activities. In intra-households food allocations, women get less priority. In the agricultural decision making, women are persistently less empowered than men. For removing wage differentials, some regulatory interventions may be warranted based on rigorous analysis of productivity performance of men and women in similar activities. For improving empowerment, awareness building and advocacy campaign through government and NGO initiatives can make significant impact.

Ensure food safety through the food chain

Consumption of safe food is seriously constrained by contamination and adulteration through the whole food chain. Apart from contamination by heavy metals and trace elements in the production process, chemical contamination through mixing of adulterants, bacterial contamination and loss of nutrient during storage, transportation and processing pose serious threats to health. Production and market monitoring along with enforcement of regulatory framework has to be ensured with utmost priority. In this regard, formation and activation of the Food Safety Authority as provisioned in the newly enacted Food Safety Law (2013) needs to be expedited.

Develop resilience to climate change impacts

To address the adverse impacts of climate change, the government developed the National Adaptation Plan of Action (NAPA) in 2005 and Bangladesh Climatic Change Strategy and Adaptation Plan (BCCSAP) in 2009. The BCCSAP includes actions to increase the resilience through scaling up of community level adaptation, livelihood diversification, better access to basic services and social protection. Some of the activities are being pursued through the multi-donor Bangladesh Climate Change Resilience Find (BCCRF). Bangladesh, with technical

assistance from FAO, has also prepared the Master Plan for Agricultural Development in the Southern Region (MOA/FAO 2013) which largely addresses the climate issues pertaining to southern region. Implementation of the Master Plan should get high priority. Although Bangladesh contributes little to the climate change phenomenon the country by far is the worst victim of its adverse impacts. It becomes the moral obligation for the international community to allocate more resources for mitigation and adaptation to the adverse consequences. Eventually it emerges to be the inevitable option for the Government of Bangladesh to allocate more resources for developing resilient measures for coping with the adverse impacts of climate change.

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