

Case Report

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Sustainable Food Security of Bangladesh

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Abstract

Geographical location and rapidly climate change are the major problems for Bangladesh. Climate is changing continuously which making lots of unexpected changes in all sectors. The country is facing the problems of under consumption and over consumption. Besides, pure drinking water, water supply, sewerage system and waste management system are challenge. Drinking water supply and Arsenic (As) problem also the key factors of our food sustainability. Almost 20 million people in Bangladesh are using tube wells with more than 50 PPB of arsenic. Loss of biological wealth, land degradation, deforestation, flood, and drought are the key problems for agricultural sustainability. Productivity increase, the reduction of political support for bio-fuel production, the reduction of postharvest losses in Bangladesh should be explored. Future Bangladesh food balance will not only depend on increase in overall production, reduction of waste and losses but also on the sustainable consumption pattern. By focusing on the point to sustainable food security and feed the future in Bangladesh is the major concern for Bangladesh Government, NGOs and the International bodies too

Key words: Food Security, Sustainable development, Climate change, Consumption pattern

Introduction

Bangladesh is an agricultural country. It is located in South Asia. Its population is almost 160 million. Its Population density is very high. 1,174.33 persons per square kilometre. 71.11% of the population are living in rural and 28.89% in urban (World Urban Forum, 2004). Bangladesh is politically highly unstable. Life expectancy at birth is 70 years. 16.30% of Bangladesh's population is under-nourished, while 8.41% of its male population and 6.71% of its female population is overweight. Change in consumer price index, was 6.22% in 2012, versus 10.70% in 2011 [17]. The FAO's strong focus on increasing production in contrast to other options for improving Bangladesh food balance, especially in the communication of the analysis to public is unbalanced. Alongside productivity increase, the reduction of political support for bio-fuel production, the reduction of postharvest losses in Bangladesh should be explored. By focusing on the point to feed the future in Bangladesh, there is some questions come in front of face that, Can Bangladesh feed future generation? Will everybody have asses? Can be it sustainably? What actions are needed? At what

prices? etc. [7] Individual and household food security depends on access to the food needed to meet food and nutritional needs, a condition strongly related to household income. Food availability is necessary, but not sufficient, for achieving food security. However, availability of sufficient food for current and future generations is critical and must be based on sustainable methods of production and distribution that is, using available resources in such a way that their availability for production and distribution in future is not compromised or precluded [16]. According to FAO there is no sustainable development without eradication of hunger. Hunger can persist in the midst of adequate aggregate supplies because of lacking income opportunities for the poor and the absence of effective social safety nets. The sharp increase in food prices that occurred in global and national markets in recent years and the resulting increases in the number of hungry and malnourished people have sharpened the awareness of policy-makers and of the general public to the fragility of the global food system [8].

Operational Definitions

Sustainability

“Sustainable development is growth that meets the needs of the present without compromising the facility of future generations to meet their own needs”. It contains within it two type concepts:

- 1.The concept of ‘needs’ in particular the essential needs of the world’s poor, to which overriding priority should be given; and
- 2.The idea of ‘limitations’ imposed by the state of technology and social organization on the environment’s ability to meet present and future needs. [2].

Sustainable Food

Sustainable food takes into account environmental, health, social & economic concerns and consists of eight inter-related principle

1. Local & seasonal
2. Organic & sustainable farming
3. Reduce foods of animal origin & maximize welfare standards
4. Excludes fish species identified as at risk
5. Fair-trade-certified products
6. Promote health and well being
7. Food democracy
8. Reduction of waste and packaging.

Source: The Kindling Trust, <http://www.kindling.org.uk/sustainable-food-definition>.

Food Security

Food security is achieved when all people, at all times, have physical, social, economic access to sufficient, safe, nutritious food to meet dietary needs and food preferences for an active and healthy life. [10]

The four pillars of food security are availability, access, stability and utilization.

Methodology Used

In this research used secondary data sources and have taken current overview, future challenges and opportunities of Food Security in Bangladesh and how alternatives to improve Bangladesh food balance from prestigious and recommended Journals with articles.

Bangladesh – Thinking Area

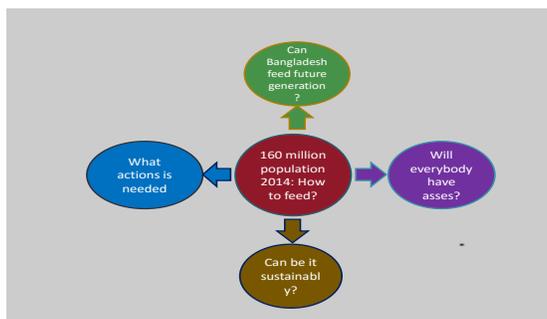


Figure 1: Thinking Zones of Bangladesh

1. Food availability
 - Domestic production
 - Import capacity
 - Food stocks
 - Food aid
2. Physical and economic access to food
 - Purchasing power
 - Income of population
 - Transport and market infrastructure
3. Stability of supply and access
 - Weather variability
 - Price fluctuations
 - Political factors
 - Economic factors
4. Food utilization
 - Food safety
 - Hygiene and manufacturing practices applied in: primary agricultural production, harvesting and storage; food processing; transportation, retail, households
 - Diet quality and diversity: meeting needs in terms of energy, macro- and micronutrients [11]

Objectives of the Study

This report argues that required increase in food production can be achieved if the necessary investment is undertaken. To examine the necessity of sustainable food security in Bangladesh, this report is focused on two important parts.

1. Sustainable food security: current overview, future challenges and opportunities
2. Alternatives to improve Bangladesh food balance. Sustainable production and consumption is placing vital footprint to future food security in Bangladesh.

Sustainable Food Security: Challenges and Opportunities

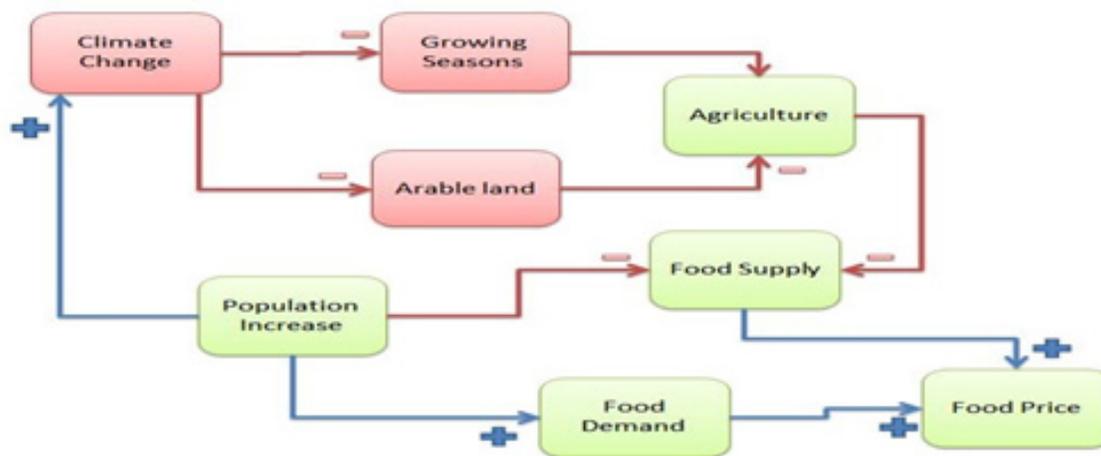
Food security and supply challenges today

Bangladesh is currently experiencing a nutrition transition. Lifestyle are becoming more urban and sedentary, with foods and drinks being more energy-dense and diets containing more processed foods, sugars, fats and animal products. The result is triple burden of malnutrition: one part of the population is still undernourished; many also suffer from deficits of specific nutrients, in particular micronutrients; and others are overweight. It is now widely accepted that chronic hunger today is more to the lack of purchasing power than to the non-availability of food to the market

[19].Close to a million people are chronically undernourished. Bangladesh is facing the problems of under consumption and over consumption. Climate is changing continuously which making lots of sudden changes in all sectors.

Population Growth and Food Demand with Prices

Population increases affect Climate change will lead to shorter growing seasons and less arable land, both of which will diminish the total amount of agriculture and the total food supply while at the same time increasing the food demand. These factors together will attribute to a rise in the market price of food.



The Effect of Climate Change and Increasing Population upon Food Prices

Figure 2: Increasing population effect the climate change and food prices

Nutritional and Health Care Situations

There are some factors which are effecting nutritional and health care situations of Bangladesh and finally it's affected food security. Such as-

- Triple burden of malnutrition. Like-
- Undernourishment.
- Micronutrient deficiencies.
- Over nutrition manifest.
- Nutrition transition in Bangladesh
- Chronically undernourished people
- Suffering from micronutrient deficiency
- Under consumption and over consumption
- Chronic hunger- because of purchasing ability
- Global warming/ climate change
- Pollution (air, water, sound etc.)

Indicators	Level	Units	As Of	~5 Y Ago	~10 Y Ago	~25 Y Ago
Rural Population	71.11%	% of Total	2012	73.01%	75.18%	81.11%
Urban Population	28.89%	% of Total	2012	26.99%	24.82%	18.89%
Fertility Rate	2.24	Births per Woman	2011	2.44	2.90	5.13
Child Mortality	40.90	Death per 1000 Births	2012	54.90	75.80	155.50
Deaths From Disease and Nutrition	37.71%	% of Deaths	2008	-	-	-
Deaths From Injury and Accident	10.25%	% of Total Deaths	2008	-	-	-
Deaths From Non-Communicable Diseases	52.04%	% of Total Deaths	2008	-	-	-
Low Birth-Weight Babies	21.60%	%	2006	-	-	-
Under-Nourished People	16.80%	%	2011	14%	14%	-
Nurses per 1000 People	0.14	Per 1000	2004	-	-	-
Health Expenditure Per Capita	67.27	PPP USD	2011	47.41	29.35	-
Access to Improved Sanitation Facilities	54.70%	%	2011	51.40%	47.10%	-

Table 1: Nutritional and Health Care Situations [20]

Water Security

There are almost 310 rivers in Bangladesh of which 57 are trans-boundary Rivers. Out of this large catchment area, only 7% lies in Bangladesh. Sorry to say, the country faces the problem of either too much or too little water respectively in monsoon and dry seasons. In the dry season water problems are compounded by low flows slowly coming down the trans-boundary Rivers due to large scale obstructions up-stream outside the country, mainly in India. It's play havoc to agriculture, ecology and lives of the people. Water supply in urban areas is not yet fully acceptable. The Dhaka Water and Sewerage Authority (DWASA) are supplying 2110 million litres per day against daily demand of 2250 million litres a day. Only 20% of the population of Dhaka is served by an expensive sewer network, the rest use septic tanks, pit latrines, unhygienic latrines or none at all. The urban water supply coverage is about 94.96% of which the coverage by piped water supply is 35.57% and the remaining 59.18% is by hand pump tube wells. This situation is worse for slums. Percentage of population using safe drinking water in 2009 was 86%. [1]

Water Security – Arsenic (As) Problem

100-300 feet below ground level, has affected people in 63 out of 64 districts since the mid-90s to till now. In Bangladesh the acceptable level of arsenic in drinking water has been set by the Government at 50 parts per billion (PPB) or 0.05 micrograms per

litre of drinking water, while the approved global WHO standard is 10 PPB. More than five million tube wells have been tested since 2000. 20% of the wells have been found to exceed the Government approved limit of 50 PPB. One in five tube wells is not providing safe drinking water. Out of 87,319 villages in the country, where 80% of all tube wells are contaminated.

Almost 20 million people in Bangladesh are using tube wells with more than 50 PPB of arsenic. [3]

Agriculture

Bangladeshi agricultural system is conventional system. Sustainability of conventional agriculture in Bangladesh is under threat. Loss of biological wealth, land degradation, deforestation are the main problem for agricultural sustainability. Continuous degradation of land, water resources problem, declining yields due to indiscriminate use of agro-chemicals are common things of Bangladesh. Agricultural sustainability depends on four pillars. Productivity, environmental stability, economical profitability, and social and economic equity.

Pillars	Current Situation
Productivity	Okay
Economical profitability	Unpredictable
Social and Economic equity	Under Risk
Environmental stability	Highly Risk

Table 2: Bangladesh Agricultural Sustainability [12]

Climate Change

Climate change will lead to problems in agriculture, more severe floods as the Himalayan glaciers continue to melt, and increasing intensity in storms. The Government estimates that more than 1,000 hectares of seasonal crops were destroyed in eastern Bangladesh, while scores of poultry farms and fish hatcheries were swept away.

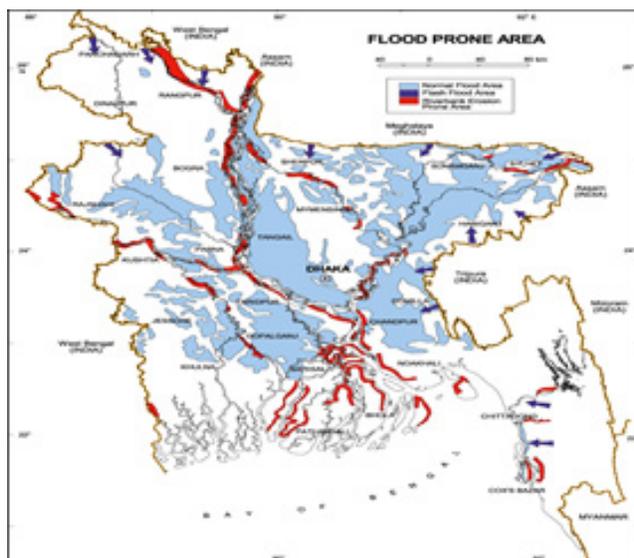


Figure 3: Flood Prone Area

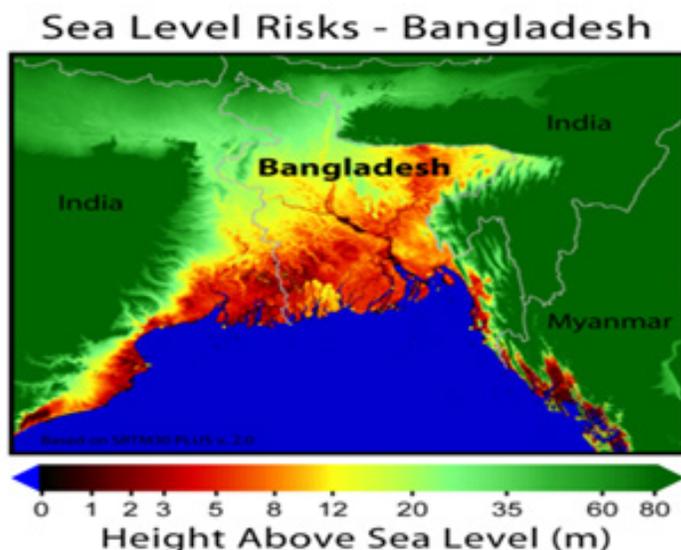


Figure 4: Sea Level Risks-Bangladesh

One such study noted that a 4°C increase in temperature would have a severe impact on food production in Bangladesh, resulting in a 28 per cent reduction for rice and a 68 per cent reduction for wheat. Temperature and rainfall changes have already affected crop production in many parts of Bangladesh, and the area of arable land has already decreased [13]

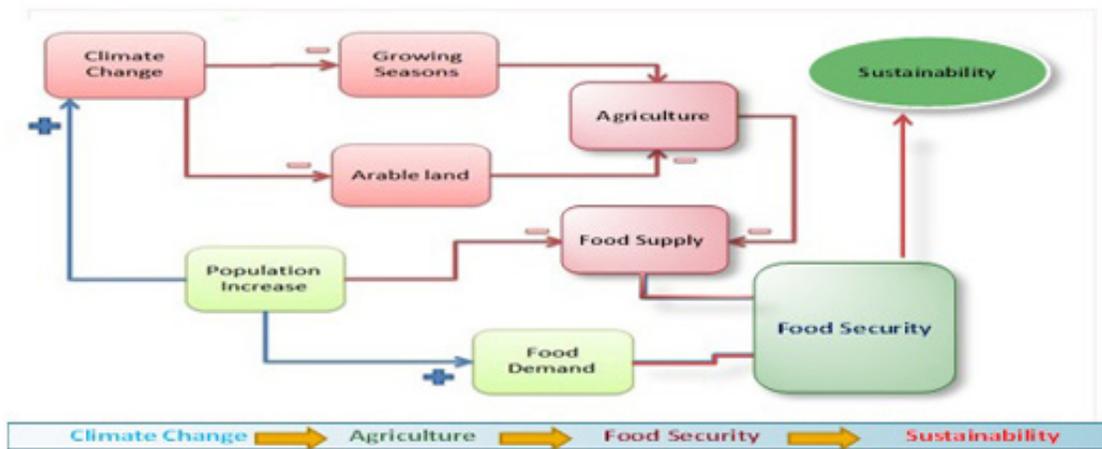


Figure 5: How sustainability affected by climate change

Global warming/ climate change

Pollution, imbalance between carbon emission and absorption are the major problem of global warming. Almost 80% of the total area of the country is prone to flooding. South and South-eastern Parts of the country were hit by Tropical Cyclones during the last few years. Almost the whole Coastal Belt along the Bay of Bengal is experiencing Salinity problem. North and North-western regions of the country are suffering because of the Extreme Temperature problem.

Climate Change on the Surface and Ground water resources will be very severe and alarming. Changes to water resources and hydrology will have a significant impact on the country’s economy, where people mostly depend on the Surface water for Irrigation, Fishery, Industrial production, Navigation and similar other activities. The fisheries sector contributes about 3.5% of the GDP in Bangladesh and people depend on fish products[5].



Figure 6: Climate change in Bangladesh

Waste Management

Waste management is an emerging problem in almost all urban areas of Bangladesh. The increase in waste generation can be primarily attributed to factors rapid rate of urbanization, rural- urban migration, changing consumption pattern and high population growth rate, while the magnitude of the problem is relatively small and manageable in rural areas. Among the major environmental concerns confronted today in the urban areas of Bangladesh are problems relating to proper management of solid

waste. There are some problems for waste management system in Bangladesh. Like- Waste generation rapidly increasing, organic waste is left unutilized, shortage of land for waste disposal, lack of awareness among citizens, inadequate waste collection, problems of solid waste management, lack of source separation, lack of partnership between stakeholders, polluting surface and ground water [6]

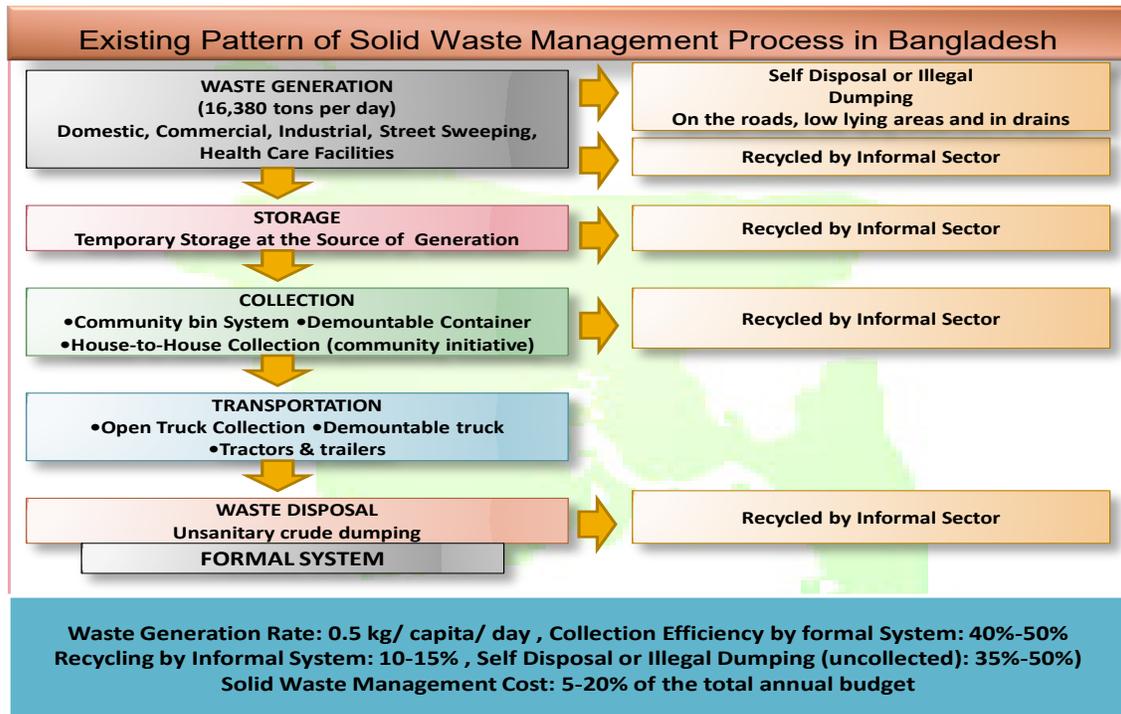


Figure 7: Existing Pattern of Solid Waste Management Process in Bangladesh [18]

Future Food Security, Supply Challenges and Opportunity in Bangladesh

1. Bangladesh Agriculture receiving particular attention and support in the wake of global food crisis, high prices. Rice production increased significantly. A crisis successfully tuned into an opportunity. Ongoing Euro zone financial and economic crisis threatening to cause negative impacts on economy of Bangladesh

If that happens, the agriculture sector may also be adversely affected and it's finally affect our food security

2. Soil degradation is a commonplace in Bangladesh. Organic matter depletion observed in 7.5 million hectors of land. Declining soil fertility, soil erosion, salinity affects respectively 5.6–8.7 million hectors, 5.3 hectors, 3.05 million hectors of land. Soil loses annually 2 m met. Tons of nutrients.

The fertility of land is expected to decline and one percent of crop GDP will be lost every year. Sustainable land management is a major challenge for now and also in the future.

1. Key challenges to agricultural growth in the country include water resource, land area constraints, soil degradation and climate change rapidly growing, increasingly urbanized and more affluent population with changing tastes.

These challenges will require new idea how domestic food security goals can be met while sustaining an increasingly fragile environment and a large population dependent on agriculture for livelihoods.

2. Climate change is going to create major problems for Bangladesh agriculture. The impacts of climate change are already being felt in the country.

The country will face more problems as climate change intensifies through changing and shifting pattern of rainfall intensive flooding, drought, and salinity ingress and land degradation. It will also impact on fish production.

3. Waste supervision rising crisis almost all municipal areas. Pace of urbanization, rural-urban migration, changing consumption outline and high population growth rate growing quickly.

As a result, Leaching (Polluting Ground & Surface Water), increasing Methane gas, Green House gas in the air and Vermin (Spreading more than 40 Diseases). Finally-Polluting air, water, soil and we will lose sustainability that impact on Food Security [6].

Country Investment Plan - focus areas achieving MDG goal

The CIP (Country Investment Plan) has identified 6 focus areas in which to concentrate their efforts for achieving MDG goal:

- (1) Integrated research and extension to develop and propagate sustainable responses to climate change;
- (2) Improved water management and infrastructure for irrigation purposes;
- (3) Supply and sustainable use of agricultural inputs;
- (4) Fishery development program;
- (5) Livestock development program;
- and (6) Access to markets, improved agricultural value added, increased non-farm incomes. (BANGLADESH FY 2011–2015 Multi-Year Strategy, U.S. Government Document, 2011; p 6f)

BANGLADESH FEED THE FUTURE PROGRAM ILLUSTRATIVE INDICATORS FOR FOOD SECURITY	
FTF Indicator	Indicator
On-Farm Productivity	1. Increased yields of food crops (custom)
	2. Increased farm income (custom)
	3. Increased area planted to non-rice crops (custom)
	4. Increased value added processing of food staples (custom)
	5. Increased nutritional awareness
	6. Increased family consumptions of nutrient-rich foods
Market and Value Chain Efficiency	7. Increased use of market linked inputs (custom)
	8. Increased diversification of agricultural production (custom)
	9. Increased person-days employment in agriculture (custom)
Food Security Policy & Planning Capacity Building	10. FTF indicator: 4.5.2-38 Value of new private sector investment in the agriculture sector or food chain leveraged by FTF implementation
	12. Improved agribusiness investment environment
	13. Improved effectiveness of GOB sector investments (custom)
Agricultural Innovation Capacity Building	14. New technologies released by research programs
	15. Agricultural graduates find employment (custom)

Table 3: Bangladesh Feed the Future Program Illustrative Indicators for Food Security
Source: BANGLADESH FY 2011–2015 Multi-Year Strategy, U.S. Government Document, 2011

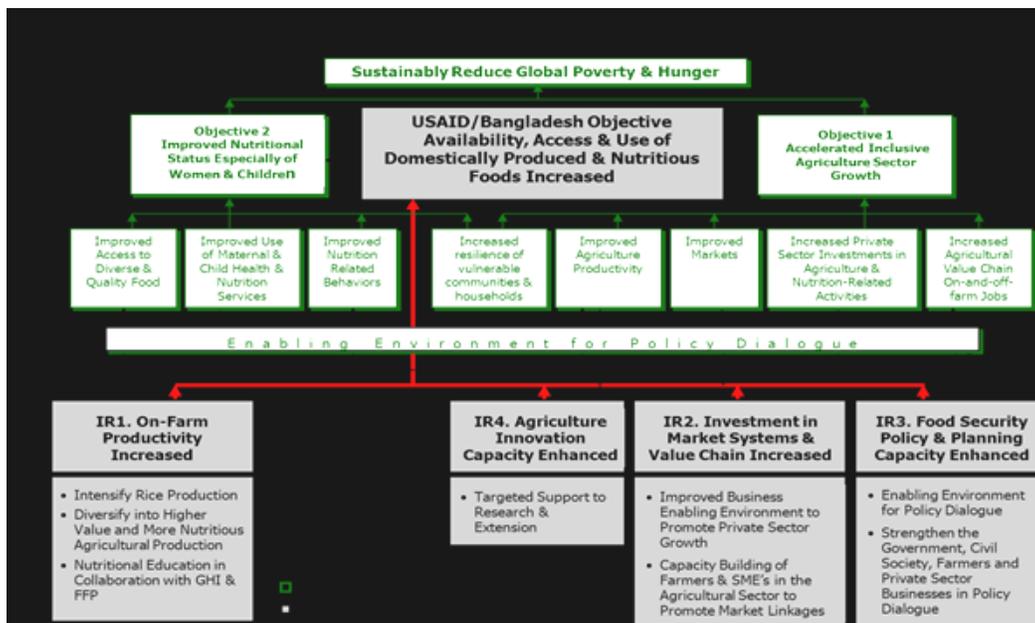


Figure 8: Bangladesh Feed the Future Strategy Framework

FTF Initiative Framework (Green colour); USAID/Bangladesh FTF Framework (Grey colour)
 Source: BANGLADESH FY 2011–2015 Multi-Year Strategy, U.S. Government Document, 2011

How to Improve Alternatives Food Balance in Bangladesh

Changes in consumption pattern

Future food balance will depend on:

- Overall agricultural production
- Overall calorie intake
- Composition of average human diet

In human diet: meat based diets is more resource intensive than plant based diet. Meat consumption should be reduced. It has lot of benefits:

- Consumer health: Over consumption of meat causes heart disease, strokes and some cancers
- Environmental sustainability: Livestock, including feed production contributes to environmental problems. Increasing demand for feed and meat in one country increases environmental pressure and unsustainable land used in another country
- Increasing Temperature and Food Security: Less meat consumption will cause a reduction in greenhouse gas (GHG) emissions from livestock. Current have 18% of total global emissions responsible for meat consumption. It also affected Bangladesh which is not good for sustainable food security.

Effective natural resource management for sustainable and inclusive growth

Water, energy and land are connected with each other. We need to proper uses of our natural resources. Producing more food needs more water, energy/ bio-energy and land. So need to use all resources efficiently to have adequate access in future. To improve water use efficiency and productivity through the modernization of irrigation practices, improved crops productivity and better water use policies. Promote sustainable land resources management that increases production and sustains ecosystem services. Increase organic agricultural practice.

Reduction of postharvest, supply-chain & food waste losses

Current postharvest loss level is estimated at 20-40%, with supply chain losses representing the dominant form of loss in Bangladesh. Inadequate infrastructure, such as of roads, transportation and storage facilities, is one important factor for postharvest losses in Bangladesh. The challenge of feeding a growing population is commonly framed in terms of the need to increase production. However, there is another route to increasing food availability- the reduction of postharvest losses. A greater production increase than loss reduction is necessary to achieve the same level of food availability, since any production increase also suffers losses.

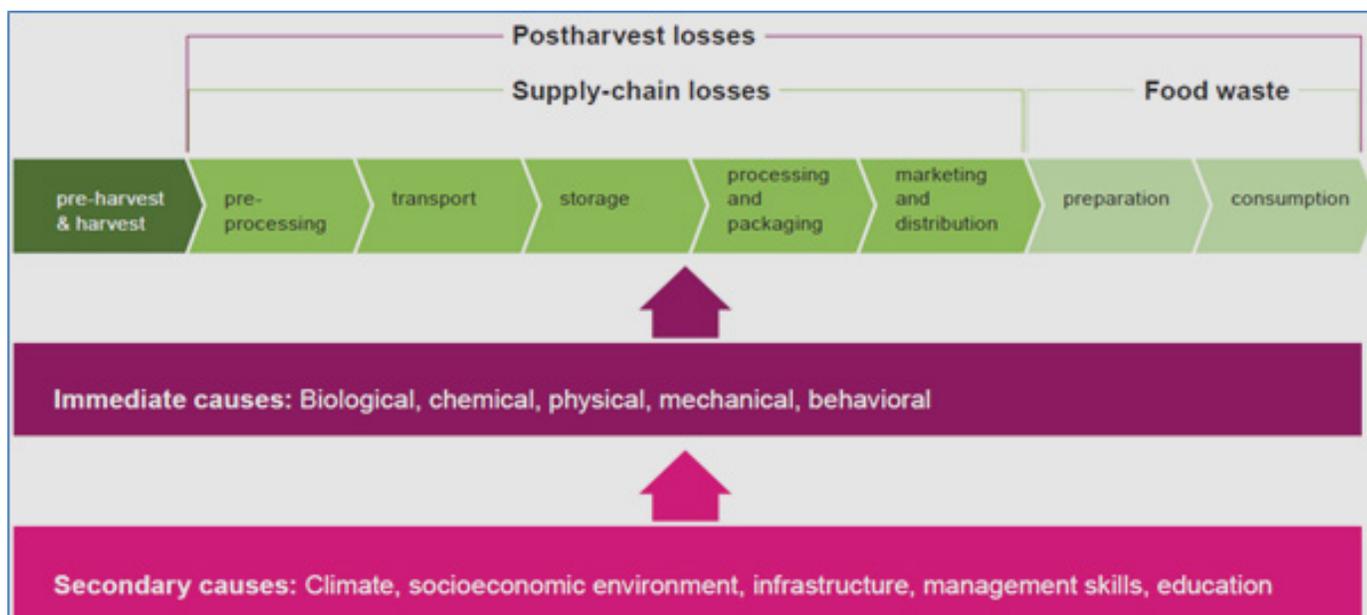


Figure 9: Reduction of postharvest, supply-chain & food waste losses [9]

Conclusions

Sustainable food is concept of food security for future. Challenge of feeding a growing population is framed in terms of the need to increase food production 70% more by 2050. Sustainable use of land, water, energy is requiring because those will become scarcer in the future. Future Bangladesh food balance will not only depend on increase in overall production, reduction of waste and losses but also on the sustainable consumption pattern. According to FAO there is no sustainability without decreasing hunger. Bangladesh food security challenge is not about the capability of world agricultural producers to produce enough food to feed the country people, but rather is about ensuring that the poorest people in the country have the economic and physical access to the food they require to meet their nutritional needs. Undernourishment is not a problem of country's food availability, but rather of access to food. Improving the Bangladesh food balance sustainably is of importance in order to prevent food prices from increasing to a level that leads to increasing food insecurity and poverty for people who spend a high share of income on food. Need the efforts to increase food production should be complemented and balanced with other strategies for improving the food balance, including elimination bio-energy subsidies; reducing postharvest losses and reaching a lower meat share in food consumption in Bangladesh.

We need some more scientific research to increase investment to sustain productivity growth in technology, infrastructure and institutions, environmental services and sustainable resource management. Building of political will is necessary to address challenges that transcend the traditional decision-making horizons of producers, consumers and policy makers. Investment in rural infrastructure, agricultural research and public services, as well as efforts to improve governance systems and institutions which allow markets to work within food insecure regions is necessary.

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