Fill the Nutrient Gap
Bangladesh

Concise Report

December 2019

WFP World Food Programme


ON
STORAGE

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Message

It is a great pleasure to share the findings and recommendations of the Fill the Nutrient Gap (FNG) analysis for Bangladesh and the overall and specific recommendations as formulated by the government stakeholders.

Bangladesh has made great progress in reducing poverty and hunger, reached food self-sufficiency, and is now focused on ensuring high quality and efficiency of our human resources. Good nutrition throughout life is essential for human capital as it allows to achieve full physical and cognitive development and health.

Reshaping our food systems, including the food environment, to be more nutrition-sensitive requires aligned efforts across sectors to increase access, production, and choice of safe and nutritious foods.

The FNG process in Bangladesh has elucidated how the food system shapes food access and food choices, and how each sector in the public and private sectors must contribute in a harmonised and coordinated manner to create a food environment that supports people to access diverse, safe, and nutritious foods. Furthermore, it has highlighted vulnerabilities and practices that disadvantage specific groups, such as girls and young women, putting not only their nutrition and health but also that of tomorrow's generation at risk.

The result of this process are recommendations for improvements across sectors based on thoroughly scrutinized findings. These recommendations are very timely as the Government is formulating its next Five-Year plan as well as sector specific policies. I encourage all stakeholders to take good note of the findings and recommendations and identify which actions they can take, in coordination with others, to improve nutrition and development among all people in our society.

Dr Shamsul Alam

Dhaka
December 2019

Richard Ragan

Representative and Country Director
World Food Programme
Bangladesh

রিচার্ড রেগান

রিপ্রেজেন্টেটিভ ও কান্ট্রি ডিরেক্টর
বিশ্ব খাদ্য কর্মসূচী
বাংলাদেশ

Foreword

I am delighted that the Cabinet Division, in close collaboration with WFP, has prepared this Fill the Nutrient Gap (FNG) Concise Report for Bangladesh.

Further improvements in nutrition are within reach in Bangladesh. The FNG analysis shows that by working together to achieve systemic changes we can create a healthier food environment that provides the right incentives to both producers and consumers to promote wider consumption of healthy, safe, and nutritious diets. Diets should be based on Bangladesh's rich and varied food culture to enhance health and wellbeing. By building on the success of the past 30 years and this new knowledge, we can develop innovative strategies for meeting the needs of the most nutritionally vulnerable individuals, while at the same time safeguarding the health of our environment and promoting the sustainable use of our natural resources. Responsible food production and consumption, with an emphasis on diverse, high-quality, plant-based foods is the goal, to keep greenhouse gas emissions and global warming in check and ensure the security of our food supply.

We have reached this understanding thanks to the time, effort, and attention dedicated to this process by the Technical Working Group, composed of representatives of Government of Bangladesh ministries, United Nations agencies, civil society, academia and research institutions. By combining their expertise and knowledge with the work done by WFP's technical team based in Dhaka and Rome, we have been able to uncover findings that will help forge the path ahead.

FNG consultations with ministries, NGOs, and academia have resulted in the recommendations presented in this report. They identify the coordinated efforts that are required to transform the food system and enable healthier food choices. Now is the time to translate these recommendations into actions.

Richard Ragan

Dhaka,
December 2019

Sheikh Mujibur Rahman ndc

Secretary
Coordination and Reform
Cabinet Division
Government of the
People's Republic of Bangladesh

শেখ মুজিবুর রহমান এনডিসি

সচিব, সমন্বয় ও সংস্কার

মন্ত্রিপরিষদ বিভাগ

গণপ্রজাতন্ত্রী বাংলাদেশ সরকার

Foreword

The Cabinet Division is proud to present the outcome of the Fill the Nutrient Gap (FNG) analysis for Bangladesh undertaken with technical support from WFP.

Nutrition is not only a health concern. Improving nutrition is essential for human capital development and economic growth. Bangladesh has made great progress in improving the lives of our people over the last 30 years. However, to accomplish the SDGs and the vision of the Agenda 2030 of eradicating all forms of malnutrition, we must scale up our efforts and our coordination to ensure a bright future for our nation.

As a middle-income country we are now facing new challenges in terms of malnutrition, which need to be addressed by a healthy, safe, and nutritious diet, in combination with prevention of disease and greater promotion of physically active lifestyles. By enabling healthy diets and promoting healthy practices, we can reduce undernutrition and curb the growing threat of overweight and obesity.

The FNG analysis has reviewed our rich evidence base to assess what limits people's consumption of nutritious foods, in terms of availability, economic access, dietary preferences and societal norms and practices, and how that relates to malnutrition statistics. The findings have been thoroughly discussed with the Technical Working Group that was brought together by the Cabinet Division. Individual ministries have been consulted for their reflections and recommendations on how to make policies and programmes more nutrition-sensitive.

The overarching and sector-specific recommendations will inform Government on its programme design and policy formulation which will certainly influence the current system to create an enabling environment for balanced and diversified diets, and to design programmes to prevent malnutrition among the most vulnerable and marginalized. Especially, adequate initiatives are required to realign food production, demand, and social protection programmes to match nutrition requirements.

FNG findings and recommendations can be a good source to build alliances across sectors and create practical results to meet the targets of abolishing all forms of malnutrition.

Md Sheikh Mujibur Rahman ndc

Dhaka,

December 2019

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Cabinet Division, Government of Bangladesh, in collaboration with World Food Programme

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Executive Summary

Bangladesh has made significant progress over the last 20 years to reduce rates of malnutrition among its population. Childhood stunting rates decreased from 60 percent in 1997 to 31 percent in 2018; underweight in women has nearly halved from 34 to 19 percent since 2004 (1a). Yet malnutrition persists. The country is facing a triple burden of malnutrition, with decreasing but still high stunting and wasting rates (31 and 8 percent respectively), high prevalence of micronutrient deficiencies (anemia in non-pregnant, non-lactating women is at 26 percent), and steeply increasing rates of overweight and obesity (24 percent in ever married women aged 15–49 in 2014, up from 9 percent in 2004) (1, 4, 2).

Investments in nutrition interventions in Bangladesh have been estimated to provide a 1:10 return (3), making nutrition a powerful tool to improve human capital development and accelerate growth and productivity.

A multisectoral policy framework to enhance nutrition interventions is largely in place. A comprehensive agenda for nutrition is provided by the National Nutrition Policy 2015 and the second National Plan of Action for Nutrition (NPAN2), in tandem with the Food Policy 2006, Micronutrient Strategy and Second Country Investment Plan. Recent policy mapping has shown that in most relevant sector policies, availability and access have been adequately addressed. Yet food utilization, and thus food consumption and nutrient intake, is poorly articulated in many sectors policies. Matters related to women's agency are particularly identified as a common gap, even in recent policies like the Agriculture Policy (July 2019).

A recent World Bank study shows the need to re-examine the changing drivers of malnutrition to ensure programmes and policies address the triple burden effectively (5). The FNG analysis draws five overarching conclusions.

1. Food Environment – At least one in eight (13 percent) households cannot afford to meet their nutrient needs. Food safety concerns might jeopardize availability and affordability of nutritious foods.

Within the scope of the FNG analysis, the minimum cost for a household to consume a nutritious diet calculated as a basis for comparison (174 Bangladeshi Taka - BDT) is more than twice as high as that calculated for meeting energy needs only (80 BDT). Energy needs can be met cheaply by a combination of wheat and rice, while an optimized nutritious diet includes a combination of staples (rice, wheat), tubers, legumes, animal source foods (fish, milk), vegetables (including green leafy vegetables), fruit and oil. The optimized nutritious diet is composed of less rice and more vegetables, milk and pulses than what is currently consumed.

Comparing the cost to actual food expenditure, all households can afford an energy-only diet, but at least one in eight (13 percent) cannot afford an optimized nutritious diet. This figure is in line with the prevalence of extreme poverty (11.3 percent) (6). The widespread affordability of foods, including nutrient-dense foods, is a major achievement in recent years and in large part due to the government's efforts to reduce poverty and promote agricultural production.

The FNG analysis assumes that all foods included for analysis are not adulterated and are safe for human consumption. The limited evidence on the actual extent of food adulteration is mixed (7–11) and regulation was put in place to prevent food adulteration and inform public opinion. Yet in recent years numerous reports of food adulteration have heightened public awareness of the practice, and of contamination. Evidence suggests that some food might be tampered with to preserve or increase its commercial value, for example by preserving fish with formaldehyde or adding water to milk. The efforts to ensure food is not adulterated throughout the supply chain might increase food prices, reduce availability of certain foods, and reduce affordability.

2. Consumer Choices - Food culture and market incentives lead to suboptimal food choices which make nutritious diets less affordable. A healthy food environment underpins nutritious choices.

In Bangladeshi food culture the consumption of rice and sugar are part of social life. Increasingly urban lifestyles, advertising and time-poverty lead to the higher consumption of convenience foods which contributes to the over-consumption of salt, sugar, oil and rice. By contrast, higher prices, more time-intensive preparation of nutritious foods, and concerns over contamination and adulteration of fresh and processed foods, contribute to too low consumption of fruit, vegetables and animal source foods. Many of the most nutritious foods, especially green leafy and other vegetables, have a low social status and are considered to be food of the poor.

With increasing wealth, the demand for meat, milk and fruit is predicted to increase by 20 to 25 percent over the next 10 years. Meanwhile the demand for vegetables is predicted to grow by only 5 percent over the same period (12). Unless actively encouraged and enabled, an increase in wealth might not translate into healthier, balanced diets. Unhealthy dietary habits increase the cost and reduce the affordability of a nutritious diet. The FNG analysis modeled the implications of over-consumption of rice at the current level (367g per capita per day) and daily snacking (sweet and savory). These dietary choices increase the cost of a nutritious diet by up to 40 percent and reduce the proportion of households that can afford a nutritious diet from 87 percent to 59 percent. The food culture and the food environment need to support healthy choices.

3. Supply Chains - For healthier diets, investment is needed to simultaneously increase demand and supply of nutrient-dense foods with a focus on food safety, environmental sustainability, and nutritional value.

Bangladesh has achieved self-sufficiency in rice supply and most recently in meat and fish production (13), thanks to substantial efforts by government and communities. However, compared to recommended consumption based on the Bangladeshi Dietary Guidelines (14) the current supply is low for vegetables, fruit, milk and other nutritious foods (15). The World Bank finds that the price of nutritious foods in Bangladesh has been increasing faster than the price of staples over time, and that their price relative to staples is higher in Bangladesh than in neighboring countries (16). However, it is important to note that improvements and transformations of supply chains that increase availability of specific food types do not necessarily increase their nutrient value. For example, the fish species farmed in ponds have lower nutritional value compared to captured fish species, resulting in a decrease of micronutrient intake from fish over recent years, although fish consumption increased (17, 18).

Disasters – such as floods – impact supply chains and decrease the affordability of nutritious diets in the long run. The damage to infrastructure and productive assets drives up prices in the short term. If these assets are not recuperated quickly, disasters may set off vicious cycles of low agricultural production, low labor demand and low wages (19), all of which affect diets negatively.

4. Social Protection - Social services and safety nets could enable every household to access a nutritious diet. To be effective, they need to offer nutrition-sensitive services and ensure that household and programme resources are spent on nutritious foods.

There are several ways to improve the ability of households to afford nutritious diets. The FNG analysis scrutinized two social protection programmes, the Mother and Child Benefit Programme (MCBP) and the Vulnerable Group Development programme (VGD), including the Investment Component of the VGD programme (ICVGD). Assuming all households with low food expenditure have access to these programmes, the proportion of households unable to afford a nutritious diet would decrease from 13 percent to 6 percent (MCBP) and 4 percent (VGD) respectively. Households would benefit even more if the transfer was paired with a micronutrient supplement or if it provided fortified rice (instead of unfortified). Likewise, high quality, accessible social services such as health care and education, could reduce the amount households have to spend on these services and hence increase their purchasing power for nutritious foods.

The actual impact of social protection programmes on nutrition, however, depends on whether programmes are: 1) designed to channel additional household purchasing power to improved dietary choices, and 2) adequately address underlying contributing barriers to nutrition, especially gender equality, empowerment of women and girls, and knowledge gaps. Effective social protection requires household behavior change as well as ensuring households have access to safe, affordable and culturally accepted nutritious foods.

5. Underserved Groups - Adolescents are the most nutritionally vulnerable individuals due to their high nutrient requirements. This is particularly true for girls, given unfavorable gender norms and practices. The nutrition needs of adolescents and the elderly are currently largely unaddressed.

Throughout the lifecycle, the cost of a nutritious diet increases substantially in early adolescence and remains high until old age. In resource-constrained households, adolescent girls and boys are at higher risk of not receiving a nutritious diet than their younger siblings. Their nutritional vulnerability is compounded by protection risks, often exacerbated by poverty, putting them at a higher risk of being married early and/or dropping out of school in favor of paid work. Pregnancy increases the already high cost of a nutritious diet for an adolescent girl by 8 percent. As children born to young, malnourished mothers are more likely to be stunted and wasted, adolescent pregnancy is a social and nutritional risk for mother and child.

Declining fertility will cause Bangladesh to undergo a demographic transition in the coming decades which will result in an older population with a smaller proportion of young children and a larger proportion of adolescents and older people. Yet there are currently few social safety net programmes that include adolescents and older people. School meals are a powerful existing platform which could be tailored to meet the specific needs of adolescents, and existing social protection programmes could be leveraged to reach older people.

[1]Food environment refers to the physical, economic, political and socio-cultural context in which consumers engage with the food system to make their decisions about acquiring, preparing and consuming food (High Level Panel of Experts on Food Security and Nutrition 2017).

Based on the FNG findings, stakeholders have recommended the following multi-sectoral actions that were discussed in the Policy Dialogue called by the Cabinet Division on 28 November:

1. **Social and Behaviour Change Communication (SBCC)** interventions across sectors should aim to **generate social change** of cultural norms on food habits and consumption, not just change in individual behaviours.
2. Adequate **investment in public awareness on nutrition across different sectors** including nutrition SBCC is needed to inform public perception of nutrition.
3. Some households, including those below the poverty line, need support through targeted programmes to be able to afford a nutritious diet.
4. **Systematic food quality and safety assurance and control mechanisms** need to be implemented and enforced across all sectors to ensure availability of safe and nutritious foods.
5. Further **strengthen the production and supply chain of diverse nutrient-dense foods** like leafy vegetables and sustainable production of animal source foods to reduce food losses, enhance availability and food safety, and meet increasing demand.
6. Seek **collaboration of the private sector** to improve food quality and safety through **responsible food processing, packaging and marketing** which may need some regulation and enforcement.
7. FNG modelling shows a need to **reassess transfer values of selected social safety nets** to ensure affordability of nutritious diets (e.g. Mother and Child Benefit, School Meal Programme, and Elderly Allowance).
8. **Increase and strengthen government staff awareness and capacity on age- and gender-specific nutrition requirements** (e.g. young children, adolescents, women, the elderly) and nutrition sensitivity across all sectors to improve programme planning and implementation.
9. Target interventions to better **serve the nutritional needs of the adolescent population** through nutrition services such as family sensitisation, community youth groups, and school meals.
10. Further integrate and scale up multiple micronutrient fortified foods, such as rice and oil, for vulnerable groups in social protection programmes, including school meals, and in emergency response.

Introduction and Methodology

The Fill the Nutrient Gap (FNG) analysis combines a comprehensive nutrition situation analysis with a stakeholder engagement process. The process is led by the Cabinet Division of the Government of Bangladesh and the World Food Programme (WFP) and aims to generate evidence for decision-making to improve diets and prevent malnutrition. The analysis combines a secondary literature review and Cost of the Diet (CotD) linear optimization to examine availability and affordability of a healthy diet (20, 21). Stakeholders recommended 220 reports, academic publications, non-academic reports, policies and national survey data for review. The CotD analysis used data on food prices and household food expenditure from the Household Income and Expenditure Survey (HIES) 2016 data set (22) to estimate the minimum cost and the economic affordability of a nutritious diet, and to model the impact of current and proposed interventions to reduce this cost and increase affordability.

At every step, stakeholders from a range of sectors (health, agriculture, education, women and children's affairs, food, etc.) provided inputs and validated assumptions of the analysis under the leadership of the Cabinet Division. Underlying assumptions for the CotD analysis validated by stakeholders include:

- Baseline calculations and modeling are done for a five-person household to capture nutritionally vulnerable individuals: a breastfed child under 2, a school-aged child, an adolescent girl, a lactating woman and an adult man. The modeled household includes individuals at critical stages throughout their lifecycle and does not reflect an average or ideal Bangladeshi household. However, sensitivity analyses have shown that the per capita average derived from this household is not very different from those derived from households of other compositions.
- Analysis is conducted by division for urban and rural areas and the reported averages are weighted by population size; modeling is done for five divisions (Dhaka, Khulna, Chattogram, Sylhet, Rangpur). Considering the relative homogeneity of Bangladesh, the modeling can be considered representative at national level.
- The HIES 2016 data set is the most recent, complete and representative data set available for a wide range of food prices and household food expenditure.
- The linear optimization is adjusted to include at least two portions per day of rice as a staple.

The FNG process ran from April to November 2019. The Technical Working Group met three times (April, July, September) to provide inputs and shape the analysis. In addition, a series of meetings with individual ministries was held in August to discuss findings pertinent to their mandate. A further meeting was held with Bangladesh Bureau of Statistics (BBS), confirming that the data sets used were indeed the most current published data sets. Based on the FNG findings, recommendations were developed by individual ministries and finalized through a policy dialogue under the leadership of the Cabinet Division.

Interpretation of Cost of the Diet results

The CotD analysis is an economic analysis of diets based on reported availability of foods in the area. It serves to detect nutritional vulnerabilities, drivers of vulnerabilities, and entry points for solutions. It does not necessarily reflect the foods people choose to eat, nor is it a suitable basis on which to make food-based recommendations. The modeling illustrates the potential impact of interventions on household cost and affordability of a nutritious diet, based on assumptions validated by research and stakeholders. It does not constitute a cost-benefit analysis as it does not take into consideration all input and implementation costs. These should be taken into consideration before implementing any policies and programmes.

Glossary

Energy-only diet	a diet that only meets energy (calorie) requirements
nutritious diet	a diet that meets all nutrient requirements: energy, protein and fat, as well as the recommended nutrient intake (RNI) for 9 vitamins and 4 minerals
optimized nutritious diet (staple adjusted)	the cheapest possible way of meeting all nutrient requirements, assuming the consumption of at least two portions of rice daily
affordability	percentage of households whose current food expenditure is high enough to afford the cost of an optimized nutritious diet

Cost of the Diet Baseline Findings

Takeaways

- A nutritious diet is more than twice as expensive as a diet meeting only energy requirements.
- The prevalence of non-affordability of the nutritious diet (optimistically estimated at 13 percent of households), assuming optimal nutrition choices and food safety, is in line with the national extreme poverty line (12.9 percent in 2016) (23).
- The cost of the nutritious diet doubles from childhood to pre-adolescence and peaks during adolescence, remaining high until old age.

Findings

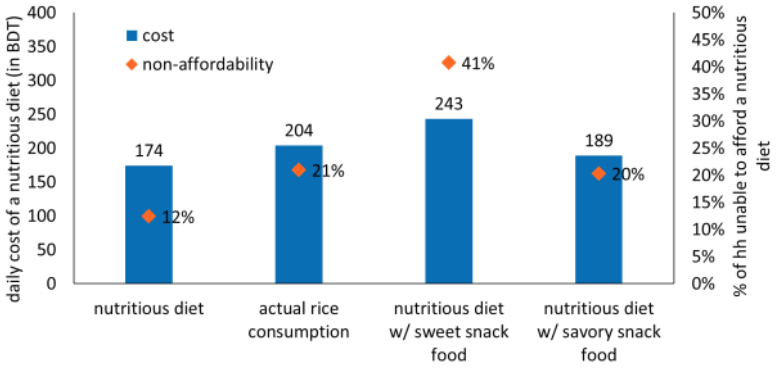
The cost of the nutritious diet

- An optimized nutritious diet is more than twice as expensive as an energy-only diet. The lowest cost nutritious diet for a five-person household is 174 BDT per day, whereas the lowest cost diet that meets only energy (kilocalorie) needs is 80 BDT per day. It should be noted that this figure is purely for comparison and is not based on what people actually eat. Median food expenditure in 2016 was 270 BDT.
- The optimized nutritious diet is composed of about 10 different foods (with some variation by district and rural/urban settings) from different food groups, including cereals, tubers, legumes, meat, milk, fish, vegetables, fruit and oils. The energy-only diet is composed of rice and wheat.
- Food prices in Bangladesh vary considerably by food group. Staple foods with low nutrient density are cheapest per calorie, while nutrient-dense foods such as meat and fish are most expensive (22).

Affordability and consumer choices

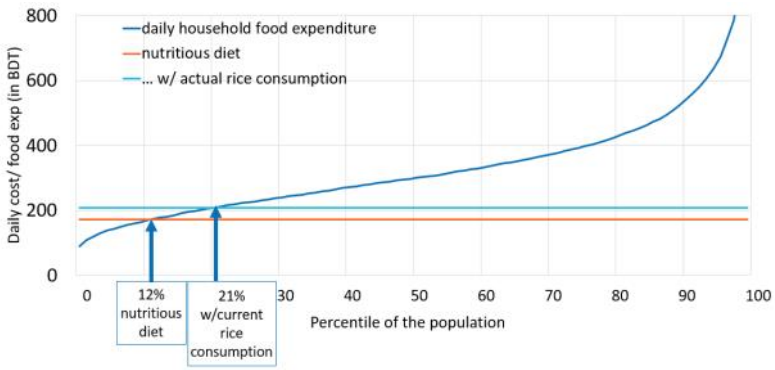
- Most Bangladeshi households would be able to afford a nutritious diet: improving nutrition requires addressing non-financial barriers (e.g. time, knowledge, food safety, food culture) and promoting healthy choices.
- While nutritious choices need to be encouraged for all households, 13 percent of households cannot afford a nutritious diet. Strategies to improve affordability and increase access to specific nutritious foods are especially important for these households.
- For an illustrative example of the food expenditure curve and affordability calculation see Figure 1 (shown for rural Chattogram). At national level, affordability is calculated from the average rural and urban division level affordabilities weighed by population size. Because the expenditure curve is relatively flat, a small increase in cost means a large increase in non-affordability.
- Unhealthy dietary habits increase the cost and non-affordability of a nutritious diet (Figure 2) making it more challenging for individuals to meet their nutrient needs.
- Overconsumption of rice at the current level (367g per capita per day) increases the household's cost of a nutritious diet by 17 percent, and the proportion of households that cannot afford a nutritious diet to 21 percent. Reducing rice consumption would allow for a cheaper and more diversified nutritious diet.
- Daily snacking (of sweet or savory nutrient-poor foods) increases the cost of a nutritious diet by up to 40 percent and increases the proportion of households that cannot afford a nutritious diet to 41 percent.

Figure 2: The cost of the nutritious diet and non-affordability when accounting for actual rice consumption or daily snacking*



* Average across modelling areas only

Figure 1: The food expenditure curve and affordability calculation in rural Chattogram



- It is important to note that the non-affordability of the nutritious diet for 13 percent of households is an optimistic estimate. Several factors can increase the cost of a nutritious diet in addition to those already mentioned, including buying of prepared foods, making less optimized choices from within healthy food groups, and vitamin loss during cooking. Also note that small reductions in income can make a nutritious diet unaffordable for more households.
- The cost of a recommended diet, in-line with Bangladesh food-based dietary guidelines, which is further adapted to consumer choices, has been reported to be unaffordable for 53% of households (16).

Food Supply Chains

Takeaways

- Bangladesh has made significant progress to reach self-sufficiency in rice, meat and fish, but domestic supply is still lagging for recommended consumption of vegetables, fruit, milk and other nutritious foods.
- Changes in food production methods, technology, and processes that increase availability of specific foods, do not necessarily increase nutrient intakes from these foods.
- Widespread concerns about food contamination and adulteration need to be addressed on both sides of the supply chain to promote consumption of nutritious foods.
- Post-harvest losses are significant, especially for more perishable produce such as fruit and vegetables, which reduces their availability on the market.

Findings

Bangladesh has achieved self-sufficiency in rice and most recently in meat, egg, and fish production (13), thanks to substantial efforts by the government and communities to increase agricultural productivity and diversify production. This is in line with decreasing the proportion of households with a food deficit over the past 20 years. However, compared to recommended consumption based on the Bangladeshi Dietary Guidelines (14) the current supply is still low for vegetables, fruit, milk and other nutritious foods (15). A 2012 IFPRI analysis projected that rice production could face a deficit compared to population growth by 2030 (12); updated projections could be conducted for rice and a wider range of nutritious foods to ensure adequate production, supply and affordability in the future. The recommended healthy diet would require a larger land area for cultivation than the current diet requires. Hence, the required dietary shift would need strategies to overcome land constraints by decreasing loss, increasing efficiency, fostering trade, and protecting the environment.

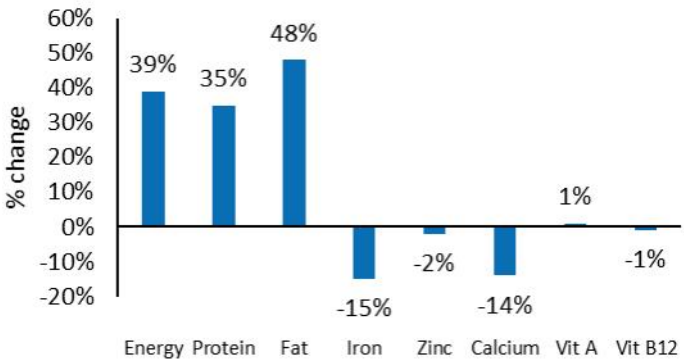
Post-harvest losses

Post-harvest losses are significant, especially for more perishable produce such as fruit and vegetables. Nationally representative information on post-harvest losses exists only for staple foods and some spices, and ranges between 3 percent (chili) and nearly 6 percent (rice: Aus variety) (26). Several non-representative studies estimate the extent of post-harvest loss in fruit and vegetables to vary between 24 percent (orange) and 44 percent (jackfruit). The total direct economic loss due to post-harvest spoilage of fruit and vegetable is estimated to be 3,442 Crore BDT (approximately USD 400 million) (26). Most post-harvest losses are due to inadequate handling, transport and storage facilities. The Ministry of Agriculture has already taken important steps to try to address the challenge of nutrient-dense fresh produce never reaching the consumer. Generating reliable local demand for fresh produce through social protection programmes such as school meals could be an opportunity to reduce transport and storage needs and thus post-harvest losses.

Nutrition-sensitive and safe transformations of food supply chains

Transformations of food supply chains, including production and distribution, have significantly contributed to improving the availability and accessibility of nutritious foods in the past. Yet not all improvements and transformations necessarily increase nutrient availability. For example, micronutrient intake from fish has decreased over recent years, even though fish consumption increased (17, 18). This is mainly due to the variety of fish being farmed vs. captured, and the way they are prepared and consumed (with or without bones, with or without eyes). Figure 6 illustrates that energy, protein and fat intake from fish increased by 35 percent to 48 percent between 1991 and 2010, while intake of vitamin A and vitamin B12 remained constant and iron and calcium intake reduced by 15 percent.

Figure 6: Change (%) in nutrient intakes from fish between 1991 and 2010 (adapted from Bogard et al. 2017)

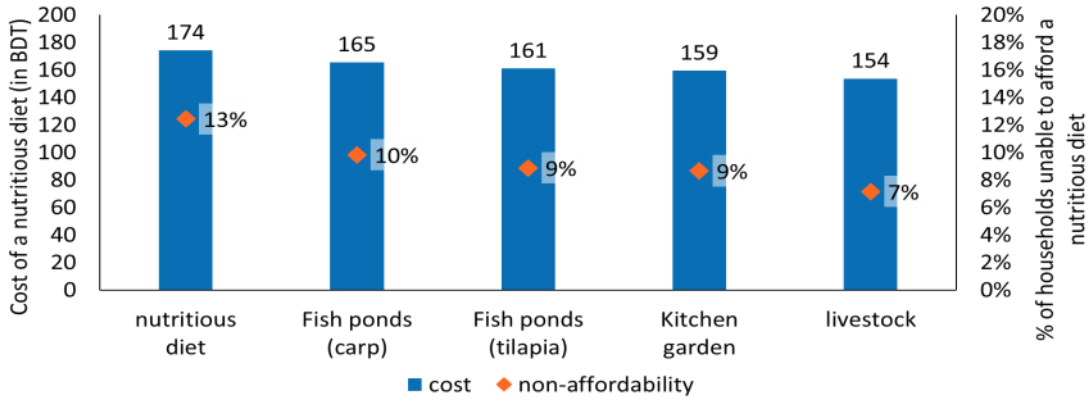


Evidence suggests that some food might be adulterated to preserve or increase its commercial value, for example by preserving fish with formaldehyde or adding water to milk. The efforts to ensure that food is not adulterated throughout the supply chain might increase food prices, reduce availability of certain foods, and reduce affordability. Research recently recommended systematic checks throughout the supply chain to identify and eliminate sources of contamination (27).

Livelihood interventions have the potential to increase the availability of fresh nutrient-dense foods at household level while putting some of the control over food safety and adulteration back into the hands of consumers. Figure 7 illustrates the potential of fish ponds, kitchen gardens and dairy livestock to reduce the daily cost of a nutritious diet by up to 13 percent (20 BDT) and reduce non-affordability by 6 percent.

Livelihood programmes have often seen challenges in sustainability because of floods and difficulties in procuring inputs for the next growing season, especially seeds. As discussed in the findings on Shock Response and Resilience (below), disasters and floods destroy productive assets and have long term adverse effects on livelihoods. The impact can be reduced by either preventing the loss of these assets, or by supporting their rapid repair and replacement. Negative effects of disasters must be mitigated to ensure quick recovery of food availability and affordability following a shock.

Figure 7: Cost and non-affordability of a nutritious diet with different livelihood interventions*

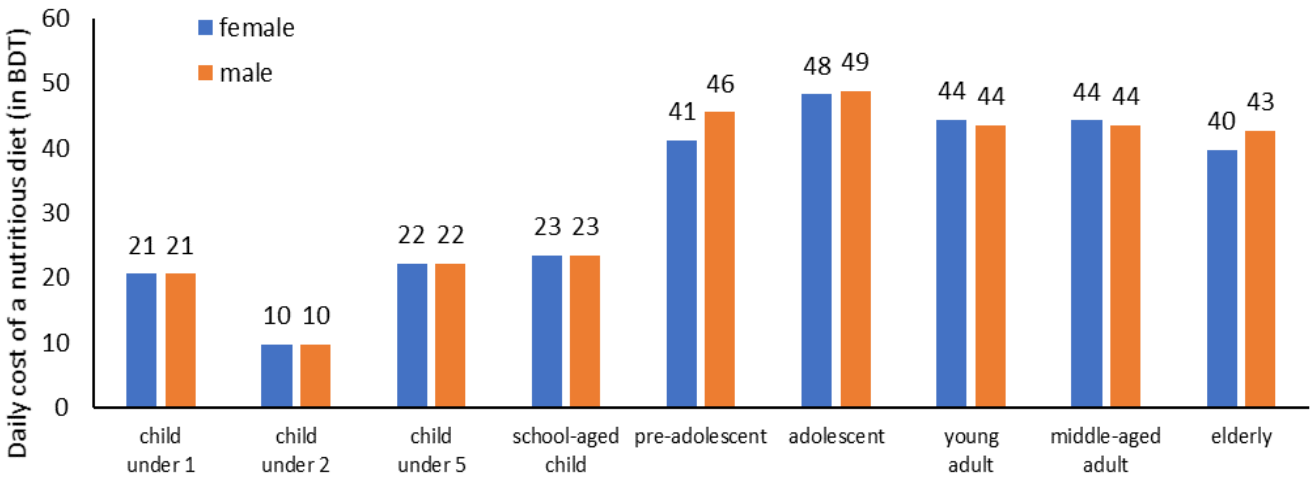


*Assumption: consumption of 5kg of fish per month per household from fish ponds; consumption of 8kg of fruit and vegetables per week per household from kitchen garden; 130g of milk per person per day from dairy livestock (Bushamuka 2010; World Bank 2019).

The nutritious diet across the lifecycle

- The cost of the nutritious diet varies considerably throughout the lifecycle and by gender due to changing nutritional needs.
- The cost of the nutritious diet increases substantially in pre-adolescence and is highest during adolescence for both girls and boys (Figure 3).
- Women and girls have the highest micronutrient requirements in the household as they require very nutrient-dense foods. Their nutrient needs are therefore the most difficult to meet, putting them in a nutritionally vulnerable position.
- The breastfed child aged 6–23 months represents only a small share of the total household cost of the diet, yet highly nutrient-dense complementary foods need to be given daily (animal source foods, fresh fruit and vegetables or fortified foods). Providing these can be a challenge for households.
- Intra-household food distribution should be aligned with nutrient needs of individuals, with attention paid to the higher needs of adolescent girls and boys, pregnant or lactating women (PLW), and children under 2 years old.
- Household compositions vary, comprising individuals with different nutritional vulnerabilities. Declining fertility and a demographic transition will lead to an older population with a larger share of high-cost individuals in the household in coming decades. This means household purchasing power needs to increase over time to maintain the same level of affordability of a nutritious diet.

Figure 3: Cost of the nutritious diet across the life-cycle by gender



Food environment: supply and demand of nutritious foods

Takeaways

- For healthier diets, investment is needed to simultaneously increase demand and supply of all nutrient-dense foods, including pulses, vegetables, fruit and dairy.
- Consumer confidence in food safety is essential to enable nutritious diets.
- Rice fortification could reduce the cost of the diet of the household by 5 percent and would contribute significantly to meeting nutrient requirements, particularly of those most in need, when distributed through social safety net programmes.

Findings

Bangladesh has made substantial progress towards ensuring nobody needs to go hungry. Food security has been achieved, but ensuring the population consumes a healthy, nutritious diet remains a challenge.

Investing in demand and supply for nutritious diets

The quality of Bangladeshi diets has improved since 1995. The share of dietary energy from rice has decreased from 83 percent in 1991 to 68 percent in 2016 (22, 24). Compared to the recommended 55 percent of dietary energy from staples as per Bangladesh's Food-Based Dietary Guidelines (14), this is still high (Figure 4). In addition, recent research suggests that the decrease is partially due to a measurement error induced by inadequately accounting for changes in consumption habits, especially capturing rice consumption out of home (25). Reducing rice consumption would allow for a more nutritious, affordable and diversified diet that meets energy and all nutrient needs for the different members of the household. Predicted growth in demand for vegetables until 2030 is lower (5 percent) than that of other nutritious foods, such as meat (25 percent), milk (20 percent), and fruit (21 percent) (12). As Bangladesh's economy grows and household incomes increase, vegetable consumption needs to be promoted to ensure the adoption of healthy food habits.

Substantial efforts have been made to increase and diversify agricultural production, yet current supply (15) and demand for vegetables, fruit, and milk are still too low compared to recommended consumption (14). Building on the successful effort which resulted in the increase in rice yields and overall rice production, simultaneous investments are needed to further shift consumer choices towards more nutritious foods and increase the demand for, and availability of, locally produced nutritious foods, especially vegetables. The health, social, economic and environmental implications of promoting different nutritious foods need to be evaluated prior to their promotion.

The government is taking important steps to promote and ensure food safety. Building consumer trust, awareness, and private sector incentives and accountability are essential parts of the effort to create a favorable environment for improved diets.

Rice fortification

Fortification of rice could be an effective short-term strategy to increase micronutrient availability and intake. The analysis compared three types of fortified rice, namely vitamin A biofortified Golden Rice, zinc biofortified rice, and post-harvest fortified rice with six micronutrients. The latter option shows the greatest potential to contribute to meeting household nutrient requirements. It could reduce the household cost of a nutritious diet by 5 percent if households purchase fortified rice instead of regular rice at the current market price of regular rice.

Fortified rice could play a crucial role in ensuring adequate micronutrient intake, particularly as part of social safety net programmes but also for households that are not able to diversify their diets enough for various reasons. Household benefitting from these programmes are already at higher risk of not meeting their nutrient requirements than the rest of the population. For example, the Food Friendly subsidized rice project with fortified rice and the Vulnerable Group Development Programme with fortified rice make significant contributions to reducing cost and non-affordability of a nutritious diet from 13 percent to 4 percent and 3 percent respectively (see Figure 5). In addition, distribution of fortified rice through these programmes could contribute to creating awareness and promoting demand for fortified foods. A 2014 study found 95 percent overall acceptance of fortified rice by VGD participants (64).

Figure 5: Cost and non-affordability of a nutritious diet with rice provided at a subsidized rate or in kind

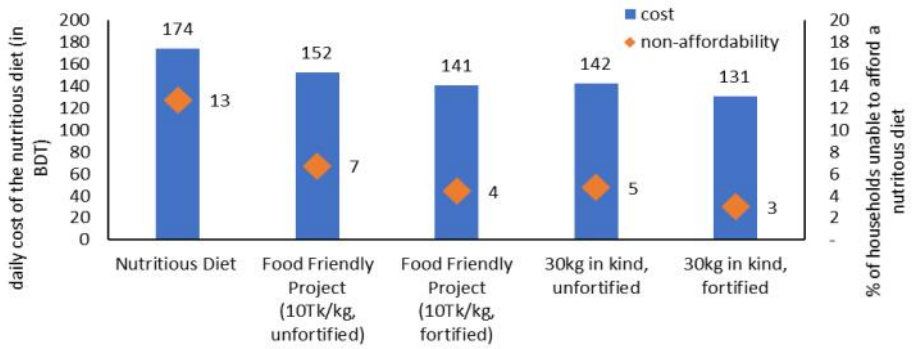
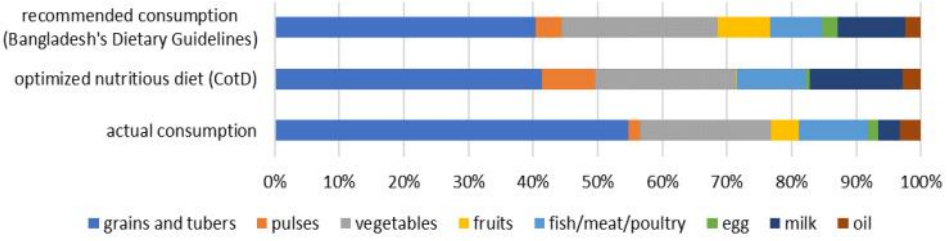


Figure 4: Actual and recommended consumption by food group (percentage of total consumed food weight)



Nutritional vulnerabilities related to gender and age – lifecycle approach

Takeaways

- Pregnant and lactating women and adolescent girls are the most nutritionally and socially vulnerable individuals in the household.
- Gender equality and empowerment of women and girls are essential for ensuring good nutrition.
- The Mother and Child Benefit Programme provides essential financial support during the first 1,000 days, but non-financial barriers also need to be addressed for social protection programmes to be effective.

Findings

At the national population level, comparisons of average consumption by food group as reported in the HIES 2016 (23) with recommended intakes based on Bangladesh's Food-Based Dietary Guidelines (14), suggest that diets may not be sufficiently nutritious and that several micronutrient requirements remain unmet (16). Of particular concern are underconsumption of pulses, fish, eggs, meat, milk, vegetables, and fruit, combined with overconsumption of less nutritious energy-dense foods like oils and sweets. These patterns have worsened since the HIES 2010 (16). Research by Dhaka University is currently ongoing to identify the exact specific micronutrient gaps based on available food consumption data sets.

Poor diets at the household level are compounded for nutritionally and socially vulnerable groups such as women and girls. Measures of women's dietary diversity demonstrate that only one in three women and girls aged 10–49 (34 percent) are consuming adequately diverse diets (28). The proportion is lower for women living in rural areas (30 percent), in the Dhaka slums (1 percent), and those who belong to the lowest wealth quintiles (15 percent). In these resource-constrained environments, women and households are also more prone to constraints related to inadequate cooking and WASH facilities, fuel, and cold storage, which could contribute to reducing consumption of safe and nutritious meals.

Women and adolescent girls have high micronutrient needs which require the consumption of a greater share of nutrient-dense, fresh and animal source foods in their diets compared to other household members. These foods can be a challenge for due to their relatively high cost and a lack of knowledge of their needs. Gender norms and women's disempowerment seem to be contributing to women's poor diets. For example, women and girls are disfavored in intra-household food allocation and more likely than men to resort to negative coping strategies (skipping meals) in times of food insecurity (28). Hence, they are the individuals least likely to meet their nutrient needs, particularly in resource-constrained households.

Adolescent girls face a double risk

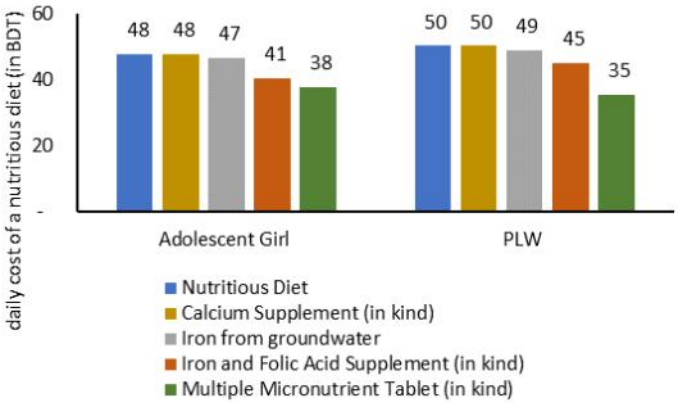
The nutritional vulnerability of adolescent girls is compounded by socioeconomic vulnerability linked to age and gender. In 2014, 31 percent of girls aged 15–19 were already mothers or pregnant with their first children, and 59 percent of women aged 20–24 were married before the age of 18 (1). The government's efforts to reduce high rates of child marriage and early pregnancy are essential to protect and promote the empowerment of girls, continued education (6), and nutritional status. A pregnancy increases the already high cost of a nutritious diet of an adolescent girl by 8 percent. As children born to young, malnourished mothers are more likely to be stunted and wasted, adolescent pregnancy is a social and nutritional risk for mother and child (1).

Mother and child nutrition during the first 1,000 days

Public services, including accessible, quality health services and social protection, could support women, children, and their families during the first 1,000 days.

Supplementation is a potential cost-effective strategy to enable girls and PLW to meet some of their essential nutrient needs. CotD modeling shows that the multiple micronutrient supplement has the greatest potential reduction in the cost of the nutritious diet for these groups (Figure 8).

Figure 8: Daily cost of the nutritious diet for the adolescent girl and the pregnant or lactating women (in BDT) with iron from groundwater or with different supplements



Social protection programmes could support an enabling environment for nutrition by increasing affordability of nutritious diets, empowering women and girls, and educating men and women in nutrition and care practices. There is mixed evidence on the empowerment impact of social protection programmes, including the ICVGD, for women and mothers (29–31). What comes out clearly from past experience is the need to carefully design these programmes to mitigate potential risks (e.g. increased tensions among men and women, gender-based violence, further curtailing of women's movement) and to draw on the benefit of involving all members in the household, including mothers-in-law, boys, men, and fathers to achieve women's empowerment objectives (29, 31–35).

The PLW has the highest cost of diet in the household and the child aged 6–23 months has the lowest. However, the foods selected do not necessarily make good recipes and fresh foods are typically not bought in small quantities for the young child alone. Therefore, the child's nutrient needs can be difficult to meet for financial and behavioral reasons. The models of the complementary feeding recipes and the results of household and community level behavioral barriers are presented in the Findings on the First 1,000 Days, opposite.

The FNG modeled and compared the potential contributions of different programmes in improving the affordability of nutritious diets. The current Mother and Child Benefit Programme (MCBP) could reduce non-affordability of the nutritious diet to half its current rate, from 11 percent to 6 percent2. IFPRI and WFP are initiating research on different iterations of the programme (36). CotD estimates these programme iterations could reduce non-affordability of a nutritious diet to as much as zero, assuming optimized choices and behaviors. The VGD programme and the ICVGD could reduce non -affordability to zero. For these programmes to improve nutrition, non-monetary barriers need to be addressed and consumer choice of nutritious foods promoted.

Reductions in gender inequalities enable nutritious diets

Bangladesh has made noteworthy improvements in women's education and empowerment (1) yet many women remain disadvantaged by their gender, warranting continued efforts. The literature review shows persistent gender inequalities including:

- intra-household food distribution that tends to favor men (32, 34, 37);
- continued gender-based violence that disproportionally affects women (1);
- decision-making on resources, food purchases, and health issues skewed towards men (1,38);
- women's limited mobility outside of the home (1), and;
- responsibility for housework and cooking primarily assigned to women (1,39,40).

The First 1,000 Days

Takeaways

- Socio-economic barriers at household and community levels hinder optimal infant and young child feeding (IYCF).
- Enriching complementary feeding recipes with multiple micronutrient powder (MNP), egg or (small) fish products is particularly effective at ensuring young children's meals are adequately nutrient-dense.
- Adolescent girls and PLW are highly nutritionally vulnerable and could benefit from better intra-household food allocation and additional supplementation, especially multiple micronutrient supplement (MMS) tablets.

Findings

Bangladesh's efforts to provide a quality, free health care service as part of an essential service package is important to support households in affording and consuming nutritious diets. Out of pocket expenditure is high, especially for medicines (41), partly due to a large proportion of (poor) households only attending pharmacies and quacks for health care, and partly because households seek quality private care that is relatively costly.

Creating an enabling environment for breastfeeding and complementary feeding

Sixty three percent of infants aged 0–5 months receive exclusive breastfeeding (42). If the child is not breastfed, meeting nutrient requirements becomes more costly and challenging. Removing breastmilk partially or fully from the diet of a child 6–23 months increases his/her cost of diet by as much as 60 percent. An enabling environment – family, community and institutional – is essential to allow mothers to breastfeed in line with recommendations (33, 43–45), or to provide adequate support for caretakers when mothers are unable to breastfeed.

The breastfed child aged 6–23 months represents only a small share (6 percent) of the total household cost of the nutritious diet. Yet, only 28 percent of breastfed children (6–23 months) and 17 percent of non-breastfed children achieve a minimum acceptable diet, mostly due to low dietary diversity (1a, 42).

Non-financial, social, and cultural barriers to feeding young children a nutritious diet may include: (i) the practical challenge of frequently purchasing, preparing and storing small quantities of diverse and highly nutritious foods, including when items would just be for the young child (46), and opportunity costs for the caregiver to procure, prepare and provide such meals; (ii) knowledge and attitudes towards IYCF from household members; (iii) the acceptance of these foods by the child; (iv) a lack of agency and empowerment of women and girls, and; (v) insufficient resources and infrastructure to cover basic needs (1, 33,38, 43–45, 47–49).

Cooking methods impact nutrient content. Extensive cooking reduces vitamin content considerably but the addition of oil to vegetables that are not cooked for too long improves the bioavailability of provitamin A. As cooking methods and the nutrient content of foods vary, cooking losses have not been taken into account in the nutrient content estimations.

To support communities, the Bangladesh Breastfeeding Foundation (BBF) developed guidance for parents in the form of a recipe book. The FNG modeled three of these complementary feeding recipes: Chirar Polao, Vegetable/Egg Khichuri (50), and sooji (semolina porridge) prepared with milk, oil, sugar and egg (Table 1). If a household purchased and fed these meals to a child daily, the cost of the nutritious diet of the child would increase by as much as 150 percent. The recipes are nutritionally sound but are not economically optimized (Figure 9). This shows that, theoretically, the optimized cost to feed a nutritious diet to a child is low when based on mathematical calculations but when based on preferences for taste, convenience and culturally accepted recipes, the actual cost of the child's nutritious diet is likely to be higher and become a barrier, particularly for the poorest households.

[2] Average across modelling areas only.

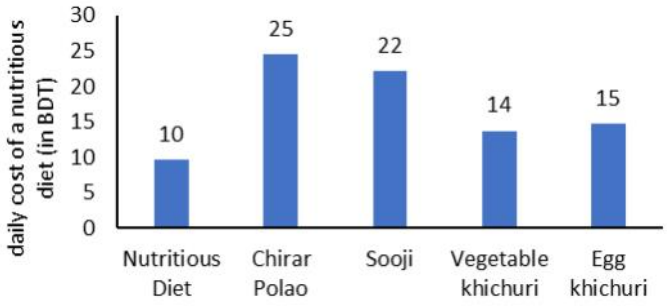
Stunting prevention programmes

Several trials are currently ongoing to identify effective ways to improve complementary feeding for stunting prevention by including animal source foods into commonly used recipes. For example, the International Centre for Diarrhoeal Disease Research, Bangladesh (Icddr, b) is currently conducting research on the potential of sooji in stunting prevention. It is prepared with UHT milk, oil and sugar and combined with an egg and MNP with 15 micronutrients. Preliminary results are very promising. Figure 9 shows that sooji, like several other propagated complementary food recipes, substantially increases the cost of a nutritious diet for a child if ingredients are purchased on the market. Indeed, recipes for complementary feeding necessarily imply higher costs than the 10 BDT minimum cost of the nutritious diet for the child, as the latter is an optimization instead of a combination of foods required for a real meal that is acceptable for children.

If the more expensive ingredients in the Icddr, b meal could be provided free of charge (e.g. through vouchers) and used as recommended (possibly communicated in mother's peer support groups), it could reduce the cost of the child's nutritious diet substantially while ensuring the intake of essential micronutrients. This is especially true if the dish is served in combination with MNP (Figure 10) and egg, which would enrich the meal with additional micronutrients.
Because free ingredients could be diverted to other uses (or consumed by other individuals in the household), there may be an opportunity to identify possible community platforms such as parent support groups to cook and share complementary foods.

In addition to the analysis of complementary feeding recipes, the FNG also modeled and compared the potential contributions of different specialized nutritious foods and supplements when provided in kind (for free). These foods are specifically designed to meet the nutrient needs of young children but should only be considered short-term solutions until IYCF practices have improved and affordability for all is ensured. The results are presented in Figure 10 and show that small fish products or powder are the most effective at reducing the cost of the child's diet because of their high calcium content in combination with B vitamins.

Figure 9: Cost of the nutritious diet of the child 12-23 months old with complementary food recipes included at market cost



Source: BBF 2013; CotD 2019

Nutrition support for women and girls

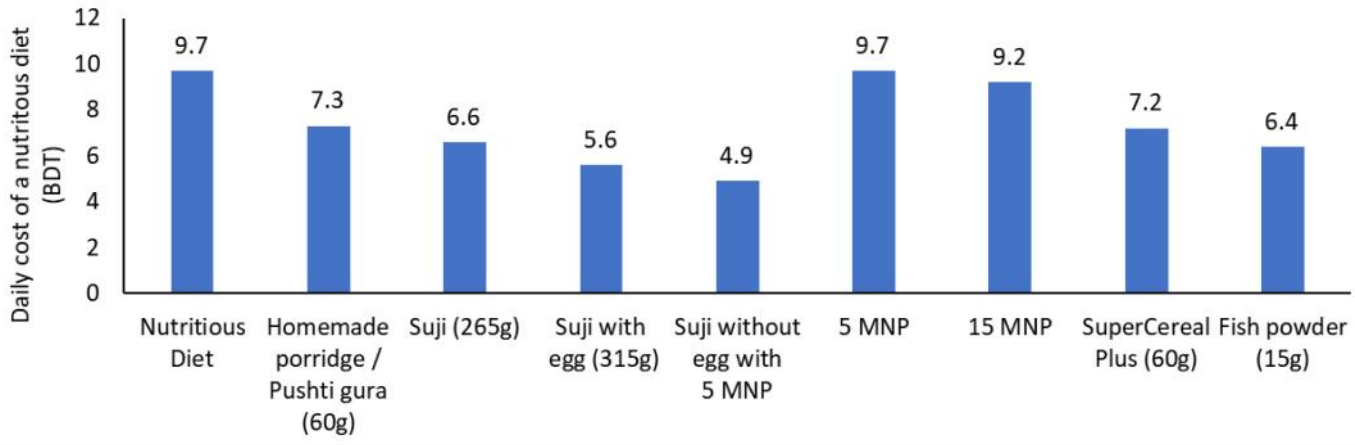
PLW and adolescent girls are the household members most at risk of not having their nutrient needs met. Only 1 in 3 girls and women aged 10–49 are consuming adequately diverse diets (28). Adolescent girls require specific attention warranted by their significant nutritional vulnerability. An appropriate food-based healthy diet with supplementation can enable them to receive some of the nutrients most difficult for them to obtain, such as iron and calcium, in a cost-effective manner. CotD modeling shows that the MMS offers the greatest potential cost reduction.

Table 1: Complementary Porridge Recipes

Suji	Homemade porridge/ pushti gura[1]
35g Semolina 200ml UHT milk 10ml oil 20g sugar 1 egg (50g)	30g pulses 15g whole grain, e.g. corn 15g whole grain, e.g. wheat

1The porridge, when prepared, weights approx. 300g due to the addition of water

Figure 10: Cost of the nutritious diet for the child under 2 (in BDT) with different complementary foods and supplements



Source: CotD 2019

Nutrition in schools

Takeaways

- Fresh school meals are an investment for the future because they could promote healthy food behaviors from a young age.
- Carefully designed nutritious school meals can reduce the cost of a child's diet to the household by almost 50 percent.
- A combination of fortified rice, fresh vegetables, and animal source foods can provide nutritionally complete meals.
- School meal rations need to be specifically tailored, in quantity and quality, if they are to meet the nutrient needs of adolescents.

Findings

School meals are a potentially powerful entry point for improving nutrient intake among children aged 6–18.

Optimizing school meal compositions for nutrition

Bangladesh has recently mandated the increase in school meal coverage from three million to 16 million+ students in primary education. This could contribute to reducing widespread micronutrient deficiency among school-aged children, support their cognitive and psycho-social development, and foster healthy food habits for life (2).

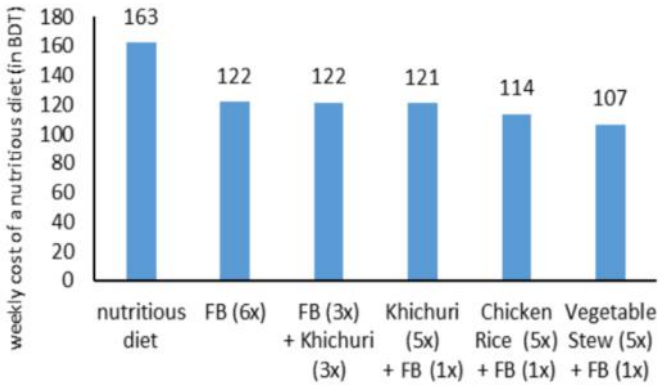
The nutritional impact of school meals depends on whether they include a diverse range of fresh plant-based and animal source foods. Different school meal rations, costing under 18 BDT per child per day (ingredients only), were modeled as part of the FNG (see table 2), representing a diversification from fortified biscuits (FB) only. The modeled rations could reduce the cost to the household of the nutritious diet of the school-aged child by between 26 percent (khichuri containing rice) and 33 percent (vegetable stew with chapati) (Figure 11).

Table 2: Weekly school meal rations modelled

	Weekly ration (in g)			
	Khichuri + FB	**Khichuri**	**Chicken Rice**	**Veg Stew**
Biscuits	225	75	75	75
Rice	270	450	500	
Wheat flour				250
Lentils	135	225		
Veg. oil	36	60	60	150
Pumpkin	60	100		250
Leafy veg	45	75	500	300
Cauliflower				250
Potato	45	75		300
Eggs	45	70		120
Chicken			350	

Widely available nutrient-dense foods such as green leafy vegetables (e.g. amaranth leaves) and eggs are particularly cost-effective foods, suitable for integration in child-friendly and culturally adapted recipes. Adding whole wheat or fortified rice instead of regular rice could increase the nutritional value of the meals.

Figure 11: Weekly cost of the nutritious diet of the child with different school meal rations (with cost price) for the household



Increasing the nutritional value of school meals through (bio)fortification

The school meal policy aims for school meals to provide 30 percent of the daily requirement of energy, protein and fat and 50 percent of micronutrient requirements, and states that they should include a minimum of four out of ten food groups. The modeling shows that adding different special (fortified) foods (eggs, fish powder or fortified rice instead of regular rice) to the school meals could enhance their nutritional content and help meet targets. Fish powder, albeit not common in Bangladesh, is a cost-effective source of calcium, a micronutrient that is not found in other foods currently in the school meal recipes. Figure 12 breaks down the nutrient contribution of the different foods included in an enhanced Khichuri recipe, illustrating the need for a wide variety of foods from different food groups to supply a complementary range of micronutrients.

School meals to reduce the nutritional and social vulnerability of adolescents

The Directorate of Secondary and Higher Education has initiated the Mid-Day Meal at secondary schools in Bangladesh, so school meals now serve students with a wider range of nutritional vulnerabilities, particularly adolescent girls. In early childhood, stunting and micronutrient deficiencies are the main concern in Bangladesh. In adolescence, overweight and obesity and the heightened risk of non-communicable diseases, become an additional nutritional challenge (1, 51, 52). Their elevated nutrition needs mean that adolescents have the costliest nutritious diets in the household. The current school meal budget of 18 BDT per meal per child could cover 78 percent of the cost of the nutritious diet of a young child, but only 37 percent for an adolescent.

Fresh school meals have the potential to contribute towards developing healthy food habits early in life and promote nutritionally sound choices in adulthood. Schools could also serve as a platform for complementary interventions targeting adolescent girls and boys, especially those aiming to reduce early marriage and adolescent pregnancy, and improving gender equality. Evidence suggests that school meals could contribute to keeping girls in school, potentially delaying age at first marriage and first pregnancy, which is important to break the intergenerational cycle of malnutrition (53).

Though the nutrient content of school meals within the 18 BDT budget meets Reference Nutrient Intake (RNI) targets for younger children, the rations are inadequate to cover the higher needs of adolescents (Figure 13). To leverage the potential of school meals to improve nutritional and socioeconomic status, school meal budgets and recipes need to be specifically revised.

Figure 12: Nutrient content of fresh school meals (one week, 5 school days) by ingredient

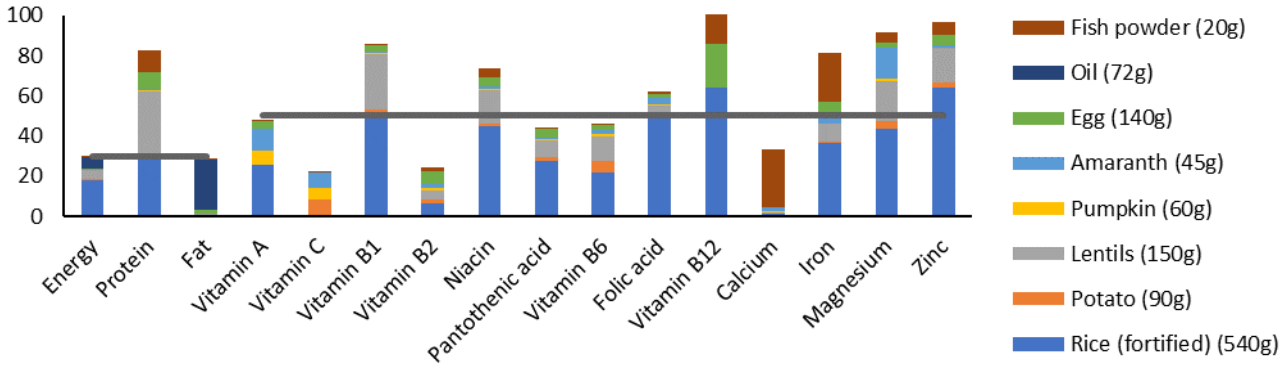
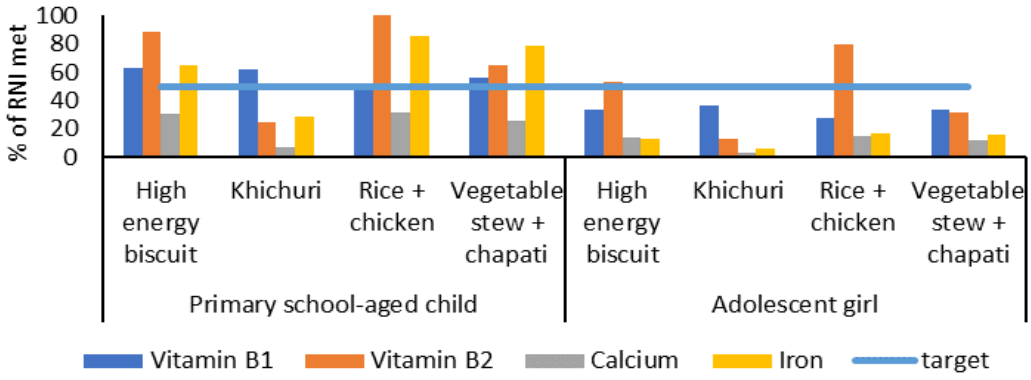


Figure 13: Percentage of daily Reference Nutrient Intake (RNI) met by different school meals for the school-aged child and adolescent girl



Shock response and resilience

Takeaways

- Food supply chains recover quickly after a disaster. They offer an important but currently underexploited entry point for delivering relief.
- If infrastructure and productive assets are not recovered quickly, disaster can depress wages and affordability of nutritious diets for several years after an event.

Findings

Bangladesh has a strong disaster management and relief capability with the focus shifting from relief to risk reduction and resilience. Its legal and policy frameworks for disaster management and relief are well-developed, and community-centered preparedness and early warning systems are in place and functioning (54–56). Significant challenges for disaster relief and recovery remain, especially: poor infrastructure such as roads and bridges; waterborne diseases during emergencies; and medium-and long-term negative impacts of disasters on livelihoods and credit markets. Experience shows that food supply chains are not significantly disrupted by commonly experienced slow and rapid onset disasters such as floods, cyclones, or salinity intrusion, offering an important entry point for delivering relief which is currently often underexploited (19, 57–60).

For short-term relief, the Ministry of Disaster Management and Relief (MoDMR) supports local authorities to provide lifesaving food aid. The FNG modeled and compared the potential impact of relief packages on meeting household nutrient requirements (see Figure 14). The Bangladesh Food Security Cluster identifies packages of flattened rice (chira), molasses, and fortified biscuits (Option A) or fortified biscuits alone (Option B) (61) for immediate response when no cooking facilities are available. Option A covers nutrient needs the best, reducing the cost of the optimized nutritious diet of the household by about 70 percent. The analysis highlights the importance of combining chira, molasses and fortified biscuits to cover nutrients needs best (Figure 14).

Government-mandated Dry Food Packages consisting of regular rice, sugar, lentils and oil reduce the daily cost of the optimized nutritious diet of the household by 31 percent. Replacing the regular rice with fortified rice achieves a 36 percent reduction. Supplementing these packages with fresh foods such as eggs and/or green leafy vegetables could further enhance the nutritional value of the food packages, although logistics and food hygiene need to be managed carefully.

MoDMR has started to implement a shift in delivery modes from in-kind food to cash-based transfers where markets are functional. This is potentially more efficient in delivering relief. Activities need to ensure that resources are spent on nutritious foods. In-kind distribution of nutritious food in emergencies may stimulate consumption of those foods for vulnerable household members, especially young children and PLW. Children under 5 are particularly nutritionally vulnerable during a disaster, as they require frequent feedings of diverse and nutrient-dense foods. Lactating women need support to prevent discontinuation of breastfeeding due to the emergency.

MoDMR is currently exploring options for a specialized food package for children under 5 to enhance the nutrient intake of this age group during emergencies. FNG compared a range of complementary foods for children under 5 which could be added to the existing Dry Food Package to better meet young children's nutrient needs.

The results, presented in Figure 15, reveal that fresh foods (fish or egg) or a fortified porridge (SuperCereal Plus) best complement the existing household package and could support households to feed a more nutritious diet to their young children in times of crisis.

In the medium and long term, disasters may produce vicious cycles that impact household affordability of nutritious foods to even years afterwards. The immediate impacts of disaster, which include harvest losses, lower demand for labor, and damage to infrastructure, catalyze long-term negative impacts as purchasing power falls, loans are defaulted, and new loans to rehabilitate damaged infrastructure become unobtainable. This perpetuates the cycle of low demand for labor and low purchasing power (19).

Figure 14: Daily cost of the nutritious diet for the model household (in BDT) with different emergency food packages provided in kind

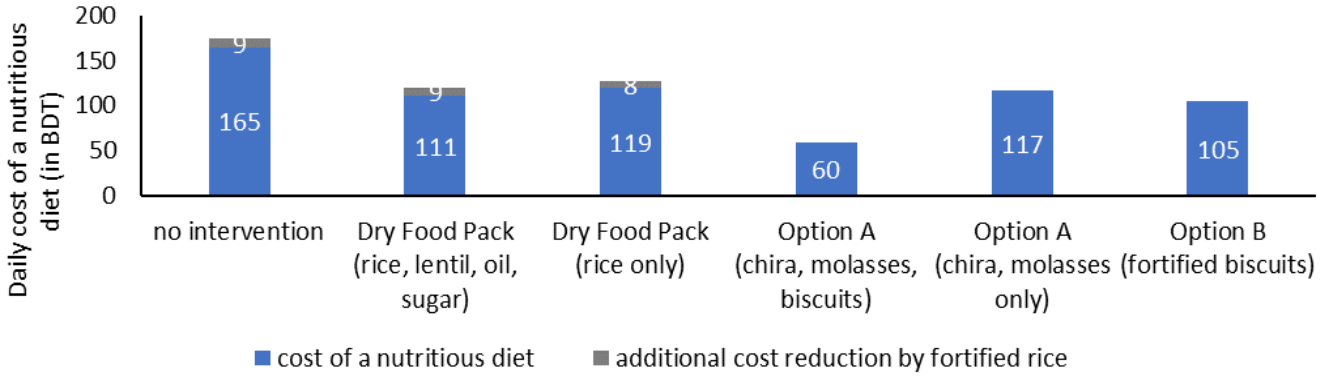
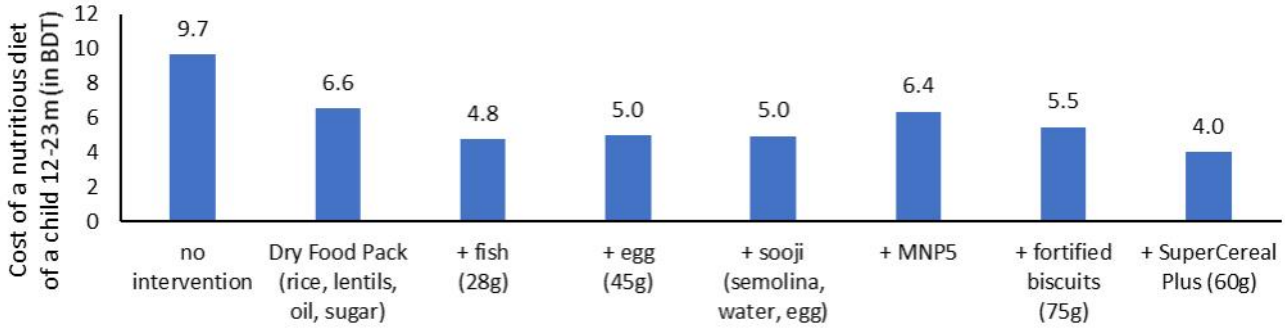
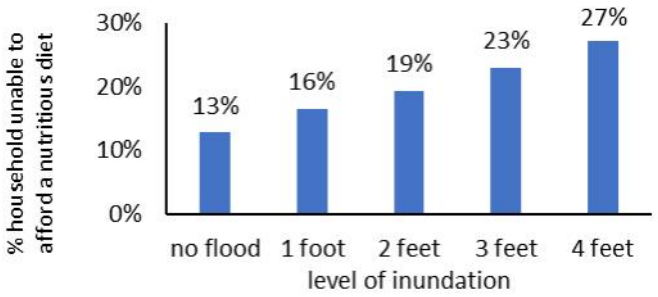


Figure 15: Daily cost of the nutritious diet for the child aged 12-23 months (in BDT) with different interventions



The long-term effects of floods on livelihoods are rarely documented in detail. The limited available evidence shows that wages might not recover for many years following a disaster. Five years after the 1998 floods, in the areas that were the worst affected non-agricultural wages were 7 percent lower per one-foot increase in the flood level (62). Reduced wages translate to a significant increase in the percentage of households unable to afford a nutritious diet. For the households studied 5 years after the 1998 flood, non-affordability would have ranged from 13 percent to 16–27 percent, depending on the level of inundation (Figure 16). This data is outdated and many improvements in disaster response and management have been implemented since then, but newer data about the long-term impact of shocks is not available. Recent WFP data shows short-term spikes in food prices for some commodities immediately after the flood, but no long-term effect on food prices. However, further and more detailed analysis of wages is needed to update the 1998 study findings.

Figure 16: Percentage of households unable to afford a nutritious diet due to disaster-induced wage losses 5 years after floods



Detailed Recommendations

Recommendation	Sectors involved
1. Food Environment	
1.1. Coordination and alignment with National Nutrition Policy and NPAN2 must be further prioritized (and adjusted based on new evidence), with concrete actions including: • Formulate sector-specific and overarching recommendations for improving access to nutrients in specific situations • Increase availability of nutritious foods for key vulnerable groups • Identify and strengthen nutrition sensitive and nutrition specific programmes of the sectoral ministries • Coordinate sectoral ministries to identify the overlapping areas and complementarities of nutrition programmes for better collaboration	All sectors
1.2. Adequate funds should be allocated to ensure a healthy food environment.	All sectors
1.3. Additional research and evidence are needed to understand the extent, type and implications of food adulteration and contamination on affordability and consumers' selection, preference and convenience-related choice of nutritious foods. Establish an accredited laboratory.	MoFood BFSA BIRTAN
1.4. Ensure that adequate hygiene and sanitation facilities, as well as cooking facilities, are in place at the schools.	MoLGRD DPHE
1.5. Impose higher taxes for some fast foods and fizzy drinks of poor nutritional value.	MoHFW MoInd MoF
2. Food Supply Chains	
2.1. Further invest in the diversification of agricultural production, particularly fruit and vegetables. Create better knowledge and production information on "under-utilized" (indigenous) species, their optimal cultivation methods, and nutritional benefits, for (commercial and homestead) producers, policy makers and consumers. This will require research, and demand creation, and platforms for dissemination.	MoA MoFLS BIRTAN BARC BARI BRRI
2.2. Policy interventions are needed to reduce post-harvest losses by developing agro-processing industry e.g. through vertical expansion of diversified agricultural products. In addition, investments are needed in establishment and strengthening of SMEs as part of the supply / value chain that produce value added products.	MoInd MoA; BIRTAN
2.3. Collaborate with the private sector and assist them to create incentives to increase safe production and distribution of nutrient-dense foods.	MoInd MoA MoFLS
2.4. Increase and strengthen capacity and accountability on food quality and safety of all actors engaged in the food supply chain, from the private sector and government and its institutions, to ensure quality across the food value chain and to promote consumer confidence.	MoFood MoInd MoA & MoFLS
2.5. Support policy guidance to ensure adequate production of diversified, healthy, safe, nutrient-dense foods.	MoFood MoA & MoFLS MoInd MoCommerce
2.6. Connect small-scale producers of fruit, vegetables, livestock, fish and eggs with demand generated through social protection programmes (e.g. school meals) to incentivize investments into local production and reduce post-harvest losses.	MoFood & MoA MoPME; MoE MoH MoWCA
2.7. Continue support for the further increase in domestic production of fortified rice and other fortified foods (oil, iodized salt, etc.), including for public consumption. Linkage with social protection, school meals, institutional canteens and public consumption will create a stable and guaranteed market for fortified rice, which is required to ensure a stable supply.	MoFood MoA MoPME MoWCA MoDMR
2.8. Identify suitable highly nutrient-dense food products for local nutrition-sensitive processing that can enrich school meals and analyse them for their cost-effectiveness. This should further promote preservation or even add commercial value to fruit and vegetables for off-season times.	MoA MoFLS MoInd
2.9. Assess the potential impact of innovations for production increase in supply chains on food safety and nutrient content prior to their rollout.	MoA MoFLS MoInd MoFood
2.10. Continue efforts to increase fish production in line with nutrition requirements: • Establishment of fish sanctuary will boost the captured fish production, which species have a higher micronutrient content. • Expansion of poly culture of fish like Carp and Pangasalong with SIS (Small Indigenous Species) will pave the way to increase consumption of micronutrients (Calcium, Iron, Phosphorus, Zinc, Vit- A, D, E) etc. • Promotion of research on and production of small fish and other traditional or indigenous varieties of fish with high nutrient contents • Promotion of research on increasing the nutritional value of pond farmed fish to bring it closer to that of captured fish.	MoFLS

Detailed Recommendations

2. Food Supply Chains - continued	
2.11. Increase awareness-building services, trainings and activities for farmers on nutrient-dense crop cultivation, integrated pest management, and Good Agricultural Practices, e.g. through farmer field schools (adapted to the needs of male and female farmers), public procurement of nutritious foods for school meals and other social protection programmes.	MoA & MoFLS BIRTAN MoI MoPTIT: DoICT
2.12. Research and promotion of innovation to establish nutrient-preserving product formulation, processing, packaging, transport and storage. Find strategies to reduce waste and increase technical and economic efficiency.	MoInd MoCom MoEFCC
2.13. Establish a knowledge HUB for producers, processors and consumers on nutrition, agriculture and food systems.	MoHFW: BNNC MoFood: FPMU, BFSA MoA MoFLS MoInd MoECFF MoPTIT: DoICT
2.14. Promote cooperation and identify strategies striving to quickly recuperate (household) productive assets after a disaster. Invest in agricultural rehabilitation, e.g. short-day yielding fruit and vegetable varieties for quick access to nutrient-dense foods after a disaster.	MoDMR MoFood MoInd MoA
2.15. Further enhance cooperation and identify strategies to enhance resilience to climate change, disasters and shock of vulnerable communities and households.	MoDMR MoEFCC
2.16. Revise food basket composition to enhance nutrient value, including child and pregnant and lactating women supplement options, depending on market context and cooking facilities, including options for fresh food.	MoDMR
2.17. Explore ways to incorporate commodity-specific (e)vouchers in disaster response to stimulate supply and demand for nutritious foods in areas with resilient food markets.	MoDMR MoFood
3. Consumer Demand	
3.1. Social and Behavior Change interventions across sectors should aim to generate social change in cultural norms on food habits and consumption, not just change in individual behaviors.	MoInfo MoPTIT: DoICT MoHFW: DHE, DGHS, DGFP MoWCA MoPME MoFood MoDMR MoLGRDC
3.2. Adopt a household approach to improve intrahousehold food distribution as well as the diets of the entire household with more nutrient-dense foods. This should especially enable an improved diet for children under 2 as they receive nutritious portions of the family diet.	MoHFW: DHE, DGHS, DGFP MoWCA
3.3. Seek out opportunities to create awareness and promote demand for nutritious foods, and healthy food habits, through for example schools, media, and/or price incentives.	MoFood MoA MoPME MoE
3.4. Advocate with the National Curriculum and Textbook Board (NCTB) to strengthen the food and nutrition part of the National School Curriculum and textbooks, including about the adverse effect of high-caloric foods with low nutrient density, as teaching children will have a multiplier effect.	MoPME MoE
3.5. The school feeding/meal programme should optimize the utilization of SBCC opportunities to help parents to understand their children's nutrition situation and nutritional requirements.	MoPME MoE
3.6. Awareness raising on healthy balanced diets and hygiene for the cooks and the suppliers of the homegrown school meal programme should be incorporated in the programme design and be adequately monitored and reinforced.	MoPME MoE
3.7. Explore the barriers and enablers to increase use of foods rich in iron and calcium, especially whole (small) fish and green leafy vegetables, in young children's diets, and evaluate the acceptability of fish products for inclusion into complementary feeding recipes.	MoHFW: DHE, BNNC
3.8. Promote and enable feeding for the young child (6-23 mo) with time-saving and convenient nutrient-adequate recipes and products, such as sooji with milk, egg and MNP with 5 - or 15 – micronutrients.	MoHFW MoWCA
3.9 Critically evaluate the different nutrient-dense foods (especially meat, fish, eggs, milk products and green leafy vegetables) for their impact on nutrient intake, food habits, affordability by the poorest households and the environment prior to promoting certain commodities for their micronutrient content.	MoHFW INFS BIRTAN
3.10. Explore ways to implement necessary orientation and awareness interventions to encourage appropriate utilization of cash transfers during emergencies and recovery operations to enhance nutritious diets.	MoDMR MoHFW MoI / MoICT

Detailed Recommendations

4. Social Protection	
4.1. Social protection support to food insecure households with adolescent girls is essential to mitigate nutrition and protection risks.	MoWCA MoSW
4.2. Need for new data and evidence of status of gender equality and women's empowerment to document progress and identify gaps and strategies for how best to address them.	All sectors
4.3. Harmonize age and needs-specific nutrition messaging across all programmes.	All sectors
4.4. IC-VGD should be scaled up and transformed into vulnerable women benefit programme as envisaged in National Social Security Strategy with a view to reducing gender inequalities and malnutrition.	MoWCA MoSW Cabinet Division
4.5. Continue investing in designing and piloting recipes for school feeding that maximize the nutritional impact of school meals to fill the micronutrient gap and work with subnational authorities to disseminate recipes and support schools to make nutritious choices.	MoPME MoE MoHFW INFS BIRTAN
4.6. Advocacy to increase public funds per child for school meals should continue and will require additional research and evidence on the food consumption and nutritional status of school-aged children and adolescents.	MoPME MoE
4.7. Identify synergies between healthy school meals, the promotion of local demand for fresh produce and diversification of agriculture. Reducing post-harvest losses of fruit and vegetables, through increased demand from schools, can be a key element of this collaboration.	MoPME MoA MoFLS MoFood MoHFW
4.8. Establish a quality assurance mechanism, including SOPs (standard operating procedures), for school meals preparation to ensure the meals served to children are nutritious and safe for consumption and establish a quality control mechanism.	MoPME
4.9. Integrate gender-sensitive elements into health programmes and strengthen nutrition outcomes of social protection and safety nets, including during emergencies.	MoDMR
4.10. Develop community and school-based approaches for school-going adolescents (boys and girls) to have more affordable and healthy food options at and around the schools and support and guide different actors to make this shift.	MoE MoWCA MoFood Private sector
4.11. Enhance impact on recovery of most affected households through food or cash for work programmes for swift recuperation of infrastructure by increasing the transfer value and the number of working days per household. Create additional recovery mechanisms for most vulnerable household without availability of able-bodied laborers through adaptive social safety nets.	MoDMR MoDMR MoSW
5. Underserved Groups	
5.1. Policies, programmes and interventions need to be sensitive to the different levels of nutritional vulnerability and identify ways to meet different target groups' needs, ways to reach them and to create demand for nutritious food. Strengthen understanding of and capacity on age-related nutritional needs across the lifecycle when designing programmes and for decision making. Essential to efficiently and effectively target, identify, and enroll the most vulnerable, including adolescents.	MoHFW: IPHN INFS BIRTAN
5.2. All sectors should consider how to better serve the nutritional needs of older people and the adolescent population – boys and girls – with a view to improve their choices, behaviors, empowerment, and capabilities.	All ministries
5.3. Transfer values for social protection need to be almost doubled to enable positive nutrition outcomes for all pregnant and lactating women and young girls.	Cabinet Division MoF MoSW, MoWCA
5.4. Ensure better inclusion of adolescent girls and pregnant and lactating women in health and nutrition programmes tailored to the needs and priorities of these target groups. Enhance the platforms for reaching pregnant and lactating adolescent girls with mother and child health and nutrition (antenatal care/postnatal care/ growth monitoring and promotion) programming.	MoHFW MoWCA MoLGRDC
5.5. Form partnerships to improve secondary level completion in tandem with improved nutrition for vulnerable adolescents and food habit through an integrated school nutrition programme, providing home grown school meals, nutrition education, and physical activity routines.	MoE MoPME MoYS
5.6. Identify opportunities to reach adolescent girls and boys with nutrition and health services through schools, with a view to reducing gender inequalities, child marriage, child labour, and malnutrition in this age group. Identify strategies and alternative platforms to reach adolescent girls and boys that are not in school.	MoE MoPME MoSW MoLGRDC MoRA
5.7. Explore the possibility to provide MMS instead of iron and folic acid supplements for the adolescent girl and women during pregnancy and lactation, including investing in research to test the acceptability and effectiveness of MMS in the Bangladeshi population. Assess coverage and adherence to calcium supplements.	MoHFW IPHN INFS

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Abbreviations

BARC	Bangladesh Agriculture Research Council
BARI	Bangladesh Agriculture Research Institute
BBF	Bangladesh Breastfeeding Foundation
BBS	Bangladesh Bureau of Statistics
BDT	Bangladeshi Taka
BFSA	Bangladesh Food Safety Authority
BNNC	Bangladesh National Nutrition Councils
BRRI	Bangladesh Rice Research Institute
BIRTAN	Bangladesh Institute of Research & Training on Applied Nutrition
CotD	Cost of the Diet
FAO	Food and Agriculture Organization of the United Nations
FB	Fortified Biscuits
FNG	Fill the Nutrient Gap
FPMU	Food Planning and Monitoring Unit
GAIN	Global Alliance for Improved Nutrition
HIES	Household Income and Expenditure Survey
Icddr,b	International Centre for Diarrhoeal Disease Research, Bangladesh
ICVGD	Investment Component of the Vulnerable Group Development Programme
INFS	Institute of Nutrition and Food Sciences
IPHN	Institute for Public Health Nutrition
IYCF	Infant and Young Child Feeding
MCBP	Mother and Child Benefit Programme
MICS	Multiple Indicator Cluster Survey
MMS	Multiple Micronutrient Supplement
MNP	Multiple Micronutrient Powder
MoA	Ministry of Agriculture
MoC	Ministry of Commerce
MoDMR	Ministry of Disaster Management and Relief
MoE	Ministry of Education
MoEFCC	Ministry of Environment, Forest and Climate Change
MoF	Ministry of Finance
MoFLS	Ministry of Fisheries and Livestock
MoFood	Ministry of Food
MoHFW	Ministry of Health and Family Welfare
MoInd	Ministry of Industries
MoInfo	Ministry of Information
MoLE	Ministry of Labour and Employment
MoLGRDC	Ministry of Local Government, Rural Development and Co-operatives
MoP	Ministry of Planning
MoPME	Ministry of Primary and Mass Education
MoPTCT	Ministry of Posts, Telecommunications and Information Technology
MoRA	Ministry of Religious Affairs
MoST	Ministry of Science and Technology
MoSW	Ministry of Social Welfare
MoWCA	Ministry of Women and Children Affairs
MoYS	Ministry of Youth and Sports
NPAN2	Second National Plan of Action for Nutrition
NSSS	National Social Safety Strategy
PLW	Pregnant and lactating women
RNI	Reference Nutrient Intake
SBCC	Social and Behavior Change Communication
UHT	Ultra High Temperature
UNICEF	United Nations Children's Fund
VGD	Vulnerable Group Development
WFP	World Food Programme

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