



Food Utilization and Nutrition Security

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EXECUTIVE SUMMARY

The consequences of high maternal and child undernutrition cannot be emphasized enough. A combination of poor maternal nutrition and postnatal factors cause child undernutrition, which in turn can have far-reaching consequences for national and global development outcomes. The levels of stunting, underweight, wasting, and childhood anemia are very high in Bangladesh, as are levels of maternal chronic energy deficiency and anemia. Notwithstanding previous positive trends in these indicators, the pace of improvements in maternal and child undernutrition in the country needs rapid and sustained acceleration.

Three guiding principles are used to identify policy priorities for addressing food utilization and nutrition security in Bangladesh: First, in considering an individual's nutritional health, the period between his or her mother's pre-pregnancy (including adolescence) and his or her first two years of life is viewed as a critical pivot point for targeting interventions. Second, the United Nations Children's Fund (UNICEF) conceptual framework for nutrition is used to frame the role of multiple factors that influence maternal and child nutrition. Third, linked to this framework, a set of linked direct and indirect interventions that need to be in place to achieve rapid reductions in undernutrition is mapped. Direct interventions are those that have short-term impact on direct determinants of nutrition (such as dietary intakes and health status) and include age-appropriate infant and young child feeding, immunization, population control, hygiene interventions, and access to preventive and curative health care. Indirect interventions are those that can modify the influence of direct interventions, or themselves affect dietary intake and health status through routes of household food security, poverty, women's empowerment, and agriculture. Bringing both direct and indirect interventions together and targeting them during key periods of opportunity will maximize benefits.

Based on this approach and empirical evidence from Bangladesh, we propose the following actions to address the high burden of undernutrition: (1) Identify, cost out, and sharply scale up a priority package of direct nutrition and health interventions targeted to adolescents, women of reproductive age, pregnant and lactating women, and children under two years of age. This will require addressing design and implementation constraints in the National Nutrition Program as well as the use of the health, water sanitation, and education sectors to more strongly address nutrition. (2) Generate impact and operational evidence to build consensus around contextually appropriate interventions to address childhood anemia and acute malnutrition. (3) Recognize the critical nature of underlying factors such as food security, gender, food prices, and agricultural policies in improving nutrition to ensure appropriate interventions and policies are in place to address these; not doing so could severely compromise the impact of direct interventions. (4) Invest in a solid monitoring and evaluation framework and process for nutrition that is linked closely to the monitoring and evaluation framework for the health sector and other relevant sectors. (5) Ensure an effective, authoritative, and functioning national coordinating mechanism to convene, facilitate, mobilize, and hold accountable the multistakeholder platform that must deliver the activities needed to improve nutrition.

In summary, a solid policy focus and substantial investments are needed both on direct and indirect interventions, targeted at the window of opportunity of pre-pregnancy and the first two years of life, for addressing maternal and child undernutrition. Prevention of undernutrition should be front and center in an overall strategy, with curative interventions integrated. Neither by itself will be sufficient to bring about change at the scale needed for significant improvements. This is well recognized by the government of Bangladesh in the areas of intervention for nutrition specified in the National Food Policy Plan of Action. Our analyses and recommendations are intended to sharpen the policy focus and prioritize high-impact interventions.

OVERVIEW OF THE NUTRITION SITUATION IN BANGLADESH: ISSUES AND TRENDS

Introduction and framework

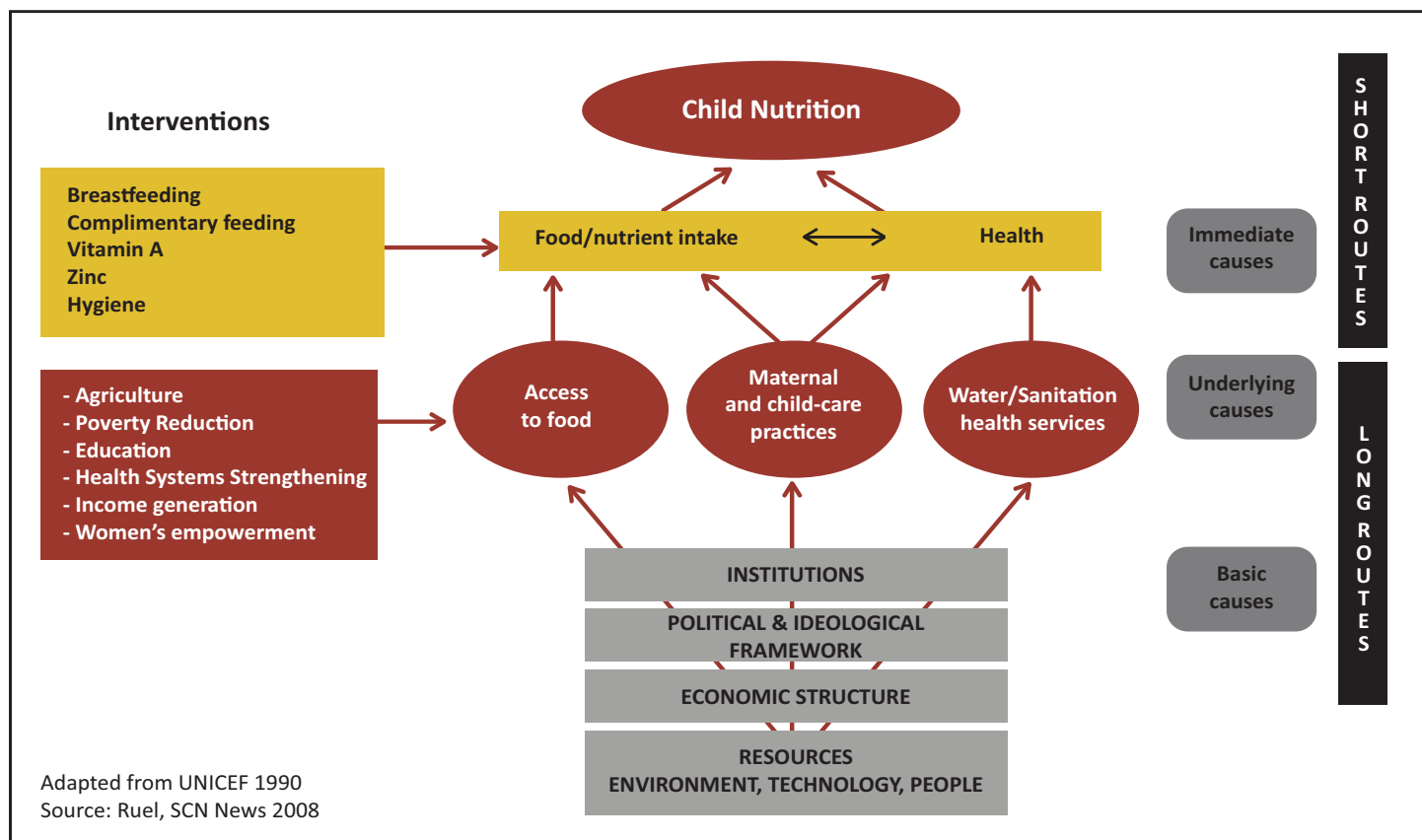
The economic consequences of high maternal and child undernutrition cannot be overstated. A combination of high maternal undernutrition and postnatal factors cause child undernutrition, which in turn can influence children’s school performance and their future occupational choices, and can undermine the future productivity of nations. Notwithstanding rapid economic growth in a number of South Asian countries (including Bangladesh and India), the pace of improvements in maternal and child undernutrition in the region remains deeply unsatisfactory. Bangladesh has made considerable progress in addressing the non-income poverty indicators for the first Millennium Development Goal (MDG1)—that is, reducing the prevalence of underweight children under five years of age—but improvements are slowing, which raises questions about whether the target will be achieved or not. Furthermore, the overall levels of maternal and child undernutrition are still high in Bangladesh, and further investments are needed to accelerate improvements and prevent the negative impact of maternal and child undernutrition on long-term development. This paper is, therefore, about the

policy focus that is needed to greatly improve the current status of maternal and children nutrition. Although overweight and obesity are emerging problems in Bangladesh, this paper will not address this aspect of undernutrition. However, it is a potential concern in the future, and this trend should be monitored.

The UNICEF conceptual framework for nutrition, which specifies that maternal and child nutrition outcomes are determined by immediate, underlying, and basic factors (see Figure 1), is at the heart of this paper. The immediate and underlying factors, and the related “direct” and “indirect” (or “short route” and “long route”) interventions they map to, form the basis for our framing of policy options for reducing undernutrition in Bangladesh. Evidence from countries that rapidly reduced undernutrition show clearly that investing in both kinds of interventions is crucial to success (Von Braun, Ruel, and Gulati 2009). Neither one is likely to be sufficient to sustain rapid reductions in undernutrition. This is because there is no single magic bullet solution to the persistent problem of high maternal and child undernutrition in South Asia, including Bangladesh. Thus, there are two routes to address undernutrition:

- a. The route of *direct interventions* that aim to improve the nutritional status by directly providing health and nutrition inputs. This includes expanding the reach of public health measures (such as water and sanitation, maternal and child health care) as well as “targeted

Figure 1—The link between the UNICEF conceptual framework and direct/indirect interventions



nutritional interventions” (Bhutta et al. 2008). An important component of direct nutritional interventions relates to behavior change communication aimed at influencing health and nutritional behaviors at household and community levels. This encompasses a range of activities such as exclusive breastfeeding and complementary feeding, promoting hygienic behavior, changing intrahousehold allocation patterns of food, reducing fertility, and other practices.

- b. Indirect routes that influence the household capacity to invest in maternal, adolescent, and child nutrition. These include various economic and social empowerment measures that can reduce consumption poverty, increase non-cereal food and micronutrient intake, and increase women’s empowerment, thus having effects on health and nutritional outcomes more indirectly.

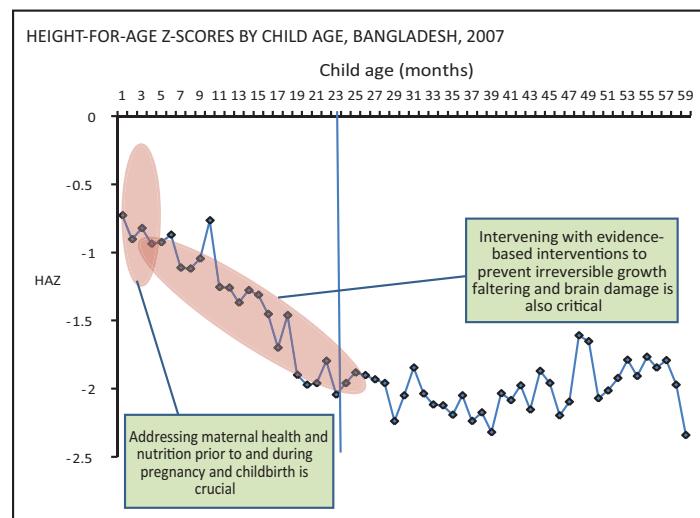
Both avenues are important for discussing the policies on improving nutritional security in the present context of Bangladesh. The routes of poverty reduction and women’s empowerment can have important influences on undernutrition (Monteiro et al. 2010) and contribute significantly to enhancing the effects of most of the direct nutritional interventions. On the other hand, lack of access to direct interventions and poor health and nutritional behavior can constrain nutritional improvements even in resource-rich households.

Policy focus on the “window of opportunity”

This paper is based on the basic understanding that in order to improve undernutrition, it is critical to ensure that nutrition interventions are prioritized for women and children in the biological periods when they are most vulnerable to the effects of poor nutrition. This is the window between pre-pregnancy and two years of age, which is also the window within which ensuring good nutrition yields the greatest returns in terms of education, income, chronic diseases, and other outcomes (Victora 2010; Hoddinott 2008). It is also the window in which preventive interventions yield substantial benefits (Ruel et al, 2008). Given high rates of adolescent undernutrition in Bangladesh, and the link between adolescent pregnancy and poor maternal and child health and nutrition outcomes, it is crucial that the window of opportunity encompass the vulnerable period of adolescence in Bangladesh and, in fact, in all of South Asia (Rah et al. 2008 and 2009).

Data from Bangladesh substantiate global findings on the age and timing of growth faltering and poor nutrition in children (Victora et al. 2010; Black et al. 2008). Figure 2 below shows that anthropometric outcomes among Bangladeshi children reflect global patterns; using height-for-age we see dramatic declines between 0 and 2 years of age with little change thereafter. Very importantly, the figure also shows that children in Bangladesh are already substantially undernourished even at birth. This highlights the need to focus on the mother-child dyad and window of opportunity to achieve nutrition improvements.

Figure 2—Height-for-Age Z-Scores by Age, Bangladesh, 2007



Source: Bangladesh Demographic and Health Survey 2007 data.

Data on stunting and underweight show that these measures of undernutrition also increase dramatically in the 0–2 year age range, with little change thereafter. For wasting, the 0–2 age period shows a peak, with highest wasting rates seen in the 9–21 month age period. Anemia also peaks in this age group, demonstrating the importance of this age window for interventions.

High levels of undernutrition in early infancy (0–3 months of age) reflect poor nutrition *in utero* and of the mother prior to pregnancy. Studies of interventions that aimed to improve birth outcomes by targeting the period of pregnancy have found limited success. More recently, research in Bangladesh has reinforced the pre-pregnancy state of the mother as being a key driver of the success of interventions during pregnancy (Shaheen et al. 2008).

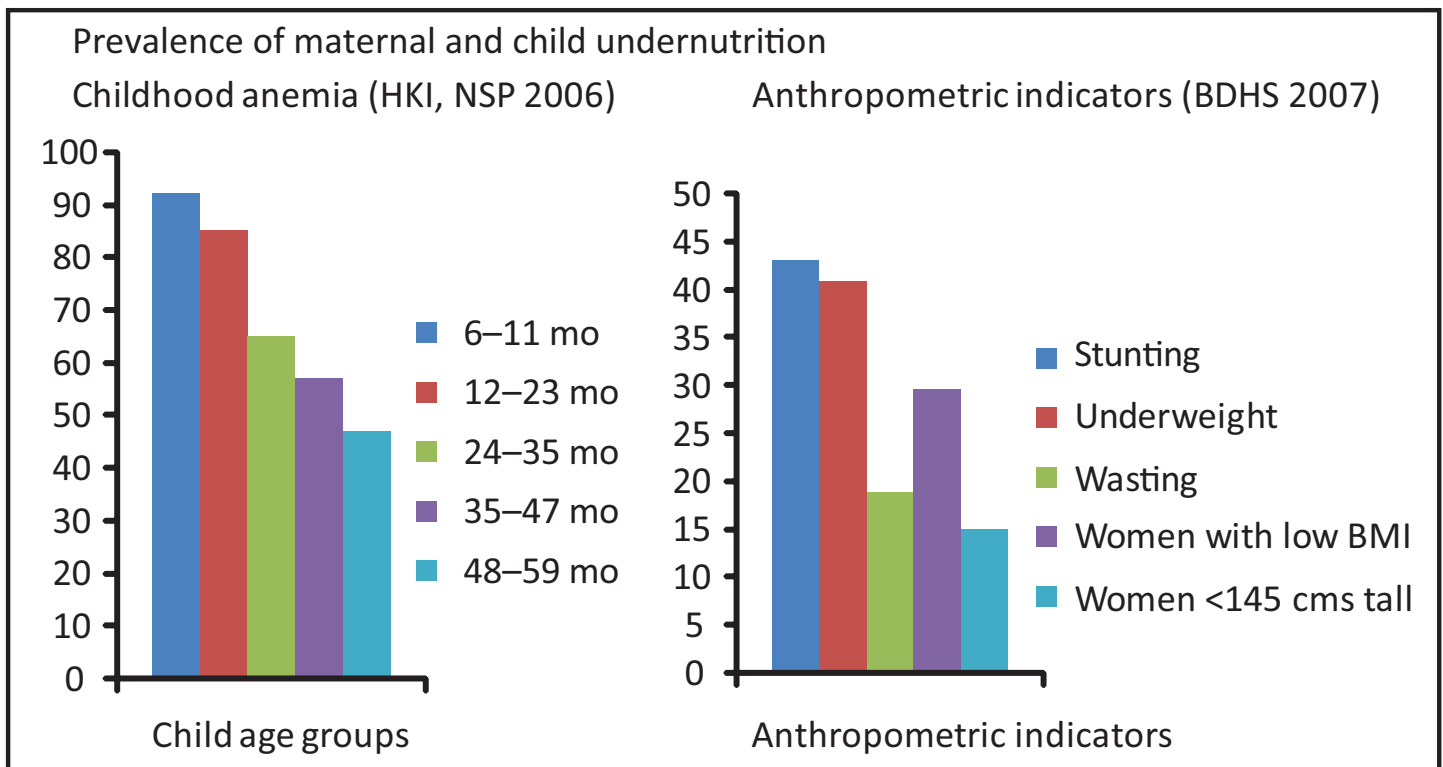
Prevalence of maternal and child undernutrition

Notwithstanding some noticeable progress over the past decade, the prevalence of child and maternal undernutrition remains alarmingly high. The proportion of underweight children was 41 percent in 2007, according to Demographic and Healthy Surveys (DHS) data.¹ The proportion of stunted children is as high as 43 percent (Figure 3). Anemia is also a widespread problem, with estimates suggesting that anemia rates among young infants could be as high as 90 percent.

From a gender perspective, child undernutrition is 42 percent for female children and 40 percent for male children; however, differences in undernutrition between boys and girls have increased during 2000–2007. Furthermore, some analyses suggest that although there are no gender differentials early in infancy (0–2 years of age), they become more prominent as

¹ This is according to the new World Health Organization standard. The previous NCHS standard would place it at 46 percent (see REACH-Bangladesh: Selected Results from Situation Analysis, PPT, 5 April 2010, p. 2).

Figure 3—Prevalence of anemia and undernutrition (anthropometric indicators) among children and women in Bangladesh



children grow older. This is in spite of gradual improvements in sex ratios and declining sex differentials in child mortality in Bangladesh, suggesting possible nutritional neglect of the female child among the surviving children (Dancer et al. 2008).

The proportion of stunted children is about 24 percent higher in rural areas compared to the urban setting; the matched difference for underweight children is even higher (29 percent). Within urban areas, considerable differentiation persists between slum and non-slum areas. The prevalence of child undernutrition in slum areas can be twice as high as the non-slum areas and about 44 percent higher than the rural average (MICS 2003). Children living in slums thus appear to be a priority social category in designing nutritional interventions from a spatial targeting point of view.

Divisional differences are also noteworthy. For instance, the income-lagging region of Barisal division, which registered the highest level of consumption poverty (52 percent) in the 2005 Household Income Expenditure Survey (HIES), predictably has the highest prevalence of child undernutrition in both stunting and underweight measures. However, the reverse is not necessarily true: Dhaka and Chittagong have lowest poverty at 32-34 percent, but do not occupy the lowest ranks in child undernutrition. This suggests that the nutritional ranking of geographic regions is the outcome of a complex set of factors not explained by resource endowments and access to health service delivery alone.

Such an alarming level of child undernutrition is related to a very high incidence of low birth-weight babies, which is assessed at 30 percent as per Multiple Indicator Cluster Surveys (MICS) 2003 data. This is, in turn, biomedically related to maternal

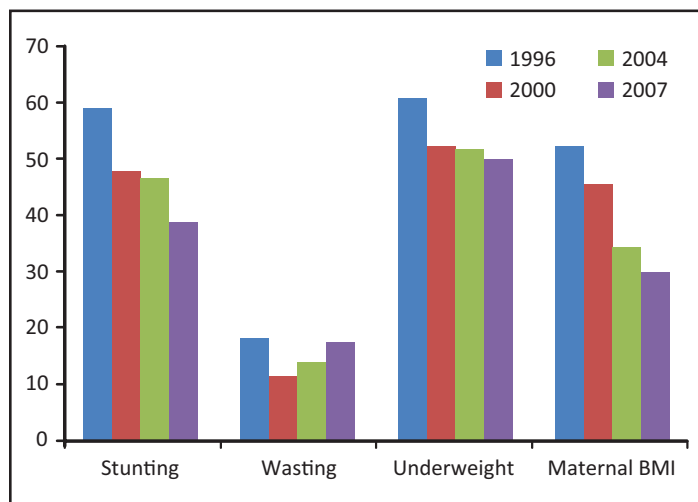
undernutrition, which is also very high in Bangladesh. The proportion of chronically energy deficient women in the reproductive age group of 15–49 (defined as having a body mass index of less than 18.5) is as high as 30 percent (BDHS 2007). The urban–rural gap is much higher in maternal undernutrition compared to child undernutrition (66 percent as opposed to 29 percent). Furthermore, the highest prevalence of maternal undernutrition (39 percent) is in the relatively income rich Sylhet division (and not in the poorest Barisal). The income-lagging region of Khulna division again has the lowest prevalence of 25 percent compared to affluent Dhaka (28 percent) and Chittagong (28 percent). Clearly, income or poverty level is not the only correlate of child or maternal undernutrition status; other routes also need to be brought into consideration while explaining spatial divergences.

Trends in maternal and child undernutrition

Long-term nutritional trends are encouraging, suggesting that breakthroughs can be made in tackling the complex problem of child and maternal undernutrition. Steady reductions have been seen in stunting and low maternal body mass index between 1996 and 2007, but improvements in underweight have slowed recently, and wasting has even increased. Using the National Center for Health Statistics (NCHS) reference standards for anthropometry, which are the same as those used in the MDG target, we see that the proportion of underweight children has dropped from 60+ percent in 1996 to 46 percent in 2007. Stunting has shown a steady decline as well, with severe stunting

also declining from 28 percent to 16 percent in a matter of one decade between 1996/97 and 2007. The declines in stunting are particularly encouraging given the long-term impact of stunting on later cognition, schooling, and other development outcomes. Still, given the stalling of the trend in underweight, accelerating efforts to improve nutrition will be essential to achieve the MDG target of 33 percent child underweight by 2015.

Figure 4—Trends in maternal and child undernutrition (1996–2007)



Source: Bangladesh DHS (1996–2007); child anthropometry trends are estimated using the NCHS reference standards for parity across years and with the MDG indicator. Graph courtesy of Helen Keller International, Bangladesh.

Data on trends in micronutrient deficiencies are not available; therefore, ensuring availability of nationally representative data on micronutrient deficiencies among women and children should be a high priority.

The link between maternal and child nutrition

There is a strong link between maternal and child undernutrition. This can be seen from both household and spatial data. There is ample evidence that undernourished mothers tend to have undernourished children, operating mainly through the route of in-utero nutrition and immediate postnatal care (such as breastfeeding and illness). The proportion of underweight children in the category of malnourished mothers is 51 percent; in contrast, the matched indicator for the well-nourished mothers is 38 percent, according to DHS 2007 data.

The above is true even when one controls for the variation in the household poverty status. In the case of the extreme poor, the proportion of children underweight for severely malnourished mothers (those with a body mass index of less than 16) is 76 percent while the matched figure for the well nourished mothers (those with a body mass index of more than 18.5) is 53 percent (Begum and Sen 2009). Similarly, in the case of a middle non-poor group, the matched figure for the severely malnourished mothers is 56 percent as opposed to 33 percent for the

well-nourished mothers. The sharp contrast in the child nutritional status between severely malnourished and well nourished mothers largely holds true for all three child anthropometric measures and all four household poverty categories.

High levels of anemia among children 6–11 months of age also reflect poor iron stores among children at birth, which in turn is linked to iron status anemia in adolescents and women.

The key takeaway here is that the link between women’s nutrition and health and children’s nutrition and health is inextricable, and both need to be addressed simultaneously.

DIRECT ROUTES FOR IMPROVING NUTRITION

The channel of targeted nutrition and health programs

Direct routes for improving nutrition are those intervention channels that aim to improve the immediate determinants of undernutrition depicted in the UNICEF conceptual framework, specifically, dietary intake (including diet quality) and health. There is now a core of global evidence, including from Bangladesh, which lies behind some of the recommended direct interventions to address maternal and child undernutrition. These include evidence reviews and syntheses in the Lancet Series on maternal and child undernutrition (2008) as well as the more recent analyses on the costs of scaling up direct evidence-based interventions globally (Horton, Shekar, and Mahal 2009; Bezanson and Ikenman 2010).

Broadly, the evidence base identifies a set of core interventions that should reach women and children at a coverage rate of at least 90 percent to yield improvements of up to 30 percent in undernutrition (Bhutta et al. 2008). These interventions must be delivered primarily by the health sector and by direct and targeted nutrition programs that focus on the window of opportunity age group. They include the following types of direct interventions:

- **Direct interventions for maternal nutrition:** Iron-folate supplementation, food supplementation during pregnancy, calcium supplementation, antenatal care (including counseling for improved food intake and supplementation, increased rest, and preparation for breastfeeding).
- **Direct interventions for child nutrition:** Behavior change counseling for early and exclusive breastfeeding, age appropriate complementary feeding and micronutrient supplementation (if needed), provision of micronutrient supplements or fortified complementary foods, hygiene interventions (via behavior change communications and increased access to water/sanitation facilities), and nutritional management of severe-acute undernutrition either in facilities or communities.

Choices about which direct interventions to prioritize in a country nutrition strategy must be based on a careful analysis of the current gaps in the coverage of each of the critical known interventions, the context-specific impact of each critical intervention, and the potential channels through which access to and use of critical interventions might be scaled up.

Interventions to improve the quality of infant diets in Bangladesh have included peer counseling to encourage exclusive breastfeeding, homestead food production combined with nutrition education to improve quality of complementary feeding diets, counseling to improve use of family foods that enhance the quality of complementary foods fed to infants, the use of micronutrient powders (“Sprinkles”) to improve the micronutrient content of home foods, and distribution of food supplements (cereal-pulse mixes) (Haider et al. 2000; Roy et al. 2005; Hyder et al. 2007). Unfortunately, few studies in Bangladesh provide insights into how best to address the particular challenge of improving diets of young children at a large scale .

Health sector interventions that can have an impact on nutrition outcomes for women and children include immunization, hygiene promotion, provision/supply of appropriate toilets/latrines and safe sources of water, vitamin A supplementation, provision of iron-folate supplements, zinc and oral rehydration for diarrhea treatment, and promotion of breastfeeding at well and sick child visits .

Status of direct interventions

Bangladesh has had policies and policy instruments to address maternal and child undernutrition for many years now. Notable among these are the National Nutrition Policy and the National Strategy for Infant and Young Child Feeding in Bangladesh, both of which are well focused on direct interventions targeted to the “window of opportunity” timeframe. The major policy instrument for direct interventions such as food supplementation and counseling for improved feeding of infants and young children is the National Nutrition Program (NNP). A variety of other stakeholders are implementing supporting and smaller-scale interventions related to direct nutrition inputs. Other health and nutrition interventions (such as immunization, iron-folate supplementation, etc.) are implemented through the public health system and private health care providers. Interventions to improve infant and young child feeding are currently implemented with varying intensity and scale, and by different stakeholders across Bangladesh, but need better harmonization of messages and materials, and better outreach to influential household and community members. Recent analysis suggests that interventions to promote exclusive breastfeeding, a crucial intervention for improved nutrition and decreased rates of neonatal and infant mortality, currently reach less than 35 percent of mothers.² Progress toward scaling up breastfeeding promotion and support interventions is often compromised by violations of the Code of

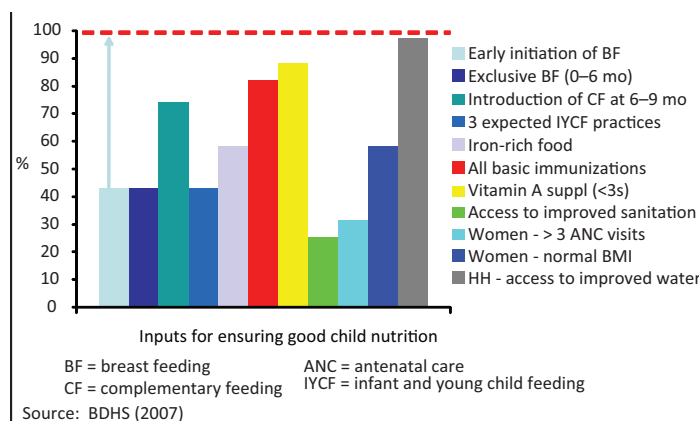
² REACH landscaping analysis (WFP-Bangladesh and partners).

Marketing of Breast Milk Substitutes; capacity and funding for monitoring code violations are currently lower than needed. A call to action for addressing exclusive breast feeding and other aspects of infant and young child feeding more forcefully is of utmost importance (Talukder and Talukder, 2009)

In relation to quality of complementary foods, in addition to behavior change communication interventions through different channels, nongovernmental organizations (NGOs) have been implementing homestead food production interventions for many years now. However, many of these have not been effectively integrated with nutrition counseling, diminishing the impact of this intervention. The use of micronutrient powders to improve diet quality has also been well studied in Bangladesh and has been shown to be effective at reducing anemia. This program is now being implemented on a small scale within the NNP, as well as by different international agencies. Additionally, the local private sector has launched the sale of micronutrient powders in the market.

The status of many health sector interventions is reasonably high in Bangladesh. Still, sustaining already high coverage of certain interventions, and “going the last mile” to scale them up further to 90–100 percent coverage can help substantially. A review of the status of a range of key interventions/inputs for child nutrition in the Bangladesh DHS data from 2007 (Figure 5) shows that for many key inputs, the coverage levels are well below even 50 percent. A core set of interventions and a call to scale these up in Bangladesh is also highlighted in Ahmed and Ahmed (2009). Interventions that are particularly important to address are early and exclusive breastfeeding (EBF), age-appropriate complementary feeding, ensuring diet quality through diversified diets and additional food/micronutrient supplements as needed, treatment of acute malnutrition when needed, and improved maternal nutrition and sanitation interventions.

Figure 5—Status of key direct interventions for child nutrition in Bangladesh



Source: Bangladesh Demographic and Health Survey [BDHS] 2007; we include maternal nutrition, access to prenatal care and access to improved water as direct inputs to nutrition given their criticality in the window of opportunity)

Of some concern in relation to nutrition outcomes is the poor status of sanitation, both from the perspective of

sanitation behaviors and access to facilities. Only 25 percent of households have access to improved sanitation, even though more than 95 percent of households have access to improved sources of water (BDHS 2007). Less than 40 percent of households use safe disposal practices for children's stools, which can be a major source of microbial contamination of the household environment (personal communication). Because poor sanitation can influence nutrition through more routes than just diarrhea, sanitation interventions deserve greater attention to reduce undernutrition further (Humphrey 2009).

A mid-term review of the Health, Nutrition and Population Sector Programme (HNPS) in early 2008 highlighted a number of issues that need to be addressed to achieve health and nutrition

objectives of the sector program. Box 1 below highlights some of these from the perspective of the National Nutrition Program, though other direct health interventions are also highly relevant to addressing nutrition objectives. A specific review of the overall health sector implementation from the perspective of nutrition is outside the scope of this paper but is likely to be important to do to achieve objectives of better integration of health and nutrition activities within the health sector. Table 1, following Box 1, lays out the critical package of direct interventions that should be considered for scaling up, and discusses the current status of these interventions and considerations for scaling them up.

Box 1—An overview of the National Nutrition Program, current known challenges, and the way forward

Background: The government's Ministry of Health and Family Welfare, with the assistance of development partners, has made substantial investments in nutrition, including the National Nutrition Program (NNP), which provides comprehensive nutrition services to children and women at a community level. NNP aims to reduce malnutrition in children, adolescent girls, and women through community-based nutrition interventions and intersectoral efforts to improve nutrition of vulnerable segments of the population. The core NNP services include (i) behavioral change communication (BCC) activities, (ii) training, (iii) birth weight recording and registration, (iv) growth monitoring and promotion (GMP) activities, (v) food supplementation to the malnourished children under 2 years of age and severely malnourished mothers, (vi) micronutrient (vitamin A and iron folate) supplementation, and (vii) awareness building forums for adolescent girls and newly-weds. The NNP was designed to provide services from community nutrition centers (CNCs), each covering a population of approximately 1,200 and managed by nongovernmental organizations (NGOs), which were contracted out through competitive bidding. Currently, 10 NGOs are contracted to deliver services for NNP through 23,246 CNCs in 109 *upazilas* in 34 districts, with considerable variation in the number of CNCs managed by each NGO—ranging from 5,226 CNCs for one NGO to only 253 CNCs for another. Recently, NNP coverage was expanded to 63 new *upazilas*, making the coverage around 35 percent of all *upazilas*.

Known design and implementation Issues: The government's response to malnutrition in Bangladesh has focused on Area Based Community Nutrition (ABCN) interventions under the NNP. However, the program has been plagued by regular interruptions in service delivery due to delays in contracting the service-delivery NGOs and weakened by design flaws identified when the program was implemented as the Bangladesh Integrated Nutrition Program (BINP). Weak technical capacity to design, manage, and effectively supervise the nutrition programs remains a major impediment of delivering effective services. Monitoring and evaluation has not been invested in adequately; since the end of BINP, which raised many criticisms around program design and evaluation approaches, there have been no major investments in evaluating the impact and processes related to NNP itself.

Looking forward: Specific interventions in the current package of NNP services should be carefully reviewed in light of national and global evidence. Explicit consideration should be given to how to integrate and scale up a priority "nutrition package" of known effective interventions identified through the Lancet Nutrition Series (2008) and new global recommendations (Scaling up Nutrition 2010) into the program and beyond, into the health and other sectors. Highest priority for scaling up should be given to those interventions that are feasible and acceptable for rapid scale-up in the Bangladeshi context, both through the NNP and other delivery platforms of the health system, including family welfare assistants and other community and local health center-based workers. Using non-NNP NGOs to scale up interventions such as behavior change communications (BCC) for improved infant and young child feeding, hygiene and sanitation interventions and women's nutrition could also help achieve scale more rapidly. There is an urgent need to build operational evidence and move toward technical consensus on interventions that need more local adaptation, such as those to address acute malnutrition through community-based management programs. From an implementation perspective, NNP needs to further invest in adding nutritionists to the NNP team and building skills and technical capacity to supervise and monitor the implementing NGOs. Ensuring an overarching monitoring and evaluation framework for nutrition is crucial, as is strengthening impact and process evaluation to build evidence on what works to ensure availability of high quality nutrition interventions at scale. Using new monitoring platforms such as the Food Security and Nutrition Surveillance Project (FSNSP) can also aid with monitoring of outcomes.

Table 1—Overview of status and trends in direct interventions and factors to consider in relation to scaling up direct interventions

Direct intervention	Status, trends	Policy instrument/program implementation modalities	Factors to consider for accelerating scale-up
Early initiation of exclusive breastfeeding & exclusive breastfeeding for 6 months	Rates of early initiation increasing but still low overall (43%); colostrum feeding is high . EBF rates (43%) have not changed in the last 15 years.	HNPSP/NNP (antenatal care, counseling during pregnancy); NGOs; mass media to raise awareness. BBF helps with code monitoring but violations continue to be rampant. Lack of workplace and home-based support for EBF leads to high drop off rates at 3–4 months.	Constraints to EBF for 6 months operate at different levels: individual, family, workplace, community, private sector (formula companies). Strengthening, harmonizing, and expanding actions in the National IYCF Strategy, using DGHS/ DGFP/NNP platforms; NGOs; mass media. Expanding current monitoring mechanisms of code of marketing of breastmilk substitutes.
Age-appropriate complementary feeding (timing of introduction, diet diversity, diet quality, frequency of feeding, consumption of fortified foods or supplements where needed, responsive feeding)	Initiation of complementary feeding between 6-8 months is now at 74% but diet quality, frequency and amounts fed are a major issue (only 16% of 6-8 month old children, 36% of 9-11 month old children were fed appropriately for their age). Age-appropriate infant and young child feeding is, therefore, a major concern. Vitamin A supplementation levels are high (>95% according to UNICEF) but are lower for 6-24 months. Iodized salt consumption is high but anemia is a critical issue and urgent solutions are needed. Responsive feeding needs to be addressed through behavior change communication.	HNPSP/NNP, but low coverage (counseling at community nutrition centers, growth monitoring, provision of food supplement). Coverage by NGOs also low; quality is variable and needs to be harmonized across partners . Multiple channels are being explored for use of micronutrient powders but confusions remain about formulation.	Addressing quality of communications and tailoring communications to known local barriers is critical . Strengthening, harmonizing, and expanding actions in the National IYCF Strategy, using DGHS/ DGFP/NNP platforms; NGOs; mass media. Improving diet quality of <i>pushti</i> packet in NNP . Broad scale awareness raising with multiple stakeholders on the importance of the complementary feeding period for undernutrition is crucial. Addressing food security, access to and use of high-nutrient value foods. Operations and impact evaluation of different modalities for improving CF.
Hygiene interventions (hand-washing and stool disposal behavior; water and sanitation facilities); deworming & appropriate care and treatment for diarrhea	Access to improved sources of water high (97%) but arsenic a concern; drinking water treatment low. Improved sanitation low (25%); only 22% of households safely dispose of children’s stools . ORT use for diarrhea is high, but zinc use very low . Deworming use is high among children under five (80%) but does not reach 12-24 months .	Coverage of hand-washing interventions not high. Economic constraints can dampen adherence to hand-washing . ORT use is widely promoted by providers, and ORS is widely available through pharmacies, health workers, etc . Current modality for deworming (NIDs) does not cover children <24 months of age.	Assess options to scale-up latrine access; harmonize messages and build awareness of hand-washing, safe stool disposal, etc . Conduct non-user research to close gap in ORS use; address known constraints to zinc scale-up . Assess expansion of age group for deworming.
Immunization	Immunization coverage among young children is high in Bangladesh (82% of children 12-23 had all basic immunizations) but closing the gap is important.	Current modalities include NIDs, facility-based routine immunization; coverage is achieved through the NIDs and public and private health sector.	Understanding constraints to full immunization among those not fully immunized can help identify factors relevant to scale-up.
Prevention and management of acute malnutrition	Moderate and severe acute malnutrition is a serious issue in Bangladesh . The bulk of the affected children are less than 2 years of age. Wasting has increased slightly in the last 5 years.	Facility-based treatment facilities are currently through the HNPSP but are not at the scale needed to address the problem. Local solutions (<i>pushti</i> packet; <i>khichuri</i>) are preferred by the government and technical nutrition community; ready-to-use therapeutic foods are used at a very small scale.	Community-based solutions that are both locally acceptable and efficacious are urgently needed . Research support to identify such solutions is essential, as is implementation support to scale up promising solutions, including local therapeutic foods and counseling to prevent relapses. Prevention through appropriate IYCF, hygiene and health care is essential.

Direct intervention	Status, trends	Policy instrument/program implementation modalities	Factors to consider for accelerating scale-up
Maternal nutrition (BMI, anemia)	<p>Only 60% of women have normal BMI; 15% are below 145 cms. The % of women with low BMI has gone down since 2004. Anemia is known to be a serious problem for women of reproductive age.</p> <p>Data on adolescent nutrition are lacking but important to consider monitoring because of known high rates of adolescent marriage and pregnancy, and links between adolescent pregnancy and maternal, newborn, and child health and nutrition outcomes, including low birth weight.</p>	<p>(1) Few interventions currently exist at a large scale to improve women's nutrition other than iron-folate supplementation through the HNPS, counseling and provision of food supplements through NNP, where it is present. (2) Interventions to reach pre-pregnant women and improve their health and nutrition are fewer, but contraceptive use is moderately high, and newlywed counseling programs are operational (but at small scale). (3) NGOs are operating programs to improve health and nutrition of adolescent girls. The GoB secondary school stipend and other social transfer programs can also have an impact on adolescent health and nutrition, and subsequent health of children .</p>	<p>Advocacy to highlight the criticality of adolescent and women's nutrition and health to child undernutrition is essential. Strategies to reach all adolescent girls and women of reproductive age (pregnant or not) with key nutrition interventions and supportive family planning to delay first pregnancies and space births must be a priority. Addressing social norms in relation to these will need mass awareness raising through media campaigns, and other modalities . Household food security and purchasing power, gender constraints such as bargaining power, mobility, violence against women need addressing through communications, legislation, and social mobilization .</p>

Source: Based on Maintaining Momentum to 2015? An Impact Evaluation of Interventions to Improve Maternal and Child Health and Nutrition in Bangladesh (2006 World Bank); Mid-Term Review of HNPS 2008; and discussions with development partners.

INDIRECT ROUTES FOR IMPROVING NUTRITION

Indirect routes that are known to have substantial potential for improving nutrition include interventions and policies related to poverty reduction, agricultural interventions, and women's empowerment. Although other indirect interventions might also have an impact on nutrition, these three are predominant channels that are important to consider in the Bangladeshi context.

Poverty reduction

Household poverty—whether defined as asset poverty or consumption poverty—is an important correlate of maternal and child poverty. Reducing poverty strengthens household capacity to invest in child and maternal nutrition through greater purchasing ability of food, non-food goods, and services. For asset poverty, the proportion of underweight children varies from 51 percent in the poorest asset quintile to 41 percent in the middle quintile, dropping further to 26 percent in the highest asset quintile, according to DHS 2007.

Recent studies show that microfinance programs have important health and nutritional effects for the participants, including higher vaccination, higher level of contraceptive use, better behavior change communication, and more importantly, lower child undernutrition rates for the poor and the poorest (World Bank 2008). Empirical evidence suggests that the presence of NGO programs in a village is associated with a strong reduction in child undernutrition in the bottom consumption

quintile (Deolalikar 2005). The evidence also suggests that public transfer and relief programs that provide food to the poor, such as the Vulnerable Group Feeding and the Food-for-Work programs, have a significant effects on reducing child undernutrition among the poor (Deolalikar 2005).

The main policy point to emphasize here is that reducing poverty through pro-poor growth as well as targeted anti-poverty interventions will indirectly reduce the prevalence of child and maternal undernutrition.

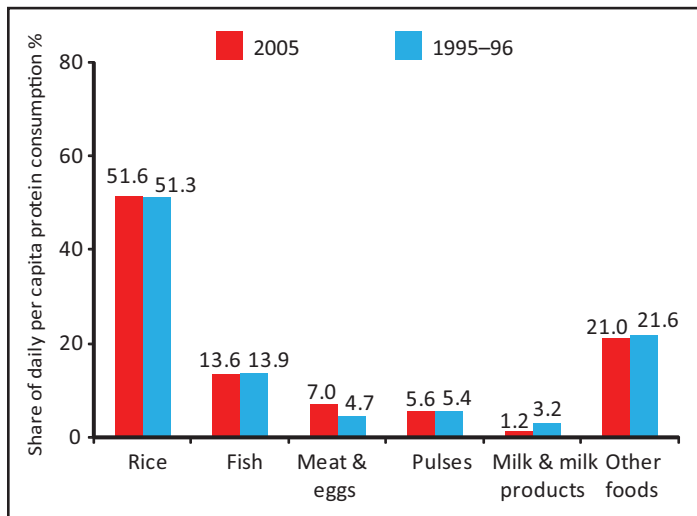
Agriculture-led improvement in diet quality

A large share of the Bangladeshi population is food-insecure due to poor diet quality. The usual diet is heavily dependent on rice and most of the energy in the diet is contributed by cereals. Given the low micronutrient content of the diet, a high prevalence of micronutrient deficiency is common in Bangladesh. The solution lies in increased consumption of high quality foods (such as fruits, vegetables, fish, meat, milk, etc.), which the poor desire but cannot afford. Agriculture can play an important role by contributing to the improved quality (diversity) of the family diet, reducing micronutrient undernutrition.

Food consumption patterns in Bangladesh show very little diversity even at the national level. A comparison of the patterns of food consumption in terms of calorie and protein shares in the average Bangladeshi diet shows little change over a 10 year period, from 1995–2005. Rice accounted for 71 percent of total calorie consumption in 1995–96; the share was 68 percent in 2005. Although rice is a poor source of protein, it constituted

about half of total protein consumption in both 1995–96 and 2005 (Figure 6).

Figure 6—Percentages of total daily protein consumed per capita by food items at national level, 2005 and 1995–96



Source: Data from the BBS Household Income and Expenditure Surveys.

Fig. 7—Trends in real price of coarse rice, fiscal year 1983 to 2009 (Base: 1995/96=100)

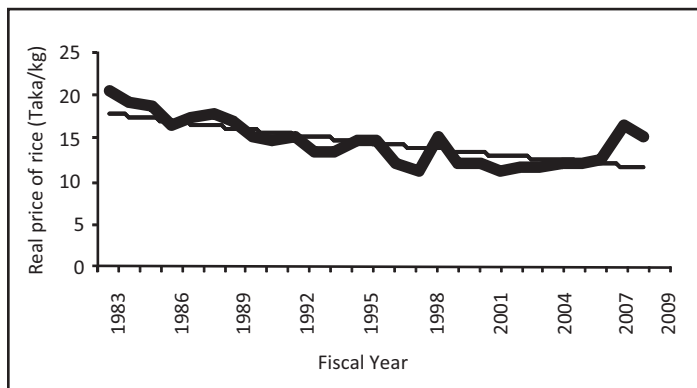
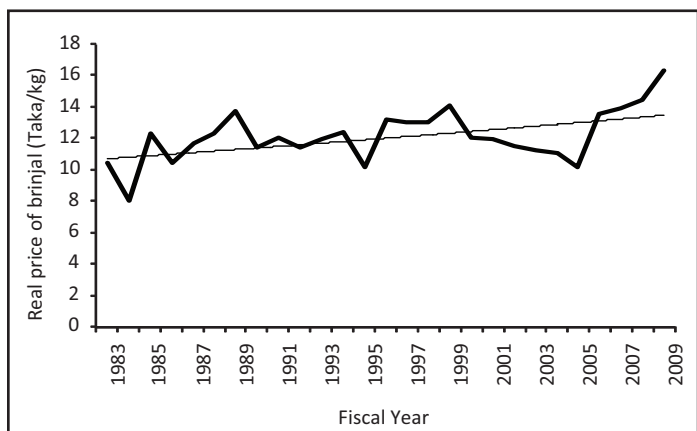


Fig. 9—Trends in real price of Brinjal (eggplant), fiscal year 1983 to 2009 (Base: 1995/96=100)



Source: Price data from the Department of Agricultural Marketing and GDP deflator data from the World Bank.

The demand for non-rice, nutrient-rich food items such as milk, meat, fish, and fruits is more responsive to changes in income than that for rice. Real gross domestic product (GDP) per capita increased by 33 percent from 1995–96 to 2005. Despite such a significant increase in real per capita income, why do the food consumption patterns remain virtually the same over the 10 year period? The analysis of food price trends may help explain the apparent paradox.

We examine the trends in the real (inflation-adjusted) price of rice over the period of 1983 to 2009. The real price of rice fell by 38 percent from 1983 to 2007, before the remarkable rice price surge in 2008. Even the exceptionally high rice price in 2008 was 20 percent lower than the price in 1983. The falling price of rice has helped the rural landless and the urban poor, who purchase the rice they consume. There are about 40 million Bangladeshis—the ultra poor—who cannot purchase enough rice to meet energy requirements, despite a falling real price of rice. Therefore, the level of technology and institutional innovations that made this price decline possible must be maintained.

However the real price of several foods that are rich in nutrients demonstrates increasing price trends (see Figures 7 to 10). The price of fish has risen more rapidly. The increase in the real

Fig. 8—Trends in real price of lentil pulse, fiscal year 1983 to 2009 (Base: 1995/96=100)

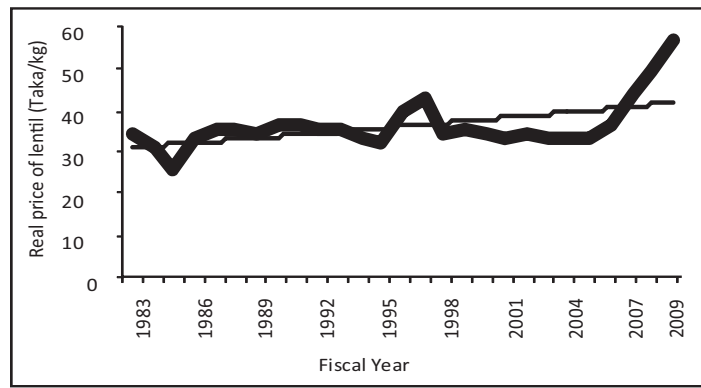
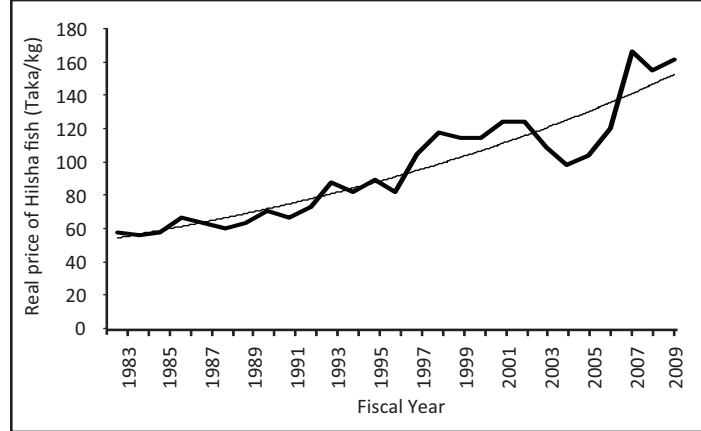


Fig. 10—Trends in real price of Hilsha fish, fiscal year 1983 to 2009 (Base: 1995/96=100)



price of non-rice foods probably reflects supply-side constraints since these products are very responsive to demand-side increases in income. Food demand estimates in Bangladesh reveal that the poor are more price-responsive than the rich (Ahmed and Shams 1996). If policies are not undertaken to increase supply of non-cereal, nutrient-rich foods (such as pulses, fruits, vegetables and fish), prices of these foods will continue to increase in the face of income and population growth. Consequently, the diet quality and nutritional status of the poor will deteriorate further. These observations have important implications for agricultural policy.

Women's empowerment

Women's empowerment is an important factor influencing women's own well-being as well as children's well-being (Murthi et al. 1995; Sen 1999). Research shows that improvements in women's empowerment can yield substantial improvements in child undernutrition. What is often less emphasized is that maternal nutrition also varies by a considerable degree with the level of women's empowerment (or agency), the latter captured by proxy indicators. The term "proxy indicators" is important to take note of however. "Agency" is a measure of the ability to take control over one's own life and the ability to make own choices; such a measure is not easy to capture directly from the conventional survey instruments. Proxy indicators such as women's education (level of formal schooling), exposure to media (radio, TV, or newspaper), and role in the "domestic decisionmaking" are found to be positively correlated with improved maternal nutrition, as measured by body mass index.

It is also useful to consider how women's empowerment operates in relation to the window of opportunity for reducing child undernutrition. Recent analyses using the Bangladesh Demographic and Health Survey (BDHS) 2007 data and panel data from studies conducted by the International Food Policy Research Institute (Quisumbing et al. 2009) show that different measures of women's empowerment are associated with different aspects of child undernutrition. In particular, findings underscored the role of women's attitudes and exposure to domestic violence as having negative effects on stunting, a measure of chronic child undernutrition. These findings are also substantiated by other research in Bangladesh showing that women exposed to violence consume smaller amounts of nutritional food supplements during pregnancy, have greater fetal stress, etc. Women's mobility, another proxy empowerment measure, is associated with greater diversity of diets for infants and young children.

Last but not least, the role of women's empowerment as it relates to adolescent girls is also important to consider. Recent research demonstrates that adolescent childbearing has negative impacts not only for the child, but also for the mother, completely stunting her own height growth in the adolescent growth spurt period (Rah et al. 2008 and 2009). This in turn has serious implications for subsequent births that she might have, because low maternal height is a known severe constraint on infant growth *in-utero*, and predisposes mothers to negative outcomes for mother and child during the birth process.

The main policy point here is the need to emphasize the importance of women's empowerment as correlate of child and maternal nutritional outcomes. This needs to be recognized as an important indirect route capable of making difference to child and maternal well-being, along with poverty reduction. Policy interventions hence need to be judged from their degree of success in enhancing women's empowerment, whether they relate to growth projects, anti-poverty measures, or public health interventions.

LOOKING FORWARD: POLICY LEVERS FOR IMPROVED NUTRITION

Although Bangladesh has witnessed improvements in nutritional and health-related measures over the past decade, the overarching needs, are to:

1. identify a high-impact, feasible, and locally appropriate package of interventions that can be sharply scaled up through multiple channels and sectors, and develop a detailed costing and implementation plan for this priority package at the country level. Prevention should be a central aspect of the package of interventions, with curative interventions integrated.
2. build further evidence on those interventions and strategies that, though plausibly effective, might currently be controversial (such as micronutrient powders, strategies for addressing acute malnutrition, etc.),
3. recognize and address the role of factors such as food security, women's empowerment, and agricultural and price policies, as not doing so can compromise efforts driven solely by direct interventions,
4. develop a national monitoring and evaluation system to ensure that evidence on programs, policies, and problems is used to recalibrate and adjust policies and program priorities, and
5. develop and agree upon a framework for coordinating the work of all partners and identify one national coordinating authority with a broad multisectoral mandate that is empowered to take on stewardship of the nutrition movement. Finding and sustaining strategic partnerships for ensuring coordination of multiple activities is key to success; for this, excellent coordination is critical.

In relation to the interventions that need to be in place to address undernutrition, there are two kinds of challenges. The first relates to sustaining successes in areas where positive trends have been seen. The second relates to achieving certain milestones that have not received adequate attention to date. The policy recommendations for direct and indirect routes are grouped from this angle.

Direct interventions to reduce undernutrition

Some of the direct interventions that are high priority for maintaining earlier successes and scaling up further to “close the gap” include the following:

- *Timing of introduction of complementary feeding:* Building broad awareness and ensuring inclusion of behavior change communications in the public and private health sector are essential to close the gap for this intervention.
- *Vitamin A supplementation:* The main challenge that remains is to ensure that younger children and children in remote areas, who are currently missed from supplementation efforts (for reasons not well known), receive supplements regularly.
- *Use of iodized salt:* Scaling up of iodized salt production is essential to ensure that all households can use iodized salt. The challenges to scaling up include addressing availability of hardware for local fortification of salt, advocacy and monitoring to ensure compliance with iodization, and awareness raising to ensure that families and caregivers are aware of the importance of using iodized salt.
- *Deworming:* High coverage of deworming for children under five in Bangladesh is extremely positive. Sustaining this and enhancing the impact of deworming on undernutrition rates requires an assessment of inclusion of children under 24 months for deworming, improved hygiene education, and awareness-raising about the importance of deworming.

A number of high impact direct interventions for addressing undernutrition are either not included in current health and nutrition packages, or not reaching the scale that they should in order to accelerate reduction in undernutrition rates. The following interventions are particularly important to address in a forward-thinking strategy to improve nutrition:

- *Improving women’s nutrition and health:* Interventions to address women’s nutrition, starting in early adolescence, are essential to mitigate what is a major bottleneck in Bangladesh, and to set an example for South Asia . Direct interventions for women’s health and nutrition include access to contraception to delay first birth and ensure adequate birth spacing, access to adequate and diverse diets in the home, increasing access to and use of iron-folate supplements and to antenatal care when pregnant, ensuring adequate rest when pregnant, etc. Innovative approaches to shift social norms related to gender norms that are detrimental to women’s health are essential to invest in .
- *Appropriate breastfeeding and age-appropriate complementary feeding:* Scaling up interventions to

address early initiation of exclusive breastfeeding through the public and private/NGO health sector and community mobilization is critical; linking to initiatives for safe motherhood and newborn health can help address this particular issue. Addressing exclusive breastfeeding will require a multi-pronged approach that confronts the major known challenges to exclusive breastfeeding: training of health workers to promote and support women in exclusive breastfeeding, mobilization of communities, support from older women and fathers for women to breastfeed in the home, mobilizing work places and industries to provide facilities and maternity leave to enable exclusive breastfeeding, and monitoring of the Code of Marketing of Breast Milk Substitutes to prevent violations of the code . Improving complementary feeding will require training investments for community-based health workers to counsel caregivers and families about age-appropriate feeding; investment in media and other channels to increase broad awareness; and ensuring access to high quality foods as well as micronutrient supplements (vitamin A, iron, multiple micronutrient powders, etc.) and/or fortified foods to address diet quality. These issues are well articulated in Bangladesh’s National Strategy for Infant and Young Child Feeding; the challenge is operationalization at scale, for which multiple platforms and delivery channels must be used.

- *Addressing poor hygiene:* Poor hygiene is a significant contributor to undernutrition, and interventions to address hygiene are crucial. These include scaling up access to hygienic latrines and to improved sources of water in rural and urban areas, and raising widespread awareness of appropriate handwashing and stool disposal practices to reduce contamination.
- *Ensuring appropriate and adequate treatment for severe acute undernutrition:* Ensuring severely malnourished children have access to appropriate and effective treatment in a timely fashion is important to save lives and rehabilitate children. Developing locally appropriate approaches to address severe acute undernutrition and to improve and scale up of known facility-based approaches within the current health system is critical to move this issue forward .

Indirect interventions to reduce undernutrition

Poverty reduction, women’s empowerment, and revitalizing agricultural production for ensuring the adequate supply of micronutrient rich food should be the three key focus areas here. In all of these areas some considerable successes have been achieved in the past decade. Poverty declined by 10 percentage points between 2000 and 2005. Women’s empowerment—captured by a multitude of indicators—has increased considerably over the

past decade. Cereal production has increased considerably. The policy challenge is to sustain this success in the medium-term. There are also new (emerging) challenges in each of these areas.

Improve nutrition through strengthening growth–poverty linkages

Maintaining a decent per capita GDP growth rate of 4–5 percent should be a major target in the medium-term to sustain the impressive poverty reduction rate recorded in the past. This cannot be achieved by relying on agriculture alone. In Bangladesh, structural transformation that has taken place underscores the importance of non-agricultural sectors, especially the industrial sector. Until 1990, for instance, Bangladesh was predominantly an agrarian economy with agriculture accounting for nearly 30 percent of GDP. Between 1990 and 2008, the share of agriculture in GDP has decreased to about 20 percent while the share of industry increased from around 20 percent to about 30 percent, with the share of the service sector remaining virtually unchanged at around 50 percent. Thus, the structural transformation since 1990s seems more like a transition from agriculture to industry rather than to service. Sustaining the pace of growth in industrial sector will help maintain the desired growth rate in per capita GDP and the desired pace of poverty reduction needed to improve the nutritional status .

With higher economic growth it will be possible to allocate more public investments in women’s education and health, and to increase female workforce participation by creating more remunerative jobs and through providing support to targeted programs and institutions that foster women’s economic and social empowerment. Agriculture needs to get continued priority in order to ensure food security at the national and household level.

New challenges in the area of poverty reduction are also noteworthy. From a nutritional point of view, it is important to reduce the present high level of extreme and chronic food insecurity in Bangladesh. This will demand a pro-poor growth that combines remunerative employment generation in the course of the country’s growth process with much more effective safety net programs to reduce seasonal hunger and food insecurity of the poorest.

Enhance women’s empowerment for better child and maternal nutrition

Empirical evidence underscores the key role of women’s empowerment in shaping child and maternal well-being and the significance of female agency for better health care access and practices . Female empowerment (or female agency, broadly speaking) is related to many economic and social factors such as woman’s education, her control of assets and income, her exposure to media, and her exercise of autonomy, control, and choice over domestic decisionmaking processes. Policy instruments to address women’s empowerment will therefore have to address these various factors. Some of these policy instruments are in place while other challenges need to be confronted. For

example, violence against women, which has serious negative consequences for women and children, must be addressed, and communities and individuals mobilized to address violence.

In addition to empowering women, addressing the issue of adolescent health and empowerment through continued support for the secondary school stipend program and through focused health, nutrition, and empowerment programs for adolescent girls and boys can have far reaching benefits. Mobilizing communities to address some of the social barriers to improving adolescent health is key to success, particularly in relation to keeping adolescents in school, reducing early marriage, delaying child-bearing, and empowering young women to care for and feed their babies and themselves.

Reorient agriculture for ensuring improved diet quality

While cereal food production has increased, it has not been matched by increased production (and consumption) of non-cereal production of vegetables, fruits, fish, eggs, and meat. This has adverse implications for micronutrient intake, especially for the poor and the poorest. This brings to the fore the policy issue of reorienting agriculture for ensuring the supply of improved diet quality. Several aspects are noteworthy:

First, in Bangladesh, investments in agricultural research to improve productivity of non-staple foods have been somewhat neglected in favor of cereal-centric investments to improve productivity of rice and wheat. Review of agricultural investments in non-staples that are high value added and high nutrition value added is urgently needed.

Second, year-to-year price fluctuations are much larger for non-cereal crops than for cereals, indicating relatively high levels of market-induced risks for production of non-cereal crops. Non-staple crops, especially fruits and vegetables, have thin domestic markets due to relatively low levels of domestic demand for these crops. These crops also have high price elasticities of both supply and demand. At the same time, horticultural crops face problems related to perishability and quality . Interplay of all these factors contributes to the risks in production of horticultural crops. However, these factors also imply that addressing the market efficiency issues is likely to be an effective means of reducing the risks associated with adoption of horticultural crops.

Third, investments in research can potentially minimize production risks. Research can play an important role in increasing productivity of non-staple crops, thereby reducing the cost of production. In addition to improving productivity of non-staples, research should focus on developing vegetable varieties that (1) grow well in off-seasons, (2) are disease- and pest-resistant, and (3) have high contents of important micronutrients.

Fourth, recent agricultural research initiatives by the centers of the Consultative Group on International Agricultural Research and the Bangladesh Rice Research Institute suggest that it may be possible to get the plants themselves to do the work of fortification, an intervention strategy referred to as “biofortification.” There are at least two inherent comparative advantages

of such an approach. Biofortification is cost-effective. Once the plants are developed and being grown by farmers, there are no recurring costs of buying the fortificants and adding them to food during processing. The other benefit of biofortification is that it is sustainable. Once the research and extension investments are made in developing and disseminating the nutritionally improved crops, farmers will be driven by incentives to continue to produce these crops, because this strategy has the potential to significantly improve crop productivity. Rice, because it is consumed by the entire population, is an excellent vehicle for biofortification (with iron and zinc).

CONCLUSION

Our conclusions are based on the guiding principles of (1) targeting the period of pre-pregnancy and the first two years of life; (2) using the UNICEF conceptual framework to capture multiple determinants of nutrition; and (3) mapping direct and indirect interventions and policy instruments. The need for multi-level interventions is well recognized by the government in its National Food Policy Plan of Action. The analyses and recommendations presented here are intended to sharpen the policy focus on the “window of opportunity” and to prioritize high impact interventions.

Thus, we propose the following actions to address the high burden of undernutrition :

1. Identify, cost out, and sharply scale up a priority package of direct nutrition and health interventions targeted to adolescents, women of reproductive age, pregnant and lactating women, and children under two years of age. This will require addressing design and implementation constraints in the National Nutrition Program as well as the use of the health, water-sanitation, and education sectors to more strongly address nutrition.
2. Generate impact and operational evidence to build consensus around contextually appropriate interventions to address childhood anemia and acute malnutrition.
3. Recognize criticality of underlying factors such as food security, gender, food prices, and agricultural policies in improving nutrition, and ensure appropriate interventions and policies are in place to address these;

not doing so could severely compromise the impact of direct intervention.

4. Invest in a solid monitoring and evaluation framework and processes, linked closely to the monitoring and evaluation framework of the health sector and other relevant sectors.
5. Ensure an effective, authoritative, and functioning national coordinating mechanism to convene, coordinate, mobilize, and hold accountable the multistakeholder platform that must deliver the activities needed to improve nutrition.

In summary, substantial investments are needed both in direct and indirect interventions for addressing maternal and child undernutrition. Neither by itself is sufficient to bring about change at the scale necessary to prevent the pernicious impacts of poor nutrition on the future development of Bangladesh.

Priority investment areas:

Direct interventions

- Promotion and support for age appropriate infant and young child feeding, including micronutrient interventions
- Scaling up hygiene and sanitation interventions
- Scaling up basic preventive health services
- Adolescent and women’s nutrition (micronutrients, food supplements, as needed)
- Identifying appropriate curative interventions for acute malnutrition
- Delaying first-time child birth and limiting fertility

Indirect interventions

- Social protection and economic growth policies to reduce household poverty
- Targeted interventions to address women’s empowerment and status, including secondary education and adolescent programs
- Social protection, agricultural and price policies to improve supply of, and access to, high nutrient value foods

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