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Improving Nutritional Status for Women in Low-Income Households

by Afifa Shahrin and John Richards

CENTRE FOR POLICY RESEARCH
IUBAT

IUBAT—International University of Business Agriculture and Technology
Dhaka, Bangladesh

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AFIFA SHAHRIN graduated in 2012 from Simon Fraser University, Vancouver, where she obtained a Masters in Public Policy degree. She is a former economics instructor at BRAC University.

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Foreword

This 8th CPR *Commentary* is an ambitious study of nutrition among low-income women in Bangladesh. The authors undertook a survey of nearly 600 women in two sites, in slum communities along the Tongi-Ashulia Road in Uttara and in four villages in Jamalpur district. While some of the women surveyed face problems of inadequate calorie intake, the more serious nutritional problem is a lack of dietary variety. Many of the women suffer a deficiency in necessary vitamins and micronutrients to be found in fruits, vegetables, and dairy products. Nearly all women in the rural sample use hygienic tube well water, but the great majority of urban women sampled use unhygienic tap water.

The authors discuss several potential policy responses, from government promoting use of fortified rice to setting tube wells in urban slum areas.

This *Commentary* is the result of a collaboration among three universities. The principal author, Ms. Afifa Shahrin, conducted the survey while a visitor at the IUBAT nursing college in the summer of 2011. Several IUBAT students participated in the conduct of the survey. Formerly, Ms. Shahrin was an instructor at BRAC University, and BRAC cooperated extensively in the conduct of the rural survey in Jamalpur. An earlier version of this study was submitted to Simon Fraser University in Vancouver, Canada, as part of the requirements for Ms. Shahrin to obtain her Masters of Public Policy degree. The second author, John Richards, is a professor at Simon Fraser University and long-time overseas faculty member of IUBAT.

— Dr. M. Alimullah Miyan
Vice-Chancellor and Founder, IUBAT

List of Acronyms

ADB	Asian Development Bank
BMI	Body Mass Index
BBS	Bangladesh Bureau of Statistics
BRAC	Bangladesh Rural Advancement Committee
ESCAP	Economic and Social Commission for Asia and Pacific
FAO	Food and Agriculture Organization
ICDDR, B	International Centre for Diarrhoeal Disease Research, Bangladesh
NGO	Non-Government Organization
SEWA	Self Employed Women's Association,
UNICEF	United Nations Children's Emergency Fund
UNDP	United Nations Development Programme
UNFPA	The United Nations Population Fund
WFP	World Food Programme
WHO	World Health Organization

Executive Summary

THE OBJECTIVE OF THIS STUDY IS TO PROVIDE POLICY ADVICE TO IMPROVE the nutritional status of low-income women in Bangladesh. While some suffer from inadequate calorie intake, the major nutritional problem is inadequate consumption of protein and micronutrients.

We first report the nutritional status of a sample of nearly 600 women surveyed in two sites, one rural and one urban. The rural site is a group of villages near Jamalpur; the urban site is a slum in Uttara, in the Dhaka metropolitan area.

Malnutrition among women is a serious problem – in Bangladesh as in many developing countries. Protein-energy malnutrition, iron deficiency anaemia, and vitamin A deficiency are common. Malnutrition is a major cause of the high maternal mortality rate in Bangladesh, a rate second only to Nepal among South Asian countries. Malnutrition passes from one generation to the next as malnourished mothers give birth to malnourished children.

There exist regional differences in the health and nutritional status of women. Generally, people living in the slums of Dhaka region consume more calories than those living in slums elsewhere. Among an earlier study undertaken by the nursing college at IUBAT of women living in a Uttara slum, about 12 per cent did not have adequate calorie intake in their diet to achieve a body mass index (BMI) above the traditional threshold of 18.5. Other studies have found more than 20 per cent of slum women in Dhaka suffering a BMI below 18.5.

Most studies on low-income women's health and nutritional status in Bangladesh concentrate on urban and suburban slums.

One exception is a large-scale study of rural adolescent girls (ages 13-18 years); it found 21 per cent "thin" and 32 per cent "stunted." Another study found limited, though increasing, evidence of obesity among women living in Dhaka region and other urban centres of the country.

Food security in Bangladesh has often been assessed on the basis of the adequacy of rice consumption. In our survey more than 90 per cent of all women consumed satisfactory servings from the cereals and potato group of foods. The majority in both samples failed to eat at least five – the recommended number – of servings from the fruit and vegetables category. Women consumed inadequate dairy servings. Milk consumed with tea is often the only source of calcium and vitamin D. The majority consumed adequate protein, but over a quarter did not. Almost all women consumed fat, oil and sugar within acceptable limits. To obtain adequate intake of micronutrients, a diverse diet is required. Nearly a third of the low-income women received the lowest score on this question. Given their rural location, it is not surprising that the rural women scored better in terms of eating at least two vegetables, due to their access to home-grown and locally produced vegetables at low cost and sometimes free of cost. Rural women also scored higher in terms of eating at least one fresh fruit and choosing healthy snacks. But the majority of both groups did not eat any fresh fruit and chose relatively unhealthy snacks mostly purchased from nearby street food shops.

While the majority of low-income women may have an adequate calorie intake, the evidence is clear: many suffer from deficiency of protein and micronutrients. The central policy problem is how to improve the quality of their diet at a reasonable incremental cost – whether to the women's families, to government, or to relevant NGOs.

Explaining Poor Nutrition

Many factors – at the household, community, national and international levels – underlie the problem. In analyzing the survey results, we considered separately six sets of factors: 1) poverty and food price inflation; 2) low education levels among women; 3) absence of basic nutritional information; 4) cultural barriers facing women; 5) inadequate standards of cleanliness and hygiene (including source of drinking/cooking water); and 6) addiction to tobacco and betel nut among household members.

Poverty and Food Price Inflation

Poverty is often the root cause of food insecurity, inadequate access to health care services, poor sanitation and unsafe water, low education levels, and lack of proper caring practices among pregnant women. Bangladesh has experienced food price inflation over the last decade, the most dramatic being the 2008 spike in rice prices. Even if low-income families have sufficient income for a healthy diet, spikes in food prices may lead to a sacrifice in diversity of diet. Rural women who reported having reduced food consumption in the previous year due to food price inflation were more likely to have inadequate diets.

Education

Independently of its effect on productivity and earnings of workers, education builds abilities and social skills, which in turn contribute to health and wellbeing of people as adults. In general, women in households with higher education levels enjoyed better nutrition.

Nutritional Information

Vulnerable households usually have limited access to nutrition information. Among rural girls in Bangladesh, ages 13-18, one study found that more than half do not know the name of foods that are sources of protein, and a third do not know the necessity of nutritional supplements for their physical growth. Even with a low income, families can often improve their nutritional status by substituting healthy for unhealthy foods, and eliminating or reducing expenditure on addictive products such as tobacco.

The survey results imply in general improved nutrition among those receiving advice comes from a reliable source such as a nurse or doctor working in a health facility. On the other hand, advice received from NGO health workers apparently had no impact.

Cultural Barriers

Due to the patriarchal nature of Bangladeshi society and a deep-rooted preference for sons, females in South Asian countries often face discrimination in terms of investment in education, access to resources (such as food and health care), and freedom to own assets – and in household decision making. Son-preference is rooted in the idea of higher earning potential of sons than daughters, and expectation of support from sons for parents during their old age and at times of crisis. In South Asia the nutritional status of female children (age 0-4 years) is worse than male children of the same age. The South Asian gender gap in nutrition is worse than in other regions of the world and the gap widens as children grow up. Our survey found no significant evidence of this effect.

Hygiene and Cleanliness

Frequent attacks of infectious diseases can offset the value of a nutritious diet. In the rural sample nearly all women used safe water from tube wells; in the urban sample, only 16 per cent did.

Unhygienic water and sanitation may result in a high incidence of various water-borne communicable diseases. Unclean household environment, poor personal sanitation, and improper disposal of human feces are common in poor neighbourhoods resulting in various parasitic infections. Disease reduces the ability of the body to use nutrients, and poor diet increases the incidence of disease.

Tobacco and Betel Nut

Among low-income men in Bangladesh, addiction to tobacco is very common. More than 65 per cent of the rural households and 70 per cent of the urban households sampled have at least one member who smokes. Tobacco consumption is the cause

of eight major diseases, such as ischemic heart disease, lung cancer, stroke, oral cancer, cancer of the larynx, chronic obstructive pulmonary disease, pulmonary tuberculosis, and Buerger's disease. The average standardized rate of mortality due to lung cancer in Bangladesh (18.2 per 100,000 population) is the highest among all South Asian countries.

In very few cases do the women themselves smoke. However in analyzing the survey, we found in general a negative association between women's nutrition and the extent of tobacco consumption in the household. Consumption of tobacco may affect women's nutrition via several routes. Income spent on tobacco reduces income available for food. Families that smoke may be less knowledgeable of the dangers of tobacco and the requirements for a healthy diet. Whatever the nature of the link, the survey results point to a nutrition benefit – in addition to health benefits to those presently smoking – of eliminating use of tobacco.

About 65 per cent of poor households have at least one member who chews betel nut. The majority of those chewing are women. Betel quid (betel leaf, areca nut, lime and sometimes tobacco) is another common addictive purchase in Bangladesh and South Asia. In rural areas, offering a decorated betel quid to guests and relatives is a symbol of hospitality, which people consume for recreation, breath freshening and for digestive purpose. Chewing areca nut may cause submucous fibrosis and used along with tobacco can cause leukoplakia which ends as oral cancer.

Recommendations

We examined numerous options, some appropriate for pursuit by NGOs and others by the Government of Bangladesh. We considered options in five categories:

- **PROMOTION OF NUTRITIONAL SUPPLEMENTS:** Two options within this category are rice fortified with micronutrients and fortified yogurt (shokti-doi).
- **IMPROVEMENTS IN HYGIENE:** Two options here are setting shallow tube wells in slum areas of cities not subject to arsenic in groundwater and providing "siraj mixture" for treating contaminated ground water where arsenic is a serious problem. (Arsenic is not a serious problem in Dhaka.)
- **IMPROVEMENT IN SOURCES OF NUTRITIONAL ADVICE:** Better training of community health workers is a potentially effective option.
- **ROLE OF SOCIAL ENTERPRISES:** Social enterprises pursue dual goals of providing a social service and covering all or most of their costs from sale of services. There may be a potential to copy a Jakarta-based project selling healthy food via street vans. Another is NGO promotion of vegetable gardens in rural areas.
- **CAMPAIGNS AGAINST TOBACCO USE:** Given the negative link between tobacco consumption and nutrition, anti-tobacco campaigns should be pursued. However, pursuing such campaigns aggressively will probably raise significant opposition from adversely affected interests.

As first priority our recommendation is the four options listed in the accompanying table as highly effective. They address key nutritional problems and are low cost in terms of cost/ household targeted or unit of service provided. Admittedly, implementing a subsidized rice fortification program targeted to the ultra poor poses a threat of additional corruption. There may be useful lessons from the Female Stipend Program. Potentially, the subsidy could be given to targeted families via coupons enabling a discount on purchases of fortified rice.

We have divided policy options between those better implemented by the government and those better implemented by NGOs. However, the distinction is not absolute. It may be feasible for government to contract with slum community leaders for the maintenance of shallow tube wells in slums, and NGOs may play a role. Government might also choose to mount a program providing nutritional training to community health workers.

Policy Options	Effectiveness	Cost (Taka)
1. Nutritional supplements (fortified rice)	High (among government options)	Annual cost: Tk.154 crore Annual cost per household: Tk.960 (bottom 10 per cent of population)
2. Hygienic water for urban slums (setting shallow tube wells or providing 'siraj mixture')	High (among government options)	Annual levelized cost of tube wells: Tk.13.9 crore Annual cost per household of tube wells: Tk.140 (for urban slums where arsenic concentration low)
3. Healthy food initiative through social enterprises		
Jakarta model food van (urban)	Low (among NGO options)	Annual cost per van: Tk.49,500 (10 van pilot project) Cost per meal: Tk.20
Household gardens (rural)	High (among NGO options)	Low cost to sponsoring NGO
4. Nutritional and hygienic advice		
Improve training of community health workers	High (among NGO options)	High cost relative to typical NGO budget, unless NGO obtains explicit donor support
Television advertisement	Medium (among government options)	Low cost for government, provided media outlets agree to broadcast messages as public service; high, otherwise
5. Tobacco control		
Restrictive selling	Medium (among government options)	Low cost for government
Advertisement ban	Medium (among government options)	Low cost for government

সার সংক্ষেপ

নিম্নবিত্ত পরিবারের মহিলাদের পুষ্টিমান উন্নয়ন করার জন্য কি কি পদক্ষেপ নেওয়া যেতে পারে তার নীতি-নির্দেশনা প্রদান এই গবেষণার উদ্দেশ্য। মহিলাদের কেউ কেউ ক্যালরী স্বল্পতায় ভুগলেও, অধিকাংশের মূল সমস্যা হল দৈনন্দিন খাবারে আমিষ, ভিটামিন এবং খনিজ পদার্থের অভাব।

গবেষণার প্রথম অংশে গ্রাম ও শহরে বসবাসকারী প্রায় ৬০০ মহিলার উপরে পরিচালিত একটি জরিপের ফলাফল তুলে ধরা হয়েছে। তাদের খাদ্য ও পুষ্টির অবস্থা নিরূপনের লক্ষ্যে মূলত এই জরিপটি করা হয়েছে। জামালপুর জেলার পাশাপাশি চারটি গ্রাম এবং ঢা কার উত্তরার একটি বস্তিতে জরিপটি পরিচালিত হয়েছে।

অন্যান্য উন্নয়নশীল দেশের মত বাংলাদেশেও নারীদের পুষ্টিহীনতা প্রকট আকারে বিদ্যমান। পর্যাপ্ত আমিষ, খনিজ পদার্থ এবং ভিটামিনের অভাবে অধিকাংশ মহিলা শক্তিহীনতা, রক্তশূন্যতা ইত্যাদি সমস্যায় আক্রান্ত। প্রসূতিকালীন মৃত্যুর একটি বড় কারনও এ ই পুষ্টিহীনতা। দক্ষিণ এশিয়ার দেশগুলোর মধ্যে বাংলাদেশ প্রসূতি মৃত্যুহারে দ্বিতীয় অবস্থানে রয়েছে, পাকিস্তান আছে প্রথম অবস্থানে। পুষ্টিহীনতা মায়ের মাধ্যমে সন্তানের মধ্যে ছড়িয়ে পড়ছে। আর এভাবেই তা প্রজন্ম থেকে প্রজন্মান্তরে বাহিত হচ্ছে।

বাংলাদেশে সকল অঞ্চলের মহিলাদের খাবার যেমন একরকম না, তেমনি সবাই খাবার থেকে সমপরিমাণ পুষ্টিও পায়না। ঢাকার বস্তিতে বসবাসকারী মহিলারা তুলনামূলক বেশি ক্যালরী গ্রহন করে। ইতিপূর্বে আই.ইউ.বি.এ.টি. এর নার্সিং কলেজের শিক্ষার্থীরা উত্তরার বস্তিতে স্বল্প পরিসরে একই ধরনের আরেকটি সমীক্ষা পরিচালনা করেছিল। সমীক্ষার ফলাফলে দেখা গেছে কেবল শতকরা ১২ ভাগ মহিলা পর্যাপ্ত ক্যালরীর অভাবে ওজন-উচ্চতার সূচকের (Body mass index) কাম্যব্যাপ্তির সীমার (Optimum range)নীচে অবস্থান করছে। অন্যান্য গবেষণায় ঢাকা শহরে এই হার শতকরা ২০ ভাগ দেখা গেছে।

নিম্নবিত্ত মহিলাদের উপর পরিচালিত অধিকাংশ গবেষণাই শহর ও শহরতলীর বস্তিকেন্দ্রিক। এক্ষেত্রে গ্রামের ১৩-১৮ বছরের কিশোরীদের উপরে পরিচালিত একটি সমীক্ষাকে ব্যতিক্রম বলা চলে। এই গবেষণায় দেখা গেছে শতকরা ২১ ভাগের শারীরিক ওজন এবং শতকরা ৩২ ভাগের শারীরিক বৃদ্ধি তাদের বয়সের তুলনায় কম। তবে আরেকটি সমীক্ষা ঢাকা অঞ্চলের সল্পসংখ্যক মহিলার ক্ষেত্রে স্থূলতাকে অন্যতম স্বাস্থ্য সমস্যা হিসাবে চিহ্নিত করেছে।

ভাত খাওয়ার পরিমান বাংলাদেশে খাদ্য নিরাপত্তার প্রধান মাপকাঠি হিসাবে বিবেচিত। এই গবেষণায় দেখা গেছে শতকরা ৯০ ভাগের বেশি মহিলা পর্যাপ্ত পরিমানে শস্য ও আলু শ্রেনীর খাবার খাচ্ছে। গ্রাম এবং শহরাঞ্চলের অধিকাংশ মহিলাই সন্তোষজনক পর্যায়ের (৫ পরিবেশন) ফল ও শাক-সব্জি খাচ্ছে না। একইভাবে প্রায় সবার খাদ্যতালিকায় দুধ ও দুগ্ধজাত খাবারের উপস্থিতি প্রায় নেই বললেই চলে। অধিকাংশ ক্ষেত্রে চায়ের সাথে মেশানো সামান্য পরিমানে দুধই তাদের ভিটামিন ডি ও ক্যালসিয়ামের একমাত্র একমাত্র উৎস। প্রায় এক-চতুর্থাংশ মহিলা পর্যাপ্ত পরিমানে আমিষ গ্রহন করে, যা ভিটামিন, মিনারেল গ্রহনের তুলনায় সন্তোষজনক বলা চলে। তবে অধিকাংশই গ্রহণযোগ্য মাত্রায় চর্বি ও চিনিজাতীয় খাবার খায়। পর্যাপ্ত পরিমানে ভিটামিন ও খনিজ পদার্থ পেতে হলে খাদ্যতালিকায় বৈচিত্র্য থাকা প্রয়োজন। প্রায় এক-তৃতীয়াংশ মহিলা এই প্রশ্নটিতে সর্বনিম্ন স্কোর করেছে। গ্রামের মহিলারা বিনামূল্যে অথবা অল্প দামে শাক-সব্জি, ফলমূল খেতে পারে বিধায় কাঁচা শাক-সব্জি বিষয়ক প্রশ্নটিতে গ্রামের মহিলাদের স্কোর শহরের মহিলাদের চেয়ে বেশি। তবে দুই এলাকার মহিলাদের অধিকাংশই সুপারিশকৃত একটি তাজা ফল খায়না বরং হালকা খাবার খেলে রাস্তার পাশের অস্বাস্থ্যকর খাবারগুলো বেছে নেয়। তুলনামূলক বিচারে অবশ্য গ্রামের অবস্থা শহরের চেয়ে ভাল।

এই গবেষণা থেকে সুনিশ্চিতভাবে যা বলা যায় তা হলো বাংলাদেশের অধিকাংশ মহিলা আমিষ, ভিটামিন এবং খনিজ পদার্থের ঘাটতিতে আক্রান্ত। পরিবার, সরকার কিংবা বেসরকারী সংস্থা, যার মাধ্যমেই হোক, তুলনামূলক কম খরচে কিভাবে মহিলাদের দৈনন্দিন খাবারের মানোন্নয়ন সম্ভব - তাই এই গবেষণার প্রধান নীতি সমস্যা হিসাবে চিহ্নিত করা হয়েছে।

পুষ্টিহীনতাকে ব্যাখ্যা করাঃ

পারিবারিক, সামাজিক, জাতীয় এবং আন্তর্জাতিক পরিসরে বিস্তৃত উপাদানের আলোকে পুষ্টিহীনতাকে

ব্যাখ্যা করা যায়। জরিপের ফলাফল বিশ্লেষণকালে আমরা এর পিছনে প্রধানত ৬ টি বিষয়কে চিহ্নিত করেছি। এগুলো হলঃ ১) দারিদ্র্য এবং খাদ্যদ্রব্যের মূল্যবৃদ্ধি, ২) মহিলাদের শিক্ষার নিম্নহার, ৩) পুষ্টি সংশ্লিষ্ট প্রাথমিক জ্ঞানের অভাব, ৪) সাংস্কৃতিক বাধা, ৫) উপযুক্ত পরিষ্কার-পরিচ্ছন্নতা বজায় না রাখা (বিশুদ্ধ পানির অভাব), ৬) পরিবারের সদস্যদের তামাক ও পান-সুপারীতে আসক্তি।

দারিদ্র্য এবং খাদ্যদ্রব্যের মূল্যবৃদ্ধিঃ

খাদ্যের অনিরাপত্তা, অপ্রতুল স্বাস্থ্যসেবা, অস্বাস্থ্যকর পয়ঃনিষ্কাশণ ব্যবস্থা এবং অনিরাপদ পানি, অশিক্ষা, গর্ভবতী মহিলাদের পর্যাপ্ত যত্নের অভাব - অধিকাংশ ক্ষেত্রে এসবের মূল কারণ হল দারিদ্র্য। গত এক দশক ধরে বাংলাদেশে খাদ্যদ্রব্যের দামে ঊর্ধগতি চলছে। সবচেয়ে বড় ধাক্কাটা ছিল ২০০৮ এর চালের দামের বৃদ্ধি। নিম্ন আয়ের পরিবারগুলোর স্বাস্থ্যকর খাবার কেনার স্বামর্থ্য থাকলেও, খাদ্যদ্রব্যের দাম বাড়ার কারণে তাদের খাদ্য তালিকায় বৈচিত্র্য কমিয়ে দিতে হয়েছিল। গ্রামের মহিলাদের মধ্যে যারা খাদ্যদ্রব্যের মূল্যবৃদ্ধির কারণে আগের বছরের তুলনায় কম খাবার খাচ্ছে বলে উল্লেখ করেছিলো, তাদের অধিকাংশই অপর্যাপ্ত খাবার খায় বলে দেখা গেছে।

শিক্ষাঃ

কেবলমাত্র উৎপাদনশীলতা আর আয় বাড়ানোই নয়, শিক্ষা মানুষের যোগ্যতা আর সামাজিক দক্ষতা বাড়ানোতেও অবদান রাখে। মানুষের স্বাস্থ্য এবং কল্যানেও এর যথেষ্ট ভূমিকা রয়েছে। বেশি শিক্ষিত খানার মহিলারা বেশি পুষ্টিকর খাবার খায়।

স্বাস্থ্য সম্পর্কিত তথ্যঃ

হতদরিদ্র পরিবারগুলোর পুষ্টিবিষয়ক জ্ঞানের বেশ সীমাবদ্ধতা রয়েছে। গ্রামের কিশোরীদের উপরে

পরিচালিত একটি সমীক্ষায় দেখা গেছে তাদের অর্ধেকেরও বেশি আমিষ জাতীয় খাবারের নাম বলতে পারেনা এবং প্রায় এক-তৃতীয়াংশ শরীরে ভিটামিন ও খনিজ পদার্থের গুরুত্ব জানেনা। খাবারের পিছনে খরচ না বাড়িয়ে কেবল অস্বাস্থ্যকর খাবার আর ধূমপানের পিছিনে ব্যয় করা টাকা দিয়ে নিম্ন আয়ের পরিবারগুলো পুষ্টিমানের উন্নতি করতে পারে।

স্বাস্থ্যসেবাদানকারী প্রতিষ্ঠানে কর্মরত সেবিকা, চিকিৎসকদের নিকট থেকে পাওয়া তুলনামূলক নির্ভরযোগ্য পুষ্টিবিষয়ক তথ্য মহিলাদের পুষ্টির অবস্থা উন্নয়নে বড় ভূমিকা পালন করে বলে এই গবেষণায় দেখা গেছে। তবে বেসরকারী প্রতিষ্ঠান থেকে আগত স্বাস্থ্যকর্মীরা এক্ষেত্রে তেমন ভূমিকা রাখতে পারেনি।

সাংস্কৃতিক বাধাঃ

পিতৃতান্ত্রিক সমাজব্যবস্থা এবং পুত্রসন্তানের প্রতি পক্ষপাত দক্ষিণ এশিয়ার নারীদের শিক্ষা, সম্পত্তির অধিকার (খাদ্য ও স্বাস্থ্যসেবা সহ), নিজ সম্পত্তি ভোগের স্বাধীনতা এবং পারিবারিক সিদ্ধান্ত গ্রহনের পথে অন্তরায় হিসাবে কাজ করে। পুত্রকে অর্থনৈতিক নিরাপত্তা ও বৃদ্ধ বয়সে সামাজিক নিরাপত্তার সহায়ক হিসাবে যুগ যুগ ধরে যে বিশ্বাস প্রচলিত রয়েছে তা এহেন পক্ষপাতের মূল কারন। খাবার বন্টন এবং শারীরিক পুষ্টির ক্ষেত্রে নারী-পুরুষের বৈষম্য দক্ষিণ এশিয়ায় প্রকটভাবে বিদ্যমান। এ অঞ্চলের মেয়ে শিশুদের (০-৪ বছর) দৈহিক পুষ্টি বৃদ্ধির অবস্থা একই বয়সের ছেলে শিশুদের চেয়ে খারাপ। শিশুদের বয়স বাড়ার সাথে সাথে এই বৈষম্য আরও বাড়ে। তবে এই সমীক্ষায় লিঙ্গ বৈষম্যের পক্ষে কোনও উল্লেখযোগ্য কোনও প্রমান পাওয়া যায়নি।

পরিষ্কার-পরিচ্ছন্নতাঃ

সংক্রামক রোগের উপস্থিতি শরীরে পুষ্টিকর খাবারের কার্যকারিতা কমিয়ে দেয়। সমীক্ষায় দেখা গেছে গ্রামের মহিলাদের প্রায় সবাই টিউবওয়েলের পানি পান করে। তবে শহরের মহিলাদের মাত্র ১৬ শতাংশ টিউবওয়েল অথবা ফুটানো অর্থাৎ বিশুদ্ধ পানি পান করে।

পানিবাহিত রোগের সবচেয়ে বড় কারন হল অপরিষ্কার পানি এবং পয়ঃনিষ্কাশন ব্যবস্থা। দরিদ্র এলাকায় বাড়িগুলোর নোংরা পরিবেশ, অনুপযুক্ত পয়ঃনিষ্কাশন ব্যবস্থা এবং সেই সাথে ব্যক্তিগত পরিষ্কার পরিচ্ছন্নতার অভাবে খুব সহজেই নানা ধরনের পরজীবির সংক্রমন ঘটে। এর ফলে পুষ্টিকর খাবার খেলেও তার কার্যকারিতা থাকেনা। আবার অস্বাস্থ্যকর খাবার বাড়িয়ে দেয় রোগে আক্রান্ত হওয়ার ঝুঁকি।

তামাক এবং পান-সুপারীঃ

বাংলাদেশ নিম্ন আয়ের পুরুষদের মধ্যে তামাকে আসক্তি ব্যাপক হারে বিস্তৃত। সমীক্ষার ফলাফলে দেখা গেছে গ্রামের প্রায় ৬৫ ভাগ এবং শহরের প্রায় ৭০ ভাগ খানার পুরুষ সদস্যরা ধূমপান করে। আট প্রকারের রোগের প্রধান কারন হিসাবে ধূমপানকে চিহ্নিত করা হয়েছে। এগুলো হলঃ ইসচেমিক হৃদরোগ (ischemic heart disease), ফুসফুসের ক্যান্সার (lung cancer), স্ট্রোক (stroke), মুখের ক্যান্সার (oral cancer), স্বরযন্ত্রের ক্যান্সার (cancer of the larynx), ক্রনিক অবস্ট্রাক্টিভ পালমোনারি ডিজিজ (chronic obstructive pulmonary disease), ফুসফুসে যক্ষা (pulmonary tuberculosis)এবং বুয়ের্জার ডিজিজ (Buerger's disease)। ফুসফুসের ক্যান্সারের কারনে বাংলাদেশে গড় প্রমিত মৃত্যু হার (average standardized rate) দক্ষিণ এশিয়ার দেশগুলোর মধ্যে সর্বাধিক।

মহিলাদের খুব কম সংখ্যকই ধূমপান করে। তবে জরিপের ফলাফল বিশ্লেষণ করে দেখা গেছে খানার সদস্যদের ধূমপানের ব্যাপ্তি এবং মহিলাদের পুষ্টির অবস্থার মাঝে বিপরীতমুখী সম্পর্ক রয়েছে। খানার সদস্যদের তামাকে আসক্তি মহিলাদের পুষ্টিকে নানা ভাবে প্রভাবিত করতে পারে। ধূমপানের খরচ খাবারের জন্য বরাদ্দ আয়ের অংশকে কমিয়ে দেয়। যেসব পরিবার ধূমপান করে তারা তামাকের ক্ষতিকর প্রভাব এবং পুষ্টিকর খাবারের উপকারিতা সম্পর্কে কম জানতে পারে। মহিলাদের পুষ্টি এবং ধূমপান এই দুইয়ের মধ্যে সম্পর্ক যাই হোক না কেন, এই গবেষণা ধূমপান বন্ধ করার পিছনে কেবল স্বাস্থ্যগত উপকারীতাই হয়, পুষ্টিগত উপকারীতার উপরও গুরুত্বারোপ করেছে।

প্রায় শতকরা ৬৫ ভাগ পরিবারের অন্তত একজন সদস্য পান-সুপারী খায়। এদের অধিকাংশই মহিলা। পান-সুপারী (পান পাতা, সুপারী, চুন এবং অনেক সময় তামাক পাতা যোগ করে তৈরি) বাংলাদেশসহ দক্ষিণ এশিয়ার আরেকটি বহুল প্রচলিত আসক্তিকর খাবার। গ্রামাঞ্চলে নানারকম মসলা দিয়ে সাজানো পান অতিথি

আপ্যায়নের একটি বড় উপকরণ। নিঃশ্বাস সতেজ করা এবং হজমের জন্য যেমন মানুষ পান খায় তেমনি পান চিবিয়ে মানুষ বিপুল মানসিক তৃপ্তি লাভ ও করে। নিয়মিত পান চর্বনে ইব্রসিস সাবমুকাস ফাইব্রসিস (Submucous Fibrosis) এবং কুকেপ্লাকিয়া (Kukoplakia) রোগ হতে পারে যা মুখের ক্যান্সারে গিয়ে শেষ হয়।

সুপারিশমালাঃ

বেশ কয়েকটি সম্ভাব্য পদক্ষেপ পর্যালোচনাকালে আমরা এদের কোনটি সরকার আবার কোনটি বেসরকারী সংস্থা কর্তৃক বাস্তবায়ন প্রাসঙ্গিক হিসাবে চিহ্নিত করেছি। সুপারিশগুলোকে আমরা পাঁচ ভাগে ভাগ করে ছিঃ

- পুষ্টিসম্পুরক (খাদ্য) উপাদানের প্রবর্তনঃ বাংলাদেশের প্রেক্ষাপটে খাবারের পুষ্টিগুন বাড়ানোর দুইটি পদ্ধতি চিহ্নিত করা হয়েছে। প্রথমতি হল নানা ধরনের পুষ্টি সম্পুরক উপাদান (nutritional supplements) যোগ করে চালের পুষ্টিগুন বাড়ানো। দরিদ্র মানুষের খাবারের পুষ্টিগুন বাড়ানোর একটি বহুল প্রচলিত পদ্ধতি এটি। দ্বিতীয়টি বর্তমানে গ্রামীন করছে; দইয়ের পুষ্টিগুন বাড়িয়ে বাজারে বিক্রি করা। 'শক্তি দই' নামের এই দই একটি সামাজিক উদ্যোগ।

- পরিষ্কার-পরিচ্ছন্নতার মানোন্নয়নঃ আর্সেনিকপ্রবন নয় এমন এলাকার বস্তিতে অগভীর টিউবওয়েল স্থাপন করে বিশুদ্ধ পানির ব্যবস্থা করা যেতে পারে। যেসকল অঞ্চলে আর্সেনিক সমস্যা প্রকট, সেখানে উচিত আর্সেনিকযুক্ত পানি শুদ্ধ করতে পারে এমন কোনও বিশুদ্ধিকরণ পদার্থ ব্যবহার করা। এমন একটি পানি বিশুদ্ধকরণ গুড়া হল আই.সি.ডি.ডি.আর.বি. কর্তৃক আবিষ্কৃত "সিরাজ-মিক্সচার"।

- পুষ্টি বিষয়ক তথ্য-উপদেশের কার্যকারিতা বাড়ানোঃ গনস্বাস্থ্যকর্মীদের উন্নতমানের প্রশিক্ষণ দিয়ে তথ্য-উপদেশের কার্যকারিতা বাড়ানো সম্ভব।

- সামাজিক উদ্যোগ (Social Enterprise) এর ভূমিকাঃ সামাজিক সেবাদান এবং সেবা বিক্রি করে খরচের অনেকাংশ উত্তোলন করে সামাজিক উদ্যোগ অনেক সময় অনেক কার্যকর, সময়োপযোগী ভূমিকা পালন করে। এ ধরনের একটি অনুসরনীয় দৃষ্টান্ত হল জাকার্তা ভিত্তিক একটি সামাজিক উদ্যোগ যেখানে রাস্তায় ছোট ভ্যানে স্বাস্থ্যকর খাবার কম দামে বিক্রি করা হয়। গ্রামাঞ্চলে সবজি বাগান করার জন্য বেসরকারী সংস্থাগুলো প্রকল্প নিতে পারে।
- তামাক-বিরোধী প্রচারণাঃ ধূমপান এবং পুষ্টির মধ্যে ঋনাত্মক সম্পর্ক থাকায় তামাক বিরোধী প্রচারণা জোরদার করা উচিত। তবে এ ধরনের প্রচারণা ক্ষতিগ্রস্ত গোষ্ঠীর বিরোধীতার সম্মুখীন হতে পারে।

নিচের টেবিলের 'বেশি কার্যকর' হিসাবে চিহ্নিত পদক্ষেপগুলোকে সরকারী ও বেসরকারী সংস্থার অগ্রাধিকার ভিত্তিতে বাস্তবায়ন করা উচিত। সম্ভাব্য পদক্ষেপগুলির ক্রমনির্ধারণ অনেকাংশেই আপেক্ষিক। তবে এই পাঁচটি পদক্ষেপ নিশ্চিতভাবেই পুষ্টিসমস্যার মূলে পৌছাতে পারে, কম খরচে, বড় ধরনের প্রশাসনিক জটিলতা ছাড়া এবং জনমতের পক্ষে থেকেই বাস্তবায়ন করা সম্ভব।

সরকারী এবং বেসরকারী সংস্থার মধ্যে কারা অধিক দক্ষভাবে বাস্তবায়ন করতে পারে তার ভিত্তিতে সুপারিশগুলো ভাগ করা হয়েছে। তবে এই বিন্যাস অকাট্য (absolute) নয়। সরকার টিউবওয়েল রক্ষনাবেক্ষনের কাজ বস্তির সমাজনেতাদের দিতে পারে। আবার জনস্বাস্থ্যকর্মীদের দক্ষতা বাড়ানোর জন্য নতুন প্রশিক্ষণ কার্যক্রম চালু করতে পারে। সুপারিশগুলোর কার্যকারিতা আমরা যেভাবে মূল্যায়ন করেছি তা সঠিক নাও হতে পারে। জাকার্তার মডেল অনুসারে শহরের স্বাস্থ্যকর খাবার বিক্রির উদ্যোগ আশাতীত সফলতা অর্জন করতে পারে।

সম্ভাব্য পদক্ষেপ	কার্যকারিতা	ব্যয় (টাকা)
১। পুষ্টিসম্পুরক খাদ্য উপাদান (চালের পুষ্টিগুন বাড়ানো)	বেশি (সরকারী পদক্ষেপের অন্তর্ভুক্ত)	বার্ষিক খরচঃ ১৫৪ কোটি টাকা প্রতি খানার জন্য খরচঃ ৯৬০ টাকা (শতকরা ১০ ভাগ চরম দরিদ্র জনগোষ্ঠীর জন্য)
২। শহরের বস্তিতে বিশুদ্ধ পানি সরবরাহ (অগভীর টিউবওয়েল স্থাপন অথবা "সিরাজ-মিক্সচার")	বেশি (সরকারী পদক্ষেপের অন্তর্ভুক্ত)	টিউবওয়েলের পিছনে বার্ষিক খরচঃ ১৩.৯ কোটি টাকা প্রতি খানার জন্য খরচঃ ১৪০ টাকা (শুধু শহরের বস্তিতে যেখানে আর্সেনিকের বিস্তার কম)
৩। সামাজিক উদ্যোগের মাধ্যমে স্বাস্থ্যকর খাবারের ব্যবস্থাঃ		
৩ক) জাকার্তা মডেল অনুযায়ী খাবারের ভ্যান (শহরাঞ্চলের জন্য)	কম (বেসরকারী সংস্থার পদক্ষেপের অন্তর্ভুক্ত)	প্রতি ভ্যানের খরচঃ ৪৯,৫০০ টাকা (১০ টি ভ্যানের পরীক্ষামূলক উদ্যোগ) একবেলা খাবারের পিছনে খরচঃ ২০ টাকা
৩খ) গৃহস্থালী বাগান (গ্রামের জন্য)	বেশি (বেসরকারী সংস্থার পদক্ষেপের অন্তর্ভুক্ত)	পৃষ্ঠপোষক বেসরকারী সংস্থার জন্য খরচ তুলনামূলক কম।
৪। পুষ্টি এবং পরিষ্কার পরিচ্ছন্নতা বিষয়ক উপদেশঃ		
৪ক) গনস্বাস্থ্যকর্মীদের মানসম্মত প্রশিক্ষন প্রদান	বেশি (বেসরকারী সংস্থার পদক্ষেপের অন্তর্ভুক্ত)	বেসরকারী সংস্থাগুলোর বাজেট বিবেচনায় এই খরচ তুলনামূলক বেশি। তবে দাতাদের সাহায্য পেলে বাস্তবায়ন সম্ভব।
৪খ) টেলিভিশনে বিজ্ঞাপন	মাঝারী (সরকারী সংস্থার পদক্ষেপের অন্তর্ভুক্ত)	গনমাধ্যমগুলো জনসচেতনতা বাড়ানোর জন্য বিনামূল্যে অথবা কম মূল্যে এ ধরনের বিজ্ঞাপন সম্প্রচার করলে সরকারের তেমন কোনও খরচ নেই। তবে তা না হলে খরচ বেশি
৫। তামাক নিয়ন্ত্রণ		
৫ক) বাজারে নিয়ন্ত্রনমূলক বিক্রি	মাঝারী (বেসরকারী সংস্থার পদক্ষেপের অন্তর্ভুক্ত)	কম খরচ
৫খ) তামাকের বিজ্ঞাপন প্রচারে নিষেধাজ্ঞা	মাঝারী (সরকারী সংস্থার পদক্ষেপের অন্তর্ভুক্ত)	কম খরচ

1. Introduction

THE OBJECTIVE OF THIS STUDY IS TO PROVIDE POLICY ADVICE TO IMPROVE the nutritional status of low-income women in Bangladesh. While some suffer from inadequate calorie intake, the major nutritional problem is inadequate consumption of protein and micronutrients.

We first report the nutritional status of a sample of women surveyed in two sites, one rural and one urban. The rural site is a group of villages near Jamalpur; the urban site is a slum in Uttara, in the Dhaka metropolitan area. (See figure 1.1.)

Though we appreciate the value of long-term measures (such as improved education levels) to address nutritional deficiencies, we focus on programs able to yield benefits within a few years – some intended for implementation by NGOs and some by the Government of Bangladesh.

In spite of rapid urbanization in recent decades – Dhaka is the world's 9th largest city with a population approaching 20 million – about seven of ten Bangladeshi live in rural areas.[1] Lacking adequate education and skills, most urban migrants work in the informal sector as rickshaw pullers, van and auto drivers, construction workers and day labourers. A few, with better education and skills, find jobs as low-skilled office employees and garment workers (Hossain 2006). In rural areas most income earners are agricultural workers, working their own or others' lands. Some own small businesses such as handicrafts and poultry farms. Though urban residents, including those living in slums, have in general more access to education, health care and other services than do rural villagers, often the access remains inadequate.

Rice is the basic staple food in Bangladesh. Generally, people consume rice twice per day, along with curries made with fishes, meats, eggs, vegetables, or lentils. The quantity and quality of food greatly vary

[1] Population Division, United Nations 2011.

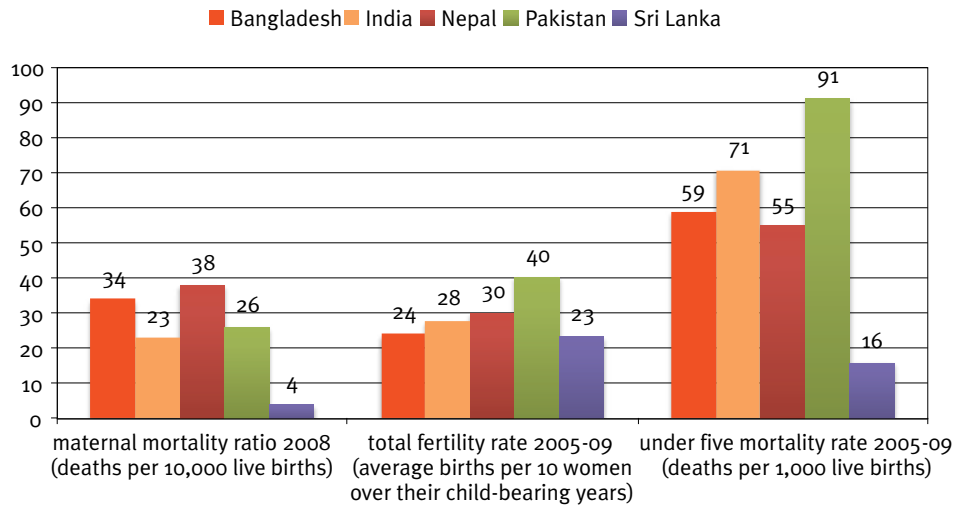
Figure 1.1 Map of Bangladesh Showing Sample Areas for this Study

We report the nutritional status of a sample of women surveyed in two sites, one rural and one urban. The rural site is a group of villages near Jamalpur; the urban site is a slum in Uttara, in the Dhaka metropolitan area.

Uttara, in Dhaka metropolitan area

Village near Jamalpur

Figure 1.2: Maternal Mortality, Total Fertility, and Under Five Mortality Rates, South Asia



Source: World Bank (2011)

with the economic well-being of households. Tea is a popular drink in both urban and rural areas. Milk consumed with tea is often the only source of calcium and vitamin D among the poor. Milk, fruits, meat and fish are consumed by the poor but often not in sufficient quantities. In recent years, food consumption among the poor has included nutritionally poor food items such as chips, biscuits, *samosas*, chocolates, and carbonated cold drinks (such as Coke) (Halder et al. 2003).

Malnutrition among women is a serious problem – in Bangladesh as in many developing countries. Protein-energy malnutrition, iron deficiency anaemia, iodine deficiency disorders[2] and vitamin A deficiency are common (UNICEF 2010, Latham 1997). Malnutrition is a major cause of the high maternal mortality rate in Bangladesh, a rate second only to Nepal among South Asian countries (UNICEF 2011). The World Food Program (2004) estimated the prevalence of anaemia among pregnant women in Bangladesh in 2004 at 47 per cent. Malnutrition passes from one generation to the next generation as malnourished mothers give birth to malnourished children. Nutritional problems among children contribute to the high – by world standards – under age-five mortality rates in Bangladesh and other South Asian countries. (See figure 1.2.)

There exist regional differences in the health and nutritional status of women. Generally, people living in the slums of Dhaka region consume more calories than those living in slums elsewhere. In a study

[2] In general iodine deficiency is not a problem in Bangladesh. More than 80 per cent of households consume iodized salt (WFP 2004).

of 1900 slum households in Dhaka, Chittagong, Khulna and Rajshahi, 24 per cent of Dhaka slum households consumed less than 80 per cent of the recommended calorie intake. The comparable statistic for Khulna was 31 per cent, for Chittagong 36 per cent, and Rajshahi 40 per cent (Benson 2007). Among a study undertaken by the nursing college at IUBAT of 120 women living in a Uttara slum, about 12 per cent did not have adequate calorie intake in their diet to achieve a body mass index (BMI) above the traditional threshold of 18.5 (Richards et al. 2010).[3] Bloem et al. (2004) found more than 20 per cent of slum women in Dhaka suffering chronic energy deficiency (BMI < 18.5); in Chittagong and Khulna about 35 per cent of slum women suffered chronic deficiency.

Most studies on low-income women's health and nutritional status in Bangladesh concentrate on urban and suburban slums. One exception is a large-scale study of rural adolescent girls (ages 13 to 18 years); it found 21 per cent "thin" and 32 per cent "stunted" (Alam et al. 2010).[4] A comparative rural/urban study on 15-49 years old married women living in Orissa, one of the less developed Indian states, found the BMI distribution of rural women to be worse than for urban women (Rout et al. 2009). Another study (Corsi et al. 2011) found limited, though increasing, evidence of obesity among women living in Dhaka region and other urban centres of the country. In the context of Bangladesh, where many people struggle to get adequate calories, obesity has been considered a much less serious problem than insufficient calorie intake.

Food security in Bangladesh has often been assessed on the basis of the adequacy of rice consumption (Bose and Dey 2007). Among the sample of ultra-poor women considered in her study, Haseen (2005) found that 90 per cent of their calories came from rice. Another study, of 7000 households of all income classes residing in both urban and rural areas, found that rice and wheat accounted for more than three-fourths of per-capita protein and calorie intake (Bose and Dey 2007). Benson (2007) reached similar conclusions: among urban slum households located in Dhaka, Chittagong, Khulna and Rajshahi, meat, poultry, milk products and sugar were irregularly consumed.

The inadequate consumption of protein and micronutrients results in various long- and short-term health problems such as stunting, underweight, osteoporosis, and low bone-mass. In turn, these problems impair the physical ability to work and undertake healthy pregnancies (Leslie 1991; Sheshadri 2001; Pathak et al. 2004; UNICEF 2011). Lack of dietary diversity has been identified as a reason for micronutrient insufficiency by researchers (Ahmed et al. 2009). Such deficiencies are most often identified during pregnancy when there is increased need of micronutrients due to changes in women's physiology (Pathak et

3 This previous study was conducted by nursing students at IUBAT. The study is available on line at www.iubat.edu/cpr.

4 Thin was defined as a woman below the 15th percentile of the WHO age-specific BMI distribution for women. Stunted was defined as more than two standard deviations below the average age-specific height for women.

al. 2004). Most nutritional interventions have targeted maternal and child health, and are limited to pregnant and lactating women (Pathak et al. 2004; Leslie 1991). This targeting, Leslie concludes, means a relative under-emphasis on overall nutrition at other times.

While the majority of low-income women may have an adequate calorie intake, the evidence is clear: many suffer from deficiency of protein and micronutrients. The central policy problem is how to improve the quality of their diet at a reasonable incremental cost – whether to the women's families, to government, or to relevant NGOs.

Explaining Poor Nutrition

Many factors – at the household, community, national and international levels – underlie the problem posed by inadequate nutrition. Osmani (1997) organized his explanation into three theories: 1) material deprivation or poverty; 2) inadequate public health infrastructure; and 3) cultural-behavioural effects, including quality of governance. (See *Three theories to explain low population nutrition status*.)

In analyzing the survey results of low-income women in Uttara and Jamalpur, we consider separately six potentially relevant sets of factors: 1) poverty and food price inflation; 2) low education levels among women; 3) absence of basic nutritional information; 4) cultural barriers facing women; 5) inadequate standards of cleanliness and hygiene (including drinking/cooking water); and 6) addiction to tobacco and betel nut among household members.

Poverty and Food Price Inflation

Poverty is often the root cause of food insecurity, inadequate access to health care services, poor sanitation and unsafe water, illiteracy and low education, and lack of proper caring practices among pregnant women (UNICEF 2009; Haseen 2005).

The most frequently cited poverty threshold in developing countries is per-capita income of USD1.25 per day in US dollar purchasing power parity. The most recent UNDP estimate of the Bangladesh population consuming at less than USD1.25 per day is 49.6 per cent (UNDP 2011). (Henceforth, those consuming less than USD1.25 per day are identified as "extreme poor.") Among the extreme poor, those living with less than USD1 per day are identified as "ultra poor" (BRAC 2012a). They comprise 8 per cent of the national population. The rural poverty rate is higher than in urban areas in the country (Narayan et al. 2007). In order to obtain adequate calories, the extreme poor – and even moreso the ultra poor – often sacrifice more costly foods (fish, meat, pulses, fruits and vegetables) that are high in protein and/or micronutrients.

While income is relevant, so too may be food price inflation. Even if family income remains above an income threshold, low-income families may respond to food price inflation by sacrificing quality and diversity of diet (FAO 2010; Sulaiman et al. 2010). The most dramatic example of food price inflation over the last decade was the rice

Three Theories to Explain Low Population Nutrition Status

Roughly speaking, one can discern three major strands among the theories that have emerged to explain the secular improvement in health and nutrition observed in the developed world and parts of the contemporary developing world ...

The **material well-being theory** explains improved health outcomes principally in terms of the secular improvement in food consumption made possible by general expansion in material prosperity and increased agricultural productivity. [Some] have advanced this explanation for the vast improvement in life expectancy that occurred in the Western world in the late 19th and early 20th century. They give this explanation precedence over the technology-based explanation on the grounds that it was not until well into the 20th century that major advances occurred in medical technology capable of fighting the major infectious diseases responsible for high mortality ...

This view has been challenged by proponents of the **public-health or technology-based theory**. Their explanation recognizes that the most important breakthroughs in medical technology [occurred] after and not before the most significant advances in human health were made in the West. But they emphasize the importance of public health improvements at the local level that were based on marginal advances in technology [that] had far-reaching implications. Examples are access to safe water, sanitation, and pasteurized milk. The argument is extended also to the contemporary developing world. It is suggested that the sharp decline in mortality observed in the developing world in the second half of this century owes more to technologies that made possible mass access to safe water, sanitation, vaccination and other public health facilities (such as oral rehydration therapy for diarrhea) than to material prosperity as such.

The third strand, namely the **cultural-behavioural theory**, also extends the argument to the contemporary developing world. The vast disparities that exist in the experience of developing countries provide the motivation for this theory. It is well-known that several poor countries (such as China, Costa Rica, Cuba, Mauritius, Sri Lanka) and sub-regions (such as Kerala state in India) have achieved levels of life expectancy that are close to the levels achieved by the richest countries in the world, which suggests that a good deal more than material prosperity is involved in the explanation of improved health status. By the same token, a good deal more than public health technology must also be involved, since others who haven't done so well have had access to the same technologies that were put to good effect by the more successful ones. The missing element presumably lies in the cultural and behavioural pattern of the people concerned; different cultural influences may predispose them to respond differently to the availability of food and health technology. Among the major determinants of the relevant behavioural pattern, researchers have identified female education and gender relationship as especially important, along with the system of governance.

— Siddiq Osmani (1997), from *Poverty and Nutrition in South Asia*

price spike in 2008. However other foods have also experienced significant inflation (Richards et al. 2010,33-36). In May 2011 the annual Bangladesh food price inflation rate was around 13 per cent (BBS unpublished, May 2011). Food price inflation has been higher in rural (14 per cent) than in urban areas (11 per cent).[5]

Education

Independently of its effect on labour productivity, education builds abilities and social skills, which in turn contribute to health and wellbeing of people as adults. Among countries at similar levels of economic development, higher female literacy rates typically are associated with dramatically better overall health status among women and children (Richards 2012).

Nutritional Information

Vulnerable households usually have limited access to nutrition information (FAO 2011). Among rural girls in Bangladesh, ages 13-18, more than half do not know the name of foods that are sources of protein, and a third do not know the necessity of nutritional supplements for their physical growth (Alam et al. 2011).

[5] Bangladesh Bureau of Statistics 2011 (unpublished).

Even with a low income, families can often improve their nutritional status by substituting healthy for unhealthy foods, and eliminating or reducing expenditure on addictive products such as tobacco. Potentially, the provision of information can have a beneficial impact on nutrition.

Cultural Barriers

Due to the patriarchal nature of Bangladeshi society and a deep-rooted preference for sons, females in South Asian countries often face discrimination in terms of investment in education, access to resources (such as food and health care), and freedom to own assets – and in household decision making (FAO 2011; Ravindran 1986; Leslie 1991; World Bank 2011). Son-preference is rooted in the idea of higher earning potential of sons than daughters, and expectation of support from sons for parents during their old age and at times of crisis (Muhuri and Preston 1991). In the South Asian region the nutritional status of female children (ages 0 to 4 years) is worse than male children of the same age. The South Asian gender gap in nutrition is worse than in other regions of the world and the gap widens as children grow up (UNICEF 2011).

Because of the discriminatory cultural and social environment, women often have low self-confidence and accept a self-sacrificing role in the family – including acceptance of her food needs as the least important among family members. As a result, from childhood through adolescence and even during pregnancy and lactating periods, women consume inadequate nutrients.

Hygiene and Cleanliness

Frequent attacks of infectious diseases can offset the improvement of health status arising from a nutritious diet. In Bangladesh poor people often do not have access to safe drinking water and sanitation. Among rural people 78 per cent have access to improved water such as a household connection, a public standpipe, a borehole, a protected well or spring, or rainwater collection (World Bank 2011). Among urban people this per cent is slightly higher (85 per cent); obviously the living condition of urban slums are much worse than for the average urban resident.

Unhygienic water and sanitation may result in a high incidence of various waterborne communicable diseases. The morbidity rate due to diarrhoea in Bangladesh per 1,000 population is 9.4 per year (BBS

2000). Unclean household environment, poor personal sanitation, and improper disposal of human feces are common in poor neighbourhoods resulting in various parasitic infections (Haseen 2005). Osmani (1997) describes an "infection-nutrition nexus," a two-way relationship between diet and disease. Disease reduces the ability of the body to use nutrients, and poor diet increases the incidence of disease.

Tobacco and Betel Nut

Among low-income men in Bangladesh, addiction to tobacco is very common. More than 65 per cent of the rural households and 70 per cent of the urban households sampled have at least one member who smokes.

In very few cases do the women sampled smoke. However in analyzing the survey, we found in general a negative association between women's nutrition and the extent of tobacco consumption in the household. Consumption of tobacco may affect women's nutrition via several routes. Income spent on tobacco reduces income available for food. Families that smoke may be less knowledgeable of the dangers of tobacco and the requirements for a healthy diet. Whatever the nature of the link, the survey results point to a nutrition benefit – in addition to health benefits to those presently smoking – of programs combating use of tobacco.

Tobacco consumption is the cause of eight major diseases, such as ischemic heart disease, lung cancer, stroke, oral cancer, cancer of the larynx, chronic obstructive pulmonary disease, pulmonary tuberculosis, and Buerger's disease (GLOBOCAN 2008; WHO 2005). These diseases are responsible for 16 per cent of all deaths in Bangladesh; tobacco consumption is the sole cause of 9 per cent of such deaths (WHO 2005). The average standardized rate of mortality due to lung cancer in Bangladesh (18.2 per 100,000 population) is the highest among South Asian countries (GLOBOCAN 2008). The annual cost of tobacco-related illness in Bangladesh is estimated at USD40 million (WHO 2005).

Betel quid (betel leaf, areca nut, lime and sometimes tobacco) is another common addictive purchase in Bangladesh and South Asia. In rural areas, offering a decorated betel quid to guests and relatives is a symbol of hospitality, which people consume for recreation, breath freshening and for digestive purpose. The IUBAT survey reported 65 per cent of households have at least one member who chews betel nut. Chewing areca nut may cause submucous fibrosis and used along with tobacco can cause leukoplakia which ends as oral cancer (Auluck et al. 2009).

2. Methodology

THE PRIMARY METHODOLOGY WAS A SURVEY TO ASSESS THE NUTRITIONAL status of low-income women in the two sites. To explore more complex issues, two focus group discussions were conducted, again one urban the other rural. (See figures 2.1 and 2.2.) Only married women were considered for the study.

We acknowledge here that the Asian University for Women conducted a parallel survey, using the same survey questionnaire, among a sample of young women in Raozan, a suburban community near Chittagong. Their survey was addressing matters beyond the scope of low-income women and we do not here discuss their results. We hope in the future to compare the results of their sample with those drawn from the two samples analyzed in this study.

For the rural survey, low-income women were selected from four villages (Satkura, Mohadanga, Narkeli and Fatehpur) in the Kendua union in Jamalpur Sadar, an upazila in the district of Jamalpur, located in northern Bangladesh.[6] This is a rural area where relatively little urbanization has occurred.

The urban study was conducted in a large slum located in the Abdullahpur / Kamarpara area in Uttara, Sector 10, in northern Dhaka city, close to the Turag River. The established residents are reasonably prosperous. Over the last two decades, a large shanty community, mostly migrants from rural areas, has arisen on government-owned land. These slum houses are mostly built by local political leaders who often have no legal lease on the land but nonetheless collect rent from the slum dwellers.

Most of the houses in the rural area and urban slums are *non-pakka* (without solid permanent foundations, walls and roofs). The major difference in the pattern of houses in rural and urban areas is the surrounding space. In Jamalpur each house is separated from other houses and has a wide open area around it. Each house has a separate kitchen and washroom. Slum houses in Uttara are spread along the two sides of a highway (the Tongi-Ashulia road). These

6 Bangladesh consists of six administrative divisions, divided into 64 districts. Jamalpur is one of them. Each district is divided into sub-districts (upazila). Jamalpur Sadar is a upazila in Jamalpur district. Each upazila is divided into a number of unions, the lowest administrative unit in rural Bangladesh (Banglapedia 2012).

Figure 2.1 Rural sample area location: Kendua thana in Jamalpur Sadar upazila

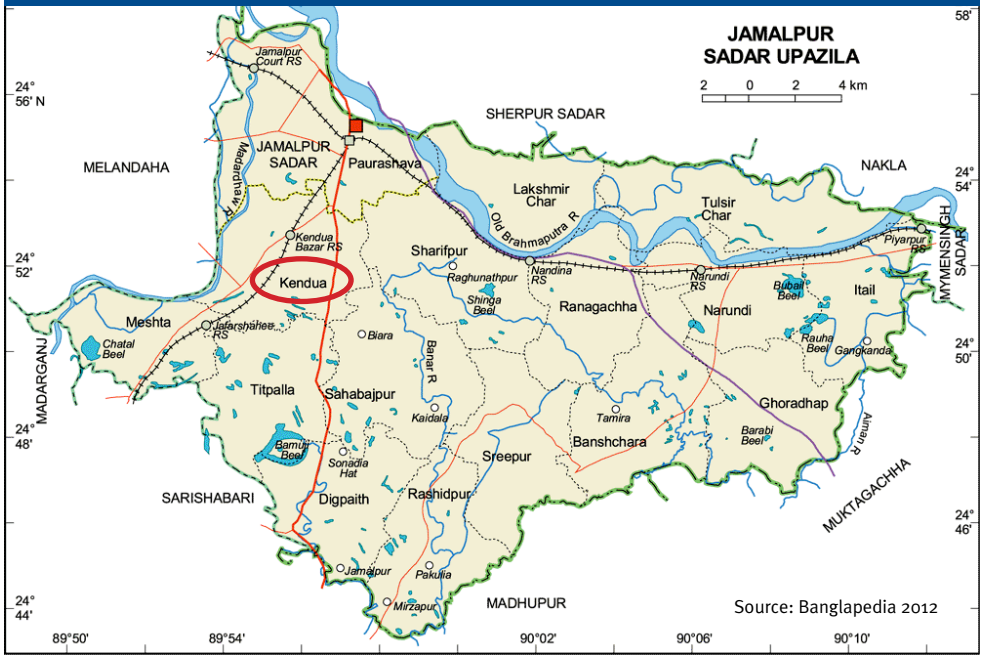
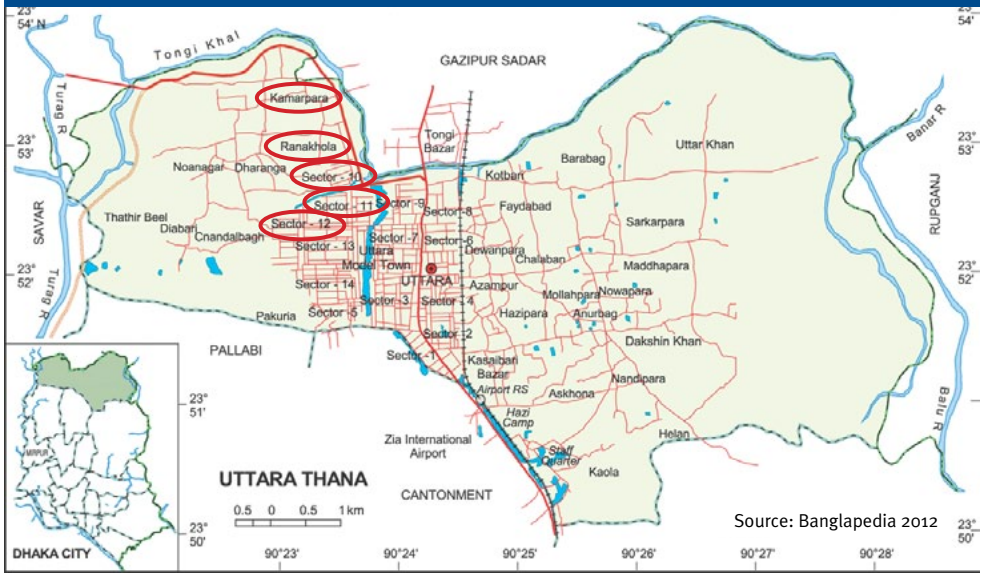


Figure 2.1 Urban sample area location: Uttara (Dhaka)



houses are *non-pakka*: they share common walls made of corrugated tin or sheets of interwoven bamboo leaves. In most cases each family lives in one room, and shares kitchen, washroom and other household facilities with other families.

Sampling Technique

The surveyors restricted their sample to women who live in *non-pakka* houses. A systematic sampling[7] technique was used. Initially we designated a sample size of 600 households divided equally between rural and urban. In each sample location, surveyors approached every third *non-pakka* house. If the woman did not want to participate in the survey, then the next *non-pakka* house was approached. If a woman from that house participated in the survey, then surveyors repeated the process.

A household included all people living together in the same dwelling and sharing their assets and income. Both characteristics needed to be fulfilled to define a household. If two households live in the same dwelling, then surveyors randomly selected one household for the interview.

Questionnaire Design

The survey consists of 37 questions. Originally prepared in English, we translated the questionnaire into simple Bangla. The translation used sensitive wording for questions that may be uncomfortable for the women or their household. (See Appendix A for the English version of the questionnaire.)

The broad topics for the survey were the following:

- The 24-hours diet recall was the key component to assess the nutritional status of the women. Each woman was asked to recall what she ate at breakfast, lunch, supper and other times during the day. Though the measurement of quantity of consumed food is subjective and depends on the respondent's memory, this is a well accepted research method to assess a person's regular diet (WHO 2001).
- Surveyors asked whether the women consumed iodized salt, calcium tablets, fortified yogurt, vitamin "sprinkles," zinc and iron – either regularly or irregularly. Surveyors also asked about sources of drinking and other water for household uses, and about household toilet facilities.
- Twelve questions gathered information about the number of household members who smoke or chew betel nut, and about any change in use of tobacco or betel nut, and reasons behind those changes.
- The survey asked whether the women received advice on nutrition, and from what source.

7 *Systematic sampling* is often used instead of random sampling. After the required sample size has been calculated, every Nth record is selected from a list of population members. (Source: statpac.com/surveys/sampling.htm)

- The survey assessed several socioeconomic characteristics of the household. Women were asked about each member's occupation and how many hours on average each member works per day. Also questions were posed about land ownership, electricity connection of the household, and the list of assets the household owns. Information was collected on the respondent's age, weight, height, highest school class attainment and occupation. Similar information (except height and weight) was also collected for all other members in the household. (Each pair of surveyors was provided a scale and a tape to measure the weight and height of the women.)
- To assess the effect of inflation on the respondent's food consumption and nutrition, she was asked to assess in general the household's current food adequacy and food adequacy one year before. Some qualitative questions were posed about food distribution among household members (who gets more food in the household or is food divided equally among all?), problems due to food price increases, and reasons for consuming less food if so reported.

In the neighbourhood of each survey area, surveyors inquired of a few shopkeepers about the price of regular foods purchased by the nearby households. National data about the price of those foods are available. However large regional variation exists in the retail price of daily foods. So we collected the local price from the neighbourhood shops and market place.

The Survey and its Limitations

In rural areas the survey data were collected by 10 professional surveyors in June 2011. The survey in the urban slums was undertaken by 10 undergraduate students at IUBAT, from mid-June to early July 2011. In total, 276 rural and 301 urban women were interviewed. Being a Muslim country, Fridays in Bangladesh are a religious day and a holiday. Most households prepare special meals on that day. So Friday and Saturday were avoided in conducting the survey.

A pair of surveyors, a male and a female, went to each household to interview respondents. Questions were asked orally by the female surveyor. The male surveyor took notes and assisted the female surveyors. The reason behind female surveyors posing questions and measuring height and weight was the cultural sensitivity of interaction between male and female. Due to security concerns of young women in Bangladesh moving alone, each pair of surveyors included a man. Surveyors received an honorarium for their work.

One limitation of the survey is weak information on family income. Women are reluctant to describe income to strangers and are less knowledgeable than their husbands of monetary matters. Accordingly, we did not pose direct questions about income. Many women were uncomfortable about mentioning household toilet facilities. Women in urban slums were less uncomfortable regarding these questions than women in rural areas. Answers to these questions may be biased.

Focus Group Discussions

We conducted two focus group discussions with women, one in Satkura, a village in Jamalpur, and another in Uttara. The discussions took place in BRAC non-formal schools located in those areas. Approximately a dozen women participated in each focus group. BRAC provided organizational supports for the interviews.

We asked questions about the effects of food price inflation and coping strategies at the time of food price spikes. We also discussed women's nutritional education, their husbands' smoking behaviour, arranging healthy food for the family, role of schools for nutritional education, short-term income-generating initiatives appropriate for less educated and conservative women. Questions were semi-structured and were open ended. Women's views were useful for the policy analysis part of my study.

3. Descriptive Statistics

THERE ARE MANY MEASURES OF THE HEALTH AND NUTRITIONAL STATUS of a population.[8] The current survey uses a WHO (2001) food score measure of dietary intake and a widely used measure, body mass index (BMI). Surveyors listed all foods and enquired about quantities consumed by the women for the previous 24 hours. To determine BMI, surveyors measured weight and height.

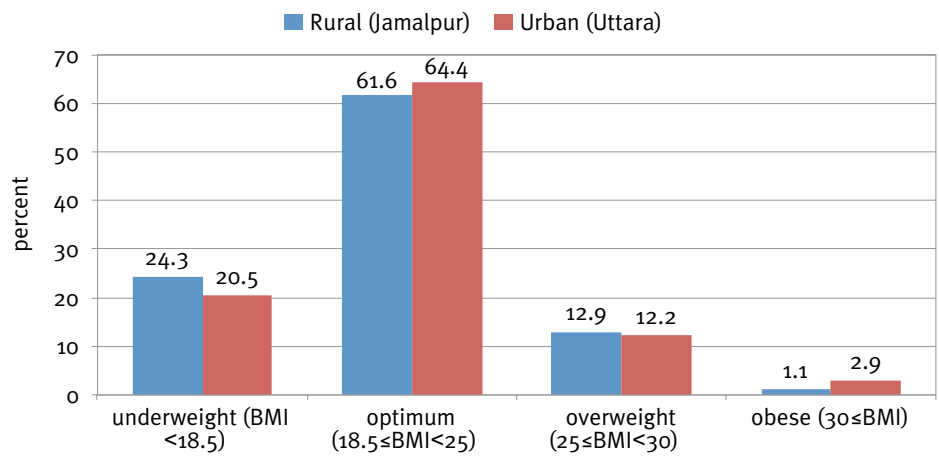
Neither BMI nor food scoring captures detailed nutritional problems. However, these non-intrusive techniques provide fundamental nutritional information about a population. The size of the low end of the BMI distribution is a good indicator of the extent to which a group experiences inadequate calorie intake; the food score reveals the approximate extent of inadequate dietary intake of micronutrients and protein, of excess fat consumption, and so forth.

Figure 3.1 illustrates the BMI distributions of the rural and urban population samples. The 'optimum' BMI range is 18.5 to 25. A BMI score below 18.5 indicates 'underweight', between 25 and 30 'overweight', and above 30 'obesity'. Relative to those within the optimum range, those whose BMI is below and above are more susceptible to a range of diseases and other complex health syndromes. Underweight is somewhat more prevalent among low-income rural than urban women. By a similar margin the share falling into the optimum range is higher in the urban sample. Overweight and obesity, combined, are similar shares in both samples.

The food score is a summary measure derived from the 24-hour diet recall. It comprises ten questions, on each of which the respondent received a score of 1 (adequate),

[8] BMI is a widely used measure, defined as the ratio of weight (in kilograms) divided by the square of height (in meters).

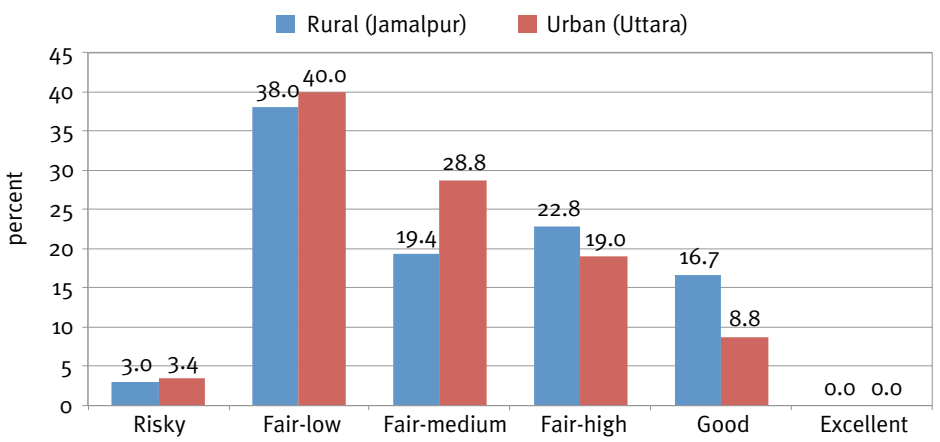
Figure 3.1: Distribution of Body Mass Index (BMI), Rural and Urban Samples



0.5 (minimally adequate), or 0 (inadequate). For example, Q6 scores diets with respect to the variety of foods consumed within the major food groups. The more variety the greater the probability that the respondent is receiving adequate micronutrients. (See Appendix B for further detail on scoring of questions.) A respondent's food score ranges between a minimum of 0 and maximum of 10. The WHO identifies ranges of the food score as risky (3.5 or less), fair (4 – 7), good (7.5 – 8.5), excellent (9 – 10). We have subdivided the fair category into fair-low (4 – 5), fair-medium (5.5 – 6) and fair-high (6.5 – 7). Given our interest in factors associated with nutritional inadequacy, we have for some aspects of the analysis divided the sample into those whose diet is deemed either inadequate (0 – 5) or adequate (5.5 – 10).

Figure 3.2 illustrates the distribution of food scores in each sample, by category. None of the women scored excellent; however, women in the rural sample displayed somewhat better nutrition in that they obtained higher shares in the fair-high and good categories than their urban counterparts. Figure 3.3 illustrates the distributions, by question. More than 90 per cent of all women consumed satisfactory servings (score 1) from the cereals and potato group of food (Q1). The majority in both samples failed to eat at least five – the recommended number – of servings from the fruit and vegetables category (Q2). Nearly all women sampled consumed inadequate dairy servings (Q3). In both samples, the majority consumed adequate protein, but a quarter did not. Nearly all women consumed fat, oil and sugar within acceptable limits (Q5, Q10). To obtain adequate intake of micronutrients, a diverse diet is required. Nearly a third scored zero on the question probing dietary diversity (Q6). Given their rural location, it is not surprising that the

Figure 3.2: Distribution of Rural and Urban Food Score, by Category



rural women scored better in terms of eating at least two vegetables, due to their access to home-grown and locally produced vegetables at low cost and sometimes free of cost (Q7). Rural women also scored higher in terms of eating at least one fresh fruit (Q8) and choosing healthy snacks (Q9). But the majority of both groups did not eat any fresh fruit and chose relatively unhealthy snacks, mostly purchased from nearby street food shops (Q10).

Explanatory factors

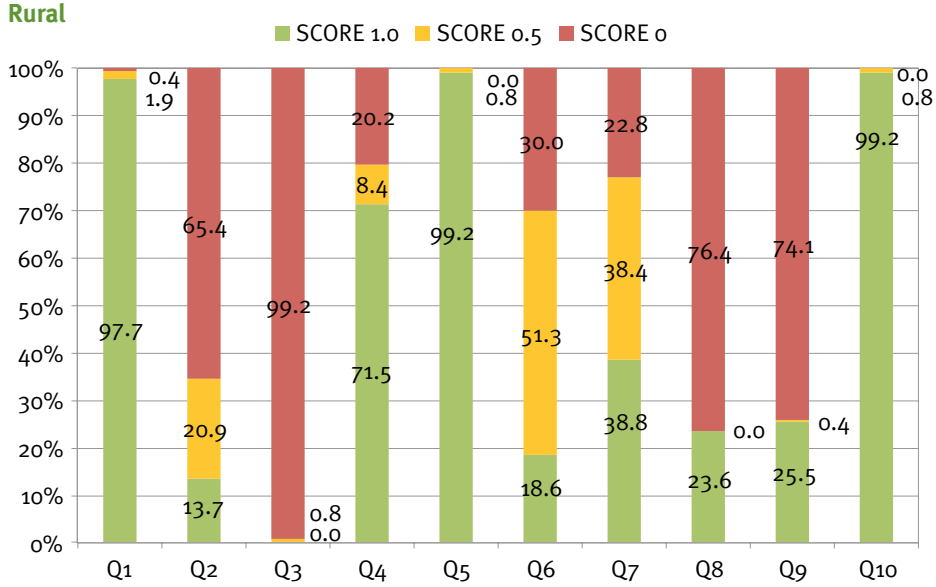
As discussed earlier, we identified six sets of factors that potentially influence women's nutritional status. In chapter 4, we attempt to assess the statistical significance of each of the particular factors on the nutritional status of the women surveyed. In this chapter we describe in some detail the actual survey results.

Poverty and food price inflation

The average age of rural women in the sample is 38 years, of urban women 34 years (figure 3.4). The majority of married women in Bangladesh do not work in paid jobs outside their home, however women in the urban slum are more likely to do so than their rural counterparts (figure 3.5). An urban setting affords more opportunity to earn income, and the high cost of living encourages women to abandon traditional conservative customs. The occupations of women who do work outside the home include agricultural farming, business, handicrafts, poultry farming, house worker, official job, construction worker, garment worker. Women's work in paid jobs contributes positively to their nutritional status in either or both of two ways: households where both husband and wife work will have a higher family income; women who work outside the home may have more au-

Figure 3.3: Distribution of Food Score, by Question

Rural



Urban

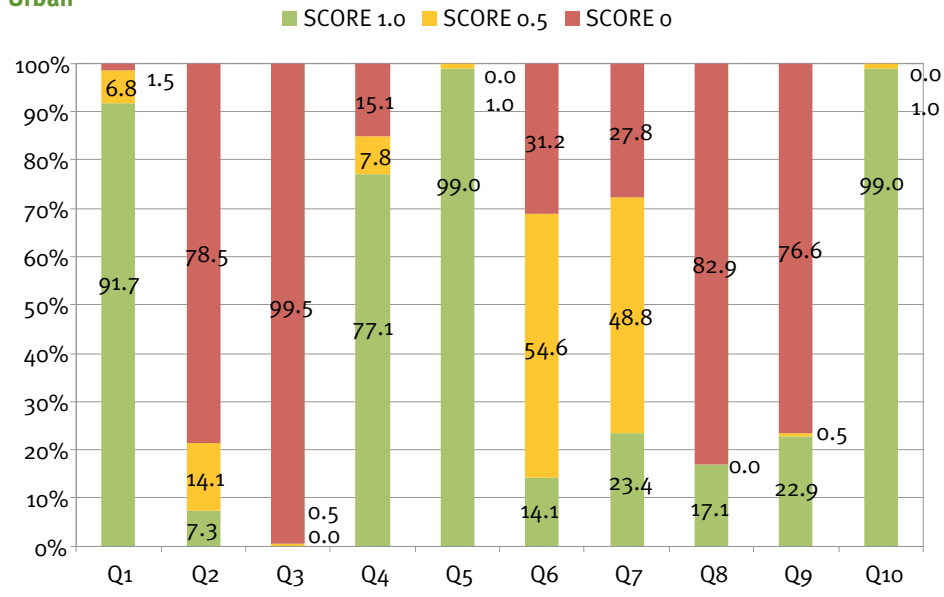


Figure 3.4: Distribution of the Age of Women

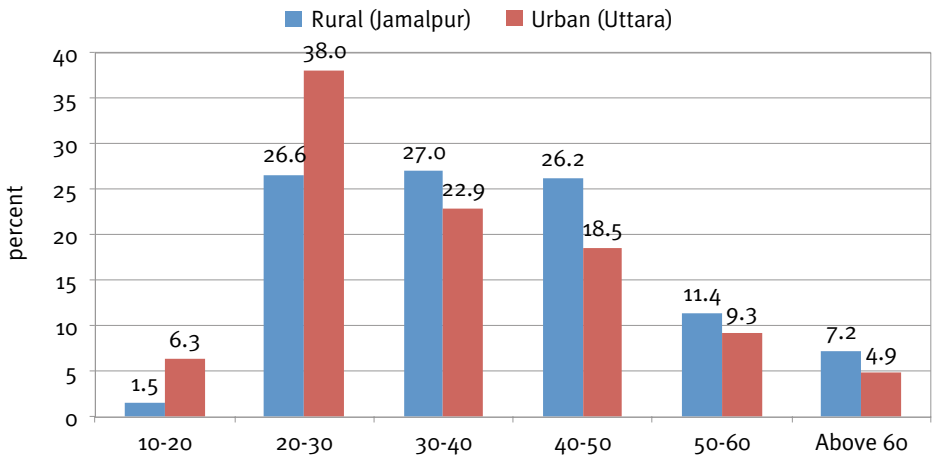
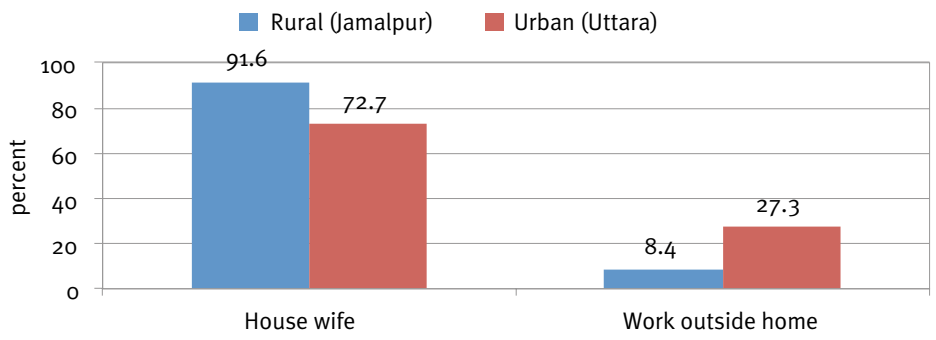


Figure 3.5: Share of Women Who Work Outside Home



tonomy and freedom and thus access more nutritious food. However, in the context of the conservative Bangladesh society, families often do not allow women to work outside the home unless they face extreme financial difficulties. Hence, working outside the home is often a proxy for particularly low income.

In the rural area the majority of the husbands are agricultural labourers. In the urban area the majority of the husbands work in the residual category (day labourer, hawker, rickshaw-puller and construction worker). One-fifth of the urban husbands work in the low-paid formal sector, which includes car driver, office assistant, field workers in NGOs, security guard (figure 3.6).

We constructed an estimate of household members' labour income and income from income-generating assets. From the survey we obtained information on household members' occupations, average hours worked per day, and household assets. In estimating money income per family member, we applied the "square-root formula" (dividing the estimate of total family income by the square-root of total number of household members). Rural households are on average poorer than the urban in terms of income. The high living costs in Dhaka reduce somewhat the urban income advantage. (See table 3.1. The details of the calculation are given in Appendix C.)

Women who reported having consumed less food compared to the previous year were asked to explain. One explanation given was household financial difficulty. A far more frequently offered reason was food price inflation. Respondents may have given both reasons, but even if inflation-adjusted household income did not decline, high food price inflation may have caused women to reduce food consumption. (figure 3.7).

Figure 3.6: Distribution of Husbands' Occupations

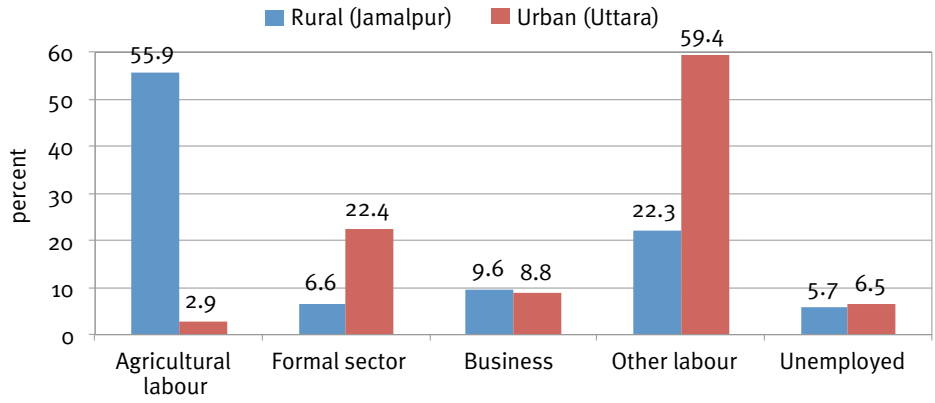


Table 3.1: Distribution of Households, by Estimated Per Capita Income

	Rural (Jamalpur)	Urban (Uttara)
	percent	
Very low (Less than $1.25 per day)	25.5	4.9
Low ($1.25- $2 per day)	26.6	13.7
Medium ($2-4 per day)	38.8	69.3
High ($4-10 per day)	9.1	12.2
Very high (More than $10 per day)	0.0	0.0

Figure 3.7: Reasons Offered Among Respondents Who Consumed Less Food Than Previous Year

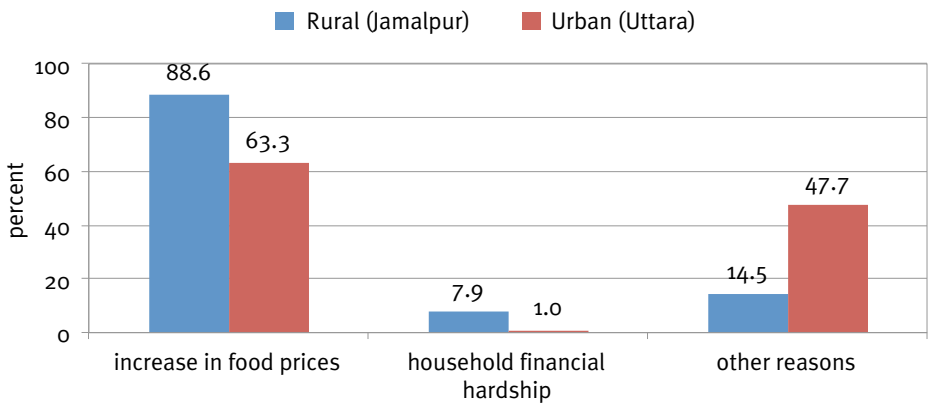
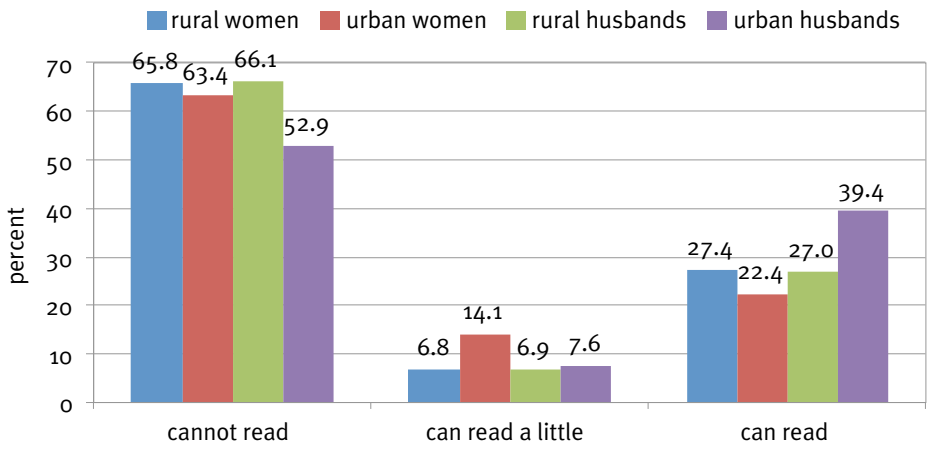


Figure 3.8: Distribution of Literacy, by Sample and Gender



Education

We gathered data on both 'literacy' and 'highest class attendance' of women and other members of the household (figures 3.8, 3.9). Among the women sampled, approximately two out of three cannot read at all. The median highest level of education among both women and their husbands, both in the rural and urban sample, is in the interval of class 0 – 2. As reported, husbands' education levels are somewhat higher than for their wives; however the results are overall similar.

Figure 3.9: Distribution of Highest Class Attended, by Sample and Gender

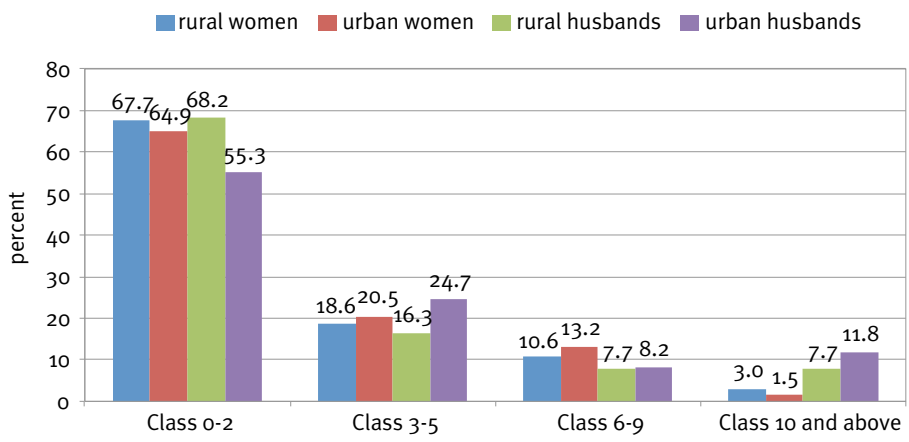


Table 3.2: Frequency of Reference to Particular Sources of Advice

	Rural (Jamalpur)	Urban (Uttara)
	percent	
Family/Neighbour	35.4	32.7
Health facility care providers (doctors, nurses)	16.0	18.5
Community health workers	49.4	38.0
Public meetings sponsored by NGOs	20.9	43.9
Radio/TV	14.4	5.9
Other	1.5	10.7

Women's husbands are primarily responsible for earning money income and buying food in the household. Given the patriarchal nature of society, husbands have more authority in household decision-making than women. A better educated husband is expected to earn more and buy more nutritious food than an illiterate husband and may be more concerned about his wife's health and nutrition.

Nutritional Information

Women who report having received advice on nutritional diets are expected to have better nutritional status than women who do not (table 3.2). We defined several variables specifying sources of advice: 1) family, relatives or neighbours; 2) health facility care providers (doctors, nurses); 3) community health workers who visit homes; 4) public

Table 3.3: Distribution of Frequency of Use of Nutritional Supplements							
	Iodized salt	Calcium tablet	Fortified yogurt	Vitamin tablet	Sprinkles	Zinc tablets / syrup	Iron tablets / syrup
	(percent)						
RURAL							
Regularly	81.4	3.4	0.0	1.5	0.0	0.0	3.4
Sometimes, not regularly	12.5	36.5	6.1	39.5	1.5	12.5	37.6
When pregnant or nursing children	0.0	7.6	0.8	4.9	0.0	1.9	13.7
Never	4.2	49.8	86.3	47.9	82.5	74.1	43.0
Don't know	1.9	2.7	6.8	6.1	15.2	11.4	2.3
URBAN							
Regularly	90.2	2.0	0.0	2.0	0.0	0.0	1.0
Sometimes, not regularly	5.9	39.5	2.0	48.3	1.0	2.9	22.4
When pregnant or nursing children	0.0	5.9	2.0	11.7	0.5	1.5	6.3
Never	1.5	38.5	37.1	29.8	25.4	42.9	43.4
Don't know	2.0	4.4	10.7	8.3	22.0	16.6	2.9

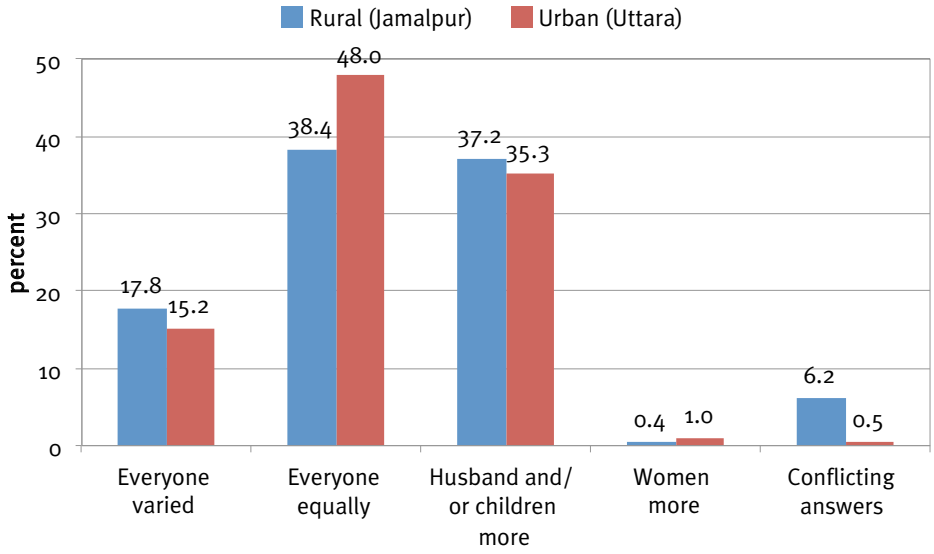
meetings conducted by NGOs; 5) radio and television announcements; and 6) other (which include posters, public announcements, etc.). Respondents could indicate multiple sources of information.

Community health workers are the most frequently cited source of nutritional information in the rural sample and a close second in the urban sample. By contrast, less than one in five got advice from nurses or doctors in health facilities.

Most women regularly consumed iodized salt, but 20 per cent of rural and 10 per cent of urban women did not (table 3.3). More than 90 per cent of women either did not consume or had not heard about fortified yogurt[9] and sprinkles. Over 80 per cent of urban and rural women either had not heard of or never consumed zinc tablet/syrup. Most women consume calcium, vitamin and iron tablet/syrup irregularly. There was little evidence of increased use of nutritional supplements during pregnancy.

9 Fortified yogurt is a special kind of nutritious yogurt fortified with additional micronutrients. The joint venture of Grameen and Danone, a social business, markets such yogurt ('shokti-doi') (Yunus Centre 2012).

Figure 3.10: Distribution of Household Food Allocation Patterns



Cultural Barriers

We constructed a question on intra-household variation in food consumption as a measure of intra-household gender equality (figure 3.10). It is expected that households which divide expensive and nutritious food such as milk, meat, fish and fruits equally among household members are more gender-neutral compared to households in which husbands and children get more of those foods. Approximately a third of the women sampled reported that their husband and children received more generous food servings than did they.

We categorized families as nuclear, stem, and joint. A 'nuclear' family is a two-generation family consisting of husband and/or wife and their single children. A 'stem' family is a three-generation family living together. It consists of husband and/or wife, their parents, married and/or unmarried siblings and the unmarried children of the husband/wife and their siblings. A 'joint' family is a type of family where three or more generations with members like the stem family plus husbands/wives uncles/aunts and their families live together. Women living in stem and joint families are often dominated by a number of male and older female members. So, a higher percentage of women living in stem and joint families are expected to have lower nutritional status compared to women living in nuclear families. Nearly identical fractions of both rural and urban households (78 per cent) maintain a nuclear family structure.

Figure 3.11: Distribution of Sources of Drinking/Cooking Water

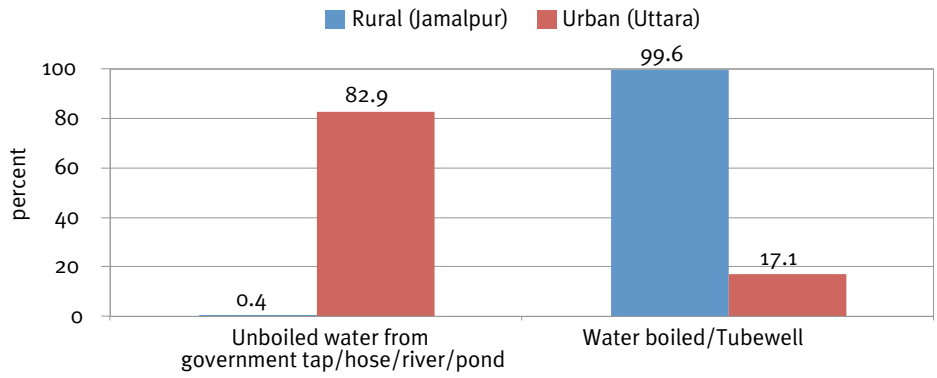
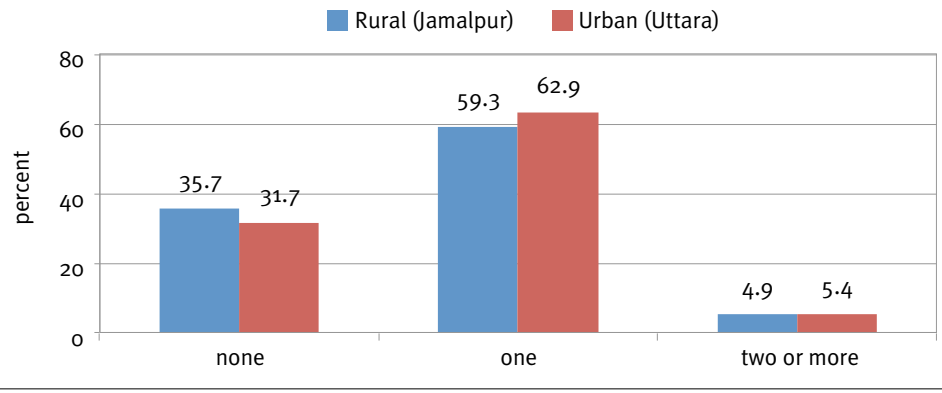


Figure 3.12: Distribution of Households, by Number of Members Smoking Tobacco



Hygiene and Cleanliness of the Household

Categorical variables on sources of water are a measure of household hygiene and cleanliness (figure 3.11). Almost all rural households consume hygienic water, from either tube wells or boiled tap/river/pond water. However 84 per cent of the urban slum women use unhygienic water sources.

Addictions to Tobacco and Betel Nut

We constructed a number of categorical variables such as 'number of household members who smoke', 'monthly expenditure on tobacco' and share of husbands and wives smoking. Among low income men in Bangladesh, addiction to tobacco is very common. Approximately two thirds of households have at least one member who

Figure 3.13: Distribution of Estimated Monthly Expenditure on Tobacco, Households with Smokers

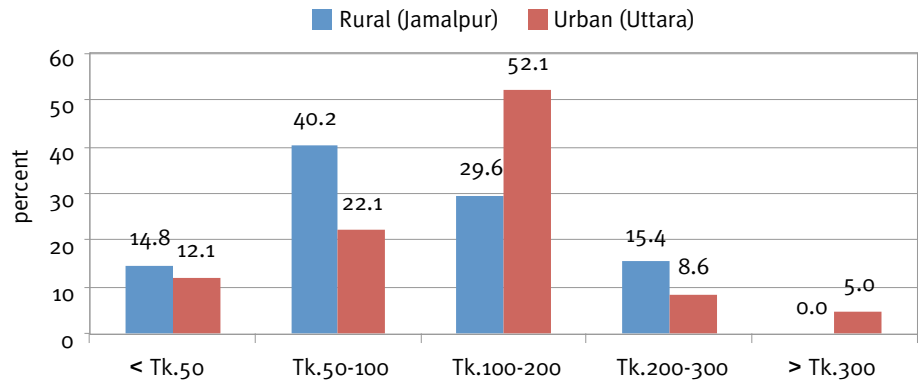
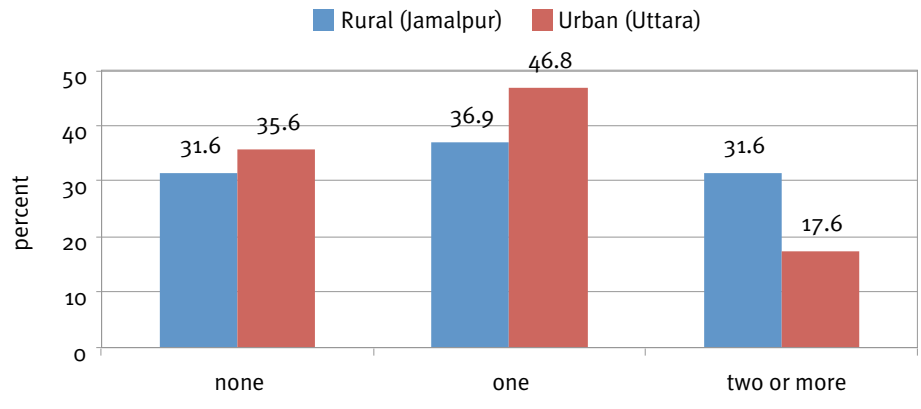


Figure 3.14: Distribution of Households, by Number of Members who Chew Betel Nut



smokes. Very few households have female smokers (figure 3.16).

The variable 'monthly expenditure on tobacco' was constructed by multiplying household total cigarette consumption (adding cigarette consumption of all household members) by the price of the cheapest cigarette in Bangladesh (Tk.0.24) (figure 3.13). Since expenditure is based on the price of *bidis*, this is probably an underestimate. The average monthly expenditure on tobacco in the rural households with at least one smoker is Tk.114, in the urban area Tk.139. (In both this is approximately one per cent of estimated monthly income.) In both samples, about 15 per cent of households spend over Tk.200 per month on tobacco.

About two thirds of households have at least one member who chews betel nut (figure 3.14). Prevalence of chewing betel

Figure 3.15: Distribution of Estimated Monthly Expenditure on Betel Nut, Households with Betel Nut Chewers

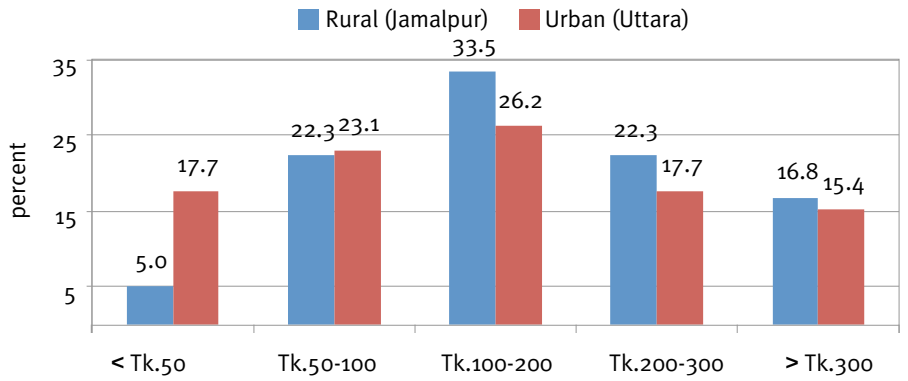
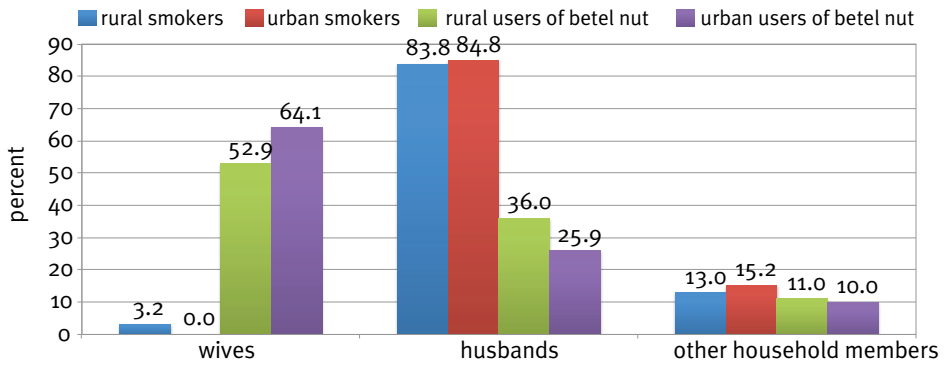


Figure 3.16: Distribution of Smokers and Users of Betel Nut



nut is somewhat greater in the rural sample, and rural households with members who chew betel nut spend on average more than their urban counterparts. The majority of those chewing are women. We estimated monthly expenditure on betel nut by multiplying household total number of betel quid consumed (adding betel quid consumption of all household members) by the price of one quid (figure 3.15). The average monthly expenditure varies between Tk.150 and Tk.200.

If we examine the distribution of those who smoke and those who chew betel nut by household member, there are dramatic differences. Very few women smoke; the overwhelming majority of smokers are husbands and other family members (figure 3.16). By contrast, the majority of those using betel nut are women.

4. Statistical analysis

WE UNDERTOOK TO ANALYZE THE SURVEY RESULTS VIA LOGISTIC REGRESSIONS run separately on the rural and urban samples.[10] There are useful results to report, but we emphasize their tentative nature. The regressions in this chapter explain some of the variance in outcomes among the women sampled – but there is much more to explain than is accounted for here.

Regressions Constructed

We discuss nine regressions that attempt to explain five nutrition-related outcomes (regressands). (See tables at end of chapter for detailed regression results.):

- **FOOD ADEQUACY** (regressions 1 and 5): Our primary interest is explaining whether low-income women achieve an adequate level of nutrition. We defined a binary variable: 1 if women's diet is deemed adequate, 0 if inadequate. Adequacy means a food score of 5 or above, inadequacy a score below 5. In other words, inadequacy is defined as a score falling in the 'risky' or 'fair-low' range.

[10] A logistic regression estimates the log of the odds of a particular outcome occurring as a linear function of the regressors. Beyond noting that the sign of the coefficient indicates whether the regressor has a positive or negative incremental impact on the outcome, interpreting the coefficients is not intuitive. In the case of a binary regressor that assumes a value of 0 or 1, the coefficient of the regressor, b, can be interpreted as follows: the marginal effect on the odds of an outcome due to a change in the regressor from 0 to 1 is given be e^b. If the coefficient is in the range $0 < b < 0.5$, then $100*b$ is approximately the percentage increase in the expected value of the odds. If the coefficient is in the range $-0.5 < b < 0$, then $100*b$ is approximately the percentage decrease in the expected value of the odds. This approximation becomes less exact the further the coefficient deviates from 0.

- **DIET DIVERSITY** (regressions 2 and 6): The food score is a composite index derived from ten questions. One of the central questions is no.6 dealing with diet diversity ('Did the respondent eat a variety of foods within each of three main food groups – cereals and potato; fruits and vegetables; meat, fish, eggs, daal?'). As with the other nine questions, this question was scored 1 (adequate), 0.5 (minimally adequate), 0 (inadequate).
- **PREVALENCE OF SMOKERS IN HOUSEHOLD** (regressions 3 and 7): Very few women in the sample smoked, but in the majority of households there was at least one smoker. This is a binary variable assuming the value 1 if at least one household member smokes, 0 otherwise.
- **PREVALENCE OF FAMILY MEMBERS CHEWING BETEL NUT** (regressions 4 and 8): Similar to 'smokers in household', this variable assumes the value 1 if at least one household member chews betel nut, 0 otherwise.
- **USE OF SAFE COOKING/DRINKING WATER** (regression 9): This variable assumes the value 1 if the household uses a safe source of water (from tube well or water boiled) for cooking and drinking, 0 otherwise. We ran this regression on the urban sample only.

Which Explanatory Factors Matter?

We here summarize which explanatory factors (regressors) are statistically significant in explaining the nutrition-related outcomes:

- **FAMILY HIGHEST EDUCATION LEVEL:** We used three binary variables to define the household's highest education level. The coefficients indicate the impact relative to the reference education level of class 0 – 2. The first is that at least one member achieved class 3 – 5, the second class 6 – 9, the third class 10 and above. For the urban regressions, the second variable is class 6 and above. Higher education is positively and significantly associated with higher food security in the rural sample; it is not significant in the urban sample. Higher education is strongly associated with respondents reporting a greater diversity in their diets, both in the rural and urban sample. In the rural sample, higher education is associated with a lower prevalence of smokers in the household; there is no significant association in the urban sample. Higher education is associated with a lower prevalence of betel nut chewing in both samples.
- **NUMBER OF CIGARETTES CONSUMED PER DAY IN HOUSEHOLD:** There is a significant negative association between nutrition and extent of cigarette consumption in the rural sample. This is true whether nutrition is defined in terms of food security or diet diversity. There are no comparable significant results for the urban sample.

- **WOMEN WORKING OUTSIDE HOME IN PAID JOB:** As discussed earlier, this is probably a proxy for a household experiencing particularly low income. In the rural sample there is a significant negative association between a woman working outside the home and her food security. In the urban sample, working outside the home does not have a significant impact on food security, but it significantly reduces diet diversity and is strongly associated with use of unhygienic water for cooking/drinking.
- **SOURCES OF NUTRITION ADVICE:** Readers should be particularly cautious in interpreting these results. Nonetheless, the presence of a statistically significant association between a woman reporting she had received nutritional advice from a particular source is evidence that the nutritional advice from the source may have an impact.
  - The only significant association from advice given by family and neighbours occurs in the case of the decision to use hygienic water among the urban sample. The association is negative: implying that advice from this source is conducive to relying on unhygienic tap water.
  - Advice from doctors/nurses is significantly associated with greater food security and diet diversity among rural women. In the case of urban women, such advice is associated with use of sanitary water but counter-intuitively it is also significantly associated with *less* diet diversity.
  - Advice from home visits by community health workers is significantly associated in the rural sample with a lower prevalence of smokers in the household. However, this is the only statistically significant association between advice from community health workers and nutritional outcomes. We refer to this result in the next chapter and suggest better training for community health workers.
  - In the rural sample there is a significant positive association between women who explicitly referred to nutritional advice via the media (television, radio or newspaper) and better food security and diet diversity. In the urban sample women who referred to nutritional advice via the media were much more likely to use hygienic water.
  - There is no statistically significant association between women attending public meetings on nutrition and better outcomes, either in the rural or urban sample.
- **UNEQUAL INTRA-HOUSEHOLD DISTRIBUTION OF NUTRITIOUS FOODS:** Women who reported such inequality might be expected to have less food security and less diet diversity. There is no evidence to this effect among the rural sample. Counter-intuitively, among the urban sample is a significant, albeit weak, positive association of inequality and diet diversity.

- **FOOD PRICE INFLATION** as reason for reduced food consumption in previous year: Among the rural sample there is a strong significant association between women citing this reason and both less food security and less diet diversity. There is also a strong positive association with increased prevalence of chewing betel nut – perhaps as a hunger depressant. Among the urban sample are no statistically significant relationships.
- **FINANCIAL HARDSHIP** as reason for reduced food consumption in previous year: Among the rural sample there is a significant association between women citing this reason and both less food security and less diet diversity. Also, those citing this reason reported a lower prevalence of household smoking but a higher prevalence of betel nut chewing. Among the urban sample the only statistically significant association is that women reporting financial hardship are more likely to report a higher prevalence of betel nut chewing.

Table 4.1 Summary Regression Results, Rural Sample (n = 263)

	Food security (1.)	Diet diversity (Q6) (2.)	Prevalence of household smoking (3.)	Prevalence of betel nut chewing (4.)
Household's highest education, class 3-5: (1: highest is class 3-5; 0: otherwise)	2.1 (2.97)	2.7 (2.1)*	-1.2 (3.04)	-3.7 (2.9)*
Household's highest education, class 6-9: (1: highest is class 6-9; 0: otherwise)	2.4 (3.3)	2.6 (2.3)	-5.2 (3.4)**	-3.7 (3.2)
Household's highest education, class 10 and above: (1: highest is class 10 and above; 0: elsewhere)	4.6 (3.0)*	4.5 (2.1)***	-1.6 (3.1)	-1.3 (3.0)
Cigarettes consumed per day by household members (cardinal number)	-0.32(0.11)***	-0.11 (0.08)*		
Woman works outside home (1: works outside home; 0: otherwise)	-6.7 (3.6)**	-0.8 (2.5)	1.1 (3.6)	-2.3 (3.4)
Nutrition advice from family and/or neighbours (1: received advice from this source; 0: otherwise)	1.24 (1.6)	0.6 (1.1)	-0.13 (1.6)	-1.7 (1.5)

Table 4.1 Summary Regression Results, Rural Sample (n = 263) continued				
	Food security (1.)	Diet diversity (Q6) (2.)	Prevalence of household smoking (3.)	Prevalence of betel nut chewing (4.)
Nutrition advice from doctors, nurses and health clinics (1: received advice from this source; 0: otherwise)	7.8 (2.8) ***	4.4 (1.98)***	-0.5 (2.9)	-0.2 (2.8)
Nutrition advice from community health workers who visit home (1: received advice from this source; 0: otherwise)	-0.6 (1.89)	-0.7 (1.32)	-3.5 (1.9)**	-0.2 (1.8)
Nutrition advice from TV, radio, or newspaper (1: received advice from this source; 0: otherwise)	4.6 (2.35)***	5.25(1.65)***	-2.7 (2.4)	0.4 (2.3)
Nutrition advice from public meeting the women attended (1: received advice from this source; 0: otherwise)	2.2 (3.0)	0.1 (2.1)	2.7 (3.1)	-3.0 (2.9)
Unequal distribution of nutritious foods in household (1: unequal distribution; 0: otherwise)	-0.4 (1.98)	1.3 (1.4)		
Inflation as reason for less food consumption this year over last (1: this reason cited; 0: otherwise)	-4.05(2.1)***	-4.4 (1.5)***	0.2 (2.1)	5.7 (2.0)***
Financial hardship as reason for less food consumption this year over last (1: this reason cited; 0: otherwise)	-5.4 (4.1)*	-3.6 (2.9)*	-7.7 (4.2)**	9.3 (4.0)***
R^2	.14	.13	.04	.07
Adjusted R^2	.10	.10	.00	.03

Note: All regressands for Tables 4.1 and 4.2 are log of odds ratio of the respective outcome.
Standard errors in parentheses. Legend for one-tail significance: * 10%, ** 5%, *** 2.5%.

Table 4.2 Summary Regression Results, Urban Sample (n = 205)					
	Food security (5.)	Diet diversity (Q6) (6.)	Prevalence of household smoking (7.)	Prevalence of betel nut chewing (8.)	Use of hygienic water for cooking and drinking (9.)
Household's highest education, class 3-5: (1: highest is class 3-5; 0: otherwise)	2.3 (3.3)	3.3 (2.1)**	3.4 (3.0)	-3.04 (3.0)	-2.4 (2.3)
Household's highest education, class 6 and above: (1: highest is class 6 and above; 0: otherwise)	2.8 (3.3)	5.2 (2.1)***	2.8 (3.0)	-4.9 (3.12)*	-1.8 (2.4)
Cigarettes consumed per day by household members (cardinal number)	0.04 (0.1)	-0.07 (0.07)			
Woman works outside home (1: works outside home; 0: otherwise)	-1.8 (2.7)	-3.5 (1.7)***	-2.8 (2.5)	-0.4 (2.5)	-4.3(1.9)***
Nutrition advice from family and/or neighbours (1: received advice from this source; 0: otherwise)	0.2 (2.3)	1.4 (1.4)	-0.9 (1.96)	0.3 (2.0)	-2.6 (1.5)**
Nutrition advice from doctors, nurses and health clinics (1: received advice from this source; 0: otherwise)	-3.3 (3.1)	-4.4 (2.0)***	3.4 (2.9)	-1.02(2.97)	4.1 (2.3)**
Nutrition advice from community health workers who visit home (1: received advice from this source; 0: otherwise)	-1.1 (2.4)	-1.5 (1.5)	-2.4 (2.3)	-2.3 (2.3)	0.6 (1.8)
Nutrition advice from TV, radio, or newspaper (1: received advice from this source; 0: otherwise)	2.1 (2.4)	-1.03 (1.5)	-0.09 (2.2)	0.6 (2.3)	4.1 (1.7)***

Table 4.2 Summary Regression Results, Urban Sample (n = 205) continued					
	Food security (5.)	Diet diversity (Q6) (6.)	Prevalence of household smoking (7.)	Prevalence of betel nut chewing (8.)	Use of hygienic water for cooking and drinking (9.)
Nutrition advice from public meeting the women attended (1: received advice from this source; 0: otherwise)	1.7 (5.0)	-1.0 (3.2)	4.5 (4.7)	1.7 (4.8)	-1.8 (3.7)
Unequal distribution of nutritious foods in household (1: unequal distribution; 0: otherwise)	1.3 (2.5)	2.1 (1.6)*			
Inflation as reason for less food consumption this year over last or use of unhygienic water (1: this reason cited; 0: otherwise)	-0.05 (2.4)	-0.8 (1.5)	-0.3 (2.2)	-2.0 (2.2)	-1.4 (1.7)
Financial hardship as reason for less food consumption this year over last or use of unhygienic water (1: this reason cited; 0: otherwise)	-0.8 (11.9)	3.8 (7.6)	11.6 (10.9)	13.9(11.3)*	-1.95 (8.6)
Source of water for cooking and drinking (1: hygienic source; 0: otherwise)	2.2 (3.2)	0.1 (2.02)			
R^2	.02	.10	.05	.03	.09
Adjusted R^2	-.04	.03	.05	-.00	.05

Note: All regressands for Tables 4.1 and 4.2 are log of odds ratio of the respective outcome.
Standard errors in parentheses. Legend for one-tail significance: * 10%, ** 5%, *** 2.5%.

5. Policy Analysis

BANGLADESH HAS VERY FEW PROGRAMS TO IMPROVE OVERALL NUTRITIONAL status of low-income women. The 'National Nutrition Program' and 'Area based community nutrition program' are the two major programs initiated by the government. Both target pregnant and lactating women only. In Bangladesh only 50 per cent of women visit health facilities during pregnancy, and only 21 per cent visit facilities as part of post-natal care (World Bank, no date). Some NGOs currently provide food supplements ('*pushti*')[11] to underweight (BMI<18.5) pregnant women (Ortolano et al. 2003), but the coverage is limited.

Here we concentrate on five direct nutrition-related policies. However, several long-term policies will yield nutritional benefits given sufficient time. One obvious policy is to give priority to improved female school attainment; another is improvement in the overall primary health care system accessible by low-income women. Creating income-generating opportunities will also yield nutritional benefits.[11]

[11] '*Pushti*' is a bangla word meaning nutrition. This supplement consists of rice-flour, roasted pulse flour, molasses and oil; it provides approximately 600 kcal per day.

Option 1: Nutritional supplements

There are several ways to provide nutritional supplements, starting with provision of direct oral micronutrient supplements via a health care centre. Home food fortification through micronutrient sachets (popularly known as sprinkles) is an effective method practised among 6-24 month-old children in many countries. Sprinkles provide iron, zinc, iodine and vitamins (Micronutrient Forum 2008; WFP 2009). However the micronutrient sachets are designed for children aged 6-24 months, who consume

small amounts of food. More research is necessary to prove the effectiveness of sprinkles for adults (Sprinkles Global Health Initiative 2012). Grameen Social Business[12] is producing a fortified sweet yogurt (*'Shokti-doi'*) specifically designed for children. The price of this yogurt (Tk.7 in rural area and Tk.12 in urban area) is not easily affordable by poor people. Large scale production may reduce cost in the long run (Planète d'Entrepreneurs 2012).

For adults, fortifying staple foods is an effective tactic for providing nutritional supplements (Allen et al. 2006, World Bank 2011, Micronutrient Forum 2012). This tactic has the advantage of not requiring any change in population eating habits. A pilot project in Bangladesh identified wheat flour and edible oil as two potential vehicles for food fortification (Dary and Rassas 2004). In 2012, six edible oil refiners in Bangladesh started to fortify edible oil. The cost of fortified oil is predicted to be higher than the available edible oils in the market.[13]

In Bangladesh no initiative has yet been undertaken to fortify rice. Some countries[14] have mandatory rice fortification programs: a specific per cent of total rice production must be fortified and targeted for the poor. Four main technologies can be used to fortify rice: hot extrusion, cold extrusion, coating and dusting.[15] Cold extrusion and coating are the most cost-effective (Alavi et al. 2008). With coated rice, the nutrition value decreases if washed before cooking. Country case studies show that rice fortification will increase the retail price by 1.5 to 4 per cent (Alavi et al. 2008; World Bank 2011).

Almost none of the women sampled have heard about fortified food and sprinkles, while the consumption of iron tablets/syrups, vitamin tables, zinc and calcium tablet/syrup is limited to only a few. Given the lack of use and knowledge of nutritional supplementation, a potential government policy options should include the following elements:

- Subsidizing fortified rice to the poor such that its price is equivalent to the lowest price of unfortified rice for a period of at least the first year
- Popularizing fortified rice as an easy and cheap way to address vitamin and mineral deficiencies
- Promoting the popularity of fortified yogurt.

[12] A wing of 'Grameen Bank', Bangladesh.

[13] www.thefinancialexpress-bd.com/more.php?news_id=98443&date=2012-02-14.

[14] Examples are Philippines, Costa Rica and some states in United States. India, Indonesia and China have also successfully introduced pilot programs of rice fortification for specific marginal groups.

[15] Hot and cold extrusion produces rice shape kernels by mixing a rice made dough flours, a fortification mix and water either in hot (70-110°C) or in cold (below 70°C) temperature. Coating spread and layered fortification mix in wax or gum form on rice and dusting polish rice grains with micronutrient premix, stick with rice.

Option 2: Hygienic drinking water

According to the 2009 Multiple Indicator Cluster Survey, only 8.5 per cent of households in slum areas in Bangladesh use improved sanitation facilities that meet UNICEF monitoring standards (UNICEF 2012). Ahmed (2002) estimated the cost of treatment for hygiene-related diseases at Tk.640 crore per year. Our survey results show almost all rural and suburban women have access to either safe tube well water or boiled water. In the Uttara slum however, only 16 per cent use hygienic drinking water. Other studies (Podymow et al. 2003) have found similar results in Dhaka slums.[16]

No significant initiatives have been undertaken to supply safe water in urban slums in Bangladesh. In1999 the Bangladesh Association for Social Advancement (BASA), a local NGO, set up 15 tube wells for 700 people in slums in Gazipur, a suburban area near Dhaka city. This NGO has carried out another safe drinking water project in a slum located in Mirpur area of Dhaka.

Setting sufficient tube wells in slum areas to ensure that slum families can access hygienic water is an obvious policy response. Tube wells can be either deep or shallow. Deep tube wells are not suitable as they are expensive to drill and maintain.[17] Furthermore, urban slums are often transitory. Shallow tube wells are much less costly.

Large areas in Bangladesh face a risk of arsenic in tube well water (As-arsenic 2012). In such areas, low-cost purification tablets of surface water are a potential solution. ICDDR,B, the pioneer of diarrhoeal research in Bangladesh, recently invented 'siraj mixture', which effectively reduces the risk of diarrhoea (ICDDR,B 2012).[18] A single siraj mixture costs Tk.0.35 and purifies 15 liters. Water purification tablets in arsenic-affected regions may well be justifiable in terms of nutrition and improvements in overall health status, but our two sample populations live in areas not seriously affected by arsenic.

Option 3: Healthy food initiative through social enterprises

A social enterprise has two goals: to achieve social, cultural, community economic or environmental outcomes; and to earn revenue from sale of its service or product. A frequently cited example is Grameen/Danone Foods, a partnership between Grameen Bank and Danone, a French manufacturer of dairy products. The social enterprise manufactures a fortified yogurt (*Shokti-doi*) as means to introduce micronutrients into children's diet. The enterprise is expected to operate efficiently, raise its revenue through sales, but pose rigid limits on any dividends to the shareholders.

[16] In this study of three slums located in Mohammadpur, Lalbagh and Dhanmondi in Dhaka city the authors found 87 per cent of slum dwellers do not have access to safe drinking water.

[17] The cost of setting one deep tube well is approximately Tk.160,000 (Biswas 2004)

[18] The siraj mixture contains a precise combination of alum potash, bleaching powder and lime.

Very few women, in either sample, have adequate servings of vegetables, fruits and milk in their regular diet. Moreover many of them regularly consume unhealthy snacks such as *samosa*, chips, biscuits, *paratha* and different kind of sweets. These snacks are mostly deep fried, made of flour and potato. They are prepared without maintaining minimum standards of hygiene and cleanliness. Such snacks are cheaper than fruits and vegetables.

Access to fruits, vegetables and healthy snacks at a low cost will encourage people to buy them. This is a potential tactic for NGO-sponsored social enterprises. Such enterprises also create work opportunities for women. A relevant example is Mercy Corps, an Indonesian NGO. It has launched Kedai Balitaku (My Child's Café) selling through street vans in Jakarta.[19] The goal is to provide healthy foods to school children, while raising awareness and increasing economic opportunity among local people. The cost of one chicken, rice, vegetable porridge meal for a child is the equivalent of Tk.16. This initiative has become popular and has been spun off as a for-profit social enterprise. Nonetheless, this porridge must compete with the favourite local snack, a gelatin pop, almost always made with artificial fruit flavours and selling at half the porridge meal cost.

NGOs operating in Bangladesh could expand nutrition-enhancing social enterprises with pilot initiatives in at least two ways:

- Sell 'Jakarta model' cheap nutritious meals and snacks through street vans in cities;
- Initiate gardening to produce vegetables and fruits in the homestead gardens near homes in rural areas (if land is available). Women and children will work to produce fruits and vegetables for their households and community. NGOs can support the gardens via subsidized seeds, fertilizer and advice.

Option 4: Behaviour change through nutritional advice

In our survey, half of the women in the rural area and one-third in the urban area, received advice from health workers who visited them at home. Such advice did not appear to have any effect on nutritional outcomes. Inadequate nutritional knowledge among these health workers and lack of incentive to provide nutritional advice may be the explanation. On the other hand, there appears to be a positive relationship in all regions between women's nutritional outcomes and receiving advice from either the media or from doctors or nurses at health facilities. Media advertisements are generally attractive and eye-catching presentations.

Moreover there are many examples of health-related advice programs in Bangladesh dealing with specific health problems such as diarrhoea, tuberculosis, malaria, HIV, hygiene and cleanliness, and pre- and post-natal care of mother and children (BRAC 2012, Khandoker et al. 2009, UNI-

[19] The New York Times; May 23, 2011 (http://opinionator.blogs.nytimes.com/2011/05/23/in-food-deserts-oases-of-nutrition/)

CEF 2004). These programs may contribute to better nutrition indirectly, but few aim to promote healthy food preparation at low cost. So, the fourth policy option is the following:

- Incorporate education on healthy food selection and preparation, maintaining nutrition during inflation, and balanced diet with existing health education programs;
- Improve training of community health workers.

Option 5: Reducing consumption of tobacco

In two thirds of the sampled households at least one member smokes. In Bangladesh 43.3 per cent of the adults use tobacco products, either smoking or smokeless (GATT 2010). By contrast, in typical high-income countries one-fifth of adults smoke.[20]

Our statistical analysis demonstrates a significant negative association between women's nutrition and tobacco consumption in the household. As discussed earlier, consumption of tobacco may affect nutrition via several routes. The results point to a nutrition benefit – in addition to health benefits to those presently smoking – of programs combating use of tobacco. There are three general tactics to pursue: increasing the price of tobacco by taxation, restricting the advertising of tobacco and tobacco products, and restricting the shops allowed to sell tobacco products.

Tobacco is a cheap consumer products in Bangladesh. The price of a 20-stick packet of *bidi* is Tk.6. Even the price of a 20-stick pack of one of the most expensive brands of cigarette is less than Tk.100.[21] The tax rate on tobacco in Bangladesh has remained stagnant for almost 10 years (Unnayan Shamannay 2010).

A significant increase in the price of tobacco is probably the most effective way to reduce tobacco consumption and to encourage current users to stop smoking (WHO 2003, WHO 2009, Unnanyan Shamannay 2010). According to a WHO (2009) report, a 10 per cent increase in the price of tobacco reduces consumption by 8 per cent in low- and middle-income countries. The price elasticity of demand for cigarettes in Bangladesh has been estimated at -0.4 in the short run and -0.3 in the long run (Shamunnay 2010, Barkat et al. 2008). Poorer households may be more responsive to price changes than are rich households in Southeast Asia (Guindon 2003). Shamunnay (2010) estimates the price elasticity of *bidi* as -0.64. Nonetheless, demand for cigarette and *bidi* is inelastic: a tax increase will reduce consumption but will also result in an increase in total household expenditure on smoking. There is evidence (from Canada) that young adolescents are particularly sensitive to price, that the elasticity of taking up the smoking habit displays an elasticity between -1.5 and -2.0 (Sen et al. 2010). This suggests that,

[20] In Canada 20.8 per cent of the population aged 12 and above smoke (Statistics Canada, 2010).

[21] Monthly Statistical Bulletin, Bangladesh Bureau of Statistics, August 2010.

Table 5.1: Rates of Tobacco Taxes in Bangladesh, 2009			
Price segment	Price range (Tk.)	Tax rate	
		Supplementary duty	Value Added Tax (VAT)
Low*	14.60-17.60	32%	15%
Medium*	32.80-34.80	52%	15%
High*	46.72-58.72	55%	15%
Premium*	93+	57%	15%
Bidi (Akiz)**	6.00	20%	15%
Jorda, Gul***	2.00-4.00	10%	15%

Note: 1. * 20 cigarettes per pack; ** Handmade cigarettes of 25 sticks per pack; *** smokeless tobacco
2. 1 USD = Tk. 80.43
Source: PATT Policy Brief- 1, Unnayan Shamannay 2010.

intergenerationally, tobacco demand may be price elastic. But this is a very long-run policy. We do not recommend tobacco tax increases as an immediate policy.[22] While less effective than taxation, countries may legislate to ban tobacco advertisements and restrict sales. In Bangladesh there is no restriction on buying and selling of tobacco.

In Bangladesh the first major law on tobacco control ('The Smoking and Using of Tobacco Products Control Act, No XI, 2005') was passed in 2005 when Bangladesh became a party to the WHO Framework Convention on Tobacco Control. There are some restrictions on direct advertising of cigarettes, but tobacco companies can still advertise and sponsor popular events. According to the tobacco control law, health warning labels should cover 30 per cent of the tobacco package, but this too has not been adequately enforced (Campaign for tobacco free kids 2012). Though a majority of smokers know that smoking is harmful, very few are aware of specific health effects of smoking such as cancer, respiratory diseases, stroke and heart diseases (Efroymson and Ahmed 2003).

In summary, this policy option involves two elements:

- Restricting tobacco sold in specific areas such as near educational institutions.
- Legislating a ban on an all advertisement of tobacco and tobacco products.

[22] In 1997, South Africa increased cigarette tax by 52 per cent, and reduced consumption by 30 per cent. However, very high taxation of tobacco was not effective in Thailand: 80 per cent tax rate on cigarettes resulted in tax avoidance and large cigarette sales in the black market. In Bangladesh, where law enforcement is quite weak, high tobacco taxes may result in a large black market.

Criteria for Analysis

To assess how well the aforementioned policy options can be expected to impact women's nutrition, we used the following criteria. Most are measured informally.

Effectiveness

The effectiveness of each policy option will be measured in two ways: first, how effective will the policy probably be in reducing nutritional deficiencies among those targeted; second, how effective will the policy be in reducing the likelihood of women succumbing to disease. If a policy fulfills both objectives, it will score 'high'; if it fulfills any one objective, it will score 'moderate'; if it fulfills neither of the objectives, it will score 'low'.

Cost

This criterion estimates annual total cost and cost per beneficiary or unit of service. It involves the cost of implementing the specific policy by the relevant agency (either government or NGO) without any external funding support. Actual costs involved will vary with extent of corruption and quality of administration. However due to the difficulty of estimating these dimensions of cost, we have not allowed for them. Consequently, our cost estimates may be unduly low.

Administrative Feasibility

Here we assess whether the new policy requires hiring administrative staff, acquiring new physical facilities, enacting new legislation, and is susceptible to 'additional corruption'. The expected implementation time lag will also be considered:

- If the policy does not require additional staff, administrative changes and new infrastructure, does not increase the likelihood of 'additional corruption', does not require additional legislation and can start implementation fully within six months, it scores 'high'.
- If the policy requires some additional staffs, some administrative changes and infrastructure but does not increase the likelihood of 'additional corruption', does not require new legislation and can start implementation fully within one year, it scores 'medium'.
- If the policy requires a large additional staffs, significant administrative changes and infrastructure and/or increases the likelihood of 'additional corruption', requires new legislation and cannot start implementation fully within one year, it scores 'low'.

Public Acceptance

This criterion captures how the involved parties, such as the women themselves, their families and society in general, political parties, donors and businesses view the policy option:

- If the option is acceptable by all stakeholders, it scores 'high'.
- If the policy is acceptable by the general public but not by other stakeholders, it scores 'medium'.

- If the policy is accepted by none of the above, it scores 'low'.

Evaluation of Options

Nutritional Supplements Program

Since almost all women consume adequate servings from the cereals and potato group (primarily in the form of rice), fortified rice will probably be highly effective in combating micronutrient deficiencies – provided it sells at a price equivalent to non-fortified rice of similar quality. The average rice consumption among rural women sampled is 14.5 servings, for urban 10 servings.[23] The effectiveness of fortified food to reduce short-term deficiencies and prevent long term illness has been established in many countries. The high incidence of night blindness in Denmark during 1900 was reduced by fortifying margarine with vitamin A and D. Fortification of flour eliminated pellagra in United States and thiamin and riboflavin deficiencies in Newfoundland. Hotz et al. (2008) showed that the consumption of iron-fortified rice for six months resulted in 80 per cent reduction of iron-deficiency anaemia among female garment workers in Mexico.

Introduction of fortified rice will require adoption of new technologies by commercial rice producers. If the fortified rice is targeted to all households designated ultra poor, that implies a subsidy for 10 per cent of the total population.[24] The need for a partnership of government, international organizations and private rice producers may create new administrative complexities and some additional corruption.

The cost of rice fortification using cold extrusion comprises the cost of machinery, fortification mix, labour and the cost of rice. Building a cold extrusion rice factory with fortifying capacity of 30 thousand to 60 thousand metric tonnes per year will require Tk.6 crore (Alavi et al. 2008). This will increase the final selling price of rice by an estimated 2 per cent. Considering the current price[25] of coarse rice of Tk.30 per kg, fortification will increase the price of rice to Tk. 30.6 per kg. In Bangladesh, rice consumption per capita per day is 0.44 kg (Abdullah et al. 2006). The cost of subsidizing fortified rice for the ultra poor population is accordingly Tk.154 crore per

[23] 6 servings from cereals and potato group considered adequate.

[24] The NGO BRAC has identified the bottom 10 per cent population of Bangladesh through a program named 'Challenging the Frontiers of Poverty Reduction, Targeting the Ultra Poor'. The criteria include 'household's ownership of land (less than 10 decimals – or less than one tenth an acre), no active male income earners, dependency on begging or female domestic work, no ownership in productive assets and no support from children engaged in wage earning' (BRAC 2012). The government may receive support from international organizations like Global Alliance to Improve Nutrition. GAIN provided technological support in Brazil to fortify rice (www.gainhealth.org/press-releases/path-gain-partner-advance-rice-fortification-brazil-tackle-malnutrition-globally).

[25] Trading corporation of Bangladesh 2012.

year, equivalent to approximately Tk.500 per ultra poor household.[26]

However many women above the ultra poor threshold but still classified as extreme poor and better-off households also face micronutrient deficiencies. For these women, fortified yogurt may be a preferable option for micronutrient supplements. Selling fortified rice at a subsidized price to an additional 40 per cent of the population (includes all household members) will multiply by four the overall cost of the program.

Fortified rice produced through cold extrusion is opaque and slightly off-colour, but the taste does not change (Alavi et al. 2008). In India and other developing countries such as Cambodia and Nicaragua, fortified rice is widely accepted and performed well in terms of taste. In Bangladesh the social acceptance of fortified food will be high. An initial marketing campaign might be helpful.

Implementing a subsidized rice fortification program targeted to the ultra poor poses a serious threat of additional corruption. There may be useful lessons from the Female Stipend Program, which provides an incentive to low-income families that keep their daughters in school. Initially, the subsidy was given in the form of rice; subsequently, the subsidy has been in cash. Potentially, the subsidy could be given to targeted families via coupons enabling a discount on purchases of fortified rice.

[26] The reported Tk.154.2 crore = 16 million (10% of Bangladesh total population) x 2% x Tk.30 (cost of fortification) x 0.44kg/capita/day x 365 days/year. The per household estimate assumes an average of five persons per household.

Providing Hygienic Drinking Water

A 2003/04 study of 225,000 in a rural area in Bangladesh showed that households with greater tube well density reported significantly lower incidence of diarrhoea (Carrel et al. 2011). The effectiveness of 'siraj' mixture has been proved through a randomized control trial in rural Bangladesh (Islam et. al. 2011). Among the treatment group with 'siraj' mixture only 0.2 per cent were subject to diarrhoea, among the control group 5.12 per cent.

If one tube well is set for 10 households, then approximately 100,000 wells are required for all urban slums. We estimate the initial capital cost at Tk.75 crore. Based on a levelized cost calculation, we estimate the annual total cost of tube wells in slums at Tk.13.9 crore, which is equivalent to an annual cost per slum household of Tk.140.[27] The initial cost of setting up tube wells is

[27] The estimated number of slum households in urban areas in Bangladesh is 1 million (Centre for Urban Studies, Bangladesh 2005). According to Water Aid (2012) each shallow tube well can be shared by 10 households. The cost of pipes and hand pump of one 30 feet shallow tubewell is estimated at Tk.6,000. Additional cost of drilling and digging is estimated at Tk.1,500. www.wateraid.org/uk/get_involved/community_groups/schools/buckets_of_water/5422.asp. Considering the average cost of one shallow tube well installed to be approximately Tk.7,500, the total cost will be Tk.75 crore (= 1,000,000 households / 10 households per well x Tk.7,500 per well). Assume the levelized annual capital cost at Tk.7.5 crore. Add Tk.6.4 crore as an estimate of annual operation and maintenance costs. This implies an annual cost per slum household of Tk.139 (= Tk.13.9 crore / 1,000,000 households).

high, but the levelized annual cost per slum household is low.

One packet of siraj mixture purifies 15 liters of water and costs only Tk.0.35. However, 29 million people are exposed to groundwater with arsenic levels above the Bangladesh standard (50 microgram/liter) and 49 million above the WHO recommended level (10 microgram/liter) (Ahmed and Rahman 2011). The cost of providing 'siraj mix' to this group will be nearly Tk.100 crore per year. The annual cost per household is slightly over Tk.100.[28] Again, the annual cost is high, and the cost per affected household low. The cost to government depends obviously on the extent of subsidy and total demand, which will depend on the willingness of families to pay the residual cost.

Setting up approximately 100,000 tube wells requires large scale administrative coordination. Primarily the decisions will be taken by the Water Resources Planning Organization (WARPO) and will be implemented by relevant city and municipal corporations. In some cases, NGOs may take the initiative. No additional employees need be hired beyond the labour to set up tube wells and maintain them. Maintenance costs will be low if supervision is good; however, it may well not be. Similar administrative problems may complicate organization of a large-scale subsidized 'siraj' program. We rate the administrative feasibility as medium.

The public acceptance of tube wells will be high as people in Bangladesh are already aware of the benefit of tube well water over other sources. Public acceptance of siraj mix requires a publicity campaign. If people need to buy it, acceptance will be low. If government distributes the mixture free of cost, public acceptance will be high.

Healthy Food Initiative Through Social Enterprises

The cost of a van for selling healthy food and snacks will be approximately Tk.15,000. There will be additional costs for cooking, storing and serving food of about Tk.4,000 per month.[29] A reasonable estimate of cost per meal is Tk.20, which implies 2,500 meals served per van per year. Probably, the cost of food and the salary of a van driver can be covered by the revenue of food sold. Initially a pilot project in Dhaka might involve 10 vans that move around slum areas, garment factories and schools, locales where the urban poor and their children generally buy food. Ultimately, success will depend on public acceptability of the food van offerings. The availability

[28] In Bangladesh 46.4 million people (= 29 per cent x 160 million) live in arsenic-contaminated areas (People's Daily Online, 2007). An adult person needs to drink 2.5 litres water per day. One siraj mix purifies 15 litres water. The total cost of siraj provision is Tk.98.4 crore (= Tk.0.35 x [(46.4million x 2.5liters/day x 365days/year)/15liters/mix). Assuming five people per household, the average annual cost/household is Tk.106 (= Tk.98.4 crore / [46.4 million / 5 members/household.)

[29] These estimates summarize our initial investigation. Assume a levelized annual cost of the van as Tk.1,500. This implies a total annual levelized cost per van of Tk.49,500 (= 1,500 + 12 x 4,000).

of healthy foods does not ensure that people will purchase it.

Family gardens may be the major source of micronutrients for low-income rural women who do not work outside the home, and have access to unused land. During 1986, CARE Bangladesh, a NGO, launched a pilot project, 'Local Initiatives for Farmers', in the district of Gaibandha and Tangail to promote homestead horticulture among landless and marginal farmers who own a little land beside their home. The benefits according to the participants were increased earnings and more adequate consumption of vegetables and fruits (Midmore et al. 1991). After CARE's withdrawal of support, this project did not unfortunately survive. The cost of household gardens will be low as gardens are located in homestead and underutilized lands in villages and suburban areas. The initial cost of a household garden will be seeds, plants and fertilizers. Households with domestic animals can use dung as fertilizer.

There are moderate administrative costs to start up a healthy snack van or household garden project. Some new employees are needed to manage all these initiatives. Public acceptance is uncertain in advance. However considering the success of the Jakarta food vans, public acceptance can be considered as medium in urban areas. The public acceptance of household gardening by low-income women might be high as it increases their earning and vegetable consumption potential.

Both are projects suitable for NGOs not government. The effectiveness of community gardens as means to improve women's nutritional status is probably higher than street van food projects. We accord a 'high' effectiveness score to community gardens; a 'low' score to street van food.

Achieving Behaviour Change Through Nutritional Advice

In our study, those receiving nutritional advice from doctors and nurses in health facilities appeared to benefit. However it is beyond the scope of this study to assess the potential of increasing the supply of professional health care providers.

In many developing countries health education through community health workers has proved effective (WHO 2007). By contrast, our analysis showed no statistical impact from advice given in home visits by community workers. Currently many community health workers in Bangladesh work on a voluntary basis for NGOs, notably for BRAC. In the case of BRAC, the incentive to become a voluntary health worker is easy access to microcredit and other services BRAC offers, and to earn income from selling certain pharmaceutical drugs (Prashad et al. 2007, Ahmed 2008). Currently BRAC has 80,000 unpaid volunteer health workers and 8,000 paid community health workers (BRAC 2012). To be effective, the community health workers need basic dietary training, which would impose costs on BRAC. Furthermore, to provide an incentive for health workers to provide nutritional advice independent of selling drugs, payment of a modest salary to all health workers is probably necessary. The cost of such upgrading of the BRAC health

worker program is high relative to the financial resources available to BRAC.

Providing nutritional advice via media, notably television, appears to have a beneficial impact. Such programming on a widespread basis involves high cost.[30] Currently, there is no discount on advertising rates charged for public awareness television advertisements broadcast by channels in Bangladesh (Ahmed 2011). However, given the high profitability of private television companies, the government could probably oblige private television companies to broadcast health education spots at no or low public cost.

Evaluation of Tobacco Control

Public anti-tobacco campaigns featuring bans on tobacco advertising and restrictions on tobacco sales do reduce consumption intergenerationally. But their short-term impact is likely modest. Countries that have achieved large reductions in the prevalence of smoking have maintained ongoing campaigns for several decades (Willemsen and Blij 2012). In South Africa, for example, strong legislation banning all advertisement and restricting sale of cigarettes among non-adults reduced cigarette consumption by 4 to 7 per cent among different groups of people from 1993 to 1999. Given the strong link in our survey between extent of smoking among family members and lower nutrition among women, we are reluctant to dismiss anti-tobacco campaigns as 'low' in effectiveness; we award them a 'medium' effectiveness score.

The public support of an aggressive anti-tobacco campaign will be medium. A large per cent of adults smoke, but there is wide civil society support for some restrictions on the industry. There is no direct cost to government upon banning advertisements. New inspectors may be necessary to impose restriction on tobacco selling, which adds some modest cost for government. The key obstacle is opposition from the tobacco industry and media outlets receiving revenue from tobacco advertising. Given the likely extent of such opposition, the administrative feasibility of imposing tobacco control policies is currently low.

[30] The cost of TV commercials per minute is Bangladesh varies between Tk.40,000 – Tk.60,000. This increases by factors of five during major national and cultural festivals (The Daily Star 2010).

Table 5.2. Summary Policy Evaluations

Policy Options	Effectiveness	Cost (Taka)	Administrative feasibility	Public acceptance
1. Nutritional supplements (fortified rice)	High (among government options)	Annual cost: Tk.154 crore Annual cost per household: Tk.960 (bottom 10 per cent of population)	Medium	High
2. Hygienic water for urban slums (setting shallow tube wells or providing 'siraj mixture')	High (among government options)	Annual levelized cost of tube wells: Tk.13.9 crore Annual cost per household of tube wells: Tk.140 (for urban slums where arsenic concentration low)	Medium	High
3. Healthy food initiative through social enterprises				
Jakarta model food van (urban)	Low (among NGO options)	Annual cost per van: Tk.49,500 (10 van pilot project) Cost per meal: Tk.20	Medium	Medium
Household gardens (rural)	High (among NGO options)	Low cost to sponsoring NGO	Medium	High
4. Nutritional advice				
Improve training of community health workers	High (among NGO options)	High cost relative to typical NGO budget, unless NGO obtains explicit donor support	Medium	High
Television advertisement	Medium (among government options)	Low cost for government, provided media outlets agree to broadcast messages as public service; high, otherwise	Low	High
5. Tobacco control				
Restrictive selling	Medium (among government options)	Low cost for government	Low	Medium
Advertisement ban	Medium (among government options)	Low cost for government	Low	Medium

6. Conclusion

OUR RECOMMENDATION TO GOVERNMENT AND TO NGOS IS TO PURSUE AS first priority those options rated 'high' in terms of effectiveness. While our ratings are admittedly informal, the four options rated 'high' in effectiveness unambiguously address key nutritional problems, are low cost in terms of cost/household targeted or unit of service provided, could be initiated reasonably quickly, and do not face insurmountable administrative difficulties or public opposition.

The government is the main institution to implement new programs. However, over the last two decades, NGOs have made significant contributions to improve social conditions for the marginalized population. Micro-credit, non-formal education, basic health care services, social enterprises and women's empowerment programs are examples of NGO activities. Funding of NGOs comes through overseas donors and, to a limited extent, through cross-subsidization from profitable business ventures (such as micro-credit) undertaken by the NGOs themselves (Davis 2006). Given the limited administrative capacity and limited public mandate of the NGOs, large-scale public programs are primarily in the government's domain.

We have divided policy options between those better implemented by the government and those better implemented by NGOs. However, the distinction is not absolute. It may be feasible for government to contract with slum community leaders for the maintenance of shallow tube wells in slums. Government might also choose to mount a program providing nutritional training to community health workers. Also, our effectiveness evaluations may be wrong. The Jakarta model for selling nutritious food in urban areas might, for example, prove more effective than we concluded.

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APPENDIX A

Survey Questionnaire

Diet Recall:

We would like to ask you about the food you personally ate in the last 24 hours.

1. Looking at the **largest** of the cups provided, how much of each type of food did you personally eat yesterday? (cooked volumes). If you did not eat any category keep blank under number column.

   [Be sure to emphasize the idea of a full day's set of meals – early morning to evening.]

	Breakfast	Lunch	Supper	Others
Rice [large cups]				
Lentil (Daal) [large cups]				
Beef/Mutton/ lamb [small cups]				
Chicken/ other birds [small cups]				
Egg [number]				
Fish [small cups] a) b)	 a) b)	 a) b)	 a) b)	 a) b)
Leafy vegetables/shak [small cups] a) b) c)	 a) b) c)	 a) b) c)	 a) b) c)	 a) b) c)
Other vegetables [small cups] a) b)	 a) b)	 a) b)	 a) b)	 a) b)
Potato [small cups]				

	Breakfast	Lunch	Supper	Others
Milk [small cups]				
a) Powder milk (mixed with water)	a)	a)	a)	a)
b) Liquid milk	b)	b)	b)	b)
Butter [small cups]				
Yoghurt/ Cheese [small cups]				
a) Sweet Yoghurt	a)	a)	a)	a)
b) Sour Yoghurt	b)	b)	b)	b)
c) Cheese	c)	c)	c)	c)
Tea/Coffee [actual cups consumed]				
a) Tea with milk and sugar/ condensed milk				
b) Tea with sugar and without milk				
c) Tea with milk and without sugar	a)	a)	a)	a)
d) Tea without milk and sugar (e.g. lime tea/ ginger tea)	b)	b)	b)	b)
	c)	c)	c)	c)
Bread/ Roti [pieces]				
Fruits [pieces]				
a)	a)	a)	a)	a)
b)	b)	b)	b)	b)
c)	c)	c)	c)	c)
Snacks (halka/faltu foods, like chips/ shingara) [pieces]				
a)	a)	a)	a)	a)
b)	b)	b)	b)	b)
c)	c)	c)	c)	c)
Others [list and record units]				
a)	a)	a)	a)	a)
b)	b)	b)	b)	b)

2. How do you identify your own or your household's cooking in terms of oil?

- ❑ More oily
- ❑ Less oily

3. Compared to last year at this time, how have you changed your regular food diet? (Put √ on appropriate box)

	I eat more of this food than last year	I eat the same amount of this food as last year	I eat less of this food than last year	I have started eating this food recently	I no longer eat this food
Rice					
Lentil (Daal)					
Beef/mutton/ lamb					
Chicken/ other birds					
Egg					
Fish a) b)					
Leafy vegetables/shak a) b) c)					
Other vegetables a) b)					
Potato					
Milk a) Powder milk (mixed with water) b) Liquid milk					
Oil					
Butter [woodblock]					
Yoghurt/ Cheese a) Sweet Yoghurt b) Sour Yoghurt c) Cheese					
Tea/Coffee [Actual cups consumed] a) Tea with milk b) Tea with condensed milk c) Tea without milk					

	I eat more of this food than last year	I eat the same amount of this food as last year	I eat less of this food than last year	I have started eating this food recently	I no longer eat this food
Bread/ Roti					
Fruits a) b) c)					
Snacks (halka/faltu foods, like chips/ shingara) a) b) c)					
Others [list] a) b)					

4. If you have stopped eating, or are eating less of, particular food(s), what are the reasons? (can check √ multiple reasons)

- ❑ Don't like them
- ❑ Overall, food prices are higher and decided to buy less or cut out some foods
- ❑ Household members changed.
- ❑ Other, please specify _____

* *[If the respondent mentions 'high prices' in question 4, please do question 5 and 6, otherwise go to question 7].*

5. How serious a problem has been higher food prices for you and your household? (put √ on appropriate box)

- ❑ Very Serious
- ❑ Serious
- ❑ Somewhat serious
- ❑ No problem at all

6. How have you adjusted to the high food prices? (can check √ multiple reasons)

- ❑ I ate less
- ❑ Everyone in the family ate less

- ❑ Buy lower quality foods
- ❑ Spent less on non-food items
- ❑ Working family members earning more
- ❑ New family members are working. Who? _____
- ❑ Moved to city
- ❑ Sold assets
- ❑ Borrowed money from _____
- ❑ Stopped sending one or more children to schools
- ❑ Received help from the government/ NGOs/ school stipend

7. Who eats fish/ meat/ milk/ fruits in your family? (put √ on appropriate box or boxes)
   - ❑ Everybody does, but varied amounts for different family members
   - ❑ Everybody does, about the same amount each
   - ❑ My husband gets more
   - ❑ My children get more
   - ❑ I get more than others

Sources of minerals and vitamins:

8. As you may know, we need certain minerals and vitamins to be healthy. I would like to ask you whether you are eating/consuming any of the following. (Put √ on appropriate box)

	Regularly	Not regularly	When I am pregnant or nursing my children	Never	Don't know
Iodized Salt					
Calcium Tablets					
Fortified Yogurt					
Vitamin tablets					
Sprinkles					
Zinc tablets or syrup					
Iron tablets or syrup					
Other supplements or fortified foods					

Hygiene and cleanliness:

9. Where do you usually get water for different everyday uses? (Put √ on appropriate box).

	Drinking?	Cooking?	Washing Clothes?	Bathing/ hand washing?	Dish washing?
Government (tap, hose)					
Tube Well					
Stored rain water					
River/Pond					

10. Do you boil water before drinking?

- ❑ Yes
- ❑ No

11. What is your toilet facility? (Put √ on appropriate box)

- ❑ Here and there
- ❑ Open hole
- ❑ Drain to pond/canal/ river
- ❑ Hanging latrine (over water)
- ❑ Pit (with cement)
- ❑ Ring slab
- ❑ Sanitary
- ❑ Other (specify): _____

Smoking and Betel-Nut chewing:

12. How many members of your household smoke, including you? _____

[If none put o, go to Question 16]

13. How many cigarettes/ *bidis* do you think members of your household smoke in a day?

	Number/ Range of numbers
Self	
Husband	
Children	
Others	

14. Among members of your household who presently smoke, do they smoke more or fewer cigarettes/ *bidis* in a day now than they did one year ago? (Put √ on appropriate box)

- ❑ More
- ❑ Fewer
- ❑ Same

15. Is there any member of your household who started smoking within the last year (started smoking)?

- ❑ Yes
- ❑ No

16. Is there any member of your household who smoked earlier but does not smoke now (stopped smoking)?

- ❑ Yes
- ❑ No

17. If your household smokes less, or any member stopped smoking, what was the reason? (can check √ multiple reasons).

- ❑ Worried about health
- ❑ Too expensive
- ❑ Prices of other foods are higher now
- ❑ Religious reasons
- ❑ Disapproval of family/ community
- ❑ Other, please specify:_____

18. How many members of your household chew paan, including you? _____

[If none put 0, go to Question 22]

19. How many times a day does your family members take paan?

	Number/ Range of numbers
Self	
Husband	
Children	
Others	

20. Among members of your household who presently take paan, do they use more or less paan in a day now than they did one year ago?

- ❑ More
- ❑ Less
- ❑ Same

21. Is there any member of your household who started taking paan within the last year (started)?

- ❑ Yes
- ❑ No

22. Is there any member of your household who used paan earlier but does not use it now (stopped)?

- ❑ Yes
- ❑ No

23. If your household uses less, or if any member stopped using paan, what was the reason? (can check √ multiple reasons).

- ❑ Worried about health
- ❑ Too expensive
- ❑ Prices of other foods are higher now
- ❑ Disapproval of family/ community
- ❑ Other, please specify _____

Awareness/ Education:

24. People around you, like your family members/ doctors/ health workers may talk about health/ nutrition/ smoking etc. Also you may see programs on TV regarding these. Have you received advice on these different things from any of these sources? (Put √ on appropriate box).

Received advice from	Healthy food?	Managing healthy food during price increase?	Sanitation?	Smoking?	Chewing paan?
None					
Husband					
Other family members/ Relatives					
Neighbours					
School Teachers					

Received advice from	Healthy food?	Managing healthy food during price increase?	Sanitation?	Smoking?	Chewing paan?
Health facilities/ Doctor/ Nurse					
Health/ Community workers came to house					
Religious leader					
Television					
Radio					
Newspaper					
Posters					
Public meeting with health workers					
Others (please specify)					

25. When you get together with other women do you discuss any of the following things? (can check √ multiple reasons)

- ❑ Health issues/ problems
- ❑ Nutritious food
- ❑ No, we don't discuss any of the above issues *[if this is the answer move to question 28]*

26. How often do you discuss those issues?

- ❑ almost every day
- ❑ 2-3 times a week
- ❑ once a week
- ❑ once a month
- ❑ once a year or less often

27. Where do you meet?

- ❑ family home
- ❑ community center
- ❑ children's school
- ❑ near tube well/ water tap/ pond/ river
- ❑ other, please specify:

28. Would you be interested in health classes at Oasis Medical Center?

- ❑ Yes (proceed to next question)
- ❑ No (go to question 30)

29. Which of the following classes interest you? (can check √ multiple reasons)

- ❑ healthy pregnancy care
- ❑ infant feeding
- ❑ breastfeeding
- ❑ child feeding
- ❑ family feeding
- ❑ using ORS
- ❑ immunizations
- ❑ diet
- ❑ diabetes
- ❑ blood pressure
- ❑ joint pain
- ❑ weakness, headache, dizziness
- ❑ family planning
- ❑ healthy eating for weight
- ❑ other:

Assets/ Wealth and Income:

[Note to the surveyor: Fill out question 30 and 31 by yourself (without asking the respondent)]

30. Material of the house in which the respondent is living: (Check √ multiple boxes if house made with more than one material)

- ❑ Mud
- ❑ Tin
- ❑ Bamboo
- ❑ Plastic
- ❑ Other (specify): _____

31. Does the house in which the respondent is living have electricity?

[The surveyor can look at whether any electric wear is outside the house]

- ❑ Yes
- ❑ No

32. Who owns the house in which you are living? (Put √ on appropriate box)

- ❏ You or your husband
- ❏ Rented house
- ❏ Sharing houses with others not paying rent
- ❏ Other (specify) _____

33. Which of the following things do you/ your household own? Note: Assets will include only the currently usable ones. [*The surveyor should use common sense in filling out this section*]. Put 'o' if they do not have any.

Type of Assets	Numbers	Comments
Homestead Land (in 'katha')		
Cultivable Land (in 'katha')		
Chicken/ Duck/ Pigeon		
Goat/ Lamb		
Cow		
Mosquito Net		
Land/ Mobile phone		
Radio		
Fan		
TV		
Bicycle		
Rickshaw		
Motorbike		
Other vehicle (please specify)		
Refrigerator		
Computer		
DVD player		
Internet		
Other important asset (specify)		

34. How do you assess the situation of overall food adequacy of your family/ household?
(Put √ on appropriate box)

Current situation	Situation one year before
❑ Enough	❑ Enough
❑ Sometimes not enough	❑ Sometimes not enough
❑ More than enough	❑ More than enough
❑ Never enough	❑ Never enough

35. If your family/ household had more money, how would you spend it?
(Put √ on appropriate box)

- ❑ buy more rice
- ❑ buy other foods
- ❑ buy some vitamin/ mineral supplements
- ❑ spend on clothing
- ❑ spend on children's education
- ❑ spend on health treatments
- ❑ buy a radio/ television
- ❑ repair house
- ❑ save for future
- ❑ repay debt
- ❑ other, specify _____

Demographic and Socio-Economic Status:

36. Name of the respondent (Optional): _____

37. Height (centimeters): _____ Weight (kilograms): _____

38. How many members are in your household? (write down numbers): _____

39. Family members' information:

Member of the household	Age (in years)	Can read? (Y = Yes N = No)	Highest class attended (in numbers)	Occupation	Hours worked per day	School attendance of children	
						C / F	If C, then A/ M/ S
Respondent							
Husband							
Child 1							
Child 2							
Child 3							
Child 4							
Other members							
1.							
2.							
3.							
4.							

Note: C = Continuing to the school, F = Finished at school
A = Always, M = Most of the days, S = Stopped attending for some days

40. If one or more of your children has stopped attending school, what was the most important reason? Any other reason? Keep going...

[Note for the surveyors: Rank the most important reason as 1, the second most important reason as 2, etc].

- ❏ We could not afford the costs of school (such as tutoring, school supplies)
- ❏ The child was not interested in school work
- ❏ We needed the child to help with housework (such as caring for younger children)
- ❏ We need the child to earn some money for the family
- ❏ Other (please specify): _____

48. Any important observation by the surveyor: _____

_____

_____

_____

[Questions to ask of local merchants]

We are interested to know about the food price changes compared to the last year. Women may not properly know the price if the male member(s) of the household purchased the necessary commodities. The shopkeepers near the house may ask about their selling prices. The surveyors are advised to take help from the local people. The number of shopkeepers interviewed may vary on the basis of spread of the interviewed households and the availability of shops nearby. Please write down the selling prices by the local shops of the following commodities. If don't know put 'o'.

Commodity	Current price (taka)	Price one year before (taka)
Rice		
Lentil (Mosuri Daal)		
Flour		
Chicken		
Beef		
Fishes: a) b) c)		
Egg		
Potato		
Onions		
Oil		
Milk a) Powdered milk b) Liquid milk c) Condensed milk		
Sugar		
Salt		

APPENDIX B

Food Scoring Method

We used a modified version of the ten-question food scoring instrument proposed by the WHO (2001). Below are the ten WHO questions and detailed notes on our scoring procedure.

Legend

s: serving
cup: one cup is 250 ml.
tsp: tea-spoon

Q1: Did the individual eat at least 6 servings from the cereals and potato group?

- s ≥ 6 from cereals and potato group: 1 point
- 3 ≤ s < 6 from cereals and potato group: 0.5 point
- s < 3 from cereals and potato group: 0 point

where

- ½ cup cooked rice = 1 serving
- ½ cup potato (cooked/ fried) = 1 serving (not considered in vegetables group)
- 1 roti/bread = 1 serving
- 1 pitha/ pan cake/ cup cake = ½ serving
- 1 cup puffed rice/ chips = ½ serving
- 1 biscuits = 1/3 serving

Q2: Did the individual eat at least 5 servings from vegetables and fruits group?

- s ≥ 5 from vegetables and fruit group: 1 point
- 2.5 ≤ s < 5 from vegetables and fruit group: 0.5 point
- s < 2.5 from vegetables and fruit group: 0 point

where

- ½ cup vegetables = 1 serving
- 1 banana or 1 apple or 1 orange or 1 mango = 1 serving
- ½ cup grapes/ jack fruit = 1 serving

Q3: Did the individual have at least 2 servings from the milk products group?

- s ≥ 2 from milk products: 1 point
- 1 ≤ s < 2 from milk products: 0.5 point
- s < 1 from milk and milk products: 0 point

where

- 1 lcup milk = 1 serving
- 4 small cups tea (with milk) = 1 serving of milk

We considered 1 large cup of tea (250 ml, used in the survey) equivalent to 4 small cups of tea. Lower income people in Bangladesh usually use small cups. We assumed each cup of tea contains some milk and the milk in 4 cups equals one milk serving.

Q4: Did the individual eat at least 1 serving from meat and alternatives group (meat, fish, eggs, daal or other pulses)?

- $s \geq 1$ from meat and meat alternatives group: 1 point
- $0.5 \leq s < 1$ from meat and meat alternatives group: 0.5 point
- $s < 0.5$ from meat and meat alternatives group: 0 point

where

- ½ cup of meat (any kind) = 1 serving
- ½ cup fish (any kind including dried fish/ shutki) = 1 serving
- 1 egg = 1 serving
- ½ cup daal or other pulses = 1 serving

Q5: Did the individual consume fewer than 2 servings from the fat, oils and sugar group?

- $0 \leq s \leq 2$ from fats, oils and sugar group: 1 point
- $2 < s < 4$ from fats, oils and sugar group: 0.5 point
- $s \geq 4$ from fats, oils and sugar group: 0 point

where

- 2 tsp of oil = 1 serving
- 2 tsp butter = 1 serving
- 2 tsp sugar = 1 serving

For this question we made the following detailed scoring assumptions:

- 1 biscuit = ½ serving from fat, oil, sugar group
- 1 packet chips = 1 serving from fat, oil, sugar group
- 1 large cup of tea or 4 small cups of tea = 2 servings of sugar (assuming 1 tsp sugar per small cup)
- 1 cup halka/faltu food = 1 serving of fat, oil, sugar group
- 1 pitha/ pan cake = ¼ serving from fat, oil, sugar group (lower income people generally prepare pitha with or without oil, but sugar/gur is a common ingredient. As types of pitha were not specified in the survey, we assumed each pita contributed a small portion of a fat, oil, sugar group serving)
- 1 puri/ samosa/ singara = ¼ serving of fat, oil, sugar group

We also assessed the impact of meat, fish, vegetables, eggs and daal consumption on the fat, oil, sugar group. In Bangladesh, most people use oil (as much as they can!) when they prepare curries. Also meat and fish contain fat:

- 1 cup of meat = ½ serving of fat, oil, sugar group
- 1cup of fish = ½ serving of fat, oil, sugar group
- 1 cup of vegetable = ½ serving of fat, oil, sugar group

- 1 cup of daal = ¼ serving of fat, oil, sugar group (usually less oil use to cook daal than curry)
- 1 egg = ½ serving of fat, oil, sugar group (fried is the most common means to consume eggs for lower income people) where 1 cup egg = 2 eggs
- 1 sweet = 1 serving from fat, oil, sugar group

Q6: Did the individual eat a variety of foods within each of four main food groups ([1] cereals and potato, [2] fruits and vegetables, [3] meat, fish, eggs, daal) [4] milk and milk products?

- 2 items in each of 4 food groups: 1 point
- 2 items in each of 2 or 3 food groups: 0.5 point
- 2 items in 0 or 1 food group: 0 point

Very few low-income Bangladeshi consume a variety of milk products. To include this group, as recommended by the WHO, would have generated unreasonably low scores on this question.

Q7: Did the individual eat at least 2 fresh vegetables?

- 2 or more fresh vegetables: 1 point
- 1 fresh vegetable: 0.5 point
- 0 fresh vegetables: 0 point

Here I considered leafy and other vegetables in terms of number of items, as opposed to quantity of servings.

Q8: Did the individual eat at least one fresh fruit?

- 1 or more fresh fruit: 1 point
- 0 fresh fruit: 0 point

As for Q7, we considered number of items, not quantity of servings. We awarded no intermediate 0.5 scores to this question.

Q9: Did the individual eat mostly nutritious snacks?

- 0 snacks and 1 fruit: 1 point
- 0 or 1 processed snacks (shingara, samosa, puri, packet of chips) plus 1 or more fruit: 1 point
- 1 or 2 processed snacks plus 1 or more fruit: 0.5 point
- 2 processed snacks plus 1 or more fruit: 0 point
- 0 or 1 biscuit and 1 or more fruit: 1 point
- 1 or 2 biscuits plus 1 or more fruit: 0.5 point
- 2 biscuits and 1 or more fruit: 0 point
- 0 – 2 pitha and 1 or more fruit: 1 point
- 2 – 3 pitha and 1 or more fruit: 0.5 point
- 3 pitha and 1 or more fruit: 0 point

As snacks we considered the halka/faltu foods. Respondents reported consuming biscuits, chips, shingara, samosa, puri, pitha, puffed/beaten rice (khoi/chira) as snacks. We gave more points if the foods

contain hygienic/nutritious items and were probably produced in hygienic situations. Shingara, samosa, puri, and chips are widely available in Bangladesh; however they are often cooked in unhygienic situations by street vendors, and most contain lots of oil. Pithas (sweet breads or pastries) are mostly home-cooked in more hygienic situations and contain less oil. We considered fruits as potential snacks.

Q10: Did the individual consume mostly lean or low fat content foods?

This question was scored identically to Q5.

APPENDIX C

Income and Asset Index Calculation

The survey provided data on the occupation of each member of the household and hours worked per day: full time worker (5 hrs or more per day); part time worker (less than 5 hrs per day). We categorized the occupations into six categories:

- Agricultural labour
- Other labour
- Business
- Official jobs (including driver)
- House worker (maid servant)
- Garment worker

Data for the daily wages for each category are taken from the Bangladesh Bureau of Statistics. We multiplied the hours of work times the estimated wage to get wage per day. For each profession we considered 24–30 working days per month. We summed the income of all members in the household to calculate the annual household income.

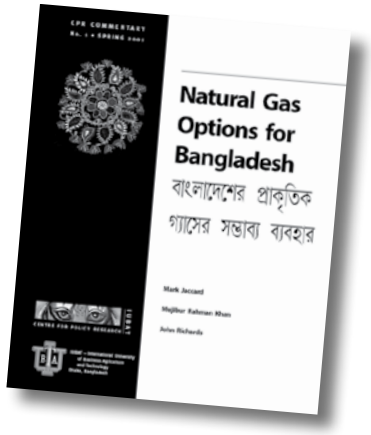
To estimate income from family-owned assets we included cultivable land, cows, chickens, ducks and income-generating vehicles such as rickshaws. We estimated average productivity of each type of asset per unit (e.g., daily milk per cow per day).

Adding the income from labour and from assets we calculated the total annual income for the household. Per capita income was calculated by dividing total annual household income by the square-root of the number of household members.

CPR COMMENTARY NO. 1

Natural Gas Options for Bangladesh

বাংলাদেশের প্রাকৃতিক গ্যাসের সম্ভাব্য ব্যবহার



by **MARK JACCARD**, *Director, Energy Research Group, School of Resource and Environmental Management at Simon Fraser University,* **MUJIBUR RAHMAN KHAN**, *Professor, College of Engineering and Technology at IUBAT, and* **JOHN RICHARDS,** *Professor, Master of Public Policy Program at Simon Fraser University*

The very low level of available commercial energy is a serious constraint on economic development in Bangladesh. Fortunately, there is one bright prospect – sizeable discoveries of natural gas.

This report explores three options for how Bangladesh might use its natural gas endowment: exporting gas to provide public revenues that could be directed to many other development needs; expanding the many possible end-uses for gas in domestic industry, agriculture and households; or concentrating natural gas use on accelerated electrification. After assessing the three options, the authors conclude that rapid electrification should have the highest priority.

In addition, the report discusses institutional reforms to foster private investment and to improve the transparency, efficiency and consistency of government corporations, ministries and agencies. There is an important case to be made for integrated resource planning that includes environmental and social objectives.

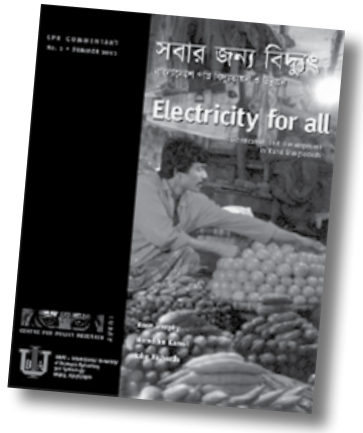
বাণিজ্যিক খাতে জ্বালানি শক্তির অতিস্বল্পতা বাংলাদেশের অর্থনৈতিক উন্নয়নের পথে একটি গুরুত্বপূর্ণ অন্তরায়। সৌভাগ্যক্রমে প্রাকৃতিক গ্যাসের বড় ধরনের উৎস আবিস্কৃত হওয়ায় উন্নয়ন ক্ষেত্রে একটি উজ্জ্বল সম্ভাবনা সৃষ্টি হয়েছে। এই প্রতিবেদনে বাংলাদেশের প্রাকৃতিক গ্যাস সম্পদ ব্যবহারের তিনটি সম্ভাবনা নিয়ে পর্যালোচনা করা হয়েছে ঃ গ্যাস বিদেশে রপ্তানী করে সরকারী রাজস্বখাতে অর্থ আয় যা উন্নয়নের চাহিদা মিটাতে পারবে, দেশীয় শিল্প, কৃষি, গৃহস্থলি ও অন্যান্য সম্ভাব্য কাজে গ্যাসের ব্যবহার সম্প্রসারণ; বা দ্রুত বিদ্যুতায়নের ক্ষেত্রে প্রাকৃতিক গ্যাসের ব্যবহার কেন্দ্রীভূত করা। এই তিনটি সম্ভাবনা যাচাই করে প্রতিবেদকগণ এই সিদ্ধান্তে পৌছেন যে দ্রুত বিদ্যুতায়নই সর্বোচ্চ প্রাধান্য পাওয়া উচিৎ।

অধিকন্তু এই প্রতিবেদনে কিছু কিছু প্রাতিষ্ঠানিক সংস্কারের বিষয় আলোচনা করা হয়েছে যা বেসরকারী বিনিয়োগকে উৎসাহিত করবে এবং সরকারী প্রতিষ্ঠান, মন্ত্রণালয়সমূহ এবং এজেন্সিসমূহের কাজের স্বচ্ছতা, দক্ষতা এবং নির্ভরযোগ্যতা বৃদ্ধি করবে। পরিবেশগত এবং সামাজিক লক্ষ্যগুলি অন্তর্ভূক্ত করে সমন্বিত সম্পদ পরিকল্পানার গুরুত্বের বিষয়ও এই প্রতিবেদনে সুপারিশ করা হয়েছে।

CPR COMMENTARY NO. 2

Electricity for All

সবার জন্য বিদ্যুৎ



by **ROSE MURPHY,** *Research Associate with the Energy and Materials Research Group at the School of Resource and Environmental Management at Simon Fraser University,* **NURUDDIN KAMAL**, *Senior Research Fellow for the Centre for Policy Research at IUBAT, and* **JOHN RICHARDS,** *Professor, Master of Public Policy Program at Simon Fraser University*

বাংলাদেশে পাঁচজনের মধ্যে মাত্র একজন বিদ্যুতের সুবিধা পান। গ্রাম বাংলায় বিদ্যুতের সুবিধা পান প্রতি সাতজনে একজন।

বাংলাদেশে বিদ্যুৎ খাতে এই সমস্যাগুলি কেন অব্যাহত থাকছে? এই সমস্যাগুলি সমাধানের জন্য কি ব্যবস্থা নেয়া যায়? এই রিপোর্টে দ্রুত বিদ্যুতায়ন, বিশেষ করে পল্লি বিদ্যুতায়নের ক্ষেত্রে বাধা সমূহের মূল্যায়ন করা হয়েছে। একই সাথে এই বাধাসমূহ দূর করার জন্য কিছু বাস্তবধর্মী সুপারিশ রাখা হয়েছে।

বর্তমানে পল্লি বিদ্যুতায়ন বোর্ড (আর ই বি) এবং তার সমবায় নেটওয়ার্ক পল্লি বিদ্যুৎ সমিতিগুলির মাধ্যমে পল্লি এলাকায় দেশে ব্যবহৃত বিদ্যুতের এক চতুর্থাংশ বিতরণ করে। এই আকর্ষণীয় সাফল্য সত্ত্বেও, বাংলাদেশে বিদ্যুতায়নের ক্ষেত্রে আরো অনেক কিছু করার বাকি আছে।

গবেষকগণ সুপারিশ করেন যে আর ই বি'কে স্বাধীনভাবে বিদ্যুৎ উৎপাদনের প্রতি অগ্রাধিকার ভিত্তিতে অধিক গুরুত্ব দিতে হবে, বিশেষ করে জাতীয় সঞ্চালন গ্রীড বহির্ভূত এলাকাসমূহে। এই সম্প্রসারণের জন্য প্রয়োজন হবে অধিকতর মাত্রায় ব্যক্তিখাতে বিনিয়োগে এবং আর ই বি গ্রাহকদের ক্ষেত্রে বর্ধিত হারে গড় ট্যারিফ।

অধিকতর হারে নতুন বিনিয়োগ আকর্ষণ এবং ট্যারিফসমূহের সংস্কার কঠিন কাজ, তবে বিদ্যুৎ ব্যবস্থার ব্যাপক সম্প্রসারণের লক্ষ্যে গুরুত্বের সাথে এই প্রয়োজনীয় সংস্কারসমূহ বাস্তবায়ন যুক্তিসঙ্গত।

Only one in five Bangladeshis has access to power; among those in rural areas the ratio is about one in seven. What can be done to improve access? This report assesses the barriers to accelerated electrification – rural electrification in particular – and offers practical recommendations.

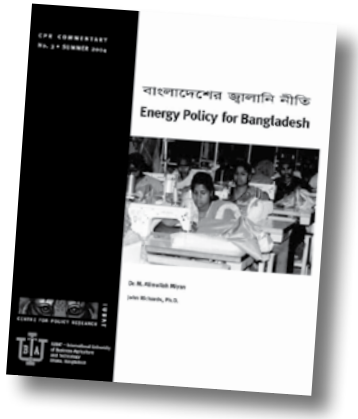
The Rural Electrification Board (REB) and its network of cooperatives – Palli Biddyut Samitees – now distribute nearly a quarter of electricity consumed in the country. Despite this impressive accomplishment, they need to do more.

The authors recommend that the REB place a high priority on power generation independent of the national transmission grid. This expansion will require private investment and higher average tariffs for REB customers. Securing major new investment and revising tariffs will not be easy, but the goal of increased electrification is sufficiently important to justify the required reforms.

CPR COMMENTARY NO. 3

Energy Policy for Bangladesh

বাংলাদেশের জ্বালানি নীতি



by **DR. M. ALIMULLAH MIYAN,** *Vice Chancellor and Founder, IUBAT, and* **JOHN RICHARDS,** *Professor, Master of Public Policy Program at Simon Fraser University*

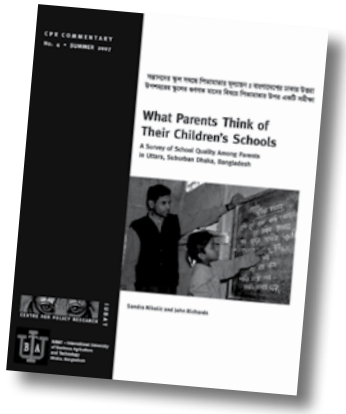
বাংলাদেশের ভবিষ্যৎ সমৃদ্ধির জন্য পর্যাপ্ত পরিমাণ বাণিজ্যিক জ্বালানি সরবরাহের গুরুত্ব সম্বন্ধে অতিরঞ্জনের কোন অবকাশ নেই। বাংলাদেশ সরকার ২০০৪ সালের মে মাসে একটি খসড়া জাতীয় জ্বালানি নীতি ঘোষণা করে এবং এর উপর জনসাধারণের অভিমত আহবান করে। সরকারের এই প্রতিবেদনে বর্তমান নীতির গুরুতর সমস্যার বিষয় এবং নূতন নীতি প্রণয়ন যে অতীব বিতর্কপূর্ণ তা স্বীকার করা হয়।

সেন্টার ফর পলিসি রিচার্সের এই তৃতীয় প্রতিবেদনটির মাধ্যমে খসড়া জাতীয় জ্বালানি নীতির উপর মন্তব্য এবং সুপারিশ করা হয়েছে। ড. এম আলিমউল্যা মিয়ান, উপাচার্য ও প্রতিষ্ঠাতা, আই ইউ বি এ টি - ইন্টারন্যাশনাল ইউনিভার্সিটি অব বিজনেস এগ্রিকালচর এন্ড টেকনোলজি এবং ড. জন রিচার্ডস, অধ্যাপক, সাইমন ফ্রেজার ইউনিভার্সিটি, কানাডা এবং আই ইউ বি এ টি'র ভিজিটিং অধ্যাপক এই প্রতিবেদনটি প্রণয়ন করেছেন। তাঁদের সুপারিশ মালার মধ্যে প্রাকৃতিক গ্যাসের রপ্তানি থেকে শুরু করে জৈব জ্বালানি শক্তি ব্যবহারের উন্নতি সাধনসহ গুরুত্বপূর্ণ বিষয় সমূহ অন্তর্ভূক্ত হয়েছে।

It is hard to exaggerate the importance of adequate supplies of commercial energy for the future development of Bangladesh. In May 2004, the Government of Bangladesh released a draft National Energy Policy, and invited public commentary. The government report acknowledges the serious shortcomings of present policy and the dilemmas in designing new policy.

In this third report of the Centre for Policy Research, Dr. Alimullah Miyan, Vice-Chancellor and Founder of IUBAT—International University of Business Agriculture and Technology, and Dr. John Richards, Professor at Simon Fraser University in Canada and Visiting Professor at IUBAT, respond to the draft National Energy Policy and offer a series of recommendations. The recommendations cover major issues from export of natural gas to improvements in the utilisation of biomass fuels.

CPR COMMENTARY NO. 4



What Parents Think of Their Children's Schools

A Survey of School Quality Among Parents in Uttara, Suburban Dhaka, Bangladesh

সন্তানদের স্কুল সম্বন্ধে পিতামাতার মূল্যায়ন ঃ বাংলাদেশের ঢাকার উত্তরা উপশহরের স্কুলের গুণগত মানের বিষয়ে পিতামাতার উপর একটি সমীক্ষা

by **SANDRA NIKOLIC,** *Planner, Health Services Authority of British Columbia, and*
JOHN RICHARDS, *Professor, Master of Public Policy Program at Simon Fraser University*

বিগত এক দশকে শিক্ষার প্রাপ্যতা বিস্তারে বাংলাদেশ প্রশংসনীয় সাফল্য অর্জন করেছে। ২০০৪ ইংরেজি সালে ১৮ মিলিয়ন শিশু, ১,১০,০০০ প্রাথমিক স্কুলে ভর্তি হয়। এতদ্সত্ত্বেও অনেক পিতামাতা তাঁদের সন্তানদেরকে বেসরকারি স্কুলে ভর্তি করান, যার ব্যয়ভার তাঁদেরকে বহন করতে হয়। আরো অনেকে বেছে নেন বেসরকারি সংস্থা কর্তৃক পরিচালিত স্কুল, যেমন ব্রাক পরিচালিত স্কুল বা মাদ্রাসা। সরকার পরিচালিত স্কুলের চেয়ে বেসরকারি পর্যায়ে পরিচালিত স্কুলের জনপ্রিয়তার মধ্যে আমরা দুটি বিষয়ের দিক নির্দেশনা দেখতে পাই যথা স্কুলের গুণগতমান সম্বন্ধে পিতামাতার উদ্বেগ এবং স্কুলে স্থান সঙ্কুলান সম্পর্কে সচেতনতা।

স্কুলের গুণগতমান সম্পর্কীয় সমস্যা সম্পর্কে পিতামাতার মনোভাব যাচাই করার জন্য, ঢাকা শহরের উত্তরে অবস্থিত উত্তরায় আইইউবিএটি-ইন্টারন্যাশনাল ইউনিভার্সিটি অব বিজনেস এগ্রিকালচার এবং টেকনোলজি'র গবেষণারত ছাত্র-ছাত্রীরা একটি জরিপ পরিচালনা করে। জরিপের ফলাফল এই প্রতিবেদনে উপস্থাপন করা হয়েছে। এই সমীক্ষায় শিক্ষার ফলাফল উন্নত করার লক্ষ্যে কয়েকটি কৌশলের মূল্যায়ন করা হয়েছে।

Over the last decade, Bangladesh has made impressive gains in the *quantity* of education available. As of 2004, there were 18 million children enrolled in 110,000 primary schools. Still, many parents choose to enrol their children in private schools where parents pay, in nonformal schools run by NGOs such as BRAC, and in madrasas. The popularity of school types other than government-run schools suggests that parents have concerns about school quality – as well as the availability of school spaces.

To assess parental attitudes to problems of school quality, student researchers from IUBAT—International University of Business Agriculture and Technology surveyed residents in Uttara, a suburb in northern Dhaka. This study reports their findings. The study also assesses broad strategies for improving education outcomes.

CPR COMMENTARY NO. 5

Barriers to Girls' Secondary School Participation in Rural Bangladesh

গ্রাম-বাংলায় মাধ্যমিক স্কুলে মেয়েদের অংশগ্রহণে প্রতিবন্ধকতা

by **JENNIFER HOVE,** *Bachelor of International Relations at University of British Columbia 2000, Master of Public Policy at Simon Fraser University 2007, Visiting Fellow, IUBAT*

বিগত ১৫ বছর মাধ্যমিক স্কুলে ছেলে-মেয়ে উভয়ের ভর্তির হার নাটকীয়ভাবে বেড়েছে। অবশ্য মেয়েদের ৬ষ্ঠ থেকে ১০ম মান পর্যন্ত লেগে থেকে পড়া শেষ করার হার হতাশাব্যঞ্জকভাবে কম। তুলনামূলকভাবে যদিও ছেলেদের টিকে থকার হারও কম। ৬ষ্ঠ মানে ভর্তির বেলায় ছেলে-মেয়ের ভর্তির হার প্রায় সমান সমান। ১০ম মান পর্যায়ে ছেলেরা মাধ্যমিক সরকারি পরীক্ষায় বিশেষভাবে মেয়েদের থেকে এগিয়ে। দশম মানের পরবর্তী উচ্চ মাধ্যমিক পর্যায়ে ভর্তির বেলায়ও ছেলেদের হারই বেশি। মেয়েদের মধ্যে যাঁরা ১০ম মান শেষ করে উচ্চ মাধ্যমিক একাদশ ও দ্বাদশ শ্রেণীতে প্রবেশ করে তাদের হার মাত্র ১৩%। স্কুল, পরিবার ও বৃহত্তর পর্যায়ে সমাজের মধ্যে এমন কিছু ক্ষমতাধর শক্তি কাজ করে যা মেয়েদেরকে স্কুলে টিকে থাকতে নিরুৎসাহিত করে। পল্লী এলাকার ৪টি স্কুলের শিক্ষক, ছাত্রী ও পিতামাতার মধ্যে সমীক্ষা চালানোর মাধ্যমে এই গবেষণায় ছাত্রীরা কেন স্কুল ছেড়ে যায় তার কারণ বিশেষণ করা হয় এবং একই সাথে কি নীতিমালা অবলম্বনে ছাত্রীদের মাধ্যমিক স্তরে স্কুল শেষ করার হার বাড়ানো যায় তার সুপারিশ পেশ করা হয়।

Over the last 15 years, secondary school enrolment rates among both boys and girls have risen dramatically. However, girls' rates of progression and completion of the secondary cycle (from grades six through ten) are disturbingly low – albeit the comparable rates for boys are also low. At grade six there is near parity between the number of boys and girls enrolled. By grade ten, boys are significantly ahead of girls in participation in public examinations and promotion to higher secondary school. Only 13 per cent of girls who complete the tenth grade transition to the higher secondary grades of eleven and twelve. There are powerful forces at work within schools, families and the broader society that dissuade girls from staying in school. Based on interview responses among teachers, students and parents in four rural schools, this study analyses why girls drop out of school, and offers policy recommendations to increase completion rates.

CPR COMMENTARY NO. 6

A New Mandate for the Rural Electrification Board

পল্লী বিদ্যুতায়ন বোর্ডের জন্য নতুন নির্দেশাবলীঃ

বিদ্যুৎ স্বল্পতা নিরসনে এলাকা-ভিত্তিক পরিকল্পনার পদক্ষেপ

by **B.D. RAHMATULLAH, NANCY NORRIS, JOHN RICHARDS**

নির্ভরযোগ্য বিদ্যুৎ অভাব বাংলাদেশের অর্থনৈতিক উন্নয়নকে দারুণভাবে বাধাগ্রস্ত করছে। বাংলাদেশের শতকরা ৭৮ ভাগ প্রতিষ্ঠান দুর্বল বিদ্যুৎ সেবাকে তাদের ব্যবসা সম্প্রসারণে প্রধান অন্তরায় হিসাবে চিহ্নিত করে।

সফল সংস্কারের ভিত্তি হলো প্রশাসনিক বিশ্বাসযোগ্যতা। বিদ্যুৎ খাতের প্রধান সংস্থাগুলির মধ্যে সবচাইতে বেশী বিশ্বাসযোগ্য হলো পল্লী বিদ্যুতায়ন বোর্ড (আর ই বি)। বিগত একদশকে আর ই বি বিদ্যুৎ সংযোগের সংখ্যা দ্বিগুণ করেছে এবং এই সংস্থা বর্তমানে বাংলাদেশে উৎপাদিত মোট বিদ্যুতের শতকরা ৪০ ভাগ বিতরণ করে থাকে। এই মনোগ্রাফের প্রণেতাগণ সুপারিশ করেন যে আর ই বি-এর ম্যান্ডেট সম্প্রসারণ করে জাতীয় গ্রীডের বাইরে স্বাধীনভাবে বিদ্যুৎ উৎপাদনের ব্যবস্থা করা। স্বাধীনভাবে বিদ্যুৎ উৎপাদনে স্বাভাবিকভাবেই এই সংস্থার সহযোগী পল্লী সমবায় (পল্লী বিদ্যুৎ সমিতি)গুলি সম্পৃক্ত হবে। উৎপাদিত বিদ্যুত অগ্রাধিকার ভিত্তিতে স্থানীয়ভাবে সহযোগী পি বি এস এর গ্রাহকদের মধ্যে বিতরণ করা হবে।

A lack of reliable electrical power is severely impeding Bangladesh economic development. Seventy-eight per cent of Bangladeshi firms cite poor electricity service as a “major” or “severe” obstacle to expansion.

Successful reform requires building on a foundation of administrative credibility. The most credible of the major agencies in the power sector is the Rural Electrification Board (REB). Over the last decade, it has doubled the number of customer connections, and now distributes 40 per cent of all power generated in Bangladesh. The authors of this monograph recommend an expansion of the REB mandate to enable the REB and its network of rural cooperatives (Palli Biddyut Samitee) to create generating capacity independent of the national grid, capacity whose power would be distributed on a priority basis to customers in the local participating PBS.

CPR COMMENTARY NO. 7

Benchmarking the Nutritional Status of Women in the Tongi-Ashulia Road Slums

টঙ্গি-আশুলিয়া সড়কের বস্তিবাসি মহিলাদের পুষ্টিমান মূল্যায়ন

by **JOHN RICHARDS, AFIFA SHAHRIN AND KAREN LUND**

এই সমীক্ষায় উত্তরার তুরাগ নদী সংলগ্ন এলাকার বস্তিবাসী মহিলাদের পুষ্টিমানের একটি প্রতিবেদন তুলে ধরা হয়েছে। গবেষণাটির উপাত্ত সংগ্রহ করে আই ইউ বি এ টি— ইন্টারন্যাশনাল ইউনিভার্সিটি অফ বিজনেস এগ্রিকালচার এণ্ড টেকনোলজি-এর নার্সিং শিক্ষার্থীরা। জরিপে দেখা যায় যে অধিকাংশ মহিলার খাবারে পর্যাপ্ত পরিমাণ ক্যালরী থাকে। তবে তাদের অধিকাংশই সব শ্রেণীর খাদ্যের সুষম বন্টন থেকে বঞ্চিত। চালের মূল্যস্ফিতির কারণে হয়তবা তারা একই পরিমাণ চাল ক্রয়ের জন্য অন্যান্য শ্রেণীর খাবার বাদ দিতে বাধ্য হয়েছে।

অধিকাংশ পরিবার কোনও ধরণের বিশুদ্ধিকরণ ছাড়াই ঢাকা পানি ও পয় কর্তৃপক্ষের পানি ব্যবহার করে। ভূ-পৃষ্ঠের পানি দূষণের কারণে ওয়াসার পানিতে আশংকামুক্ত মাত্রায় রোগ-বালাইয়ের জীবানু থাকতে পারে। পরিবারের সদস্যদের মাঝে তামাক ও পানের ব্যাপক ব্যবহার লক্ষণীয়। দীর্ঘমেয়াদী ব্যবহার এই দুইটিই ভয়ানক স্বাস্থ্যহানীর কারণ হতে পারে। স্বাস্থ্যকর্মীদের কাছ থেকে প্রাপ্ত প্রত্যক্ষ উপদেশ এবং মহিলাদের স্বাক্ষরতা পুষ্টিমানের উপর ইতিবাচক প্রভাব ফেলে।

This Commentary reports on the nutritional status of shanty dwelling women in Uttara (near the Turag River). Data were collected by nursing students at IUBAT—International University of Business Agriculture and Technology. Most women have an adequate caloric intake. However, most lack adequate servings from the full range of food groups. Inflation in rice prices may have induced them to sacrifice other foods in order to maintain rice consumption.

The majority use non-boiled tap water from the Dhaka Water and Sewage Authority. Due to contamination from ground water, it may contain high levels of pathogens. Tobacco and betel nut are widely used by family members. Both pose serious health hazards if consumed on a long-term basis. The ability of women to read, and receiving one-on-one advice from a health worker had positive impacts on aspects of nutrition.

এই গবেষনায় বাংলাদেশের দুইটি অঞ্চলের স্বল্প আয়ের পরিবারের মহিলাদের খাদ্য ও পুষ্টিমানের অবস্থা তুলে ধরা হয়েছে। অঞ্চল দুটির একটি হল জামালপুর জেলার পাশাপাশি চারটি গ্রাম, অপরটি হল ঢাকা মহানগরীর উত্তরা এলাকার বস্তি। স্বল্পসংখ্যক মহিলা ক্যালরী স্বল্পতায় ভুগলেও অধিকাংশের সমস্যা হল আমিষ, ভিটামিন, মিনারেল এবং খনিজ পদার্থের স্বল্পতা।

পুষ্টিকে প্রভাবিত করতে পারে এমন উপাদানগুলোর গুরুত্ব এই গবেষণায় পর্যালোচনা করা হয়েছে। সাধারনত কম শিক্ষিত পরিবারের মহিলাদের তুলনায় বেশি শিক্ষিত পরিবারের মহিলাদের পুষ্টিমান উন্নত; তাদের অধি কাংশ ধূমপানও করেনা, তবে যেসব পরিবারে ধূমপায়ী সদস্য রয়েছে সেসব পরিবারের মহিলাদের পুষ্টির অবস্থা তুলনামূলক খারাপ।

এক্ষেত্রে সরকারের প্রতি যে প্রধান দুইটি সুপারিশ তা হলঃ পুষ্টি সম্পূরক উপাদান যোগ করে চালের পুষ্টিগুণ বাড়ানো (Rice fortification) এবং যেসব অঞ্চলে আর্সেনিকের প্রকোপ বেশি নয় সেসব অঞ্চলে অগভীর টিউবওয়েল বসানো। বেসরকারী সংস্থাগুলোর প্রতি সুপারিশ হলঃ গনস্বাস্থ্যকর্মীদের উন্নতমানের প্রশিক্ষণ দিয়ে তথ্য-উপদেশের কার্যকারিতা বাড়ানো এবং গ্রামাঞ্চলের বাড়িগুলোতে সবজি বাগান করতে জনগণকে সহযোগিতা করা।

This monograph reports on the nutritional status of a sample of 600 women in two sites: four villages near Jamalpur, and shanty dwellers in the Dhaka metropolitan area. While some suffer inadequate calorie intake, the major nutritional problem is inadequate consumption of protein, vitamins and micronutrients.

The authors assess the importance of factors that influence nutrition. In general, women's nutrition is better in households with higher education levels; most women do not smoke, but their nutrition is worse if other family members use tobacco.

The recommendation to government is to pursue two programs: rice fortification, and setting of tube wells in slum neighbourhoods (where groundwater is not affected by arsenic). NGOs are invited to improve training of community health workers, and encourage household vegetable gardens in rural villages.

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