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স্কুলগামী শিশুকিশোরদের শিক্ষা সাফল্যের
উপর পুষ্টির প্রভাবঃ একটি পর্যালোচনা

Education Success and Nutrition: Is there a link?

by John Richards and Afifa Shahrin

CENTRE FOR POLICY RESEARCH
IUBAT

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

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Contents

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We also express thanks to Dr. Alimullah Miyan and Dr. Karen Lund, Senior Advisor at the IUBAT Nursing College. Dr. Lund organized the ethics approval process in gathering the data. Sanchay Barua typed the Bangla version of the survey instrument. Others at IUBAT helped us in every stage of the data collection process. Last but not least, we thank the 20 interviewers who enabled collection of the survey data.

Foreword

This 9th CPR *Commentary* is a sequel to *Improving Nutritional Status for Women in Low-Income Households* published in 2012. Both reports analyze information collected in an ambitious survey of social conditions among nearly 600 low-income families in urban and rural communities. While the previous report concentrated on the nutritional status of the mothers interviewed for the survey, this report analyzes the impact of family nutrition on school completion among the children of these families.

Like the previous *Commentary*, this report is the result of collaboration among three universities. Ms. Afifa Shahrin organized the survey in the summer of 2011 while a visitor at the IUBAT nursing college. Several IUBAT students conducted interviews for the survey. Formerly, Ms. Shahrin was an instructor at BRAC University, and BRAC cooperated extensively in the conduct of the rural survey in Jamalpur. The second author, John Richards, is a professor at Simon Fraser University in Vancouver, Canada, and a long-time overseas faculty member of IUBAT.

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

List of acronyms

BMI	Body-mass index. (BMI is calculated as weight, in kilograms, divided by height, in meters, squared.)
BRAC	Large Bangladeshi NGO. (Originally, "BRAC" referred to Bangladesh Rural Advancement Committee.)
CAMPE	Campaign for Public Education, an association of NGOs concerned with primary education.
CPR	Centre for Policy Research, IUBAT.
FAO	Food and Agriculture Organization (UN organization).
GDP	Gross domestic product.
HSC	Higher secondary certificate. (Certificate awarded upon successful completion of exams written upon completion of Grade 12.)
IUBAT	International University of Business Agriculture and Technology, Dhaka, Bangladesh.
MDG	Millennium development goal.
NGO	Non-governmental organization.
SFU	Simon Fraser University, Vancouver, Canada.
SSC	Secondary school certificate. (Certificate awarded upon successful completion of exams written upon completion of Grade 10).
UNESCO	United Nations Education Scientific and Cultural Organization.
WB	World Bank.
WDI	World Development Indicators, compiled by World Bank.
WHO	World Health Organization.

Executive summary

IS THERE A LINK BETWEEN NUTRITION AND CHILDREN'S EDUCATION SUCCESS? The answer from many international studies is "yes." This monograph provides evidence on the extent of the link among a random sample of nearly 600 low-income families in Bangladesh. Of the total, slightly over 200 families had children in the relevant age range to measure school completion.

If the great majority of adults in the next generation are to be literate, the great majority of present-day children must complete primary school. The experience of parents in this survey illustrates this conclusion. Very few reported being able to "read" or even "read a little" among those who entered primary school but did not go beyond Grade 2. By contrast, among the minority who survived to Grade 5 or had completed primary school three quarters reported being able to "read" and most of the remainder reported being able to "read a little."

Universal primary education depends on both the "supply" of education services and the "demand" among families for such services. The "demand" arises in early grades from parents' expectations for their children, supplemented, at higher grades, by the expectations of children themselves. The "supply" depends both on the availability of quality schools and parents' ability to help their children succeed in school.

A crucial dimension of the "supply" side is a reasonably effective government willing and able to organize a reasonably efficient school system. This system need not comprise government-run schools only; it will usually include non-government schools. Unfortunately, Bangladesh suffers from

political instability and weak governance. The problems of governance have affected the school system, especially government schools. One indicator is that the proportion of students attending government primary schools appears to have declined by about 10 percentage points from the late 1990s to late 2000s; it was found to be 57 per cent in a large survey conducted in 2008 (Nath and Chowdhury 2009,64). A wide range of non-government primary schools – from NGO-supported non-formal schools to madrassas[1] – are now important providers of primary education, especially in hard-to-serve communities such as urban slums and certain rural areas. At the secondary school level, over 90 per cent of schools are non-government.

Meanwhile, we should recognize that family decisions and family resources are important "supply" side factors that influence whether children complete their schooling. Children whose parents can read are more likely to finish primary school than children whose parents cannot. Higher-income parents typically have more time to help their children complete their school studies. So too, we demonstrate in this study, children fare better if their parents provide them with good nutrition.

Surveying in rural and urban communities

The survey was conducted among 577 women in four rural villages in Jamalpur district and in a slum community located in Uttara, in metropolitan Dhaka. The interviewers posed identical questions in both rural and urban communities. However, nearly all children in the rural communities had completed primary school, whereas very few urban children had even entered Grade 6, the first year of secondary studies. Accordingly, the rural analysis assesses factors potentially important in explaining whether children complete secondary studies leading to the Secondary School Certificate (SSC); the urban sample undertakes a similar exercise to assess factors relevant to children completing primary school. (In Bangladesh, students sit an exam for the SSC at the completion of Grade 10. They may also sit an exam for the Higher Secondary Certificate (HSC) written upon completion of Grade 12.) In addition to the education status of children, the survey instrument included detailed questions on the food consumed by the mother over the previous 24 hours. The interviewers queried mothers; they did not obtain direct evidence on children's nutrition. We infer a child's nutritional status based on responses about his or her mother's nutrition and her response to a question about the distribution of "good food" (meat, fish, fruits and vegetables other than rice) among family members.

1 Madrassas are educational institutions to study Islamic religion, though they also teach other subjects.

Children in Jamalpur district village with Afifa Shahrin and Rokeya Khatun, BRAC area coordinator for Jamalpur district. Two girls are holding younger siblings. Parents' expectation that children care for younger siblings is a common reason for girls' failure to complete school. JOHN RICHARDS PHOTO

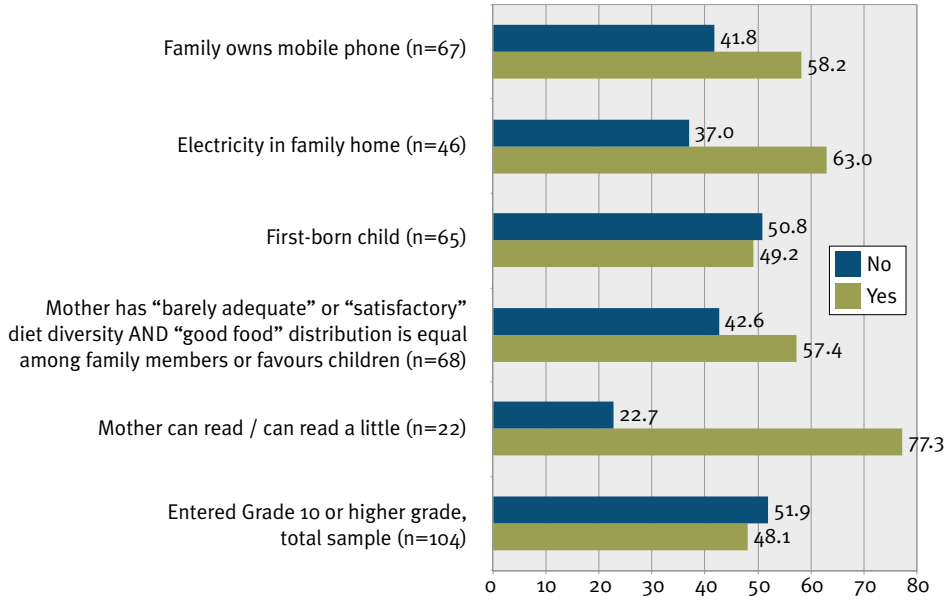
What factors matter in explaining school completion?

In the accompanying figures we illustrate the probabilities of children completing their studies, either at the primary or secondary level, conditional on important explanatory factors. (The number of observations for which the condition was satisfied is indicated in parentheses.) In this summary, we have illustrated conditional probabilities only for factors that turn out to be statistically significant in the multivariate regression analysis. The report discusses additional factors not shown here.

As to be expected from other studies on child nutrition, if both the mother's diet is diverse *and* "good food" distribution is equal or favours children, there is a greater probability of a child having completed either primary or secondary studies. Furthermore, in both urban and rural samples, if the mother's diet satisfies both criteria of diet diversity and food distribution, then the probability of completion is higher than if family nutrition satisfied only one (see Figures 5 and 6 from the report).

In both the rural and urban samples, approximately three quarters of children whose mothers reported being able to read completed their studies. As for fathers, it

Probability of rural village children having completed secondary studies, conditional on selected characteristics of children's families



(See additional results in Figure 5)

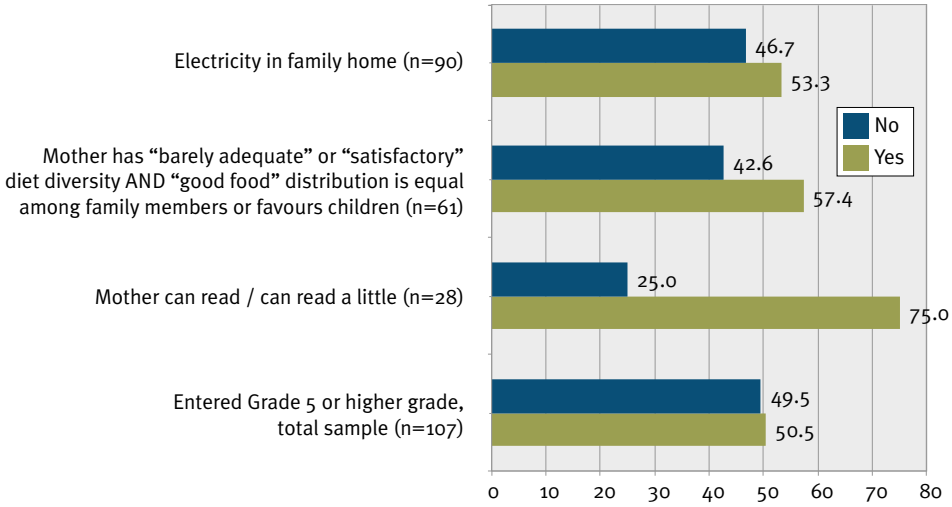
turns out that their influence on children's education success is greater, if measured not by their being able to read but by their completing primary school (in the urban sample) or having entered secondary (in the rural sample). However, in the multivariate analysis the impact of fathers' education is at best marginal. In the rural sample, but not the urban sample, being the first-born child in a family increases the probability of successfully completing studies relative to siblings.

The conditional probabilities associated with the various measures of income and assets offer expected results. Whether it is due to its value as an input into children's learning or as a measure of family income or both, the one measure that turns out to be significant in both the rural and urban multivariate analyses is access to electricity. Mobile phone ownership by the family is associated with a higher probability of education success in the rural sample; the impact is negligible in the urban sample.

Conclusion

Based on the reported regression results, improving urban and rural child nutrition by five percentage points results in seven percentage point increases in school completion rates. This result depends on our model specification and should be interpreted with

Probability of urban slum children having completed primary school, conditional on selected characteristics of children's families



(See additional results in Figure 6)

caution. Nonetheless, these are not trivial effects. The survey provides reasonably firm evidence that, in both rural and urban low-income communities, better nutrition generates important benefits in terms of school completion.

Evidence from this survey provides support for various policy interventions intended to improve child nutrition. These can range from campaigns targeting pregnant mothers and early child nutrition to social marketing campaigns to promote improved diets in low-income communities, and to school feeding programs in schools where low-income children attend. Fortified snacks inexpensively distributed in schools of food-insecure areas in Bangladesh improved children's BMI and school enrolment, attendance, and academic achievement, and reduced drop-out (Ahmed 2004).

Better nutrition – whether undertaken by families or schools – improves the productivity of the "supply" side of education services. If successful, child nutrition programs may lower grade repetition and thereby reduce somewhat the pressure on schools. But successful nutrition programs are not a panacea. They may simultaneously lower dropout rates, a desirable outcome for individual students but one that aggravates the overall problems faced by crowded under-funded schools. In sum, nutrition matters, but many other innovations are required if Bangladesh's literacy rate is to improve substantially in the coming generation.

BRAC school teacher in Jamapur village. JOHN RICHARDS PHOTO

সারসংক্ষেপ

শিশুদের শিক্ষা সাফল্যের সাথে পুষ্টির কোন সম্পর্ক আছে কি? অনেক আন্তর্জাতিক গবেষণা মতে এই সম্পর্ক ইতিবাচক। বাংলাদেশের প্রায় ৬০০ নিম্ন আয়ের দৈবচয়িতভাবে নির্বাচিত পরিবার থেকে প্রাপ্ত তথ্যের ভিত্তিতে এই গবেষণায় শিশু শিক্ষায় সাফল্য ও পুষ্টির সম্পর্কের মাত্রাজনিত প্রমাণ পাওয়া যায়। মোট পরিবারের মধ্যে, ২০০ থেকে কিছু বেশি পরিবারে স্কুল সমাপনী পরিমাপ করা যায় এই বয়সের শিশু বর্তমান।

অধিকাংশ শিশুর প্রাথমিক শিক্ষা সম্পন্ন করার মাধ্যমেই কেবল ভবিষ্যত বাংলাদেশের প্রাপ্তবয়স্ক নাগরিকদের অধিকাংশের স্বাক্ষরতা নিশ্চিত করা সম্ভব। জরিপে অংশগ্রহণকারী পিতা-মাতার শিক্ষাগত অবস্থান থেকে এর প্রমান পাওয়া যায়। প্রাথমিক বিদ্যালয়ে ভর্তি হয়েছিল কিন্তু দ্বিতীয় শ্রেণী পর্যন্ত পড়েছে এমন পিতা-মাতার মধ্যে খুব কম সংখ্যকই 'পড়তে পারে' অথবা 'অল্প-অল্প পড়তে পারে' বলে জানায়। অন্যদিকে খুব কম সংখ্যক হলেও যারা পঞ্চম শ্রেণী পর্যন্ত টিকেছে বা প্রাথমিক শিক্ষা সম্পন্ন করেছে তাদের প্রায় তিন-চতুর্থাংশ পড়তে পারে; আর বাকীরা অল্প-অল্প পড়তে পারে বলে জানায়।

শিক্ষা সেবার 'সরবরাহ' ও পারিবারিক পর্যায়ে শিক্ষা সেবার 'চাহিদা' এর উপর সার্বজনীন প্রাথমিক শিক্ষা অর্জন নির্ভরশীল। প্রাথমিক পর্যায়ে শিশুদের কাছ থেকে পিতা-মাতার শিক্ষাজনিত প্রত্যাশার উপর 'চাহিদা' নির্ভরশীল, তবে উচ্চতর পর্যায়ে শিশুদের নিজস্ব শিক্ষাগত প্রত্যাশা সম্পুরক হিসাবে কাজ করে। মানসম্পন্ন স্কুলের সংখ্যা ও শিশুদের শিক্ষা সাফল্যে পিতা-মাতার অবদান রাখার সামর্থ্যের উপর 'সরবরাহ' নির্ভরশীল।

সরবরাহের একটি অত্যন্ত তাৎপর্যপূর্ণ দিক হলো একটি মোটামুটি কার্যকর সরকার, যার আগ্রহ ও ক্ষমতা থাকতে হবে একটি মোটামুটি দক্ষ স্কুল ব্যবস্থা চালু রাখার। এই ব্যবস্থায় শুধুমাত্র সরকারী স্কুল অন্তর্ভূক্ত হবে, তা না, এটা সাধারণত বেসরকারী স্কুলগুলিকেও অন্তর্ভূক্ত করে। দূর্ভাগ্যবশত, বাংলাদেশে রাজনৈতিক অস্থিতিশীলতা ও দুর্বল শাসন ব্যবস্থা বিদ্যমান। এই দুর্বল শাসন ব্যবস্থাজনিত সমস্যা স্কুল ব্যবস্থাকে প্রভাবিত করছে, বিশেষ করে সরকারী স্কুলগুলোকে তা দারুনভাবে ক্ষতিগ্রস্থ করছে। এর একটি উদাহরণ হল সরকারী স্কুলগুলোতে শিক্ষার্থীর সংখ্যা ১৯৯০ সালের শেষ দিকের তুলনায় ২০০০ সালের শেষ দিকে এসে শতকরা ১০ ভাগ হ্রাস পেয়েছে; ২০০৮ সালের একটি বৃহৎ জরিপে এই হার শতকরা ৫৭ ভাগ দেখা গেছে (নাথ ও চৌধুরী, ২০০৮, ৬৪)। সরকারী স্কুলের পাশাপাশি উল্লেখযোগ্য সংখ্যক এন.জি.ও. সহায়তায় পরিচালিত অপ্রাতিষ্ঠানিক স্কুল থেকে শুরু করে মাদ্রাসা বিশেষ করে শহরের বস্তিতে ও কোন কোন পল্লী এলাকায় প্রাথমিক শিক্ষার প্রধান সরবরাহকারী হিসাবে কাজ করে। মাধ্যমিক পর্যায়ে দেশের শতকরা ৯০ ভাগ স্কুলই বেসরকারী।

এখানে মনে রাখা দরকার যে পারিবারিক সিদ্ধান্ত ও সম্পদ, একটি শিশু তার স্কুল শিক্ষা সম্পন্ন করতে পারবে কি না তার নিয়ামক হিসাবে কাজ করে। এই দুটি বিষয়ই 'সরবরাহ' প্রান্তের গুরুত্বপূর্ণ দিক। যাদের পিতা-মাতা পড়তে পারে তাদের স্কুল সমাপনীর সম্ভাবনা যাদের পিতা-মাতা পড়তে পারে না তার তুলনায় অনেক বেশী। যেসব পিতা-মাতার আয় বেশী তারা সাধারণত তাদের শিশুদের বেশী সময় পর্যন্ত স্কুলের পড়া শেষ করার সুযোগ দিতে পারে। একইভাবে এই গবেষণায় প্রমাণ পাওয়া যায় যেসব পিতা-মাতা সন্তানদের উন্নততর পুষ্টির ব্যবস্থা করতে পারেন তাদের শিশুরা স্কুল সমাপনীতে অনেক বেশি কৃতকার্য হয়।

পল্লী ও শহর পর্যায়ে জরীপ

জামালপুরের পল্লী এলাকার ৪টি গ্রাম ও ঢাকা শহরের উত্তরার বস্তিতে ৫৭৭ জন মহিলার উপর জরিপ চালানো হয়। প্রশ্নকারীরা গ্রাম ও শহর এলাকার মহিলাদেরকে একই প্রকারের প্রশ্ন করে। জরিপে দেখা যায় যে পল্লী এলাকার প্রায় সব শিশুই প্রাথমিক স্কুলের শিক্ষা শেষ করেছে, যেখানে শহরের খুব কম সংখ্যক শিশুই মাধ্যমিকের প্রথম স্তর, ষষ্ঠ শ্রেণীতে ভর্তি হতে পেরেছে। সেই অনুযায়ী, পল্লী এলাকা হতে প্রাপ্ত তথ্য বিশ্লেষনের বিশেষ দিক ছিল কোন কোন উপাদানের উপর শিশুদের মাধ্যমিকের নিম্নস্তর শেষ করে সেকন্ডারী স্কুল সার্টিফিকেট (এসএসসি)পর্যন্ত নির্ভর করে (বাংলাদেশে দশম শ্রেণী থেকে উত্তীর্ণ হওয়ার পরে শিক্ষার্থীরা স্বীয় শিক্ষা বোর্ডের অধীনে এসএসসি পরীক্ষায় অংশ নেয়। দ্বাদশ শ্রেণীর পরে তারা অংশ নেয় হাইয়ার সেকন্ডারী স্কুল সার্টিফিকেট (এইচএসএসসি) পরীক্ষায়)। অন্যদিকে শহরের ক্ষেত্রে বিশ্লেষণের দিকটি ছিল প্রাথমিক শিক্ষা সম্পন্ন করার বিষয়টি। শিশুদের শিক্ষাগত অবস্থানের দিকটি ছাড়াও, জরিপের প্রশ্নমালায় গত ২৪ ঘন্টায় সাক্ষাৎ প্রদানকারী মায়েরা কি খাবার খেয়েছে তার উপর বিষদ প্রশ্নাদি অন্তর্ভূক্ত করা হয়। তবে শিশুদের খাদ্য/ পুষ্টি সম্পর্কিত কোনো প্রশ্ন এই সমীক্ষার অন্তর্ভুক্ত ছিলনা। শিশুর পুষ্টি অবস্থা সম্বন্ধে আমাদের ধারণার মূল ভিত্তি ছিল তার মায়ের পুষ্টিজনিত সরবরাহকৃত তথ্য এবং একই সাথে 'ভাল খাবার' (ভাত ছাড়া মাছ, মাংস, ফল ও সব্জি) পরিবারের সদস্যদের মধ্যে বণ্টনের তথ্য।

Diets have improved in the last generation with more chicken as a source of protein. JOHN RICHARDS PHOTO

বাংলাদেশের অনেক শিশুই সঠিক সময়ে স্কুলে যায়না কিংবা খুব অল্পদিনের মধ্যেই ঝরে পড়ে।
সমীক্ষা পরিচালনাকালে ঢাকা শহরের উত্তরার বস্তি থেকে এই ছবিটি তুলেছেন জন রিচার্ডস।

স্কুল শিক্ষার শেষ পর্যায়ে পৌঁছানো কোন কোন বিষয়ের উপর নির্ভরশীল

এই রিপোর্টের executive summery অংশে সংশ্লিষ্ট লেখচিত্রে অন্যান্য বিষয়ের সাপেক্ষে ছেলেমেয়েদের প্রাথমিক অথবা মাধ্যমিক শিক্ষা সম্পন্ন করার সম্ভাবনা ব্যাখ্যা করা হয়েছে (উপযুক্ত শর্ত পূরণকারী নমুনাসংখ্যা বন্ধনীতে উল্লেখ করা হয়েছে)। এই সারসংক্ষেপে কেবল যেসব বিষয় বহুধা নির্ভরনের (multiple regression) মাধ্যমে পরিসংখ্যানগতভাবে অর্থপূর্ণ (statistically significant) নির্ণীত হয়েছে তাদের শর্তাধীন সম্ভাবনা (conditional probabilities) ব্যাখ্যা করা হয়েছে। পূর্ণাঙ্গ বিবরণে অন্যান্য সংশ্লিষ্ট বিষয়ও আলোচনা করা হয়েছে।

সংশ্লিষ্ট আরও অনেক গবেষণার মতই বর্তমান গবেষণাও দেখা যায় যে, যদি মায়ের খাবার বৈচিত্র্যপূর্ন হয় এবং 'ভালো খাবার' পরিবারের সকল সদস্যের মাঝে সমানভাবে অথবা শিশুর অনুকূলে বণ্টন হয়, তাহলে শিশুর প্রাথমিক এবং মাধ্যমিক শিক্ষা সমাপনী করার সম্ভাবনা বেড়ে যায়। অধিকন্তু, পল্লী ও শহর উভয় এলাকার ক্ষেত্রে দেখা যায় যে, পারিবারিক পুষ্টির ক্ষেত্রে যে কোনো একটি মাপকাঠির তুলনায় উভয় মাপকাঠির উপস্থিতি শিশুর শিক্ষার ক্ষেত্রে বেশি সহায়ক ভূমিকা রাখে (মূল প্রতিবেদনের সারণি ৫ এবং ৬ দেখুন)।

গ্রাম-শহর এই দুই এলাকাতেই মা পড়তে পারে এমন শিশুদের শতকরা ৭৫ ভাগ তাদের স্কুল সমাপ্ত করেছে। বাবাদের ক্ষেত্রে 'পড়তে পারা' নয় বরং প্রাথমিক শিক্ষা শেষ করা শিশুর শিক্ষার জন্য গুরুত্বপূর্ণ। তবে বহুচলক বিশ্লেষণে (multivariate analysis) বাবার শিক্ষার প্রভাব অতি সামান্য দেখা গেছে। পরিবারের প্রথম সন্তান হওয়া শিশুর স্কুল সমাপ্ত করার সম্ভাবনাকে বাড়িয়ে দেয়।

আয় এবং সম্পদের পরিমাপকগুলোর উন্নতি স্কুল সমাপ্তির সম্ভাবনা বাড়ায়। শিশুদের পড়াশোনার সহায়ক অথবা পরিবারের অর্থনৈতিক অবস্থার নির্ধারক; যেভাবেই কাজ করুক না কেন, বিদ্যুৎ সংযোগ স্কুল সমাপ্তির ক্ষেত্রে গুরুত্বপূর্ণ ভূমিকা রাখে। পরিবারে মোবাইল ফোনের মালিকানাও শিশুদের শিক্ষা সমাপ্তির ক্ষেত্রে ইতিবাচক ভূমিকা পালন করে। তবে শহর এলাকায় এর প্রভাব নেই বললেই চলে।

উপসংহার

মূল নির্ভরনের (benchmark regression) ফলাফলে দেখা যায় গ্রাম-শহর উভয় এলাকাতেই পাঁচ শতাংশ পুষ্টি অবস্থার উন্নতি শিশুদের স্কুল সমাপ্তির সম্ভাবনাকে সাত শতাংশ বাড়িয়ে দেয়। মডেল নির্ধারণের বিভিন্নতা দ্বারা এই ফলাফল প্রভাবিত হলেও প্রাপ্ত ফলাফলের গুরুত্ব অস্বীকার করার উপায় নেই। বাংলাদেশের গ্রাম এবং শহর উভয় এলাকাতেই নিম্ন আয়ের পরিবারগুলির ক্ষেত্রে পুষ্টির উন্নতি স্কুল সমাপ্তির ক্ষেত্রে গুরুত্বপূর্ণ ভূমিকা রাখে তা এই সমীক্ষা থেকে বলা যায়।

সমীক্ষা হতে প্রাপ্ত ফলাফলের ভিত্তিতে শিশু পুষ্টির উন্নতির জন্য বিবিধ উন্নয়ন নীতিমালা গ্রহন করা যেতে পারে। এরমধ্যে প্রসূতি মা এবং নবজাত শিশুর পুষ্টি কর্মসূচী থেকে শুরু করে সামাজিক বিপনন উদ্যোগ পর্যন্ত অনেক কিছুই হতে পারে। এছাড়াও দরিদ্র পরিবারের শিশুরা পড়ে এমন স্কুলগুলোতে খাদ্য কর্মসূচীও দরিদ্র জনগোষ্ঠীর পুষ্টিমান উন্নয়নে সহায়ক ভূমিকা রাখে। পুষ্টি সম্পূরক হালকা খাবার বিনামূল্যে প্রদান করা সম্ভব হলে স্কুলের শিক্ষার্থীদের দৈহিক ওজন-আয়তনের সূচক (body-mass index), স্কুলে ভর্তি, উপস্থিতির সংখ্যা বাড়ায়, পরীক্ষার ফলাফলের উন্নতি ঘটায় এবং স্কুল থেকে ঝরে পরাকে কমায় (আহমেদ ২০০৪)।

উন্নত পুষ্টি, তা পরিবার কিংবা শিক্ষা প্রতিষ্ঠান যার মাধ্যমেই আসুক না কেন তা শিক্ষাসেবা সরবরাহের দিকের কার্যকারিতা বাড়ানোর ক্ষেত্রে গুরুত্বপূর্ণ। পুষ্টি মানোন্নয়নের কর্মসূচী শিশুর একই শ্রেণীতে পুনরাবৃত্তি করার সম্ভাবনা কমায় এবং তা সফল হলে স্কুলের উপর ছাত্র সংখ্যার চাপ কমবে। তবে একমাত্র সফল পুষ্টি কর্মসূচীর মাধ্যমেই সবকিছুর সমাধান নিশ্চিত করা সম্ভব নয়। এর মাধ্যমে স্কুল থেকে শিক্ষার্থী ঝরে পড়ার হার কমে যেতে পারে, যা ব্যাক্তি পর্যায়ে শিক্ষার্থীদের জন্য একান্ত কাম্য। তবে মনে রাখতে হবে যে এর ফলে আর্থিক সংকটে পড়া জনাকীর্ণ স্কুলের ব্যবস্থাপনার সমস্যা অনেকগুন বেড়ে যাবে। পরিশেষে বলা যায় পুষ্টি অবশ্যই একটি গুরুত্বপূর্ণ বিষয়, তবে বাংলাদেশে ভবিষ্যৎ প্রজন্মের স্বাক্ষরতার হার উল্লেখযোগ্য মাত্রায় বৃদ্ধি করতে হলে অন্যান্য উদ্ভাবনীমূলক কর্মসূচীর প্রবর্তন ও প্রয়োজন।

1. Introduction

IS THERE A LINK BETWEEN NUTRITION AND CHILDREN'S EDUCATION SUCCESS? The answer from many international studies is "yes." The purpose of this monograph is to provide evidence on the extent of the link in Bangladesh, using results from a survey of low-income families.

Two fundamental ideas: the economic significance of literacy and primary school completion

No country escapes poverty until the great majority of its adult citizens can read and write. High levels of literacy are *not* a guarantee of escaping poverty, but widespread illiteracy *is* a guarantee of continuing poverty. Figure 1 on page 20 illustrates this first fundamental idea. Among all of the 16 poorest countries (with per capita GDP below $1,000) adult literacy is below 80 per cent. The middle group (with per capita GDP between $1,000 and $3,000) includes Bangladesh (BGD). With average per capita GDP of $1,400 over the half decade and average adult literacy of 56 per cent, it is very close to the trend line. Here, adult literacy among 22 of the 27 countries is below 80 per cent. Among the 14 most prosperous (with per capita GDP above $3,000) only four have adult literacy below 80 per cent.

Admittedly, many factors other than literacy matter in explaining per capita income levels. And causation also runs in the other direction: more prosperous countries organize better schools, and parents in more prosperous countries are more likely themselves to be literate and better able to help their children succeed in school. But there is a great deal of evidence to the effect that the direction of causation among countries below the $3,000 level is primarily from greater literacy to higher per capita incomes. Employers in countries whose governments are effective in educating their citizens are more able to take advantage of higher

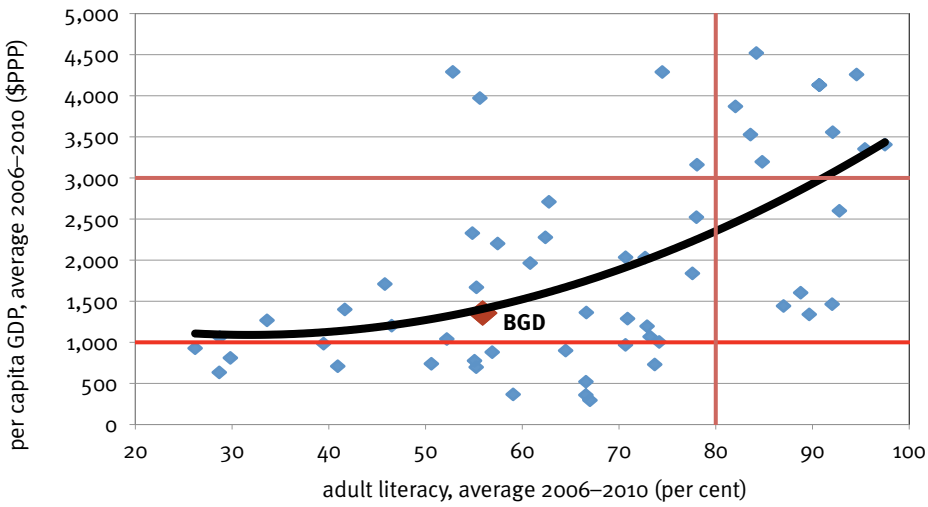
Map of Bangladesh showing sample areas for this study

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

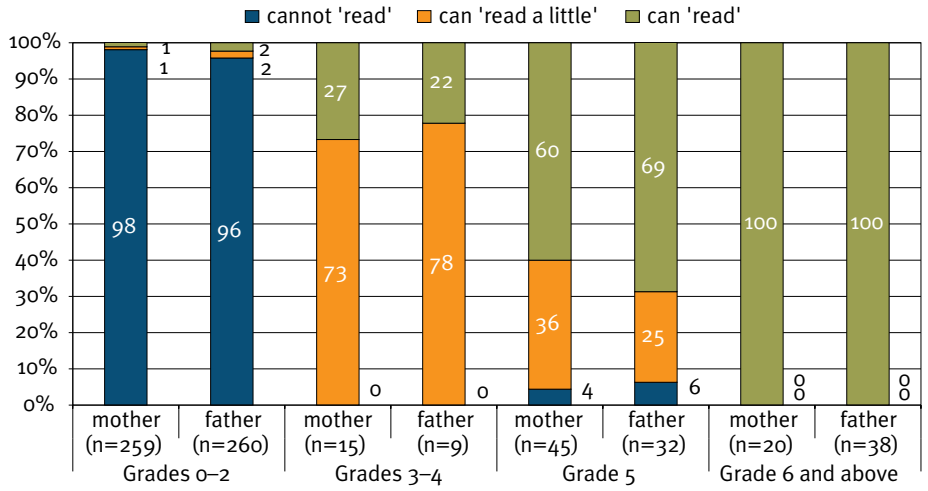
Figure 1: Per capita GDP by adult literacy, 2006–2010 (57 low-income countries)

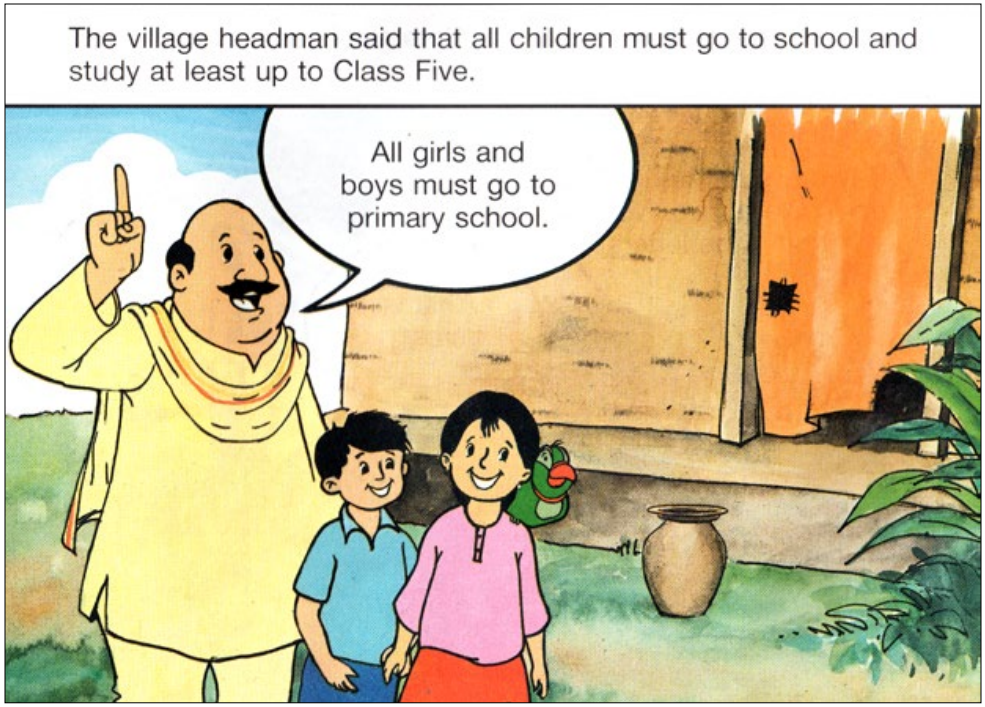


Source: World Bank (2012)

Note: Fifty-seven countries with available data averaged per capita GDP over the half-decade 2006–2010 below PPP$4,800. This threshold is the average for low- and medium-income countries over these years. (To put the cut-off into perspective, it is approximately 10 per cent of the comparable United States average.) For these 57 low-income countries, average 2006–2010 national adult literacy rates ranged from 26 to 97 per cent. At 56 per cent, Bangladeshi adult literacy ranked 39th among the 57 countries.

Figure 2: Distribution of parents' ability to read conditional on their highest class attendence





Since the 1990s UNICEF has made extensive use in South Asia of a series of cartoons featuring Meena, a village girl, and Mithu, her magic parrot. The primary goal is to increase parents' expectations for girls' education.

productivity opportunities, and workers in those countries are more able to realize the higher wages from such activities. In Bangladesh, the most obvious example of this dynamic is in the ready-made garment sector.

A second fundamental idea is that, if the great majority of adults in the next generation are to be literate, the great majority of present-day children must complete primary school. Figure 2 illustrates the relation between highest grade completed and ability to read among parents in the survey we conducted. The majority of parents did not progress beyond Grade 2. Among them, very few reported being able to "read" or even able to "read a little." Among those who had reached Grade 3 or 4, a quarter said they could "read" and three quarters said they could "read a little." Among those who had reached Grade 5 (the final year of the Bangladesh primary school cycle), nearly two thirds said they could "read"; nearly all the remainder said they could "read a little." Among those with some secondary schooling, all reported being able to "read."

A low-income country that achieves the 80 per cent literacy threshold should not be complacent. To realize middle-income status requires that sizeable minorities complete secondary studies and significant numbers pursue post-secondary training.

Two more fundamental ideas: the "supply" of and "demand" for education

A third fundamental idea is that universal primary education depends on both the "supply" of education services and the "demand" for them. The "demand" arises from parents' expectations and, at higher grades, the expectations of students themselves. The "supply" depends on both the availability of reasonable quality schools and parents' support of their children.

An interesting illustration of the importance of demand for schooling is a study of the impact that the nearby presence of garment factories has on years of schooling undertaken by girls (Heath and Mobarak 2011). Whatever the inadequacies of work safety regulations and however low are garment wages relative to those in other countries, the sector offers millions of young Bangladeshi women the prospect of increasing their income relative to most other options. Controlling for other factors, this study found a significant increase in average years-of-schooling in villages near to garment factories, relative to more distant villages.

A crucial element of the "supply" side is a reasonably effective government willing and able to organize a reasonably efficient school system (Richards and Vining 2013). This system need not comprise government-run schools only; it will usually include non-government schools. Unfortunately, Bangladesh suffers from political instability and weak governance. As to be expected, the problems of governance affect the school system, especially government schools.[2] One indicator is that the proportion of students attending government primary schools appears to have declined by about 10 percentage points from the late 1990s to late 2000s; it was found to be 57 per cent in a large survey conducted in 2008 (Nath and Chowdhury 2009,64). A wide range of non-government primary schools – from NGO-supported non-formal schools to madrassas – are now important providers of primary education, especially in hard-to-serve communities such as urban slums and certain rural areas. At the secondary school level, over 90 per cent of schools are non-government.

In response to the Millennium Development Goals (MDG) and the earlier Education for All campaign, primary and secondary enrolment in Bangladesh rose over the last decade.[3] However, a constellation of problems – inadequate funding, over-centralization of government school administration, and political interference in school management – resulted in a high level of school dropout and grade repetition. In 2008, the Campaign for Public Education (CAMPE) conducted a comprehensive national survey of students' progress in the country's various school types, both government and non-government. Of 100 students entering Grade 1 (at whatever

2 For a history and description of the Bangladesh school system see Sabur and Ahmed (2010).

3 The net primary enrolment rate is calculated as follows: the numerator is all children of appropriate primary school age (6 – 10 in Bangladesh) attending school, regardless of grade; the denominator is all children of appropriate primary school age (World Bank 2012).

The absence of an electrical connection to their village is one obstacle to these children (near the Sunderban in southwest Bangladesh) completing school. Only homes with solar panels have access to electrical lighting. JOHN RICHARDS PHOTO

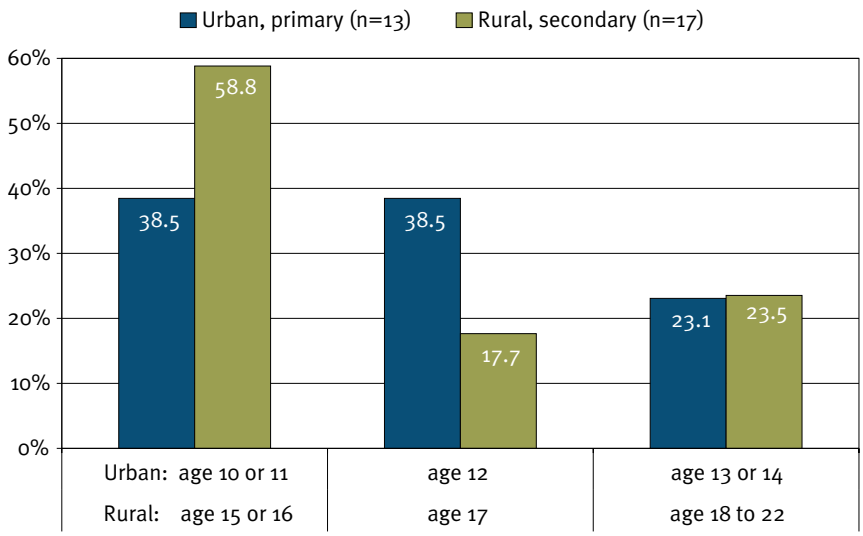
age), they found that 58 survived to Grade 5, averaged across all school types (Nath and Chowdhury 2009,84-89).[4] Only 50 successfully finished Grade 5. These survival and completion rates are substantially lower than the comparable results (81 per cent and 76 per cent, respectively) from a similar survey conducted in 2000. Somewhat offsetting this decline in the efficiency of student progress through the primary school cycle was an increase in the primary net enrolment rate. CAMPE estimated the enrolment rate improved from 71 per cent in 1998 to 76 per cent a decade later.

4 These results are from a synthetic cohort UNESCO algorithm applied to records of a sample of over 400 schools of all types.

There is additional evidence to suggest weakness in overall school management. Children enter first grade at varying ages, usually above the specified age of six. This late entry should not be blamed on government. However, it combines with a high rate of grade repetition to produce very low "age-in-grade" congruence. Hossain (2010) found in a 2009 survey that only 27 per cent of Bangladeshi children entered primary school at the prescribed age and survived to Grade 5 without grade repetition. Only 2 per cent in Grade 5 were under-age; 71 per cent were over-age. Most of the over-age were "over" by two years or more.

In the second half of the last decade, the net secondary enrolment rate averaged 45

Figure 3: Distribution of students currently in final grade, by age (Grade 5 for primary, Grade 10 for secondary)



per cent (World Bank 2012), but this rate is deceptive, since a quarter of students in the relevant age cohort (11 – 15 years in Bangladesh) were enrolled in primary grades (Ahmed et al. 2007, 18-19). Hossain (2009, 6) found higher age-in-grade congruence in secondary grades than in primary grades. In Grades 6 to 10, it was approximately 40 per cent. Nonetheless, 60 per cent remain over-age.

Our sample covered children some of whom were currently attending school and others who were not. Among the (admittedly small) sample of students currently in school and in the terminal year of their respective diplomas (Grade 5 for primary and Grade 10 for secondary) the lack of congruence is less severe than that reported by Hossain, but a quarter of the total, in both the rural and urban samples, were "over age" by two years or more. (See Figure 3.)

Bangladesh increased gross primary school completion[5] from 40 to 60 per cent in the 1990s, but made little further progress in the 2000s (World Bank 2012). The primary enrolment rate rose over the last decade but so too did dropout rates and

5 The numerator of the gross completion rate is the total number of students in the last grade of primary school, minus the number of repeaters in that grade. The denominator is the total number of children of official graduation age, assuming no grade repetition and student entry into Grade 1 at the designated age. This is a "gross" rate inasmuch as it includes all students completing, regardless of age. The "net" primary completion rate restricts the numerator to students at the appropriate completion age, assuming entry at the appropriate age and no grade repetition.

grade repetition. Given these problems, plus mediocre average school quality and a primary school cycle of only five years, probably no more than half of the present cohort of primary age children will be functionally literate as adults. For adult literacy in Bangladesh to cross the 80 per cent threshold (recall Figure 1 on page 20) this generation will probably require major improvements in government effectiveness in the education sector.

The family's role in "supply" of education services

Meanwhile, we should not ignore that family decisions and family resources are among the "supply" side factors that influence whether children complete their schooling. This is the fourth fundamental idea. As we illustrate below, children whose parents can read are more likely to finish primary school than children whose parents cannot. Better-educated and higher-income parents typically have more time and ability to help their children complete their school studies. So too, we demonstrate below, children fare better if their parents provide them with good nutrition.

This brings us to the subject of this report, the potential for better child nutrition to improve education outcomes. To an extent, addressing problems of inadequate nutrition can compensate for weaknesses of school systems – in Bangladesh as elsewhere.

Improving maternal and child nutrition is a prominent theme in worldwide public health research. *The Lancet*, a leading medical journal, published in 2008 a major review of the health consequences of maternal and child malnutrition and in 2013 a similarly ambitious review of strategies to address it (Black et al. 2008; Bhutta et al. 2013). Among the nutritional interventions that have proved effective, the *Lancet* concludes, are school-based food programs for disadvantaged children.

To foreshadow our results, we found that a constellation of family-level factors raise the probability of children completing both the primary and secondary cycle in a substantively important and statistically significant manner. These factors include higher quality of child nutrition, higher education among mothers, and presence of electricity in the family home.

Following this introduction, we discuss the sample, relevant variables and descriptive statistics. We raise some methodological issues, and present results. The final section includes discussion of results and policy implications.

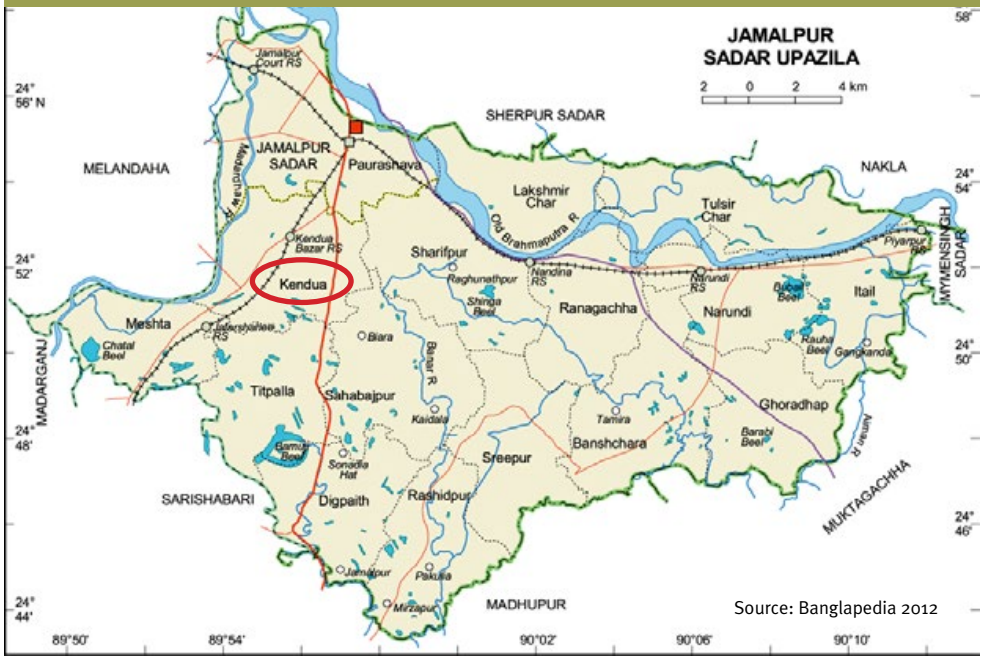
2. The survey of low-income women and their families

THE DATA FOR THIS STUDY ARE FROM A RANDOM SURVEY OF 577 LOW-INCOME married women conducted in an urban slum in Uttara, a community within the Dhaka metropolitan area (see Map 1 on page 19), and four rural villages in the Jamalpur district, in northern Bangladesh (see Maps 2 and 3 on page 28).

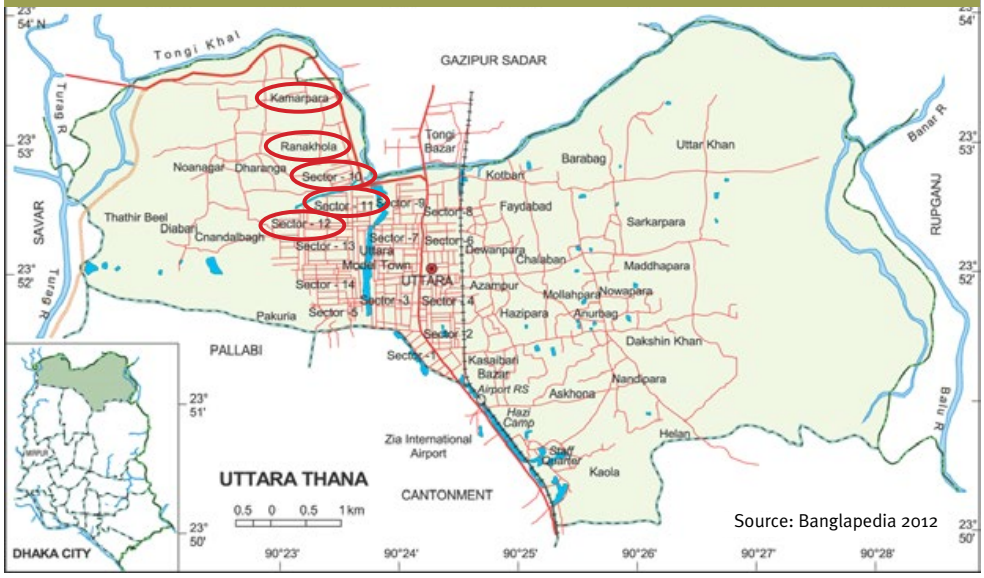
The interviewers restricted their sample to women living in *non-pakka* houses (houses without solid permanent foundations, walls and roofs). In each sample location, interviewers systematically sampled every third *non-pakka* house. If the potential respondent did not wish to participate in the survey, they approached the next *non-pakka* house. If a woman from that house participated in the survey, they repeated the process. A household included all people living together in the same dwelling and sharing assets and income. In this study, we analyze only those families in the sample having children within the age ranges described below (approximately 200 families).

The survey instrument comprised 40 questions dealing with various aspects of nutrition, family characteristics and community. In particular, it included detailed diet recall questions on the food consumed by the mother over the previous 24 hours and the education status of children. The interviewers queried mothers; they did not obtain direct evidence on children's nutrition. We infer children nutritional status based on responses about the mothers' nutrition and their response to a question posed on the distribution of "good food" (meat, fish, fruits and vegetables other than rice). For a description and precise definition of both dependent and independent variables, see Table 1 on pages 30 and 31.

Map 2: Rural sample area location: Kendua thana in Jamalpur Sadar upazila



Map 3: Urban sample area location: Uttara (Dhaka)



Dependent variables discussion

As our earlier discussion of the Bangladeshi school system indicates, there is a wide range in the age at which children complete (if they do) primary and secondary diplomas. In this study, we restrict the age range of children potentially in a position to have completed primary school to those between the ages of 10 and 17 years. The subset of children deemed to have completed primary school are those who survive to Grade 5, the final year of the Bangladesh primary school cycle, or to some higher grade and remain in school, or had finished schooling at Grade 5 or higher. Using this definition, nearly all of the eligible children in the rural (Jamalpur) sample completed primary school. The regression results for primary school completion are, therefore, based on the urban (Uttara) sample. Approximately half of the relevant aged children completed primary school.

Very few urban children in the sample entered secondary school. Therefore, we conduct an analysis on factors conducive to completion of secondary studies only on the rural sample. In Bangladesh, students sit an exam leading to the Secondary School Certificate (SSC) upon completion of Grade 10. (Those students who continue and complete Grade 12 sit an exam leading to the Higher Secondary Certificate (HSC).) We define the age range of children (or young adults) potentially in a position to complete the SSC as those between ages 15 – 22. The subset of children who had completed was defined as all children who had survived to Grade 10 or to some higher grade and were in school, or had finished schooling at Grade 10 or higher. By this definition, approximately half the rural sample had completed secondary studies.

Below, we undertake multivariate regressions using a logistic functional form. Hence, the dependent variables are transformations of the (binary) completion observations of the relevant students. They are, respectively, the log of the odds of a child completing primary (*Lnodds.complete.primary*) school or secondary (*Lnodds.complete.secondary*) school.

Independent variables discussion

The survey included questions on a range of family and community characteristics. Only some of these questions are relevant explanatory factors in this study. For convenience, we partition the relevant questions (and variables) into three categories: nutrition and intra-family dynamics, parental education, and family income/assets. Within the nutrition and intra-family dynamics category, we include three explicitly diet-related variables (mother's diet diversity, intra-family distribution of "good food" and an inferred child nutrition quality variable), a family drinking water quality variable (urban sample only), and an index variable that proxies potential advantages for a first-born child. Within the parental education category, we include variables measuring both parents' literacy and highest grade attended. The distinctions captured by the highest-grade-attended variables are, first, whether the parent finished primary school

Table 1: Description and definition of regression variables			
Variable	**Description**	**Definition**	**Notes**
Dependent variables			
lnodds. complete. primary	Log of odds that child has completed the primary school cycle or survived to final primary school grade	Status of child is binary: 1: child is currently attending Grade 5 or higher, or has completed education at Grade 5 or higher; 0: otherwise	Grade 5 is final primary grade. If child enters Grade 1 at specified age of six, completion occurs at age 10 or 11. Children frequently enter at higher than specified age and repeat grades. Hence, age in grade congruence is low. Sample includes all urban children ages 10–17 years. (Survey Q39)
lnodds. complete. secondary	Log of odds that child has completed SSC or survived to Grade 10	Status of child is binary: 1: child is currently attending Grade 10 or higher, or has completed education at Grade 10 or higher; 0: otherwise	For reasons of low age in grade congruence, sample includes all rural children, ages 15–22 years. Upon completing Grade 10, students take SSC examination. (Survey Q39)
Nutrition and intra-family dynamics			
child.diet. quality	Measure of child's diet quality inferred from mother's diet variety and intra-family food distribution	Interactive, binary variable 1: mother's diet diversity adequate or satisfactory AND 'good foods' distributed equally or in favour of children; 0: otherwise	This variable constructed by multiplying variables *intra-family. food.distribution* and *mother. diet.diversity.* (Survey Q1, Q7)
intra-family. food. distribution	'good food' distribution among family members	Binary variable 1: 'good food' distributed equally among family members or in favour of children; 0: otherwise	Survey allowed respondents to choose among different options of family food distribution. 'Good food' includes meat, fish, fruits, milk, etc. (Survey Q7)
mother. diet. diversity	Self-reported diet variety	Binary variable 1: mother ate at least 2 items in each of at least 2 of 4 main food groups (cereals and potatoes, fruits and vegetables, protein sources, dairy products) during last 24 hours 0: otherwise	Variable constructed from reported food consumption by respondent in 24-hour diet recall. (Survey Q1)
drinking. water. urban	Source of drinking water	Binary variable 1: family drinks tube well water or boils drinking water collected from other sources; 0: otherwise	Respondent reported the source of drinking water. Variable used in urban sample only, as almost all rural households access tubewell water. (Survey Q9, Q10)
rank.child	child's rank among siblings	Binary variable 1: child is oldest among his/her siblings; 0: otherwise	Calculated from survey data on age of all children in a family. (Survey Q39)

Table 1 continued

Variable	Description	Definition	Notes
Parental education			
mother. literate	Self-assessment of ability to read	Binary variable 1: mother responded 'can read' or 'can read a little'; 0: mother responded 'cannot read'	Survey allowed respondents to choose among three options: 'can read', 'can read a little', 'cannot read.' (Survey Q39)
father. grade5	Assessment by mother of husband's having reached at least Grade 5	Binary variable 1: mother responded that her husband attended Grade 5 or higher; 0: otherwise	Survey collected information on highest grade attended in school for all family members including husband (father of the child). The mother answered the question. (Survey Q39)
father. grade6	Assessment by mother of husband's having reached at least Grade 6	Binary variable 1: mother responded that her husband attended Grade 6 or higher; 0: otherwise	See above. (Survey Q39)
Income/asset measures			
electricity	Household access to electricity	Binary variable 1: House has electricity connection; 0: otherwise	(Survey Q33)
cultivable. land.rural	family's total holding of cultivable land (in acre)	Continuous variable, measured in acres.	Respondent reported the total of cultivable land respondent's family owns. Variable used in rural sample, where land is an important indicator of asset and income for the family. (Survey Q33)
village. land.urban	family's holding of homestead land in village	Binary variable 1: family holds some homestead in village; 0: otherwise	Respondent reported the total amount of homestead land her family holds. Variable used in urban sample. (Survey Q33)
mobile. phone	Ownership by family of at least one mobile phone	Binary variable: 1: family owns at least one mobile phone; 0: otherwise	(Survey Q33)
family. food. adequacy	Assessment by mother of family's food adequacy	Binary variable 1: family currently has 'enough' or 'more than enough' food for all members; 0: otherwise	Survey allowed respondent to choose among 4 options; 'more than enough', 'enough', 'sometimes not enough' and 'never enough.' (Survey Q34)

and, second, whether the parent entered secondary school. The family assets and income category includes a self-reported family food adequacy variable, land ownership variables (which differ for the urban and rural samples), a mobile phone ownership variable, and a household access to electricity variable.

Nutrition and intra-family dynamics

Recent literature on maternal and child nutrition stresses that for a child's cognitive development good nutrition is particularly important in the prenatal period and during the first three years of life (Bhutta et al., 2013; Black et al., 2008; Chowdhury and Ghosh, 2011; Georgieff, 2007; Kretchmer et al., 1996). Less critical perhaps, nutrition is also important for older children. A meta-review of evaluations of 18 school feeding programs among low-income children by Kristjansson et al. (2009, 29) concludes that: "school meals resulted in small improvements in weight, height in younger children, attendance, math performance, and behaviour. Evidence suggests a possible impact on intelligence tests, but replication is needed." Half of the 18 studies were conducted in developing countries. The average gain in annual school attendance in the treatment group was 4 – 6 days over the control groups. Of particular note was improvement in mathematics scores.

Good nutrition is a complex, multi-dimensional concept. It extends from the simple idea of adequate calories to assessments of the role played by particular micronutrients. The Food and Agriculture Organization has defined the "big four" nutritional problems in the developing world as micronutrient deficiencies in vitamin A, iodine, and iron, plus protein-energy malnutrition (Latham, 1997, ch.39). Georgieff (2007, 614S) discusses the nutrients crucial to early childhood brain development: protein energy, certain fats, iron, zinc, copper, iodine, selenium, vitamin A, choline, and folate. Adequate calorie intake – measured by the absence of stunting and wasting – is important, but clearly inadequate as measure of good nutrition, and certainly inadequate in an exploration of the link between nutrition, child cognitive development and school performance. Our choice of a summary nutrition variable used below stems from the conclusion that the ideal source for many micronutrients is a *diverse* diet, especially one that is rich in fruits and vegetables.

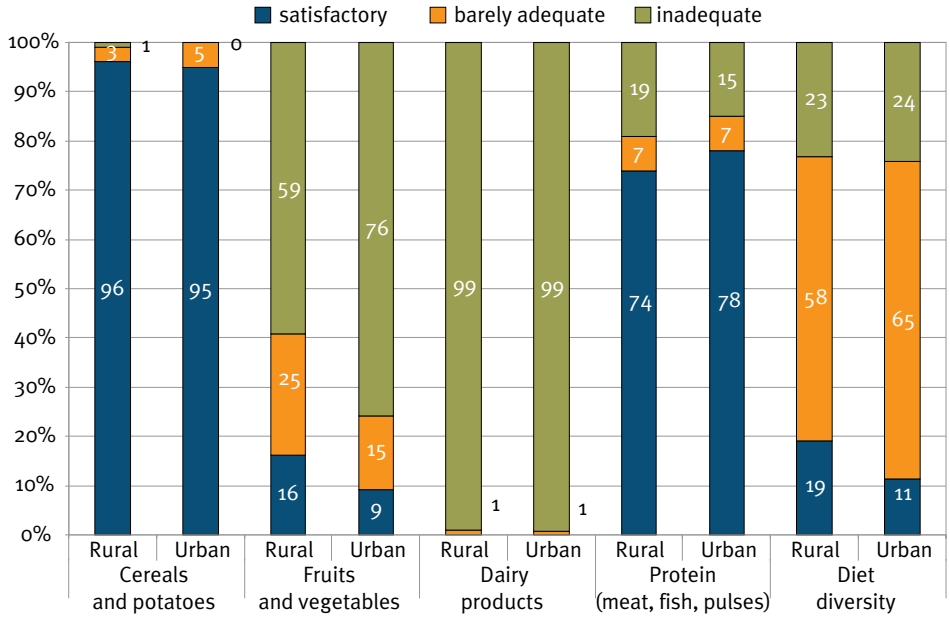
Based on a World Health Organization (2001) diet-recall scoring scheme, we define for each of the four basic food groups (cereals, fruits and vegetables, dairy products, protein) three levels of consumption: "satisfactory," "barely adequate" and "inadequate." Figure 4 illustrates the distribution, by consumption level, for urban and rural women relevant to this study. Nearly all women consumed a satisfactory number of servings of cereals and approximately three quarters a satisfactory number of protein servings. However, roughly two thirds had inadequate servings of fruit and vegetables and virtually all inadequate servings of dairy products.

The WHO scoring scheme also defines a diet diversity measure. While it does not specify individuals' specific diet deficiencies,

it is a useful measure of aggregate diet quality in a population. Based on this measure, we again construct a tri-level scoring. Figure 4 includes rural and urban distributions of this summary measure. Well over two in ten respondents fall into the "inadequate" range. More than six in ten are in the "barely adequate" range. Fewer than two in ten are at the "satisfactory" level.

There is no perfect summary metric of maternal diet quality. We construct a binary diet quality variable for the relevant

Figure 4: Distribution of mothers' diet-recall scores, by four major food groups and diet diversity (summary measure), rural and urban



Note: The four main food groups are cereals and potatoes, fruits and vegetables, dairy products, protein (meat, fish, pulses). For the text of the survey instrument and description of scoring method of all dimensions of the diet-recall, see Shahrin and Richards (2012). Below are descriptions of "satisfactory" and "barely adequate" scoring for each of the four food categories and summary diet diversity:

- **CEREALS AND POTATOES:** satisfactory: 6 servings or more; barely adequate: 3 to 5.5 servings
- **FRUITS AND VEGETABLES:** satisfactory: 5 servings or more; barely adequate: 2.5 to 4.5 servings
- **DAIRY PRODUCTS:** satisfactory: 2 servings or more; barely adequate: 1 to 1.5 servings
- **PROTEIN:** satisfactory: 1 serving or more; barely adequate: 0.5 serving
- **DIET DIVERSITY:** satisfactory: at least 2 items from at least 3 of 4 main food groups; barely adequate: at least 2 items from at least 2 of four main food groups.

mothers (*mothers.diet.diversity*) based on the "barely adequate" diversity threshold: it assumes a value of one if the respondent had consumed at least two distinct items from at least two of the four basic food categories over the previous 24 hours, otherwise zero.

Razzaque and colleagues (2011, 1) insist on "the importance of understanding the distribution of resources within a household in formulating policies as well as their implementation." Underlying their research is a concern that patriarchal cultural traditions in traditional South Asian communities are, in part, the explanation for persistence of inadequate nutrition within families, even where total family income is above standard poverty thresholds. From childhood to adulthood, even during pregnancy and lactating periods, many women receive inadequate nutrition (Leslie 1991, Ravindran 1986). It can reasonably be inferred that, if the mother's nutritional status surpasses the "barely adequate" level, so too will that of her children. Interviewers asked about the distribution of "good food" (meat, fish, fruits and vegetables other than rice or potatoes) among family members (*intra-family.food.distribution*). Enquiring about distribution of food within the family is delicate and this variable may be subject to considerable over-reporting of equal distribution or distribution favouring children.

As a measure of children receiving nutrition at or above "barely adequate," we define an interactive variable (*child.diet.quality*): the family diet is of reasonable quality inasmuch as the mother scored at or above the "barely adequate" level on diet diversity (*mother.diet.diversity*) and "good food" was distributed equally among family members or the distribution favoured children.

We acknowledge obvious limitations to this measure of children's nutrition. It is an inferred measure; it is not based on observations of children's food consumption. Second, we measured nutrition at a point in time when the children are of an age to have graduated from either the primary or secondary cycle. We have no evidence as to the continuity of adequate or inadequate nutrition since the children's birth.[6]

A second nutrition-related variable concerns family decisions in the urban community with respect to use of hygienic family drinking water (*drinking.water.urban*). If drinking water is unsafe, the probability of gastro-intestinal infection increases, which in turn lowers the nutritional benefit derived from a given diet. Virtually all rural families have access to hygienic water via tubewells. In the urban slum community, families gather drinking water from a range of risky sources (tap water, ponds, river). Only a minority render it hygienic by boiling.

We also probed a potential cultural effect leading to a favouring of the first-born child (*rank.child*). This variable indexes various diet and other considerations that may be afforded to the oldest sibling. A weakness in the survey design was our failure to record the sex of children. The treatment of sons and daughters may well differ.

6 We are aware of almost no studies of specific samples of children in developing countries that link early childhood nutritional status and subsequent cognitive development (but, see Chowdhury and Ghosh 2011).

Parental education

We use two different measures of parental education: literacy and "highest grade attained." In terms of parental support for children completing primary grades, probably the more important measure is literacy, the parent's ability to read school texts and children's assignments. In terms of parental support in secondary school, knowledge of course content becomes more important and probably "highest grade attained" is the better measure.[7]

We enquired as to the ability of father and mother to read. As Ahmed (2011) has discussed, the definition of literacy in national statistics agencies relies on a crude binary self-evaluation in a census or similar survey, whereas literacy is ideally considered as a continuum of competencies. The survey literacy question remained simple, but it invited respondents to distinguish between an unqualified ability to read and a more limited ability to "read a little." (However, the regression literacy variables are binary: literacy is defined as "can read" or "can read a little.")

We also enquired as to highest grade attended for both father and mother. Only a minority of parents reached Grade 5, and in both the rural and urban sample the number having entered secondary school (attended

7 Given the size of the samples, we are limited to summary definitions of parental education, and given the high co-linearity between measuring education via completion of primary school, entry into secondary, and literacy, we are restricted in any regression to use of only one specification in measuring each parent's contribution.

Grade 6 or higher) was less than half the number who had reached Grade 5.

Very few mothers entered secondary school in either sample, and we designate their education via the literacy measure (*mother.literate*). Fathers' education influence is negligible when defined in terms of literacy. If, instead, we define it in terms of highest grade attained, it approaches significance, at least in the rural sample. In the urban sample, we define a variable based on whether the father had reached Grade 5 (*father.grade5*). In the rural sample, we define a more demanding variable based on whether the father had entered secondary school (*father.grade6*).

Family income/assets

The sample affords some limited information on the income and asset holdings of families. We have defined the following variables: household access to electricity (*electricity*), amount of cultivable land owned by rural families (*cultivable.land.rural*), ownership by urban families of homestead land in the village of origin (*village.land.urban*), possession of a mobile phone (*mobile.phone*), and a subjective measure by the respondent of current adequacy of food available for the family (*family.food.adequacy*).

Nearly all slum households have an electrical connection, which is likely to be illegal and be subject to no or to variable informal charges. Electricity access in the urban sample is not a powerful indicator of relative income. Access to electricity in the rural sample is less prevalent. Rural electricity distribution is under the jurisdiction of the Rural Electrification Board, an agency with a remarkably good reputation for billing accurately and collecting amounts owing, fully and honestly (Rahmatullah et al. 2008). Hence, rural families with electricity are likely to be more prosperous than those without. However, the presence of an electrical connection in the home is more than a measure of income; access to electricity is a direct input to children's education success. It is far less stressful to study at night via an electric light than a kerosene lamp.

In the rural sample, the mother's estimate of the cultivable land owned by the family may be a good measure of family income. Similarly, in the urban sample, ownership of homestead land in the family's village of origin may indicate higher income.

In the urban sample three quarters of families (77 count) possessed at least one mobile phone. In the rural sample, phone ownership was somewhat less prevalent (67 count). Being less prevalent, phone ownership in rural communities may be a better proxy for a higher-income family than in the urban context.

The response to a simple question on adequacy of food available for the family is a straightforward measure of income. The question has been used in many studies involving low-income respondents.

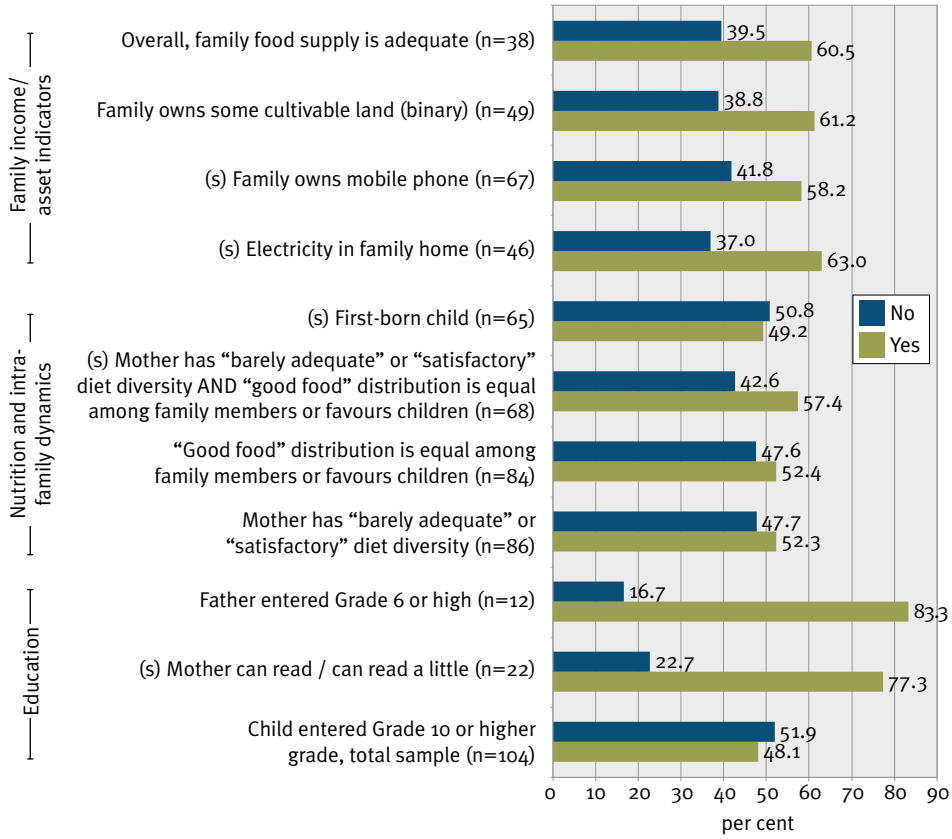
3. What factors matter in explaining school completion?

WE FIRST DISCUSS THE PROBABILITIES OF CHILDREN COMPLETING THEIR STUDIES, either at the primary or secondary level, conditional on the individual variables introduced above. We then turn to a more rigorous multivariate discussion in which we attempt to explain the incremental effect of change in particular variables. While the conditional probabilities are usually a good indicator of which variables matter, when we allow for the more complex interrelationships of the multivariate regressions, some of the seemingly important bilateral relationships turn out not to be significant. (The factors statistically significant in the regression analysis are designated "(S)" in Figures 5 and 6 on pages 38 and 39.) In the urban sample, for example, use of hygienic drinking water is clearly associated with a higher probability of completion. However, this relation is not significant in the multivariate analysis.

Bilateral relationships

If both the mother's diet diversity criterion is met *and* "good food" distribution is equal or favours children, the probability of a child having completed either primary or secondary studies is greater than the sample average. Furthermore, in both samples, if the child's diet satisfies this double criterion, the probability of completion is higher than if family nutrition satisfied only one of the diet diversity or food distribution criteria (see Figures 5 and 6).

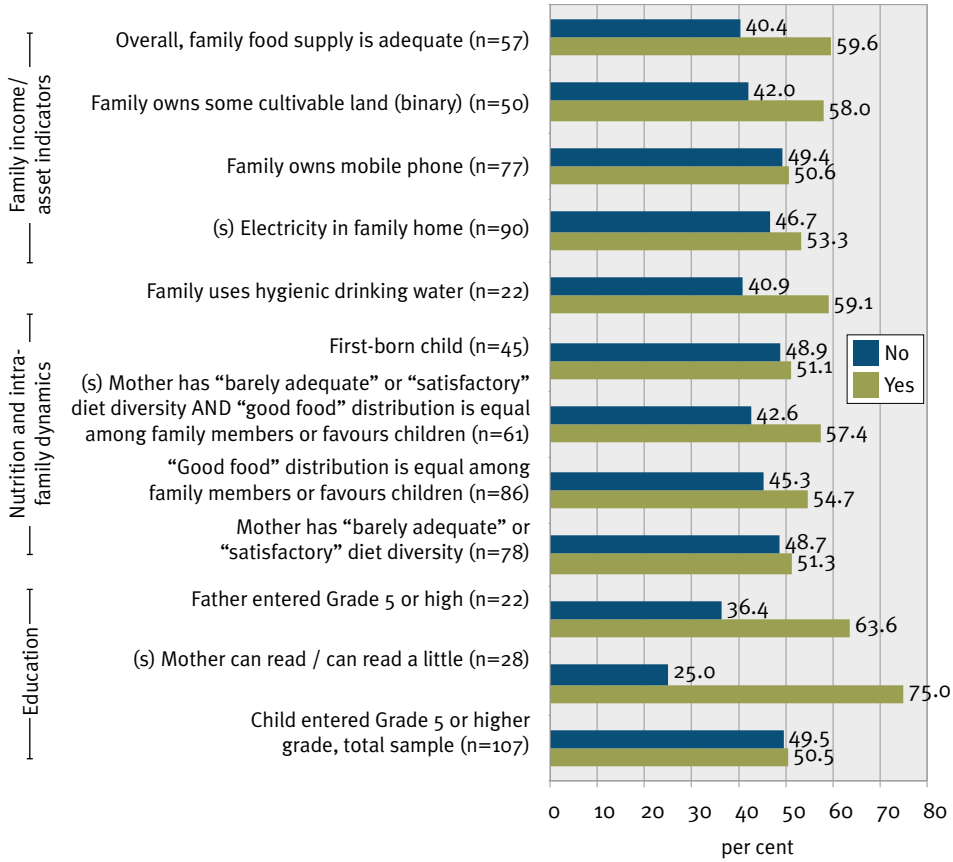
Figure 5: Probability of rural village children having completed secondary studies, conditional on selected characteristics of children's families



Note: Factors statistically significant in the regression analysis are designated "(S)"

We can specify parental education in several ways.[8] In terms of conditional probabilities, the education of both parents to the levels indicated dramatically increases the conditional probability of their children completing studies.

Figure 6: Probability of urban slum children having completed primary school, conditional on selected characteristics of children's families



Note: Factors statistically significant in the regression analysis are designated "(S)"

8 Given the size of the samples, we are limited to summary definitions of parental education, and given the high co-linearity between measuring education via highest grade and literacy, we are restricted in any regression to use of only one specification in measuring each parent's contribution.



The conditional probabilities associated with the four income/asset variables offer expected results. Whether due to its value as an input into children's learning or as a measure of family income or both, children are more likely to succeed in families having access to electricity. This is particularly evident in the conditional probability for the rural sample. Mobile phone ownership is associated with a much higher probability of education success in the rural sample; the impact is negligible in the urban sample. Ownership of land, as defined, is associated with a much higher probability of education success in both samples, as is the mother's subjective evaluation of food adequacy.

Multivariate regression relationships

The urban and rural regression results (see Table 2) reveal several statistically significant variables associated with education success, although they obviously leave much of the variance unexplained. We discuss the independent variables, in order, across both regressions.

First, the children's dietary quality variable is statistically significant in both regressions. As measured by *child.diet.quality*, a five percentage point improvement in average urban or rural child nutrition results in a seven percentage point increase in the respective completion rates. This result de-

Table 2: School completion regressions (rural and urban)		
	Dependent variables	
Explanatory variables	Log of odds that child reached Grade 10 or above (rural) *(Lnodds.complete. secondary)*	Log of odds that child reached Grade 5 or above (urban) *(Lnodds.complete. primary)*
Nutrition and intra-family dynamics		
child.diet.quality	6.200** (1.96)	5.697** (1.76)
drinking.water.urban		0.613 (0.15)
rank.child	6.299*** (2.07)	-0.726 (-0.22)
Parental education		
mother.literate	6.336* (1.63)	10.606*** (2.88)
father.grade6	5.703 (1.21)	
father.grade5		2.278 (0.58)
Income/asset measures		
electricity	7.342*** (2.46)	7.457** (1.72)
cultivable.land.rural	0.385 (1.08)	
village.land.urban		3.336 (0.97)
mobile.phone	7.862*** (2.43)	-2.081 (-0.57)
family.food.adequacy	-0.999 (-0.29)	2.993 (0.89)
R^2	0.29	0.18
Adjusted R^2	0.23	0.10
Number of observations	104	107

Note: In all cases, the estimation assumes the impact of individual variables on the dependent variable follows a logistic curve. The range of the log of the odds ratio is from negative to positive infinity. The actual regressions are conducted by OLS. The coefficients indicate the impact of incremental changes of regressors on the log of the odds ratio. T-statistics are in parentheses.

Legend:

*** significant (one tail) at 0.025
** significant (one tail) at 0.05
* significant (one tail) at 0.10

pends on our model specification and should be interpreted with caution.[9] Nonetheless, these are not trivial effects. On the other hand, the coefficient for a family's decision to use hygienic water in the urban sample (*drinking.water.urban*) is of expected sign but small and statistically insignificant.

Second, whether mothers are literate (*mother.literate*) is highly significant in the urban context. In the rural sample, it is significant but only at the 0.1 level. Fathers' education is not significant in either regression. Their influence approaches significance in the rural regression as specified by their having entered secondary school (*father.grade6*). Almost no fathers entered secondary school in the urban sample. Their influence, measured by completion of primary school (*father.grade5*), has the expected sign but is far from being significant.[10]

Third, in both samples, access to electricity is statistically significant. In addition to its contribution to productivity in many sectors, access to electricity is almost certainly of value in helping children succeed at school.

Fourth, the regressions reveal a sharp distinction between the rural and urban sample in terms of relevance of birth order and ownership of a mobile phone. In the rural sample the first-born child coefficient is positive and highly significant; in the urban sample, the coefficient has no significance. This may imply cultural differences between the urban slum and rural villages in treatment of first-born. Similarly, ownership of a phone has a positive statistically significant effect among rural families, probably because it serves as a proxy indicating higher family income. Among urban families, phone ownership is statistically irrelevant.

The coefficients for the land ownership variables have the expected positive signs, but are not significant. The food adequacy coefficient has the expected sign in the urban sample, but not in the rural sample. In neither sample is this variable statistically significant.

9 The seven-percentage point increment is calculated on the assumption all variables initially assume the average values for the relevant sample.

10 The data and results from alternate specifications are available upon request from the authors.

Rokeya Khatun, BRAC area manager, is responsible for more than 200 schools. BRAC is currently implementing a school feeding program. JOHN RICHARDS PHOTO


Horlicks
NIDO
Campbells
DIPLOMA
Vim

4. Policy implications and conclusion

OUR SURVEY PROVIDES REASONABLY FIRM EVIDENCE THAT, IN LOW-INCOME communities in Bangladesh, improvements in family nutrition – particularly improvements in diet diversity – would not only resolve some serious micronutrient deficiencies but would also contribute to better school performance.

The WHO (2013) recently published a comprehensive survey illustrating the vast range of nutritional policies being pursued across the world. The previous CPR monograph (on maternal nutrition) discussed at length some strategies for improving nutrition, and undertook some cost estimates (Shahrin and Richards, 2012). Here, we briefly note several of the proposals discussed.

Based on the same survey underlying this report, we found that receiving nutritional advice from doctors or nurses was associated with better maternal nutrition; receiving advice from community health workers was not. This implies that health workers should probably receive better training in the fundamentals of nutrition.

Although the regression results reported above do not find use of hygienic water to be a statistically significant factor in explaining primary school completion (in the urban sample), the conditional probability indicates that it matters. And the WHO nutrition policy report finds that programs to assure hygienic drinking water are a common feature among national nutrition programs. In the absence of safe sanitary water (the situation for the urban slum community), programs encouraging families to wash hands prior to handling food, boiling water, and so on, are useful but obviously second best.

Manufacturers of *halka* (snack foods) successfully sell to adults and children in low-income communities, evidence that these families have some discretionary income and respond to marketing campaigns mounted by manufacturers. NGOs and government could learn from food processing firms to conduct tests on consumer acceptability of foods fortified with supplements (such as fortified rice and yogurt) or how to adapt corporate marketing techniques on behalf of marketing better nutrition. Social marketing can extend to campaigns encouraging family vegetable gardens, a tactic better suited to rural communities where small, unused plots of land are more accessible.

Some countries (for example, France) have restricted the sale of unhealthy food in schools and expanded nutritional instruction in the curriculum (WHO 2013, 87-88). Most countries have integrated anti-tobacco campaigns into school nutritional instruction and have severely restricted tobacco advertising. Discouraging consumption of halka foods and, even more so, discouraging use of tobacco are important public health priorities in Bangladesh. In our survey, smoking was widespread. In two thirds of the households surveyed there was at least one smoker (usually the husband or teen-age sons). An effective anti-tobacco campaign would be a difficult policy to implement in a country like Bangladesh, due to weak governance.

An obvious strategy to address child nutrition is school feeding programs. The WHO (2013,18) policy study concludes that "settings such as schools and workplaces are not sufficiently used to reach and deliver nutrition interventions. In addition, when nutrition interventions are being implemented in schools, they do not cover the entire spectrum of nutrition problems." Ahmed (2004) found that the distribution of fortified snacks in schools of food-insecure areas in Bangladesh simultaneously improved children's BMI, school enrolment and attendance, academic achievement, and reduced dropout. Provision of biscuits is a relatively low-cost initiative; provision of school meals is administratively more complex and more expensive, but could address a wider spectrum of problems.

Better child nutrition improves the "supply" side of education services. If successful, child nutrition programs may well lower grade repetition and thereby reduce somewhat the pressure on schools to accommodate large numbers of students repeating grades. But successful nutrition programs are not enough. They may simultaneously lower dropout rates, a desirable outcome but one that aggravates the problems faced by crowded schools attempting to accommodate large student populations on very low budgets.

In sum, nutrition matters, but many other policy innovations are required over the next generation if Bangladesh's literacy rate is to reach the 80 per cent threshold discussed in the introduction, let alone approach universal adult literacy.

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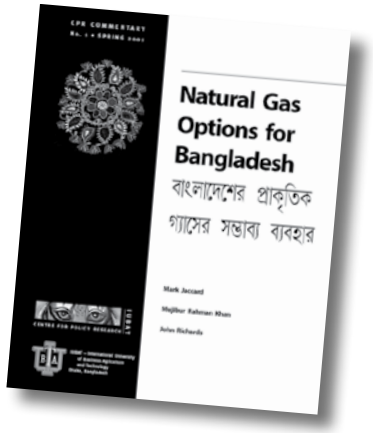
CPR COMMENTARY NO. 1

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.

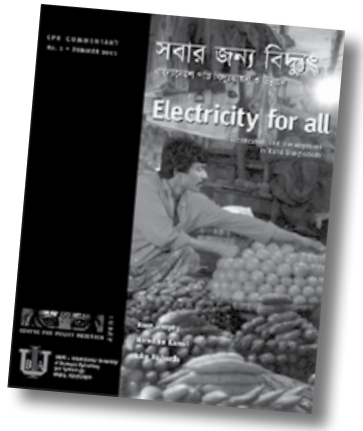
বাণিজ্যিক খাতে জ্বালানি শক্তির অতিস্বল্পতা বাংলাদেশের অর্থনৈতিক উন্নয়নের পথে একটি গুরুত্বপূর্ণ অন্তরায়। সৌভাগ্যক্রমে প্রাকৃতিক গ্যাসের বড় ধরনের উৎস আবিষ্কৃত হওয়ায় উন্নয়ন ক্ষেত্রে একটি উজ্জ্বল সম্ভাবনা সৃষ্টি হয়েছে। এই প্রতিবেদনে বাংলাদেশের প্রাকৃতিক গ্যাস সম্পদ ব্যবহারের তিনটি সম্ভাবনা নিয়ে পর্যালোচনা 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



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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.

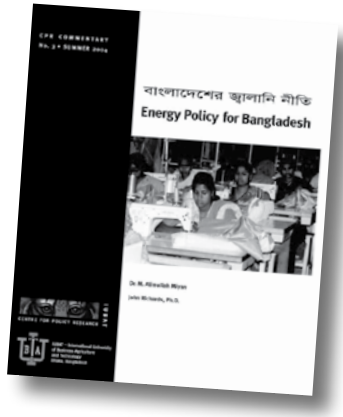
The Rural Electrification Board (REB) and its network of cooperatives – Palli Biddyut Samitees – now distribute nearly a quarter of electricity consumed in the country. Despite this impressive accomplishment, they need to do more.

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*

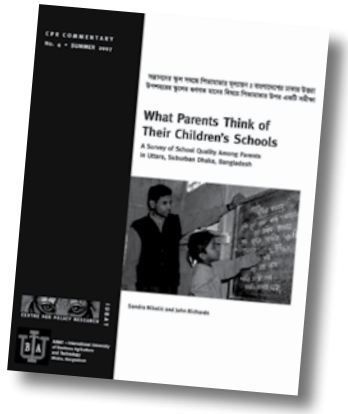
বাংলাদেশের ভবিষ্যৎ সমৃদ্ধির জন্য পর্যাপ্ত পরিমাণ বাণিজ্যিক জ্বালানি সরবরাহের গুরুত্ব সম্বন্ধে অতিরঞ্জনের কোন অবকাশ নেই। বাংলাদেশ সরকার ২০০৪ সালের মে মাসে একটি খসড়া জাতীয় জ্বালানি নীতি ঘোষণা করে এবং এর উপর জনসাধারণের অভিমত আহবান করে। সরকারের এই প্রতিবেদনে বর্তমান নীতির গুরুতর সমস্যার বিষয় এবং নূতন 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। পলী 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 6 through 10) are disturbingly low – albeit the comparable rates for boys are also low. At Grade 6 there is near parity between the number of boys and girls enrolled. By Grade 10, 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 11 and 12. 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।

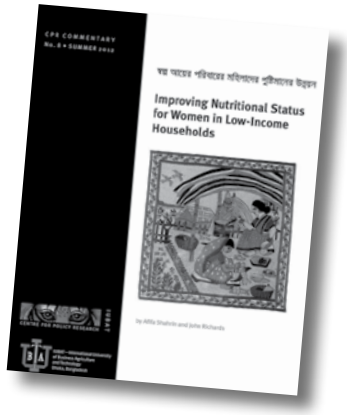
অধিকাংশ পরিবার কোনও ধরণের বিশুদ্ধিকরণ ছাড়াই ঢাকা পানি ও পয় কর্তৃপক্ষের পানি ব্যবহার করে। ভূ–পৃষ্ঠের পানি দূষণের কারণে ওয়াসার পানিতে আশংকামুক্ত মাত্রায় রোগ–বালাইয়ের জীবানু থাকতে পারে। পরিবারের সদস্যদের মাঝে তামাক ও পানের ব্যাপক ব্যবহার লক্ষণীয়। দীর্ঘমেয়াদী ব্যবহার এই দুইটিই ভয়ানক স্বাস্থ্যহানীর 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.

CPR COMMENTARY NO. 8

A New Mandate for the Rural Electrification Board



স্বল্প আয়ের পরিবারের মহিলাদের পুষ্টিমানের উন্নয়ন

by **AFIFA SHAHRIN AND JOHN RICHARDS**

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.

শিশুদের শিক্ষা সাফল্যের সাথে পুষ্টির কোন সম্পর্ক আছে কি? অনেক আন্তর্জাতিক গবেষণা মতে এই সম্পর্ক ইতিবাচক। বাংলাদেশের শহর ও গ্রামাঞ্চলের নিম্ন আয়ের পরিবারের উপর পরিচালিত এই গবেষণায় প্রাথমিক এবং মাধ্যমিক স্কুল পর্যায়ে এই সম্পর্কের মাত্রাজনিত প্রমাণ পাওয়া যায়।

গবেষণায় অন্তর্ভুক্ত শিশুদের মধ্যে যাদের পিতা-মাতা পড়তে পারে তাদের স্কুলের শিক্ষা সম্পন্ন করার সম্ভাবনা পিতা-মাতা পড়তে পারেনা এমন শিশুদের চাইতে বেশি। যেসব পিতা-মাতার আয় বেশী তারা সাধারণত তাদের শিশুদের বেশী সময় পর্যন্ত স্কুলের পড়া শেষ করার সুযোগ দিতে পারে। আবার বাড়ীতে বিদ্যুৎ সংযোগ থাকায় অর্থনৈতিকভাবে সম্পন্ন পিতা-মাতার সন্তানেরা পড়াশুনায় ভাল করে। দেখা গেছে, স্কুলের সাফল্যের ক্ষেত্রে উন্নত পুষ্টি একটি গুরুত্বপূর্ণ নিয়ামক।

জরিপে হতে প্রাপ্ত তথ্যের বিশ্লেষণে আলোচ্য গবেষণা মা এবং শিশুদের উন্নততর পুষ্টির উপর গুরুত্ব আরোপ করেছে। প্রসূতি মা এবং নবজাত শিশুর পুষ্টি কর্মসূচী থেকে শুরু করে সামাজিক বিপনন উদ্যোগ, দরিদ্র পরিবারের শিশুরা পড়ে এমন স্কুলগুলোতে খাদ্য কর্মসূচী ইত্যাদি অনেক ধরনের নীতিই দরিদ্র জনগোষ্ঠীর পুষ্টিমান উন্নয়নে সহায়ক ভূমিকা রাখে।

Is there a link between nutrition and children's education success? The answer from international studies is "yes." Here we provide evidence on the extent of the link – both at the primary and secondary school level – among a sample of low-income families in urban and rural Bangladesh.

Children whose parents can read are more likely to complete their studies than children whose parents cannot. Higher-income parents typically have more time to help their children, and usually their homes have access to electricity, a valuable aid to learning. This study demonstrate that, among the factors bearing on success at school, good nutrition matters.

Evidence from the families surveyed indicates the importance of better maternal and child nutrition. The range of potentially valuable programs is wide: from nutrition campaigns targeting pregnant mothers and pre-school children, to social marketing campaigns that promote improved diets, to school feeding programs.

US$15 – Taka 200