

## CHAPTER 4: SPECIAL CHALLENGES TO ATTAINMENT OF THE MDGs

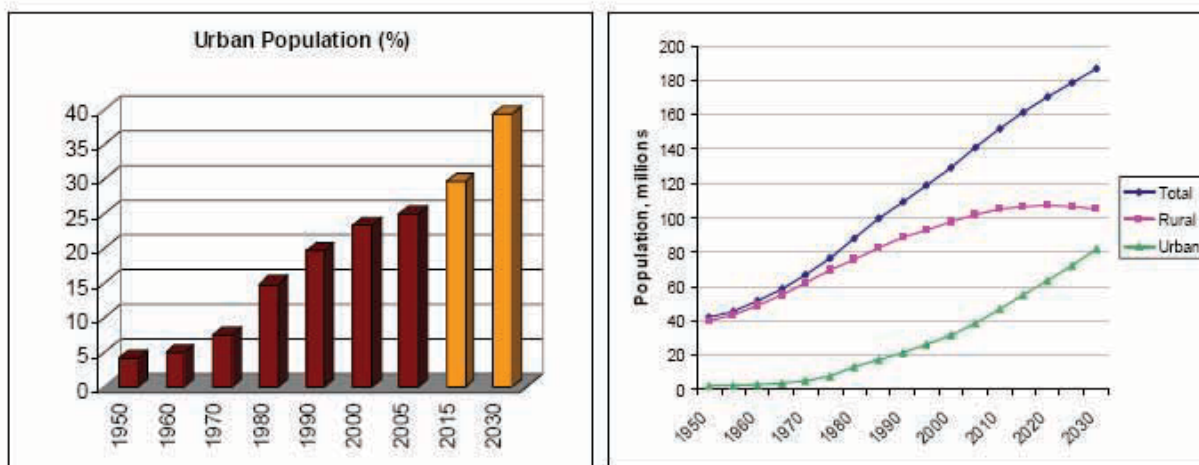
35. Bangladesh's growth record and history of social progress have been emphasized in this report as developments that bode well for the country's prospects for achieving many of the MDGs. It has been suggested as well that Bangladesh might even be able to expedite its pace of economic and social progress and, in so doing, surpass specific MDGs. This possibility should be cause for great hope in the country. However, there exist a number of significant development challenges that have far-reaching consequences for overall MDG progress, and that threaten to undermine Bangladesh's gains. Each of them imposes a significant constraint on Bangladesh's development prospects through their wide-ranging implications. For example, urbanization in Bangladesh and the concomitant deterioration of welfare in metropolitan areas raises serious questions about the attainability of the MDGs at the national scale. Until now, the policy response to these changes has been muted, as urban problems, which are continuously growing and worsening, are often approached with rural conceptual frameworks that are ill-suited to urban life. The challenges posed by urbanization are critical because they are felt across multiple sectors and constrain multiple MDGs. Likewise for issues related to inadequate infrastructure and poor environmental quality. In these sectors, too, problems and constraints impact upon all the MDGs, as well as tend to reinforce each other. The unsatisfactory state of water and sanitation infrastructure, for example, leads to unnecessary degradation of the people's environments, and in so doing affects morbidity, labor productivity, learning outcomes, and nutrition. The third cross-cutting challenge to the MDGs that we will focus on here is related to malnutrition. As is well known, proper nutrition is essential for cognitive and physical development and functioning, and yet Bangladesh has one of the highest malnutrition rates in the world. In Bangladesh, this problem is not only a consequence of income poverty and low consumption; even in the richest quintiles one finds malnutrition rates that rival the averages from impoverished neighbors such as Myanmar. Thus, these three cross-cutting issues—urbanization, infrastructure and environment, and malnutrition—represent major threats to the MDGs, which do not have straightforward solutions. In urban areas, in particular, the policies that are necessary for addressing these special challenges are not yet well-defined. By providing an overview of them here, this report hopes to draw attention to subjects that it argues merit greater attention by policymakers than has been paid until now.

### **I Emerging Challenges Created by Urbanization**

36. At present the majority of Bangladesh's population is rural, but this situation is changing rapidly as a continuously increasing share of the population lives in urban areas. The rate of urbanization at the national level is among the fastest in the world, with the capital city Dhaka the single fastest growing metropolis—by 2020 it is expected to be the second largest urban agglomeration on the global stage. Given current trends, the national population is expected to become predominantly urban in roughly three decades.

37. An increasing proportion of national progress or stagnation toward the MDGs will depend on outcomes in urban areas of the country. The urban population's share will increase from 25 to 30 percent of the national population in the time period between 2005 and 2015, which is the decade remaining for Bangladesh to achieve its MDGs. This trend underscores the fact that urban areas will play an increasingly important role at the national level and indeed will be increasingly important determinants over time of national welfare and performance on the MDGs.

Figure 4.1: Urbanization in Bangladesh



Source: UN World Urbanization Prospects

38. Urbanization has not been spread evenly across municipalities but rather has been driven by increases in the number of people living in metropolitan cities, particularly Dhaka and Chittagong. One descriptive measure that captures the nature of this demographic concentration is urban primacy, which is the share of the total urban population that resides in the largest urban agglomeration in the country (Henderson 2002). According to figures from the Bangladesh Bureau of Statistics (BBS), this measure of urban primacy has increased from 25 percent in 1981 to 34 percent in 2001. If one expands the definition somewhat to include all statistical metropolitan areas (SMAs)—that is, Dhaka, Chittagong, Khulna, Sylhet, Rajshahi, and Barisal—then the urban primacy rate has increased from 42 percent in 1981 to 52 percent in 2001. Thus, not only has urbanization been increasing rapidly nation-wide, but also the share of urban dwellers is increasingly concentrated in only a few metropolitan areas.

39. The high concentration of the population in metropolitan areas poses special problems for economic development and service delivery. The manner by which economic development and service delivery can be enhanced in metropolitan areas has not yet been assigned due attention from planners and development practitioners, who tend in Bangladesh, as in other countries that have been historically largely agrarian, to adhere through habit or past experience to rural-oriented conceptual frameworks and models. This assertion is evidenced in part through the extensive efforts to improve access of rural people to primary and secondary education, to health facilities, to improved sanitation sources, and to microfinance. By contrast, urban and metropolitan areas rarely receive comparable programs designed specifically to tackle the outstanding issues they face. Instead, they are often recipients of programs that have been applied elsewhere, often successfully, but which fail to account for urban specificities. One example of such rural-oriented thinking can be seen in the secondary education sub-sector, to which the Female Secondary School Assistance Program (FSSAP) and the Monthly Pay Order (MPO) system have done much to boost access, particularly for rural girls, but has failed to address the specificities of the metropolitan context.<sup>12</sup>

40. This section of the report examines the performance of metropolitan and urban areas on a number of MDG indicators, which are important in their own right but are also significant as inputs to maternal and child health outcomes. It will be seen that the human development situation in metropolitan areas is either stagnating or actively worsening as a rapidly growing population increasingly strains

<sup>12</sup> See Stopnitzky, Al Zayed, and Khan (2006) for an in-depth discussion of these programs in the metropolitan context. The principal conclusions of their paper can be found in chapter 4 below.

services and stresses the living environment. This strain on services is characterized by two features: firstly, the rising population requires a continuously and proportionately increasing supply of services that have not been forthcoming until now for a variety of reasons; secondly, the growing pressure placed on existing services outstrips their capacity to provide, thereby driving down the quality of those existing services. In other words, for a large percentage of metropolitan city dwellers, particularly the poor among them, there exist both ‘*first generation*’ problems of access to services and ‘*second generation*’ issues related to the quality of services. These dual challenges must be addressed if Bangladesh is to sustain, and further, progress toward the MDGs.

41. In Bangladesh, there is significant spatial variation in outcomes for all MDGs, much of which is driven by the often poor performance of metropolitan areas. Even within metropolitan areas, substantial differences in MDG outcomes can be seen, particularly in the low-income areas and slums as compared to wealthier areas. The available evidence suggests that these slums, in which outcomes on many MDG-related indicators are catastrophic, as will be seen below, have been growing at roughly 13 percent per year, or over 200 percent in the last decade alone, an even faster rate than metropolitan areas as a whole. The situation of service delivery in the slums and low-income areas is worse than already low metropolitan averages, a point that will be emphasized repeatedly in the discussion that follows. Of course, these outcomes have a significant effect at the national level due to the large and growing share of the national population that resides in urban areas generally, and low-income urban settlements in particular.

**Table 4.1: Slum Growth Over the Last Decade**

Comparison of figures for 1996 and 2005					
Year	Number of clusters	Number of households	Slum population	Total population	% Living in slums
1996	3,007	220,920	1,104,600	---	---
2005	4,966	673,874	3,420,521	9,136,182	37.4%
Growth of slums over past 10 years in absolute and relative terms					
Year	Number of clusters	Number of households	Slum population		
1996-2005	1,959	452,954	2,315,921		
10 year period	65.2%	205.0%	209.7%		
Annual average	5.7%	13.2%	13.4%		

Source: Orsola-Vidal (2006) using data from the Center for Urban Studies.

42. Of the eight MDGs, only one deals explicitly with urban areas: Goal 7 on Ensuring Environmental Sustainability, which uses three indicators to assess progress. These indicators are: the proportion of the urban population with access to safe water, the proportion of the urban population that has access to improved sanitation, and the proportion that has secure tenure, either through documentary evidence or de facto protection against eviction. The UN adds durability of housing, which provides protection against extreme climatic conditions such as flooding, and sufficient living area as two further dimensions that affect the welfare of slum dwellers.

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43. Although only Goal 7 of the MDGs deals directly with urban issues, each and every one of the other MDG outcomes in Bangladesh is also affected by the conditions and characteristics of urban life. Provision of primary and secondary education, for example, is negatively influenced by the relatively higher prices associated with land and labor. Health care systems are burdened with growing demand for services and limited access to primary health care, including antenatal care. Extremely poor air quality produced by industry and a heavy reliance on automobiles both pose health risks that exacerbate acute respiratory infections (ARI), a leading cause of child mortality. High levels of chemical and biological pollution in water sources increase the prevalence of diarrhea, another important factor in child and maternal mortality and morbidity. In such ways, among others, the features of modern urban life impact upon the MDGs and impair progress toward them.



### Service Delivery in Metropolitan Areas

44. Available services are delivered by a combination of public agencies, private providers (often ‘mastaans’ that provide through illegal means), NGOs, and donors. These various service providers vary dramatically in their technical capacities, financial resources, and accountabilities, but on average metropolitan residents appear to be wholly dissatisfied with the current state of service delivery (World Bank, 2002). Overall, less than 20 percent of city residents were happy with the state of eight different services. Among poor households, this figure dropped to less than five percent on seven types of basic services.

Table 4.2: Administrative Structure of Service Delivery in Greater Dhaka

Agency	Services	Sources of Financing
<b>Central government agencies</b>	Education, health, legal, judicial, police, land registration,	Taxes, donor funds
<b>Dhaka City Corporation</b>	Sanitation, solid waste disposal, road building and maintenance, street lighting, traffic signaling, parks, playgrounds, graveyards, slaughter houses, market places, street addressing, provision of nominal stipends to primary education, slum improvement, mosquito prevention, primary health care	Property taxes, conservancy, lighting and water tariffs, fees, fines, rental income, government grants, donor funds
<b>Pourashava</b>	Sanitation, solid waste disposal, primary health care, road building and maintenance, street lighting, traffic signaling, parks, playground, poverty alleviation, slum improvement, planning, etc.	Property taxes, conservancy, lighting and water tariffs, fees, fines, rental income, government grants, donor funds
<b>WASA (Water and Sewage Authority)</b>	Drinking water, sewerage	Water tariffs, loans, government grants, donor funds
<b>RAJUK</b>	Planning and development of physical infrastructure, including housing	Sale of lands, government grants
<b>Specialized authorities: PWD, NHA, DPHE, LGED</b>	Civil works, housing, physical development	Government budget, donor funds
<b>DESA (Dhaka Electric Supply Authority)</b>	Electricity	
<b>Titas</b>	Gas Supply	

Source: Chowdry 2004 and World Bank 2006

### Water and Sanitation Services in Slums Drive Outcomes in Metropolitan Areas

45. Access to improved sanitation has increased remarkably in rural areas but has remained virtually stagnant in metropolitan areas. The Government of Bangladesh's Total Sanitation program, which was initiated in 2003, has performed well in rural areas, dramatically improving access to improved sanitation in rural Bangladesh from only 29 percent in 2003 to 62 percent in 2005 (see Table 4.3 below). Meanwhile, access to sanitation in metropolitan areas has remained stagnant at about 75 percent, after improving only five percent in the same two-year period.

**Table 4.3: Absolute and Relative Measures of Sanitation Progress in Bangladesh**

Area	Total No. of Households	October 2003 (%)	June 2004 (%)	December 2004 (%)	June 2005 (%)	December 2005 (%)
Rural Area	1,83,26,332	5,272,589 (28.8)	6,081,923 (33.1)	7,240,626 (39.4)	10,457,387 (57.1)	11,347,905 (61.9)
Municipalities	18,51,337	983,025 (53.1)	1,036,350 (56.0)	1,189,599 (64.3)	1,371,416 (74.1)	1,431,515 (77.3)
City Corporation	1216424	850,527 (69.9)	885,454 (72.8)	892,906 (73.4)	907,797 (74.6)	914,034 (75.1)
National	21394093	7,106,141 (33.2)	8,003,727 (37.4)	9,323,131 (43.6)	12,736,600 (59.5)	13,693,458 (64.0)

Source: Orsola-Vidal (2006) using data from the National Sanitation Secretariat

46. Looking at the average for metropolitan areas masks the water and sanitation situation in slums, in which outcomes are significantly worse. Recent studies (LGED 2005; Orsola-Vidal, 2006) present evidence that only 35 percent of low-income metropolitan inhabitants use hygienic latrines (as compared, e.g., to 75 percent in non-metro urban areas). In Dhaka, it is estimated that merely 26 percent of slum dwellers use only hygienic latrines, which suggests that the remainder is exposed at least part of the time to health risks caused by unhygienic sanitation in a given location; over 50 percent of slum dwellers use only unhygienic latrines, and thereby suffer constant exposure to such health risks. There are in fact good reasons to suspect this number has been worsening over time—and will continue to do so in the future—including the fact that more aggregated figures on access to hygienic sanitation in metropolitan areas show little improvement, the fact that the slum population is rapidly increasing, and the related evidence that slums are least likely within these areas to benefit.

47. Adequate provision of safe water and improved sanitation in metropolitan areas, especially in slums, is constrained by the lack of a comprehensive urban policy framework, insecure land tenure, technical difficulties, and institutional weaknesses among providers. There does not exist a national urban policy that addresses urbanization and urban poverty, most likely due to the persistent but erroneous belief that the situation in rural areas is universally direr than in metropolitan areas, and the notion that improving the situation in the slums will tend to attract more migrants to the cities. Further, the pervasive lack of land tenure among the metropolitan poor impairs implementation of the existing relevant policies such as the National Policy for Safe Water and Sanitation 1998. The Dhaka and Chittagong Water and Sewerage Authorities, for example, do not provide services to those households deemed 'illegal' for lack of secure tenure. A shift in this policy is absolutely critical if low-income inhabitants of metropolitan areas are to gain access to a safe water supply and hygienic sanitation facilities. Compounding the constraints of the institutional framework explained above is a number of technical difficulties specific to metropolitan life, such as extraordinarily dense settlements with little free space, as well as their frequent proximity to water bodies and flood-prone areas. Finally, the institutional service providers for water and sanitation suffer from their own constraints. There is poor coordination between the Water and Sewerage Authorities and the City Corporations, neither of which have sufficient capacity to provide universal water and sanitation services. Importantly, the WASAs suffer from very

limited accountability both internally and externally, a lack of transparency in management, financial limitations, and extremely bureaucratic decision-making processes (Orsola-Vidal, 2006).

48. Nevertheless, successful models of water and sanitation service delivery can overcome these constraints by giving the community control over physical resources, providing significant support to program software, and helping to reduce the risks associated with possible eviction. Dushtha Shasthya Kendra (DSK), for example, is a non-governmental organization that piloted, with the support of WaterAid, a service delivery model based on social intermediation between community members and the public utilities, which enhances the relationships of accountability among stakeholders. The model is driven by community demand and emphasizes strongly the social mobilization and community management (i.e. software) components, ensuring that latrines do not end up unused, as with many supply-driven models. The model is also based on cost recovery, which drives down the costs of provision, helps to build the 'short route' of accountability, and enhances long term sustainability. This model has proven to be effective and is now being replicated by international NGOs and scaled up by WaterAid through partnerships with other local NGOs.

49. Like the post-mortem exercise that is an integral part of the GK health care system (which is discussed in greater detail in chapter 5), the DSK model of sanitation service delivery in slums provides an excellent example of *creative tension*. Under usual circumstances, the relationship between slum dwellers and metropolitan public utilities is non-cooperative at best, largely due to the fact that the WASAs fail to provide water to those without secure tenure—a highly problematic situation for slum dwellers which was discussed above. But in the DSK model, the organization enters to reframe the institutional framework guiding service provision in such a way that service users and providers are placed into newly productive, complementary roles based on mechanisms of accountability that did not exist previously. These relationships are structured by creative tension, which describes that all stakeholders are active in a way that encourages the others to fulfill their own roles and responsibilities. DSK serves, then, as a kind of bridge between a given slum community and WASA that re-instills the creative tension or balance among stakeholders, which had been lost due to the particular policies of the WASAs. The social intermediation function performed by DSK is, however, only one aspect of its service delivery model that fosters such creative tension. The DSK model also has several specific features that create incentives for beneficial interaction among stakeholders. One of these features of the DSK model is the cost recovery component of water and sanitation provision. By paying for the services that are consumed, slum dwellers enter into a normal operating relationship with the public utilities, albeit one mediated by an external agency (i.e. DSK). More to the point, they have effectively 'bought into' the service delivery framework by making regular payments to service providers, thereby increasing the incentives for monitoring the quantity and quality of the services they receive (see also WDR 2004 for a discussion on the related argument that user payments enhance the 'short route' of accountability). Finally, DSK also facilitates community involvement and social mobilization around project design (contamination and poverty mapping, and choice of technology), implementation (cleaning and maintenance of facilities, money collection, monitoring), and advocacy regarding user rights. Each of these activities draws the various stakeholders into an institutional framework marked by novel roles and responsibilities, which operate in complement to each other in order to produce desirable outcomes.

### **Poor Secondary Schooling Outcomes in Metropolitan Areas**

50. National progress in expanding access to secondary schooling has been driven largely by improved enrolment rates in rural areas, while metropolitan areas have been left behind. The GoB's efforts to boost the supply and demand for schooling through the MPO system and the FSSAP have been hugely successful in rural areas. Metropolitan areas, however, have not kept pace with these successes; indeed, some evidence suggests that the situation may be worsening, particularly among the two poorest income quintiles (HIES 1996, 2001, and 2006). In metropolitan areas, for example, only 47 percent of

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primary school graduates from the poorest two quintiles are enrolled in secondary school. This outcome compares disastrously with rural areas, in which the enrolment rates among the bottom two quintiles are nearly 70 percent. In 2001, only in the richest quintiles were enrolment rates in metropolitan areas any higher than rural areas (82 versus 81 percent, respectively) but they were still significantly lower than non-metro urban areas (91 percent). The situation in secondary schooling for these groups too has been worsening over the last five years: today enrolment rates for the richest two quintiles are lower in metropolitan areas than anywhere else in the country.

51. Looking at all children of secondary school age (11-18) irrespective of whether or not they graduated from primary school (thus a more comprehensive reflection of the education situation in metropolitan areas), enrolment rates are at terrible levels, dropping as low as 19 percent for males and 24 percent for females from the poorest quintile. This finding reflects the fact that secondary enrolment levels are outcomes of both the secondary and primary schooling systems. In metropolitan areas, primary schooling rates, like secondary enrolment rates, are significantly lower than in rural or non-metro urban areas. Again, this outcome is more severe among the poorest two quintiles, for which primary enrolment rates are only 50 percent for the first quintile, and under 70 percent for the second. Overall, then, in metropolitan areas half of very poor children of schooling age are failing to enroll in primary school; of those that do go and finish, another half fail to enroll in secondary school. This combined effect creates the catastrophically low enrolment figures found in the figure below.

**Table 4.4: Secondary Enrolment Rates of All Children Aged 11-18**

Income Group	Male			Female		
	Urban	Rural	Metro	Urban	Rural	Metro
Poorest 40%	39.3	40.5	37.0	58.0	51.9	36.0
Middle 20%	61.7	53.1	46.7	70.3	65.8	56.2
Richest 40%	79.1	67.6	70.6	78.3	76.6	69.7

Source: Stopnitzky, Al Zayed, and Khan (2006) using data from HIES 2006.

52. These outcomes can be explained in part by comparing how the MPO system functions across different geographical areas. The MPO is an instrument for publicly funding privately delivered secondary education. It does so by subsidizing 90 percent of recurrent costs faced by private providers, which are largely salary costs based on the universal public pay scale. Consequently, in areas of the country where recurrent and/or establishment costs are high, as they are in metropolitan areas, private providers are not proportionately subsidized (as compared to rural providers of secondary schooling). In fact, private providers in metropolitan have recurrent expenses, including rent and salaries, that are three times the average cost of schooling in rural and non-metro urban areas (Stopnitzky et al, 2006). At the same time, the MPO compensates them for a much smaller proportion of their total income. In rural schools, for example, the ratio of MPO income to non-MPO income is 109 percent in rural schools, but only 57 percent in metropolitan Dhaka schools. As could be expected, metropolitan secondary schools must find ways to raise the additional income it takes to operate, which usually take the form of fees passed on to students/households. Thus, 88 percent of income in metropolitan schools is generated through fees, whereas only 54 percent is in rural schools. Through these mechanisms, which derive from

the particularities of metropolitan areas, such as relatively high land costs,<sup>13</sup> the incentives for private provision of secondary schooling are undermined and supply is reduced.

53. Another critical factor in creating low enrolment rates is low demand for schooling among poor households. As was just explained, schools in metropolitan areas must generate relatively more income from students through fees, which will place a disproportionate burden on poor families, who may not be able to pay such amounts given their budget constraint, or who, at least, must reduce current consumption significantly. Evidence from HIES 2001 confirms this: among the poorest quintile, average secondary school fees account for roughly one quarter of per capita household expenditure. Secondary education fees thus represent a significant burden that drive down demand. In addition to the direct cost of education, metropolitan areas also create through relatively diverse economic activities more employment opportunities for children, thereby increasing the opportunity cost associated with a child not working and being in school instead. Recent research suggests both that child wage rates (i.e. opportunity costs) are significantly higher in metropolitan areas than in other areas of the country, and that the prevailing child wage rate is the single most important determinant of secondary enrolment, even when controlling for the effects of other determinants, such as parental education levels and household income (Stopnitzky et al, 2006). These findings help to identify that the direct and indirect costs associated with schooling are the factors that most drive down demand for education, and thus schooling outcomes, in metropolitan areas.

54. Given the great successes of the MPO and FSSAP programs, adjustments could be made to their design, implementation, and/or benefits to better suit the needs of metropolitan areas. With respect to the MPO system, for example, GoB may consider increasing the subsidy to private providers for recurrent expenses to an amount greater than 90 percent, or may consider providing tax breaks or rental subsidies for land, which would help offset the cost of this massive component of recurrent expenditures in metropolitan areas. Similarly, the FSSAP program can be extended to metropolitan areas as well, and may be means-tested and targeted to the poorest households. Though the amount of the stipend need not be the equal to the costs of education borne by the households (because households have a preference for education and are willing to contribute), the amount may need to be revised somewhat from that given in rural areas in order to offset a proportionate amount of the direct and indirect costs of schooling.

### Urban Health Care

55. Nearly half of all households (46 percent) in metropolitan areas report a lack of access to health care, and poor households have even lower rates of access. Only 12 percent of the poor report receiving care from free government health centers (World Bank 2005), and many cannot afford the additional bribes and payments necessary to secure care. For similar reasons of affordability, many poor do not have sufficient purchasing power to access private health services. Moreover, clinics and hospitals that are accessible rarely have the capacity to provide care to all those who need it, and consequently, the waiting time for patients is often extremely long. This time requirement poses an additional challenge for the poor, who may not be able to take sufficient time out of work obligations.

56. The City Corporations in large cities and Municipalities in smaller urban areas are responsible, under the Ministry of Local Government, Rural Development and Cooperatives (MLGRD), for providing primary health care. Nevertheless, very few public services are provided due to lack of resources and capacity, and most attention is focused on environmental health issues like vector control. Wealthier urban residents do generally have access to private providers, but the poor are largely unable to afford

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<sup>13</sup> Land prices in Dhaka are among the highest in the world. Prime real estate in Dhaka, such as the Dhanmondi and Banani neighborhoods, is valued on average at Tk. 3500 (roughly 60 USD) per square foot. Even less desirable peripheral areas, such as Uttara and Pallabi, have average land prices around Tk. 1600 per sq. ft., ranking these areas as more expensive than Chicago or Miami. (Glaeser and Gyorko, 2003).

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such services. Many poor and middle income people are served by health care NGOs, which have gained attention as government and donors have searched for ways to contract-out health service delivery from incapable public institutions, and to instead give those public institutions a role in quality assurance and oversight. At the core of such a health care strategy for urban areas is the focus on the Essential Service Delivery (ESD) package, which is comprised of basic services such as immunization, micronutrient support, family planning, prenatal and postnatal care, reproductive health, and control of communicable diseases such as tuberculosis. This emphasis on ESD mirrors the Ministry of Health and Family Welfare's larger national health strategy, and is embodied in the national HNPS (donor-supported) and urban-oriented UPHCP-II (DFID funded).

57. The models of upward and downward accountability which have worked well in rural contexts are more difficult to apply in the metropolitan areas, partly due to the depersonalization created by large concentrations of people. Such depersonalization disrupts the regular flows of information among clients and service providers, and so creates special challenges to mechanisms of accountability. One NGO that has attempted to design service delivery models in light of such constraints is Gonoshasthaya Kendra (GK), which has just reached agreement with the Dhaka City Government to apply and adapt their successful framework across a whole ward in a major urban setting. If this effort can be made to work, then the model can be applied more broadly across metropolitan areas. Dhaka Community Hospital, like GK, operates HMO-type urban health care models. The upward accountability side of these models are well developed in the sense that vertical supervision provides monitoring of service provision. But there are some problems with downward accountability to communities and users of the services. The proper mechanisms of accountability are not possible because the two systems address a small segment of the urban population in each area and monitoring by the community is difficult to establish. If the GK pilot can develop properly mechanisms of downward accountability that complement upward accountability mechanisms, then an approach involving partnerships between urban governments and private/NGO providers may be the most effective way of addressing the health care problems of the urban poor.

### Urban Environmental Health

58. Unhealthy environments are estimated to cause roughly one-fifth of Bangladesh's total disease burden (World Bank, 2006). In particular, environmental conditions characterized by poor air quality, unsafe water, and inadequate sanitation exacerbate the prevalence and severity of respiratory illness and diarrhoeal disease—two of three of the top causes of death in Bangladesh, particularly among children.<sup>14</sup> These environmental health risks are presented in the pie graph below; the environmental health risks captured in that graph together account for the approximately one-fifth of Bangladesh's total disease burden. The largest environmental health risk—diarrhoeal disease—stems from poor water and sanitation services, which not only increase mortality rates directly, but can also indirectly affect maternal and child mortality by worsening malnutrition levels and reducing labor productivity.

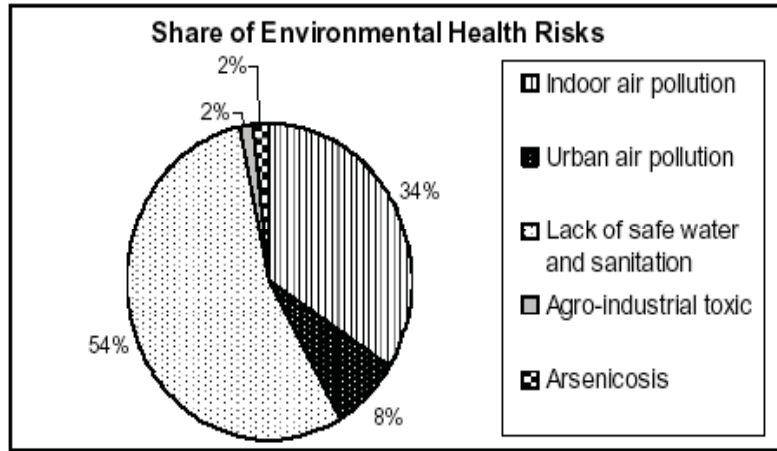
59. The metropolitan areas of Bangladesh, particularly Dhaka, are characterized by serious and growing problems of airborne and waterborne pollution, which have significant deleterious effects on the general health and productivity of the populace. It is estimated, for example, that 10 percent of Bangladesh's total number of respiratory infections and disease can be attributed to urban air pollution. When combined with the effects of poor indoor air quality, air pollution is estimated to contribute to between 36 and 60 percent of all respiratory infections and illnesses in Bangladesh (World Bank, 2006). Foremost among pollutants are suspended particulates, especially fine particulate matter (PM<sub>2.5</sub>), which poses the most serious health risks. Levels of particulates in the air are nearly always above

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<sup>14</sup> WHO (1997) estimates that at the global level 90 percent of the risks associated inadequate water and sanitation-induced diarrhoeal disease is borne by children.

recommended national limits except during the rainy season when levels usually drop within acceptable limits.

**Figure 4.2: Health Risks Weighted by Associated Disease Burden**



Source: World Bank, 2006 “Country Environmental Assessment”

60. Indoor air pollution, which is caused by the burning of bio-fuels such as wood and dung for cooking, as well as from smoking of cigarettes, has a significant and negative impact on health outcomes, particularly for children. The health impacts associated with indoor air pollution in terms of respiratory infections and other illnesses are estimated to be around eight percent of Bangladesh’s total disease burden according to the (World Bank 2006). Relatedly, research from GK project areas shows that having a smoker as a parent (either the father or mother) results in a significantly higher probability of child mortality (Chaudhury, 2006). Additional World Bank research (2004, 2005) shows that there is substantial heterogeneity among households in exposure to indoor pollution, even when using the same fuels. This suggests that construction materials of the dwelling and ventilation are important factors in determining exposure to indoor pollutants, and that policy interventions must focus equally on household behavior and construction that improves ventilation.

61. Water quality in metropolitan areas is likewise extremely poor, with nearly all waste from humans, livestock and industry making their way without treatment into surface water bodies (which over time seeps into groundwater as well). In Dhaka, there is at present only one sewage treatment plant at Pagla, which usually runs at less than capacity due to technical failures and a lack of treatment of effluents by polluting industries. The massive quantities of untreated waste entering water bodies results in large sections of the rivers and water bodies of Dhaka becoming biologically dead during the dry season, rendering the water unfit for human use and likely unfit for livestock use as well. Extraordinarily high levels of ammonia in the water are another serious cause for concern for they threaten the Saidabad Water Treatment Plants ability to treat water up to standards necessary for drinking.<sup>15</sup> The problem of water pollution is particularly damaging to the poor, who in general have fewer options available to them and cannot avoid the health risks posed by terrible water quality. A recent World Bank report (2006) estimates that the total economic cost associated with poor water quality, including human health costs, is on the order of US \$670 million annually, and is expected to rise over time. These findings underscore the importance of water resources in producing positive health outcomes, particularly among the poor, in line with the MDGs.

<sup>15</sup> This section is based on the discussion of water quality found in the “Country Environmental Assessment 2006” by the World Bank.

**Table 4.5: Bangladesh—Share of Disability Adjusted Life Years (DALYs) Lost by Cause and Environmental Contribution**

Cause	%	Environmental Factor	Share of Cause (%)	Share of Total (%)
Respiratory Infections and Disease	17	Indoor Air Pollution	30 – 50	5 – 8
		Urban Air Pollution	6 – 10	1 - 2
Perinatal Causes	14	Not Applicable	-	-
Diarrhoeal Disease	12	Low access to safe water, poor sanitation and hygiene	80 - 90	10 - 11
Injuries	11.5	Not Applicable	-	-
Nutrition/Endocrine	10	Not Applicable	-	-
Malignant Neoplasms	2	Agro-industrial toxics	5 – 25	0.1 - 0.5
Other	33.5	Arsenicosis <sup>a</sup>	-	0.3 - 0.4
<b>Total</b>	<b>100</b>		-	<b>16.4 – 21.9</b>

Sources: Streatfield (2001), Murray and Lopez (1996), Lokuge *et al* (2004), WHO (2002), World Bank staff.  
(a): Disease burden due to arsenic levels >50 ppb, estimated by Lokuge *et al* (2004). May include portions of the burden of disease listed under other causes.

62. Addressing the environmental problems outlined above will require a cross-sectoral strategic framework that places efforts to improve air and water quality, sanitation, and solid waste treatment within a broader urban planning framework. To achieve this, general environmental awareness must be enhanced in addition to more effective monitoring and compliance of environmental regulations. For water resources, this means greater public provision of information about water quality and the consequent effects on health, as well as a principled effort to reduce untreated industrial discharges. With respect to air pollution, greater attention must be focused on fuel quality, gross diesel polluters, and ensuring adequate ventilation and behaviors within households so that the negative impacts of indoor air pollution from stoves and cigarettes are diminished.

### General Policy Conclusions for Metropolitan Areas

#### *Addressing Service Quality*

63. Metropolitan areas experience widespread problems with both access to and quality of services. For many sectors that are directly and indirectly associated with the MDGs, rapid urbanization and a burgeoning metropolitan population have made ensuring access to services difficult and have diminished the quality of existing services. It is therefore necessary to address immediately the ‘first generation’ service delivery problems of access, particularly given the available evidence on the impacts of services of even present quality, particularly secondary education (see, e.g., Al-Zayed *et al*, 2006). These efforts ought not to exclude ‘second generation’ considerations of quality, which we can expect to improve the primary and secondary effects of expanding access.

64. There must be a major shift in government policy toward urban areas, particularly with regard to provision of services to slum dwellers and sites without tenure. Successful models of service delivery in slums and low-income communities of metropolitan areas demonstrate that it is indeed possible to provide services in slums, and importantly, that slum dwellers are willing to pay for decent services and assist in the management of common resources. Sometimes these successes have occurred because NGOs and/or communities have assumed onto themselves the associated risks, but oftentimes donors, NGOs and private entrepreneurs are reluctant to provide formal services to slums for fear of losing their investments should evictions occur. This situation presents one of the most significant constraints to adequate service delivery in metropolitan areas.

### *The Problem of Urban Institutional Inadequacy*

65. Urban institutions are not structured to adapt the lessons of accountability from successful rural experiences. Metropolitan local governments are not organized in a manner that obtains accountability from municipal service providers. Other metropolitan institutions are heavily dominated by central Ministries, which are not accountable to local citizens, and their agendas may not always be conducive to the well-being of the metropolitan population, particularly the poor. Thus, even if resource problems were solved, the structure of metropolitan institutions in Bangladesh does not allow proper delivery of basic services, particularly to the poor and those who are not well connected. Pervasive institutional weaknesses in terms of both accountability and capacity must be remedied so that service providers have the ability and motivation to provide services to all metropolitan residents. Tackling metropolitan problems will require a restructuring of the relationships of accountability between policymakers, service providers, and clients.

66. The first problem is that urban local governments are not structured to be responsive to the demands of the population, especially those in metropolitan cities. There has been a tendency to develop urban governments around a fixed institutional structure which is based on historical geography, i.e. geographic jurisdiction determined under British India. The structure has been modified modestly over time, but it is still built around priorities of a different scale and a different era—essentially, the provision of public services to roughly 100,000 people. While capacity to deliver services can be enhanced by increasing the number of municipal employees or contracting in services, upward accountability—an essential element of successful local government—cannot be assured. In a large city like Dhaka, the lowest level of representation, the ward commissioner, may represent over a 100,000 people. The large size of this unit of representation significantly undermines the role of responsive, accountable local government. At present, the quality of services provided depends especially on the willingness of municipal employees to compensate for an inadequate institutional structure with hard work. But such employees are permanent civil servants, and not accountable to those who use the services they provide.

67. There may be need to change the structure of metropolitan governments based on population size, so that each elected representative is responsible for a smaller and more manageable group and, conversely, can be monitored by their voters. The experience of large and fast-growing slums in Latin America provides lessons which can be incorporated in Bangladesh. The Latin America model has allowed the creation of a structure of elected local representatives for various slum localities who act to monitor the provision of services. Similarly, the new city Government structure in Pakistan, which has introduced three tiers of urban local government—the first being responsible for the whole urban region, the second for sub-regions, and the last for localities (and structured like Union Parishads in rural Bangladesh) may also provide lessons. A discussion of how urban governance can be structured points to an important governance agenda in Bangladesh: the need for effective local governments of various sizes across the rural-urban continuum, not only for municipalities or rural unions. It is only through a functional system of governance that addresses the heterogeneity of modern life at all spatial scales can Bangladesh ensure that service providers and policymakers are accountable to citizens and users.

68. Apart from enhancing accountability by increasing the tiers of urban local government, one alternative way of improving basic services is to make the centrally controlled service providers more effective and/or to build a strong metropolitan government. This approach is based on the undeniable fact that technical improvements and greater efficiency in the centrally controlled service agencies are very much needed. Still, such changes by themselves may not be enough to improve services for the poor, as a history of disappointing investments in those agencies has shown. Strong metropolitan government structures can be useful but may not be attainable given the political economy of Bangladesh, which centralizes power in Dhaka in such a way that national institutions exert undue influence on metropolitan ones. Even if a strong metropolitan government were to be created, this change would not be able to

## Accountability and Institutional Innovation in Bangladesh

replace lower tiers of local government through which the poor would have more influence in the governance process. For these reasons, it is becoming increasingly clear that investments in centrally located agencies must be supplemented by structures that increase voice of service users, particularly of the poor, and increase the accountability of service providers.

69. The roles and responsibilities of government agencies, both local and central, must be better delineated and more effectively coordinated. At present, there is a patchwork combination of service providers that are frequently impeded from fulfilling their obligations because they depend on complementary functions performed by other agencies. For example, the Dhaka City Corporation is responsible for many services, including sanitation, solid waste removal and road building and maintenance, but is unable to perform its role properly because (a) it is dependent upon the central government for financial grants and staffing appointments, and (b) it has no official role in city planning or urban development (World Bank 2005). In analytical terms, fault (a) is inefficient as it leads to an important mismatch between the city's revenue-raising and expenditure responsibilities. Fault (b) is simply incoherent, so ensuring that sanitation and transport services will be poorly provided.

70. The thinking over the last 10-15 years is that strict hierarchies led by the head of state and reaching down to ward-level officers are not only rigid and costly, but fundamentally unsuited to the requirements of providing a broad array of public services with different technical, economic and social characteristics. Ostrom et al (1993) provide evidence from Asia, Africa, and the Americas of the advantages of a *polycentric* system of administration. Polycentrism holds that overlapping-but-not-concentric districts, centered on different sources of authority, can provide services and protect common resources more effectively and efficiently than a simple, hierarchical bureaucracy. This is because its institutional design takes clear, explicit account of the key parameters of the services and resources involved. Primary education, for example, has different economies of scale and different natural resource implications than water and sanitation. And the sorts of administrative structures designed to provide either service would be deeply unsuited to managing an irrigation system or forest.

### **Enhancing Accountability in Metropolitan Areas: An Example of Local Education Reforms in Chittagong**

Since becoming an elected authority, the City Corporation of Chittagong has developed a large number of creative initiatives for improving education at all levels in Bangladesh's second city. The city runs 41 schools, 8 colleges and 1 university directly. Schools and colleges were mostly taken over from private management committees that previously ran them. Under city control, a Teacher Training Institute was established to improve teacher skills, performance incentives based on teacher efforts and student results in yearly examinations were incorporated into teacher pay, and a number of literacy programs were established.

Specific measures taken by the city include:

- Free books for children in grades 1-3, to spur literacy
- Free books for 25,000 students in the city's religious schools
- Improved teacher salaries
- Salary increments depend on student grades of at least 50% on exams
- Students who pass exams receive Tk.5000 each, and their teachers receive Tk.1000
- All of this was financed without rises in local taxes or central transfers, but instead by a large expansion in own revenue generation.

The results of these reforms have been striking:

- Secondary School Certificate test results have risen from a 60-70% to a 99% pass rate.
- Parents now queue for admission into City Corporation schools. Before being taken over these schools' exam results were poor, and they were attended by children rejected by government schools.
- Teacher performance on teacher training exams has improved.
- This has proved so powerful a mechanism that student pass rates have increased in the city as a whole as a result.

Under the previous system, teachers were accountable to no one. Under the new system, teachers are accountable to the City Corporation for their students' and their own performance, and through the city to the parents of the students they teach. Accountability—which appears to be strong—operates entirely through the “long route” of the electoral mechanism. A possible weak point is that the system features no “short route” accountability measures between schools and parents directly. Means of boosting the short route of accountability, such as through demand-side financing schemes, could be used to complement the long route and ensure that improved outcomes are not vulnerable to political changes borne of electoral idiosyncrasies.

71. Such issues of public administration have deep implications for Bangladeshi systems of governance. But this does not imply that reforms must be radical or broad-based. Reforms can start small, from the bottom up. In Chittagong, for example, the City Corporation has intervened in the education sector by taking over management of 41 schools from ineffective school management committees. The City Corporation has increased the training available to teachers, and has implemented a suite of incentives that boost teacher salaries and provide bonus pay based on the performance of their students. Students also receive monetary incentives to do well on exams (Tk. 5000 if the exam is passed). These successful interventions have dramatically boosted the examination pass rates and literacy rates of students in the schools in which they were implemented. The experience provides concrete evidence that with proper political motivation structured by the 'long route of accountability', it is indeed possible to realign the prevailing institutional relationships and to boost accountability of service providers with great effect on outcomes. There is, however, a need to apply some caution to the findings from Chittagong. The system is working because the current mayor is operating under the 'long-route of accountability' and a change in mayor or mayoral motivation could easily change the outcomes. Thus, for the Chittagong success to continue, it is essential that the long route of accountability be supplemented by the "short route", through empowerment of the consumers of these services.

72. Another critical barrier to effective service delivery in metropolitan areas derives from an essential problem of perception among policymakers. A fundamental step must be taken by Government in recognizing that those people moving to urban areas are not transients, and their problems need to be addressed on a long term basis. There is an unwillingness to recognize the increasing flow of residents to urban areas as something permanent, and thus legal recognition is systematically withheld as they attempt to establish themselves in the urban setting. One basic manifestation of this unwillingness is the inability of slum-dwellers to secure some form of recognition of their rights of tenure. This is critical as tenure is currently at the heart of the service delivery paradigm. For example, public water utilities will not provide services if users cannot prove legal tenure. In addition to the social intermediation models of service delivery highlighted above, the issue of legal tenure could also be by-passed by using existing technical solutions. Water and power authorities could start using pre-paid meters, for example, to provide connections to the urban poor who do not have tenure. Such a model has shown great success elsewhere, such as in telecoms, where rapid mobile phone penetration in Bangladesh was made possible in large part because of pre-paid services. The same service model can be creatively used for other essential utilities as well even in the context of an inadequate policy framework for metropolitan areas.

## II. Infrastructure and the Environment

73. The Government of Bangladesh's PRS emphasizes the important roles to be played by critical infrastructure and sound management of environmental resources in supporting accelerated economic growth and poverty reduction. Indeed, given the spatial distribution of poverty and Bangladesh's majority rural population, and agriculture's disproportionate contribution to pro-poor growth, the PRSP highlights further development of the agriculture and rural development sector as a foremost priority. Accordingly, the PRSP argues that agricultural productivity and environmental sustainability must be enhanced if Bangladesh is to move away from a predominantly subsistence level of agriculture and develop a more sophisticated commercial-oriented agricultural sector and a more vibrant non-farm rural economy. Doing so will require, at the very least, efforts to prevent the degradation of soil quality and better manage water resources. But successful commercialization and development of the non-farm economy will also require investments in infrastructure that support the economic activities of farmers and non-farm rural dwellers, such as a year-round road network and reliably cheap transportation system, electrification for irrigation pumps and cold-storage, access to telephones to gather market information on going prices for goods and services, and so on. In such ways both the environment and infrastructure sectors have a critical role to play in driving economic growth and helping to further reduce poverty.

74. Environmental and infrastructural issues are important not only at the macro-economic level, but also very much so at the micro-level in terms of vulnerability, health, and productivity of households and individuals. Poor water and air quality lead to and exacerbate poor health outcomes, including respiratory and diarrhoeal illnesses in particular. Such outcomes damage the chances of reaching the health MDGs while also reducing labor productivity, with all of the attendant consequences. Poor infrastructure too can impede better human development outcomes. Inadequate roads make it more difficult for households to access schools or health facilities. Similarly, lack of electricity makes more difficult students' efforts to study, and it prevents proper storage of certain medicines. Environmental quality and access to infrastructure thus have direct consequences on the human development MDGs in addition to the MDG on poverty. As time progresses and the population continues to expand, environmental and infrastructural issues can be expected to become increasingly important constraints to all the MDGs if these sectoral challenges with multi-sectoral consequences are not addressed.

75. The case of water and sanitation perhaps best illustrates the cross-cutting value of adequate infrastructure and a healthy environment for both economic and human development. Safe drinking water and hygienic sanitation are fundamental to mitigating diarrhoeal disease, which is one of the most common and serious health risks in Bangladesh (34 percent of total morbidity).<sup>16</sup> The same is true at the global level, for which the WHO (1997) estimates that 90 percent of the diarrhoeal disease burden is associated with unsafe water and poor sanitation services, and further, that 90 percent of this disease burden is shouldered by children, who are particularly vulnerable to this environmental health risk created largely by inadequate infrastructure. This global finding has been confirmed most recently in DHS 2004, which discovered that eight percent of children under-five had suffered during the two week period prior to the survey; this number increased to 12 percent among the most vulnerable 6 month to 2 year old age group. Such high prevalence of diarrhea increases the mortality rate for children directly, and can have indirect negative effects on health by damaging nutrition levels of either the child or mother and/or impairing income sources through diminished labor productivity and shortened amounts of time available for work.

76. Infrastructural development over the recent past has been fundamental in facilitating improvements in welfare and progress toward the MDGs in Bangladesh. A growing body of research provides evidence that access to infrastructure in Bangladesh has not only fuelled economic growth and

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<sup>16</sup> World Bank, 2006 "Bangladesh Country Environmental Assessment".

poverty reduction, but is also closely associated with improvements in health and education outcomes. In World Bank (2005), for example, evidence was presented on the significant effects on poverty of distinct types of infrastructure, such as electrification and accessibility of transportation. Similarly, these types of infrastructure were found to be associated with higher school enrolment and completion rates, while access to improved water and sanitation significantly boosted school completion rates and reduced malnutrition, presumably by lowering the incidence of diarrhoeal disease and other related illnesses among school-going children and their households. These findings, among others, provide strong evidence that infrastructural improvements can play a critical role as part of a package of multi-sectoral interventions to reach the MDGs in Bangladesh.

77. Since the beginning of the 90s Bangladesh has experienced a rapid expansion of access to roads, electricity, telephony (especially cellular), and water and sanitation services. Importantly, progress has also been made in particularly in the Northwest region of the country, which has been historically, and remains to some degree, a lagging region in terms of availability of infrastructure (as well as poverty reduction). With respect to roads, the total network has grown by an annualized rate of 4.9 percent over the period 1990 to 2003, which has been accompanied by 3 percent annual growth in the share of paved roads. Average electricity consumption has similarly skyrocketed at a rate of 20 percent per annum. Finally, access to cellular phones has exploded by a factor of 18,000, albeit from initially low levels approaching zero (Chowdhury and Torrero, 2006). The following table presents data on the magnitude of changes in key types of infrastructure both at the national level and for the lagging Northwest region.

**Table 4.6: The State of Physical Infrastructure in Bangladesh and Rajshahi 1990/91 and 2002/2003**

Indicator	National			Northwest region		
	1990-91	2002-03	% Growth	1990-91	2002-03	% Growth
<b>Roads</b>						
Roads, paved (share of total roads)	57	78	3.07	70 <sup>a</sup>	91	2.73
Roads, total network (kilometers)	14,104	22,360	4.88	3,122 <sup>a</sup>	4,443	3.85
Roads (kilometers) per square kilometer	0.10	0.16	5.00	0.09	0.13	3.70
<b>Electricity</b>						
Electric power consumption (kwh per capita)	43	144	19.57	na	na	
Total number of households connected		7,100,000		na	na	
Total number of rural households connected		4,700,000		208,930 <sup>a</sup>	1,098,722 <sup>a</sup>	
<b>Fixed Telephones</b>						
Telephone lines per 1,000 people	2.2	7.2	18.94	0.8	3.2	25.00
Rural telephone lines per 1,000 people	0.4	0.6 <sup>c</sup>	4.55	0.2	0.4 <sup>c</sup>	9.09
Waiting list for telephone lines	112,656	137,412	1.83	13,585	11,280	-1.41
Revenue per fixed line (current US\$)	512	163	-5.68	412	131	-5.68
Total number of subscribers	248,817	962,294 <sup>b</sup>	22.06	22,304	105,435 <sup>b</sup>	28.67
Total number of rural subscribers	38,507	123,729 <sup>b</sup>	17.02	5,603	58,279 <sup>b</sup>	72.32
<b>Cellular telephones</b>						
Total number of subscribers	2,502 <sup>d</sup>	3,210,358	18,316	na	na	
Total number of rural subscribers	na	100,000		na	na	
Cellular phones per 1,000 people	0.02	21.91	14,890	na	na	

Source: Chowdhury and Torrero (2006)

78. Since 2003, access to improved sanitation services in rural areas has risen from 29 percent coverage to over 60 percent today; coverage in urban and metropolitan areas has not increased with the same rapidity, although there has been limited positive change. In 2003 the Government of Bangladesh launched its Total Sanitation campaign, which is striving to reach the goal of 100 percent sanitation in Bangladesh by the year 2010; this would put the country well ahead of the internationally agreed MDG targets. While rural areas have witnessed a rapid increase in access to hygienic sanitation, urban areas,

and particularly metropolitan areas, have experienced much slower improvement, due to a variety of factors that include extremely rapid urbanization and institutional constraints.

### Access to Infrastructure is Associated with Many MDG Outcomes

79. An expansion of access to infrastructure, particularly in the relatively impoverished Northwest region of the country, has helped to fuel economic growth and has had positive welfare effects on rural households.<sup>17</sup> Much of this investment was publicly funded, such as roads and electricity, but substantial private investment has also been important, especially in telecommunications. These changes have helped to facilitate greater non-farm economic activities, the secondary and tertiary sectors, and greater urban-rural market integration, thereby playing a critical role in creating rural employment and income-generating opportunities. Chowdhury and Torrero (2006) find that many of these improvements in outcomes stem from higher farm prices, an important consequence of the infrastructural expansion that allowed farmers to better gather information, gain access to better and cheaper inputs such as fertilizers, and move goods to markets where they could fetch the best prices. By contrast, there was found to be no change in the average number of hours worked by rural households. An increase in the share of non-farm activities of households was also found. These findings provide evidence of efficiency gains, which allow households to allocate an increased amount of their time to non-farm activities and/or leisure, and spend less time on the farm, without losing income. These findings add to the lessons of previous studies in Bangladesh that find road improvement has a significant effect on income levels and poverty. For example, Khandker et al (2006) find that rural road investment reduces poverty through enhanced agricultural production, higher wages, lowered costs of agricultural inputs and transportation, and higher output prices. Further, impact evaluations of road improvement projects, such as RDP and RRMIMP find that rural road improvement can have a strong and positive effect on welfare by facilitating greater market development, more voluminous passenger and freight traffic, reduced transportation costs, savings on spoilage, etc. (BIDS, 2000). In RDP sample project areas, for example, a reduction of 9 percent in moderate poverty levels was found as compared to negligible changes in poverty levels in the control areas. For RRMIMP, development of roads led to a reduction of moderate poverty levels by 11 and 12 percent for project areas as compared to control areas.

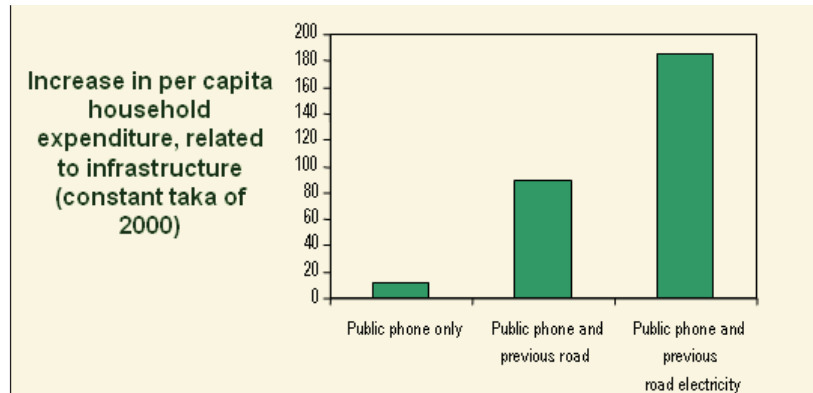
80. Access to more than one type of infrastructure creates a synergy that improves welfare to a degree greater than does the sum of individual types of infrastructure. For example, the monthly income effect associated with access to a telephone was found to be only Tk. 12. When telephony was combined with access to roads, the monthly income gains associated with this change rose to 89 taka. Finally, when access to telephones was added to access to roads and electricity, average income increases by 185 taka per month, more than double the effect of the telephony/road combination, and more than 10 times the effect of telephony alone.<sup>18</sup> These findings provide compelling evidence that simultaneous investments in several types of critical infrastructure can have disproportionately positive effects on household welfare.

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<sup>17</sup> Chowdhury and Torrero (2006) “Urban-Rural Linkages in Bangladesh: The impact of infrastructure and the food value chain on livelihoods and migration of landless households, women and girls in the northwestern region”. IFPRI. The following section draws heavily on the numerous findings of this paper.

<sup>18</sup> Ibid.

Figure 4.3: Monthly Increases in Income due to Infrastructure



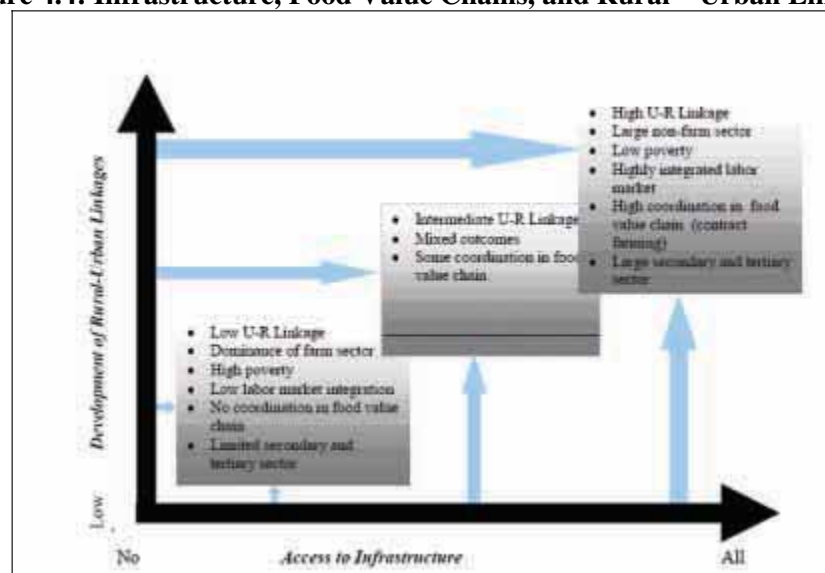
Source: Chowdhury and Torrero (2006)

81. Infrastructural investments in roads, electricity and telephony also have disproportionately positive effects on women and the landless, two of the most vulnerable social groups, according to Chowdhury and Torrero (2006). ‘Hard’ infrastructure helps to increase the amount of time devoted to non-farm work as well as increases the time spent on unpaid work by shifting time away from activities such as collecting food and water, and toward new economic activities (for women) such as fishing and rickshaw/van pulling. Additionally, women with access to paved roads were found to have raised greater spatial mobility and attendance levels in training activities on income generation. Such increases in women’s activity outside the homestead have been shown in other studies on Bangladesh to be one of the most important determinants of female autonomy (Anderson and Eswaran, 2005). In such ways, infrastructural development can lead to certain forms of women’s empowerment and qualitative differences in gender relations. With respect to the landless, Chowdhury and Torrero (2006) found that their welfare was more sensitive to changes in infrastructure, even when they only gained access to one type of infrastructure. For the land-owning households, by contrast, significant income increases came only from increases to two or more types of infrastructure, but not from zero to one type. This finding suggests that any expansions in access to these types of infrastructure will directly and disproportionately benefit the landless.



82. Access to infrastructure is associated with better rural-urban market integration, such as new food value chains between urban supermarkets and rural producers. These changes have served to reduce the variability of staple crop prices, particularly with respect to seasonal variability, and so have been important in reducing vulnerability to poverty and helped to maintain caloric intake. Interestingly, Chowdhury and Torrero (2006) also find that infrastructural improvements result in little to no permanent rural to urban migration among the households surveyed, and insignificant levels of inter-thana and inter-district labor movements. Thus, while infrastructural development does lead to beneficial urban-rural linkages, there appears to be no reason to presume from the available evidence that improving infrastructure, especially roads, will exacerbate the already extremely high rates of urbanization. The following diagram, taken from Chowdhury and Torrero (2006), provides a schematic representation of how greater urban-rural market linkages can serve to improve the condition and rural areas and therefore help to mitigate urbanization.

Figure 4.4: Infrastructure, Food Value Chains, and Rural – Urban Linkages



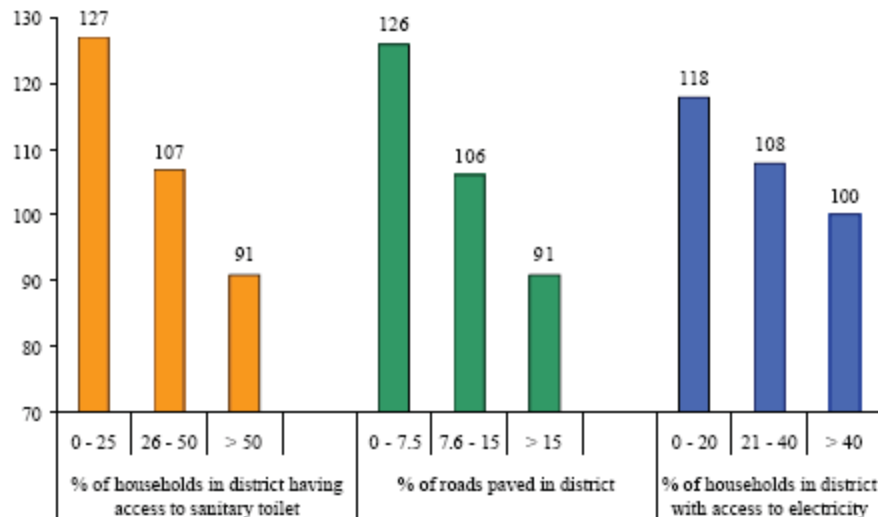
Source: Chowdhury and Torrero (2006)

83. Infrastructure development also plays an important role in ensuring that people can access health services, that health-related information is disseminated, and that health facilities have the amenities necessary to deliver proper treatments (e.g. cold-storage of certain prescription drugs). Additionally, access to clean drinking water and hygienic sanitation services is very important for the prevention of diseases such as diarrhea. These effects are all likely to facilitate reduced levels of child and maternal mortality. The following figure illustrates the district-wise correlation between infrastructure and the child mortality rate, suggesting in a simplistic way that health outcomes are indeed related to the accessibility of infrastructure.

84. More generally, numerous cross-country analyses have provided evidence of the mutually supportive effects of infrastructure and health care. This literature suggests that even in the context of poor quality care, access to infrastructure can significantly improve health outcomes. When combined with high quality care, however, infrastructure has an exponential impact capable of significantly reducing child mortality; this effect has been found to hold even when controlling for income levels. Such synergy can be seen in the straightforward correlations reported in Leipziger et al (2003) and reproduced below. In these results, health interventions have nearly triple the impact on child mortality if a high level of infrastructure already exists, and the health effects of an improvement in infrastructure are

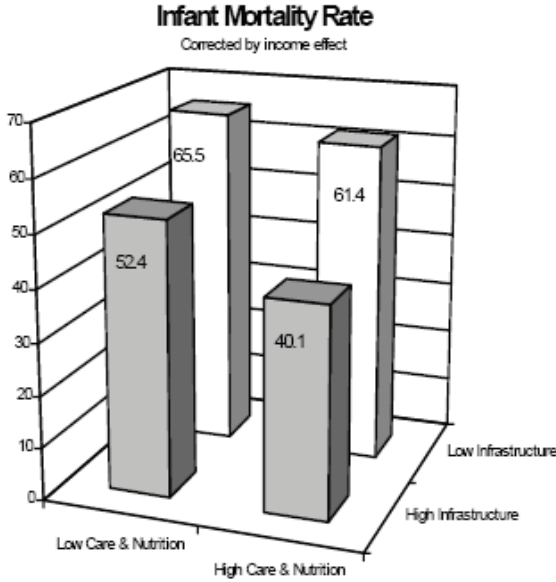
nearly double when there exists a high level of health interventions. Additionally, the authors report that the prevalence of a variety of infrastructure explains as much as 37 percent of the difference in child mortality rates between the highest and lowest income quintiles. These general findings lend further support to studies that find a direct relationship, for example, between water and sanitation and diarrhoeal morbidity (Esrey et al. 1991) or transport facilities and easier access to health facilities by both clients and staff (Brenneman and Kerf, 2002). But the findings in Leipziger et al suggest moreover that the mechanisms by which, for example, water and sanitation impact upon diarrhoeal morbidity are likely to be mediated by health interventions, such as, for example, hygiene promotion and handwashing. Similarly, it can be expected that improving physical access to health facilities by clients will have an additionally positive effect if those clinics provide good quality services (and indeed if the staff are present, as is more likely if their access is improved too through improvements in the transport network). Interestingly, Leipziger et al (2003) also find that education, in addition to the use of health services, conditions the impact of infrastructure.

Figure 4.5: Correlations between Access to Infrastructure at District Level and Child Mortality Levels



Source: World Bank, 2005 "Attaining the MDGs in Bangladesh"

Figure 4.6: Interaction Effects between Infrastructure and Health Care



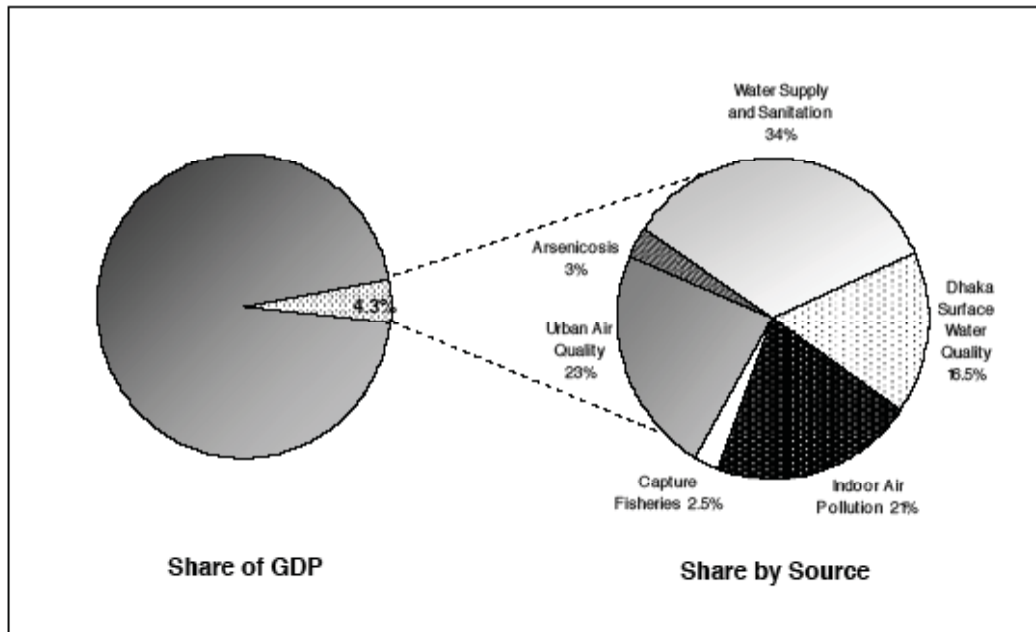
Source: Leipziger et al (2003)

**Environmental Quality Also Affects MDG Outcomes**

85. As was just seen with the prevalence and accessibility of infrastructure, the quality of the environment also serves as an important variable that impacts upon a range of MDGs, particularly with respect to women and children. In many cases, environmental quality and infrastructure are themselves closely related, as in the case of the environmental health risks posed by low quality or degraded water resources and unhygienic sanitation services. But the environment and infrastructure are related in a number of additional ways as well. Access to electricity in the home can help to reduce indoor air pollution, which is a major determinant of acute respiratory infections (ARI) and respiratory morbidity. Similarly, transport policy and infrastructure have a defining role to play in outdoor air pollution, particularly in urban areas that rely heavily on motorized vehicles. Environmental quality has also a tremendous impact on growth and productivity, particularly among fisherfolk, farmers, and other rural dwellers that depend directly upon the quality of the natural resource base for much of their livelihoods.

86. At the macroeconomic scale, environmental degradation is estimated to amount to over 4 percent of GDP through the effects of poor environmental quality on health and through the deterioration of environmental goods such as capture fisheries (World Bank, 2006). These environmental threats include poor air quality (both indoor and outdoor), inadequately safe water (including arsenic-contaminated water) and unhygienic sanitation, untreated solid waste and agro-chemical and industrial effluents, and overuse of renewable resources such as forests and fisheries. Together, they represent significant challenges to attainment of all the MDGs by impairing economic growth and by their micro-level effects on labor productivity and damaged health.

Figure 4.7: The Economic Cost of Environmental Degradation



Source: World Bank 2006 “Country Environmental Assessment”.

87. A very large proportion of Bangladesh’s disease burden—between 16.5 and 22 percent—can be directly linked to environmental factors. Of these, environmental factors that contribute to diarrhoeal disease account for some 54 percent of the total, and factors that lead to respiratory problems, i.e. indoor and outdoor air pollution, contribute to another 42 percent of the environmentally related health risks of the country.<sup>19</sup> With respect to air pollution, recent World Bank research (2005) finds that indoor air pollution in particular poses a significant health risk (as much as 8 percent of Bangladesh’s total disease burden), with hazardous concentrations of particulates in a majority of poor households, and particularly exposure levels among women and children. These findings highlight the critical importance of addressing water and sanitation inadequacies and reducing exposure to various forms of air pollution to help improve child and maternal health. The World Bank estimates that realistic improvements on these two environmental fronts (which include attaining the GoB’s own goal on total sanitation, reaching 100 percent access to safe water, and reducing exposure to air pollution by 20 to 80 percent can result in annual savings of between US \$644 and 1755 million, or between 1.3 and 3.5 percent of GDP. The GoB is already striving to provide 100 percent sanitation coverage by 2010 by making the UPs focal points in providing sanitation services to the poor in rural areas, and by using Wards for a similar function in urban areas. These efforts have achieved substantial success over the last three years, but metropolitan areas remain a serious problem, as will be discussed later. On water supply, Bangladesh was able to achieve near universal access to safe water through hand-pumps (86 percent) and piped water (10 percent). These figures, however, have been damaged somewhat by the arsenic contamination of groundwater, which reduced national rates of access to safe water down to only 73 percent, a still relatively high figure. Indoor air pollution can be tackled through a combination of cleaner fuels (to replace biomass), improved efficiency of fuel use (such as through improved stoves), and improved ventilation. The latter in particular represents an immediate policy goal that can reduce the severe health effects of indoor pollution even among poor families, who are able to make small structural (cooking locations, construction materials, door/window locations) and/or behavioral (opening windows and doors, allowing children to

<sup>19</sup> See World Bank 2006 “Bangladesh Country Environmental Assessment”, on which this section is based, for more details.

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spend time outdoors while cooking) changes. Achieving this will require prompt and concerted public information campaigns to raise awareness of the health consequences of indoor air pollution.

88. The degradation of capture fisheries embodies one of the most serious environmental threats facing Bangladesh, both in terms of its effect on economic growth and its indirect effects on nutrition levels. The country's fisheries create approximately nine percent of national employment and provide over two-thirds of the country's animal protein needs, thereby representing a crucial livelihood resource and nutritional base of direct relevance to mortality rates among children and women. Despite this importance, capture fisheries (as distinct from aquaculture) have been declining by 2.1 percent annually in inland areas and 1.6 percent per year in coastal areas, largely due to overconsumption of fish and the decline of fish populations, urbanization and infrastructural encroachment of habitat, and pollution from both agricultural and industrial activities. Nearly 30 percent of all inland fish species are now under threat of extinction, according to IUCN (2000). Remedying this situation is essentially a question of management and governance, as the experience in rejuvenating the declining Hilsa (an important local fish) population has proven. In that case, political will helped to facilitate national concern and awareness, which adopted and implemented a successful management strategy based on sound science. Elements of a management strategy to improve the declining capture fisheries will likely include the protection of dry season water flows, the establishment of sanctuaries in which populations can rehabilitate, and institutional arrangements that regulate access to fisheries while maintaining the rights of poor subsistence fishers.<sup>20</sup>

136. The quality of the environment therefore has significant impacts for both the macro- and micro-levels by constraining Bangladesh's overall GDP and by affecting the health, nutrition and productivity levels of households. Reassuringly, there exist some simple interventions that can make cost-effective but impacting improvements to certain features of the environment. Chief among these is the real reduction in levels of smoke in the household both from stoves and the burning of bio-fuels and from cigarettes. With relatively small changes in behavior and little physical investment, substantial improvements can be made to levels of indoor air pollution and exposure to it. Achieving this would help to mitigate one of the major environmental health risks that contribute to Bangladesh's child mortality rates.

### III. Malnutrition

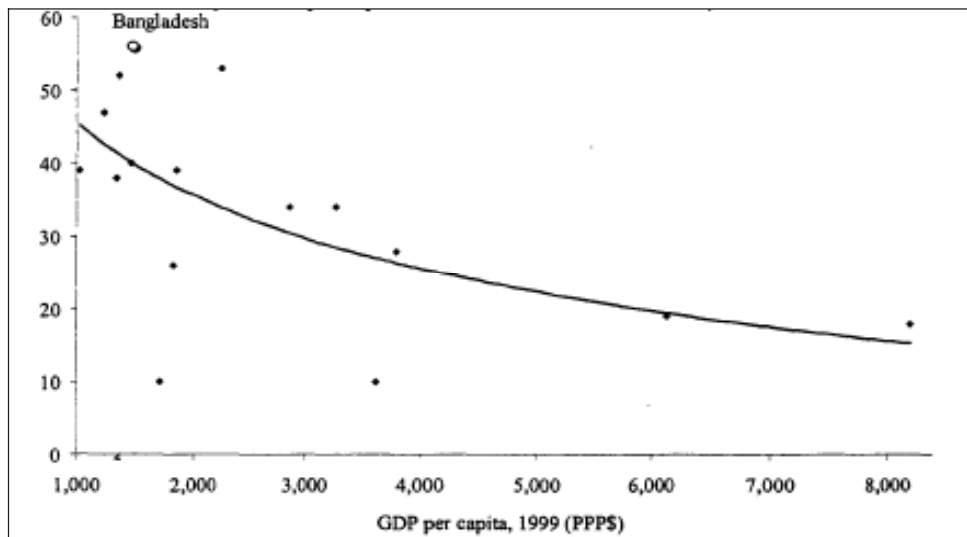
89. Malnutrition levels in Bangladesh, particularly among children, are among the highest in the world. Almost one-half of children under the age of five are moderately underweight or stunted, according to the DHS 2004, and 16 percent of Bangladeshi children are severely stunted. These disastrous nutritional outcomes have lifelong consequences in terms of productivity, cognitive ability, educational attainment, vulnerability to disease, and quality of life. Child malnutrition is therefore of fundamental import for all the MDGs, but particularly so for infant and child mortality, to which it is a major contributing factor. The critical moments in a child's development, during which permanent patterns of poor nutrition are often established, occurs *in utero* and during the first six months of life, when the child should be breastfeeding. If a woman fails to meet her own and the developing baby's nutritional needs during this time—due to poverty, social constraints, or cultural beliefs regarding maternal behavior and child needs—then the nutritional deficit is passed on to the developing child, who depends upon its mother for all nourishment and is at its most vulnerable. For this reason the nutritional status of women during and after pregnancy is a critical determinant of the long-term nutritional outcomes of children. Moreover, low stature among women (itself a direct consequence of poor childhood nutrition) and low scores for mothers on the body mass index (BMI) both increase the likelihood of complications during delivery, and so have a direct relationship with maternal mortality. In these ways, chronic and acute malnutrition have direct and sizeable impacts on child and maternal mortality.

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<sup>20</sup> This paragraph is drawn from material presented in World Bank (2006).

90. In all countries, malnutrition is closely linked to consumption poverty. In Bangladesh, however, this fairly steady relationship at the global level exhibits some peculiarities that are extremely revealing about the nature of the nutritional crisis in the country. The first idiosyncrasy worthy of mention concerns the severity of the problem. Because Bangladesh is one of the poorest countries in the world, high malnutrition levels could be expected based on the well-established correlation just mentioned. When compared to other countries, however, malnutrition levels in Bangladesh are approximately 16 percentage points higher than could be expected based on income levels (Deolalikar, 2004). Figure 4.8 depicts the relationship between poverty and child malnutrition for a group of 16 Asian countries: not only does Bangladesh have the highest rates in this group, but it is also a distinct outlier.

Figure 4.8: Predicted Relationship Between GDP per Capita and Malnutrition in 16 Asian Countries



Source: Deolalikar, 2004

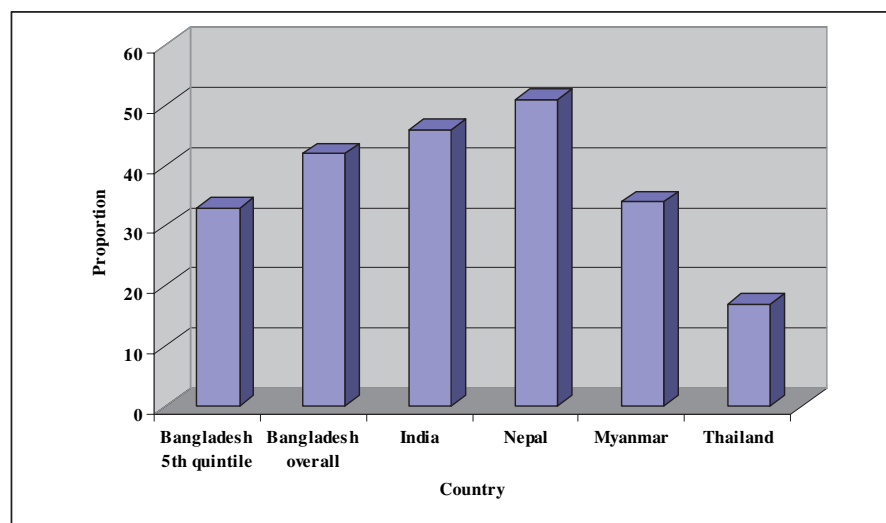
91. The second important feature of malnutrition in Bangladesh concerns the relationship between income and nutritional levels *within* the country. Of course, malnutrition is high among the poorest quintiles, the levels of which average between 46 and 50 percent for the first and second quintiles, respectively. But even among the richest income quintile, malnutrition levels are surprisingly high at 33 percent. This remarkable figure places the average malnutrition levels of the richest 20 percent of Bangladesh's population, for example, on par with Myanmar's national average (Helen Keller International, 2006). It would seem, therefore, that the binding constraints to better nutrition in Bangladesh are not strictly linked to income, although improvements in household income should allow households to increase consumption. Rather, certain behavioral patterns must be changed in all households to ensure that the developing child receives sufficient nutrients during the most critical moments in its development—*in utero*, during the first half-year of life, and as the child weans away from breastfeeding.

### Child Malnutrition Patterns

92. The preceding comments characterize the uniqueness and severity of child malnutrition in Bangladesh. The country has made, however, significant progress in reducing malnutrition levels over the last 15 years or so, particularly since the early 90s. For example, the rate of stunting dropped between

1992 and 2000 at an annualized rate of 3.3 percent (from 64 to 49 percent); and the proportion of wasted children fell still more rapidly (World Bank, 2005). In the DHS 2004 survey, stunting has been reduced still further to 43 percent of children (DHS 2004).

**Figure 4.9: Stunting in Bangladesh and Neighboring Countries**



Source: Helen Keller International, 2005

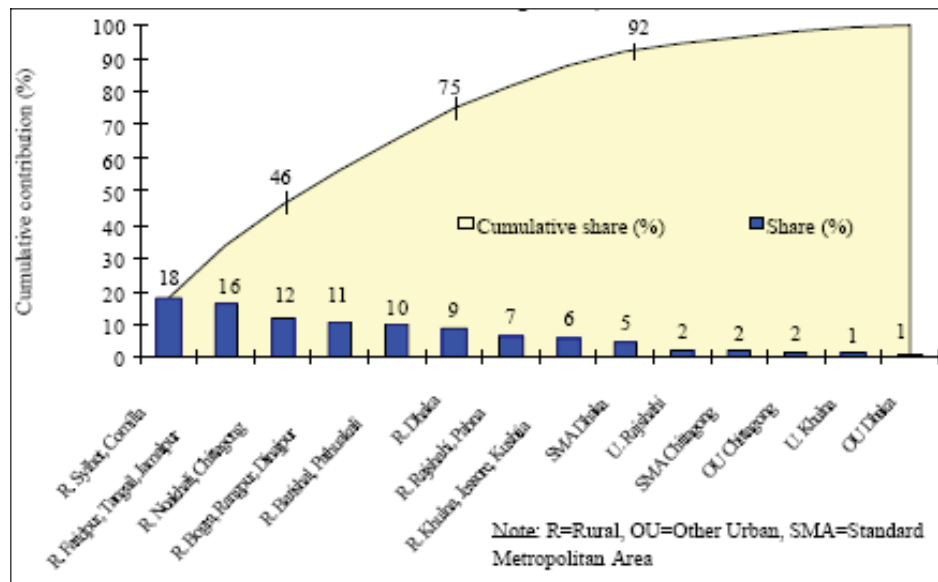
93. Adequate nutrition during pregnancy and the first six months of life are critical to a child's development because of the impact on birth weight. Poor nutritional status at birth is subsequently perpetuated by insufficient or inappropriate breastfeeding and supplementary feeding habits. Oftentimes, inadequate breastfeeding stems from the mother's insufficient milk supply, which is due to her own poor nutrition or heavy workload. Gonoshasthaya Kendra (GK) has found success in improving maternal nutrition by convincing poor households to allow pregnant mothers to take rest from work for three additional hours per day; this translates into caloric savings that improve both maternal and child nutrition. GK also advocates that pregnant and lactating mothers be allowed to serve themselves first at meals, a simple behavioral change in the household that also tends to increase the amount of calories that mothers consume. There are other important household decisions and behaviors that affect child nutrition. Mistaken but persistent beliefs regarding the value of colostrum, for example, are also a significant factor that undermines child nutrition. Such nutritional deficits account for approximately one-third of child malnutrition (Deolalikar, 2004). After the first year of life, however, the risks facing the child increase dramatically due to the process of weaning away from breast milk that usually happens at that time. This transition to exclusive solid foods frequently fails to provide to children the full variety of nutrients that are needed. This transition to solid foods must therefore become a focus of attention in order to mitigate the permanent damage malnutrition causes to infants.

94. Girls are particularly vulnerable to this serious risk, as they are significantly more likely than boys to be underweight or stunted between six and 24 months of age. As they get older, the malnutrition rates of boys and girls become more even, though this effect is likely explained by the increased mortality rates that young girls face relative to boys (the child mortality rate for girls is 29; for boys it is 24), which will tend to underestimate the actual malnutrition rates of girls between one and five years of age, rather than reflect any true evening out of malnutrition levels between the sexes. Furthermore, the gender of the child is important because of the powerful interact effect it has with the birth order of the child. Generally, the lower the birth order of a female child, the greater probability it has of being malnourished as compared to a male. First-born daughters, then, are 75 percent more likely to be severely malnourished

than first-born males. Higher birth order children, however, tend to be treated more equally (Deolalikar, 2004). Addressing the gender bias that fuels malnutrition and child mortality among females is therefore critical to furthering progress toward these MDGs.

95. The spatial distribution of child malnutrition in Bangladesh is uneven, with several areas of the country, such as Dhaka and Chittagong divisions, accounting for more than half of the country's total malnourished children. Also, the more populous regions in the country tend to have very high rates of underweight children, which results in substantial geographical concentration of child malnutrition. The following graph depicts the regional contributions to national malnutrition rates. These spatial patterns suggest that targeting nutritional interventions geographically can be effective in reducing national figures in accordance with the MDG targets.

Figure 4.10: Regional Contributions to Total Underweight Children (6-71 months) in Bangladesh (2000)



Source: World Bank, 2005

### Proximate Causes and Socio-Economic Determinants of Malnutrition

96. It has already been mentioned that infant feeding practices are fundamental to the nutritional outcomes of children. UNICEF and the WHO recommend that all children receive colostrum (foremilk) immediately after birth, although only 24 percent of Bangladeshi children are breastfed within an hour of delivery (DHS 2004). This tendency is detrimental because the incidence of underweight children is significantly higher among children who did not receive colostrums as their first food (cow milk, sugar, honey and mustard oil are popular substitutes in Bangladesh). Additionally, colostrum provides an important injection of antibodies and proteins that boost an infant's immune system and reduces morbidity over the medium term, particularly of diarrhoeal diseases. Thereafter, breastfeeding becomes much more widespread: 83 percent of mothers breastfeed within the first 24 hours, and 98 percent of children are breastfed at some point (DHS 2004). Unfortunately, much of this breastfeeding during the first six months is not exclusive, i.e. it is supplemented by other less nutritious foods. Only 55 percent of children less than two months of age are exclusively breastfed; for children between 2 and 3 months, the figure drops to 38 percent; for children between 4 and 5 months, only 21 percent are exclusively breastfed. The cumulative effect of these breastfeeding patterns is that only 36 percent of infants are exclusively breastfed for six months, in contrast to WHO guidelines.

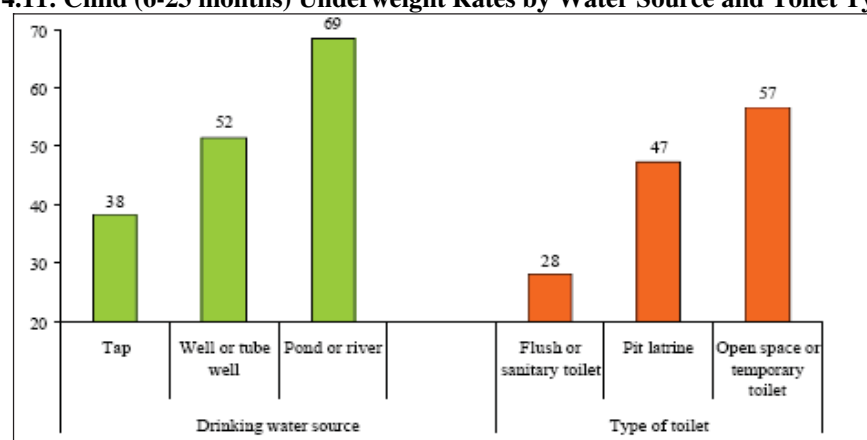
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97. As the family begins to feed to infants supplementary foods aside from breast milk, the nutritional qualities of the household's diet become an increasingly important factor in a child's nutritional status. In this respect, it could be expected that the wealth of the household would translate directly into greater consumption of calories and nutrients, and that therefore wealth would be closely (positively) correlated with nutritional status. But this expected effect is muted in Bangladesh. Using data from the National Nutritional Surveillance Project, Helen Keller International provides evidence of a small tendency toward greater household expenditure on food among richer households, but finds that this increased expenditure tends to be on food items that are not derived from animals (HKI, 2006). Thus, while overall consumption increases slightly with raised income levels, diets are still deficient in crucial nutrients, particularly protein, vitamin A, and iron, and are generally not adequate to cover all household members' nutritional needs. The breakdown of household food expenditure that is observed—and the nutritional consequences of those decisions—likely explains much of the high malnutrition levels observed among richer income quintiles.

98. While richer families may not be eating an adequate variety of foods, many poor families are not able to afford regularly nutrient-rich foods. Micronutrient deficiencies are therefore extremely common and have severe effects on child and maternal mortality. For example, vitamin A is important for proper functioning of the immune system; vitamin A deficiency can raise the severity of infections, including diarrhoeal disease, and can in extreme cases lead to blindness. Recent research also shows that vitamin A deficiency is common in pregnant and lactating mothers in Bangladesh, and that this lack both decreases a mother's chance of survival and facilitates vitamin A deficiency among their children (Christian, 2002). Yet foods rich in vitamin A such as dark green leafy vegetables and eggs are not eaten in sufficient quantities (HKI, 2006) and many children and mothers still do not receive the recommended bi-annual vitamin A supplement recommended by the government (DHS, 2004). Iron deficiency is also a serious problem in Bangladesh because it impedes the physical and cognitive development of children and puts mothers at heightened risk of maternal mortality. In fact, anemia can kill women during delivery or postpartum even through small losses of blood—anemic mothers are 3.5 times more likely to die than those with adequate hemoglobin levels (Brabin, Hakimi, and Pelletier, 2001). Despite the importance of iron, one half of Bangladesh children and mothers of reproductive age are anemic, according to NSP data (HKI, 2002). Thus, immediate efforts must be made to improve iron intake—through supplements in the first instance until the moment at which iron-rich foods become a more regular part of the Bangladesh diet. These efforts can build on the relatively successful distribution processes already in place for vitamin A supplementation; in such a case, alternative packing arrangements can be found to increase the amount of iron supplements given to households so that it lasts longer than the 15 days that the present dose lasts. This would help facilitate use by ensuring that mothers did not need to return for supplements bi-monthly, as is the current practice.

99. One of the principal consequences of poor nutrition is increased morbidity. But morbidity, particularly diarrhoeal disease, can also affect nutritional status if it afflicts a child repeatedly. There is thus a feedback loop between malnutrition and diarrhea that is particularly damaging to maternal and child health. Two of the most important factors in this bivariate relationship diarrhea are proper, hygienic sanitation facilities and a safe water supply. For example, data from the Child Nutrition Survey 2000 shows a greater than 30 percent increase in child underweight rates among households that get their drinking water from ponds or rivers as opposed to taps. This can have a negative impact even among infants: because bottle-feeding is relatively common in Bangladesh, unsafe water and preparation facilities may increase microbial contamination and increase diarrhoeal morbidity. Similarly, there is a roughly 30 percent increase in child underweight rates for households that use a sanitary toilet over those that use an open space or temporary toilet (World Bank, 2005). These findings indicate that access to safe water and hygienic sanitation facilities can significantly disrupt the mutually reinforcing interrelation between malnutrition and diarrhoeal disease.

Figure 4.11: Child (6-23 months) Underweight Rates by Water Source and Toilet Type, 2000



Source: World Bank, 2005.

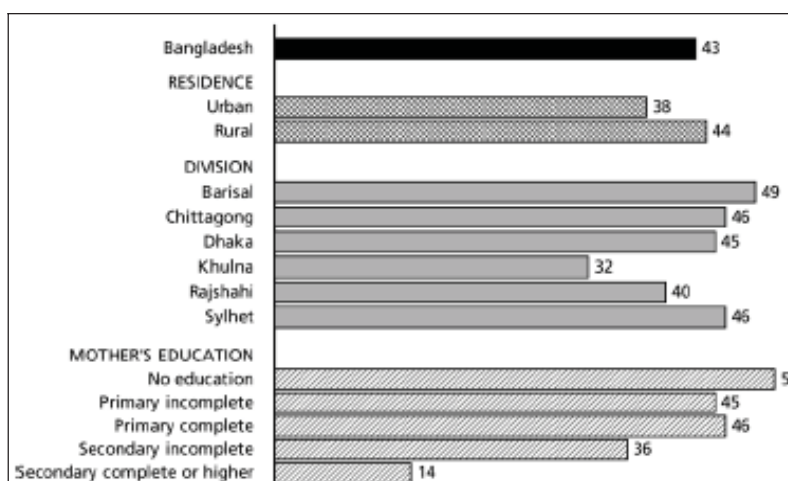
100. Access to and utilization of health services are also very important in reducing child malnutrition. For example, attendance at birth by a trained medical provider increases substantially the probability that breastfeeding occurs immediately after birth (DHS 2004). Research by the World Bank (2005) also demonstrates that having a thana (i.e. upazila) health center within 5 kilometers of a village decreases the average underweight rate by 2.4 percent (from 53.5 to 51.9 percent); moreover, this effect is strongly pro-poor in the sense that the largest reductions in the underweight rates accrue to the poorest income quintile. The effect of easy access to health facilities holds for NGO-administered health clinics, but not for private health clinics, which suggests that the poor either cannot afford private health clinics and so do not go, or that they receive poorer quality services once there.

### Secondary Education is Critically Important for Improving Nutrition

101. The educational level of mothers has a powerful effect on child malnutrition: the greater the educational attainment, particularly to secondary school, the better nourished are her children. For example, the CNS 2000 indicated that 57 percent of children (aged 6-23 months) of mothers with no schooling were underweight, whereas only 27 percent of children of mothers who completed secondary education are malnourished. This effect appears stronger in the DHS 2004 data: 51 percent of stunted children had mothers with no education, but only 14 percent of stunted children had mothers who completed secondary school. From this data, it appears that the jump between primary and secondary schooling yields the biggest impact in terms of improved child nutrition—even incomplete levels of secondary education lead to stunting rates that are 10 percent less than that found among children of mothers who had only completed primary school. This strongly positive bivariate relationship, however, may be masking the effect of unobserved variables, such as access to health care, income levels, access to infrastructure, etc. Al Zayed, Stopnitzky and Khan (2006) examine the role of secondary education in reducing child malnutrition in a multivariate framework that controls for a set of basic household characteristics, but that also examines the interaction effects between education and wealth. They find that secondary education has the largest and most significant effect on malnutrition, and that these benefits accrue irrespective of the household's wealth. The policy implications of these findings are substantive: an expansion of female secondary schooling is the single most important factor in improving Bangladesh's terrible child malnutrition problem. Simulations of the predicted impact of increased female secondary schooling on malnutrition show that every additional year of schooling results in a 2 percent decline in the malnutrition rate (World Bank, 2005) and that reaching full female secondary

enrolment would diminish by half the probability that a child is malnourished (Al Zayed et al, 2006). Thus, expanding completely girls' access to secondary education can by itself be expected to drive the behavior changes necessary to reach the child malnutrition MDG, one of Bangladesh's most troublesome (see Table 4.7).

Figure 4.12: Percentage of Children Under Five Who are Stunted, by Socio-Economic Characteristics



Source: BDHS 2004

Table 4.7: Simulation Results for 2015 of the Effect of Education of Fertility and Malnutrition

Scenario	Expected Fertility Rate	Expected Stunting
Education Levels in 2015 same as 2004	2.9 children per mother	47%
All mothers have primary, no increase in secondary	2.5 children per mother	31%
All mothers have at least secondary	2.0 children per mother	17%
Likely scenario simulating current enrolments i.e. 30% have at least primary and 61% at least secondary	2.4 children per mother	33% (=MDG target)

102. Given the significant effect of education on nutritional outcomes, provision of nutritional messages in secondary, and perhaps primary, schools should be considered. The evidence in Al Zayed et al. (2006) and other sources suggest that the effect of education operates not through the curriculum or learning achievements (i.e. the quality of learning), but rather through some unobserved characteristic of the educational process, such as the conditioning of children to be more receptive of information provided to them. According to this mechanism, therefore, the more a child is educated, the more amenable that individual is later in life to the health campaigns and behavioral cues that will improve MDG outcomes. Such socialization processes can be tapped into by providing nutritional and/or other critical health messages to students, which would reinforce the positive effects of schooling and could be expected to further positive health outcomes for future mothers and their children.