

Inequality in the Access to Secondary Education and Rural Poverty in Bangladesh: An Analysis of Household and School Level Data¹

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Abstract

This paper explores the relationship between different levels of education and poverty through an analysis of household-level data from 60 villages in Bangladesh. First of all, it depicts the overall trend in school enrollment at primary and secondary level between 1988-2000, and confirms the inequality that exists in the access to education at post-primary level. This is followed by a presentation of income and occupation data that show a strong positive correlation with the level of education. In the second part, an income function analysis has been done to assess the impact of education along with other determinants. Marginal returns to upper secondary and primary level of education have been found to be higher than lower secondary education. The third part analyzes the effects of education on child/woman ratio, and on the secondary school participation rate of male and female children. Both poverty and low education have positive but weak effect on child/woman ratio. On the other hand, school participation rates are strongly affected by the income status of the household and education of father and mother. Mother's education has stronger effect on girls' enrollment in secondary schools. Lastly, the analysis of school-level data confirms the findings from household survey such as the absence of gender gap at primary level and higher proportion of girls in some secondary schools. The unexpectedly high promotion rates in secondary schools suggest that the schools are more concerned about government financial support than the quality of education. High degree of private tuition among secondary school teachers also points toward inequality in the access to quality education that impairs the ability of the poor to complete the secondary level.

JEL classification: I20, I21

Key words: poverty; returns to secondary education; inequality

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I. Introduction

Poverty reduction in Bangladesh has been a slow process. An acceleration in economic growth in the 1990s, has led to a reduction of poverty in terms of proportion of population below the national poverty line. Still 40 per cent of the population were poor in 2000. The absolute number of poor has not declined and poverty is concentrated in rural areas. The positive impact of economic growth on poverty reduction has remained limited due to inequality in the access to secondary education and agricultural land. (Sen and Hossain, 2000). Recent statistics indicates that while the access to primary education has improved (Chowdhury and Choudhury, 2001), the access to secondary education has deteriorated especially among the landless households (Ahmad and Hossain 2001). In Bangladesh, non-farm activities generate higher income than farm activities (Sen, B. 2003; Hossain, M., 2004) and the level of education determines the ability of households to engage in such activities. Unequal access to education has, therefore, serious implications - it perpetuates income inequality, and limits the impact of economic growth on poverty reduction.

There are few studies dealing with the role of secondary education in poverty reduction. Bangladesh being a least developed country with high adult illiteracy, universal primary education has been the focus of researchers so far. Earlier studies on rates of returns to education in developing countries confirm higher returns to primary-level education compared to higher levels (Psacharopoulos, 1994). Since this does not tally with evidences from Bangladesh, further research with a focus on the secondary-level education is needed.

The purpose of this paper is to explore the relationship between levels of education and poverty through an analysis of household-level data from Bangladesh. The relationship between education and poverty is a circular one: the lack of secondary-level education may force poor households to engage in low-productivity activities, and results in poverty. On the other hand, poverty leads to low investment in education. The paper argues that inequality in the access to secondary education because of higher costs faced by the poor is the major reason behind their inability to benefit from economic growth. The study will explore the following issues:

1. The relationship between years of schooling and the patterns of earnings and occupations.
2. The effects of lack of education and poverty on the demographic and human capital variables – fertility and school enrollment of children.
3. The role of the supply of education in determining inequality in the access to education on the basis of school-level data.

The paper is organised as follows: Section II is devoted to conceptual and methodological issues. Section III deals with poverty profiles of rural Bangladesh and the correlates of poverty especially education. Section IV analyses the impact of education on household income. Section V deals with the effects of lack of education and poverty on demographic and social variables. Section VI analyzes school-level data to assess the impact of the school system on the access and quality of education. Section VII discusses policy implications.

II. Conceptual issues relating to poverty and education

The study of poverty and education is difficult not only because of the circular nature of the relationship. It is complex because poverty has many dimensions that are affected by education. Poverty signifies lack of income, and deprivation in terms of political and civil rights, voice, freedom of choice, and the quality of life based on health and education. While education is a goal in itself, it can be instrumental to poverty alleviation working not only through income but through its influence on other dimensions of poverty. There are two approaches - the human capital approach and the human development approach that both emphasize the role of education in human welfare (Tilak, J. B. G. 2001). The human capital approach (Schultz 1961; Becker 1964; Mincer 1972) focuses on the instrumental aspect of education while the human development approach takes a broader view of human welfare and relates education to different dimensions of poverty (UNDP, Sen, 1993). These two views are in no way contradictory since the human capital approach enables one see how education can be used to expand people's choice through higher productivity and income.

The impact of education on poverty

The impact of education on poverty works through productivity of labour and other effects on the household. The effects on labour productivity are reflected in the wage rates in labour market activities, and income from self-employment. Education increases

productivity and earnings potential through different channels. It enhances the ability to perform specific jobs and to search for employment opportunities, etc. It can also serve as a signaling and screening device to the employers. For self-employment, it enables the worker to acquire access to inputs, technology and market information.

Schooling affects the well-being of the household through many other channels than only productivity or income. First of all, knowledge about improved health practices and food/nutrition has strong impact on mortality and morbidity. Education enhances the ability of the individual to access health services provided by the state. The education of women is found to have a greater effect on children's health and schooling than education of men. It has significant effects on contraceptive behaviour and fertility (Bledsoe and Casterline 1999). Poverty reduction comes from a lower rate of population growth, another indirect effect of education among the poor. It should be stressed that positive effects of education pass through generations and have long-term consequences for poverty.

Education affects social capital and the ability of individuals to communicate and cooperate to solve collective action problems that have strong impact on poverty alleviation. Membership in associations can have feed-back effects. Belonging to an association promotes literacy through increased awareness and motivation. Poverty alleviation defined in a broader sense such as capability and empowerment is also promoted by education.

The impact of poverty on educational investment

Investment in educational human capital in developing countries may be studied using Becker's framework for the demand and supply of human capital. The demand represents the present discounted value of benefits (labour market earnings), and the supply represents the present discounted costs of education (school fees, travel costs, opportunity costs in terms of foregone earnings). There are several points attached to the issue of demand that are important.

Earnings possibilities are affected by labour market conditions faced differentially by individuals, for example, male worker may face greater opportunity of work and higher wages than female workers (Mazumdar, 1989). The demand for education is not only determined by productivity and income associated with schooling, but in many cases schooling of children is affected by the individual characteristics of students such as ability, motivation, and family background interacting with each other (Behrman, 1990). Poverty of the households plays an important role in perpetuating low motivations and low demand for education.

Costs representing the supply of education

Private costs both direct and indirect costs are affected by public policies, the incidence of child labour and labour market conditions. If there is a high demand for child labour in the labour market, opportunity costs of keeping children at school will be high for poor families. Gender differences in costs and benefits may also arise depending on the role of women in the economy, society and the family.

On the whole, poor households are likely to have low demand for education mainly because of high costs of education and low benefits arising from factors like discrimination in the labour market and low motivation for schooling.

Data

The information for this study is based on a two-period survey of a nationally representative sample of 62 villages from 57 districts. The sample villages were selected in 1987 while conducting a study on the impact of modern rice technology on income distribution and poverty (Hossain et al., 1994). The Bangladesh Institute of Development Studies (BIDS) implemented the study in collaboration with the International Rice Research Institute (IRRI). The sample was drawn through using a multi-stage (union-village-households) random sampling method. IRRI revisited the villages again in 2000 and collected data from a random sample drawn on the basis of “wealth-ranking” of households in the villages including households which were selected in the 1987 bench-mark survey by stratifying households on the basis of landownership and tenure characteristics. School level data were collected in 2003 from a sample of schools from the 62 villages from which household-level data were collected.

III. Poverty trends and educational achievements in Bangladesh

Poverty estimates in Bangladesh are available from different sources - national accounts statistics (NA), Household Expenditure Surveys (HES) carried out regularly by the Bureau of Statistics, poverty studies by BIDS and various nutrition surveys by several agencies. There are discrepancies in the estimates of long-term poverty trends because of different data sources and methodology. For example, some studies based on HES data claim an improvement in poverty situation in the mid-1980s especially in rural areas. According to

the revised estimates of M. Ravallion and B. Sen (1996) there was a reduction in poverty incidence, depth and severity around the mid-1980s, but that was not sustained after that (Ravallion and Sen, p. 786). Poverty increased in terms of headcount measure in 1991-92 and all poverty measures are higher in rural areas.

Recent estimates (World Bank 2003) for the period 1991-92 to 2000 based on NA and HES are not comparable to the above estimates. The World Bank study uses cost-of-basic-needs (CBN) method whereby any household with per capita real expenditure below a given poverty line is considered poor. According to the study, national poverty (using upper poverty line) has declined from 58.8% in 1991-92 to 49.8% in 2000- a 9 percentage point decline. The decline has been almost equal in urban and rural areas. Extreme poverty has also declined, more in rural areas especially with respect to depth and severity of poverty. Inequality has increased more in urban than in rural areas. Poverty reduction in urban areas was mainly due to rapid economic growth which was inequitable whereas rural poverty reduction came from broad-based economic growth. However, a higher level of rural poverty compared to urban areas can be attributed to lack of access to secondary education. A lower level of poverty but similar trends in poverty decline are estimated by Sen (2003) based on consumption expenditure data from a survey of 21 villages.

Progress of education in Bangladesh

According to Primary and Mass Education Division of the Ministry of Education, Primary gross enrollment increased from 76% in 1991 to 104% in 2000. However, Household Income and Expenditure (HIES) Surveys give a more pessimistic picture. The corresponding figure for 2000 is 75% and in fact, there has been a decline of 5% since 1995-96. According to the World Bank, "the ministry records most likely overestimate the rise in enrollments in recent years". Enrollment in secondary school has risen marginally from 63.7 in 1995-96 % to 65.3% in 2000, and in urban areas it has declined. A major concern in Bangladesh is the poor quality of education at primary level which is not only due to limited resources but also inefficient utilisation of public resources. The poor quality of education at primary level has serious impact on the overall literacy (population 7 years and over) which is only 44.9% in 2000. An analysis of school-level survey data in the mid-1990s indicate that high drop-out rates at upper grades of primary school are closely associated with the quality of schools (Alam, 2000). This is also connected with the main problem that is the low enrollment rates in secondary school (declining) and college level. Below we consider the estimates from our survey areas.

Two indicators are used to measure progress in education - the proportion of children and youths enrolled at different levels and the proportion of the adult population having different levels of education. According to our sample survey, substantial progress has been made in terms of enrollment in primary school that went up from 66 per cent to 101 per cent (Table 1). The achievement of female children is especially noteworthy, and the fact that total enrollment rate in secondary schools has gone up from 50 per cent to 61 per cent mainly due to the high enrollment rate among girls. Actually, the enrollment of boys has declined from 60 to 58 per cent. Progress has also been made in college education - from a low 15 per cent to 24 per cent. Here again, the rate of increase in the participation rate is higher among girls than boys. However, the gender gap is still large at college level.

The results for primary level are similar and consistent with the ministry's estimate but not the HIES estimates as mentioned above. On the other hand, enrollment rates at secondary levels are similar to HIES. Both estimates point toward a decline in male enrollment and a rise in female enrollment.

Although our estimates are not directly comparable with overall literacy figures, there are some similarities - the proportion of the adult population without formal schooling declined from 67 per cent to 44 per cent (Table 2). Gender gap in adult literacy is declining and progress in secondary education especially for girls is noteworthy. In 1988, the proportion of the female adult population with secondary level education was only 11 per cent compared to 27 per cent in 2000. These figures are for the whole rural population. There are, however, differences among different income and landholding groups.

Inequality in access to education – national and household-level sample survey data

According to the World Bank study, while progress has been made in terms of reducing gender gaps in primary school enrolment, adult literacy and in pro-poor distribution of public expenditure at primary level, pro-rich bias at post primary level remains. This is reflected in the lower participation rates of children from poor households and changes over time at different levels (Table 3). In 1988, the proportion of children from the landless households enrolled in primary school was only 54 per cent. By 2000, the enrollment rate has reached 98 percent indicating that almost everybody has access to primary level education. We do not have data that differentiate between the enrollment rates at lower and upper grades of primary school, and on repetition or dropout rates. Alam's (2000) study relating to data in mid-1990s indicate that "rates of dropouts and repeaters (at upper grades)

are much higher for the socio-economically disadvantaged if we compare them with other socio-economic groups ” (p.57).

On the other hand, only 29 per cent of children were enrolled in secondary school, and the figure went up to 41 per cent in 2000 recording an increase of 41 per cent compared to 81 per cent at the primary level. The enrollment rate of male children fell from 39 per cent to 36 per cent whereas the female rate rose sharply from 18 per cent to 46 per cent.

Inequality in the access to education is reflected in the lower enrollment of poor children at secondary (41 per cent) than the general level (61 per cent). Similar to the total population, enrollment of boys in secondary school in our survey areas has declined. But the rate of decline among the poor households is greater (8 per cent) than the whole population (3 per cent). Exactly the opposite is true for girls – enrollment of girls from the landless households increased faster than the total population. Inequality is most evident at college level. Only 9 per cent of young people from poor households are enrolled in college compared to 24 per cent of the whole population. Although the rate of progress is high mainly because of the low initial base, there is a wide gap in the access to high education. Unequal access to education at higher level has important implications for poverty alleviation in rural Bangladesh as will be discussed below.

Table 1. Changes in the school participation rate, 1988 to 2000

[Percent of relevant school age group¹]

Education level	Male population		Female population		Total population	
	1988	2000	1988	2000	1988	2000
Primary	70	101	61	100	66	101
Secondary	60	58	40	63	50	61
College	25	30	6	17	15	24

Note: ¹The school age group was defined as follows: Primary level 6 to 11; secondary level 12 to 16; and college level 17 to 24 years of age.

Table 2. Educational attainment of adult population (non-student), 1988 and 2000

Education level	Male population		Female population		Total population	
	1988	2000	1988	2000	1988	2000
No formal schooling	55.8	36.6	77.4	52.2	66.7	43.6
Primary level	14.8	16.9	10.6	15.9	12.5	16.5
Secondary level	20.0	30.9	10.7	27.3	15.4	29.2
College level	9.4	15.6	1.3	4.6	5.4	10.7
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table 3. Changes in the school participation rate for the landless and marginal landholding households¹, 1988 to 2000

[Percent of relevant school age group²]

Education level	Male population		Female population		Total population	
	1988	2000	1988	2000	1988	2000
Primary	58	99	48	97	54	98
Secondary	39	36	18	46	29	41
College	5	12	0	5	2	9

Note: ¹These households were defined as those with a size of owned land at less than 0.20 hectares. In Bangladesh, this group is defined as “functionally landless”. In our sample, the group comprised 49 percent of all rural households.

²The school age group was defined as follows: Primary level 6 to 11; secondary level 12 to 16; and college level 17 to 24 years of age.

So far inequality in the access to education has been discussed in terms of outcome. The main reasons behind differential outcomes are unequal opportunities created by education policies, the school system and poverty itself. A brief description of the present education system is given below.

Primary education upto Grade 5 is free in Bangladesh, and inequality in the access to primary education is greatly reduced in recent years. Private costs of education at primary level are negligible because of state subsidies and low opportunity cost in terms of foregone earnings of children (Alam, M. 2000). There is, however, the problem of quality which affects the poor mainly, and perceived benefits of education among the poor seem to be low. (World Bank op. cit). Secondary education, on the other hand, is not free although a large proportion of the salary of teachers are subsidized by the government. Most secondary schools are privately managed where tuition fees are charged, and there are other expenses as well.

“According to the 1996 household survey, parental outlays averaged 500 taka per primary school child, 1500 taka per secondary school child, and 2400 taka per higher secondary school child” (Education Sector Review Vol. II, p. 62). “Costs to parents include direct costs that is contribution to running schools and other costs. In junior secondary education, pay on average 154 Tk for admission, 237 Tk. For uniforms, 385Tk. For books, 87 Tk. For exam fees, 265Tk. For tuition, 180 Tk. For transportation and 765Tk. For private tutors”(ibid, footnote 10).

Besides, there are indirect costs like foregone income that are especially important for poor households. Inequality in the access to education is affected by different factors:

- Public subsidies to education are lowest for secondary level, and out-of-pocket expenditure plays a large role that goes against the poor.
- Costs of education and quality of education vary widely between urban and rural areas. In urban areas, costs of education rise with the quality of school, and admission to good schools is extremely competitive. Only rich parents can provide special coaching that is essential for the entry exam.
- The rural areas are generally under-provided especially in upper secondary schools. There is unequal geographical distribution of secondary schools – private schools are often established according to the demand of the well-off communities. Entry to such schools is not as competitive as in urban areas because of the low effective demand for secondary education. For the poor, not only the costs of education are high but perceived benefits are low as well largely due to poor quality of education.
- The poor experience not only unequal access to education, they also receive poorer quality of education compared to the rich which impairs their ability to continue and attain the certificate of exam. The poor suffer most from poor quality of education because they cannot afford to employ private tutors which the system allows and in fact, contributes to poor quality of teaching at school. Low level of education of parents and the atmosphere at home are also not conducive to learning. According to Bangladesh Education Sector Review, the lower rate of returns associated with below-SSC exam is not necessarily the lack of demand in the labour market, rather, the poor quality of education that fails to teach basic skills.

IV. The impact of education on occupation and income - household-level data

There are different factors that determine rural income in Bangladesh such as the access to land, number of working members in different occupations, education, non-land assets, infrastructure, etc. Bangladesh is an agriculture-based economy, and traditionally, land has been the most important source of income. With the introduction of modern rice technology, other factors (that are complementary to land) such as irrigation facilities, credit and

education are playing increasingly important roles. Access to non-land resources increases not only the productivity of land but also opens up the possibility for non-farm occupations. Education is particularly important for participation in non-agricultural occupations. In recent years, with the growth of non-farm activities, and declining importance of agriculture, the importance of education as a source of livelihood has increased.

This is clearly reflected in the average income earned in different occupations and the educational attainment of workers in each category (Tables 4 and 5). 1988, average household income was highest in services followed by farming, trade and business, agricultural labour and non-agricultural labour. By 2000 the situation has changed drastically - services is still the highest income occupation, followed by trade and business that have not only surpassed farming but have come close to services. The declining importance of agriculture is reflected in reduced income for farming and agricultural labour on the one hand, and non-farm activities and non-agricultural labour on the other. The increasing significance of education for income and occupation is evident from the data related to years of schooling of workers in different occupations (Table 5). Those engaged in service occupations have the highest number of years of education followed by trade & business, crop cultivation, non-agricultural labour and agricultural labour. Note that the relationship between education and income has become stronger in 2000 compared to 1988.

Our results on education and income are consistent with other studies. According to the World Bank study (2002) "individuals in the top deciles have, on average 7 times as many years of education as individuals in the lowest decile" (World Bank 2003, Page 25). We have also done some income function analysis to find out the importance of education controlling for other factors. The methods of analysis and the results are presented in the following section.

Table 4. Annual Household Incomes for Different Occupations (Taka at 2000 constant price)

Occupation	1987-1988	1999-2000
Farming	27,292	24,061
Agricultural labour	16,526	8,215
Trade and business	25,266	48,024
Service	50,109	58,040
Non-agricultural labour	13,100	17,262

Source: IRRI- BIDS Household Survey

Table 5. Educational attainment of workers employed in different occupation, 1988 and 2000

Occupation	1988		2000	
	Percent of workers	Average years of schooling	Percent of workers	Average years of schooling
Crop cultivation	41	3.5	34	3.9
Other agriculture	2	0.3	1	1.4
Agricultural labor	22	1.1	13	1.5
Trade and business	9	3.6	14	5.5
Services	15	6.5	21	8.5
Non-agricultural labor	11	1.9	17	3.0

Regression analyses: effects of education on income and on social variables

Income function analysis (Table 6 regression results)

There are different channels through which education affects income in rural Bangladesh:

1. It increases efficiency in specific occupations,
2. It facilitates mobility to higher productivity jobs i. e., from agriculture to non-farm activities within rural areas. We have seen income in non-agricultural work has increased together with higher educational achievement of the non-agricultural workers.
3. It facilitates rural-urban migration and remittances contributing to rural capital accumulation.

Household-level data from 60 villages are used to find out the relative importance of different determinants of income vis-à-vis education. Stepwise regression models were run to capture the following effects:

1. Determinants of income without the educator factor.
2. Determinants of income with education factor entered in terms of year of schooling to capture linear effects of education.
3. Determinants of income with education factor entered as dummies for different levels of education to capture the non-linear effects of education that arise because of the labour market condition in Bangladesh. There are no job opportunities in the formal market unless tertiary level of education is attained.

4. The positive effects on income that come from the movement of labour from low-productivity (agriculture) sector to high-productivity sector because of higher education. To capture this effect the worker variable is separated into agriculture and non-agriculture.
5. Effects of education on productivity in non-farm activities.

The models are in linear form and the co-efficient values are marginal increases in incomes in response to one unit of change in the factors. For example, in Model 1 (Table 6), an increase of one hectare of owned land would increase income at the margin by 24,489 Taka that is 32% of mean income, and the variable is highly significant. Average size of land in Bangladesh is small and 1 hectare of land can contribute to income substantially. Hence, this is not an unexpected result. Having one more hectare under modern rice would increase income by 11,170 Taka, 17% increase of mean income. A worker in the household earns on the margin 21,607 Taka also leads to a high increase in income, 21,607 Taka (34 per cent of mean income). An investment of 100 Taka gives a return of Taka 32. Average household income increases by about 27,600 Taka if the village has electricity. Cultivation of modern rice increases income by 11,170 Taka. These five variables explain 62% of the variations in income of the households and they are highly significant .

In regression Model 2 (Table 6), education in terms of years of schooling is entered for three members, head of the household and the second and third members. R^2 is slightly higher in this model. Only one education variable, that is for the household head is significant together with other variables included in model one. One extra year of schooling of the household head increases income by 1,657 Taka. Education has also positive impact on the technology variable. The income from MV rice increases to 12,332 Taka , a difference of 1,000 Taka from regression 1. On the other hand, the contribution of land owned by the household falls by about 4,000 Taka.

In Model 3 (Table 6) three education dummies – representing completion of schooling at the primary level (upto 5 years of schooling), participation in secondary schools (5-9 years) with secondary schools certificates (10-11 years) and with college or university level of education.secondary classes, higher secondary classes and degree classes are entered to calculate the marginal returns to primary, secondary, higher secondary and above classes. The dummy for primary classes for the household is insignificant but for secondary classes (completed primary level) is highly significant. It means that a household with the head being educated at the secondary level earned about 17,916 Taka more than a household head

having no formal schooling. However, being in secondary higher education classes but not having the certificate does not have much improvement. The dummy is insignificant and its contribution to income falls to 7,116. Completing higher secondary level and having studied in degree classes again improves income substantially. The dummy becomes highly significant and the contribution to income rises to 23,669 Taka. Our results indicate that returns to education rise between primary and lower secondary education, falls between lower secondary and higher secondary, and again rises after higher secondary and it is the highest in our example. The low return on education for the high school drop-outs and those who do not have college level education is presumably due to the difficulty of finding jobs in the formal service sector with level of education. Members with this level of education also become misfit for participation in agricultural activities. This non-linear pattern of returns to education has serious implications for poverty because the poor may not be able to benefit much from education unless the college level is achieved.

Most of the dummies for the education of other members are not significant except the dummy for secondary classes for the spouse. It is significant at 5% level and it contributes to income by 9,749 Taka. It indicates that the completion of primary level by a wife contributes to income but marginal income becomes lower for the completion of the secondary level and it even declines after the completion of the higher secondary certificate. This effect may be explained in terms of the withdrawal of female labour force in Bangladesh with the rise of family income.

In Model 4 (Table 6), an additional dummy variable was entered to see the effect of remittance as a source of income of the household. The results show an increase in R^2 from the previous models. Most of the variables that had significant effects on household income are the same in this model except the case of the spouse's education in secondary classes (completion of the primary level). The relevant dummy has become insignificant. The value of the regression coefficient shows that with remittance household income increases by about 19,812 Taka, a 30% increase over mean income.

In Model 5 (Table 6), the worker variable is divided into two categories – agriculture and non-agriculture, to discern the effects of mobility from agriculture to non-agriculture as a result of higher education. The variables that were significant in the previous model turn out to be highly significant, and the model has higher explanatory power with the R^2 rising to 0.66. The interesting part is that agricultural worker variable has become less significant with a marginal return of 8,443 Taka only whereas non-agricultural worker variable is not

only more significant but also has the highest marginal returns, 26,381 Taka. One of the important structural changes associated with economic development and poverty reduction is the increase in productivity of labour arising from mobility between sector (Lewis, 1956). Our study stresses the fact that this process may have been facilitated by increased education in rural areas, and our results confirm this hypothesis. It may be noted that the marginal return to education at secondary and degree level education (that was very high in the previous model with the merged worker variable) is lower in this model. It suggests that a part of the effect of education is due to mobility and a part due to increased productivity within the non-farm sector.

Summing-up: The hypotheses that education contributes to income through different channels are substantiated by the analysis of our survey data. It may be useful to keep in mind that in many cases schooling appears to be a proxy for other characteristics, such as ability, motivation and family background (determinants of social capital), rather than representing purely the effects of schooling per se. Ignoring these factors may indicate exaggerated correlation between schooling and earnings (Behrman, P. 34).

Table 6. Regression results - Income Function with education

	Model 1		Model 2		Model 3		Model 4		Model 5	
	B	Sig	B	Sig	B	Sig	B	Sig	B	Sig
Explanatory variables										
OWNLAND	24489.472633	.0000	20360.880947	.0000	20525.328241	.0000	20047.339592	.0000	21445.002997	.0000
WRKR	21607.848339	.0000	21230.188035	.0000	22262.667600	.0000	19389.194891	.0000		
CPTL	.324487	.0000	.318018	.0000	.321142	.0000	.323449	.0000	.316832	.0000
MVAREA	11170.439190	.0000	12332.363058	.0000	12644.783443	.0000	13831.326287	.0000	18148.221499	.0000
ELECTHH	276.093083	.0000	257.498701	.0000	261.330348	.0000	267.696091	.0000	241.155908	.0000
AGWRKR									8443.184594	.0000
NAWRKR									26381.008264	.0000
EDNH			1657.435975	.0001						
EDN2A15			694.934746	.1645						
EDN3A15			740.360790	.0202						
EDNHP					3197.791413	.3393	2950.624796	.3744	1227.136898	.7055
EDNHS					17916.525020	.0000	17326.360983	.0001	14440.246890	.0006
EDNHH					7116.821676	.2291	6731.853397	.2517	2901.501574	.6137
EDNHD					23669.570875	.0003	23510.644277	.0003	16512.211175	.0105
EDNSP					2506.742042	.4506	2252.300951	.4946	120.619450	.9702
EDNSS					9749.825537	.0299	8375.779858	.0606	3998.229999	.3613
EDNSH					1194.012657	.8832	-3080.674692	.7037	-8312.394141	.2945
EDNSD					-6353.549061	.5941	-9128.984556	.4408	-11675.91458	.3128
EDN3P					-6554.211313	.1064	-5713.121379	.1565	-4749.075275	.2277
EDN3S					4127.869811	.3716	3426.870098	.4550	2628.023865	.5574
EDN3H					10487.146168	.1218	6582.807030	.3304	5595.965136	.3968
EDN3D					5064.067360	8045.	254.254765	.9748	-5620.390863	.4750
DUMREMT							19812.564611	.0000	11705.750055	.0014
(Constant)	-6643.700722	.0157	-14241.87288	.0000	-13530.74254	.0000	-11987.00495	.000	-5395.029710	.0817
R ²	.62		.63		.63		.64		.66	
Adjusted R ²	.62		.63		.63		.64		.65	

<i>Mean</i>	<i>Std Deviat</i>	<i>Label</i>	
INCHH	64258.045	91088.031	Total income of the household
OWNLAND	.531	.996	Ownland of household at aggregated level
WRKR	1.666	1.018	Number of total adult earner
AGWRKR	.810	.822	Number of adult agricultural worker
NAWRKR	.855	1.002	Number of adult non-agricultural worker
CPTL	29331.049	153670.585	Total capital: non-land fixed (Tk)
MVAREA	.330	.708	MV rice cultivated area (ha)
ELECTHH	31.494	36.047	Percent of HH has access to electricity
EDNHP	.274	.446	Household head with primary classes (dummy)
EDNHS	.158	.365	Household head with secondary classes (dummy)
EDNHH	.073	.259	Household head with higher secondary (dummy)
EDNHD	.067	.250	Household head with degree classes (dummy)
EDNSP	.282	.450	Household spouse with primary classes (dummy)
EDNSS	.153	.360	Household spouse with secondary classes (dummy)
EDNSH	.033	.180	Household spouse with higher secondary (dummy)
EDNSD	.014	.117	Household spouse with degree classes (dummy)
EDN3P	.148	.355	3 rd member with primary classes (dummy)
EDN3S	.102	.303	3 rd member with secondary classes (dummy)
EDN3H	.040	.197	3 rd member with higher secondary (dummy)
EDN3D	.030	.170	3 rd member with degree classes (dummy)
DUMREMT	.189	.392	Household received remittance (dummy)

No. of cases 1888

V. Social impact of education

So far we have tried to emphasize the positive impact of years of schooling on productivity and income. As mentioned above, schooling also affects well-being through many other channels than only productivity or income. The mechanisms through which schooling indirectly affects poverty are

- health and mortality
- children's schooling having a generation effect
- fertility

In spite of slow progress in reducing poverty in terms of income, Bangladesh has achieved substantial progress in other dimensions of poverty. Total fertility rate has declined from over 6 children per woman in the 1970s to 3.3 in recent years. This has resulted in the slowing down of population from 3% annually in the 1960s, 2.4% in the 1970s to 1.5% in the 1990s. Infant mortality has also declined from 130 per thousand to 60 during the same period. The success Bangladesh achieved in social spheres is largely due to the integrated nature of development programme where education has played an important part.

The effects of education on the demographic and social variables that in turn affect the well-being of the poor may be analysed through household-level data. The basic argument is that higher education especially of mothers affect the health and education of the child through different channels: improved knowledge about child health care practices, ability to utilize public health facilities, improved performance in school, and indirectly through higher labour force participation rates and income. Fertility rate is also affected because of changes in the relative costs of rearing children and improved ability to adopt family planning. Lower fertility affects also income and consumption patterns with more expenditure per child. This works not only at the national level but also at the household level. In this paper, we have focused on fertility and school participation of children at secondary level.

Exploring the impact of education on child-woman ratio which is a measure of current fertility (see Table 7 for regression results)

Hypotheses regarding the determinants of fertility are derived from the microeconomic theories of fertility (Becker, Mincer, Willis, Easterlin, Leibenstein) focusing on the role of costs and benefits of children which may differ according to stage of economic

development. One important difference between the basic model of Becker and the general model of Easterlin is that the costs of fertility regulation may be affected both by health care and family planning facilities and by education and labour force status of women.

Cost of children

- Direct costs
- Indirect costs – opportunity costs

Benefits of children

- Old-age security
- Productive work of children
- Social status especially for women.

We also assume that both costs and benefits are affected by the socio-economic context in the study area.

Explanatory variables that are expected to affect costs and benefits of children, and the costs of fertility regulation are presented below:

- Income and poverty - since the relationship between income and fertility may be of non-linear type, we have used different dummy variables to capture the poverty and wealth effects at different levels. For instance, in extreme cases poverty may have fertility dampening effects either through impaired fecundity of women and/or change in fertility behaviour supported by family planning services (Kabeer, N. 1994). In most cases, fertility may rise with increasing income to a certain level because of the Malthusian effects on both mortality and fertility. Once the threshold level of income is reached further increase in income affects fertility negatively as it is predicted in micro theories of fertility. For these reasons, income is not included in our model in a linear form. Moreover, the effects of income may work through landownership and education.
- Landownership is expected to promote fertility
- Number of adult members reduces child-caring costs for parents and induce fertility. On the other hand, the demand for labour will be less and hence the demand for children, with negative effect on fertility.
- Father's education indicates improved awareness about quality of children and greater ability to access family planning facilities. Hence negative effect on fertility is expected.

- Mother's education – improved ability to communicate with husband together with the ability to utilize family planning services leading to negative effects on fertility. Also, higher education means improved health and lower mortality of children that in turn reduces fertility.
- Participation of women in economic activities - has negative effects on fertility because of higher opportunity costs of rearing children.
- Age of women is expected to have a negative effect on child-woman ratio because younger women are likely to have higher fertility than older women.
- Availability of health facilities – reduces costs of fertility regulation and reduces fertility.
- Religion – Muslim population are expected to have higher fertility that comes from limited mobility of women.
- Female empowerment can affect fertility in a negative. However, any proxy for this variable could not be constructed because of paucity of data.
- Incidence of child labour: It may be expected that children's participation in the labour market may have increased the demand for children and induce fertility. However, given the recent declining trends in Bangladesh of child labour and the fact that this decline is partly due to lower fertility in the past decades as well as spread of primary education because of targeted policies, we had to drop this variable from the model.
- The relationship between NGOs and fertility is expected to be negative because of the integrated development programme of NGOs in Bangladesh that focus on women's work, family planning and children's education.
- Nearness to school and availability of electricity are also expected to affect fertility negatively because of the modernization effect on the preference of parents and quantity-quality tradeoffs.

Because of the possibility collinearity between education of household head and the spouse, we used OLS models including female education and male education separately. In Model 1 (Table 7), fitting the household-level data related to the above factors except household head's education to the multivariate regression model gives the following results: only 14% of the household-level variation in child-woman ratio are explained. The predictor

variables which are statistically significant show that poverty, availability of workers, education of spouse, age of spouse, women's involvement in economic activities and NGO membership have high level of negative and positive contribution (the value of coefficient) to the dependent variable. The results show that poor households have 15% higher child-woman ratio. One additional worker in the household reduces child-woman ratio by 10%. It implies that the cost of rearing children effect is weaker than the effects of the benefits of children as worker, the latter becoming lower with more availability of workers. Having one NGO member in the family reduces child-woman ratio by about 8%. One year of schooling of spouse will reduce fertility by 1.4 %. Economic activities of women have also negative effects on fertility as expected. The variables with highest level of statistical significance are the worker, age and poverty at 1%; education of spouse and NGO membership at 5%; and economic activities of women at 10%.

Model 2 (Table 7) includes years of schooling of husbands along with other variables. Inclusion of husbands' education instead of the wives does not change the results significantly. Similar to wives education husband's education has a negative effect on fertility. However, the effect on the dependent variable is weaker than it is for women. In the step-wise regression model, the highly significant variables are worker, poverty, age, education of household head, NGO and economic activities of women.

Table 7 Dependent variable: Child-woman ratio

Variable	Model 1		Model 2	
	B	Sig	B	Sig
WRKR	-10.272790	.0000	-10.338193	.0000
EDN2	-1.415167	.0218		
EDNH			-.705360	.0005
AGE2	-.810821	.0001	-.924167	.0482
NGOM	-8.064021	.0496	-7.837950	.0563
ECOHRF_F	-1.626258	.0848	-1.785492	.0591
POORDUM	15.446321	.0003	16.324160	.0001
(Constant)	158.985736	.0000	154.912541	.0000
R Square	.14155		.14024	
Adjusted R Square	.13580		.13449	
	<i>Mean</i>	<i>Std Deviat</i>	<i>Label</i>	
CHLD_WMR	111.619	59.458	Child-women ratio (%)	
OWNLAND	.511	.993	Ownland of household at aggregated level	
WRKR	1.678	1.108	Number of total adult earner	
EDN2	2.746	3.364	Education level of household 2 nd member	
EDNH	3.784	4.271	Education level of household head	
AGE2	34.315	10.959	Age of household 2 nd member	
NGOM	.288	.453	Household has NGO relationship (any memb	
ELECTHH	31.855	36.398	Percent of HH has access to electricity	
RELGDUM	.919	.273	Dummy: Religion of household	
ECOHRF_F	1.657	1.961	Economic hours of women (hrs/day)	
POORDUM	.427	.495	Percent of poor household	
RICHDUM	.059	.235	Percent of better-off household	

The effects of parents' education on the education of children

Parents' education has tremendous effects on children's education and it works through different channels. First, the income effect: education enables the first generation to earn more that in turn increases the ability to invest more in education of children. Secondly, with education, tastes and preferences with regard to quality of children change. The parents may want their children to engage in non-farm activities that demand more formal education.

Mother's education is likely to have greater effect (Klasen 1999; Sen and Murthy 1995) because of the quality of upbringing children and the motivation provided by an educated mother. These are in addition to the income effect mentioned above. The income effect may or may not be greater depending on the marginal returns to female education compared to marginal returns to male education. Our previous analysis of marginal effects show that the returns to female education at primary and secondary level are not higher than that of male education. We hypothesize that variations in the village-level enrollment rate at secondary level may be explained by the following factors:

- Landownership may imply greater opportunity cost and hence negative effects. But may have income effect reducing the burden of sending children to school (indeterminate).
- Proportion of adult workers – lower opportunity cost (+)
- Women's labour force participation through income effect may have positive effects because of income (+). However, opportunity cost of attending school in terms of foregone time for activities where children can substitute mother can have negative effect of school enrollment. On the whole, this effect may be indeterminate.
- Religion (-)
- Presence of NGOs in the village (+)
- Distance to high school (-)
- Availability of electricity in the village (+)
- The proportion of poor relative to moderately poor – poverty and cost of schooling effect (-)
- The proportion of rich relative to moderately poor – income and opportunity cost effect (+).
- Occupation of household measured through sources of income – agricultural wage labour, business and services. It is expected that agricultural income has negative effect and the other two occupations have positive effects on the schooling of children.

- Dependency ratio: higher the number children the greater will be the costs of sending children to school and hence will have negative impact on schooling.

Regression results (Table 8)

Model 1: Dependent variable total secondary school participation rate with schooling of household head

Model 2: Dependent variable total participation rate with mother's education

Model 3: Dependent variable participation rate of male children with father's education

Model 4: Dependent variable participation rate of male children with mother's education

Model 5: Dependent variable participation rate of female children with father's education

Model 6: Dependent variable participation rate of female children with mother's education

Total participation rate with schooling of household head

Several regression models were run: first with the dependent variable as **total** enrollment rate in secondary school explained by the above variables except mother's education. Model 1 (Table 8) explains only 9% of the variation in school participation rate. Running the regression model step-wise improves the results. R² rises to 0.22, and several variables make substantial contribution to the dependent variable. The strongest effect comes from poverty. The poor households have 18.8% less school participation rate compared to non-poor households. Agricultural worker households have 16% lower participation rate than non-agricultural households. Participation rate for the Muslim families is 9% higher than the non-Muslim families – an unexpected result. One extra child in age group 1-14 years would increase enrollment rate by 6%. This is a very strange result given the fact that poverty has strong negative effect on school participation. It may be that rich households have more children, and the result reflects the income effect (We have to check the data). Another possibility may be the positive sibling effect as it is explained in some studies (Madestam, A. 1998). However, since the dependency ratio is defined as children between 1-14 years, this argument does not hold.

Education of household head has positive effects on the participation rate. Secondary level of education (10 yrs of schooling) of household head increases participation rate by 13%. Availability of electricity also increases participation rate by having access to television and media in general. Education, dependency ratio, occupation, poverty variables are statistically significant at 1% level. Religion is significant at 5% level and electricity at 10% level.

Total enrollment rate with mother's schooling

Model 2 (Table 8) with female education instead of household head's education give poor results when all variables are included similar to the previous model. In the stepwise regression, the R^2 rises to 0.22 little higher than model with male education. The contribution of female education to the participation rate is higher than it is for male education. 10 years of schooling of mothers will increase the participation rate by almost 16%, 3% higher than it is for father's schooling. The significance level of these variables is almost the same as the previous model except with a lower level for electricity and religion.

Male enrollment rate with father's education

In Model 3 (Table 8) with all variables included, the R^2 is only 0.14 and the coefficients have low value. In a stepwise regression with only the significant variables included in the model, R^2 rises to 0.26. The occupation dummy1 has the largest contribution. Agricultural households have 22% lower participation than non-farm households. Poor households have also 15% lower participation rate than non-poor households. On the other hand, households with service income have 8% higher participation rate than households with agricultural worker and business income. Father's secondary (10 years) level education increases participation rate by about 9%. Dependency ratio has similar strong and positive effect as the previous models.

Male enrollment rate with mother's education

Including mother's education raises the R^2 slightly (Model 4, Table 8). The contribution and the significance levels of the variables are almost the same as the model with father's education except that mother's education has higher effect on the male participation rate 14% as against 9% which is consistent with our hypothesis.

Female enrollment with father's education

The effects of parents' education are stronger for girls than for boys. Father's education increases girls' participation by 16% as against 9% for boys (Model 5, Table 8).

Female enrollment with mother's education

The effect of mother's education on the education of girls is quite spectacular. Secondary-level (10 years) education of mother increases participation of girls by 26% ((Model 6, Table 8). The positive effects of dependency ratio on school enrollment rate (as mentioned above) is much weaker for girls than for boys suggesting that when there are many children in the family boys have greater likelihood of going to school.

Our analysis of village and household level data indicates that the effects of education on the demographic variables are weak and are difficult to interpret because of the possible existence of many intervening variables on which we do not have data. The positive effects of parents' education especially of mothers on children's education at secondary level are confirmed clearly by our data analysis. The most important result is the negative impact of poverty on educational attainment of the poor.

Table 8 Regression Results on School Participation at Secondary Level

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	B	Sig	B	Sig	B	Sig	B	Sig	B	Sig	B	Sig
PEDNH	11.654519	.0004										
SEDNH	13.307630	.0002										
CEDNH	12.860709	.0012										
PEDNS			12.685306	.0000								
SEDNS			15.493991	.0000								
EDNH					.890465	.0236			1.566214	.0002		
EDN2							1.422672	.00282			2.646373	.0000
DEPRATIO	6.229523	.0000	6.293292	.0000	8.209105	.0000	8.280726	.0000	2.529346	.0045	2.546853	.0038
ELECTHH	.059664	.0821	.061876	.0705					.086406	.0625	.080162	.0813
RELGDUM	9.155478	.0419			9.835094	.0757	9.119745	.0976				
PCPDUM1	-15.946654	.0000	-15.220853	.0000	-22.335822	.0000	-21.844478	.000	-10.377838	.03230	-9.069980	.0598
PCPDUM3					8.387883	.0416	8.804676	.0311				
POORDUM	-18.767087	.0000	-20.147929	.0000	-15.127699	.0000	-15.396038	.0000	-22.240819	.0000	-22.01780	.0000
(Constant)	31.173567	.0000	40.965107	.0000	20.855786	.0012	21.044114	.0008	59.953783	.0000	58.68850	.0000
R ²	.22		.22		.26		.26		.17		.18	
Adjusted R ²	.21		.21		.25		.25		.16		.18	

Variable description

	Mean	Std Dev	Label
SSRATE_T	63.375	44.282	Total: Secondary school participation ra
OWNLAND	.642	1.127	Ownland of household at aggregated level
EDNH	4.212	4.370	Education level of household head
PEDNH	.203	.402	Dummy: Primary education of HH head (3-5
SEDNH	.164	.371	Dummy: Secondary education of HH head (6
CEDNH	.139	.346	Dummy: College level of HH head (10 & ab
DEPRATIO	4.172	1.832	
NGOM	.275	.447	Household has NGO relationship (any memb
ELECTHH	30.775	36.010	Percent of HH has access to electricity
RELGDUM	.917	.276	Dummy: Religion of household
PCPDUM1	.186	.389	Dummy: Agri-wage labor is major income
PCPDUM2	.146	.353	Dummy: Business is major income
PCPDUM3	.174	.379	Dummy: Service is major income
ECOHRF	1.979	2.193	Economic hours of women (hrs/day)
POORDUM	.395	.489	Percent of poor household
RICHDUM	.068	.251	Percent of better-off household
HSCHMILE	1.303	1.040	

N of Cases = 1034

Explaining the recent changes in the gender gap in education

To understand the reasons behind the recent decline in gender gap in education it is important to decipher the factors that cause differential treatment of sons and daughters in Bangladesh. We assume that parents in Bangladesh do not necessarily discriminate their daughters vis-à-vis sons. Socio-economic institutions create the ground for discrimination. When these institutions change parents' behaviour also changes. According to the patriarchal tradition, married daughters are not responsible for taking care of their parents, and according to Muslim inheritance laws, daughters inherit only half of what the sons get of deceased parents' property. The system of transfer of landed property to sons is also supported by the economic institution whereby men can operate the land not women.

Investment in education of sons and daughters is also guided by the interaction of social and economic institutions played out in the labour market. According to the traditional pattern, women do not engage in market activities outside of the household, and there are few job opportunities for women. Since market activities generally demand formal education, it is rational for the parents to invest in sons' education. While tradition and laws support transfer of wealth to sons and investment in education, parents try to compensate daughters through dowry, some education (if it does not cost too much) and some wealth which daughters often do not claim.

Several social and economic changes are observed in Bangladesh. As mentioned before, the importance of land as a source of income and security is waning. With the growth of non-farm activities and urbanisation, many traditional values such as dependence on *only sons* are weakening. Now-a-days daughters also take care of old parents. The ability of daughters to provide financial support to parents, however, depends mainly on their own earnings. Here recent development in the labour market has played an important role. With the growth of the readymade garments sector where mostly women are employed, opportunities of work for women have expanded especially in urban areas. In rural areas, women from poor households are usually involved in home-based economic activities which has been promoted by various microcredit institutions, and in recent years, the importance of these activities vis-a-vis wage employment for women has increased (Hossain, Bose and Ahmad, 2004). It may have some effects on the opportunity costs of attending schools for girls.

Both wage employment in the textile sector and self-employment in rural areas require some basic education. There is another socio-economic change, that has increased the demand for education, is related to the marriage market. Now-a-days girls with some

education (even among the poor) have a greater chance of getting a partner because of the possibility of greater income for the family as well as better upbringing of children. These changes that are taking place in the process of development largely autonomously have influenced the attitude of parents towards the education of daughters. The main thrust, however, came from policy changes. In the last decade, the government with help of international donor agencies has invested in girls' education through many programmes like, scholarships for female students, female teachers and more public expenditure in primary schools. These policies have reduced the cost of education of daughters in the face of increasing benefits of education perceived by parents. It should be noted that in spite of these positive development poverty of the household continues to a critical barrier to female education especially at higher level.

VI. School survey – 2003 (Tables related to schools are presented at the end of the paper)

In addition to benefits of education, the motivation of parents to send their children to higher level of education is determined by supply-side factors such as availability of school, costs and quality of education. Since household level data did not include specific questions on education, an additional survey of primary and secondary schools in the sample villages was undertaken. Eighty six primary schools in sixty villages, and 13 secondary and junior secondary schools serving the population of these villages were studied. The following aspects were focused:

Type of school – private, public and community, that may affect the demand for education through its effect on costs.

Characteristics that affect the quality of education and hence household demand for education.

- Physical characteristics
 - Quality of school building
 - Classroom space per student
 - Teachers room
 - Playground
 - Tables, chairs and benches
 - WC facilities
- Teaching staff and material
 - Number of trained full-time teachers
 - Academic qualifications of headmaster/mistress

- Composition of school committee – representation by parents from all categories
- Library facilities – books, maps, globe, computer, typing machine, magazines, newspapers
- Parent-teacher interaction – number of meetings in a year
- How many subjects taught
- Teachers engagement and responsibility

Performance of students

- Numbers and proportion of students passed last year in different grades
- Number and proportion of students passed with distinction

Summary of data and analysis of findings

There are 86 primary schools serving 60 villages. Of these 41 per cent government schools, 28 per cent private, 26 per cent community and 5 per cent local govt. schools. Although only 41 per cent are government schools almost all schools are dependent on govt. financial support for the salaries of teachers. In non-govt. schools, a small amount comes from tuition fees (6%). Most of the schools are managed through school management committees, and chairmen of the committees mostly come from non-farming occupation (65%), with an overwhelming majority having education below SSC and SSC level. The village population have access to primary school, but the schools have very poor facilities (Table) in terms of electricity, toilet, library, teachers' room and teaching material. Most of the schools have govt. granted posts for headmaster (82) but in govt. schools only 63% of the posts are filled. Similar is case for senior and assistant teachers both in govt. and non-govt. schools.

In terms of the educational qualification of teachers, the headmasters in govt. schools have mostly HSC and graduate level of education and 70% have PTI training. In private schools, the level of qualifications for headmasters is lower. A higher proportion of senior and assistant teachers in private schools have HSC and graduate level of education but only 21% of them have PTI training compared to 64% in government schools.

There is very little gender gap in enrollment and attendance rate, and almost no difference between govt. and private schools. Attendance rates are around 74%. Promotion rates are quite high both in govt. and private schools. However, dropout rates are higher in govt. schools than in private ones. Percentages of students having scholarships for both boys and girls are higher in govt. schools than in private schools.

Hours worked taking classes do not vary between government and private schools but hours spent in private tuition is higher among teachers of private schools. Total hours spent

in teaching in other types of schools is lower than in government and private schools. There are more female teachers in such schools. In general, less than 40% of the teachers are involved in private tuition. The need for private tuition rises at higher level of education.

Since there is very little differences in performance with respect to enrollment, attendance and promotion and high performance is observed on average, we looked at the results of 5th grade students to assess the factors that may affect the quality of education provided by different schools.

Factors determining the quality of education

Quality of education is defined as the efficiency score of Grade 5 of students, and is measured as the sum of

$$\begin{aligned} & (\text{No. of student with 1}^{\text{st}} \text{ division} / \text{total no. of student passed}) * 3 + \\ & (\text{No. of student with 2}^{\text{nd}} \text{ division} / \text{total no. of student passed}) * 2 + \\ & (\text{No. of student with 3}^{\text{rd}} \text{ division} / \text{total no. of student passed}) * 1. \end{aligned}$$

The explanatory variables are:

- religion of teacher, non-Muslim teacher (+)
- age reflecting experience (+)
- Sex of teacher (?)
- Education level of teacher, graduate or not (+)
- Salary paid from government grant (+)
- Type of school (government +)
- Age of school (+)
- Playground (+)
- Chairman's occupation (?)
- Chairman's political affiliation (?)

Variables significant at 1% level are religion, government grant and chairman being in service occupation and his political affiliation, and variables at 5% level of significance are age of teacher, age of school and non-agricultural occupation of chairman. It is quite interesting that older schools and those received government grants for teachers' salary, and political affiliation of chairman have negative effects on the results. Neither the sex nor the qualification of teachers turned out to be significant. Three models were run separately for all students, male and female students. R²s are low, around 0.19 for all regressions.

Table 9 Regression Results on Factors Determining the Achievement of Children at 5th Grade Primary level

All Students Variable			Male students		Female students	
	B	T	B	T	B	T
RLGDUM	.225049	3.559	.192181	2.373	.257192	3.191
AGE	.007398	2.468	.006622	1.725	.006794	1.778
SEXDUM	-.342631	-.889	-.365312	-.740	-.184355	-.375
EDNDUM	.066471	1.146	.044456	.598	.110046	1.488
GRNDUM	-.279565	-3.117	-.154295	-1.343	-.393362	-3.441
SCHDUM	-.332851	-.838	-.447650	-.880	.006102	.012
SCHAGE	-.003167	-2.225	-.001150	-.631	-.004710	-2.596
PGROUND	.148148	2.344	.464230	5.735	-.267035	-3.315
CHOCP_SR	.176801	2.609	.045472	.525	.207313	2.400
CHOCP_NA	.151610	2.255	.106545	1.237	.156918	1.831
CHPOLIT	-.135861	-2.652	-.096586	-1.472	-.181128	-2.774
(Constant)	1.85476	4.502	1.655074	3.137	2.069814	3.942
R2	.19464		.18781		.18153	
Adjusted R2	.15679		.14963		.14305	

Dependent variable

PERF_AL5	1.865	.412	Results performance: G5-All students
PERF_ML5	1.855	.525	Results performance: G5-Boys
PERF_FL5	1.916	.521	Results performance: G5-Girl

	Mean	Std Dev	Label
RLGDUM	.187	.391	Religion of teacher (non-Islam)
AGE	38.573	10.754	Age (Up to 1st January 2003)
SEXDUM	.463	.500	Gender of teacher (female)
EDNDUM	.341	.475	Education level of teacher (graduate)
GRNDUM	.220	.415	Received govt grant salary
SCHDUM	.533	.500	Type of school (government)
SCHAGE	37.720	28.635	Age of the school (yrs)
PGROUND	.785	.412	Playground
CHOCP_SR	.358	.480	Com-chair: occupation is service
CHOCP_NA	.366	.483	Com-chair: occupation is business+others
CHPOLIT	.427	.496	Com_chair: political alliance

N of Cases = 246 teachers from 60 schools

Secondary Schools

There are large differences between primary and secondary schools with respect to population served, type of ownership and management. There are only 13 schools in the vicinity of the 60 sample villages, 12 of them have co-education, and one school is for girls only. Nine of them are high school upto Class 10 and 3 junior high schools upto eighth grade. All of them are private schools with different sources of finance (Table 20). The high schools depend on tuition fees and govt. finance for salaries, while junior schools rely on local donations and development funds. The share of govt. finance in salary costs varies between 64-96 per cent. Physical facilities and assets of schools differ a great deal between high schools and junior high schools and also between small and large schools in terms of number of students. However, on the whole the schools lack facilities like teachers' room, office room, library and laboratory.

The ratio of enrollment of boys and girls varies among schools. In nearly half of the schools, there are more girls than boys. However, the percentage female in total is very small even in the girls' school, and in three schools there is no female teacher. The schools vary a great deal with respect to proportion of trained teachers. Most of the junior schools do not have any trained teacher. Student-teacher ratios do not vary much.

In all schools, most of the teachers have either Bachelor or Masters degree. On the other hand, the proportion of teachers with a degree in education is much lower (9%-54%) and in three schools, no teacher has any training. The teaching loads per teacher vary between 13-26 hours per week, and in all schools the teachers spend some time at home for preparation. There is no relationship between number of classes and hours of preparation at home. In almost 50% of the schools, teachers engage in private tuition. The average number of hours varies between 2-3.7 hours per week. The number of teachers keeping contacts with the guardians of students always and occasionally is quite high in all schools. The performance of students in terms of promotion to higher classes, SSC examination and the grades received reveals some interesting aspects about the incentives working on the supply side of education. The proportion of students promoted to 10th class in 2002 is very high in all schools, between 80-100 except one (the school for only girls) where it is only 58%. But in only 8 schools students have passed SSC, and the percentage passed is much lower than the rate of promotion (average 31% for boys and 26% for girls). Among those who passed, no one received grade A+, 15% of the boys and 13% of girls had grade A. In three schools, drop-out rates are quite high around 22 to 28 per cent.

It would be interesting to explore whether quality of schools in terms of teachers' qualifications/involvement, and schools' physical and financial status are somehow correlated with the achievement of students. In Table 25 we rank the schools according to SSC results and some factors related to the quality of schools. The results weakly support the conclusion that performance of schools in terms of percentage passed SSC exam and passed with distinction are affected by the education and training of teachers, educational assets of schools per student and students-teacher ratios.

VII. Conclusions and policy implications

The paper sets out to explore the relationship between inequality in the access to secondary-level education and poverty in Bangladesh. In Bangladesh, most poor people live in rural areas, and one of the main reasons behind poverty is unequal access to secondary education. The analysis of longitudinal data from 60 villages indicates that the importance of non-farm activities and the role secondary-level education have increased in rural areas. On the other hand, the ability of the poor household to provide their children secondary education has not improved because of lack of access to schools, poor quality of education, and high costs involved. The regression analyses confirm that the poor in rural areas are trapped in low education \Rightarrow low income \Rightarrow high fertility \Rightarrow low investment in education.

School-level data indicate that the quality of education is very low reflected in the poor results of SSC exam. The management committees of schools appear to be more interested in high enrollment record maintained through easy promotion in order to receive government grants rather than improving the quality of education. The quality of education suffers due to lack of basic inputs and the involvement of teachers in private tuition.

Policy implications:

- More schools in rural areas
- More emphasis on inputs rather than only teachers' salaries
- Improving the quality of teaching at school so that the poor do not suffer – it is a challenging task especially because the poor in Bangladesh cannot exert their rights and demand better service provision.
- Since substantial progress has been achieved in enrollment rate and gender equality at primary level, it is now time to direct resources to secondary level for **both boys and girls** from poor households. This is because of the declining enrollment of boys at the secondary level, and greater employment opportunities for men with secondary education.

Tables on primary schools (Nos. 10-16)

Table 10. Ownership and management characteristics (in % of schools)

Ownership					
government					
	Government		Private	Local govt Others	Others
	41		28	5	26
Management					
	Committee	others			
	86	14			
Chairman's occupation	Farming	non- farming			
		35	65		
Chairman's education			Graduate	SSC-HSC	Below SSC
				34	42
Political affiliation	AL	BNP	no affiliation		
	21	23	48		

Table 11. Asset Position and Physical Facilities (in percentage of schools)

Ownership of land	Own	Rented			Library		0
	75.2	24.8			Laboratory		0
					Teachers' room		0
Type of building	Concrete	semi-concrete					
	33.9	55.0			Computer		0
					Globe		12
Playground	57				Map		81
					Newspaper		5
					Magazines		10
Electricity	12				Textbook		69
					Other books		63
Teachers' latrine	55				Classroom		88
Common latrine	58				Office room		51
Girls latrine	10.5				Teachers' room		0
Tubewell	52						
Gymnastic room	0						

Table 12. Financial Status of Schools

	Government	Private	Others	Total
Income from tuition fee		633600	18840	65440
Income Govt.source for salary	7974483	1334442		9308925
Income from own assets	4700	21200		25900
Income local donation	45520	146800	5320	197640
Other grant from govt.	74720	36200		110920
Development grant	636519	309000	7200	952719
Other income	46440	515100	165380	726920
Salary payable from govt.	794483	1334442		9308925
Salary payable from school		664800	20920	685720

Table 13. Enrollment, Attendance, Repetition and Drop-out Rates in Primary Schools

	<i>Government</i>				<i>Private</i>			
	Total	Girls	Boys	F/M	Total	Girls	Boys	F/M
Enrollment	8790	4299	4491	0.96	5434	2671	2763	0.97
Attendance %	74	74	74		74	75	73	
Scholarship %	36	37	36		26	28	23	
Repetition %	8	8	8		7	7	7	
Drop-out %	12	12	12		9	9	9	
Promotion %	82	81	83		83	83	83	

Table 14. Information on granted posts and no. of teachers

	Government	private	others
Head master			
Granted	38	23	21
Working	28+6=24	21+1=22	2+19=21
	(M) (F)	(M) (F)	(M) (F)
Senior and Assistant Teachers			
Granted	109	87	2
Working	57+36=93	45+36=79	1(F)
	(M) (F)	(M) (F)	

Table 15. Background of teachers

	Government			SSC	HSC	Graduate	Master	P.T.I.
	M	F	Total					
Head teacher	32	5	37	3	16	14	4	26
Senior/assteacher.	55	43	98	31	34	24	9	63
	Private							
Head Teacher	21	2	23	5	8	8	2	10
Senior/ass teacher	51	37	88	28	36	23	1	21

**Table 16. 2002 Results
Class V**

	Government		Private		Others		Total %
	M	F	M	F	M	F	
Numbers appeared	552	478	258	253	12	21	1574
Numbers passed	530	444	240	231	12	21	1478 94
Nos Ist division	170	140	73	61	2	6	452 29
Nos 2 nd division	178	187	93	84	6	10	558 35
Nos third division	176	140	74	76	4	5	475 30

Tables on Secondary Schools (nos. 17-25)

Table 17. Names and Geographical Distribution of Schools

	NAME OF SCHOOL	VILLAGE	UNION	UPAZILA	DISTRICT	DIVISION
1	Madhur Khola high school	Madhurkhola	Muksedpur	Dohar	Dhaka	Dhaka Division
2	M.D.P Adarsha high school	Mandarkandi	Burudia	Pakundia	Kishorganj	Dhaka Division
3	Baghutia K.M. high school	Uttar bashail	Bagutia	Doulatpur	Manikganj	Dhaka Division
4	Gopinathpur haidaria high school	Gopinathpur	Gopinathpur	Badarganj	Rangpur	Rajshai Division
5	Gyandas Kanai Kata junior High school	Kanaikatha gandas	Polash Bari	Nilphamari Sadar	Nilphamari	Rajshai Division
6	Kamat Kajal Dighi Adarsha junior high school	Ghotbor	Kamal Kazal Dighi	Panchagarh Sadar	Panchagarh	Rajshai Division
7	Patkathi high school	Patkhati	Durgapasha	Bakerganj	Barisal	Barisal Division
8	Beshail Khan Shahid Sreti high school	Beashainkhan	Kirtipasha	Jhalakhati Sadar	Narail	Barisal Division
9	Srejony Model junior high school	Khudia khali	Jehala	Alamdanga	Chuadanga	Khulna Division
10	Mujibnagar high school	Maniknagar	Bagowan	Meherpur Sadar	Meherpur	Khulna Division
11	Murshider Bazar Non-Govt. Girls Junior School	Khidir	Malibari	Gaibandha Sadar	Ghaibandha	Rajshai Division
12	Khidir Sharif Al-Owahedi high school	Khidir	Malibari	Gaibandha Sadar	Ghaibandha	Rajshai Division
13	Munshipara Dimukhi high school	Rotnour	Shahargram	Birol	Dinajpur	Rajshai

Table 18. Type of Schools

NAME OF SCHOOL	ESTA. YEAR	LEVEL OF SCHOOL	OWNERS HIP	INST. TYPE	GOVT AFFILIATION	Occupat ion	Educat ion	Party affiliation
Madhur Khola high school	1993	High School	Private	Co-Education	Granted	Business	S.S.C	B.N.P
M.D.P Adarsha high school	1993	High School	Private	Co-Education	Granted	Business	Class-5	Awami League
Baghutia K.M. high school	1964	High School	Private	Co-Education	Granted	Business	Class-9	B.N.P
Gopinathpur haidaria high school	1967	High School	Private	Co-Education	Granted	Business	S.S.C	Others
Gyandas Kanai Kata junior High school	1998	Junior High School	Private	Co-Education	Affiliated	Agricult ure	Class-5	Others
Kamat Kajal Dighi Adarsha junior high school	2001	Junior High School	Private	Co-Education	Affiliated	Business	H.S.C	B.N.P
Patkathi high school	1990	High School	Private	Co-Education	Granted	Retire	Class-9	Others
Beshail Khan Shahid Sreti high school	1972	High School	Private	Co-Education	Granted	Business	B.A	Others
Srejony Model junior high school	1997	Junior High School	Private	Co-Education	Nothing	Agricult ure	Class-9	Left party
Mujibnagar high school	1937	High School	Private	Co-Education	Granted	Business	B.A	B.N.P
Murshider Bazar Non-Govt. Girls Junior School	1994	Junior High School	Private	Girl	Granted	Agricult ure	S.S.C	Awami League
Khidir Sharif Al-Owahedi high school	1968	High School	Private	Co-Education	Granted	Agricult ure	S.S.C	Others
Munshipara Dimukhi high school	1960	High School	Private	Co-Education	Granted	Business	B.A	Others

Table 19 Assets of Schools

Name of school	Physical Assets (decimal land)	Educational assets (present value Tk.)	Class room no.	Teachers' room no.	office room no.	Library no.	Laboratory no.
Madhur Khola high school	239	11115	10	2	1	1	0
M.D.P Adarsha high school	107	8844	9	0	0	0	0
Baghutia K.M. high school	151	26206	15	1	1	1	1
Gopinathpur haidaria high school	16	7853	8	1	1	0	0
Gyandas Kanai Kata junior High school	31	5183	6	0	1	0	0
Kamat Kajal Dighi Adarsha junior high school	210	6100	3	0	1	0	0
Patkathi high school	35	7731	7	0	1	0	0
Beshail Khan Shahid Sreti high school	96	7957	7	0	1	0	0
Srejony Model junior high school	55	4400	3	0	1	0	0
Mujibnagar high school	221	24756	11	1	1	0	0
Murshider Bazar Non-Govt. Girls Junior School	42	3700	3	0	1	0	
Khidir Sharif Al-Owahedi high school	74	16083	13	0	0	1	2
Munshipara Dimukhi high school	195	8250	11	1	1	1	0

Note: Physical assets consist of land under building and playground.

Table 20.
Information on Students and Teachers

	Students per teacher	male/female enrollment
Madhur Khola high school	24	205/187
M.D.P Adarsha high school	24	139/121
Baghutia K.M. high school	55	703/454
Gopinathpur haidaria high school	22	135/176
Gyandas Kanai Kata junior High school	18	65/95
Kamat Kajal Dighi Adarsha junior high school	23	159/92
Patkathi high school	12	68/91
Beshail Khan Shahid Sreti high school	46	315/376
Srejony Model junior high school	24	40/80
Mujibnagar high school	18	142/141
Murshider Bazar Non-Govt. Girls Junior School	15	0/164
Khidir Sharif Al-Owahedi high school	27	339/306
Munshipara Dimukhi high school	22	160/219

Table 21. Financial Status of Schools

Name of schools	Income from tuition fee	Salary from Government	Other income	% of salary expense from govt.source	Local donation
1. Madhur Kholā high school	19600	42669	0	80	0
2. M.D.P Adarsha high school	40000	266700	52540	76	12000
3. Baghutia K.M. high school	227461	772091	449866	67	0
4. Gopinathpur haidaria high school	1940	425220	49300	90	0
5. Gyandas Kanai Kata junior High school	0	0	0	0	10000
6. Kamat Kajal Dighi Adarsha junior high school	0	0	0	0	60000
7. Patkathi high school	47880	498416	6500	90	39060
8. Beshail Khan Shahid Sreti high school	66833	510264	13350	91	400
9. Srejony Model junior high school	0	0	10000	0	5000+50000
10. Mujibnagar high school	90360	477499	586094	64	50110(dev. Fund)
11. Murshider Bazar Non-Govt. Girls Junior School	0	217560	15000	96	0
12. Khidir Sharif Al-Owahedi high school	45827	885576	15400	84	20500
13. Munshipara Dimukhi high school	283700	602991	98456	78	0

Table 22 Teachers' qualifications

Name of school	No. of teachers	% SSC	% HSC	% Graduate	% Masters	% B. P. Ed.	% B. Ed.	% M. Ed.
1. Madhur Khola high school	16 (3)	6	0	25	56	0	37	12
2. M.D.P Adarsha high school	11 (0)	0	9	73	0	9	54	0
3. Baghutia K.M. high school	21 (2)	5	0	71	9	5	48	5
4. Gopinathpur haidaria high school	14 (0)	0	0	29	57	0	21	0
5. Gyandas Kanai Kata junior High school	9 (1)	0	11	78	0	0	0	0
6. Kamat Kajal Dighi Adarsha junior high school	11 (3)	0	9	54	9	0	9	0
7. Patkathi high school	13 (1)	0	15	54	8	0	31	0
8. Beshail Khan Shahid Sreti high school	15 (1)	20	20	40	0	0	33	0
9. Srejony Model junior high school	5 (1)	0	20	0	60	0	0	0
10. Mujibnagar high school	16 (2)	0	6	69	6	0	37	0
11. Murshider Bazar Non-Govt. Girls Junior School	11 (2)	0	9	63	9	0	0	0
12. Khidir Sharif Al-Owahedi high school	24 (1)	4	17	67	0	4	29	0
13. Munshipara Dimukhi high school	17 (0)	6	18	65	6	6	35	6

Figures in parentheses are female teachers

Table 22. Teachers' performance

Name of school	No of classes per week	Hrs for preparation at home per teacher	Hrs in private tuition per teacher involved	Contact with guardian (no. of teachers responding)		
				Never	Always	Sometimes
1. Madhur Khola high school	21	2.3	2.9	4	12	0
2. M.D.P Adarsha high school	21	1.3	2.0	3	8	0
3. Baghutia K.M. high school	26	1.2	0.0	6	0	15
4. Gopinathpur haidaria high school	24	1.6	3.0	3	11	0
5. Gyandas Kanai Kata junior High school	26	.9	2.5	2	7	0
6. Kamat Kajal Dighi Adarsha junior high school	16	1.1	0.0	4	7	0
7. Patkathi high school	20	1.5	0.0	4	9	0
8. Beshail Khan Shahid Sreti high school	23	1.3	0.0	4	0	11
9. Srejony Model junior high school	16	0.6	0.0	2	3	0
10. Mujibnagar high school	20	1.4	0.0	4	12	0
11. Murshider Bazar Non-Govt. Girls Junior School	15	1.0	3.0	2	9	0
12. Khidir Sharif Al-Owahedi high school	17	1.0	0	6	18	0
13. Munshipara Dimukhi high school	13	1.4	3.7	5	12	0
All schools (183 teachers)				49 (27%)	108 (59%)	26 (14%)

Table 23. SSC results (total and average for 13 schools)

	Boys	girls
No. of students in final class	1918	1089
No. of examinees	1559	834
No. examinees with A+	0	0
No. of examinees with A	74	27
No. with B	273	108
No. with C	136	68
No. with D	18	2
% passed	31	26

Table 24. Educational Achievement of students

	% promoted	% passed in SSC 2000-02	% passed A	% drop-outs	
				M	F
1. Madhur Khola high school	84	46	19	11	8
2. M.D.P Adarsha high school	82	0	?	0	0
3. Baghutia K.M. high school	100	36	12	6	10
4. Gopinathpur haidaria high school	100	33	15	15	13
5. Gyandas Kanai Kata junior High school	100	0	0	22	9
6. Kamat Kajal Dighi Adarsha junior high school	86	0	0	0	0
7. Patkathi high school	97	44	9	9	5
8. Beshail Khan Shahid Sreti high school	98	33	0	0	0
9. Srejony Model junior high school	100	0	0	25	28
10. Mujibnagar high school	80	26	18	5	
11. Murshider Bazar Non-Govt. Girls Junior School	58	0	0		10
12. Khidir Sharif Al-Owahedi high school	90	29	12	5	2
13. Munshipara Dimukhi high school	80	26	19	9	8

Table 25
Ranking of schools according to SSC results and quality of schools

Schools	% passed in SSC 2000-02	% passed with A	% of teachers with B. Ed. and M. Ed	% of teachers with Bachelor and Master	Educational assets per student (Tk.)	Students per class room	Home preparation	Private tuition
1. Madhur Khola high school	46 (1)	19 (1)	49 (2)	81 (2)	28 (4)	39 (4)	2.3	2.9
3. Baghutia K.M. high school	36 (3)	12 (4)	53 (1)	80 (3)	23 (6)	77 (6)	1.2	00
4. Gopinathpur haidaria high school	33 (4)	15 (3)		88 (1)	37 (3)	26 (2)	1.6	3.0
7.Patkathi high school	44 (2)	9 (5)	21 (6)	62 (7)	49 (2)	23 (1)	1.5	00
8. Beshail Khan Shahid Sreti high school	33 (4)	0 (6)	31 (5)	40 (8)	12 (8)	98 (7)	1.3	
10. Mujibnagar high school	26 (6)	18 (2)	33 (4)	75 (4)	87 (1)	50 (5)	1.4	00
12. Khidir Sharif Al-Owahedi high school	29 (5)	12 (4)	29 (6)	67 (6)	25 (5)	36 (3)	1.0	0
13. Munshipara Dimukhi high school	26 (6)	19 (1)	41 (3)	71 (5)	22 (7)	26 (2)	1.4	3.7

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