THE ROLE OF POST-BASIC EDUCATION IN ALLEVIATION OF POVERTY AND DEVELOPMENT

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Abstract

The basic premise of the paper is secondary and higher education do contribute to development; they have poverty-alleviating effect as well. The paper reviews the available research evidence to show that much of the research on the role of secondary and higher education concentrated on its effect on economic growth and ignored its relation to poverty reduction and with human development indicators., which led many policy makers to argue that secondary and more specifically higher education do not reduce poverty; and it is only literacy and primary education that are related to poverty and human development. However, the limited research evidence shows that secondary and higher education contributes not only to economic growth, but also to reduction in poverty and improvement in human development indicators.

Using most recent international statistics on poverty and development indictors, it is attempted to further show with simple regression equations that the general presumption on the weak or negligible role of secondary and higher education in development is not valid and that post elementary education is important for reduction in poverty, in improving infant mortality and life expectancy, and for economic growth. Accordingly, it also pleads for sound and comprehensive education policies that recognise the importance of not just elementary education, but also of secondary and higher education and for integration of educational planning with development planning.

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"Education is not a way to escape poverty – it is a way of fighting it."
Julius Nyerere
(former President of United Republic of Tanzania)

1. Introduction

Ancient scholars in many countries, for example, in India and China highlighted the importance of widespread education in development. Education, Plato believed, is indispensable to the economic health of a good society, for education, he said, makes citizens 'reasonable men'. This aspect was emphasised by many philosophers and thinkers over the centuries. Education was regarded important on its own. Since education has high value in the society, Plato argued that a considerable part of a community's wealth must be invested in education. A major contribution to the discussion on the contribution of education to development was made by several social thinkers and philosophers for several centuries. The role of education in reducing poverty and inequality and in enhancing development was widely recognised. From the days of Adam Smith, education was believed to be a possible contributor to greater social and economic equality.[1] Even prior to Adam Smith, we find references in the literature to the equity role of education,

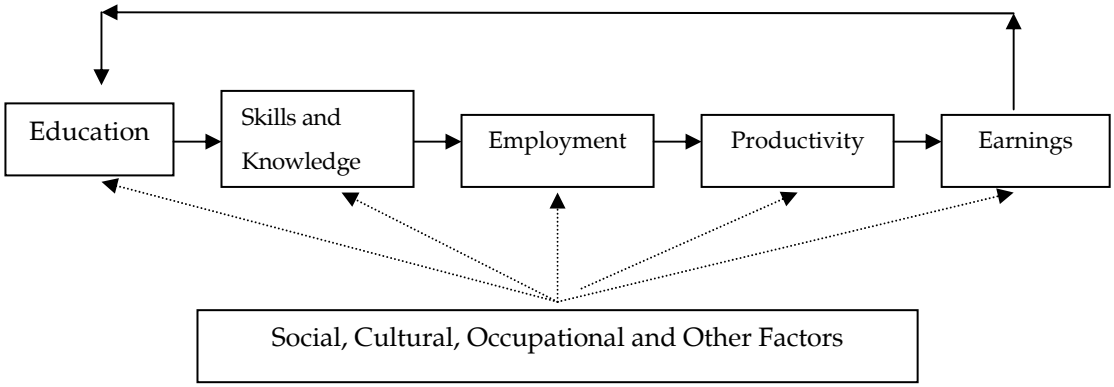
[1] See Blaug (1975) and Vaizey (1962).

besides the economic role in the creation of wealth of nations. It was William Petty who first advocated equitable distribution of education. Nehenia Green and James Stewart of the Mercantilist period also advocated mass education so as to increase agricultural productivity in particular and society's progress in general. Lord Palmerston favoured spread of literacy for various social and political purposes. The 18th and 19th century school reformers in the US like Horace Mann, Henry Barnard, James G Carter, Robert Dale Owen and George H Evans favoured educational opportunities to be extended to poorer groups of population. Horace Mann, a typical example of these reformers, viewed the school as an effective instrument to achieve justice and equality of opportunity and remove poverty. At least by the end of the 19th century the thesis was clearer. As early as in 1896, the role of education in reducing poverty was clearly recognised in Russia: "An increase of labour productivity is the only means to erase poverty in Russia and the best policy to achieve it is through the spread of education and knowledge" (Kahan, 1963, pp. 400-1).

Among economists, Adam Smith followed by a long and honourable tradition of classical and neo-classical economists including Alfred Marshall in the 20th century emphasized that "the most valuable of all capital is that invested in human beings" (Marshall, 1920). In the post-World War II period, Theodore Schultz (1961) pioneered the work on the contribution of education to economic growth. The human capital theory formulated by him laid a strong foundation for treating education as an investment in human beings and for treating it as an important source of economic growth.

According to the human capital theory, education transforms raw human beings into productive 'human capital' by inculcating skills required by both the traditional sector and the modern sector of the economy, and makes individuals more productive members of the society, not only in the market place but also in the household and also in the whole society. Education, both technical and general, contributes to economic growth through its ability to increase productivity of the population in general or of the labour force in particular, which leads to increase in individual earnings. The core of the human capital theory lies in the thesis that education increases productivity of labour force leading to increase in economic growth and reduction in poverty, as shown in Figure 1. This is true both at individual and macro levels.

Figure 1: **Relationship between Education and Earnings in the Human Capital Framework**



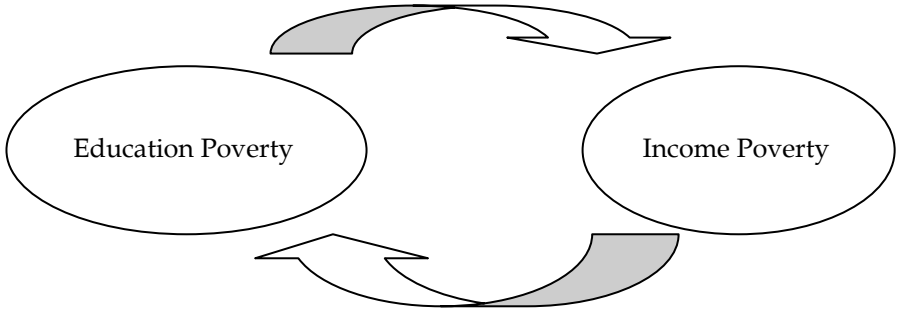
Source: Tilak (2002c)

There are a number of ways in which education influences socioeconomic well-being of the individuals and the society. First and directly, at individual level, it increases one's human capital; increases one's productivity in the labour market, and increases his/her earnings. Second, there are consumption effects of education. Educated people make more informed choices in their consumption patterns. Third, at societal level, there is found to be a positive correlation between education and health of the people. Fourth, education reduces search time in labour markets for employment. Fifth, there is an inverse relationship between average level of education and fertility rates, thereby reducing growth of population, which in developing countries is generally regarded as a positive aspect. Sixth, there is a direct relationship between education level of children and their parents' education. Seventh, education has an inverse effect on crime, a direct positive effect on social cohesion and technology development. Lastly, education produces several other positive externalities (benefits that are not confined to the individuals concerned, but that flow to the whole society) simple, and dynamic – social, economic, political and cultural.

That education reduces poverty is now well recognised. But equally true is that poverty reduces demand for education, and thus the relationship between education and poverty is a two-way one (Figure 2). Poverty is a cause and an effect of lack of education; so is deprivation of education: it is a cause and an effect of poverty. It is also well noted that the best mechanism of breaking the poverty trap is improvement in education.

Of late, lack of education itself is recognised not just as a cause of poverty, but as poverty in itself, as specialists in human development argue. It is known as an important dimension of human poverty, or simply as education poverty (see Tilak, 2002b, c, 2005).

Figure 2: **Inter-Relationship between Education Poverty and Income Poverty**



Source: Tilak (2002c).

Though education is rightly regarded as an important component of anti-poverty programmes in many developing countries, within education, focus has been relatively more on primary education, including non-formal education and adult education (e.g., Coombs and Ahmed, 1974; World Bank, 1990), and at best on primary and lower secondary education (World Bank, 1995). A substantial part of the available research (e.g., Noor, 1980; World Bank, 1993) seemed to have concentrated on analysing positive effects of literacy and primary education on poverty reduction and other aspects of social and human development like infant mortality, life expectancy, etc., and firmly

concluded that literacy and primary education have significant effects on poverty reduction. While all levels of education are found to be contributing to development, based mainly on the estimates of rates of return to education in several countries, Psacharopoulos (1973)[2] showed, from a compilation of estimates of rates of return in several countries that rates of return decline by increasing levels of education. Psacharopoulos subsequently made several updates of these estimates, which found a prominent place in the World Bank policy papers.[3] Though the World Bank (1980, p. 49) has clearly stated that "renewed emphasis on the importance of primary education, its high returns relative to secondary and higher education, should not start the pendulum swinging too far in the other direction" it did happen over the years. The Bank papers themselves (e.g., World Bank 1986, 1995) highlighted 'misallocation' of resources in favour of higher education, and recommended reallocation of public resources away from higher education and in favour of primary education. Of late, the view that secondary education yields lower returns than primary education and higher education the least -- has gained much strength. As Bloom *et a*l (2005) summed up, the World Bank's lack of emphasis on tertiary education has resulted in the absence of higher education in the poverty reduction strategies in all but a few African countries.[4] These strategies do not recognize the specific contribution of higher education to development needs. As a result, today there is a strong presumption among many policy makers that secondary and higher education is not necessary for economic growth and development; on the other hand, it is literacy and primary education that is important for economic growth and reduction in poverty.[5]

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[2] See Psacharopoulos and Patrinos (2004) for the most recent update on global estimates of rates of return to education.

[3] It is widely held that the World Bank policies were considerably influenced by rate of return studies conducted by Psacharopoulos, who as a staff member held several key positions in the Bank for 17 years from 1981 to 1998. He had a prominent role in the preparation of the Bank's education policy papers (e.g., World Bank, 1980 and 1986). See Psacharopoulos (2006).

[4] See also Bloom et al (2006) for a short summary.

[5] World Bank's (2002a, b, 2005a) recent pronouncements do not have much effect on the policies of national governments or even of international organisations (including those of the World Bank) in this regard, partly because of the kind and nature of policy thrusts they

Besides the estimates on internal rates of return, increased national and international concerns for Education For All, also led to overall neglect of secondary and higher education in many developing countries. The problem of resource scarcity added further to the problem. Accordingly, secondary and higher education do not figure prominently on many a development agenda in general and more particularly on the poverty reduction agenda of many poor countries and of the international community. Secondary and more strikingly higher education has been subject to neglect and as a result, the progress in secondary and higher education is far from satisfactory.

In the field of education, the development efforts of national governments, non-governmental organizations (e.g., OXFAM, 2000), and even of international development community including the United Nations, UNESCO, UNDP, and UNICEF and bilateral aid organisations (e.g., SIDA) are largely concentrated on primary education as an instrument of poverty alleviation.[6] For example, the Millennium Development Goals of the United Nations that aim at poverty alleviation or the Poverty Reduction Strategy Papers, recommended by the World Bank refer largely to primary education, and education of girls. Not many researchers or especially policy makers have turned their attention to secondary or higher education as a poverty-alleviating measure.[7] Relatively very little attention is paid to a detailed examination of the relationship between higher education and development, or even secondary education and development. Instead, it is widely held that secondary and higher education is less poverty alleviating, and is not important for social development, income distribution, equity and development. It is only now, as King (2005) observes, some international organisations are beginning to turn their attention to post-basic education,

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emphasise at the same time. For example, see Tilak (2000) for a discussion on the Report of the Task Force on Higher Education and Society (2000), published by the World Bank.

[6] Many organisations do support secondary and even higher education, though not to the extent of basic education; but do not view them as poverty alleviating.

[7] A major exception is the series of studies produced under 'Beyond the Basics', a project funded by the DFID. See http://www.cas.ed.ac.uk/PBET.html for more details. Also occasionally some (e.g., World Bank) have emphasised vocational and technical education (see e.g., Middleton et al., 1993), and even higher education (Salmi and Verspoor, eds., 1994). However, they had little impact upon the policies of international organisations or of national governments, partly because of the nature and kind of policies advocated in the same studies.

realizing the connections between primary, secondary and higher education and development, and that goals relating to universal primary education or the Millennium Development Goals on poverty reduction cannot be reached by only targeting universal primary education.[8] It is however, not certain how influential these reports would be on future thinking on the relationship between post-basic education and development and on national and international policies on education development. After all, two recent reports (Task Force on Higher Education and Society, 2000; World Bank, 2002a)[9] or a major international event namely the World Conference on Higher Education, organised by the UNESCO in 1998 did not lead to any significant noticeable rethinking on the part of the international development community or of the developing countries on the role of higher education in development.

In this paper, an attempt is made based on some of the recent research, and most recent cross-national data available, to review the current situation in secondary and higher education, to assess the literature on education and development, and to make a fresh attempt to estimate the contribution of secondary and higher education to development. First in the following section, we take note of the extent of poverty in several world regions, and the overall improvement of the same over the years. The research on the role of education in development is abundant. Section 3 presents a brief review of literature, focusing on a few selected facets of development.[10] Based on the most recent cross-country data, section 4 examines fresh evidence on the role of secondary and higher education in development. Some problems with such international data are familiar.[11] Though national sources are generally expected to be more reliable, in such studies as the present one there is little choice. Further, it may be argued that most of the analysis attempted here shows correlation between education and development, and not necessarily causal relationship between

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8 King (2005) reviews, among many, essentially three major international reports, viz., Commission for Africa (2005), UN Millennium Project (2005) and World Bank (2005b: forthcoming), and also Sachs (2005). See also World Bank (2005a).

9 See also Ramphele (2003).

10 This builds on a more elaborate review attempted by Tilak (1989a).

11 For example, the gross enrolment ratio in secondary education in Malawi was reported to be 98 per cent in the international sources (as given in Table A.2 in the Appendix), but the national sources put this figure much below, at less than half.

the two. Nevertheless, the analysis attempted here using time-lag for education to effect development is likely to indicate not just correlation, but also the effect of education on development. Section 5 describes the current status of secondary and higher education. Section 6 provides a short summary of the findings and their implications.[12]

2. Poverty in the World

Poverty and its alleviation are important problem that have engaged the attention of many policymakers and planners around the world for the last several decades. Both the national governments and the international community have been occupied with the reduction, if not elimination of poverty, and want to 'make poverty a history' and work out programmes on 'how we can make the end of poverty happen in our lifetime' (Sachs, 2005).

Poverty line, to be precise, monetary poverty line is defined as a minimum level of income, which could satisfy the basic calories needed by an individual. While different nations have defined poverty in terms of varying levels of income, considering prices and goods required to satisfy a minimum level of calories, the World Bank has defined international poverty line in terms of number of people living with an income below the level of US$ 1 per day and alternatively below the level of US$ 2 per day.[13] These are also called head-count ratios. Though the World Bank's estimates are subject to severe criticism (e.g., Pogge and Reddy, 2006), they are extensively used by researchers, particularly in the absence of more reliable international data. The World Bank's estimates on thus-defined poverty differ considerably from the estimates of national governments.[14] Further, these definitions of poverty

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[12] It may be noted that the problem was examined under the same project with the help of data on Indian states (Tilak, 2006) and it was found that post-elementary education has a significant effect on poverty reduction and other aspects of economic growth and human development. The objective here is to see whether this holds good in general at the international level; and hence more or less same methodology is adopted here.

[13] They are actually number of people living on less than US$ 1.08 a day and US$ 2.15 a day at 1993 international prices (World Bank, 2006, p. 286).

[14] For example, the national estimate of poverty in India is 28.5 per cent in 1999-2000, compared to 34.7 per cent (below US$1 per day) and 79.9 per cent (below US$2 per day) by the Bank for the same year. If we look at the estimates in various countries one finds that the Bank estimates are neither consistently higher nor consistently lower than national estimates. See

ratio are used mainly for developing countries.[15] World Bank also gives estimates for some of the high-income countries on population living below US$4 and US$8, though they are not exactly defined as poverty ratios.[16]

Table 1

Poverty in the World Regions (below US$ 1 per day)

	1981	1984	1987	1990	1993	1996	1999	2001
Number of People Below the Poverty Line (millions)								
East Asia & Pacific	796	562	426	472	415	287	282	271
China	634	425	308	375	334	212	223	212
Europe & Central Asia	3	2	2	2	17	20	30	17
Latin America & Caribbean	36	46	45	49	52	52	54	50
Middle East & North Africa	9	8	7	6	4	5	8	7
South Asia	475	460	473	462	476	461	429	431
Sub-Saharan Africa	164	198	219	227	242	271	294	313
Total	1482	1277	1171	1218	1208	1097	1096	1089
excluding China	848	852	863	873	873	886	873	877
People below Poverty Line as % of Total Population								
East Asia & Pacific	57.7	38.9	28.0	29.6	24.9	16.6	15.7	14.9
China	63.8	41.0	28.5	33.0	28.4	17.4	17.8	16.6
Europe & Central Asia	0.7	0.5	0.4	0.5	3.7	4.3	6.3	3.6
Latin America & Caribbean	9.7	11.8	10.9	11.3	11.3	10.7	10.5	9.5
Middle East & North Africa	5.1	3.8	3.2	2.3	1.6	2.0	2.6	2.4
South Asia	51.5	46.8	45.0	41.3	40.1	36.6	32.2	31.3
Sub-Saharan Africa	41.6	46.3	46.8	44.6	44.0	45.6	45.7	46.4
Total	40.4	32.8	28.4	27.9	26.3	22.8	21.8	21.1
excluding China	31.7	29.8	28.4	26.1	25.6	24.6	23.1	22.5

Source: World Bank (2005c).

World Bank (2005c). It is because national poverty lines are defined considering varying levels of consumption levels, and because of the differences in the value of US$ in different countries.

[15] It does not mean that poverty is a non-existent phenomenon in developed countries. The problem of poverty in advanced countries is often referred to in different contexts. (e.g., Orfield, 1999). World Bank (2005c) also provides estimates on poverty, defined differently – population living below US$4 and US$ 8 per day per head.

[16] Edward (2006) estimates an 'ethical poverty line', which is claimed to be a morally defensible poverty line that considers world consumption to life outcomes. The ethical poverty line is found to be coming closer to the 2-$ poverty line of the Bank.

The incidence of poverty varies widely between various regions, within regions between countries, and within countries between several sub-national units.

According to the World Bank (2005c), about 1.1 billion people live with an income level below the poverty line of US$ 1 per day in 2001. If US$ 2 is taken as the poverty line, the figure swells to as much as 2.7 billion, as shown in Table 2.

Table 2

Poverty in the World Regions (below US$ 2 per day)

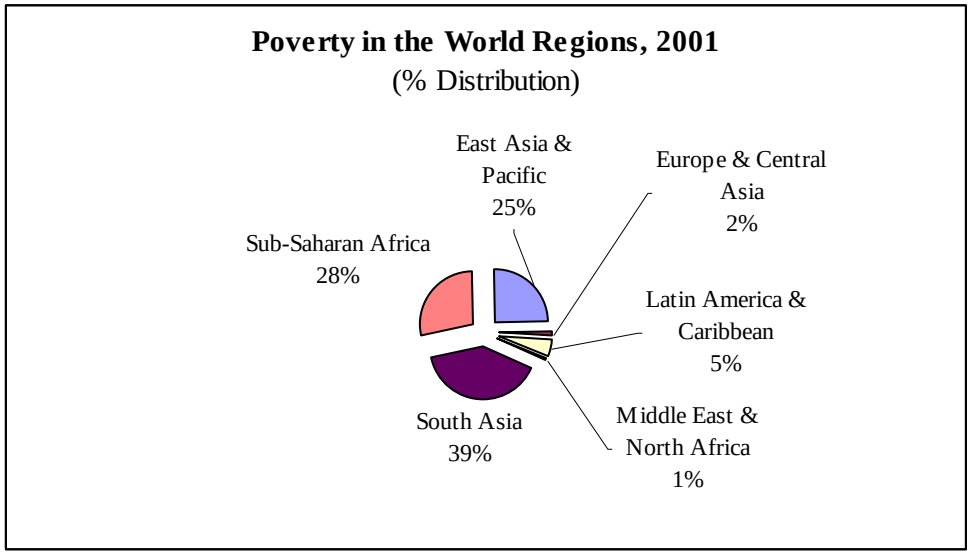
	1981	1984	1987	1990	1993	1996	1999	2001
Number of People Below the Poverty Line (millions)								
East Asia & Pacific	1170	1109	1028	1116	1079	922	900	864
China	876	814	731	825	803	650	627	594
Europe & Central Asia	20	18	15	23	81	98	113	93
Latin America & Caribbean	99	119	115	125	136	117	127	128
Middle East & North Africa	52	50	53	51	52	61	70	70
South Asia	821	859	911	958	1005	1029	1039	1064
Sub-Saharan Africa	888	326	355	382	410	447	489	516
Total	2540	2480	2478	2654	2764	2674	2739	2735
excluding China	1574	1666	1747	1829	1961	2024	2111	2142
People below Poverty Line as % of Total Population								
East Asia & Pacific	84.8	76.6	67.7	69.9	64.8	53.3	50.3	47.4
China	88.1	78.5	67.4	72.6	68.1	53.4	50.1	46.7
Europe & Central Asia	4.7	4.1	3.3	4.9	17.2	20.7	23.8	19.7
Latin America & Caribbean	26.9	30.4	27.8	28.4	29.5	24.1	25.1	24.5
Middle East & North Africa	28.9	25.2	24.2	21.4	20.2	22.3	24.3	23.2
South Asia	89.1	87.2	86.7	85.5	84.5	81.7	78.1	77.2
Sub-Saharan Africa	73.3	76.1	76.1	75.0	74.6	75.1	76.1	76.6
Total	66.7	63.7	60.1	60.8	60.2	55.5	54.4	52.9
excluding China	58.8	58.4	57.5	56.6	57.4	56.3	55.8	54.9

Source: World Bank (2005c).

Even taking the lower estimate, the 1.1 billion people living below the poverty line constitutes more than one-fifth of the world population. Despite seemingly high progress, the number of poor people in Sub-Saharan Africa, Latin America and the Caribbean region and in Europe and Central Asia has indeed increased between 1981 and 2001. In East Asia and Pacific the number

of the poor and also the proportion of the poor have declined significantly during the last two decades. The numbers are somewhat stable in South Asia, though there is a marginal decline in absolute numbers and a steep decline – 20 per cent points in poverty ratio. Sub-Saharan Africa is the worst affected region with increasing numbers of poor people and also high poverty ratios. The high rates of growth of population on the one hand, and low level of effectiveness of anti-poverty programmes explain this to some extent.

Figure 3



Source: Based on Table 1 (poverty < US$1 per day)

According to the latest figures South Asia, with 430 million poor people, is home for nearly 40 per cent of the world's poor. The 313 million poor in Sub-Saharan Africa where most of the international aid projects on poverty reduction are concentrated, account for nearly one-third of the poor in the world and China accounts for about one-fifth of the total (Figure 3). In Sub-Saharan Africa, the number has nearly doubled from 164 million in 1981 to 313 million in 2001. Even in regions that have achieved significant progress, such as South Asia and East Asia, rates of poverty reduction have been, at best quite uneven.[17]

[17] See DESA (2006) for a brief description on regional dimensions of poverty.

A wide variety of programmes is launched in many countries to eradicate poverty.[18] Some are macro policies, including trade and liberalisation; some are sectoral focusing on say education and health; some are direct anti-poverty programmes that include food for work, employment guarantee, provision of basic needs, and other welfare programmes. Yet another type of programme refers to improvement in decentralisation, community participation, governance, reduction in corruption etc. The various anti-poverty policies and programmes adopted by various countries and international development organisations have had varying impact on poverty reduction in those countries.[19]

Among the various anti-poverty programmes that national governments adopted and international organisations advocated, education is an important one. However, within education, as stated earlier, the focus has been rather somewhat exclusively on basic education, assuming that secondary and higher education is not relevant in this context.

3. Role of Education in Development: A Review of Research

Literature on education and development is abundant. It includes empirical studies at national and sub-national levels, and studies that used cross-nation data. Several studies have also used different methods – descriptive, observational and quantitative – including using econometric tools. They also covered a wide variety of facets of development – growth, distribution, poverty, inequalities etc., and formal and non-formal education.[20] Some of the important studies that used rate of return method and production functions in this context are briefly reviewed here.

First, the evidence on rates of return.

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[18] See for example, UNDP (2000) for a description of some of the policies.

[19] Country-wise data on poverty ratio (percentage of people below the poverty line – US$ 1 per day per head) are given in Table A.1 in the Annex.

[20] Some of these studies were reviewed in Tilak (1989a).

Rates of Return to Education

A large amount of research is available on rates of return to education. Beginning with Strumilin (1926), the first attempt on cost benefits analysis in education and Becker (1960) the first more systematic attempt after the beginning of the human investment revolution, we have a large number of studies in rates of return to education. In his international comparative studies Psacharopoulos (1973, 1980, 1994) has from time to time compiled a large number of studies on rates of return to education in various countries. In a recent update, Psacharopoulos and Patrinos (2004) summarized estimates relating to a large number countries, covering almost all parts of the world, developed and developing regions in Asia Africa, Australia Europe, North and South America, which are given in Table 3.

Table 3

Rates of Return to Education (%)

	Social			Private		
	Primary	Secondary	Higher	Primary	Secondary	Higher
Asia*	16.2	11.1	11.0	20.0	15.8	18.2
Europe/Middle East/North America*	15.6	9.7	9.9	13.8	13.6	18.8
Latin America & Caribbean	17.4	12.9	12.3	26.6	17.0	19.5
OECD	8.5	9.4	8.5	13.4	11.3	11.6
Sub-Saharan Africa	25.4	18.4	11.3	37.6	24.6	27.8
World	18.9	13.1	10.8	26.6	17.0	19.0

* excludes OECD countries.
Source: Psacharopoulos and Patrinos (2004).

The vast evidence on rates of return is briefly summarized as follows:

- Social returns to education in developing countries are at least as high as any reasonable measure of the opportunity cost of capital or the social discount rate. In other words investment in human capital in general, and in education in particular, may be equally if not more conducive to economic growth as investment in physical capital.

- Rates of return are highest in primary education, followed by secondary and then university levels. For primary education unit costs are small relative to the extra lifetime income or productivity associated with literacy. For university education, the opposite is true. So though secondary and higher education are associated with higher and higher earnings,[21] the internal rates of return that are based on costs of and earnings associated with education, turn out to be smaller.
- The same diminishing returns apply across countries: the more developed the country, the lower the returns to education at all levels. The high returns to education in low-income countries must be attributed to their relative scarcity of human capital.[22]
- Private returns are higher than social return, where the latter is defined on the basis of private benefits but total (private plus institutional) costs--a result of the huge public subsidization of education in most countries and the fact that typical estimates of social rates of return do not include social benefits.
- It is also widely recognised that if true social benefits or the externalities are included, the social rates of return may well be higher than private returns.

Thus, there is overwhelming evidence from the rate of return studies to support the view that education is a productive investment that pays, and that primary education yields the highest rates of return.

Rate of return studies are subject to a lot of criticism – both from the point of the view of methodology and its application. Conceptually, the 'social' rate of return is not a true social rate of return; it does not normally capture

[21] The earnings premium per year of schooling tends to be higher for higher levels of education and this earnings premium, and not the rate of returns, is argued to be the appropriate measure for assessing the contribution of education to economic growth (OECD, 2001).

[22] See Psacharopoulos (1994) who presents systematic evidence on rates of return in the world regions classified by income levels. It is important to note, however, that in the countries with universal primary education, secondary education yields higher rates of return than primary education. See, e.g., Schultz (1993) and Jain (1991).

indirect economic and direct or indirect social and other benefits. The rates of return or even the human capital approach in general does not consider anything beyond increments in earnings; it also does not attach any weight to distribution of earnings; and so on (TFHES, 2000). Empirical estimates and their policy implications have also been subject to criticism (Bennell, 1996, b, c, 1998). A lot of criticism of the rate of return method, its application to education and the estimates is valid. Yet rates of return do provide some valuable insights into the relationship between education and development and hence they are very popular. After all, this is also a basic tool used for economic evaluation of any project.

Keeping aside these limitations and weaknesses for a while, it is important to note that estimates on rates of return to secondary and higher education are high enough to say that they yield reasonably high returns, as shown in Table 3, warranting social and private investments. The social rates of return are above ten per cent in most regions of the world. In sub-Saharan Africa the rate of return to secondary education is 18 per cent and that to higher education 11 per cent. In other regions differences between secondary and higher are not so high; all rates are above 10 per cent, except in case of OECD countries. All this justifies social investment in secondary and higher education. Therefore, it may not be proper to argue that secondary and higher education do not matter for economic growth and development. At best, their contribution is relatively less than the contribution of primary education. Nevertheless, the contribution of secondary and higher education is significant and sizeable. In fact, based on total factor productivity, Jenkins (1995a) has estimated implied gross social rates of return to higher education in UK, which were as high as 70-86 per cent, compared to 5-17 per cent for overall education. If externalities produced by higher education are considered, returns to higher education could be sizeable (see McMahon, 1999; Gemmell, 1997).

Production Functions and Other Research

Research studies using production function and other methods of estimating the contribution of education to development have also increased in number as well as scope over the years and their results are sometimes very different from the results derived from rate of return studies. The process of

education influencing growth and income distribution can be simply explained as follows: education creates a more skilled labour force. This produces a shift from low-paid, unskilled and below-poverty employment levels, to better-paid, skilled and above-poverty levels of employment. This shift produces higher labour incomes, a reduction in skill differentials, and an increase in the share of wages in total output (Ahluwalia, 1976, p.322). The increase in the number of more educated and skilled people increases the ratio of such people and decreases the ratio of less educated people in the total labour force. However, in the labour market oversupply of highly educated people results, given no change in demand, in lowering their wages and increase in wages of those with less education, thus overall contributes to reduction in income differences in the labour market. Thus, expansion of education influences not only the wages of those who receive better education, but also of those who do not have education or have less education. In addition, earnings distribution can be effected by education, as earnings and education are closely related, education may compensate for adverse socioeconomic background and open up better socioeconomic opportunities for weaker sections of the society leading to faster mobility and to higher wages. In short, education reduces poverty and improves income distribution at the same time.

Now let us briefly look at the available research evidence on the relationship between education, poverty and development.

Simon Kuznets (1955) predicted that income distribution in capitalist countries would become more equal as the labour force becomes more educated. Schultz (1963, p.65) had stated more clearly: "these changes in human capital [in the US] are a basic factor reducing the inequality in the personal distribution of income. This aspect has received the attention of the empirical researchers since the beginning of the 1970s. Education is argued to be vital to increase economic growth and to improve economic equality (Harbison, 1973). Analyzing the problem in his numerous works, both from a positive point of view (Tinbergen, 1977) and a normative point of view Tinbergen (1970 and 1980) concluded that human capital is one of the most important determinants of income inequality.

Several studies on Brazil have also established the critical role of education in income distribution. A study on Brazil (Langoni, 1973; cited by

Carnoy et al, 1982) showed that distribution of income became more unequal between 1960 and 1970 in part because the distribution of schooling became more unequal. The increase in variance in education of the labour force was found to be responsible for increase in income inequality. Educational differences explained 33 per cent of inequalities in the distribution of income during this period. In fact Langoni found that education was by far the most important factor for explaining individual differences in income (see also Langoni, 1973b). Velloso (1975) also argued the same: distribution of schooling is positively related to distribution of earnings in Brazil. Fishlow (1972) who also analyzed Brazilian evidence felt that varying the distribution of schooling in the labour force should have a direct effect on the distribution of earnings. Variance in the schooling of the labour force can be reduced directly by concentrating on investment in lower levels of education. Studies on Peru (by Toledo: see Carnoy *et al.,* 1979) and Mexico (by Baskin; and Lobo; see Carnoy *at al.,* 1979) also reported similar evidence, but the effect of education is found to be small. If returns to higher education fall, relative to returns to investment in primary education, distribution of earnings is likely to improve; on the other hand, if the opposite occurs, the increasing returns to higher education relative to returns to lower levels of education reflect a trend towards greater inequality. As Knight and Sabot (1983, p.1132) observed, the change in educational composition of the labour force itself has an effect on inequality. Whether it raises or lowers inequality, *ceteris pari bus*, depends on the relative sizes of the different educational categories, their relative mean wages, and their relative wage dispersions.

Another cross-country study of 32 countries (Winegarden, 1979) concluded that higher average levels of schooling would exert an equalizing effect on income distribution. The mean levels of educational achievement as well as the dispersion of education would act as an equalizing influence on income disparities. Further, it was shown that inequalities in education play a large (larger than what the previous studies revealed) role in generating income disparities.

Leipziger and Lewis (1980) and Leipziger (1981) found a negative and significant correlation coefficient between adult literacy rate and the Gini coefficient of inequality, a standard measure of income distribution, and a

negative correlation between the Gini and the first level enrollment in the sample of 19 less developed countries with a per capita GNP level above $550 (in 1975), suggesting that literacy and first level of education are not sufficient for reducing inequalities; secondary and higher education are important. Based on another cross-country study Ram (1984) concluded that "higher mean education appears to be an equalizer, and greater educational inequality is probably an income disequalizer" (p. 420). Ram (1985) in another study on basic needs found a positive relationship between the income share of the lowest 40 percent of the population and elementary enrolment and adult literacy rates in the middle income less developed countries, but a negative relationship in the 9 low income less developed countries, indicating that there is probably a threshold level of economic development for education and income equality to be positively related. Another exercise on education expansion and schooling inequality led Ram (1990) to observe, "expansion of schooling may accentuate income inequality at early stages. At a later stage, however, the overall impact of educational expansion on income distribution is likely to be favorable."

Using data on a cross-section of countries, Sylwester (2*003)* empirically examined whether greater enrolment rates in higher education are associated with increases or decreases in subsequent income inequality as measured by the Gini coefficient and found a negative association between the two, suggesting that countries with larger enrolment rates saw their income inequality decrease relative to other countries. These findings were robust to the inclusion of several control variables and to limiting the sample to non-OECD countries.

Tilak (1986) also found with the help of data on 50 countries, a significant effect of education on the income shares of different groups of populations. Secondary enrollments have the most significant positive effect on income shares of bottom 40 percent and middle 40 percent population; and expansion of education of all levels has a strong negative effect on the income share of the top 20 percent population, suggesting that education, on the whole, might redistribute income from top 20 percent population to lower and middle income groups of the population.

Results of investigations on a few selected countries are also worth noting in this context. Based on an examination of data in a few countries, *viz.*, the Netherlands, the USA, Mexico and Nigeria, Ritzen (1977) concluded that "investment in education jointly with investments in physical capital are an important instrument for the implementation of optimal income distribution cum economic growth policies (p.239). The general tendency is that higher relative preferences for inequality minimization require higher levels of trained labour, jointly with higher physical capital stocks. However, from a theoretical model, Adelman and Levy (1984) reaffirmed more clearly their earlier argument. They argued that human resource intensive accumulation strategies are socially preferable to accumulation of physical capital as an important strategy for income redistribution and poverty eradication.

Richards and Leonor (1981) related changes in educational distribution with later changes in income distribution in a few Asian countries. The data on distribution of educational assets and work incomes among workers at two points of time in Sri Lanka and the Philippines indicated that distribution of education would improve income over time. However, they recognised the importance of other factors and conclude that "overall distribution of work incomes probably owes much more to the distribution of occupations and to factors operating on occupational income independently of educational level, than to the distribution of education" (p.175).

When inequality was decomposed and the determinants of income were analyzed in 13 out of 14 studies on 10 countries, education turned out to be the most significant factor, and in the lone exception (Thailand), education was the second most important factor (see Fields, 1980b, pp.116-20).

Thus on the whole, based on several national and cross-national studies that used different methods to analyses the relationship between education and development, poverty and income distribution, that education is found to be one of the most important variables effecting income distribution and poverty.

Education and Agricultural Productivity

A large body of empirical evidence on the contribution of education to agricultural productivity is available. Several physical effects of education on

agricultural development can be identified and quantified. Effects of education on the productivity of workers include (a) innovative effects such as ability to decode new information, know what, why, where and how; ability to estimate costs and benefits of alternatives, and ability to establish quicker access to newly available economically useful information; (b) allocative effects such as ability to choose optimum combinations of crops and agricultural practices in least number of trials, and ability to choose optimum time for marketing, transportation etc.; (c) worker effects such as ability to perform agricultural operations more efficiently in the economic sense; and (d) externalities (see Welch, 1970; and also Schultz, 1975). All these effects might increase by increasing levels of education.

It is necessary to note in this context that education has two components: (a) education for peasants which improves their skills, replaces their traditional attitudes with modern ones, which improve their innovative and allocative abilities, etc., and (b) research in agriculture which provides the peasant with new techniques of production and new inputs.

Cross-country studies (e.g., Hayami and Ruttan, 1970), and several micro studies (e.g., Griliches, 1964; and Welch, 1970) found a significant relationship between education and farm output. Hayami and Ruttan (1970) found that differences in educational levels explain one-quarter to one-half of the differences in agricultural labour productivity between the United States on the one hand, and Colombia, Egypt, India and Philippines on the other. Surveying evidence from 31 countries, Lockheed *et a1* (1980), and Jamison and Lau (1982) concluded that on average, education of four years of primary schooling of farmers enhances the farm output by 8.7 percent. This led them and many others to argue that four years of primary education is enough to improve agricultural productivity,[23] though many have studied independently the importance of research in agricultural development.

The level and type of farming and the overall general and technological environment are also seen to be resulting in varying effect of education on agricultural productivity. As Schultz (1964) demonstrated, education would be

[23] See King and Palmer (2005) for a critique of such a generalisation made by Lockheed et al. They argue that such a generalised conclusion disguises variations between different countries and the varying enabling environments. See also King et al (2005).

more effective in a changing, modernizing agricultural environment where fertilizers and new technologies are becoming available, than in a traditional one. The effects of education are due to more efficient use of seeds, fertilizers, the ability to read how to repair machinery, to keep livestock healthy, and other ways that keep the farmer responsive to management techniques, bookkeeping, and other farm practices. The multiplier effects of a modernizing environment on agricultural productivity gains are more likely to be available only where education is widely spread (Lockheed et al., 1980). Impact of education on agricultural productivity in high technology and better environmental conditions like Japan, will be different from the impact of education on agricultural productivity in low technology and poorer environmental conditions like in Nepal, India and Pakistan. It is quite possible that in the areas of farming under a better technological environment, the relative impact of education could be much smaller than estimated in aggregate situations. On the other hand, it can also be argued that a better technological environment might enable education to have a stronger effect on agricultural productivity (King and Palmer, 2005).

As per the empirical evidence available, the impact of education is higher in the low technology conditions than in high technology conditions. Compare for example the case of South Korea and Taiwan with Nepal. Within South Korea, the effect of education is higher in case of farms not using machines, than in case of mechanized farms. However, in case of Thailand, the evidence is the opposite: the effect of education is higher in case of farms using chemical fertilizers than the ones using non-chemical fertilizers, and the difference is larger. All this suggests the need for more research on the effects of education, and of various levels of education, in modern versus traditional forms of agriculture.

Education itself influences the selection of technologies. A better-educated farmer may be able to choose a superior technology than a less educated farmer, and the productivity levels obtained with the new technology may crucially depend on the level of farmers' education. With the help of a simple behavioural model applied to a data set of 500 households in Hunan province in China, Lin (1991) has shown that education has a positive impact on the adoption of new technology. Education may favour adoption of a new

superior technology not only because of the role education can play in the faster discovery and assessment of the new technologies, but also because it acts as a complementary input for the appropriate use of technologies (Cotlear, 1990, p.76).

Whether it is traditional farming, or farming based on intermediate technology or fully improved or advanced technology and/or fully irrigation based farming, the role of education is very important; but educational requirements of course vary by the type and state of farming. The level of education required depends on the sophistication of the technologies adopted. Simple numeracy may be adequate for traditional farming as in Nepal (Jamison and Moock, 1984), and numeracy and rudimentary literacy may be needed for farming with intermediate technology. Recourse to memory may be insufficient and personalized transmission of information may be inefficient in farming based on better technology. Higher level of numeracy may be required when chemical inputs are introduced, to calculate the correct proportions in their use. Looking at the same problem in another way, there exists a gap between the best practice of farming and current practice. Economic conditions, particularly the level of technology and agricultural prices, significantly explain the best practice while the low levels of current practice could be attributed to, *inter alia*, low levels of literacy and education. The path from current to the best practice is not a smooth one, as both go on changing in a dynamic sense. In this context, literacy and general education, extension education and research and development (R&D) assume much importance. Their relative importance, however, is determined by the gap between the best and the current practices. One may intuitively argue that the smaller the gap, the larger would be the role of research and development and vice versa. However, in all cases, literacy and basic education form minimum conditions. Modernization of agriculture is closely associated with levels of education in India (Rao and Shetty, 1968).

The gap between the best and the current practices in terms of technical efficiency is analyzed by Kalirajan and Shand (1988). The gap in the technical efficiency is inversely related to human capital variables, including education (formal schooling), experience and non-formal education (extension visits). The higher the human capital investment, the less would be the gap between the best and the current practice.

The role of research in agricultural development in any economy in general is quite significant. Advancement in research is a decisive factor in achieving increases in crop production throughout the world. The returns to investment in research are found to be as high as 65 per cent in Pakistan (Nagy, 1985). The green revolution in India could be attributed largely to research and development activities, besides, of course, to the widespread levels of literacy and education of the farmers. Basic education prepared people for the change, and research and development made the change possible. The rate of return on agricultural research in India was estimated to vary between 40-63 per cent (Evenson and Kislev, 1975; and Kahlon et al., 1977). In general, the role of research in agricultural development in any economy is quite significant.

Thus, the abundant research on the relationship between education and agricultural productivity shows that education significantly influences productivity directly and indirectly by influencing the selection of methods of production, use of modern inputs like fertilizers, seeds and machines, and selection of crops. Quite importantly, it was found that there exists a threshold level of education for its impact to be significant and while this level varies for different regions marginally and for different purposes, mostly it is secondary level of education of about 10 years of schooling. This threshold level of education is relevant not only for farm efficiency, but also for other activities like utilization of credit facilities, adoption of family planning methods, etc. As the economy develops, and technological advancement takes place, this threshold level goes up. For example in India, elementary education was the threshold level during the 1960s. The next decade witnessed a rapid change in the society and significant technological development, including the green revolution, and secondary level became the threshold level during the 1970s. Formal education of secondary and above that gives basic knowledge of chemistry, biology, etc., besides mathematics is a basic requirement of farming based on improved technology or fully irrigation-based technology (Heyneman, 1983). The relationship between secondary and higher education, including research and development and agricultural productivity may be strong in the case of modern technology based agriculture.

Primary, Secondary and Higher Education and Development

Many scholars have analysed the role of education in economic growth and development by levels of education and reported mixed results. Some of them have focussed rather exclusively on primary education (e.g., Colclough, 1983; Dreze and Saran, 1993). Bennett (1967) found in a study on 69 countries, high correlation between GNP per capita and secondary vocational education and low correlation between GNP per capita and general secondary education. McClelland (1966) found significant positive correlation between secondary school enrolments in 1930 in 21 developed countries and the rate of economic growth between 1929 an 1950. In another cross-country study of 75 countries, Harbison and Myers (1964) found high correlation between per capita GNP and secondary and higher educational levels.

In another study, Meyer *et al* (1979) also found significant positive effects of primary and secondary education on development in 1950-65 and 1965-70 respectively, while higher education had always a negative and statistically insignificant effect. Meyer *et al.,* also found that the effect of secondary education is higher than that of primary education. Benavot (1985) also studied the impact of various levels of education on GNP per capita on 50-110 developed and developing countries, depending upon the availability of data. The panel regression results indicated that primary education had a significant and positive effect on economic growth during all periods (1930 to 1980) both in developed and developing countries. Secondary education had a strong but a negative effect in less developed countries and weak and positive effect in the developed countries during 1930-50, and had a positive effect both in developed and developing countries during 1955-70, and during 1965-80 the effect of secondary education was weakened; and tertiary education had little to do with economic development. This historical evidence on the relationship between education and development also underscores the importance of other factors or simply the environment that enables education to influence development.

Cross-section comparisons of some 75 countries also led Tilak (1986) to arrive at more or less similar conclusions. Tilak classified these 75 countries into four categories, *viz,* very poor, poor, rich and very rich countries, based on gross national product (GNP) per capita, as given by the World Bank. Tilak

records that while on the whole, there is a significant positive relationship between education development and economic growth of the nations, the relationship is strong in the very poor countries, and rich countries, but is not significant in very rich countries and poor countries. Further, while in very poor countries, primary and secondary education have relatively more significant role in economic development, in the rich countries secondary and higher education have significant impact, and primary education is found to be statistically not significantly related. There may not be much variation in the level of primary education in rich countries; but in case of secondary and higher education, there are significant variations. In case of poor countries, the opposite is true: the level of primary education varies widely between several poor countries, but not so much in case of higher education. In another cross-country study, Tilak (1989a) found higher education to have a poverty reducing effect in rural areas, but not in urban areas. It was also found that secondary education increases the share of the bottom 40 per cent population in income; and all levels of education reduce the share of the richest 20 per cent of the population, and that it thus has an important income distribution role.

In an important study, Barro (1999) found in his cross-country regressions on 100 countries that economic growth between 1960 and 1995 is positively related to the base level (1960) secondary and higher levels of education attainment of adult population.

Quite a few other studies reported robust findings on the significant impact of secondary and higher education on growth (e.g., Barro, 1991**;** Barro and Salai-i-Martin, 1995; Lucas, 1988; Mankiw et al 1992; Barro and Lee 1993a, b; Baumol et al, 1989; Gemmell, 1995, 1996; Wolff and Gittleman, 1993; Wolff, 1994; Benhabib and Spiegel, 1994; Nehru and Dhareswar, 1994; Nehru et al, 1995; Petrakis and Stamatakis, 2002; Romer, 1986). For instance, the panel analysis of real per capita GDP growth rates in about 100 countries over three periods, 1965-75, 1975-85 and 1985-90, by Barro (1991) showed that secondary and tertiary levels of education attainment of the male adult population have significant effects on growth, and, moreover, the growth is not significantly related to primary education.[24] Barro and Salai-i-Martin (1995) found that higher initial secondary and tertiary education have significant positive growth

[24] Barro (1999, 2001) provides an updated analysis.

effects. An increase in male secondary education by 0.68 years raises annual growth by 1.1 percentage points annually, while an increase of 0.9 years in tertiary education raises growth by 0.5 percentage points. Higher education is found to be an important determinant of cross-country differences in long-run growth (Levine and Renelt, 1992). Quite a few cross-country regressions confirmed this. Meulemeester and Rochat (1995) confirmed strong causal impact of higher education on economic growth in Japan, UK, France and Sweden (but no impact in Italy and Australia). Lin (2004) reported that an increase in higher education stock by one per cent have resulted in growth in annual industrial output by 0.35 per cent in Taiwan. A study Guisan (1997) on 37 countries of different levels of development, has shown that education, measured by the stock of population with secondary education, has, along physical capital, a positive influence on economic development. Gylfason and Zoega (2001) have found in a cross-country study that is based on data on 87 industrialised and developing countries in the period 1965 to 1998, that secondary education (gross enrolment) encourages economic growth directly as well as indirectly through increased social equality and cohesion.[25]

Even when levels of education are not considered, quite a few researchers (e.g., Barro, 1997; Topel, 1999; Sianeesi and van Reenen, 2003) could conclude from similar studies using Cobb-Douglas production functions, that a high level of education of the population leads to higher level of economic growth, as the high level of education makes it easier to absorb best practice technologies.

There are a few studies that questioned the importance of education in economic growth or that find weak relationship between education and growth (e.g., Pritchett, 2001; Oulton and Young, 1996, Wolf, 2002; Sanders, 2003). A few others (e.g., Benhabib and Spiegel, 1994) conclude that the rate of economic growth is unaffected by expansion of education, although it is positively influenced by the exiting stock of educated people. The methodologies adopted, the data used, and the variables on education measured and used, inter alia, and other variable considered might explain to some extent, the

[25] Gylfason and Zoega (2001) also examined the impact of public expenditure on education relative to national income and expected years of school for girls and found similar results.

differences in the results (Temple, 2001). As Mitch (2005) classified, the research evidence consists of four categories on the relationship between education and economic growth: (i) stagnant education growth and stagnant economic growth, (ii) rise in economic growth despite stagnant educational levels, (iii) rise in educational attainments and rise in rate of economic growth, and (iv) stagnant economic growth despite improvement in educational attainment. However, the literature of category (iii) is relatively more strong and abundant.

While some have examined the role of secondary and higher education in economic growth, very few researchers have in fact examined the role of secondary and more specifically higher education in relation to reduction in poverty *per se*. In an important study, McMahon (1999) has examined the contribution of secondary and higher education along with primary education to reduction in poverty, and other aspects of economic and social development, including reduction in crime etc., and reported from cross-country regressions, significant effects of secondary and higher education on poverty reduction. Econometric results of another study on dynamics of poverty in Canada, Germany, Great Britain and USA by Valletta (2006) are quite interesting. The results have shown that households whose head has a 'high education', are 1-1 to 3.3 percentage points not likely to enter poverty than are households whose head has 'low' education.[26] In fact, all households whose head has a low education are likely to enter poverty. It was further shown that chronic poverty rates are systematically negatively related to 'high' education and positively related to 'low' education, implying clearly that 'low' education is not enough for alleviation of poverty.

A Summary of Research

The review attempted here of literature that cover a wide variety of empirical studies – national and international level studies, case studies based on field level data and observations. It concentrates relatively more on quantitative studies that have used data at the national and cross-national levels. Over the years, significant methodological improvements have

[26] The terms 'high' and 'low' education are not clearly defined.

appeared in examining the relationship between education and development. Most studies include econometric studies using production function methodologies applied to national income, total and agricultural production, poverty, income distribution etc., and studies that estimate rates of return to education. In recent years, endogenous growth models have become popular, that emphasised that the level of education attainment itself is based on initial level of education.

The review clearly shows that education makes a significant positive contribution to development; it increases economic growth, raises agricultural productivity, reduces poverty, improves income distribution, etc. It also reduces infant mortality, improves life expectancy, reduces fertility and thereby it reduces growth in population etc. While the generalized conclusion deduced from rate of return studies is that primary education yields highest rates of return, and higher education the least, suggesting the need to focus on primary education for development, other studies have shown that secondary and higher education are also important for economic growth.

An important aspect relating to the research studies is worth noting, as summarised in Table 4.

Table 4

Research on Role of Education in Development

Levels of Education	→	Development Indicators
Literacy Primary Education Non-Formal Education Adult Education Female Education	→	Health and Nutrition: Life expectancy, infant mortality Growth in Population, fertility, Human Development, Poverty agricultural productivity
Primary Education Secondary Education Higher Education	→	Economic Growth: national income, employment, Inequalities

Several studies have analysed the contribution of literacy, primary education and non-formal education to improvement in health indicators,

reduction in rate of growth in population, human development indicators, poverty and agricultural productivity. Studies that focused on economic growth and the contribution of education to it, concentrated on secondary and higher education. As the review shows, very few studies have examined the role of secondary and higher education in poverty reduction, or improvement in health and nutrition, etc. The effect of general development on educational development is also examined, but the pattern falls into the same type.

Generally, researchers concentrated more on analysing the contribution of literacy and primary education, though the limited research that examined the contribution of secondary and higher education to development did find significant effects on development. As a result, the role of primary education in poverty reduction and development is often highlighted and the role of secondary and higher education is ignored.

This is now slowly changing in some parts of the world; it is being acknowledged that post-secondary education can break the cycle of poverty. In recent years, organizations such as the World Bank and major donor organisations have begun to reconsider their exclusive focus on primary education and are now reaching out to secondary and tertiary education, as the balance between poverty reduction and growth promotion is adjusted within development assistance strategies. The World Bank also acknowledges, "There is no way we can succeed in the eradication of poverty if the developing world is not part of knowledge creation, its dissemination and utilization to promote innovation. Higher education is a critical factor in making this possible and must be part of any development strategy" Ramphele (2005).[27] DFID has floated an amount of £15 million for higher education to tackle global poverty.[28] SDC (2006) and Corporation emphasised that "access to higher education is a key element in the poverty reduction strategy" in Mongolia. The United Nations (2005) acknowledges that higher education is one of the most powerful yet underestimated means that countries can rely on to reduce poverty and achieve social and economic development goals.

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27 Quoted in Association of Universities and colleges in Canada (2005).

28 Http://www.dfid.gov.uk/news/files/pressreleases/pr-15m-higher-education.asp

It is important to note that while primary education gives the basic three R's, rarely does it provide skills necessary for employment – self-employment or otherwise that can ensure some wages and economic living. Moreover, most of the literacy and primary education programmes are also found to be not imparting literacy that is sustainable, so that children relapse into illiteracy. Secondly, primary education and even elementary, i.e., upper primary education rarely serve as a terminal level of education. Thirdly, even if primary education imparts some valuable attributes, in terms of attitudes and skills, and even if primary education is able to take people from below poverty line to above poverty line, it is possible that this could be *just above* poverty line, but not much above; and more importantly the danger of their falling below poverty line at any time could be high. On the other hand, it is secondary and higher education that consolidates the gains received from primary education; as Benhabib and Spiegel (1994) have shown, secondary education helps in innovating technology and in sustaining growth; it is secondary and higher education that provides skills that could be useful in the labour market; it is secondary and higher education that can keep people above the poverty line without such a risk of falling back into poverty trap - educational poverty or income poverty; and in fact, it is secondary and higher education that can take people to much above poverty line, by increasing the social, occupational and economic levels of the households. In all, it can be said that it is not just primary education, but it is secondary and higher education that forms a 'human capability' and 'human freedom' that Sen (1999) champions, a freedom that helps in attaining other 'freedoms', though Sen largely refers to primary education.

In the following section, using recent cross-country data, an examination of the relationship between post-basic education and development, particularly poverty and other aspects of social and human development, is attempted.

4. Has Post-Basic Education A Role in Development?

What is the effect of secondary and higher education on poverty and development? The relationship between secondary and higher education to poverty and a couple of other aspects of development is examined below. Though the relationship between education and development is bi-directional,

we examine the effect of education on development. After all, as Easterlin (1981) has shown, historically spread of formal education preceded economic growth, and also that sudden increases in levels of schooling in some countries were not followed by surges in economic development. Using the available cross-country data, regression equations are estimated regressing poverty and development indicators on indicators of secondary and higher education.

Enrolment ratio is one important variable that reflects the level of education development in a country, though there are several other measures, some of which are much superior to enrolment ratio. However, enrolment ratio by levels of education is one on which cross-country data are easily available and also for various points of time. This becomes handy, as we are also concerned with levels of education, rather than aggregate education. Level of education attainment, measured in terms of mean years of schooling, a summary statistic of education development, estimated based on the distribution of population by levels of education, would serve the purpose better. Data on population with secondary and higher education are available but only for one point of time -- the most recent year (see Annex Table A.3). However, since we wish to examine the effect of education in a year on the level of development in subsequent period, these data cannot be used. Accordingly, enrolment ratios in secondary and higher education are used in the following regression equations.

We focus here more on economic development, poverty and other aspects of development. A series of regression equations are estimated and the results are given in the following tables. In all equations time-lag is allowed, i.e., influence of secondary and higher education in 1995 on development indicators of a later period, mostly around 1999-2000. Secondly, in all cases a semi-log regression equation is estimated.

The following variables are used in the regression analysis:

ECGR	Annual Rate of economic growth (real) between 1990 and 2003
GNPPPP/pc	Gross National Product per capita (purchasing power parity US Dollars)

GERH:	Gross Enrolment Ratio in Higher education
GERP	Gross Enrolment Ratio in Primary education
GERS:	Gross Enrolment Ratio in Secondary education
	Suffix to GERi refer to the year.
HDI	Human Development Index
GENDERHDI	Gender-based Human Development Index
GINI	Gini coefficient of income inequality
POVERTY	Percentage of population living below the international poverty line defined as US$ 1 per day per head.

At the outset, it may be noted that most of the equations are good fits, with high F-values and high coefficients of determination. Data on a large number of countries, on which they are available, are used here.[29] Most of the regression coefficients of education variables also turned out to be statistically significant.

Education and Economic Development

We start with a simple linear regression of GNP per capita [measured in purchasing power parity dollars (PPP$)] on enrolment ratios in secondary and higher education. Data are available on a large number of countries from all continents of the world. A time-lag of more than five years is also allowed for education to influence economic growth. The results given in Table 5 show statistically significant coefficients of both secondary education and higher education on economic development. Both secondary and higher education have significant effects, and the coefficient of higher education is higher than that of secondary education.

[29] Country-wise data used in the analysis are given in the Annex Tables A.1 and A.2.

Table 5

Regression of lnGNPPPP/pc on Secondary and Higher Education 1995
(t-values in parentheses)

	Eqn.1	Eqn.2
Intercept	2.9878	3.2983
	(53.712)	(72.913)
GERS95	0.0115	
	(14.467)	
GERH95		0.0197
		(12.53)
Adjusted R^2	0.6194	0.5714
Standard Error	0.3149	0.3292
F-Value	209.3	157.01
N (number of observations)	129	118

It may be argued that these figures highlight the nature of the association, between higher education and development, and not the cause and effect relationships. Nevertheless, despite some such familiar limitations, these results, that used time-lag for education to have an effect on economic development, do show that secondary and higher education is positively related to economic development; and it is likely that higher education influences positively economic growth.

Education and Income Inequality

In the literature on income distribution, a large proportion of variation in income distribution is explained by education. Therefore, it may be in order to examine the relationship between inequality in income distribution and education. The Gini coefficient, a standard measure of income inequality, is regressed on secondary and higher education and the results given in Table 6 show that the Gini is considerably influenced by the enrolment ratios in secondary and higher education. The effect is also, as expected negative, i.e., higher the enrolment ratio in secondary or higher education, lower is the income inequality. The coefficients in both equations are not only statistically significant, the value of the coefficient is also higher in case of higher education, meaning that both secondary and higher education have the

potential of reducing income inequality and higher education has a larger effect than secondary education. This is contrary to the general finding that higher education increases inequalities or that at best is has no significant effect on income distribution.

Table 6

Regression of lnGINI on Secondary and Higher Education 1995
(t-values in parentheses)

	Eqn.1	Eqn.2
Intercept	1.676	1.637
	(86.832)	(107.12)
GERS95	-0.0013	
	(5.007)	
GERH95		-0.0021
		(4.236)
Adjusted R^2	0.1756	0.1401
Standard Error	0.0975	0.1013
F-Value	25.069	25.069
N	114	105

Education and Poverty

How is post-basic education related to poverty? Enrolment ratios in primary, secondary and higher education in 1991 are regressed on poverty around 1999-2000 in developing countries.[30] It is found that all levels of education have negative effects on poverty (Table 7). However, it is important to note that primary education does not have a statistically significant effect, as shown in Eqn.1, where all the three levels of education are regressed. Secondary education has significant negative effects on poverty (Equations 1, 2 and 4). Higher education has also a significant effect (in Eqn. 3). However, in Equations 1 and 4 higher education has turned out to be statistically not significant, though the sign of the coefficient is as expected, negative. Secondary education has a significant coefficient in all the equations. The

[30] We allowed a longer time-lag, as enrolments in primary education would take a long time to influence development, as their participation in work would commence much later.

effect of higher education also seems to be higher than the effect of secondary education (compare Equations 2 and 3).

Table 7

Regression of lnPOVERTY on Education 1991
(t-values in parentheses)

	Eqn.1	Eqn.2	Eqn.3	Eqn.4
Intercept	1.828	1.679	1.331	1.6517
	(8.682)	(19.065)	(17.14)	(17.11)
GERP91	-0.003			
	(1.021)			
GERS91	-0.01	-0.014		-0.011
	(3.616)	(9.031)		(4.852)
GERH91	-0.08		-0.024	-0.0072
	(1.523)		(6.302)	(1.44)
Adjusted R^2	0.4925	0.4866	0.3317	0.4872
Standard Error	0.4086	0.4109	0.4568	0.4042
F-Value	22.647	81.565	39.718	37.102
n	74	86	79	77

Similar equations on poverty with enrolment ratios in secondary and higher education in 1995 on a larger number of countries with reduced time-lag also yield very meaningful results as shown in Table 8.

Table 8

Regression of lnPOVERTY on Secondary and Higher Education 1995 (t-values in parentheses)

	Eqn.1	Eqn.2	Eqn.3
Intercept	1.626	1.716	1.3495
	(13.977)	(16.679)	(16.242)
GERS95	-0.0086	-0.0135	
	(3.215)	(7.794)	
GERH95	-0.0125		-0.0253
	(2.241)		(6.149)
Adjusted R^2	0.4009	0.4186	0.3263
Standard Error	0.4332	0.4309	0.4593
F-Value	26.425	60.749	37.805
n	77	84	77

The regression coefficients of secondary and higher education are, as expected, negative and statistically significant at 99 per cent level of confidence, showing clearly that higher the enrolment ratio in secondary or higher education in a country the lower would be the poverty ratio in the country. The three equations in Table 8 also indicate that both secondary and higher education have strong poverty reducing effects, and higher education has a higher effect than secondary education.

Education and Human Development

As mentioned earlier, much of the literature on human development concentrates on the role of literacy and primary education on infant mortality and life expectancy, and the role of secondary or higher education is not analysed, assuming that secondary and higher education has no role at all in improving life expectancy or reducing mortality rate among children. We find here that this is not true. Secondary and higher education have a very significant effect on reducing infant mortality rate. It can be argued that higher levels of education help a lot in reducing infant mortality rates, as people with higher education would be more aware of the need for preventive health care measures and also would be aware of the availability of general healthcare facilities, leading to sound decision making within households regarding healthcare. Higher education can influence the health of the population in a different way as well, through provision of skilled medical manpower to the society, thereby improving the quality and quantity of medical manpower in the society.

In case of life expectancy, an important measure of health conditions, the effect of secondary and higher education is significant and the sign of the regression coefficients is positive, as shown in Table 9. In other words, the influence of education is statistically significant, increasing the life expectancy considerably. Higher the level of education, longer is the life expectancy.

We find similar results in the case of infant mortality rate, another important measure of health conditions in a society. Both secondary and higher education have negative effects on infant mortality, and the coefficient of higher education is marginally higher.

Table 9

Regression of lnHDI Indicators on Secondary and Higher Education 1995
(t-values in parentheses)

Regression of lnLE				Regression of lnIMR		
	Eqn.1	Eqn.2			Eqn.1	Eqn.2
Intercept	1.6879	1.744		Intercept	2.0877	1.747
	(129.3)	(169.21)			(35.96)	(36.42)
GERS95	0.0019			GERS95	-0.012	
	(9.915)				(13.87)	
GERH95		0.003		GERH95		-0.019
		(8.242)				(11.21)
Adjusted R^2	0.4189	0.3524		Adjusted R^2	0.5863	0.5033
Standard Error	0.0748	0.0775		Standard Error	0.3328	0.3605
F-Value	98.304	67.92		F-Value	192.33	125.65
n	136	124		N	136	124

Are secondary and higher education related to the general human development index, and/or the gender-based human development index? Human development index generally uses literacy, enrolment ratios, mean years of schooling or education index and either exclude or do not explicitly focus on higher education. Besides education, the two other variables human development index considers are life expectancy and national income per capita. The human development index is an aggregate of the three variables. Countries are ranked by the value of the human development index. The value of the human development index or the gender based human development index is used here, though some use only the rank order of the index in such a context. Both human development index and gender-based human development index are found to be statistically significantly related to secondary and higher education (Table 10).[31] The level of significance of the coefficient of higher education is higher in the case of gender-based index than in case of general human development index.

[31] Human development index, however, includes literacy and gross enrolment ratios in all the three levels of education, though literacy gets a higher weight (0.66) than the combined enrolment index (0.33).

Table 10

Regression of lnHDI and of GENDERHDI on Secondary and Higher Education 1995
(t-values in parentheses)

	Regression of lnHDI			Regression of lnGENDERHDI	
	Eqn.1	Eqn.2		Eqn.1	Eqn.2
Intercept	-0.356	0.26		-0.367	-0.267
	(25.29)	(21.84)		(23.81)	(20.78)
GERS95	0.003			0.0031	
	(14.84)			(14.009)	
GERH95		0.0046			0.0046
		(1.852)			(10.464)
Adjusted R^2	0.6206	0.487		0.6174	0.4943
Standard Error	0.0805	0.0893		0.841	0.0916
F-Value	220.22	117.77		196.24	109.5
n	135	124		122	112

The above estimates give an impression that education causes development automatically and that there is a linear relationship between the two. However, this is not true. There are a variety of factors that influence the relationship between education and development.

Education and Development and 'Enabling Environment'

The relationship between education and poverty, growth and income distribution is, however, somewhat complex, as education's effect on poverty and development depends upon not only the way education is planned, developed and financed, but also it is contingent upon the socioeconomic factors, employment probabilities, wage structure, the fiscal base etc. For instance, changes in the payoffs to different levels of education also influence earnings distribution. When one concludes, for example, that one extra year of education (for men) raises the rate of economic growth by 1.2 per cent per year (Barro, 1997), or that one per cent increase in human capital per worker raises the rate of growth of total factor productivity by 0.0365 per cent (Outlon, 1997), it does not meant that there is a linear relationship between education and

economic growth and that education automatically leads to economic growth. There are several other enabling factors. As De Meulemeester and Rochat (1995) have argued, "it is vital that the social, political and economic structures and the technological level of the society to which the educational system belongs are such that graduates can actually make use of their accumulated knowledge". Higher education may not automatically lead to development; it is necessary for development, but not sufficient.

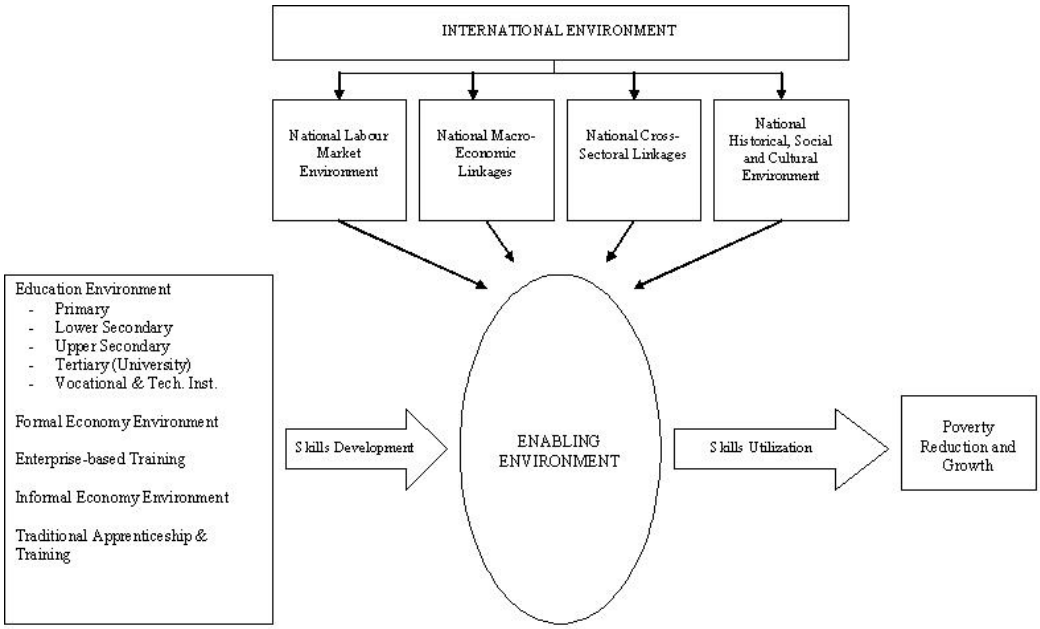
The effect of education on poverty and development is considerably influenced by the overall socioeconomic environment. The environment includes several factors -- social, economic, technological, cultural, etc. As some of the research reviewed above has shown, the effect of education on agricultural productivity varies by the level of technology of a given society; or the effect of education on economic growth varies by the very level of economic development obtained. There can be several other factors that influence the relationship between education and development. Many production function studies have used physical capital along with human capital. [32]

The environment is very important in influencing education to cause development. King and Palmer (2005) have described the importance of enabling environment for education to influence poverty and development. Environment, as they define, in this context, includes both within the education sector, the whole education and training system, and the wider non-educational environment, including for example, macro economic growth, job opportunities, job creation, good governance, and the availability of credit, agricultural output etc. Figure 4 shows the influence of a wide set of factors on the relationship between education and poverty reduction.

[32] It is argued that complementarity between human capital and other factors implies increase in the contribution of human capital to economic growth by decreasing the tendency for diminishing return to set in. See Griliches (1970), Conlisk (1970) and Broadberry (2003).

Figure 4

Education Influencing Poverty: Enabling Environment



Source: King and Palmer (2005)

To control for the effect of the environment, on the relationship between education and poverty and development in our exercise here, regression equations of economic development and poverty are estimated by including average economic growth and a few dummy variables for various regions, defined as follows:

D1 (SSA) = 1, if it is in Sub-Saharan Africa
= 0 otherwise

D2 (LAT) = 1, if it is in Latin American and Caribbean region
= 0 otherwise

D3 (CIS+) = 1, if it is in Commonwealth of Independent States (erstwhile USSR)
= 0 otherwise

D4 (ASIA) = 1, if the country is in the Asian region (non-OECD country)

= 0, otherwise

D5 (ARAB) = 1, if the country is in the Arab region
= 0, otherwise

D6 (OECD) = 1, if the country is in the group of OECD countries
= 0, otherwise

Results of the regression equations of economic development on enrolment ratios in secondary and higher education and the regional dummies are given in Table 11.

Table 11

Regression of Economic Development (lnPPP/pc) on Secondary and Higher Education (1995) along with Regional Dummies (t-values in parentheses)

	Eqn.1	Eqn.2	Eqn.3	Eqn.4
Intercept	3.4947	3.3685	3.6751	3.5643
	(22.755)	(32.049)	(39.262)	(25.153)
GERS95		0.0064		0.0058
		(4.9653)		(4.531)
GERH95	0.0155	0.0066	0.0138	0.0048
	(4.378)	(2.984)	(7.163)	(2.023)
D1 (SSA)	-0.345	-0.373	-0.515	-0.543
	(2.105)	(3.84)	(5.047)	(4.263)
D2 (LAT)	-0.022	-0.08	-0.186	-0.218
	(0.135)	(0.867)	(1.886)	(1.919)
D3 (CIS+)	-0.154	-0.271	0.27	-0.378
	(-0.925)	(3.496)	(3.162)	(4.068)
D4 (ASIA)	-0.141	-0.235	-0.287	-0.381
	(0.851)	(2.449)	(2.736)	(3.203)
D5 (ARAB)				-0.264
				(2.026)
D6 (OECD)				excluded
Adjusted R^2	0.4444	0.7066	0.6447	0.7055
Standard Error	0.2925	0.2724	0.2998	0.2686
F-Value	12.837	47.97	43.455	42.854
n	77	118	118	118
Note: n: only developing countries				

The results indicate that even after controlling for environmental factors captured by the regional dummies, secondary and higher education have significant positive effects on economic development (national income per capita in purchasing power parity dollars). Among the regional dummies, D1 (SSA), D3 (CIS) and D4 (Asia) have significant negative effects. In other words, the environment in Sub-Saharan Africa, Commonwealth of Independent States and in Asia has a negative effect on economic development.

Comparing the results given in Table 11 with those given in Table 5, where no regional dummies are included, one can say that the effect of education on economic development gets weakened in these regions. In other words, the environment is not really enabling education to contribute as much as it can to economic development. The environment in Latin America has not much effect on economic growth, as the negative effect is not statistically significant in any of the equations.

Similar regression equations on poverty also yielded similar results, as shown in Table 12. After controlling for regional variations, higher education is found to have a significant effect on poverty, as shown in all the three equations. The higher the enrolment ratio in higher education, the less is the poverty. Eqn. 3 includes economic growth also as a regressor. The rate of economic growth also has a negative effect on poverty.

The regional dummies for SSA, Lat and Asia also turned out to be statistically significant, meaning that the wider environment in Sub-Saharan Africa, Latin America and the Caribbean region and Asia is becoming a hindrance for reduction in poverty. The environment also weakens the effect of higher education on poverty reduction, as the effect is found to have been reduced once the regional dummies are introduced, compared to the estimates given in Table 6. The environment in the CIS and Arab regions has no significant effect.

Table 12

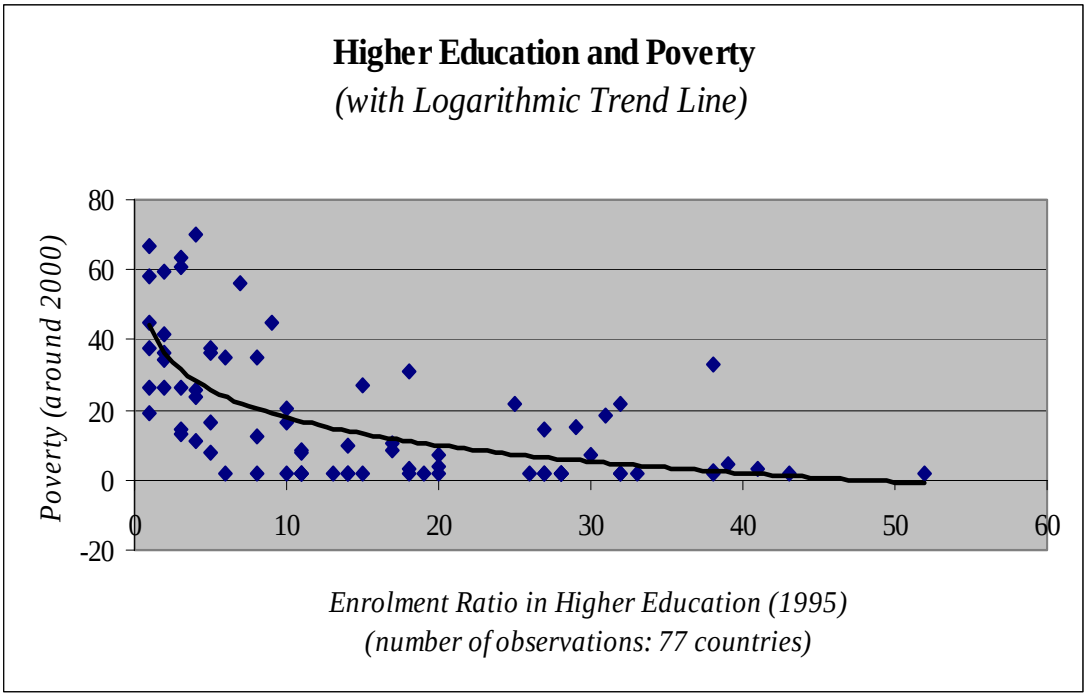
Regression of lnPOVERTY on Higher Education (1995) along with Regional Dummies (t-values in parentheses)

	Eqn.1	Eqn.2	Eqn.3
Intercept	0.5006	0.7812	0.5916
	(2.472)	(5.162)	(3.039)
GERH95	-0.011	-0.011	-0.011
	(2.464)	(2.464)	(2.965)
ECGR			-0.056
			(2.965)
D1 (SSA)	1.0392	0.7587	0.9853
	(4.828)	(4.746)	(4.803)
D2 (LAT)	0.6611	0.3806	0.6366
	(3.079)	(2.929)	(3.121)
D3 (CIS+)	0.2805	excluded	0.1902
	(1.275)		(0.901)
D4 (ASIA)	0.7214	0.4409	0.785
	(3.297)	(2.921)	(3.758)
D5 (ARAB)	Excluded	-0.281	excluded
		(1.275)	
Adjusted R^2	0.5247	0.5106	0.5717
Standard Error	0.3858	0.3858	0.3662
F-Value	17.78	17.78	17.907
N (developing countries only)	77	77	77

The relationship between higher education and poverty is plotted on a graph and a logarithmic trend line is fitted, as shown in Figure 5. It can be noted that as enrolment ratio in higher education rises to about 40 per cent, poverty ratio declines steeply to negligible levels.

Though there are many countries with low levels of poverty, with enrolment ratio around 20 per cent, gains made in reduction in poverty can be sustained only if enrolment ratios rise above 20 per cent (see Tilak, 2001). In other words, countries that aim at reducing poverty to negligible levels may have to, *inter alia,* expand their higher education systems to cover about 40 per cent of the relevant age group youth population.

Figure 5



It may be argued that simple or multiple regression equations of economic development or poverty on education suggest only correlation between the two, and not necessarily cause and effect relationship. Such an argument is partly pre-empted here, by allowing a time-lag for secondary and higher education to cause economic development or reduction in poverty. Secondly, we also find very few countries with high levels of secondary and more particularly higher education being underdeveloped, though all the economically rich nations (e.g., oil-rich countries in Arab region) have not necessarily advanced in the development and spread of education.

To sum up, secondary and higher education has a very significant role in the development of societies – in terms of economic development, poverty reduction, life expectancy, infant mortality and human development. Though in general it is true that there exists a two-way relationship between education and development, the way and the facets of development analysed here highlight the one-way relationship, viz., the contribution of secondary and higher education to development. For

instance, it does not sound logical to argue that reduction in infant mortality rate or improvement in life expectancy would lead to development of secondary or higher education a few years later. Similarly, current national income may influence the growth of education in the future, but enrolment ratios in education 5-6 years ago cannot be argued to be influenced by the current levels of economic development, or by other current indicators of development, particularly in modern times, when rapid socioeconomic developments are taking place. Further, it is obvious that there are several other factors that influence poverty and development. Inclusion of those variables in the regression equations might change the level of significance and the size of the coefficients of education; but it can be argued that the results may not necessarily be altogether different. In short, though the statistical analysis used is very simple, the group of countries used in the regression analysis is highly heterogeneous, and there can be several factors influencing economic growth, poverty and other facets of development in addition to secondary higher education, it nevertheless, indicates a strong and positive relationship – secondary and higher education clearly influence development, and help in reducing in poverty.

5. Current Status of Secondary and Higher Education

Despite the significant contribution of secondary and higher education to development, most developing countries do not seem to accord due priority to them in their development plans. While the progress with respect to basic education is being monitored, there is no mechanism to monitor the growth in secondary and higher education. Very few developing countries have formulated clear and coherent policies and prepared detailed plans for the development of secondary and higher education. As a result, while secondary education is nearly universal in many advanced countries, the enrolment ratio in secondary education is below 50 per cent in South Asia and much lower than 50 per cent in other low income countries such as those in Sub-Saharan Africa, as shown in Table 13. Among the major world regions of the developing world, the enrolment ratio ranges between 49 in South Asia and 89 in Europe and Central Asia. These are only gross enrolment ratios. We do not have data

on net enrolment ratio in many countries, which can be very much below the gross enrolment ratios.

Table 13

Participation in Secondary and Higher Education (Enrolment Ratios)

	Secondary				Tertiary	
	Gross		Net			
	1990/91	2002/03	1990/91	2002/03	1990/91	2002/03
World	**55**	**71**			**16**	**26**
Low Income Countries	***35***	***46***			***5***	***10***
Middle Income Countries	***56***	***74***			***13***	***22***
Lower Middle Income Countries	55	74			12	21
Upper Middle Income Countries	63	81	50	68	17	36
Low & Middle Income Countries	***47***	***63***			***10***	***18***
East Asia & Pacific	47	66			5	15
Europe & Central Asia	85	89			36	49
Latin America & Caribbean	49	87	29	64	16	25
Middle East & North Africa	56	65			13	
South Asia	40	49			6	11
Sub-Saharan Africa	22				3	
High Income Countries	***94***	***107***	***87***	***90***	***47***	***66***
Europe EMU	97	108		91	35	56

Source: World Bank (2005).

The status with respect to higher education is much more uneven. While the corresponding gross enrolment ratio is 66 per cent in high-income countries, it is 11 per cent in South Asia and much less in Sub-Saharan Africa and in other low-income countries, on average. Europe and Central Asia with an enrolment ratio of nearly 50 per cent fare better than all other developing regions of the world in economic growth. International comparisons (e.g., Tilak, 2001) reveal that a threshold level of 20 per cent enrolment ratio in higher education is necessary for sustainable development and that it might even rise to 40 per cent over the years.

As mentioned earlier, we have data on the distribution of population by education levels, which is a better measure of the accumulated stock of education development that has taken place over the years. Latest data are

available by countries, and not by regions and they are given in Table A.3 in the Annex, and are summarized here in Table 14. In some of the developed countries all people are educated, having at least seven (in fact, much higher in many countries) years of schooling; we do not find any one with less than 7 years of schooling in UK, Australia, Finland, Norway etc. On the other hand, developing countries are characterised with sizeable number of illiterate and less educated people. In Angola, Mozambique and Myanmar no one, according to the available statistics (given in Table A.3 in the Annexes) has education above 12 years of schooling, while 65 per cent of the population in Canada have higher education (above 12 years of schooling). In as many as 52 countries, not even ten per cent of the population has higher education.

Table 14

Number of Countries by % of Population with Given Years of Schooling

(Most Recent Estimates)

% of Population	*Years of Schooling*	
	7-12 years	*Above 12 years*
Below 10%	11	52
10-29%	32	54
30-49%	36	17
50-69%	30	3
70% and above	18	

Source: Based on Table A.4 in the Annex.

In case of secondary education, only 6 per cent of the population in Chad had 7-12 years of schooling, while in Kyrgyzstan 70 percent belongs to this category. Most of the countries with less education are also those having a high incidence of poverty.

As noted earlier, many countries have to expand their secondary and higher education systems to the threshold level of at least 20 per cent enrolment ratio in higher education and about 75 per cent in secondary education to reduce poverty and develop in general in a sustainable way.

6. Summary and Concluding Observations

The contribution of basic education to development is widely recognised. Some have described the modern development in economies such as those in Asia, as 'human resource led development' (Behrman, 1990). Ever since 1985 when the World Bank set poverty reduction as an important agenda of the Bank, and highlighted the role of primary education therein, the relative attention of the policy makes, planners and development thinkers has shifted very systematically in favour of primary education. Substantial policy research and consultancy research have established strong linkages between primary education and poverty reduction, reduction in infant mortality, reduction in population growth, and improvement in life expectancy and so on. Research has also covered literacy and non-formal education. Except for a few studies reviewed here, it can be stated that very rarely the linkages between post-basic education and poverty and related development indicators have been analysed. Simultaneously extensive empirical research, a substantial part of which originated from the World Bank, that also established that returns to primary education are high and higher than returns to secondary and higher education, had also led many to conclude that it is only primary education and literacy that matter for development – economic, social and even human development, and secondary and higher education does not matter. The conclusion also led many including the World Bank to recommend that developing countries better concentrate on primary education and deliberately ignore secondary and more specially higher education (see Tilak, 1997c). It was also felt by many that primary education cannot be provided to all children, unless the growth in post primary education is capped. Accordingly, many developing countries have not paid much attention to secondary and higher education in their national educational policy and planning exercises. The subsequent developments, including the World Bank policy papers, the structural adjustment policies that were to be adopted by most of the developing countries, and the Jomtien (and later the Dakar) conferences on Education For All (EFA), all have contributed to strengthening these trends. The problem of resource scarcity added further to the problem.

In this overall background, it becomes important to examine whether post-basic education has any role to play in development. This question has

been examined in this paper, using some of the available recent statistics. A careful review of the research and fresh analysis of secondary data clearly lead us to conclude that the general presumption on the weak or negligible role of secondary and higher education in development is not valid and that post-basic education is important for development. Post-basic education plays a significant role in development. Post-basic education leads to economic growth, which results in return to reduction in poverty. Based on cross-country data on enrolment ratios in secondary and higher education in 1995 and development indicators relating mostly to 1999-2000, and simple and multiple regression equations, the relationship between secondary and higher education and development is analysed. Whatever concerns one might have about drawing inferences from regression equations, the picture is very clear, that high levels of development are associated with high levels of secondary and higher education. It may not be wrong to conclude that:

a) Secondary and higher education contributes to economic development.
b) Secondary and higher education makes a significant contribution to reduction in absolute as well as relative poverty.
c) It negatively influences infant mortality.
d) Life expectancy is positively related to post-basic education.
e) Secondary and higher education causes an improvement in the overall human development index and gender based human development index.

Many other related aspects of development are not analysed in detail here.

The implications of these results are clear and straight forward: given the importance of secondary and higher education along with literacy and basic education, it is necessary that attention is paid to development of sound and comprehensive education policies that accord due importance to all levels of education.

The Sub-Saharan region and the South Asian region are very much backward in development of secondary and higher education. They also figure at the top in terms of the incidence of poverty. Coherent long-term policies for the development of education, including secondary and higher

education for development of the economy are needed. Public policy has to clearly recognise the critical importance of secondary and higher education in development, in poverty reduction, human development and economic growth. While there is some concern expressed of late with reference to secondary education (see e.g., World Bank, 2002b, 2003), higher education is deliberately kept away from such discussions. Education has to be planned as an important component of poverty reduction strategies. Planning education has to be integrated with development planning.

It is important to note that no nation that has not expanded reasonably well its higher education system can achieve a high level of economic development. There are very few exceptions to this rule, such as oil-rich countries. International evidence shows that all advanced countries are those that have universalized secondary education and have provided a fair degree of access to higher education. Among the advanced countries there is no single country, where higher education has not been well expanded. In most developed countries higher education is fairly democratised, and is accessible to all. In fact, there are significant trends towards massification of the base of higher education. The gross enrolment ratio in higher education in advanced countries varies between 20 per cent and is as high as 90 per cent. In contrast, in most of the developing countries, it is restricted to a small fraction of youth. No country could be found in the group of high-income countries with an enrolment ratio of less than 20 per cent, except countries like Saudi Arabia and other oil-rich countries. A 20 per cent enrolment ratio in higher education seems to be the critical threshold level for a country to become economically advanced. In fact, the threshold level may rise to 40 per cent. The 20 per cent enrolment ratio is a necessary, but not a sufficient condition for development. An enabling environment is also important to make education influence development fully. Similarly in secondary education, an enrolment ratio of about 75 per cent may serve as a threshold level for development.

It may be underscored again that it might not be sufficient if the focus is exclusively on basic education for social and economic development of the society on the one hand, and for the development of a strong and balanced

edifice of the education system on the other. Education forms an important ingredient of sustainable development, and post-basic education also serves an important instrument of achieving sustainable development (Tilak, 2004b). The long-term influence of post-basic education on all key dimensions of sustainable development is well known. For example, the role of education in reducing poverty – both at individual and national levels, in improving health and nutritional status of population, in reducing fertility and population growth and thereby contributing to demographic transition, in strengthening democratic forces and in ensuring civil and political rights of people – is too important to ignore. Balanced development of education of all levels is also a critical factor necessary for economic growth and development and also for its sustenance. It is important to note that while literacy and basic education are important and necessary for development, they are not adequate for economic development.

Given the inter-dependence of one layer of education on the other, secondary and higher education also becomes critically important along with basic education for developing and sustaining good quality education at all levels – primary, secondary and higher education.

Thus both for development – growth and poverty reduction, and for education development, it is necessary to note that secondary and higher education cannot wait until basic education is completely universal or well expanded, or higher education cannot wait until secondary education is nearly universal. The traditional sequencing of first primary education, then secondary education and then only higher education may not work any more. While primary education serves as a threshold level of human capital development for economic growth, it is secondary and higher education including investment in science and technology that accelerates and sustains high economic growth and development.

Sustainable socioeconomic development of the societies requires sustainable education systems. It is necessary to build the educational edifice, which focuses on human capital as well as human development, economic growth as well as equity and reduction in poverty, modern techniques of development as well as traditional methods, national, local as well as global concerns, and human and secular values. Only strong and vibrant education

systems, based on sound assumptions and approaches, can play the constitutive and instrumental roles in development. In other words, a strong and sustainable education system is necessary to serve (a) itself as development, as 'freedom,' as a 'capability,' as a human right, and as human development, as a key dimension of sustainable development – as an end, and (b) as a means of sustainable development from economic, social, cultural, and political points of view. Secondary and higher education is an essential tool for achieving a sustainable future, though they do not form a sufficient condition. In the present context, building of knowledge societies is also found to be increasingly important. It is clear that knowledge societies cannot be constructed without creating strong and dynamic high quality higher education institutions. After all, creation and expansion of frontiers of knowledge and dissemination of knowledge are the main function of universities and other institutions of higher education.

In addition, education, including higher education, is also a *public good* – at least a *quasi-public good*, benefits from which are not confined to the individuals who go to colleges, but also flow to others and the society at large. The externalities of education, including the dynamic externalities of higher education are indeed immense, and they have profound positive effects on economic growth.

Annexes

Table A.1

Data on Poverty and Development

HDI Rank	Country	POVERTY	ECGR	PPP$/pc	LE	IMR	HDI	GINI	GENDER HDI
26	Slovenia	2.0	3.1	19100	76	4	0.904	29.4	0.901
28	Korea Rep	2.0	4.6	18000	74	5	0.901	31.6	0.896
35	Hungary	2.0	2.6	13840	73	8	0.862	26.9	0.860
36	Poland	2.0	4.2	11210	75	6	0.858	34.1	0.856
37	Chile	2.0	4.1	9810	76	8	0.854	57.1	0.846
38	Estonia	2.0	3.3	12680	71	8	0.853	37.2	0.852
39	Lithuania	2.0	0.5	11390	72	8	0.852	31.9	0.851
45	Croatia	2.0	2.1	10610	74	6	0.841	29.0	0.837
46	Uruguay	2.0	0.9	7980	75	12	0.840	44.6	0.836
47	Costa Rica	2.0	2.6	9140	79	8	0.838	46.5	0.829
48	Latvia	2.0	2.2	10210	71	10	0.836	33.6	0.834
52	Cuba	2.0	3.5		77	7	0.817		
59	Macedonia FYR	2.0	-0.7	6750	74	10	0.797	28.2	0.794
61	Malaysia	2.0	3.4	8970	73	7	0.796	49.2	0.791
62	Russian Fed	2.0	-1.5	8950	66	16	0.795	31.0	
64	Romania	2.0	0.6	7140	70	18	0.792	30.3	0.789
67	Belarus	2.0	0.9	6050	68	13	0.786	30.4	0.785
72	Albania	2.0	5.1	4710	74	18	0.780	28.2	0.776
73	Thailand	2.0	2.8	7450	69	23	0.778	43.2	0.774
80	Kazakhstan	2.0	0.4	6280	61	63	0.761	32.3	0.759
89	Tunisia	2.0	3.1	6850	73	19	0.753	39.8	0.743
90	Jordon	2.0	0.9	4290	72	23	0.753	36.4	0.740
94	Turkey	2.0	1.3	6710	69	33	0.750	40.0	0.742
98	Jamaica	2.0	0.4	3790	76	17	0.738	37.9	0.736
99	Iran	2.0	2.1	7000	69	33	0.736	43.0	0.719
103	Algeria	2.0	0.6	5930	71	35	0.722	35.3	0.706
109	Kyrgyz Rep	2.0	-2.4	1690	65	59	0.702	34.8	0.700
124	Morocco	2.0	1.0	3940	69	36	0.631	39.5	0.616
100	Georgia	2.7	-2.7	2610	73	41	0.732	36.9	
78	Ukraine	2.9	4.7	5430	68	15	0.766	29.0	0.763
119	Egypt	3.1	2.5	3940	69	23	0.659	34.4	
101	Azerbaijan	3.7	-2.6	3790	65	75	0.729	36.5	0.725
55	Bulgaria	4.7	0.6	7540	72	12	0.808	31.9	0.807

56	Panama	7.2	2.4	6420	75	18	0.804	56.4	0.800
122	Tajikistan	7.4	-6.5	1040	66	76	0.652	32.6	0.650
110	Indonesia	7.5	2.0	3210	67	31	0.697	34.3	0.691
93	Sri Lanka	7.6	3.3	3740	74	13	0.751	33.2	0.747
63	Brazil	8.2	1.2	7510	69	33	0.792	59.3	0.786
69	Colombia	8.2	0.4	6410	72	18	0.785	57.6	0.780
53	Mexico	9.9	1.4	8980	74	23	0.814	54.6	0.804
120	South Africa	10.7	0.1	10130	46	53	0.658	57.8	0.652
163	Cote d'Ivoire	10.8	-0.4	1400	45	117	0.420	44.6	0.403
97	Turkmenistan	12.1	-1.3	5860	64	79	0.738	40.8	
57	Trinidad & Tobago	12.4	3.2	10390	72	17	0.801	40.3	0.796
135	Pakistan	13.4	1.1	2040	64	74	0.527	33.0	0.508
113	Bolivia	14.4	1.3	2490	64	53	0.687	44.7	0.679
84	Philippines	14.6	1.2	4640	70	27	0.758	46.1	0.755
75	Venezuela	15.0	-1.5	4750	74	18	0.772	49.1	0.765
88	Paraguay	16.4	-0.6	4690	71	25	0.755	57.8	0.742
85	China	16.6	8.5	4980	71	30	0.755	44.7	0.754
148	Cameroon	17.1	0.2	1990	48	95	0.497	44.6	0.487
82	Ecuador	17.7	0.1	3440	71	24	0.759	43.7	
79	Peru	18.1	2.1	5080	70	26	0.762	49.8	0.745
164	Tanzania	19.3	1.0	620	43	104	0.418	38.2	0.414
116	Honduras	20.7	0.2	2590	66	32	0.667	55.0	
111	Uzbekistan	21.8	-0.5	1720	67	57	0.694	26.8	0.692
115	Moldova	22.0	-5.7	1760	67	26	0.671	36.9	0.668
154	Kenya	22.8	-0.6	1030	45	79	0.474	42.5	0.472
131	Botswana	23.5	2.7	8370	38	82	0.565	63.0	0.559
152	Mauritania	25.9	1.6	1870	51	77	0.477		0.471
133	Lao PDR	26.3	3.7	1730	55	82	0.545	37.0	0.540
157	Senegal	26.3	1.3	1620	52	78	0.458	41.3	0.449
170	Ethiopia	26.3	2.0	710	42	112	0.367	30.0	0.355
114	Mongolia	27.0	-2.5	1820	66	56	0.679	30.3	0.677
104	El Salvador	31.1	2.1	4910	70	32	0.722	53.2	0.715
34	Argentina	33.0	1.3	11410	74	17	0.863	52.2	0.854
130	Cambodia	34.1	4.0	2000	54	97	0.571	40.4	0.567
127	India	34.7	4.0	2880	63	63	0.602	32.5	0.586
125	Namibia	34.9	0.9	6660	40	48	0.627	70.7	0.621
139	Bangladesh	36.0	3.1	1870	62	46	0.520	31.8	0.514
149	Lesotho	36.4	2.3	3100	37	79	0.497	63.2	0.487
136	Nepal	37.7	2.2	1420	60	61	0.526	36.7	0.511
168	Mozambique	37.9	4.6	1060	41	101	0.379	39.6	0.365
165	Malawi	41.7	0.9	590	38	112	0.404	50.3	0.396

138	Ghana	44.8	1.8	2190	54	59	0.520	40.8	0.517
175	Burkina Faso	44.9	1.7	1170	43	107	0.317	48.2	0.311
112	Nicaragua	45.1	0.9	3180	69	30	0.690	43.1	0.683
159	Rwanda	51.7	0.7	1290	40	118	0.450	28.9	0.447
145	Zimbabwe	56.1	-0.8		39	78	0.505	56.8	0.493
176	Sierra Leone	57.0	-5.3	530	37	166	0.298	62.9	0.279
169	Burundi	58.4	-3.5	630	42	114	0.378	33.3	0.373
155	Gambia	59.3	-0.1	1740	53	90	0.470	47.5	0.464
146	Madagascar	61.0	-0.9	800	56	78	0.499	47.5	0.483
177	Niger	61.4	-0.6	830	46	154	0.281	50.5	0.271
165	Zambia	63.7	-0.9	850	36	102	0.394	52.6	0.383
171	Central African Rep	66.6	-0.4	1080	42	115	0.355	61.3	
158	Nigeria	70.2	-0.5	900	45	98	0.453	50.6	0.439
174	Mali	72.3	2.4	960	41	122	0.333	50.5	0.323
1	Norway		2.9	37910	79	3	0.963	25.8	0.960
3	Australia		2.6	28780	80	5	0.955	35.2	0.954
5	Canada		2.3	30040	79	5	0.949	33.1	0.946
6	Sweden		2.0	26710	80	3	0.949	25.0	0.947
7	Switzerland		0.5	32220	80	4	0.947	33.1	0.946
8	Ireland		6.7	30910	78	5	0.946	35.9	0.939
9	Belgium		1.8	28920	78	4	0.945	25.0	0.941
10	US		2.1	37750	77	7	0.944	40.8	0.942
11	Japan		1.0	28450	82	3	0.943	24.9	0.937
12	Netherlands		2.1	28560	78	5	0.943	30.9	0.939
13	Finland		2.5	27640	78	3	0.941	26.9	0.940
14	Denmark		1.9	31050	77	4	0.941	24.7	0.938
15	UK		2.5	27690	78	5	0.939	36.0	0.937
16	France		1.6	27640	79	4	0.938	32.7	0.935
17	Austria		1.8	29740	79	5	0.936	30.0	0.926
18	Italy		1.5	26830	80	4	0.934	36.0	0.928
19	New Zealand		2.1	21350	79	5	0.933	36.2	0.929
20	Germany		1.3	27610	78	4	0.930	28.3	0.926
21	Spain		2.4	22150	80	4	0.928	32.5	0.922
22	Hong Kong		2.1	28680	80	4	0.916	43.4	0.912
23	Israel		1.6	19440	79	5	0.915	35.5	0.911
24	Greece		2.1	19900	78	4	0.912	35.4	0.907
25	Singapore		3.5	24180	78	3	0.907	42.5	
27	Portugal		2.2	17710	76	4	0.904	38.5	0.900
30	Barbados		1.4	15720	75	40	0.878		0.876
31	Czech		1.5	15600	75	4	0.874	25.4	0.872
41	UAE		-2.1		75	7	0.849		

42	Slovak Rep		2.4	13440	73	7	0.849	25.8	0.847
44	Kuwait		-2.3	19480	77	8	0.844		0.843
58	Libya				73	13	0.799		
65	Mauritius		4.6	11280	72	16	0.791		0.781
71	Oman		0.9		74	10	0.781		0.759
77	Saudi Arabia		-2.4	13230	73	22	0.772		0.749
81	Lebanon		2.9	4840	71	27	0.759		0.745
83	Armenia		2.8	3390	75	30	0.759	37.9	0.756
95	Dominican Rep		4.0	6310	67	29	0.749	47.4	0.739
106	Syrian Arab Rep		1.4	3430	70	16	0.721		0.702
108	Vietnam		5.9	2490	70	19	0.704	37.0	0.702
117	Guatemala			4090	66	35	0.663	59.9	0.649
129	Myanmar		5.7		57	76	0.578		
137	PNG		0.2	2250	57	69	0.523	50.9	0.518
141	Sudan		3.3	1760	59	63	0.512		0.495
142	Congo Rep		-1.4	730	52	81	0.512		0.507
143	Togo		0.4	1640	50	78	0.512		0.491
144	Uganda		3.9	1430	43	81	0.508	43.0	0.502
147	Swaziland		0.2	4850	43	105	0.498	60.9	0.485
151	Yemen		2.4	820	58	82	0.489		0.448
153	Haiti		-2.8	1730	52	76	0.475		
156	Guinea		1.6	2080	46	104	0.466	40.3	
160	Angola		0.4	1910	47	154	0.445		0.438
161	Eritrea		1.0	1020	51	45	0.444		0.431
162	Benin		2.2	1110	53	91	0.431		0.419
167	Congo DR		-6.3	660	45	129	0.385		0.373
173	Chad			1080	48	117	0.341		0.322

Blank cells: data not available.
Notation:
POVERTY: Poverty ratio (% of people below the poverty line, i.e., below US$ 1 per day per had (latest around 1999);
ECGR: GNP per capita growth rate 1990-2003 (real)
GER: gross enrolment ratios 1990-91
GINI: Gini coefficient of inequality
LE: Life expectancy, 2003
IMR: Infant mortality rate, 2003
HDI: Human Development Index
GENDER HDI: Gender based human development index
PPP$/pc: GNP per capita in purchasing power parity US$
Source: World Bank (2005), UNDP (2005)

Table A.2

Enrolment Ratios in Education (%)

	1990-91			1995	
	GERP	GERS	GERH	GERS	GERH
Haiti	48	21		14	1
Angola	92	12	1	14	1
Eritrea	21			19	1
Tanzania	67	5	0.5	5	1
Mozambique	64	7		7	1
Burundi	71	5	1	7	1
Ethiopia	32	14	1	11	1
Central African Rep	66	11	2	10	1
Chad	55	7	2	9	1
Burkina Faso	33	7	1	8	1
Cambodia	83	29	1	27	2
Lao PDR	103	24		25	2
Uganda	69	12	1	12	2
Lesotho	112	25	1	28	2
Gambia	61	18		22	2
Malawi	68	8	1	98	2
CongoDR	71		2	26	2
Bolivia	95	37	22	16	3
Pakistan		25	3	26	3
PNG	66	12		14	3
Togo	110	23		27	3
Madagascar	94	18	3	14	3
Senegal	58	16	3	16	3
Benin	59	12	3	16	3
Zambia		20	2	28	3
Vietnam	107	32	2	47	4
Botswana	103	38	3	56	4
Yemen	65			23	4
Mauritania	50	13	3	15	4
Nigeria	92	25		30	4
Cote d'Ivoire	65	21		23	4
Oman	85	45	4	66	5
China	125	49	3	67	5
Sri Lanka	113	77	5	75	5
Myanmar	109	22	4	32	5

Nepal	114	33	5	38	5
Bangladesh	80	20	4	47	5
Mauritius	109	53	3	62	6
Jamaica	101	65	7	66	6
India	99	44	6	49	6
Zimbabwe	104	47	5	47	7
Trinidad & Tobago	97	80	7	72	8
Romania	91	92	10	66	8
Namibia	124	39		62	8
Guinea	34	9	1	25	8
UAE	111	65	7	78	9
Nicaragua	94	40	8	47	9
Albania	100	78	7	35	10
Paraguay	105	31	8	38	10
Honduras	109		9	32	10
Malaysia	94	56	7	61	11
Brazil	105	38	11	45	11
Algeria	101	61	12	62	11
Indonesia	114	45	9	48	11
Morocco	65	36	11	39	11
Tunisia	114	44	9	61	13
Cuba	98	89	21	80	14
Mexico	114	53	15	58	14
Kyrgyz Rep		100	15	81	14
Saudi Arabia	73	44	10	58	15
Iran	109	57	10	69	15
Mongolia	97	82	14	59	15
Libya	105	86	15	97	16
Colombia	102	50	13	67	17
South Africa	107	66	12	84	17
Turkey	99	48	13	56	18
El Salvador	81	26	17	32	18
Syrian Arab Rep	102	49	18	44	18
Egypt	91	71	17	74	18
Hungary	95	79	14	81	19
Slovak Rep				91	20
Thailand	98	31		55	20
Azerbaijan	111	28	24	74	20
Tajikistan	91	102	23	82	20
Czech	96	91	17	96	21
Kuwait	60	43		64	25

Moldova	93	80	36	80	25
Latvia	97	91	26	85	26
Poland	98	81	22	96	27
Uruguay	109	81	31	82	27
Lebanon	113			81	27
Philippines	109	71	28	79	27
New Zealand	106	89	40	117	28
Chile	100	73		69	28
Lithuania	94	92	34	84	28
Croatia	80	69	22	82	28
Macedonia FYR	99	56	17	57	28
Venezuela	96	35	29	35	29
Panama	106	61	21	68	30
Peru	119	67	31	70	31
Switzerland	90	99	25	91	32
Slovenia	108	91	25	91	32
Costa Rica	102	43	26	50	32
Uzbekistan	81	99	31	93	32
Kazakhstan	88	97	42	83	33
Singapore	104	68	18	62	34
Portugal	123	67	24	102	34
Ireland	102	100	31	114	37
Greece	98	94	36	95	38
Argentina	106	71	1	72	38
Estonia	111	98	27	86	38
Georgia	97	95	37	73	38
Bulgaria	98	75	32	78	39
Japan	100	97	31	99	40
Italy	104	83	32	74	41
Israel	98	88	36	89	41
Ukraine	89	93	48	91	41
Russian Fed	109	93	53	87	43
Swaziland	98	41	4	132	43
Denmark	98	109	36	118	45
Austria	101	102	33	104	45
Spain	109	104	37	118	46
UK	107	88	30	134	48
Germany	101	98	32	103	48
Belgium	100	102	38	144	49
Netherlands	102	120	39	139	49
Armenia				79	49

France	108	98	40	111	50
Korea Rep	105	90	39	101	52
Norway	100	103	42	92	55
Finland	99	116	48	116	67
Australia	108	82	36	147	72
US	103	92	72	97	81
Canada	104	101	93	106	103
Niger	28	6	1	7	
Mali	25	7	1	9	
Rwanda	71	8		11	
Sudan	52	22	3	13	
Kenya	94	24	2	24	
Cameroon	99	27	3	27	
Ghana	72	35	1	37	
Dominican Rep	95			41	
Iraq	116	49		44	
Ecuador	116	55	20	50	
Congo Rep	117	46	5	53	
Hong Kong	102	80		75	
Jordan	101	63	24		
Sweden	100	90	32		
Barbados	80				
Belarus	96	95	51		
Turkmenistan			22		
Guatemala					
Sierra Leone	50	17	1		

Note: Blank cells mean data not available.
GERP: Gross enrolment ratio in primary education
GERS: Gross enrolment ratio in secondary education
GERH: Gross enrolment ratio in higher education

Source: World Bank (2005 and earlier years)

Table A.3

Distribution of Population by Years of Schooling (%)

	Survey Year	Years of Schooling			
		0	1-6 years	7-12 Years	13 or above
Canada	2000	0.0	1.0	34.0	65.0
Russian Federation	2000	0.0	1.0	40.0	59.0
United States	2000	0.0	2.0	42.0	55.0
Luxembourg	2000	1.0	17.0	34.0	49.0
Belarus	2002	2.0	28.0	27.0	44.0
Israel	2001	2.0	3.0	51.0	44.0
Australia	1994	0.0	0.0	58.0	42.0
Austria	1995	0.0	1.0	58.0	42.0
Estonia	2000	0.0	2.0	58.0	40.0
Belgium	1997	3.0	12.0	47.0	38.0
Moldova	2000	1.0	7.0	55.0	37.0
Armenia	2000	1.0	2.0	61.0	36.0
Brazil	2001	20.0	21.0	23.0	36.0
Japan	2000	0.0	11.0	53.0	36.0
Tajikistan	1999	0.0	5.0	63.0	32.0
United Kingdom	1999	0.0	0.0	68.0	31.0
Azerbaijan	1995	2.0	3.0	65.0	30.0
Finland	2000	0.0	0.0	70.0	30.0
Norway	2000	0.0	0.0	70.0	30.0
Sweden	2000	0.0	9.0	61.0	30.0
Netherlands	1999	0.0	1.0	71.0	28.0
Mongolia	2000	2.0	8.0	63.0	27.0
Argentina	2001	1.0	8.0	65.0	26.0
Jordan	2002	0.0	19.0	54.0	26.0
Taiwan, China	2000	5.0	22.0	47.0	26.0
Chile	2000	2.0	19.0	54.0	24.0
Germany	2000	2.0	36.0	39.0	23.0
Spain	1990	13.0	22.0	43.0	22.0
Panama	2000	4.0	32.0	43.0	21.0
Peru	2000	8.0	32.0	39.0	21.0
Switzerland	1992	0.0	0.0	79.0	21.0
Bolivia	1998	10.0	35.0	35.0	20.0
France	1994	20.0	12.0	48.0	20.0
Turkmenistan	1998	0.0	2.0	77.0	20.0

Uruguay	2000	1.0	34.0	45.0	20.0
Philippines	1998	3.0	32.0	46.0	19.0
Cote d'Ivoire	1998-1999	8.0	42.0	33.0	18.0
Ecuador	1998/1999	8.0	42.0	33.0	18.0
Ireland	1996	0.0	3.0	79.0	18.0
Kosovo	2000	7.0	12.0	63.0	18.0
Sri Lanka	2002	0.0	25.0	57.0	18.0
Denmark	1992	0.0	0.0	83.0	17.0
Egypt, Arab Rep.	2000	35.0	19.0	28.0	17.0
Kazakhstan	1999	1.0	3.0	79.0	17.0
Kyrgyz Rep.	1997	1.0	3.0	79.0	17.0
Uzbekistan	1996	1.0	2.0	81.0	17.0
Venezuela, RB de	2000	8.0	34.0	42.0	17.0
Costa Rica	2000	5.0	48.0	31.0	16.0
Dominican Republic	2002	10.0	35.0	40.0	15.0
Romania	2002	1.0	14.0	70.0	15.0
Sao Tome and Principe	2000	17.0	42.0	27.0	15.0
Thailand	2000	5.0	47.0	34.0	15.0
Ghana	1998/1999	31.0	14.0	41.0	14.0
Hungary	1999	0.0	10.0	75.0	14.0
Iraq	2000	26.0	33.0	27.0	14.0
Mexico	1999	8.0	41.0	37.0	14.0
Slovenia	1999	1.0	0.0	86.0	14.0
Colombia	2000	7.0	44.0	36.0	13.0
El Salvador	2000	18.0	38.0	32.0	12.0
Jamaica	2000	1.0	15.0	71.0	12.0
Paraguay	2000	6.0	53.0	29.0	12.0
Gabon	2000	19.0	32.0	38.0	11.0
Nigeria	1999	39.0	23.0	28.0	11.0
Poland	1999	0.0	21.0	67.0	11.0
Slovak Rep.	1992	1.0	14.0	74.0	11.0
Albania	2002	40.0	10.0	76.0	10.0
Bosnia and Herzegovina	2001	6.0	16.0	69.0	10.0
Bulgaria	2003	6.0	16.0	69.0	10.0
Czech Republic	1996	0.0	16.0	74.0	10.0
Guyana	2000	0.0	28.0	62.0	10.0
Italy	2000	3.0	19.0	68.0	10.0
Nicaragua	2001	23.0	41.0	26.0	10.0
Gambia, The	2000	58.0	14.0	19.0	9.0
Guinea-Bissau	2000	72.0	14.0	5.0	9.0

Madagascar	2001	0.0	65.0	26.0	9.0
Suriname	2000	1.0	38.0	52.0	9.0
Trinidad and Tobago	2000	1.0	12.0	78.0	9.0
Turkey	1998	17.0	50.0	23.0	9.0
Cameroon	1998	32.0	29.0	30.0	8.0
India	1998-2000	41.0	20.0	31.0	8.0
Papua New Guinea	1996	48.0	33.0	11.0	8.0
Indonesia	2002	9.0	50.0	34.0	7.0
Yemen, Rep	1999	65.0	11.0	17.0	7.0
Zimbabwe	1999	10.0	21.0	62.0	7.0
Honduras	2001	19.0	55.0	20.0	6.0
Zambia	1992	16.0	30.0	49.0	6.0
China	2000	7.0	33.0	55.0	5.0
Guatemala	1998/1999	29.0	45.0	21.0	5.0
Guinea	1999	77.0	9.0	9.0	5.0
Haiti	2000	40.0	33.0	22.0	5.0
Pakistan	2001	59.0	15.0	21.0	5.0
Sudan	2000	51.0	20.0	24.0	5.0
Bangladesh	1999/2000	46.0	26.0	24.0	4.0
Comoros	1996	64.0	17.0	16.0	4.0
Congo, Dem. Rep.	2000	25.0	35.0	36.0	4.0
Lao PDR	1997	32.0	44.0	20.0	4.0
Morocco	1992	63.0	18.0	15.0	4.0
Namibia	2000	20.0	23.0	53.0	4.0
Swaziland	2000	20.0	24.0	52.0	4.0
Benin	2001	63.0	23.0	12.0	3.0
Lesotho	2000	15.0	39.0	42.0	3.0
Mali	2001	81.0	10.0	6.0	3.0
Senegal	1992/1993	77.0	13.0	7.0	3.0
Sierra Leone	2000	74.0	4.0	19.0	3.0
South Africa	1998	74.0	14.0	9.0	3.0
Uganda	1995	32.0	39.0	27.0	3.0
Burkina Faso	1998/1999	86.0	22.0	4.0	2.0
Burundi	2000	61.0	32.0	5.0	2.0
Central African Republic	1994-1995	48.0	35.0	14.0	2.0
East Timor	2001	60.0	19.0	20.0	2.0
Kenya	1999	20.0	26.0	52.0	2.0
Nepal	2001	64.0	17.0	17.0	2.0
Niger	1998	85.0	9.0	5.0	2.0
Togo	1998	47.0	32.0	19.0	2.0

Vietnam	2000	6.0	34.0	57.0	2.0
Cambodia	1999	0.0	63.0	36.0	1.0
Chad	1996-1997	76.0	16.0	6.0	1.0
Ethiopia	2000	74.0	16.0	9.0	1.0
Malawi	2000	30.0	40.0	30.0	1.0
Rwanda	2000	38.0	41.0	20.0	1.0
Tanzania	1999	30.0	19.0	50.0	1.0
Angola	2000	33.0	47.0	20.0	0.0
Mozambique	1997	48.0	43.0	8.0	0.0
Myanmar	2000	26.0	47.0	27.0	0.0
Source: *World Development Report 2006*. Washington DC: World Bank.					

Table A.4

Distribution of Countries by % of Population with Given Years of Schooling
(Most Recent Estimates)

% of Population	*7-12 years of Schooling*	*Above 12 years of Schooling*
Below 10%	Burkina Faso, Guinea, South Africa, Ethiopia, Mozambique, Senegal, Mali, Chad, Guinea-Bissau, Burundi, Niger (11)	Gambia, Guinea-Bissau, Madagascar, Suriname, Trinidad and Tobago, Turkey, Cameroon, India, Papua New Guinea, Indonesia, Yemen Rep, Zimbabwe, Honduras, Zambia, China, Guatemala, Guinea, Haiti, Pakistan, Sudan, Bangladesh, Comoros, Congo Dem. Rep., Lao PDR, Morocco, Namibia, Swaziland, Benin, Lesotho, Mali, Senegal, Sierra Leone, South Africa, Uganda, Burkina Faso, Burundi, Central African Republic, East Timor, Kenya, Nepal, Niger, Togo, Vietnam, Cambodia, Chad, Ethiopia, Malawi, Rwanda, Tanzania, Angola, Mozambique, Myanmar (52)
10-29%	Paraguay, Egypt Arab Rep., Nigeria, Belarus, Sao Tome and Principe, Iraq, Uganda, Myanmar, Nicaragua, Madagascar, Sudan, Bangladesh, Brazil, Turkey, Haiti, Guatemala, Pakistan, Honduras, Lao PDR, East Timor, Rwanda, Angola, Gambia, Sierra Leone, Togo, Yemen, Rep, Nepal, Comoros, Morocco, Central African Republic, Benin, Papua New Guinea (32)	Netherlands, Mongolia, Argentina, Jordan, Taiwan China, Chile, Germany, Spain, Panama, Peru, Switzerland, Bolivia, France, Turkmenistan, Uruguay, Philippines, Cote d'Ivoire , Ecuador, Ireland, Kosovo, Sri Lanka, Denmark, Egypt Arab Rep. ,Kazakhstan, Kyrgyz Rep., Uzbekistan, Venezuela, Costa Rica, Dominican Republic, Romania, Sao Tome and Principe, Thailand, Ghana, Hungary, Iraq, Mexico, Slovenia, Colombia, El Salvador, Jamaica, Paraguay, Gabon, Nigeria, Poland, Slovak Rep., Albania, Bosnia and Herzegovina, Bulgaria, Czech Republic, Guyana, Italy, Nicaragua (54)
30-49%	Tanzania, Zambia, France, Belgium, Taiwan, Philippines, Uruguay, Spain, Panama, United States, Venezuela, Lesotho, Ghana, Russian Federation, Dominican Republic, Germany, Peru, Gabon, Mexico, Colombia, Congo Dem. Rep.	Luxembourg, Belarus, Israel, Australia, Austria, Estonia, Belgium, Moldova, Armenia, Brazil, Japan, Tajikistan, United Kingdom, Azerbaijan, Finland, Norway, Sweden (17)

	Cambodia, Bolivia, Canada, Luxembourg, Thailand, Indonesia, Cote d'Ivoire, Ecuador, El Salvador, Costa Rica, India, Cameroon, Malawi, Finland, Norway (36)	
50-69%	Romania, Bosnia and Herzegovina, Bulgaria, United Kingdom Italy, Poland, Azerbaijan, Argentina Tajikistan, Mongolia, Kosovo, Zimbabwe, Guyana, Armenia, Sweden, Austria, Estonia, Sri Lanka, Vietnam, Moldova, China, Jordan, Chile, Japan, Namibia, Suriname, Swaziland, Kenya, Israel, Tanzania (30)	Canada, Russian Federation, United States (3)
70% and above	Slovenia, Denmark, Uzbekistan, Switzerland, Ireland, Kazakhstan, Kyrgyz Rep., Trinidad and Tobago, Turkmenistan, Albania, Hungary, Slovak Rep., Czech Republic, Netherlands, Jamaica, Finland, Norway, Romania (18)	
Figures in ( ) are number of countries. Source: Based on Table A.3 in the Annex.		

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