

Report No. 32134-LK

Sri Lanka Attaining the Millennium Development Goals in Sri Lanka

How Likely and What Will it Take to Reduce Poverty, Child Mortality
and Malnutrition, and to Increase School Enrollment and Completion?

June 10, 2005

Human Development Unit
South Asia Region



Document of the World Bank

CURRENCY AND EQUIVALENT

Currency Unit = Rupees

US\$1 = Rupees 95.60

FISCAL YEAR

April 1 – March 31

ABBREVIATIONS AND ACRONYMS

CNS	-	Child Nutrition Survey
DCS	-	Department of Census and Statistics
DHS	-	Demographic and Health Survey
GCE A/L		General Certificate of Education – Advanced Level
GCE O/L		General Certificate of Education – Ordinary Level
GDP	-	Gross Domestic Product
GNP	-	Gross National Product
GOSL	-	Government of Sri Lanka
HD	-	Human Development
HDI	-	Human Development Index
HIES	-	Household Income and Expenditure Survey
IMR	-	Infant Mortality Rate
IRDPs	-	Integrated Rural Development Projects
MCH-FP	-	Maternal & Child Health-Family Planning
MD	-	Millennium Development
MDG	-	Millennium Development Goal
NDHS/WHO Organization	-	National Center for Health Statistics/World Health Organization
NEC	-	National Education Commission
NEREC	-	National Education Research and Evaluation Center
NGOs	-	Non-Governmental Organizations
NIE	-	National Institute of Education
PPP	-	Purchasing Power Parity
Rs.	-	Sri Lankan Rupees
SACSL	-	South Asia Country Sri Lanka
SASHD	-	South Asia Sector for Human Development
SLIS	-	Sri Lanka Integrated Survey
UNDP	-	United Nations Development Program
UNICEF	-	United Nations International Children's Emergency Fund
US\$	-	U.S. Dollars
WFP	-	World Food Programme

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EXECUTIVE SUMMARY

1. This report focuses on the attainment of five major human development-related MDGs by sub-national units in Sri Lanka relating to poverty, under-five and infant mortality, child malnutrition, schooling enrollment and completion, and gender disparities in schooling. The selection of these MDGs for detailed analysis was based in large part on the availability of reliable sub-national data. The report concludes that of these MDGs, Sri Lanka has already attained the numerical goals relating to universal primary enrollment and completion. Indeed, the country had almost met these goals as far back as 1990-91, and is far ahead of the other countries of South Asia in terms of having reached near-universal primary enrollment and completion. Sri Lanka has also attained the MD goal of gender parity in primary and secondary school enrollments, again having met this target as early as 1990-91. However, Sri Lanka faces considerable challenges in ensuring good quality primary education, with substantial shortfalls in cognitive achievement in the country as a whole. Further, Sri Lanka experiences sharp regional disparities in learning outcomes. Improving the quality of primary education in the country, with special emphasis on educationally disadvantaged areas, will require strategic policy development, effective service delivery and efficient investment of resources.

2. Sri Lanka's achievements are remarkable for a country that has been ravaged by a 20-year civil war. While there are many reasons for this success, chief among them are the country's impressive growth performance during the past 20 years and Sri Lanka's strong human-capital base at the beginning of the period. Sri Lanka's experience suggests that a country's human capital base does not necessarily have to deteriorate during prolonged periods of civil strife.

3. Sri Lanka has made great strides in bringing down its infant and under-five mortality rates. The country has sustained a rate of decline of more than 4% per year over the last half century to bring its infant mortality rate down to a mere 13 deaths per 1,000 live births in 2000. This rate is not only unusually low in comparison to the infant mortality rates of most developing countries but is lower than that observed in countries such as Russia, Ukraine and Argentina that are considerably wealthier than Sri Lanka. Indeed, an international comparison of infant mortality rates across 120 countries suggests that Sri Lanka enjoys an infant mortality rate that may be a fourth of what would typically be expected of a country at Sri Lanka's level of per capita income. The analysis in this paper suggests that it should be relatively easy for Sri Lanka to attain the infant mortality-related MDG of no more than 6.3 deaths per 1,000 live births by 2015, provided it maintains strong economic growth over the next decade and continues to expand access to infrastructure, particularly sanitation.

4. The two areas where Sri Lanka has not made enough progress in the past are reduction of poverty and child malnutrition. Poverty reduction has been slow because of generally slow economic growth in the past. While growth of the Sri Lankan economy accelerated during the second half of the 1990s, there was a sharp increase in inequality, and this considerably reduced the poverty-reducing benefits of economic growth. However, the

simulations undertaken in this report suggest that it should be possible for Sri Lanka to attain the MD goal of reducing the percent of population in poverty to no more than 13% by maintaining strong economic growth, continued expansion of male and female schooling, and sustained improvement in infrastructure (viz., electricity coverage), and by preventing income and consumption inequality from rising in the years ahead. Enhancing economic growth to the levels needed to attain the poverty MD goal requires the relaxation of constraints to the efficient functioning of markets, especially in agriculture; creating an enabling economic climate for the private sector; and promoting industrial and service sector activities which combine high potential for productivity growth with strong, income elastic demand.

5. Sri Lanka's poor performance on child malnutrition is more difficult to understand. One would think that the same interventions that allowed Sri Lanka to achieve unusually low rates of infant and under-five mortality relative to its income would also have permitted it to accomplish low rates of child malnutrition. However, this has obviously not been the case. With nearly one out of three children aged 5 or under being underweight, Sri Lanka has unusually high rates of child malnutrition, not only in absolute terms but also in relation to its income. The disconnect between the country's infant mortality rate and its child malnutrition rate is even more striking; a cross-country comparison suggests that Sri Lanka has a child underweight rate that may be three times as high as what would be expected of a country with Sri Lanka's level of infant mortality.

6. Part of the reason for the high rates of child malnutrition must be social and cultural, since as many as 15% of children even in the richest quintile of households – a group that is likely to have very good economic access to food – are underweight and stunted. Among these cultural and social factors may be child feeding practices, such as denying the newborn child colostrum, short duration of exclusive breast-feeding, early introduction of solid foods in a child's diet, and insufficiency and inadequacy of weaning diets. This is seen in the sharply increased risk of malnutrition for most Sri Lankan children in their second year of life (beginning at age 12 months). Thus, the evidence suggests that stepping up of efforts to provide nutritional education and counseling to expectant mothers and to adolescent girls is likely to have large pay-offs in terms of reduced child malnutrition rates. Already, there is evidence to suggest that infant feeding practices are changing rapidly. Over the period 1993-2000, there were sharp increases in the proportion of children that were given colostrum immediately after birth, the percentage of children exclusively breast-fed in their first three months of life, and the average duration of exclusive breast-feeding. Not surprisingly, there was a commensurate decline in rates of child malnutrition. Thus, the incongruence between low infant mortality and high child malnutrition rates is likely to fade away over time as feeding practices and nutrition knowledge of mothers improve.

7. It is important to note that even though Sri Lanka shows no apparent gender disparities in schooling opportunities at the primary or secondary level, there is considerable evidence of intra-household discrimination against girls in the allocation of nutritional inputs and health services. This is reflected in generally higher rates of infant mortality for females than for males. The situation is even worse when gender disparities are disaggregated by birth order. For instance, the risk of infant mortality for girls of birth order 3 or higher is

nearly 50% greater than that for boys of the same birth order. There are significant gender disparities in the risk of severe child malnutrition as well. The data suggest that girls under the age of 5 are nearly 40% and 70% more likely to be severely stunted and underweight, respectively, than boys. While these patterns of discrimination against girls are widely observed in other parts of South Asia (e.g., Pakistan, India and Bangladesh), their presence in Sri Lanka is surprising in view of the high-levels of adult female literacy and good access to health facilities for much of the population. The findings call for further investigation into why gender discrimination, especially against higher birth-order girls, has persisted in health and nutrition opportunities but not in schooling opportunities.

8. Sri Lanka's impressive achievements in infant and child mortality reduction should be further tempered by the presence of the large regional disparities in these indicators. In 1996, for instance, infant mortality in the district with the highest infant mortality rate in Sri Lanka (Anuradhapura) was almost 20 times as high as infant mortality in the district with the lowest infant mortality rate (Trincomalee). There are also wide variations across districts in the pace of infant mortality reduction over time; for instance, between 1991 and 1996, 13 districts (out of a total of 25) showed an increase in infant mortality. Likewise, the incidence of consumption poverty varies a lot across districts. In some districts, such as Badulla and Moneragala, the incidence of poverty is as much as 60% higher than the national average and 6 times as high as the incidence of poverty in the Colombo district. There is also considerable variation in the pace of poverty reduction across districts, with some districts having seen a 15% increase in poverty incidence between 1995-96 and 2002 while other districts have recorded a 72% decrease in poverty incidence over the same period. Inter-district variations in the growth of mean consumption expenditure account for much of the variations in the pace of poverty reduction. Thus, it is clear that an important task for policy makers is to narrow the large geographical disparities that exist in the MD indicators. This would mean targeting economic growth opportunities and infrastructural investments to the neediest and under-served districts that have poor levels of the MD indicators and that have seen little progress in these indicators over time.

9. The analysis in this report highlights the importance of infrastructure in attaining the MDGs. For instance, both poverty and child malnutrition are strongly correlated with electricity coverage; access to water and sanitation is associated with reduced rates of child malnutrition; and better sanitation is associated with lower levels of infant mortality. The simulations suggest that expanding electricity coverage from 57% to 72% would in itself reduce the child malnutrition rate by 5 percentage points. Investment in physical infrastructure (e.g., roads, electricity, water, etc.) has not received nearly as much attention in the past from Sri Lankan policy-makers as investments in health and educational interventions. The analysis in this report suggests that infrastructural investments, especially targeted to the poor and under-served districts, would help the country with attaining the MDGs speedily.

10. Consistent with the findings of numerous empirical studies from around the world, this report finds evidence of strong associations between female adult schooling and many of the MD indicators. For instance, female schooling, especially at the post-primary level, is strongly associated with poverty reduction and with lower child underweight rates. These

results suggest that continued increases in girls' secondary and tertiary enrollment in the coming years will fuel significant improvements in many of the MD indicators. In addition, improvements in learning levels of both boys and girls would strengthen the economic prospects and human development attainment of the country substantially.

11. One final area of concern relates to consumption inequality. While Sri Lanka saw mean consumption per capita grow significantly (at the rate of about 4% per annum) between 1995-96 and 2002, it also saw consumption inequality increase sharply. The Gini coefficient jumped up from 34% to 41% during this period. This large increase in consumption inequality makes the distribution of per capita consumption expenditure more unequal in Sri Lanka than in neighboring India, Bangladesh or Pakistan. More importantly, a poverty decomposition exercise suggests that, instead of declining by 6 percentage points (29% to 23%), the poverty headcount ratio in Sri Lanka would have fallen by as many as 17 percentage points (from 29% in 1995-96 to 12% in 2002) if the distribution of consumption had remained unchanged. Thus, the sharp increase in consumption inequality witnessed by Sri Lanka during the late 1990s, greatly reduced the poverty-reducing impact of growth. It will be important to ensure that future growth of the Sri Lankan economy is more pro-poor than past growth.

12. Finally, the importance of systematically monitoring MD outcomes at disaggregated levels and evaluating the impact of public programs cannot be overemphasized. There is a paucity of reliable, time-series data on many MD indicators, such as consumption poverty and child malnutrition, at the district level. The lack of such data makes it virtually impossible to monitor progress toward attainment of the MDGs at lower levels of administration. In addition, most public assistance programs and interventions in Sri Lanka, such as the Samurdhi program, have not been subjected to rigorous, independent evaluation. In order to choose the right set of interventions with which to attain the MDGs, it is critical to know which programs have been successful in improving MD indicators and which have not.

1. INTRODUCTION

The Millennium Development Goals

1.1 Since the launch of the Millennium Development Goals (MDGs) at the Millennium Summit held in New York in September 2000, the MDGs have become the most widely-accepted yardstick of development efforts by governments, donors and NGOs. The MDGs are a set of numerical and time-bound targets related to key achievements in human development. They include halving income-poverty and hunger; achieving universal primary education and gender equality; reducing infant and child mortality by two-thirds and maternal mortality by three-quarters; reversing the spread of HIV/AIDS; and halving the proportion of people without access to safe water. These targets are to be achieved by 2015, from their level in 1990 (United Nations 2000).

1.2 Almost all the countries in the world, including Sri Lanka, have committed themselves to attaining the targets embodied in the Millennium Declaration by 2015. Unfortunately, there is little understanding of whether Sri Lanka will be able to attain all of the MDGs. There is even less understanding of what it will take – by way of economic growth, infrastructural investments, and social-sector interventions – to attain the different MDGs. Further, this report argues the importance of disaggregating the MDGs for Sri Lanka, given the large geographical and socioeconomic variations in millennium development (MD) indicators across the country.

1.3 This report focuses on the attainment of five major human development-related MDGs by sub-national units in Sri Lanka relating to poverty, under-five and infant mortality, child malnutrition, schooling enrollment and completion, and gender disparities in schooling. The selection of these MDGs for detailed analysis was based in large part on the availability of reliable sub-national data. For example, reliable data on disease prevalence at the district level are simply not available, and this hampers useful sub-national analysis of the communicable disease-related MDG. The same is true of another important MD indicator – maternal mortality.

Data, Methodology and Caveats

1.4 Virtually all of the analysis in this report is based on two sets of national household surveys. First, data from three rounds of the nationally-representative Sri Lanka Household Income and Expenditure Survey (HIES), which were collected in 1990-91, 1995-96 and 2002, are used to analyze the levels and correlates of consumption-poverty, schooling enrollment, and gender disparity in schooling. Second, unit record data from the 1993 and 2000 rounds of the Demographic and Health Survey (DHS) are used to analyze the levels and correlates of child malnutrition and infant and under-five mortality. Both the HIES and the DHS were conducted by the Department of Census and Statistics, Government of Sri Lanka.

1.5 The methodological approach adopted in this report is roughly as follows. We apply econometric estimation techniques to household data in order to analyze the socioeconomic and policy correlates of the selected MD indicators. These estimates are then used to simulate

the likely trajectory of the MD indicators under alternative scenarios of change between now and 2015.

1.6 By its very nature, any empirical analysis is predicated on assumptions about data quality and measurement, inferences of causality between variables, and potential biases of statistical and econometric estimates. The analysis presented in this report is not immune to these same concerns. It is therefore important to note at the outset that while the results and simulations presented in this report may give an impression of precision, they are not that.¹ They should be treated as indicative of possible broad trends, and could usefully be complemented with other analyses using different methodological approaches. As long as the results are used with this understanding, they can be helpful in ‘rough-order’ planning for MDG attainment.

1.7 Finally, it is essential to note an important limitation of the simulations performed in this report. The simulations are based on statistical analysis of household survey data. By its very nature, such an analysis tends to over-emphasize readily-measurable variables, such as household income or consumption, adult schooling levels, and access to infrastructure, and under-emphasize qualitative variables, such as the quality of institutions, governance, and empowerment. Obviously, this does not imply that the latter variables are irrelevant to the MD indicators; indeed, institutional reform and good governance are critical to the attainment of the MDGs. It is therefore important to view the messages of this report as complementing those from the numerous qualitative (and detailed) studies of health, nutrition, schooling and poverty that have been conducted in the past.

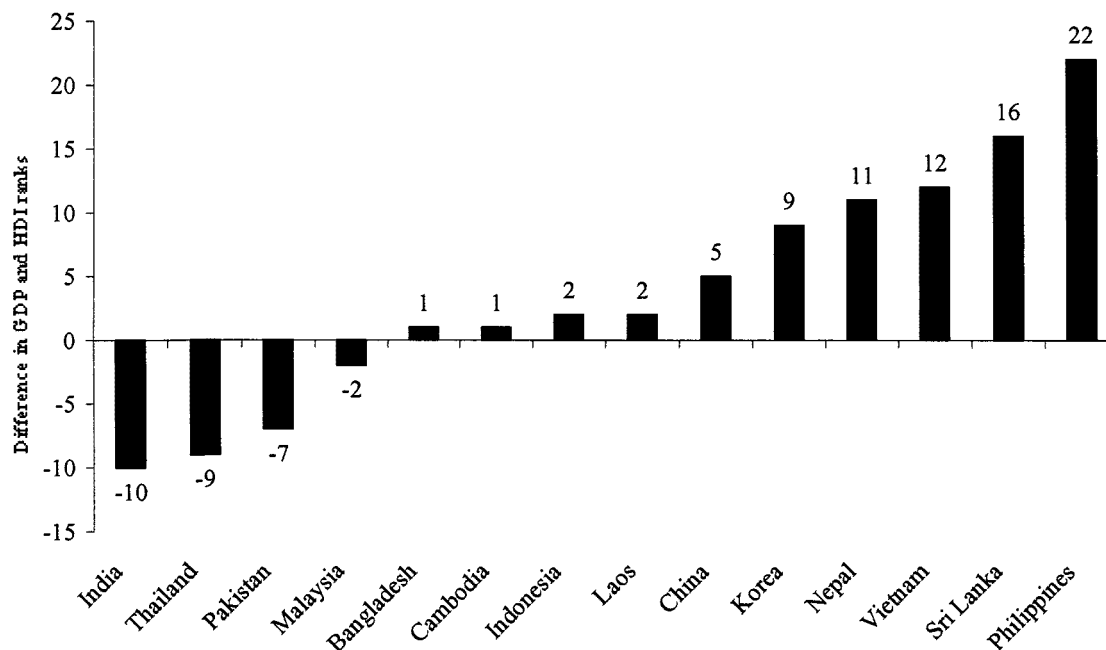
Overview of Sri Lanka’s Development Record

1.8 Sri Lanka has long been extolled in the development economics literature as a model low-income country – one that has achieved extraordinary success in attaining high levels of male and female literacy, school enrollments and health outcomes, despite low levels of per capita income. Only a handful of developing countries, such as China, Vietnam, Cuba and Costa Rica, can list as many achievements as Sri Lanka on the social front. Indeed, data from the UNDP’s global *Human Development Report 2004* suggests that Sri Lanka has one of the highest ranks of all the countries in Asia when its performance on the human development index (which is a composite index of life expectancy, adult literacy, school enrollment, and income per capita) is compared relative to its performance on GDP per capita (Figure 1.1).²

¹ In addition to lack of precision, the estimates presented in this report, like other econometric estimates, may be subject to systematic biases arising from measurement errors in the independent variables and from the omission of important variables and unobserved heterogeneity from the analysis.

² In Figure 1.1, positive figures indicate that a country’s HDI rank is higher than its rank on GDP per capita (in purchasing power parity-adjusted US\$), while a negative number indicates the opposite. Thus, a high rank score on this measure indicates superior performance on human development relative to economic development.

Figure 1.1: GDP per capita (PPP US\$) Rank minus Rank on Human Development Index, Selected Countries in Asia, 2004



Note: A positive figure indicates that a country's HDI rank is higher than the GDP per capita (PPP US\$) rank, while a negative number indicates the opposite.

Source: UNDP, Human Development Report, 2004.

1.9 Sri Lanka's impressive performance on social indicators does not mean, however, that the MDGs are irrelevant for the country. This is so for a number of reasons. First, many of the MDGs are relative goals indexed to benchmark levels in 1990, so the fact that a country enjoyed superior social indicators in 1990 does not influence its prospects for attaining the MDGs by 2015. Second, Sri Lanka's performance on income-poverty reduction – an important MDG – has lagged behind its performance on improving health and education indicators, largely because the country has generally been a slow grower during much of its past (although not its recent past). Third, as this report will make clear, Sri Lanka has experienced a diversity of outcomes even among the various social indicators. For instance, while the country has done very well in reducing infant, child and maternal mortality, it has not done anywhere as well in reducing child malnutrition.

1.10 This means that a large number of Sri Lankan children who survive infancy and childhood end up suffering a lower quality of life, at least in terms of nutritional deprivation. Fourth and finally, there are large inter-provincial and inter-district variations in MDG outcomes in Sri Lanka, so that even if the country as a whole attains a particular MDG, some regions in the country might still be short. For these and other reasons, it is important to

analyze Sri Lanka's past performance on a variety of MD indicators and assess its prospects for attaining the MDGs.

2. CONSUMPTION POVERTY

Introduction

2.1 Eradicating extreme poverty and hunger constitutes the first MDG. Reducing poverty and alleviating deprivation have also been at the heart of Sri Lankan public policy over several decades. The country has made considerable progress on poverty reduction over the long-term, with income levels and living standards improving substantially since independence in 1948. However, more recently, Sri Lanka has encountered difficulties in its battle against poverty. The present chapter examines poverty rates and regional variations in poverty over the period 1990-2002, and examines the prospects of Sri Lanka attaining the MDG of halving the incidence of consumption poverty between 1990 and 2015. For Sri Lanka, this would mean bringing the poverty incidence down to a level of 13% by 2015.

Trends and Patterns

2.2 Poverty in Sri Lanka is high and widespread. About 23% of the population lives below the official national poverty line in seven of the eight provinces in the country (Table 2.1). Household survey data suitable for poverty measurement does not exist for the eighth province – the conflict-affected North-Eastern Province. However, the North-Eastern Province has by far the lowest per capita income of all the provinces, so it is likely that the incidence of poverty in the North-Eastern Province is greater than in most of the other provinces.³ The discussion in the rest of the chapter focuses on poverty levels in the remaining seven provinces for which data on poverty are readily available. But it should be borne in mind that the national poverty level, with the North-Eastern Province included, is certain to be greater, so the poverty numbers presented and discussed in this chapter should be seen as floor or minimum estimates.

Table 2.1: Incidence of Poverty (%) by Sector, 1990/91-2002

Sector	1990/91	1995/96	2002
Sri Lanka	26	29	23
Urban	16	14	8
Rural	29	31	25
Estate	21	38	30

Notes: The Household Income and Expenditure Surveys 1990/91, 1995/96 and 2002, on which the poverty numbers are based, were conducted in seven of the eight provinces in the country. The surveys could not be conducted in the North-Eastern Province, which has been theatre of a separatist armed conflict for over 20 years. As such, the poverty rates above do not include the North-Eastern Province.

Source: Department of Census and Statistics, Government of Sri Lanka, 2004.

³ Of course, as in the other provinces, poverty incidence is likely to vary a great deal within the North-Eastern Province. For example, it is likely that some of the districts in the East, which have historically been poorer than Jaffna, have a higher incidence of poverty.

2.3 The highest level of poverty is in the estate sector, which comprises the plantations in the central highlands and surrounding areas. About 30% of the population in estate areas is poor. This is followed by the rural sector, where about 25% of the population lives below the poverty line.⁴ In the prosperous urban sector, in contrast, poverty levels are considerably lower – just 8%. This pattern of poverty across sectors, where agricultural areas exhibit substantially higher levels of poverty than areas which depend mainly on industry and services, is evident in virtually every country in the world. The wider range of economic activities and more profitable economic opportunities available in cities and towns is manifested in lower poverty rates in urban areas.

2.4 The time trend of poverty shows that the proportion of people living below the poverty line rose from 26% in 1990/91 to 29% in 1995/96 and then declined to 23% in 2002.⁵ The increase in 1995/96 was likely the result of that year being a drought year with rainfall in most parts of the country being well below average. The same trend is seen in both the rural and estate sectors which experienced rising poverty between 1990/91 and 1995/96, followed by decreasing poverty between 1995/96 and 2002. Urban poverty, in contrast, fell continually between 1990/91 and 2002. Other measures of poverty, such as the depth and severity of poverty, show a similar time trend and sector pattern. The depth and severity of poverty increased from 1990/91 to 1995/96 and decreased between 1995/96 and 2002 in the country as a whole. Further, this trend was observed in both the rural and estate sectors. In the urban sector, in contrast, the depth and severity of poverty declined throughout the time period 1990/91-2002.

International Comparisons

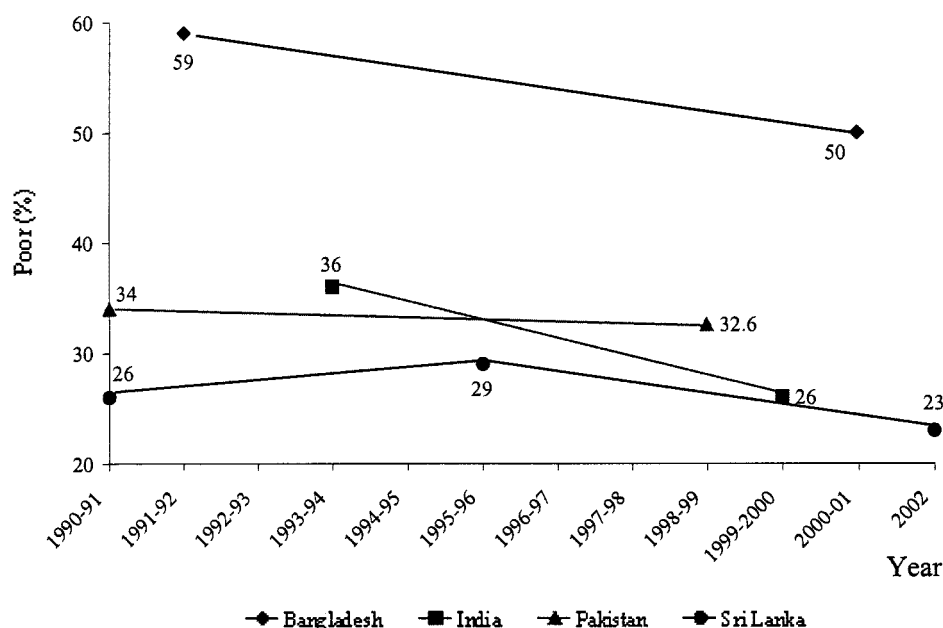
2.5 How does the trend in poverty incidence in Sri Lanka during the 1990s compare with the trends observed in other countries of the region over the same period? Figure 2.1 shows the poverty headcount ratios (based on national poverty lines) in Sri Lanka, Bangladesh, India and Pakistan at different points during the 1990s. While there are serious methodological problems in comparing poverty incidence across countries, a broad conclusion about the pace of poverty reduction can be made – viz., that Sri Lanka's overall performance on poverty reduction during the 1990s has been modest and comparable to that of Pakistan, where the poverty headcount ratio fell only from 34% in 1990-91 to 32.6% in 1998-99, but significantly short of the performance of India, where the poverty headcount ratio fell from 36% in 1993-94 to 26% in 1999-2000 – an annual decline of 1.7 percentage

⁴ It should be noted that the classification of rural and urban areas changed slightly between the 1990-91 and the 1995-96 HIES (but remained unchanged for the 2002 HIES). Hence, comparisons of urban and rural poverty rates between 1990-91 and later years should be treated with caution. It is worth mentioning that the current sectoral classification used by the Sri Lanka Department of Census and Statistics is based on somewhat-dated administrative distinctions and is in the process of being changed. The sector-specific poverty figures cited in this report could change under the new sectoral classification scheme.

⁵ Note that the poverty estimates cited in this report for the earlier years – 1990-91 and 1995-95 – differ from those shown in the World Bank's poverty assessment (World Bank 2002). The reason for this discrepancy is that the Department of Census and Statistics, Government of Sri Lanka, updated the methodology to compute poverty estimates after the publication of the World Bank's poverty assessment.

points,⁶ or Bangladesh, where the poverty headcount ratio fell from 59% in 1991-92 to 50% in 2000 – an annual rate of decline of about one percentage point. In Sri Lanka, the annual decline in poverty was only about 0.25 percentage points between 1990 and 2002.

Figure 2.1: Poverty Incidence (%) in the 1990s (national poverty lines), South Asia



Regional Variations

2.6 Provincial Variations. Inter-province variation in poverty levels is large (Table 2.2). In the two poorest provinces, Uva and Sabaragamuwa, the incidence of poverty is 37% and 33%, respectively. The poverty level in the wealthy Western Province, in contrast, is only 11%. Also, inter-province differences in poverty have grown over time. Three provinces, Uva, Sabaragamuwa and North-Western, show higher poverty levels in 2002 than in 1990/91. Poverty in the prosperous Western Province, in contrast, has decreased sharply from 19% to 11% between 1990/91 and 2002. Three other provinces, Central, North-Central and Southern, also show lower poverty levels in 2002 than in 1990/91. Thus, regional differences in the incidence of poverty have increased over the period 1990/91 to 2002.

⁶ There has been some controversy about the Indian poverty figures. Using an alternative methodology, Deaton and Dreze (2002) report the decline to be from 29% to 22% (Deaton and Dreze 2002), which works out to an annual reduction of about 1.2 percentage points – a little more than that recorded for Bangladesh.

Table 2.2: Incidence of Poverty (%) by Province, 1990/91-2002

Province	1990/91	1995/96	2002
Sri Lanka	26	29	23
Western	19	17	11
Central	30	36	24
Southern	29	32	28
North-Western	26	27	27
North-Central	24	25	21
Uva	32	47	37
Sabaragamuwa	31	42	33

Source: World Bank Estimates, based on Household Income and Expenditure Surveys, Department of Census and Statistics, 1990/91, 1995/96 and 2002

2.7 Regional disparities in poverty become even more pronounced when other poverty measures, such as the depth and severity of poverty, are examined (Tables 2.3). Over the time period 1990/91 to 2002, the *depth* of poverty increased in four provinces, North-Western, Southern, Sabaragamuwa and Uva, and remained constant in the North-Central Province, while it fell in the Western and Central Provinces. During the same time period, the *severity* of poverty increased in the North-Central, North-Western, Southern and Uva Provinces and remained constant in the Sabaragamuwa Province. However, the severity of poverty fell in the Western and Central Provinces. Overall, only the Western and Central provinces show decreases in poverty across all three measures – the incidence, depth, and severity of poverty. Uva and North-Western, in contrast show rising poverty on all three measures, while the other three provinces, North-Central, Southern and Sabaragamuwa, show rising or constant poverty on at least two poverty measures.

Table 2.3: Depth and Severity of Poverty (%) by Province, 1990/91-2002

Province	Depth of Poverty (%)			Severity of Poverty (%)		
	1990/91	1995/96	2002	1990/91	1995/96	2002
Sri Lanka	5.5	6.6	5.0	1.8	2.2	1.6
Western	4.1	3.3	2.2	1.3	1.0	0.7
Central	6.7	8.9	5.1	2.2	3.2	1.6
Southern	6.3	7.4	6.5	2.0	2.5	2.2
North-Western	5.3	5.3	6.0	1.6	1.6	2.0
North-Central	4.3	4.7	4.3	1.2	1.3	1.3
Uva	6.8	12.6	8.9	2.1	4.8	3.2
Sabaragamuwa	7.0	10.3	7.5	2.4	3.6	2.4

Source: World Bank Estimates, based on Household Income and Expenditure Surveys, Department of Census and Statistics, 1990/91, 1995/96 and 2002

2.8 **District Variations.** There are also substantial regional variations in poverty within provinces. Poverty rates at the district level show that the incidence of poverty ranges from 37% in the Moneragala and Badulla Districts to just 6% in the Colombo District (Table 2.4). The largest intra-provincial disparities in poverty are seen in the Western, Central, North-Western and Southern Provinces. In the prosperous Western Province, there is considerable variation among the three districts, with the proportion of population living below the poverty line varying from 20% in the largely agricultural Kalutara District to 11% and 6%, respectively, in the more economically-advanced Gampaha and Colombo Districts. Among the two districts of the North-Western Province, the incidence of poverty ranges from 31% in

the Puttalam District to 25% in the Kurunegala District. In the three districts of the Southern Province, the Hambantota District has a poverty level of 32% while the Galle and Matara districts have poverty levels of 26% and 27%, respectively. In the Central Province, too, there is considerable district level variation in poverty, ranging from 30% in the Matale District to 23% in the Nuwara Eliya District.

2.9 Other poverty measures, such as the depth and severity of poverty, also show large regional differences. The depth of poverty ranges from 10% in the Moneragala District to 1% in the Colombo District. Similarly, the severity of poverty ranges from 4% in the Moneragala District to less than 1% in the Colombo and Gampaha Districts. There are seven districts where the depth of poverty is about 7% or higher, Badulla, Hambantota, Kegalla, Matara, Moneragala, Puttalam and Ratnapura. This suggests that there is substantial consumption inequality even among the poor in many districts, especially in Badulla, Galle, Hambantota, Kandy, Kegalla, Kurunegala, Matale, Matara, Moneragala, Polonnaruwa, Puttalam and Ratnapura.

Table 2.4: Regional Variations in Poverty: Poverty Headcount, Depth and Severity Rates (%) by District, 2002

District	Incidence	Depth	Severity
Sri Lanka	23	5.0	1.6
Colombo	6	1.2	0.4
Gampaha	11	2.2	0.7
Kalutara	20	4.3	1.4
Kandy	25	5.4	1.7
Matale	30	6.1	1.7
Nuwara Eliya	23	4.1	1.2
Galle	26	5.8	1.9
Matara	27	6.5	2.1
Hambantota	32	7.9	2.6
Kurunegala	25	5.4	1.8
Puttalam	31	7.2	2.4
Anuradhapura	20	4.0	1.1
Polonnaruwa	24	5.0	1.6
Badulla	37	8.6	2.9
Moneragala	37	9.6	3.7
Ratnapura	34	7.7	2.5
Kegalle	32	7.2	2.3

Source: Department of Census and Statistics, Government of Sri Lanka 2004 and World Bank Estimates, based on Household Income and Expenditure Surveys, Department of Census and Statistics, 1990/91, 1995/96 and 2002.

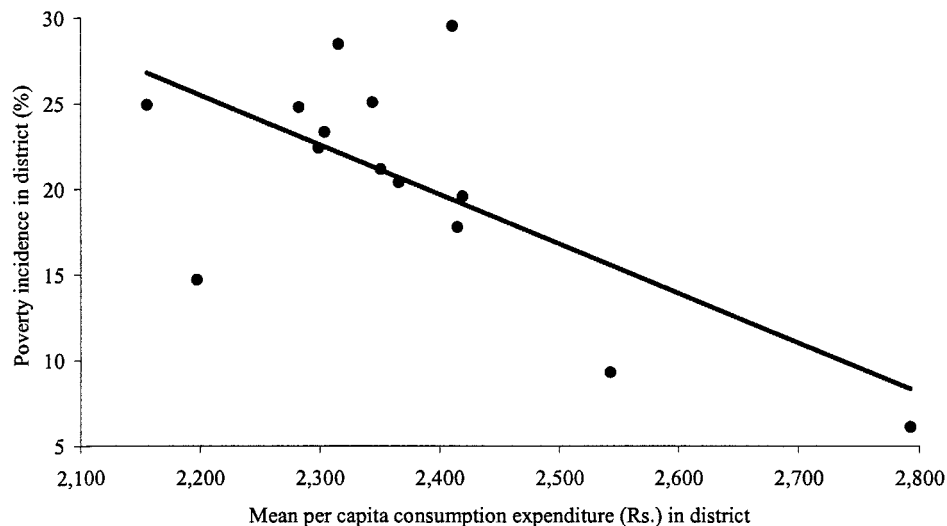
2.10 As would be expected, poverty headcount rates are associated with the per capita incomes of provinces, with higher income regions generally displaying lower poverty levels (Table 2.5). Overall, the regional pattern of poverty shows the lowest poverty rate in the Colombo District, which contains the administrative, commercial and financial capital of the country, Colombo City, the main port of the country in the Colombo harbor, and the industrial hub of the country. Districts and provinces appear to become progressively poorer the further they are located from the hub of economic activities in Colombo.

Table 2.5: Provincial Poverty Rates (%) and GDP per capita by Province, 2002

Province	Poverty Incidence	Poverty Depth	Poverty Severity	GDP per capita (Rs.)
Sri Lanka	23	5	1.6	81,967
Western	11	2.2	0.7	136,183
Central	24	5.1	1.6	63,582
Southern	28	6.5	2.2	64,117
North-Western	27	6.0	2.0	81,656
North-Central	21	4.3	1.3	56,759
Uva	37	8.9	3.2	61,372
Sabaragamuwa	33	7.5	2.4	62,381
North-Eastern	n.a.	n.a.	n.a.	41,020

Source: World Bank Estimates, based on Household Income and Expenditure Surveys, Department of Census and Statistics, 1990/91, 1995/96 and 2002 and Annual Report, Central Bank of Sri Lanka 2002.

2.11 This relationship between mean per capita consumption levels and poverty incidence holds at the district level as well. As Figure 2.2 shows, better-off districts have significantly lower rates of poverty than poorer districts. In turn, this suggests that growth of mean income or consumption in a community is likely to be associated with a significant reduction in poverty as long as inequality of income or consumption does not also rise sharply. (There is a more detailed discussion of this below in Section 2.7.)

Figure 2.2: Poverty Incidence and Mean per capita Consumption Expenditure across Districts, 2002

Who are the Poor?

2.12 Occupation and Industry of Employment. Poverty rates are highest among individuals working in elementary occupations; agriculture, forestry and fisheries workers; and craft and related workers (Table 2.6). These tend to be informal-sector occupations.

Table 2.6: Poverty Rates (%) by Occupation Category of Household Head, 2002

Occupation Category	Poverty Incidence	Poverty Depth	Poverty Severity
Senior Officials and Managers	1	0.2	0.1
Professionals	3	0.3	0.1
Associate Professionals	5	0.9	0.2
Clerks	5	0.8	0.2
Sales and Service Workers	11	2.3	0.7
Agricultural, Forestry and Fisheries Workers	34	6.5	2.0
Craft and Related Workers	25	5.2	1.5
Plant and Machine Operators	16	3.5	1.2
Elementary Occupations	38	9.0	3.1

Source: World Bank Estimates, based on Household Income and Expenditure Surveys, Department of Census and Statistics, 1990/91, 1995/96 and 2002.

2.13 Among industrial categories, poverty is highest among individuals engaged in miscellaneous labor work and agriculture, forestry and fishing (Table 2.7). These occupation and industrial groups encompass a variety of low-skilled workers, such as casual laborers, miners, quarry workers, pavement hawkers, artisans engaged in traditional crafts, farmers with very small (and often unviable) holdings and fishermen engaged in small scale fisheries activities. In addition, these occupation and industrial groups include skilled individuals with intermittent and irregular work, such as masons, plumbers and bricklayers. Many of these industries are unorganized, small-scale industries. The results indicate that the pace of growth of Sri Lanka's economy over the 1990s has been insufficient to reduce poverty among these economic groups.

2.14 Education. As would be expected, the poor in Sri Lanka are drawn predominantly from uneducated and less educated social groups (Table 2.8). The incidence of poverty is as high as 45% among individuals with no schooling, followed by 34% among individuals with primary schooling and 21% among those having junior secondary schooling. The depth and severity of poverty, too, are highest for individuals in these three schooling categories. Among individuals educated to GCE O/L and above, poverty rates are considerably lower. The incidence of poverty among graduates, for instance, is only one percent. Overall, as education levels rise, poverty declines sharply.

Table 2.7: Poverty Rates (%) by Industry of Employment of Household Head, 2002

Industry of Employment	Poverty Incidence	Poverty Depth	Poverty Severity
Agriculture, Forestry and Fishing	40	9.3	3.0
Manufacturing	21	4.2	1.2
Construction	27	5.5	1.7
Wholesale and Retail Trade	16	3.1	0.8
Hotels & Restaurants	20	4.4	1.4
Transport and Communications	16	3.6	1.2
Financial Intermediation and Real Estate	10	1.9	0.5
Public Administration and Defense	5	0.8	0.2
Education	2	0.1	0.0
Health and Social Work	7	1.4	0.5
Miscellaneous Labor Work	45	11.5	4.2
Not Adequately Defined	27	6.2	2.2

Source: World Bank Estimates, based on Household Income and Expenditure Surveys, Department of Census and Statistics, 1990/91, 1995/96 and 2002.

Table 2.8: Poverty Rates (%) by Education Level of Household Head, 2002

Education Category	Poverty Incidence	Poverty Depth	Poverty Severity
No schooling	45	11.6	4.2
Primary (grades 1-5)	34	7.6	2.5
Junior Secondary (grades 6-9)	21	4.4	1.4
GCE O/L (grade 10)	7	1.4	0.4
GCE A/L (grade 12)	2	0.3	0.1
Graduate	1	0.2	0.1

Source: World Bank Estimates, based on Household Income and Expenditure Surveys, Department of Census and Statistics, 1990/91, 1995/96 and 2002.

2.15 Gender. Contrary to what is generally believed, poverty rates among female-headed households are lower than among male-headed households (Table 2.9). Among the reasons for the lower poverty rates among female-headed households are the presence of a high income-earning female heading the household and the generous government benefits available through such schemes as *Samurdhi* to poor female-headed households.

Table 2.9: Poverty Rates (%) by Sex of Household Head, 2002

Sex of Household Head	Poverty Incidence	Poverty Depth	Poverty Severity
Male	23	5.1	1.6
Female	21	4.7	1.5

Source: World Bank Estimates, based on Household Income and Expenditure Surveys, Department of Census and Statistics, 1990/91, 1995/96 and 2002.

Government Anti-Poverty Programs

2.16 Like many other countries, the Government of Sri Lanka has a number of social assistance and poverty alleviation programs. The largest one of these is the Samurdhi program – a program that covers nearly one-half of all households in the country and on which the government spends about one percent of GDP.

2.17 While the Samurdhi program is large, an evaluation of the program by the World Bank (2002) found several weaknesses. First, household survey data suggest severe coverage problems. The program does not reach 36% of households in the poorest consumption quintile – precisely those households who would be most in need. Second, the program has large leakages, with more than 40% of Samurdhi transfers going to the richest 60% of the population. Third, the evaluation found that the program was biased against ethnic minorities, with Tamils and Moors being less likely than Sinhalese to receive benefits from the program, after controlling for income status and other characteristics that might influence program eligibility. Estate populations that include a large number of poor households were virtually left out by the program. The evaluation thus concluded that the Samurdhi program was not an efficient poverty alleviation program and that other safety-net programs such as the Public Assistance program that provides assistance to widows, orphans and the disabled, worked much better but were under-funded (World Bank 2002).

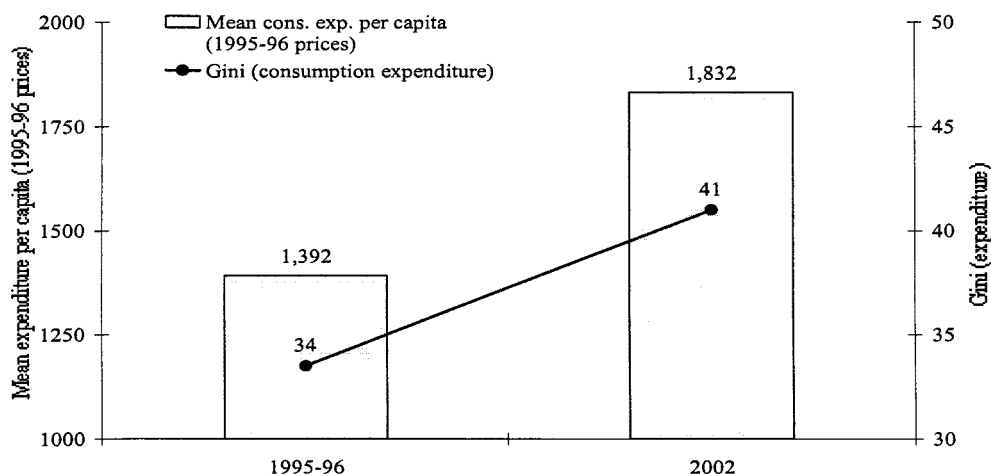
2.18 Another important government poverty alleviation intervention during the 1990s was the Integrated Rural Development Projects (IRDPs). The IRDPs typically operated at the level of a district and adopted a broad and wide-ranging strategy to improve living conditions and economic activity. This strategy typically included: (a) investment in small infrastructure, such as rural roads, bridges and small irrigation facilities; (b) promotion of economic activities through such schemes as micro-credit and micro-enterprise development programs, and agriculture development through provision of technology, fledgling plants and seeds, assistance with marketing, and research and extension services; and (c) human resource development and social mobilization activities, especially the formation of revolving credit groups, provision of training to initiate and operate micro-enterprises and small businesses, and community mobilization. Generally, the impact of the IRDPs on promoting economic activities in rural areas and lifting living standards appears to have been favorable, although clearly their performance varied from project to project, depending on the district (Gunatilleka 1999).

Growth, Inequality and Poverty in Sri Lanka

2.19 There is a large literature on the relationship between growth and poverty which argues that economic growth is one of the important determinants of poverty reduction in a country. This point has been empirically established over time for a cross-section of developing countries as well as for some individual countries. But little is known about the effect of economic growth on poverty reduction in Sri Lanka. In addition, a mediating factor in the relationship between economic growth and poverty reduction – viz., changes in income or consumption inequality – has often been overlooked in the literature. This is likely to be a

very important factor in Sri Lanka because of the sharp increase in consumption inequality observed during the decade of the 1990s.

Figure 2.3: Mean Monthly Consumption Expenditure per capita in Real (1995-96) Prices and Consumption Inequality, 1995-96 to 2002



2.20 The Sri Lankan economy grew at a steady rate of about 5% throughout the 1990s, with some acceleration in growth during the latter part of the decade. Between 1995-96 and 2002, mean consumption expenditure per capita (obtained from the 1995-96 and 2002 rounds of the HIES) grew by about 27% in real terms – an annual rate of increase of 4% (Figure 2.3).⁷ However, consumption inequality, as measured by the Gini coefficient, also grew very sharply – from a level of 34% in 1995-96 to 41% in 2002 – during this period.⁸ This is perhaps the sharpest increase in inequality recorded in Sri Lanka during its recent history. A Gini coefficient of 41% makes the distribution of per capita consumption expenditure more unequal in Sri Lanka than in neighboring India (32% in 1999-2000), Bangladesh (31% in 2000) or Pakistan (31% in 1998-99)!

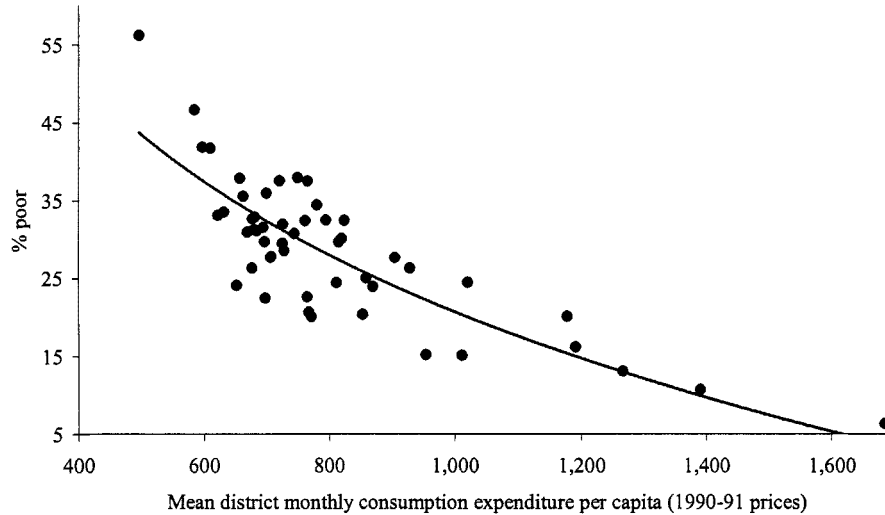
2.21 How are economic growth, changes in consumption inequality, and poverty reduction related to each other in Sri Lanka? There are two approaches to studying this association. The first is to use district-level data for the three time periods for which comparable data are available – 1990-91, 1995-96 and 2002 – to estimate an econometric relationship between changes in poverty on the one hand and changes in consumption inequality and changes in mean consumption (or economic growth) on the other hand. The other approach is to

⁷ We have used the poverty lines for the years 1995-96 and 2002 to deflate mean consumption expenditure per capita. Thus, the expenditure figures for both years are expressed in terms of 1995-96 prices.

⁸ The World Bank (2002) had noted the increase in the Gini coefficient from 1995-96 to 1999-2000, using data from the Sri Lanka Integrated Survey (SLIS) of 1999-2000 (as data from the 2002 HIES were not yet available at the time of the Bank's poverty assessment report). However, the HIES 1995-96 and SLIS 1999-2000 do not show as large an increase in inequality as do the HIES 1995-96 and the HIES 2002. The difference in results might be attributable to the fact that data on consumption expenditure from the HIES 1995-96 and the SLIS 1999-2000 are not strictly comparable.

decompose the reduction in poverty observed in the country as a whole into two components – the change attributable to growth of mean consumption and that attributable to changes in inequality.

Figure 2.4: Relationship between Consumption Poverty (%) and Mean Monthly Consumption Expenditure per capita (in 1990-91 prices) across Districts, Pooled 1990-91, 1995-96 and 2002 Data



2.22 Growth, Changes in Inequality, and Poverty Reduction across Districts. A simple scatter plot of the poverty headcount ratio against mean monthly consumption expenditure per capita (in 1990-91 prices) suggests a strong inverse (and log-linear) association between the two variables (Figure 2.4). However, the association could be spurious, as there are no controls for other variables such as inequality that may also be related to poverty, as well as for unobserved heterogeneity across districts. Unobserved (or observed) heterogeneity across districts, which might arise because of a district's peculiar location, historical circumstances, institutions, culture, proximity to power centers, quality of administration and social capital, is likely correlated with both mean levels of consumption and poverty. Thus, failure to control for district heterogeneity would lead to a spurious observed correlation between poverty incidence and mean consumption.

Figure 2.5: Relationship between % Change in Mean Real Consumption Expenditure per capita and % Change in the Incidence of Consumption Poverty across Districts, 1990-95 and 1995-2002

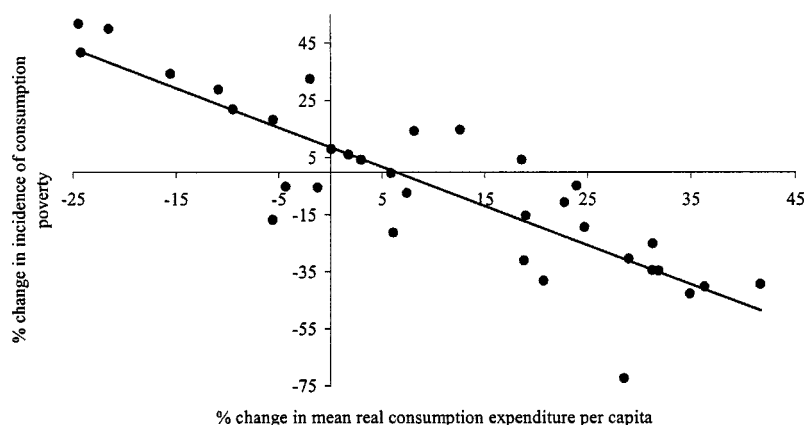
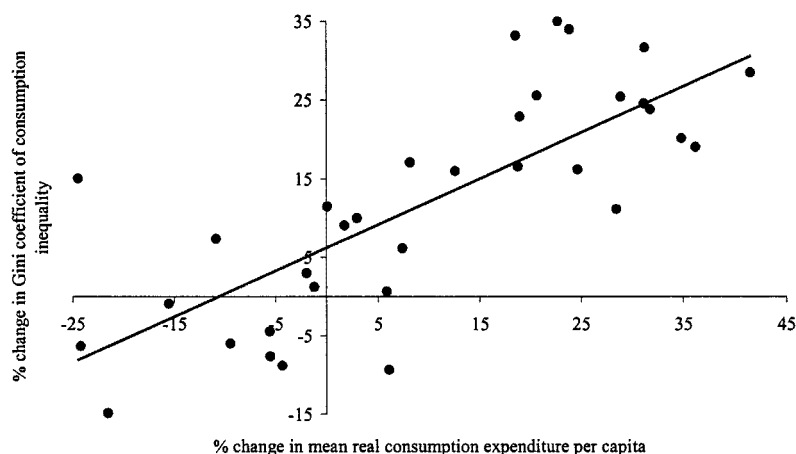


Figure 2.6: Relationship between % Change in Mean Real Consumption Expenditure per capita and % Change in the Gini Coefficient of Consumption Inequality across Districts, 1990-95 and 1995-2002



2.23 One way around these problems is to estimate a regression of *changes* (or first differences) in poverty incidence on *changes* in mean consumption and *changes* in inequality. The first-differenced regression effectively controls for all observed and unobserved district-level attributes. Figure 2.5 plots the cross-district relationship between percent changes in poverty incidence and percent changes in mean consumption per capita over the periods 1990-95 and 1995-2002. Again, a strong inverse relationship is observed.

2.24 However, when changes in mean consumption per capita in a district are plotted against changes in consumption inequality (as measured by the Gini coefficient of expenditure), a strong *positive* association is observed (Figure 2.6). What this suggests is that

consumption inequality increased sharply in those districts that experienced rapid consumption growth between 1990-91 and 1995-96 and between 1995-96 and 2002.

2.25 The results of the regression analysis are shown in Annex Table 1. Without controls for inequality and district heterogeneity, the empirical results indicate that a one percent increase in mean consumption per capita is associated with a 1.4% reduction in poverty incidence. With controls for unobserved district heterogeneity, the Gini coefficient in a district, and the years 1995-96 and 2002,⁹ the coefficient on log of mean consumption declines (from -1.4) to -1.9. Thus, the estimated 'growth elasticity' of poverty (i.e., the extent to which economic growth reduces poverty) is reduced significantly with controls for inequality change and for district heterogeneity. The preferred results indicate a nearly two-for-one association between economic growth and poverty reduction.¹⁰ At the same time, a one percent increase in consumption inequality (the Gini coefficient) is associated with a 1.2% increase in poverty incidence. Thus, as would be expected, increased inequality and economic growth have opposing effects on poverty reduction.

2.26 **Decomposition of Poverty Reduction.** The other approach is to decompose changes in the different measures of poverty according to the methodology set out in Datt and Ravallion (1992). Such a decomposition, shown in Table 2.10, suggests that the poverty headcount ratio in Sri Lanka would have fallen by nearly three times (actually, 2.9) as much as it did between 1995-96 and 2002 *if the distribution of consumption had not changed* (Table 2.10). On the other hand, if the distribution of consumption had changed but not the mean level of consumption (i.e., no economic growth), the decomposition exercise indicates that the poverty headcount ratio would have increased by 1.8 times as much as it actually did. In other words, instead of declining by 6 percentage points (29% to 23%), the poverty headcount ratio would have fallen by as many as 17 percentage points (from 29% in 1995-96 to 12% in 2002) if the distribution of consumption had stayed constant. With no growth of mean consumption, the poverty headcount ratio would have increased by almost 4 percentage points (from 29% to 33%). Thus, the sharp increase in consumption inequality witnessed by Sri Lanka between 1995 and 2002 greatly reduced the poverty-reducing impact of growth.

⁹ Since 1995-96 was a drought year, the dichotomous variable for 1995-96 should reflect the effect of the drought on poverty. However, the estimates do not indicate that poverty was significantly higher in that year, after controlling for mean consumption expenditure and inequality.

¹⁰ Using the same methodology, the World Bank (2003) has estimated the growth elasticity of poverty for Bangladesh at -2.1.

Table 2.10: Decomposition of Changes in Poverty Indices into Changes attributable to Economic Growth and those attributable to Changed Distribution of Consumption Expenditure per capita, 1995-96 to 2002

Poverty measure	Total change in poverty	Contribution of:		
		Growth	Distribution	Residual
Headcount	-6.0	-17.3	3.7	7.6
Poverty gap	-1.6	-4.2	1.6	1.0
Poverty gap squared	-0.6	-1.3	0.8	-0.1
<u>Standardized to add up to a -1 percentage point decline in poverty measure:</u>				
Headcount	-1.0	-2.9	1.8	0.1
Poverty gap	-1.0	-2.6	2.7	-1.0
Poverty gap squared	-1.0	-2.1	2.7	-1.6

Note: See Datt and Ravallion (1992) for methodology.

Multivariate Analysis of Poverty

2.27 To examine the likelihood of Sri Lanka attaining the poverty MDG, we have estimated a multivariate model of poverty incidence, using unit record data from the HIES 2002.¹¹ The multivariate model has the advantage of controlling for several variables that may be simultaneously associated with poverty. The estimation results are reported in Annex Table 2, while only the broad findings of the empirical analysis are discussed here.

2.28 The empirical results suggest that, after controlling for other variables associated with poverty, households residing in the rural or estate sector are significantly (about 40%) more likely to be poor than households in urban areas. Poverty in Sri Lanka also appears to be associated with ethnicity. While Tamils per se are not significantly more or less likely to be poor relative to the Sinhalese, Tamils living in estates are significantly less likely to be poor. On the other hand, Moors and Malays are much more likely to be poor than the Sinhalese, even after controlling for education and sector of residence. Household size is significantly associated with poverty, with each additional household member being associated with a 1 percentage point increase in the likelihood of being poor. Contrary to the bivariate results presented earlier, female-headed households are significantly more likely to be poor than male-headed households once there is control for the other correlates of poverty. The schooling of the highest-educated adult male and female in a household has strong inverse associations with the probability of being poor, with female schooling having a significantly stronger inverse association than male schooling.

2.29 An indicator of infrastructure in the district – viz., the percentage of households with electricity connection – has a significant inverse association with poverty, with a one percent increase in electricity coverage being associated with a 0.35% decline in poverty.¹²

¹¹ Since the dependent variable in the model is a dichotomous variable (i.e., whether or not a household is poor), the model has been estimated by the maximum-likelihood probit method.

¹² As with any regression, omitted variables can result in biased coefficients on the included variables, if the omitted variables are correlated with the included independent variables. To the extent that other types of infrastructure, such as access to all-weather roads and proximity to markets, would be associated with reduced poverty as well as with expanded electricity coverage, the observed inverse association between electricity

2.30 The variable that has the strongest association with poverty is the log of mean consumption expenditure per capita in a district, which is used as a proxy for average living standards. Surprisingly, the implied ‘growth elasticity’ of poverty is -2.2 – remarkably close to the growth elasticity of poverty of -1.9 estimated with the pooled, cross-district data in Section 2.7.¹³

2.31 In addition to mean district consumption expenditure per capita, we include an explanatory variable in the probit equation reflecting income inequality (proxied by the Gini coefficient of per capita consumption expenditure). The empirical results suggest that, controlling for mean consumption, poverty is associated positively and strongly with consumption inequality. The elasticity of poverty incidence with respect to the Gini coefficient is estimated to be 0.5, implying that a one percent increase in the Gini coefficient of consumption inequality would be associated with a one-half percent increase in poverty. These results suggest that worsening consumption (or income) inequality can substantially offset – even reverse – the beneficial effect of economic growth on poverty reduction.

Simulations to 2015

2.32 Based on the multivariate probit model estimated above, we have undertaken simulations of the poverty headcount ratio in Sri Lanka to 2015 under certain assumptions. The nature and magnitude of the interventions are shown in Table 2.11. The scope and magnitude of the assumed interventions are only meant to illustrate the likely reduction in poverty under one possible scenario. It is obviously not possible to predict whether the assumed interventions will indeed take place, and, even if they do, whether they will proceed as the pace assumed in Table 2.11.

Table 2.11: Assumptions about Various Interventions to Reduce Consumption Poverty, 2002 to 2015

Intervention	Starting value in 2002	Assumed change per year	Ending value in 2015
Adult male schooling (years)	9.0	0.23	12
Adult female schooling (years)	9.0	0.23	12
Mean of district monthly consumption expenditure per capita (Rs.)	3,150	3%	4,626
Gini index of consumption inequality	41	0	41
Electricity coverage (%)	68	2.5% points	100

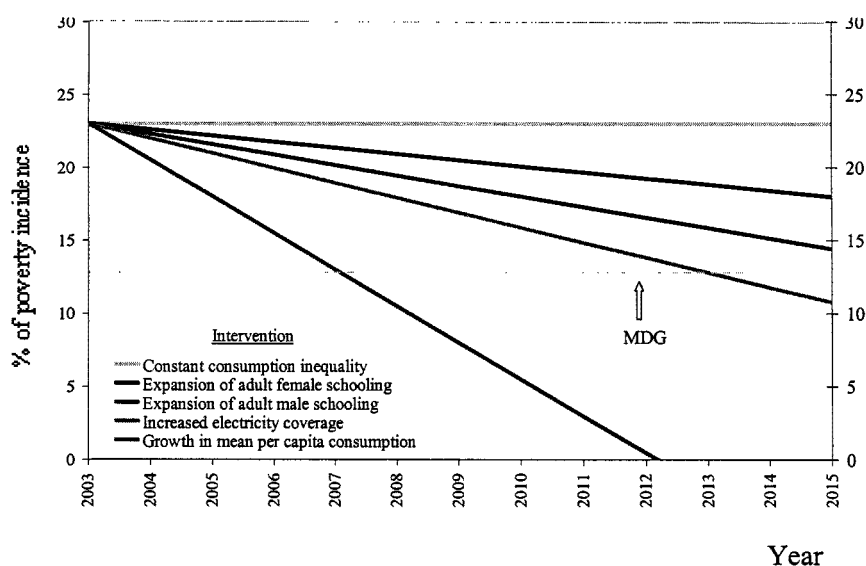
2.33 In particular, we assume that mean consumption expenditure per capita will grow annually (and in real terms) at 3% to 2015 – slightly less than the 4% rate at which it has grown during the period 1995-2002. In addition, we assume that consumption inequality will

coverage and poverty may be overestimated. District-level data on other infrastructure variables are not readily available for 2002.

¹³ Using similar methodology, the World Bank (2004b) has estimated the growth elasticity of household poverty for Pakistan at -1.8.

stay constant at the level of 2002. As noted earlier, the Gini coefficient of per capita consumption expenditure increased very sharply from 34 to 41 over the period 1995-96 to 2002. Sri Lanka already has a more unequal distribution of consumption expenditure than the other countries of South Asia, and further increases in consumption inequality will probably not be politically sustainable. As noted earlier, none of these assumptions are sacrosanct; they are only meant to be illustrative. The projections could be undertaken for any combination of changes in the policy and environmental variables.

Figure 2.7: Projected Poverty Headcount Ratio to 2015, under various Intervention Scenarios (graph shows cumulative effect of each additional intervention)



2.34 Figure 2.7 shows the projected changes in the incidence of consumption poverty in Sri Lanka when all five policy and environmental variables evolve as shown in Table 2.11. Since consumption inequality is assumed to stay constant, it has no effect on poverty. All the other interventions are associated with reductions in poverty. The expansion of male and female adult schooling and electricity coverage are associated with modest declines (4-5 percentage points each) in poverty incidence. Together, the four variables are associated with a total reduction in poverty from 23% in 2002 to 11% in 2015. However, annual growth of 3% in per capita consumption swamps the combined effect of these four variables. When growth is added in, the incidence of poverty is projected to decline sharply, with Sri Lanka achieving full eradication of poverty by 2012. Thus, under the assumptions we have maintained in this simulation, changes in the five policy and environmental variables together would allow Sri Lanka to attain its poverty MDG as early as 2007.

2.35 What these simulations underscore is that attainment of the poverty MDG certainly appears plausible in Sri Lanka, but only if the country maintains strong economic growth, continued expansion of male and female schooling, sustained improvement in infrastructure

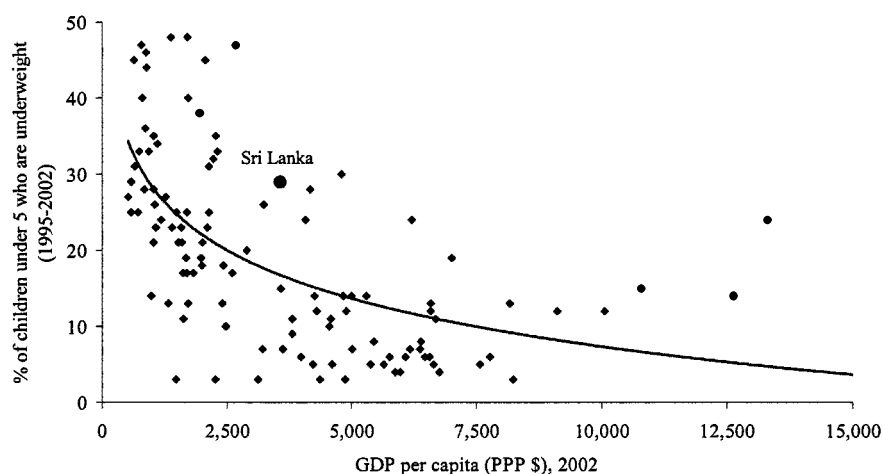
(particularly electricity coverage), and prevents income and consumption inequality from rising, in the years ahead.

3. CHILD MALNUTRITION

Introduction

3.1 Reducing child malnutrition is a key millennium development goal, as child malnutrition produces a wide and diverse range of adverse economic and social consequences. Malnutrition substantially raises the risk of infant and child deaths, and increases vulnerability to a variety of diseases in later life. In addition, malnutrition impairs cognitive ability and decreases school performance, and lowers labor productivity and lifetime earnings. Combating child malnutrition is of central importance to the future economic and social welfare of countries.

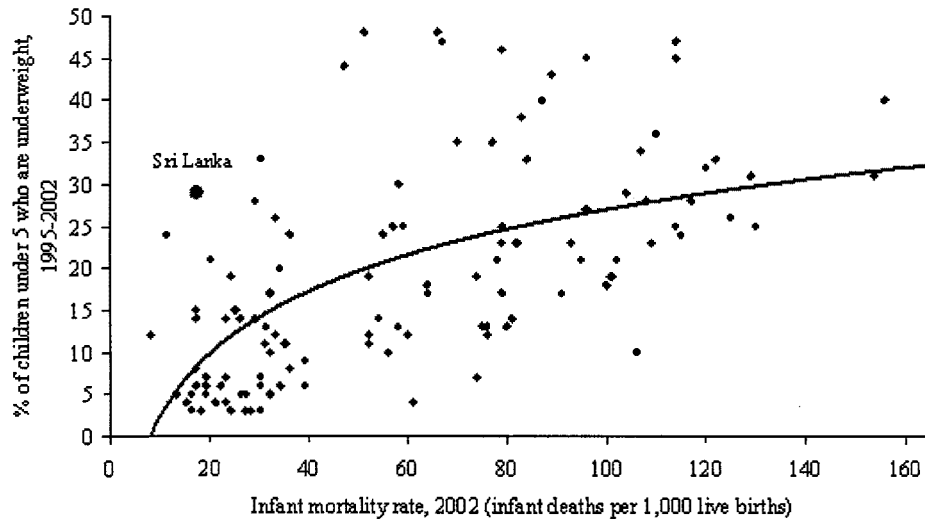
Figure 3.1: Relationship between Child Underweight Rates (1995-2002) and GDP per capita (2002) across a Cross-Section of Low- and Medium-Human Development Countries



3.2 Child malnutrition in Sri Lanka is very high. Nearly one in three children aged 3-59 months is underweight, and more than one in ten children in this age group suffers chronic or acute malnutrition. An international comparison of child malnutrition rates relative to per capita national income, based on a cross-section of 113 low- and medium-human development countries (data on which are obtained from the UNDP *Human Development Report 2002*), shows that Sri Lanka has a significantly higher child underweight rate than would be expected on the basis of its per capita GDP (Figure 3.1). This is in sharp contrast to Sri Lanka's celebrated performance on other human development outcomes such as primary education enrollment, adult literacy, infant mortality and life expectancy, where the country performs well above the levels that would normally be expected at its level of per capita income. Indeed, Figure 3.2 indicates that Sri Lanka has a child underweight rate that may be three times as high as what would be expected of a country with Sri Lanka's level of infant mortality. There is thus a big disconnect between Sri Lanka's performance on child health and its performance on child malnutrition. This incongruity is difficult to understand as most factors that bring about low rates of infant and child mortality (e.g., delivery and

utilization of high-quality health services, high female literacy, good hygiene and health practices, etc.) typically also result in lower rates of child malnutrition.

Figure 3.2: Relationship between Percent of Children under 5 who were Underweight in 1995-2002 and the Infant Mortality Rate in 2002 across a Cross-Section of Low- and Medium-Human Development Countries of Low- and Medium-Human Development Countries



3.3 One possible explanation for the paradox is that infant mortality is largely a function of the utilization of preventive and curative health services, including immunization and maternal and child health services, while child nutrition depends additionally on food and dietary intake during infancy and early childhood. While Sri Lanka enjoys good medical infrastructure, feeding practices, especially for infants and young children, may be less than ideal. There is already some evidence (reviewed below) that a large proportion of newborns are not provided colostrum (the milk produced by the mother's breasts in the first 2-3 days after childbirth), which contains important antibodies and provides the child's first form of immunization. In addition, the duration of exclusive breast-feeding is also relatively short. These behavioral practices (established perhaps by cultural norms) could easily result in a situation where children are moderately under-nourished, yet healthy enough to survive into adulthood because of the availability of other complementary inputs to their health (e.g., good hygiene and access to immunization and prompt curative care).

3.4 However, data from the 1993 and 2000 rounds of the Demographic and Health Survey indicate that infant feeding practices are changing rapidly. Over this period, there was a sharp increase in the percentage of children exclusively breast-fed in their first three months of life, and a very significant increase in the mean duration of exclusive breast-feeding (see Section 3.6 below). In addition, a much larger proportion of children under 5 received colostrum in 2000 as compared to 1993. These data suggest that the incongruence between infant mortality and child malnutrition rates is likely to narrow over time as feeding practices and nutrition knowledge of mothers improve.

Child Malnutrition Patterns and Trends

3.5 Levels. The DHS data indicate that about 29% of children 3-59 months are moderately or severely underweight (Table 3.1).^{14,15,16} A smaller, but still unacceptably high proportion (14%) of children in this age group suffer from stunting and wasting. These findings imply that children suffer from short-term acute food deficits, reflected in low weight for age, as well as longer-term chronic under-nutrition, manifested in high rates of stunting and wasting.

Table 3.1: Malnutrition Rates (%) of Children Aged 3-59 months, 2000

Indicator	Underweight (weight for age)	Stunting (height for age)	Wasting (weight for height)
Moderate or severe	29	14	14
Severe	5	3	1

Note: The malnutrition rates reported in Table 3.1 cover seven of the eight provinces, excluding the conflict affected North-Eastern Province, where the Demographic and Health Survey could not be conducted in 2000.

Sources: Department of Census and Statistics, Demographic and Health Survey, 2000 and Gunewardena, 2003.

3.6 Trends. The level of child malnutrition has been declining over time. The prevalence of underweight children fell from 38% in 1993 to 29% in 2000. The proportion of stunted children declined even more – from 25% to 14%.¹⁷ Thus, the underweight and stunting rates have declined at annual rates of 1.3 and 1.6 percentage points, respectively, over the period 1993-2000 – impressive rates of decline.

International Comparisons

3.7 How does Sri Lanka's performance on reduction of child malnutrition compare to that of its neighbors in South Asia? Figure 3.3 shows child underweight rates during the 1990s in four countries of the region. The only country that performed better than Sri Lanka in terms of reduction in child malnutrition was Bangladesh, where the underweight rate fell by an average of 2.1 percentage points annually. In India, the decline was more modest – 1 percentage point each year – while Pakistan actually saw its child underweight rate increase by 0.6 percentage points annually during the 1990s. However, it should be observed that the decreases in Bangladesh occurred from a much higher underweight rate (68% versus 38% in

¹⁴ As in the literature, a child is considered underweight when his or her weight-for-age is more than two standard deviations below the NCHS/WHO reference weight. A child is stunted when his or her height-for-age is more than two standard deviations below the NCHS/WHO reference. Severe underweight and stunting occur when the relevant nutrition indicator is more than three standard deviations below the NCHS/WHO reference.

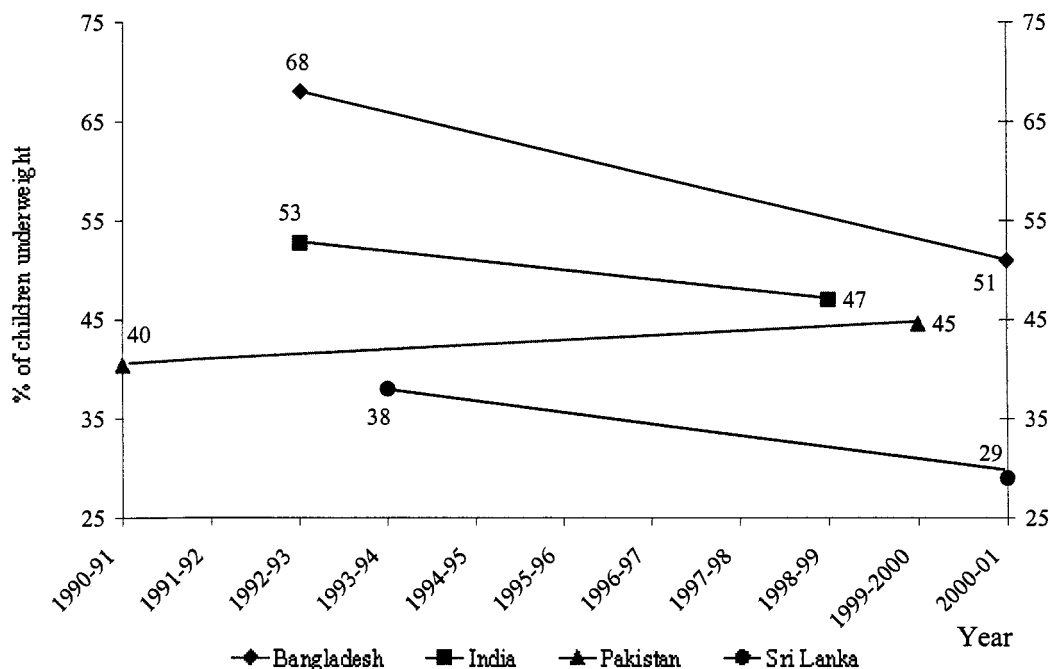
¹⁵ Another important form of malnutrition that is not pursued in this report is inadequate consumption of micronutrients, such as Vitamin A, iron and iodine.

¹⁶ Throughout this report, data on child malnutrition rates are reported only for children aged 3 months or older. As seen below in Table 3.3, child malnutrition in Sri Lanka, as in most other countries, only sets in after the age of 6 months, when children are weaned from exclusive breast-feeding.

¹⁷ The prevalence of wasting, however, declined only marginally over the same time period, from 16 percent in 1993 to 14 percent in 2000.

Sri Lanka). As the underweight rate declines, it is progressively more difficult to achieve further reductions in child malnutrition.

Figure 3.3: Child Underweight Rates (%) during the 1990s, South Asia



3.8 It is worth noting that even though moderate child malnutrition is pervasive in Sri Lanka, the rates of severe malnutrition are very low. For instance, Table 3.1 indicates that severe underweight and stunting rates are only in the range of 3-5% – approximately a fifth of the corresponding moderate rates. In contrast, the rate of severe stunting in India is as high as one-half of the moderate stunting rate, and the severe underweight rate is about 40% of the moderate underweight rate. In Bangladesh as well, the severe stunting rate is approximately 40% of the moderate stunting rate and the severe underweight rate is about 30% of the moderate underweight rate. This implies that the weight and height gains required to lift the vast majority of underweight and stunted Sri Lankans out of under-nutrition are comparatively smaller, which should make the task of eradicating child malnutrition relatively less difficult.

Regional Disparities

3.9 Child malnutrition is highest in the estate sector with over 43% of children underweight, followed by the rural sector, where about 27% of children are underweight, and the urban sector, where around 20% of children are underweight. A similar pattern can be observed for stunting, with considerably higher rates in estate areas, followed by the rural and urban sectors. While the incidence of underweight and stunting has declined

substantially over time in all areas, the decrease has been greatest in the urban sector, followed by the rural and estate sectors.

3.10 The highest child malnutrition rates are in the Uva and Central provinces (Table 3.2). The next highest malnutrition rates are in the North-Western, North-Central and Sabaragamuwa Provinces. In terms of economic zones, these high malnutrition provinces consist of estate areas, rainfed dry zone and irrigated dry zone areas, and the coastal lowlands. They tend to be the poorer districts, with fewer economic opportunities. The Western province, with its more advanced economy based on industries and services, exhibits the lowest level of child malnutrition. It should be noted, however, that, during the period 1993-2000, child malnutrition declined in all the provinces, with the sharpest declines in the North-Central, Sabaragamuwa and Southern Provinces. The North-Western Province, in contrast, recorded only a slight decrease.

Table 3.2: Province Level Variations in Child Malnutrition (% of children 3-59 months who are moderately or severely underweight), 1993-2000

Province	1993			2000		
	All children	Boys	Girls	All children	Boys	Girls
Western	28	24	32	21	19	23
Central	42	40	45	37	37	38
Southern	39	37	42	28	24	33
North-Eastern	na	na	na	na	na	na
North-Western	35	33	38	32	31	33
North-Central	48	44	53	31	28	33
Uva	47	47	48	39	40	38
Sabaragamuwa	42	44	40	31	39	22
Sri Lanka	38	35	40	29	29	30

Source: World Bank estimates based on the Department of Census and Statistics, Demographic and Health Surveys, 1993 and 2000.

Demographic Patterns

3.11 **Age Patterns.** Malnutrition for a large proportion (about a fifth) of children begins after the sixth month of life (Table 3.3). Reasons for this may be low-birth weights, sustained and nurtured by inadequate breast-feeding and complementary feeding practices. But the risk of malnutrition increases sharply in the second year of life (beginning at age 12 months), when most children stop breast-feeding and begin relying almost exclusively on solid foods. The insufficiency and inadequacy of weaning diets in Sri Lanka increases the risk of malnutrition among infants.

Table 3.3: Child Malnutrition Rates by Age and Sex, 2000

Age in Months	Moderate or severe malnutrition				Severe malnutrition			
	Weight for age		Height for age		Weight for age		Height for age	
	Males	Females	Males	Females	Males	Females	Males	Females
3-5	0.90	0.00	6.12	1.83	0.90	0.00	3.23	1.83
6-11	23.50	14.54	6.17	5.02	1.71	4.30	1.64	1.76
12-23	30.57	26.87	11.74	21.53	5.04	4.27	2.89	3.76
24-35	31.95	36.26	10.54	14.47	4.5	7.09	1.74	4.41
36-47	26.69	35.23	12.02	14.76	1.72	7.59	1.03	2.84
48-59	38.20	37.47	18.95	19.28	3.99	6.93	4.43	3.49
All	29.04	29.81	11.90	15.34	3.37	5.80	2.41	3.35

Source: World Bank Estimates from the Demographic and Health Survey 2000

3.12 Gender Disparities. Child underweight rates are fairly similar across boys and girls (Table 3.3). However, this was not the case in 1993, when the underweight rate among girls was greater than that among boys. Between 1993 and 2000, there was a steep fall in underweight rates among both boys and girls, with the sharper decline occurring among girls, especially in the North-Central, Sabaragwamua, Southern, Western and Uva provinces. As a consequence, gender parity in underweight rates was established by 2000 in the country as a whole, although girls continue to face higher underweight rates than boys in the Western, Southern and North-Central provinces. Sabaragamuwa is an unusual province in that the incidence of malnutrition is significantly greater among boys than among girls (39% versus 22%).

3.13 However, severe malnutrition shows significant gender differences, with girls having a 40% and 70% greater likelihood of being severely stunted and underweight, respectively, than boys (Table 3.3). Of course, rates of severe malnutrition are significantly lower than that of moderate malnutrition among both boys and girls.

3.14 Birth Order and Gender Disparities. There is a very clear pattern of child malnutrition rates increasing with the birth order of children (Table 3.4). For sixth- and higher-order children, the risk of malnutrition is nearly two times as large as that for first-born children. In the case of stunting, gender appears to interact with birth order, such that higher order girls have a significantly greater likelihood of being stunted than higher order boys.

Table 3.4: Child Malnutrition Rates by Birth Order and Sex, 2000

Child's birth order	Moderate or severe malnutrition				Severe malnutrition			
	Weight for age		Height for age		Weight for age		Height for age	
	Males	Females	Males	Females	Males	Females	Males	Females
Firstborn	23.50	25.46	8.55	10.42	3.27	4.96	1.32	2.25
Second	31.97	30.87	11.41	16.03	2.14	5.30	2.10	3.56
3-5	35.21	36.28	18.85	23.53	4.37	8.02	4.12	4.81
6 th and above	48.16	47.79	25.07	33.88	15.88	10.00	15.88	11.77
All	29.04	29.81	11.90	15.34	3.37	5.80	2.41	3.35

Source: Calculations from DHS 2000 data

Proximate Causes and Correlates of Child Malnutrition

3.15 Mother's Age at Birth. The literature on child malnutrition identifies the age of a mother as a significant risk factor in her children's nutritional status. Delivery complications resulting in low birth weight are more likely among babies born to women in their teens or their late 30s and 40s. The evidence for Sri Lanka shows a clear U-shaped association between maternal age and child malnutrition (Table 3.5). Malnutrition is lowest among children born to mothers in their mid-late twenties. Mothers in their teens and their 30s, especially the late 30s, are significantly more likely to have children suffering from malnutrition.

Table 3.5: Rates of Child Malnutrition among Children Aged 0-59 months, by Mother's Age and Education, 2000

Maternal characteristics		Moderate or severe malnutrition		Severe malnutrition	
		Underweight	Stunting	Underweight	Stunting
Age of mother at child's birth	14-18 years	35.56	9.96	3.82	1.40
	19-23 years	31.38	12.96	5.03	2.02
	24-29 years	23.26	10.95	3.75	2.32
	30-34 years	29.96	14.98	4.39	3.58
	35-50 years	32.72	13.55	4.84	2.82
Mother's years of schooling	None	48.37	39.90	15.32	15.71
	1-5 years	41.07	22.99	5.98	3.79
	6-10 years	32.49	14.23	4.73	2.72
	O/Level	25.04	10.65	3.75	1.99
	A/Level	10.17	6.68	1.34	2.21
	Degree and above	17.26	0.30	3.39	0.0

Source: Calculations from DHS 2000 data

3.16 Maternal schooling. Table 3.5 also shows a strong association between mother's schooling and child underweight rates. The underweight rate among children whose mothers have no formal schooling is as high as 48%, while the corresponding rate among children whose mothers have completed their A-levels is merely 10%. The differences in severe malnutrition rates are even more striking, with unschooled mothers facing severe underweight rates among their children that are more than 10 times as large as those observed among children whose mothers have completed A-levels. The favorable association between maternal schooling and child malnutrition can be attributed to such factors as superior knowledge and practices concerning childcare, feeding practices, environmental health, and household hygiene. Mother's schooling can also proxy for higher socio-economic well-being of households over and above the effect of per capita consumption expenditure. Overall, the findings confirm results documented in the development literature across a large number of countries that investment in female education is one of the best long-term, inter-generational interventions to combat child malnutrition.

3.17 Infant Feeding Practices. Infant feeding practices are an important determinant of child nutrition. The health and nutrition benefits to the child of exclusive breast-feeding

during the first four months of a child's life and continued breast-feeding thereafter are well-known. In addition, it is important that the child receives *colostrum* (the milk provided by the mother's breasts in the first 2-3 days) which contains important antibodies and provides the child's first form of immunization. This information is communicated to mothers in Sri Lanka verbally by public health workers (midwives) as well as in the literature distributed to mothers through the public health system.

3.18 Data from the Demographic and Health Surveys of 1993 and 2000 indicate a sharp increase in the percentage of children exclusively breast-fed in their first three months of life, and an increase in the mean duration of exclusive breast-feeding from 1.2 months to almost 4 months (Table 3.6). Over three-quarters of all children under 5 received *colostrum* in 2000, compared with only 55 percent in 1993.

Table 3.6: Patterns of Breast-feeding, 1993 and 2000

Indicator		1993	2000
Percent of children ever breast-fed*		98.0	98.0
Percent of children received colostrum*		54.9	76.8
Percent of children exclusively breast-fed**	0-1 months	34.5	83.9
	2-3 months	17.4	65.0
	0-4 months		57.6
Mean duration of exclusive breast-feeding***		1.2	3.7
Notes: *All children below 5 years of age. ** Youngest living child below 3 yrs of age.			
*** Children below 3 yrs of age			
Source: DCS (2002)			

3.19 Table 3.7 indicates a higher incidence of malnutrition among children who did not receive *colostrum* than among those who did. Children who were exclusively breast-fed for four months or more also had a lower incidence of malnutrition than those to whom supplementary feeding was introduced before the completion of four months.

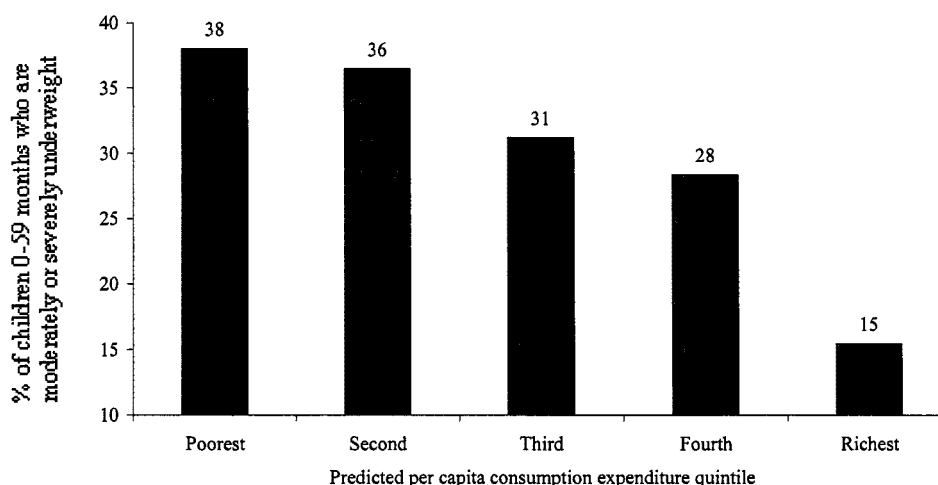
Table 3.7: Rates of Child Malnutrition (%) among Children Aged 0-59 months by Infant Feeding Practices, 2000

Breast-feeding practice		Moderate or severe malnutrition		Severe malnutrition	
		Underweight	Stunting	Underweight	Stunting
<i>Colostrum</i> was:	given to the baby	27.94	12.58	3.95	2.52
	discarded	34.49	16.60	6.46	3.70
Breast-feeding was exclusively practiced:	4 months or more	28.40	12.33	3.52	2.32
	< 4 months	32.37	15.42	6.30	3.34
Source: Calculations from DHS 2000 data					

3.20 **Living Standards.** Recent studies of child malnutrition in developing countries have awarded importance to the analysis of the relationship between malnutrition and income growth (Haddad et. al., 2003) and interventions (Stifel and Alderman 2003). Data from the DHS 2000 show an association between rates of child malnutrition and household living standards, when predicted household consumption expenditure per capita is used as a proxy

for household living standards (Figure 3.4).¹⁸ While the data show an inverse association between underweight rates and consumption quintiles, the gradient in the relationship is not steep until one gets to the richest quintile of children aged 0-59 months. Between the fourth and fifth quintiles, the underweight rate falls from 28% to 15%. There are two important things to note from these results. First, child malnutrition is pervasive in Sri Lanka, with a third of children in the bottom four quintiles being underweight. At the same time, the fact that as many as 15% of children in the top quintile – a group that is likely to have very good economic access to food – are malnourished suggests that cultural and social factors have an important role to play in determining child malnutrition in Sri Lanka.

Figure 3.4: Percent of Children 0-59 months who are Moderately or Severely Underweight, by Predicted per capita Consumption Quintile, 2000



3.21 Clean Drinking Water and Safe Sanitation. Clean drinking water and safe sanitation reduce the risk of diarrheal diseases that diminish nutrient absorption and increase the risk of malnutrition among children. The information on Sri Lanka shows higher levels of malnutrition among children who live in homes with unsafe sanitation such as houses with no toilets or merely bucket latrines, or inferior sanitation facilities such as pit latrines (Table 3.8). Child malnutrition rates are noticeably lower in houses with access to safe forms of sanitation, such as flush or water seal toilets. Similarly, children from households that

¹⁸ While the DHS 2000 data do not include information on household income or consumption expenditure, we have imputed monthly consumption expenditure per capita to sample DHS households. This has been done by making use of the availability of identical variables to those found in the DHS (household demographics, housing and assets, and location) as well as expenditure data in the Sri Lanka Integrated Survey (SLIS) 1999/2000. The latter data set was used to estimate a regression of log consumption expenditure per capita on location (rural/urban and district dummies), ownership of consumer durables (radio, TV, bicycle, refrigerator, motorcycle), type of materials used for the roof and wall of the household's dwelling, household size and demographic composition, and age, schooling, sex and marital status of the household head. The estimated regression coefficients were then used to make out-of-sample predictions of log consumption expenditure per capita for the DHS 2000 sample.

consume drinking water from unsafe sources, such as rivers, tanks, streams or unprotected wells, have higher malnutrition rates than children from households consuming drinking water from safe sources, such as main line taps, and protected wells and tube wells. Boiling water prior to consumption is also positively associated with lower levels of child malnutrition. Households that boil their drinking water experience sharply lower child malnutrition rates than households that consume drinking water that is not boiled.

Table 3.8: Rates of Child Malnutrition among Children Aged 0-59 months, by Drinking Water Source, Type of Toilet and Housing Conditions, 2000

Water, sanitation and housing indicator		Moderate or severe		Severe malnutrition	
		Underweight	Stunting	Underweight	Stunting
Drinking water source	Tap (main line)	19.06	9.38	2.67	1.86
	Protected well or tube well	29.96	12.56	5.28	3.20
	Bowser, unprotected well, river, tank or stream	38.96	23.41	5.23	4.06
Boiled water used for drinking water	For all family members	27.81	15.01	4.45	3.05
	For children under 5 years	25.66	10.74	4.00	2.99
	Not used at all	40.11	19.38	6.39	3.69
Type of toilet	Flush or water seal	25.95	12.34	3.79	2.54
	Pit latrine	42.19	18.03	7.02	2.10
	Bucket or none	44.86	27.79	9.21	9.33
Type of roof material	Tile, asbestos or tin	28.37	14.13	4.52	3.04
	Cadjan/palmyrah/straw, waste materials or other	45.48	20.45	7.80	3.84
Type of wall material	Brick/cement/stone/cabook	24.70	11.26	3.37	2.60
	Mud or wood	44.90	24.41	9.10	4.72
	Cadjan/palmyrah	51.59	18.76	7.48	3.32

Source: Calculations from DHS 2000 data

Major Policies and Programs to Decrease Child Malnutrition

3.22 The overarching policy framework of the Government of Sri Lanka to reduce child malnutrition contains four broad strategies.

3.23 **Direct food consumption based measures to ensure adequate nutrition intake among households and individuals.** The main intervention in this strategy has been the provision of food assistance to populations affected by the secessionist conflict in the North-Eastern Province, including displaced persons. The value of food assistance under this program ranges between Rs. 336 for families consisting of one individual to Rs. 1260 for families of five persons. This food assistance program is a hunger and malnutrition mitigation measure in the conflict-affected areas. A second major intervention is the *Thripasha* (triple nutrient) program. This is a pre-cooked cereal based food designed to supplement energy, protein and micronutrients among nutritionally vulnerable women and children. *Thripasha* is given to pregnant and lactating women during the first 6 months and infants between 6-11 months of age. In addition, it is given to children between 12-60 months who are at risk, as shown by growth faltering or other measures and as certified by the Medical Officer of Health. A third important intervention is a school-feeding program under which poor children are given a hot meal in school. The twin objectives of the school

meal are to attract poor children to attend school and to provide these children with adequate nutrition to stay in school and do well in school work.

3.24 Poverty reduction programs. The chief government poverty reduction initiative is the *Samurdhi* program. Under *Samurdhi*, the government provides an income supplement of between 500-1,000 rupees depending on family size and household poverty level, which can be used to purchase food items, such as grains, cereals and legumes. In addition, the *Samurdhi* program has officers trained in maternal and child nutrition and infant care who work with target groups such as pregnant women, lactating mothers and under-nourished children to help improve nutrition levels. In addition to the government *Samurdhi* program, there are numerous NGOs that engage in poverty reduction activities, including nutrition awareness programs. Donors such as UNICEF and WFP work through such NGOs.

3.25 Measures to address specific nutrition problems. The government has initiated a series of measures to combat specific nutrition problems. First, there are campaigns to promote breast-feeding of infants, including awareness creation of the nutritional benefits of breast-feeding, distribution of feeding bottles and teats to maternity hospitals and health care providers, and the provision of free and low cost supplies of infant formulae to hospitals and health-care facilities. Second, there is a salt iodization program to combat iodine deficiency disorders, including the prevalence of goiter and thyroid deficiencies. Third, there is a program to fortify wheat flour with iron to combat problems of iron deficiency anemia. A variant of this program is pilot testing the mixing of iron and vitamin supplements in wheat flour.

3.26 Health interventions. An integrated package of maternal and child health services to address child malnutrition and promote child growth has been designed by the government. The package commences at conception and proceeds through fetal life, infancy and childhood. The interventions include family planning to space and limit children, antenatal care to ensure fetal growth and well-being, breast feeding, promoting appropriate weaning, growth monitoring, immunization programs, prevention of infections such as water-borne diseases, worm infestation and respiratory illnesses, use of oral rehydration solutions for children suffering from diarrhea, feeding during infections and food supplementation.

3.27 These policies and programs to reduce child malnutrition are complemented by health and nutrition education. The Ministry of Health provides a range of health and nutrition education services. In terms of maternal education, activities exist to promote adequate food consumption and health care of pregnant and lactating mothers. Exclusive breast feeding is encouraged and growth monitoring promoted for the first 4-6 months. Nutrition education is carried out by health workers at the central, provincial and divisional levels. The school curriculum also contains material on nutrition, including hygienic food preparation, nutritious feeding habits, safe sanitary habits and consumption of clean drinking water. In addition, universities offer courses in nutrition at undergraduate and postgraduate degree levels.

3.28 Yet there is fragmentation of nutrition policies and programs across different sectors and ministries, without a leadership role played by any institution. This is preventing the government from developing a coherent approach to reducing child malnutrition.

3.29 In addition, few of these direct and indirect public nutritional interventions have been subjected to any rigorous evaluation. As such, little is known about their effectiveness and the extent to which they have contributed to a decline in child malnutrition.

Multivariate Analysis

3.30 To examine the likelihood of Sri Lanka attaining the child underweight MD goal, we have estimated a multivariate model of child underweight rates, using unit record data from the DHS 2000.¹⁹ The multivariate model has the advantage of controlling for several variables that may be simultaneously associated with child malnutrition. The estimation results are reported in Annex Table 3, while only the broad findings of the empirical analysis are discussed here.

3.31 The multivariate model confirms many of the bivariate relationships discussed earlier. After controlling for other variables, the risk of child malnutrition increases with age, albeit at a diminishing rate. While girls have a significantly lower likelihood than boys of being underweight, the nutritional advantage of girls diminishes with age and is completely eliminated by age 21 months. The results suggest that beyond that age, girls have a higher likelihood of being underweight relative to boys. Finally, the results also confirm that, even after controlling for age, higher birth order children are significantly more likely to be underweight than lower birth order children.

3.32 Maternal schooling has an inverse association with underweight rates, but only for schooling levels beyond the O-level (typically grade 10). Children whose mothers have A-level (12 years) or more schooling are more than 50% less likely to be underweight than children whose mothers have less than 12 years of schooling. Surprisingly, however, such a relationship is not observed with respect to father's schooling. Any secondary schooling of the father is associated with lower levels of child malnutrition. These results are counter-intuitive, since, in much of the literature, it is maternal, not paternal, schooling that is observed to have the strongest associations with the risk of child malnutrition.

3.33 The log of predicted monthly consumption expenditure per capita (proxying for the household's living standard) also has a strong inverse association with the risk of a child being underweight, with a one percent increase in predicted consumption expenditure per capita being associated with a 0.16% decline in the risk of being underweight.

3.34 Infrastructure generally has predictable associations with child malnutrition. Children in households having a flush toilet and piped water are, on average, 24% and 31%, respectively, less likely to be underweight than children in households not having access to a flush toilet or piped water. Access to electricity has an even stronger association, with a one percent increase in electricity coverage in a province being associated with a 1.2% decline in child malnutrition.

¹⁹ Since the dependent variable in the model is a dichotomous variable (i.e., whether or not a child is underweight), the model has been estimated by the maximum-likelihood probit method.

Simulations to 2015

3.35 Based on the multivariate probit model estimated above, we have undertaken simulations of the child underweight rate in Sri Lanka from 2001 to 2015 under certain assumptions. The nature and magnitude of the interventions are detailed in Table 3.9. As noted previously, the scope and magnitude of the assumed interventions are only meant to illustrate the likely reduction in child malnutrition under one possible scenario. It is obviously not possible to predict whether the assumed interventions will indeed take place, and, even if they do, whether they will proceed as the pace assumed in Table 3.9.

Table 3.9: Assumptions about Various Interventions to Reduce the Child Underweight Rate, 2000 to 2015

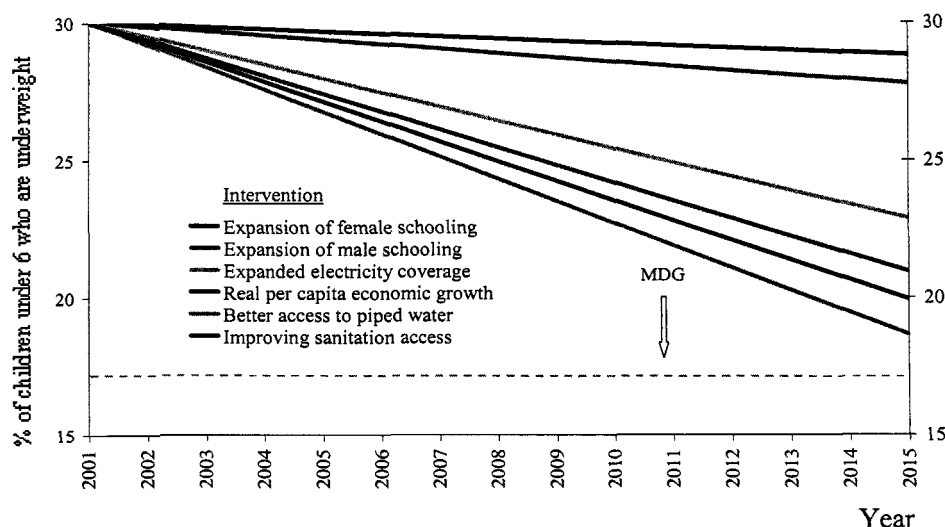
Intervention	Starting value in 2000	Assumed change per year	Ending value in 2015
% of adult females who have completed GCE A/L or equivalent	15.5	0.5	23.0
% of adult males who have completed GCE A/L or equivalent	13.3	0.5	20.8
Predicted monthly consumption expenditure per capita (Rs.)	3,150	3%	4,908
Flush toilet coverage (%)	80	1	95
Piped water access (%)	25	1	40
% of households with electricity connection in province	57	1	72

3.36 As in the previous chapter, we assume that monthly consumption expenditure per capita will grow annually at about 3% to 2015. In addition, we assume that the percent of adult males and females who have completed GCE A/L or equivalent schooling will increase by 0.5 percentage point annually, and that flush toilet, piped water and electricity access will increase by 1 percentage point annually to 2015. As noted earlier, none of these assumptions are sacrosanct; they are only meant to be illustrative. The projections could be undertaken for any combination of changes in the policy or environmental variables.

3.37 Figure 3.5 shows the projected path of the child underweight rate in Sri Lanka to 2015 with all of the six policy and environmental changes shown in Table 3.9 occurring. The largest decline in the child underweight rate (by 5 percentage points) is obtained from expanded electricity coverage. Economic growth resulting in an annual 3% increase in household consumption expenditure per capita is associated with another 2 percentage point reduction in child malnutrition. Each of the other four changes is associated with a percentage point decline. Together, the six interventions are associated with a reduction of about 11 percentage points in the child underweight rate, bringing the child underweight rate down from 30% to 19% – nearly 7 percentage points or 60% above the MDG level of no more than 12% of children being underweight). This suggests that attainment of the child nutrition MDG will be challenging in Sri Lanka, although it should be possible to bring child underweight rates down significantly with a package of interventions that includes economic

growth, expansion of male and female schooling, and improved infrastructure (viz., piped water, sanitation access, and electricity coverage).

Figure 3.5: Projected Percent of Children under 6 who are Underweight to 2015, under Different Intervention Scenarios (graph shows cumulative effect of each additional intervention)



Box III.1. Child malnutrition among children in the North-Eastern Province

Child malnutrition is considerably higher in the conflict affected North-Eastern Province (46 percent) than in the rest of the country (29 percent).^{*} In this province, the prevalence of malnutrition is significantly greater among boys, 50 percent, than among girls, 42 percent. This gender differential is in sharp contrast to the malnutrition pattern in the rest of the country, where malnutrition rates are very similar for boys and girls. The age pattern of malnutrition shows that the proportion of children who are underweight reaches a peak in the age groups 12-35 months, and then tapers off slightly from 36-59 months. This age pattern is similar to the rest of the country. Urban-rural differences in malnutrition are small, varying by just one percentage point. This is different to the pattern in other parts of the country, where malnutrition rates are noticeably higher among rural children than urban children. Maternal education is strongly associated with lower levels of malnutrition. Among mothers with no education the prevalence of child malnutrition is 63 percent. As the education attainment of mothers rises, the prevalence of child malnutrition declines: 54 percent among primary educated mothers, 42 percent among secondary educated mothers, and 36 percent among tertiary educated mothers. This pattern is consistent with evidence from the rest of the country which also shows a favorable association between maternal education and child malnutrition.

At the district level, within the North-Eastern Province, Batticaloa, 53 percent, and Vavuniya, 51 percent, exhibit the worst levels of child malnutrition. These are followed by Trincomalee, 45 percent, Ampara, 44 percent and Jaffna, 43 percent. Mannar, with 38 percent child malnutrition, performs best among the North-Eastern districts.

Note: ^{*} The DHS 2000 conducted in the North-Eastern Province covered six districts, Ampara, Batticaloa, Jaffna, Mannar, Trincomalee and Vavuniya. The survey could not be conducted in two districts, Kilinochchi and Mullativu. Levels of malnutrition in these two districts are likely to be at least as high as in the rest of the North-Eastern Province.

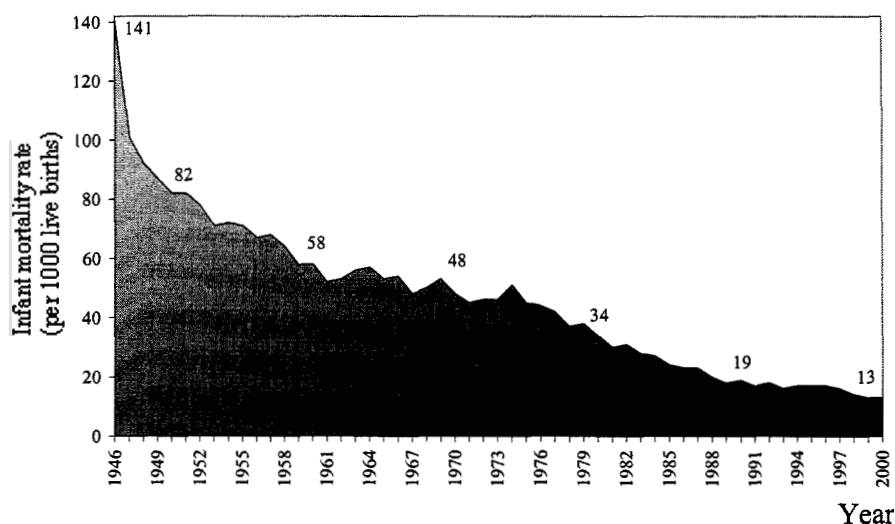
Source: DHS 2000.

4. INFANT AND UNDER-FIVE MORTALITY

Introduction

4.1 Achieving low rates of infant and under-five mortality is of central importance for social well-being and human development. Sri Lanka has been extraordinarily successful in reducing its infant and child mortality rates over the last half-century. Indeed, over the period 1946-2000, Sri Lanka has been one of the most successful developing countries in the world in terms of infant and child mortality reduction. The infant mortality rate fell from 141 infant deaths per 1,000 live births in 1946 to a mere 13 deaths per 1,000 live births by 2000 (Figure 4.1).

Figure 4.1: Infant Mortality Rate (per 1,000 live births), 1946-2000



International Comparisons

4.2 At its current level of 13 infant deaths per 1,000 live births, Sri Lanka's infant mortality rate is unusually low by the standards of most developing countries and even by the standards of countries such as Russia, Ukraine and Argentina that are considerably wealthier than Sri Lanka. An international comparison of infant mortality rates relative to per capita national income, based on a cross-section of 120 low- and medium-human development countries (data on which are obtained from the UNDP *Human Development Report 2004*), shows that Sri Lanka has a significantly lower infant mortality rate than would be expected on the basis of its per capita GDP (Figure 4.2). Indeed, the figure suggests that Sri Lanka has an infant mortality rate that may be a fourth of what would typically be expected of a country at Sri Lanka's level of per capita GDP.

Figure 4.2: Relationship between the Infant Mortality Rate and GDP per capita across a Cross-Section of Low- and Medium-Human Development Countries, 2002

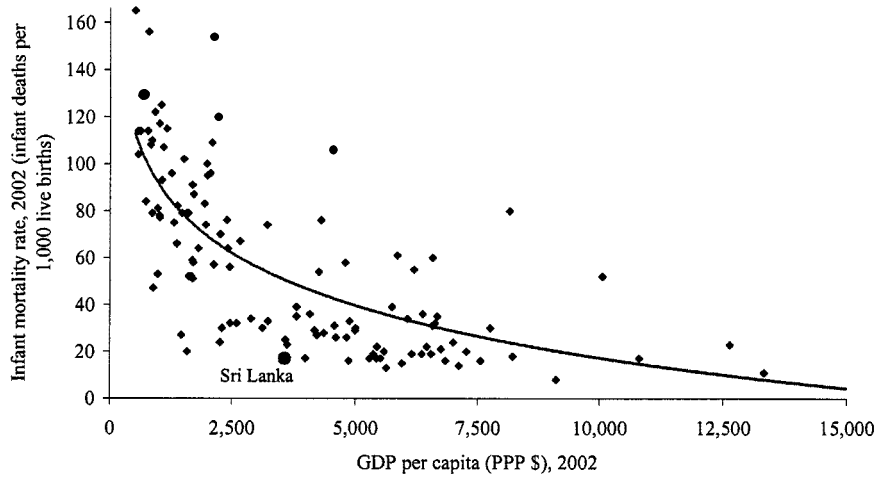
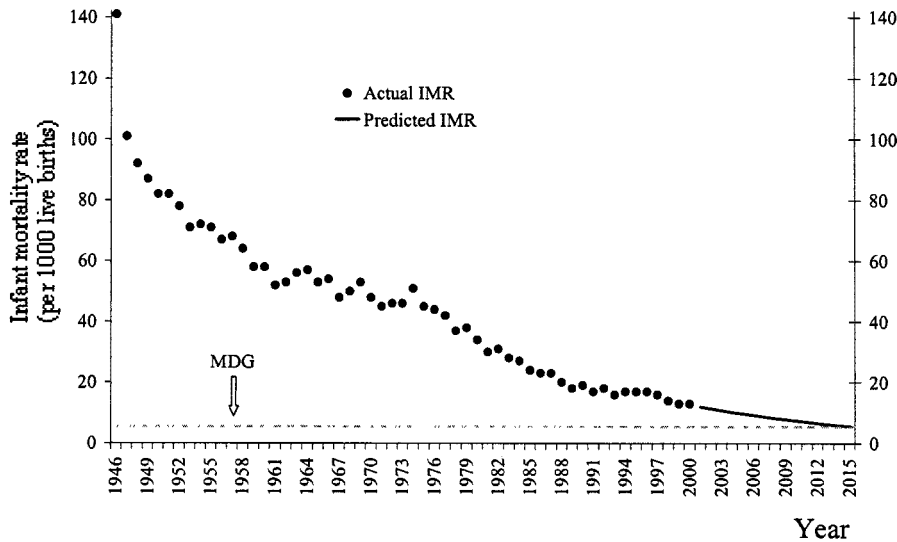


Figure 4.3: Projection of Infant Mortality Rate (per 1,000 live births) to 2015 (based on observed time trends from 1946 to 2000)



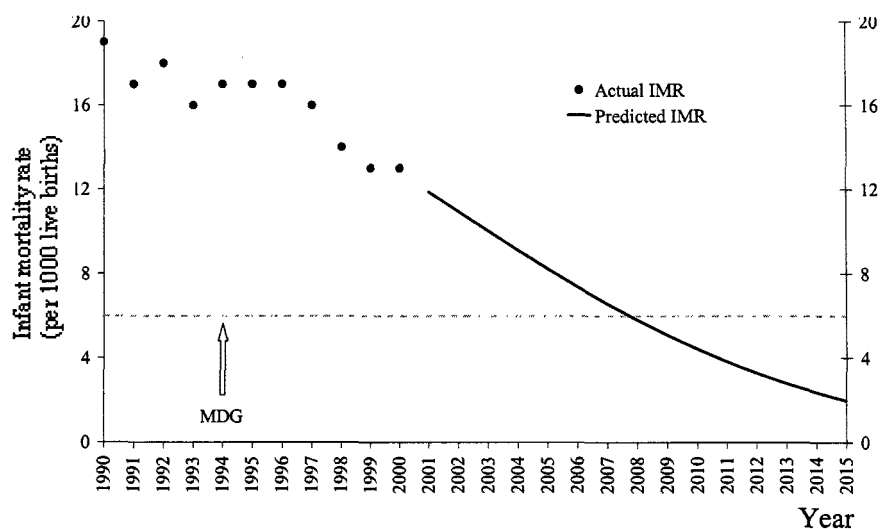
Trends and Projections to 2015

4.3 The infant mortality rate in 1990 in Sri Lanka was 19 deaths per 1,000 live births. Thus the MD goal of reducing infant mortality by two-thirds between 1990 and 2015 would translate to an infant mortality rate of about 6 deaths per 1,000 live births. How likely is Sri Lanka to attain this level of infant mortality rate given its past mortality reduction efforts? If

we extrapolate the country's experience between 1946 and 2000 forward to 2015,²⁰ the infant mortality rate could be expected to continue to decline to a level of just about 6 deaths per 1,000 live births by 2015 (Figure 4.3). This would mean that Sri Lanka would just manage to meet its MD goal by 2015.

4.4 However, if we only consider Sri Lanka's recent experience in mortality reduction (during the 1990s) in projecting future trends in the infant mortality rate, the scenario looks even brighter. Sri Lanka is expected to reach an infant mortality rate of a mere 2 deaths per 1,000 live births under this scenario (Figure 4.4). Thus, no matter which way one looks at it, the prospects of Sri Lanka attaining the infant mortality MDG are bright.

Figure 4.4: Projection of Infant Mortality Rate (per 1,000 live births) to 2015 (based on observed time trends from 1990 to 2000)



4.5 Of course, these projections have to be tempered by the fact that the decline in infant mortality experienced by Sri Lanka during the past 50 years is unprecedented. Declines from high initial levels of infant mortality are driven mainly by reductions in the number of post-neonatal deaths (i.e., deaths occurring between the age of one month and twelve months). These deaths are more easily averted by the typical (and relatively inexpensive) child survival interventions, such as child immunizations and oral rehydration therapy. However, as the overall level of infant mortality comes down, further reductions in overall infant mortality can only be obtained via reductions in neonatal mortality. Averting neonatal deaths typically requires more expensive interventions, such as professionally-attended deliveries, prompt treatment of neonatal infections (such as pneumonia), and availability of emergency obstetric care at lower levels of health-care facilities. Thus, sustained infant mortality reduction becomes increasingly more difficult and expensive. In Sri Lanka, more than three-quarters of infant deaths now occur in the first month of life, so future reductions in infant

²⁰ This projection considers the fact that the rate of reduction in infant mortality has slowed down in Sri Lanka over time, as it has in most countries.

mortality will have to be driven largely by reductions in neonatal mortality, which are considerably more difficult and expensive to attain.

Regional Variations

4.6 Sri Lanka's performance at overall infant mortality reduction should also be tempered by the fact that there exist large regional disparities in infant mortality in the country. In 1996, the infant mortality rate in the province with the highest infant mortality (North-Central) was nearly four times as large as that in the province with the lowest infant mortality (Eastern) (Table 4.1). Four provinces (North-Central, Central, Sabaragamuwa, and Southern) had mortality rates of about 20 or more deaths per 1,000 live births. Likewise, there were large provincial variations in the rate of infant mortality reduction between 1991 and 1996. In the North-Western province, infant mortality rates fell by an average of 7.6% annually, while infant mortality rates in the North-Central province actually increased by 8.5% annually. Five provinces (Southern, Northern, North -Central, Uva and Sabaragamuwa) saw an increase in infant mortality during 1991-96.

Table 4.1: Infant Mortality Rate by Province of Registration (per 1,000 live births), 1991-96

Province	1991	1993	1996
Western	20.7	19.5	17.2
Central	24.9	23.0	23.2
Southern	15.1	15.2	19.7
Northern	8.5	12.3	11.7
Eastern	9.3	7.3	6.9
North-Western	19.2	14.3	12.9
North-Central	16.6	15.4	25.0
Uva	11.9	12.6	15.0
Sabaragamuwa	19.8	15.8	20.7

Source: Registrar General's Dept.

4.7 District-level variations in infant mortality are even larger than provincial variations (Table 4.2). In 1996, infant mortality in the district with the highest infant mortality rate in Sri Lanka (Anuradhapura) was almost 20 times as high as infant mortality in the district with the lowest infant mortality rate (Trincomalee). Seven districts – Colombo, Kandy, Nuwara Eliya, Galle, Matara, Anuradhapura, and Ratnapura – had infant mortality rates that were greater than 20 deaths per 1,000 live births. The district-level data also show very wide variations in the rate of infant mortality reduction between 1991 and 1996, with 13 districts (out of a total of 25) showing an increase in infant mortality.

Table 4.2: Infant Mortality Rate by District of Registration (per 1,000 live births), 1991-96

District	1991	1993	1996
Colombo	27.0	24.7	21.6
Gampaha	9.9	10.9	11.2
Kalutara	16.6	14.8	10.6
Kandy	26.8	25.9	26.7
Matale	11.5	8.3	10.6
Nuwara Eliya	28.9	27.5	23.9
Galle	13.0	17.7	21.8
Matara	23.2	17.8	24.9
Hambantota	6.5	5.0	3.3
Jaffna	10.2	15.3	17.5
Kilinochchi	3.9	8.6	10.8
Mannar	41.7	11	7.2
Vavuniya	4.5	9.7	8.4
Mullaitivu	4.3	5.7	7.8
Batticaloa	12.4	10.2	12.6
Amparai	8.0	5.1	5.4
Trincomalee	5.6	6.6	1.4
Kurunegala	19.2	15.7	14.1
Puttalam	19.4	11.6	10.9
Anuradhapura	21.0	14.3	27.5
Polonnaruwa	6.7	17.7	18.2
Badulla	14.6	15.6	19.2
Moneragala	5.3	5.8	4.8
Ratnapura	22.6	18.6	22.7
Kegalle	14.3	10.8	17.1

Source: Registrar General's Department.

Correlates of District Variations in Infant Mortality

4.8 An interesting question is what explains the large inter-district variations in infant mortality observed in Table 4.2. To some extent, the differences could be explained by variations in living standards across districts. Ratnapura, Nuwara Eliya and Matara are relatively poor districts and have high infant mortality rates. On the other hand, Gampaha and Kalutara are relatively prosperous districts having low infant mortality rates. However, living standards alone cannot explain the entire variation in infant mortality. For instance, Monerangala has one of the lowest infant mortality rates in the country despite being the poorest district, while Colombo has a relatively high infant mortality rate given its affluence.

4.9 Figure 4.5 plots the infant mortality rate in 1996 against the mean monthly consumption expenditure per capita in 1995-96 across districts for which both data series are available. In fact, a counter-intuitive weakly positive association is observed between infant mortality and district living standards, largely because of the higher-than-expected infant

mortality rate in the Colombo district. However, not much can be made of this association, since it does not control for any other factors that may also influence infant mortality.

Figure 4.5: Infant Mortality Rate (1996) and Mean Monthly Consumption Expenditure per capita (1995-96) across Districts

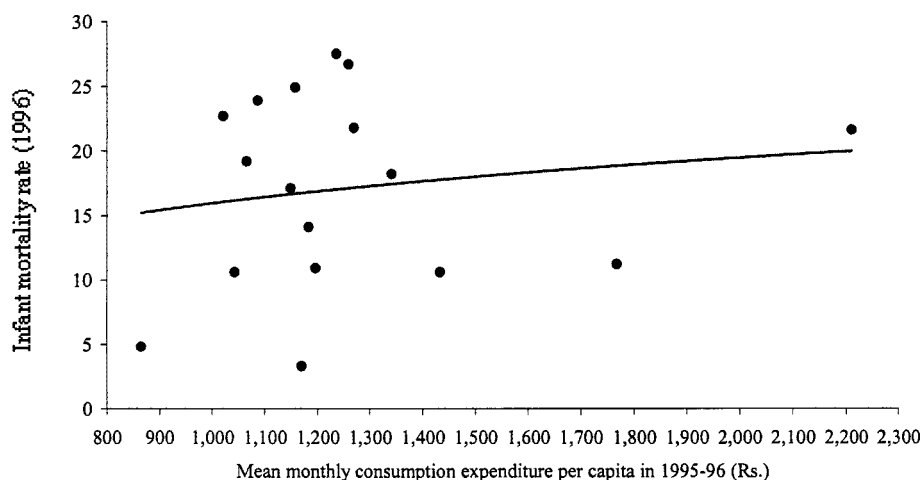
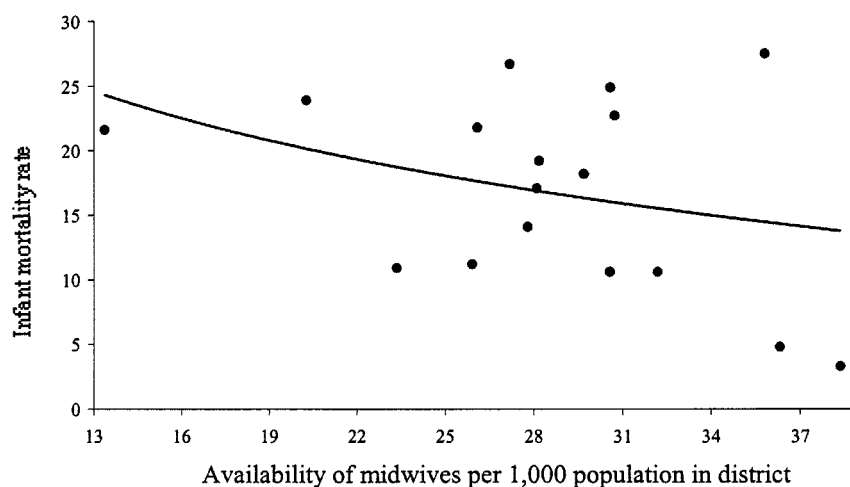


Figure 4.6: Infant Mortality Rate and Availability of Midwives per 1,000 Population across Districts



4.10 Variations in health infrastructure across districts likely explain some of the inter-district variations in infant mortality that cannot be explained by living standard variations. The experience of other countries, as well as of Sri Lanka itself (see Pathmanathan *et al.* 2003), has demonstrated the importance of having well-trained health professionals, birth attendants and midwives at the local level for safe deliveries and neonatal health. For the most part, it is these health professionals that are responsible for the implementation of the

government's vertical health program at the local levels. These professionals are also the first points of contact with the health system for the vast majority of people living in the rural areas.

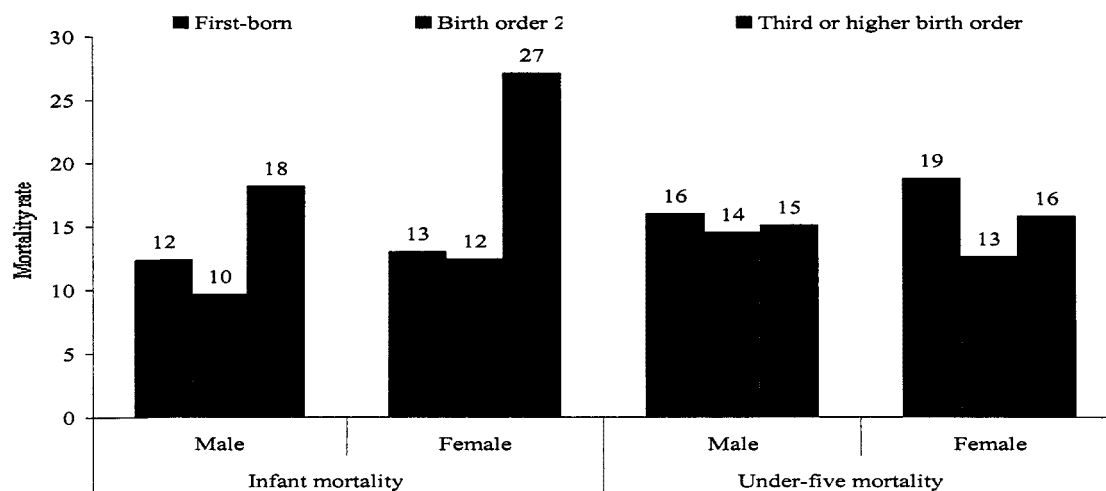
4.11 Figure 4.6, which plots the district infant mortality rate with the number of midwives per 1,000 population in each district shows a strong inverse association between the two variables. The data seem to indicate that a one-percent increase in the number of midwives per 1,000 population in a district is associated with a one-percent decrease in infant mortality in that district.

Correlates of Household Variations in Infant Mortality

4.12 Even though the overall level of infant and under-five mortality is low in Sri Lanka, it may be useful from a policy perspective to understand whether high levels of infant and under-five mortality are associated with specific household characteristics. Table 4.3 tabulates infant and under-five mortality by a variety of household characteristics, including maternal schooling, female headship, and access to infrastructure.

4.13 **Sex and Birth Order.** On average, infant mortality rates for females are about 20% higher than those for males, but under-five mortality rates are almost identical. Excess infant mortality among females is observed throughout South Asia, and reflects parental discrimination against their female children in the allocation of nutrition and medical care. The higher infant mortality for females than for males is surprising in Sri Lanka in view of the high levels of adult female literacy and extensive access to medical facilities and care through much of the country.

Figure 4.7: Infant and Under-Five Mortality Rates, by Birth Order and Sex, 2000



4.14 Another child-specific factor that increases the risk of infant death is birth order. Higher birth order children are much more likely to die prematurely than lower birth order children (Figure 4.7). What is interesting to note from the figure, however, is that birth order and sex interact with each other to produce the highest risk of premature death for higher-order girls. For instance, the infant mortality rate among girls of birth order 3 or higher is as high as 27 deaths per 1,000 live births, as compared to an infant mortality rate of only 13 deaths per 1,000 live births among first-born daughters. The comparable rates for boys are 18 and 12 deaths per 1,000 live births. Thus, while all higher-order children face a greater risk of premature death, the risk is particularly large for higher-order girls. Again, these patterns are widely observed in other parts of Asia (Pakistan, India and Bangladesh), but their presence in Sri Lanka is surprising in view of the high-levels of female literacy and good access to health facilities for much of the population.

4.15 **Mother's schooling.** There is a very large literature from around the world that demonstrates the significance of mother's schooling to low mortality outcomes among children. The pathways from mother's schooling to lower mortality rates include, but are not limited to, greater likelihood of obtaining pre- and ante-natal care, better nutrition during pregnancy (and hence lower likelihood of low child birthweight), seeking prompt medical care at the first sign of a child's illness, and more appropriate breast-feeding and nutritional supplementary practices. The DHS 2000 data from Sri Lanka do not suggest a monotonic association between mother's schooling and infant and under-five mortality rates (Table 4.3). Indeed, the main difference in mortality outcomes occurs among mothers with no or primary schooling and those with post-primary schooling. For instance, the latter have an infant mortality rate of 9 deaths per 1,000 live births while the former have an infant mortality rate which is nearly two and a half times higher (24 deaths per 1,000 live births).

4.16 **Mother's age at child's birth.** Another maternal variable that has a strong bearing on the survival prospects of a child is the mother's age at the time of the child's birth. As is well-established in the medical literature, the risk of complicated deliveries is high among very young and older mothers. The DHS data indicate that the risk of infant or child death among mothers who give birth past the age of 40 years is 3-4 times the risk among mothers who give birth between the ages of 21 and 40 years (Table 4.3). Likewise, infant and under-five mortality rates are nearly two times as high when the mother is 20 years old or younger than when she is 21-40 years of age.

4.17 **Mother's vaccination.** The DHS obtained data on whether mothers were vaccinated against rubella disease. Women of child-bearing age are usually immunized with this vaccine to prevent congenital rubella syndrome, which can cause fetal death or multiple birth defects that greatly increase the risk of death of an infant. Only about half of the mothers in Sri Lanka appear to be immunized against rubella. The data suggest large benefits – in terms of reduced mortality outcomes among children – when the mother has been immunized against rubella (Table 4.3). For instance, the children of mothers who were not immunized against rubella were nearly twice as likely to die as children born to mothers who had received the rubella vaccine.

Table 4.3: Infant and Under-Five Mortality, by Various Characteristics, 2000

Variable	Value	Infant mortality	Under-five mortality
Mother's schooling	None	10.2	13.8
	1-5 years	27.7	26.4
	6-10 years	9.4	11.2
	GCE O/L or equivalent	9.0	15.6
	GCE A/L or equivalent	9.0	16.0
	College or university	n.a.	15.9
Mother's schooling	None or 1-5 years	23.8	23.7
	6 or more years	9.0	13.2
Mother's age at child's birth	< 21 years	20.7	26.5
	21 - 40 years	11.0	13.6
	> 40 years	39.6	30.8
Whether mother vaccinated against rubella during pregnancy?	No	15.8	20.8
	Yes	9.3	10.7
Sex of child	Female	13.9	15.7
	Male	11.6	15.2
Birth weight of child	<= 2,500 gms.	50.9	50.9
	> 2,500 gms.	7.8	21.3
Head of household is:	Female	15.3	20.6
	Male	12.1	14.3
Access to electricity in house?	Yes	7.0	11.6
	No	25.7	23.8
Access to piped drinking water (private or public tap)?	No	11.9	14.6
	Yes	14.9	17.9
Access to sealed or flush toilet?	Yes	7.3	11.4
	No	29.3	26.5

Source: Authors' calculations from DHS 2000 data.

4.18 Birth weight. Birth weight has been universally established to be a very important risk factor in neonatal deaths. Reasons for low birth weight include preterm births, multiple births (twins, triplets, etc.), and poor nutrition and medical problems of the mother. While advances in newborn medical care have greatly reduced the risk of infant deaths associated with low birth weight in developed countries, low birth weight continues to remain a very high risk factor for mortality in developing countries. The DHS data indicate that low-birth weight babies (i.e., babies born with a weight of 2,500 grams or less) are nearly seven times more likely to die during infancy than normal-weight babies (Table 4.3). Interestingly, the data also show that if low birth weight babies survive infancy, their risk of subsequent death (during ages 1-5 years) is no different than that of normal-weight babies.

4.19 Household headship. Surprisingly, the sex of a household head is associated with the risk of mortality for an infant or child. In households headed by males, infant and child mortality rates are 12.1 and 14.3 deaths per 1,000 live births, respectively, while the

comparable rates in female-headed households are 15.3 and 20.6 deaths per 1,000 live births, respectively (Table 4.3).

4.20 Access to infrastructure. Availability of electricity in a household is associated very strongly with infant and under-five mortality. In households having no access to electricity, infant mortality is more than three times as high (25.7 versus 7 deaths per 1,000 live births) and under-five mortality is more than two times as high (23.8 versus 11.6 deaths per 1,000 live births) as in households having access to electricity (Table 4.3). Likewise, access to a sealed or flush toilet is also associated strongly with infant and under-five mortality rates. However, access to piped water has a puzzling perverse (positive) association with infant and under-five mortality.

Role of Contextual and Policy Variables

4.21 The roles of social values and public action in bringing down infant and child mortality rates in Sri Lanka cannot be discounted. A pervasive influence on social development in Sri Lanka has been the traditional value system which gave priority to the health and schooling of both men and women. Traditionally, children were accorded a special place in society, and with Sri Lanka having reached the replacement level of fertility, the value that society places on children has further increased. The decision of the government, as early as 1945, to provide free schooling at all levels in an extensive network of highly-accessible schools has resulted in a society with high literacy rates among both men and women.

4.22 In turn, the high literacy rates have increased individual demand for health-care services. Data from various household surveys and the Consumer Finance survey of 1996 show that the vast majority – 88% – of individuals experiencing an illness obtained treatment from allopathic (Western) hospital outpatient facilities or private clinics. Such high rates of health utilization are uncommon in South Asia, where most illness episodes go untreated or are self-treated. The DHS 2000 reports that 72% of children who reported a diarrheal episode in the two weeks prior to the survey had been taken to a medical practitioner. All households reported that sick children were brought to a hospital within 2-3 days of the onset of an illness episode, unless they resided in very remote and uncleared areas of the North-Eastern Province, where night-time transport continues to be a problem. Thus, Sri Lanka is characterized by relatively high levels of health care utilization for a country at its income level (Hsiao 2000). Outpatient physician contacts are high for a developing country and inpatient utilization rates are among the highest in the world.

4.23 Of course, the high rates of health service utilization would not have been possible had there not been an extensive network of health facilities throughout the country. Right from the early days of Independence, there was a concerted effort by the government to diffuse health services throughout the country. Already in 1975, Simeonov (1975) reported that a health care facility could be found no further than 0.8 miles from any home and a fee-exempt western type of health facility within 3 miles of any home. The access to health services has improved further over time. Within each district, health institutions are arranged in a hierarchical pattern, according to the level of sophistication of services offered, and all

hospitals have out-patient services. At present, medical officers are available at the lowest level of the hierarchy (rural hospitals) and services of specialist pediatricians are available at the level of base hospitals and above. The Lady Ridgeway Hospital for children, the apex institution for pediatric care, was built more than a century ago and continues to serve the children of the country. Thus, Sri Lanka has achieved relatively high levels of access to modern allopathic health facilities. In more recent year, midwives have been trained to recognize and manage dehydration, recognize acute respiratory problems, and assess the necessity of admitting a sick child to a hospital. In the rural areas, most communities have come to accept the Public Health Midwife as a health professional in her own right. Her advice is often sought by parents on child health problems and these skills are very useful in early referral of infants and children with respiratory illness and other health problems.

Multivariate Analysis

4.24 The problem with the correlates of infant and under-five mortality discussed above is that they do not control for the contemporaneous associations of mortality with other factors. To address this problem, we have estimated multivariate models of infant and under-five mortality using unit record data from the DHS 2000.²¹ The estimation results are reported in Annex Table 4, while only the broad findings of the empirical analysis are discussed here.

4.25 After controlling for the other factors associated with infant and under-five mortality, twin births are observed to have a significantly higher (more than two times) risk of premature death than normal births. The results also demonstrate the higher risk of infant death for higher-order girls relative to lower-order boys and girls as well as to higher-order boys.

4.26 Access to piped water has a puzzling positive association with both infant and under-five mortality, although access to sealed toilets has the predicted negative association (although only for infant, not under-five, mortality). The age of the mother at the time of a child's birth has a strong, negative association with the risk of premature death for the child. In addition, the mother's immunization against rubella also has a significant inverse association with the risk of under-five (although not infant) mortality. Finally, community living standards, proxied by mean monthly consumption expenditure per capita in the district of residence, have a strong inverse association with both infant and under-five mortality. (It is likely that mean consumption per capita in a district proxies for a wide range of variables, including household affluence, improvements in community hygiene, and better physical and health infrastructure.) Indeed, the point estimates suggest that a one-percent increase in mean income (or, more appropriately, consumption) in a community is associated with more than two percent declines in both infant and under-five mortality.

Alternative Simulations to 2015

4.27 Based on the multivariate probit model estimated above, we have undertaken simulations of the infant and under-five mortality rate in Sri Lanka to 2015 under two

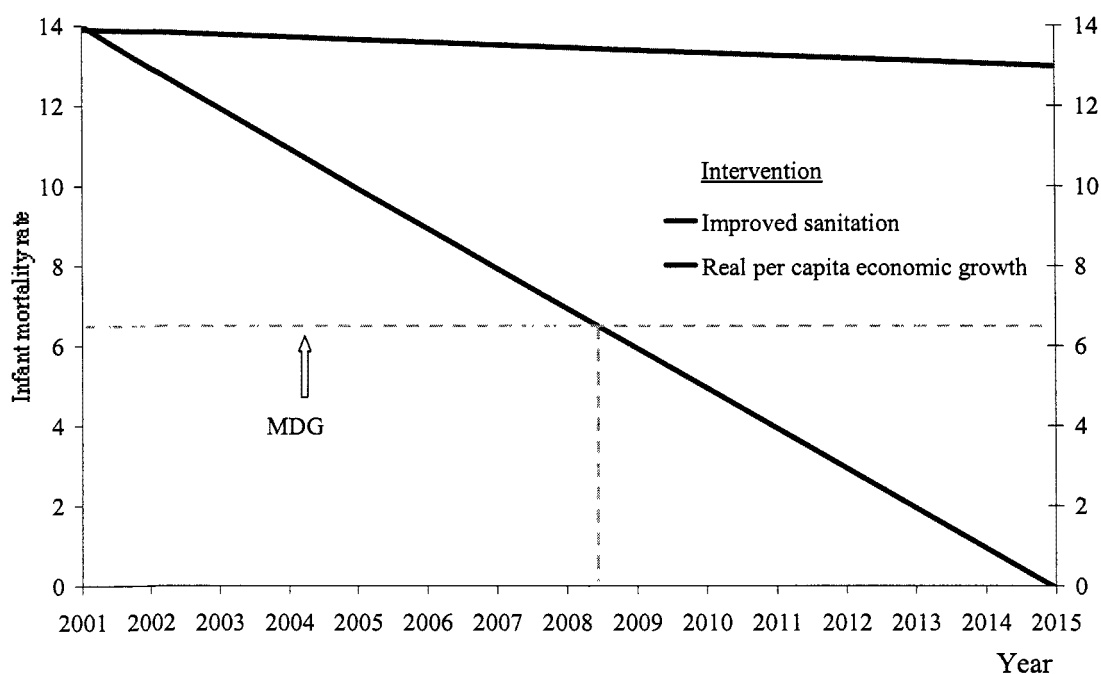
²¹ Since the dependent variables are dichotomous (viz., whether or not a child dies within 12 and 60 months of its birth), the models have been estimated by the maximum-likelihood probit method.

assumptions – (i) that sanitation access expands from 80% to 95% by 2015, and (ii) mean district monthly consumption expenditure per capita increases annually at the rate of 3% to 2015. These assumptions are merely illustrative, and meant to simulate the likely reduction in infant and under-five mortality under one possible scenario.

4.28 Figure 4.8 shows the projected trajectory of the infant mortality rate under this scenario. The infant mortality rate is observed to decline very modestly – by only one death per 1,000 live births – with expanded sanitation access. However, improvements in living standards are associated with very large declines in infant mortality. The infant mortality rate declines from a level of 13.9 per 1,000 live births to virtually zero by 2015. Since the MDG level is 6.33 deaths per 1,000 live births, the country is projected to attain the infant mortality MDG before 2009.

4.29 Thus, the simulation confirms the results of the simple trend analysis conducted earlier. The results thus suggest that it should be possible for Sri Lanka to attain the infant mortality-related MDG with strong economic growth and improved physical and health infrastructure.

Figure 4.8: Projected Infant Mortality Rate to 2015 (graph shows cumulative effect of each intervention)



5. PRIMARY SCHOOLING AND GENDER DISPARITY

Introduction

5.1 Universal primary school enrollment and completion is an MDG of central importance to child welfare and the economic future of a country. The millennium development goal is to ensure that, by 2015, all children in the primary school age group (typically age 6-10) are enrolled in the education system and complete grade 5, the final year of the primary grade cycle.

5.2 Investment in education has been at the heart of Sri Lankan government policy for several generations, to increase national income, reduce poverty and promote human development. In consequence, the country has attained high levels of primary school enrollment and completion. The impact of schooling on economic welfare and social-well being are well known. Investment in schooling constitutes an extraordinarily powerful instrument to enhance earnings, decrease poverty and promote social mobility; increase health, nutrition and life-expectancy; and produce sustained, long-term human development. It is also self-reinforcing and self-perpetuating across generations, with educated parents exhibiting strong preferences to invest in human capital for their children through schooling. The economic and social benefits of education have been well-documented in the literature for numerous countries, including Sri Lanka (World Bank 2004c).

Overall Trends

5.3 About 1.7 million children are enrolled in the primary grade cycle (grades 1-5). Net primary school attendance in Sri Lanka is about 96%, with approximately the same percentage of boys and girls in the age group 6-10 years attending school. Sri Lanka had already attained a high level of net primary attendance, 95%, by 1990/91.²² This attendance rate rose to 96% in 1995/96, and held steady through 2002 (Table 5.1). The net primary completion rate is also high, 95%, and fairly evenly distributed among both boys and girls (Table 5.3).

Regional Variations

5.4 Regional variations in net primary school attendance and completion rates are almost negligible (Tables 5.2 and 5.3). The range of variation in net primary school attendance is only from 95% in the North-Central and Southern Provinces to 97% in the Uva Province. Further, gender disaggregated figures show that regional variations in net primary school attendance at the province level are equally low among male and female children.

²² Note that the net school attendance and completion rates are for seven provinces, as household survey data on the conflict affected North-Eastern Province do not exist to enable accurate computation of these rates. However, primary enrollment numbers obtained from administrative data on North-Eastern Province suggest that net primary attendance in this region is also likely to be well over 90% and close to the national average.

Table 5.1: Net Primary School Attendance Rates (%), by Sex, 1990/91-2002

	1990/91	1995/96	2002
Both sexes	95	96	96
Boys	95	96	96
Girls	95	95	96

Source: World Bank estimates, based on the Household Income and Expenditure Survey, Department of Census and Statistics, 2002.

Table 5.2: Net Primary School Attendance Rates (%), by Sex and by Province, 2002

Province	Both Sexes	Boys	Girls
Sri Lanka	96	96	96
Western	96	96	97
Central	96	97	96
Southern	95	95	95
North-Western	96	94	97
North-Central	95	97	94
Uva	97	96	97
Sabaragamuwa	96	97	94

Source: World Bank estimates, based on the Household Income and Expenditure Survey, Department of Census and Statistics, 2002.

5.5 Regional variations in net primary school completion rates, too, are minor. Net primary school completion rates range between 93% in the Sabaragamuwa Province and 96% in the Western and Uva Provinces. Gender disparities in net primary school completion rates are also slight, varying between 93% in the Sabaragamuwa Province and 97% in the Uva Province among girls, and between 93% in the North-Central, Southern and Sabaragamuwa Provinces and 96% in the Western and Uva Provinces among boys.

Table 5.3: Net Primary School Completion Rates (%), by Sex and by Province, 2002

Province	Both Sexes	Boys	Girls
Sri Lanka	95	95	95
Western	96	96	96
Central	95	95	95
Southern	94	93	96
North-Western	95	95	95
North-Central	94	93	95
Uva	96	96	97
Sabaragamuwa	93	93	93

Source: World Bank estimates, based on the Household Income and Expenditure Survey, Department of Census and Statistics, 2002

5.6 The high net primary school attendance and completion rates and near gender parity in enrollments can be attributed to a number of factors, including strong household demand for schooling and progressive government policies. The government of Sri Lanka has several policy initiatives to promote primary school attendance and completion. These include the establishment of a complete network of tuition-free public schools which provide access to primary schooling for all children within 3 kilometers (2 miles) of their homes, free school uniforms and subsidized transport to attract children to school, and enrollment drives at grade 1 to draw out-of-school 6 year olds into the school system. Strong household demand is

reflected in the primary school attendance rates by consumption quintile; these data show that 95% of children from poor households and the lowest quintile attend school (Table 5.4). There is also little variation in primary school attendance among consumption groups and among boys and girls within consumption groups.

Table 5.4: Primary School Enrollment by Consumption Quintile, 2002

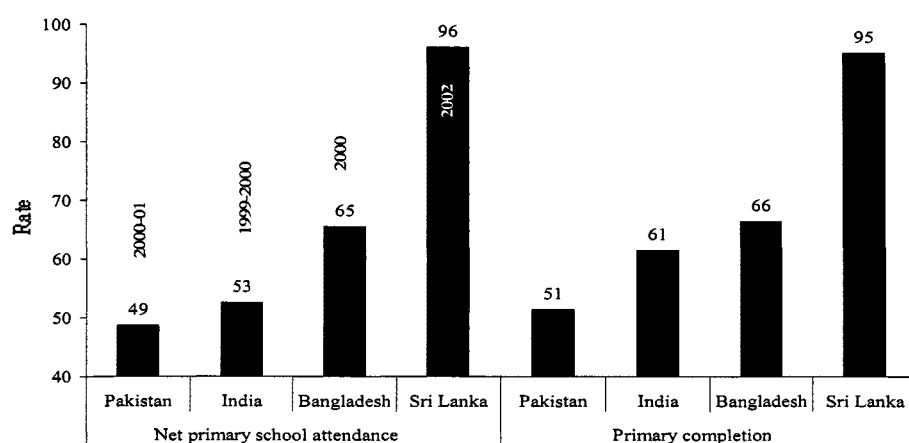
Per capita consumption quintile	Both Sexes	Male	Female
Bottom	95	95	95
Second	96	95	96
Third	96	96	96
Fourth	96	97	96
Top	97	97	97
All	96	96	96

Source: World Bank estimates, based on the Household Income and Expenditure Survey, Department of Census and Statistics, 2002

International Comparisons

5.7 Sri Lanka is easily the best performer in South Asia when it comes to its performance on primary schooling indicators. Figure 5.1 shows the net primary school attendance rates and the primary completion rates in the four large countries of South Asia.²³ As is observed in the figure, Pakistan, India and Bangladesh have net primary school attendance rates that are in the 49-65% range – more than 30 percentage points below the comparable rate for Sri Lanka. The same is true of the primary completion rate.

Figure 5.1: Net Primary Attendance Rates and Primary Completion Rates from Household Survey Data, selected South Asian Countries, circa 2000



²³ Note that both rates are defined differently – mainly in terms of the primary school age population – in each of the countries. The definitional differences are minor, and should not alter the rankings of the countries. However, it is best not to treat the comparison in Figure 5.1 as very precise but merely as indicative of broad cross-country trends.

Future Challenges for the Sri Lankan Primary School System

5.8 Given the high net primary school attendance and completion rates, the Sri Lankan education system faces two major challenges. First, the 4% of children aged 6-10 who do not attend school and the 5% of primary aged children who do not complete primary school have been fairly constant from 1995/96 onwards to 2002. As in other countries, the Sri Lankan government strategy is to attract these children into special and non-formal education programs. Second, the quality of schooling is important, and improving school quality has become the central focus of government policy (NEC 1997, 2003, World Bank 2004c). Sri Lankan policy-makers define schooling quality broadly to include: enhancing learning outcomes, orienting the education system to the world of work, and promoting civic values and good citizenship. Further, policy makers emphasize the importance of the primary school system as the foundation for a high quality education system in the country.

Special and Non-Formal Education Programs for Out-of-School Children

5.9 According to survey data from the Non-Formal and Special Education Branch of the Ministry of Education, there were about 57,100 children aged 5 to 14 years (the compulsory schooling age) who were not attending school in 2002. The largest number was in the North-Eastern Province (34,846), followed by the Southern Province (8,883), Sabaragamuwa Province (5,523), North-Western Province (3,478), Uva Province (2,586), Western Province (1,031), North-Central Province (380), and Central Province (349). By far the most frequent reasons given for non-attendance are 'economic' and 'dislike schooling' (NIE, 1998). Less frequently cited reasons include 'employed', 'physically handicapped', 'family problems', and 'household duties'. The 'dislike' category reflects reasons for non-attendance mentioned in the NEC (2003) report: "lack of empathy on the part of officials, principals, and teachers, harsh punishments and poor quality of teaching, particularly in the 'schools of the poor' " (NEC 2003, p.85). While directly comparable data on non-attendance are not available over a period of time, there would seem to have been a definite reduction in non-attendance following the introduction in 1998 of legislation requiring attendance of children in the age group 5 to 14 years.

Categories of Out-of-School Children

5.10 Children who do not enroll or who, having enrolled, fail to complete a basic education program can be represented in four categories (each of which will require a specific strategy or range of strategies to address the problem of non-attendance).

- Children with physical and/or intellectual disabilities;
- Children living in socio-economically disadvantaged circumstances either in isolated rural areas (including plantation communities) or in low income urban neighborhoods;
- Street children; and
- Children in conflict-affected areas.

Children with Physical and/or Intellectual Disabilities

5.11 Figures on the incidence of children with physical, intellectual, or behavioral disabilities prior to 2003 cannot be regarded as reliable as it was only in that year that a range of categories of disability were included in the School Census. However, severity of disability is still not adequately specified. Provisional School Census 2003 figures indicate that 1.8% of male students and 1.2% of female students in the education system were considered to have a disability. The gender imbalance (which conforms to experience elsewhere) was found in all provinces. Dropout among students with a disability was high: only 56% of those who entered grade 1 continued to secondary grades and 4.5% to GCE A/L grades. These figures, however, do not fully represent the problem of non-attendance of children with disabilities, as many never enroll in school at all.

5.12 A failure to distinguish between different types of disability and severity of disability in the School Census up to 2003 and in the NEC (2003) report, *Envisioning Education*, severely restricts the ability to plan to address the problem of children with disabilities. This might not have mattered very much when the level of provision was low, but will assume increasing importance as efforts are made to address the needs of all children with disabilities, which will require a variety of provisions, as well as different types of training for teachers. At present, there are 25 assisted special schools catering for 2,789 students with disabilities, of whom 55% are male, and there are 9,618 students in special classes in 852 mainstream schools. The categories of disability catered for in the special schools are hearing impairment (10 schools), visual impairment (7 schools) and general intellectual retardation (8 schools). While a pupil-teacher ratio of 5:1 is allowed, the actual ratio in special schools is 6.7:1, and in special classes, 10.3:1. Special schools were established as a result of local initiative, and while government pays salaries, the schools are not government schools. A two-year teacher training program is provided for teachers in special schools and classes at NIE, Maharagama Teacher Training College and Hapitigama National College of Education. However, there is a shortage of teachers; it seems teachers do not find the work very appealing.

5.13 It is clear that provision for students with disabilities is very limited. While the School Census 2003 (preliminary) describes 58,626 students as having a disability, only 12,407 students are catered for in special schools/classes. Thus, special provision is required for about 46,000 students, and assuming pupils will be in special classes and that a pupil-teacher ratio of 10 to 1 will be maintained, about 2,500 additional teachers would be required (4,600 less 2,100 who would no longer be required because of the removal of students with disabilities from mainstream classes). In addition to the need for teachers, there will also be a need for additional accommodation and resources. It should also be noted that the figures in the census report must be regarded as conservative. They do not include children who are not attending school, nor do they take account of the students who will eventually be identified when awareness is increased and improved identification procedures are introduced.

5.14 In many countries, including Sri Lanka, 'inclusive education' in which students with disabilities are 'mainstreamed' is proposed. The 1997 General Education Reforms stated that 'every effort should be made to bring children with disabilities into the mainstream of

education'. Parents tend to favour this, as their children are not segregated from siblings and friends. However, integration is not an inexpensive option. It is very difficult to accommodate in large classes if teachers are not specially prepared and without the support of ancillary staff (e.g., remedial teachers, learning support teachers, special needs assistants). Specific actions that could be considered by the Ministry of Education in addressing the needs of children with learning difficulties arising from physical and/or intellectual disabilities include:

- setting up a branch in the ministry with responsibility solely for special education;
- accepting full responsibility for the establishment and running of special schools;
- planning for the expansion of provision in mainstream and special schools with specified targets, and dates on which targets will be achieved;
- increasing the number of teachers who receive training for special education taking into accounting the range and severity of student disabilities;
- ensuring that courses (pre-service and in-service) in special education are provided for teachers in mainstream classes to identify children in need of special provision and to prepare them to deal with less severe types of disability;
- providing for training programs for remedial/resource/support teachers that will be required to support the work of classroom teachers when students with disabilities are accommodated in normal classes;
- considering the feasibility of shortening the length of courses for special education teachers;
- providing the required equipment for special education (e.g., audio-visual aids, a Braille printing press);
- developing home-based programs for children with severe disabilities;
- raising awareness of disability among teachers and parents; and
- considering an increase in the permitted pupil-teacher ratio from 5:1 in special schools/classes to a ratio that is closer to actual practice.

Children Living in Socio-economically Disadvantaged Circumstances

5.15 Many children living in socio-economically disadvantaged circumstances, whether in isolated rural areas or in low-income urban neighborhoods, may not enroll in the education system or may enroll but be frequently absent or drop out early. Precise figures, however, are not available.

5.16 Following the introduction of compulsory attendance requirements, efforts were made (in 1998) to monitor attendance through School Attendance Committees (in Grama Niladhari Divisions) and School Attendance Monitoring Committees (in Divisional Secretariat Divisions). The School Attendance Committee was intended to compile lists of non-school-going children, conduct inquiries, instruct parents to send their children to school, provide assistance if required to meet bureaucratic requirements (e.g., if a child did not have a birth certificate), and monitor attendance. While 8,459 School Attendance and Monitoring Committees had been set up by 1999, they never met regularly and had ceased to function by 2000. The reasons for this were stated to be reliance for implementation on the Non-Formal Division of the central ministry and local Non-Formal Education offices, neither of which

had adequate resources; lack of involvement by Provincial education authorities; and failure to appoint convenors.

5.17 While there are a number of incentives to attract children to school (free textbooks, free uniforms, and transport subsidies) they may not be sufficient for children in socio-economically disadvantaged families/communities, for whom alternatives to the formal education system may be required. A number of such alternatives are already in place.

5.18 There are almost a thousand literacy centers which provide literacy programs for over 20,000 out-of-school children (about equal numbers of males and females) at a time suitable for clients. Children may be admitted to school after studying in a literacy class. In 2002, 6,212 children followed this course.

5.19 Community Learning Centers are a more recent innovation, and operate mostly in rural areas. In 2003, 72 centers served by 500 instructors provided continuing education programs for 10,673 (6,927 females; 3,746 males) early school-leavers and adults. Literacy programs are available for 5- to 10-year olds (basic literacy); 10- to 16-year olds (functional literacy); and 16+ year olds (literacy, and vocational training, income generating and life enrichment programs).

5.20 Technical Training Units provide six-month courses for 32,712 students in schools where there are workshops.

5.21 Several problems have been identified in the operation of non-formal education programs. Questions have been raised about the quality of programs, their supervision and monitoring. The Division for Non-Formal Education in the ministry, while the lead agency in providing opportunities for out-of-school children, does not have the capacity (financial or human) to implement existing or planned programs. The Division is dependent for implementation on the services of zonal non-formal education officers who are not under its authority.

Street Children

5.22 Estimates of the number of children of school age who live on the street vary between 1,500 and 8,000. The children earn money in a variety of ways, and families may depend on what is earned for their survival. The children are vulnerable to exploitation for criminal activities and often come into conflict with police.

5.23 Many of the children have never been to school; some have been, but have dropped out at an early stage. Their life style obviously does not fit with the formality and requirements of schooling. Schools, for their part, are often not keen to admit street children.

5.24 Although these children have been largely neglected in discourse about the education system, some provision is available in centers with night shelters in Kataragama (51 children), Ratnapura (30 children), and Colombo (32 children). The focus in the school is on general care and basic literacy.

Learning Outcomes

5.25 The central problem facing the Sri Lankan primary schooling system, given the high rates of primary enrollment and completion, is the moderate learning levels of students. The cognitive achievement scores of primary students show that mastery of language and mathematics skills is unsatisfactory. About 10% of Grade 4 students score between 0-20% in first language, Sinhalese or Tamil, and about 25% achieve less than 41 percent (Table 5.5). In English language skills, 18% of students achieve only 0-20% of the targeted level of competency and 57% of students reach less than 41% (Table 5.6).

Table 5.5: Regional Variations in Learning Outcomes in the First Language (Sinhalese or Tamil) at Grade 4, 2003

Province	% of students scoring:				
	0-20%	21-40%	41-60%	61-80%	81-100%
Western	3.7	10.0	14.5	22.5	49.2
Central	11.7	14.8	17.6	25.6	30.2
Southern	9.9	13.4	13.7	23.4	39.6
North-Eastern	15.2	17.2	21.8	26.3	19.4
North-Western	6.1	12.6	17.7	25.3	38.2
North-Central	6.0	16.4	20.5	26.0	31.1
Uva	12.6	16.8	18.1	22.8	29.8
Sabaragamuwa	9.0	14.0	16.9	24.4	35.7
Sri Lanka	9.9	14.7	18.1	24.7	32.5

Source: National Education Research and Evaluation Center, University of Colombo, 2003

Table 5.6: Regional Variations in Learning Outcomes in English at Grade 4, 2003

Province	% of students scoring:				
	0-20%	21-40%	41-60%	61-80%	81-100%
Western	8.2	25.7	24.0	23.6	18.4
Central	17.8	38.8	19.8	16.0	7.6
Southern	17.6	35.7	19.1	15.6	11.9
North-Eastern	25.5	43.7	14.6	11.4	4.8
North-Western	14.8	41.0	22.2	14.1	8.0
North-Central	16.1	40.5	23.0	13.0	7.5
Uva	20.1	43.5	16.9	12.8	6.7
Sabaragamuwa	17.2	38.7	19.3	15.5	9.4
Sri Lanka	18.1	39.0	19.3	14.8	8.8

Source: National Education Research and Evaluation Center, University of Colombo, 2003

5.26 Achievement levels in mathematics show a similar picture. About 15% of students score only between 0-20% and 28% of students achieve less than 41% (Table 5.7).

Table 5.7: Regional Variations in Learning Outcomes in Mathematics at Grade 4, 2003

Province	% of students scoring:				
	0-20%	21-40%	41-60%	61-80%	81-100%
Western	7.9	7.6	12.6	23.9	48.0
Central	15.3	15.0	16.3	23.8	29.5
Southern	13.2	10.8	13.1	22.7	40.2
North-Eastern	23.3	17.2	16.7	19.8	22.9
North-Western	9.5	11.6	15.3	23.6	39.9
North-Central	10.0	11.9	16.6	24.3	37.2
Uva	16.6	14.2	16.2	21.7	31.3
Sabaragamuwa	14.4	11.4	14.8	20.7	38.6
Sri Lanka	14.8	13.0	15.4	22.3	34.5

Source: National Education Research and Evaluation Center, University of Colombo, 2003

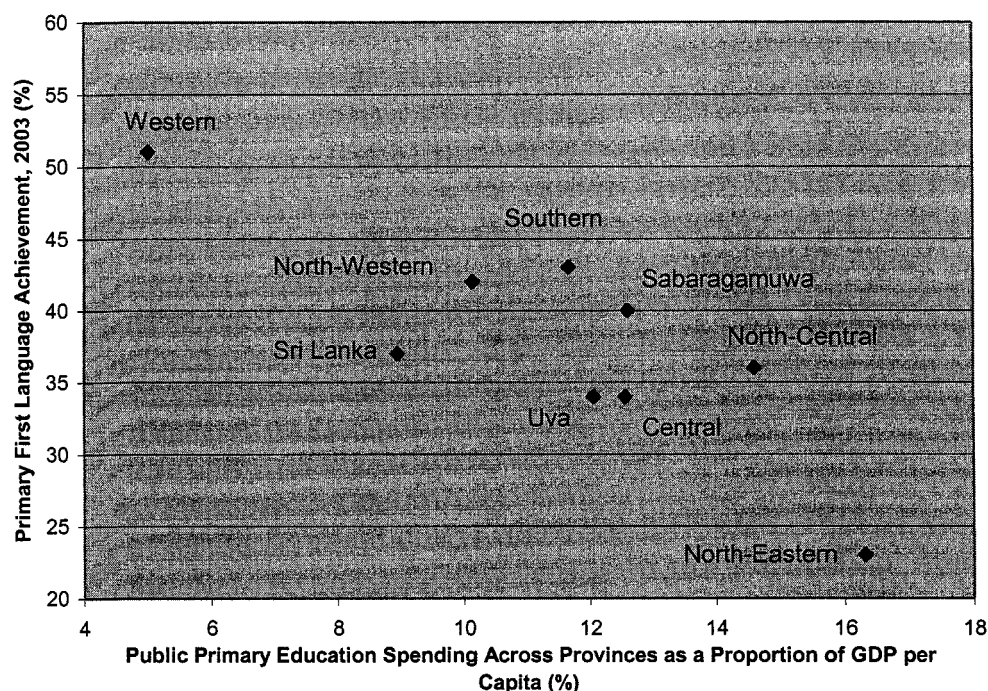
5.27 Regional variations in learning levels are clearly evident from Tables 5.5-5.7. The Western Province performs best on all three cognitive achievement tests. The North-Western, Southern and Sabaragamuwa provinces display the highest achievement levels after the Western Province. The conflict affected North-Eastern Province performs worst on all three tests, and falls well below the better performing provinces.

Government Policy to Enhance the Quality of Primary Schooling

5.28 The Government of Sri Lanka has an overarching policy framework to improve the quality of primary education and increase learning outcomes, with a special focus on poor and educationally disadvantaged areas. This policy framework contains four broad themes.

5.29 **Allocating public resources to favor poor geographical areas where learning levels are low.** The pattern of public education spending across provinces is progressive, with higher public expenditures per student (normalized by provincial income per capita to take into account the province's own capacity to fund public services) in provinces where learning levels are poor and lower public expenditures per student in areas where learning levels are high (Figure 5.2). The poorest province with the lowest learning levels, the North-Eastern Province, receives the highest proportionate government expenditure per student on education. The richest province with the highest schooling outcomes, the Western Province, receives the lowest proportionate government expenditure per student on education. Also, public education spending per student as a proportion of provincial income per capita is about 300% greater in the North-Eastern Province than in the Western Province. Other poor provinces or provinces containing very poor areas, such as Uva, North-Central, Central and Southern, also receive generous central government grants for education which enable them to invest considerably higher resources in human capital than can be financed solely through provincial resources.

Figure 5.2: Progressive Government Financing of Provinces with Low Average Primary Education Achievement Levels



Note: This diagram illustrates the deliberate effort made by the central government to allocate greater resources for education to provinces with lower levels of learning outcomes, such as North-Eastern, North-Central, Sabaragamuwa, Central and Uva, in order to help raise their average learning levels closer to the better-performing provinces, such as Western and North-Western.

Source: World Bank (2004c).

5.30 Policy initiatives in curriculum, pedagogy, and teacher education and training.

These initiatives include modernizing the primary school curriculum along the lines of the key stage model used in England, with three key stages, grades 1-2, grades 3-4 and grade 5. Essential learning competencies have been established for each key stage, so that mastery of these competencies can be assessed. In addition, the primary curriculum has been integrated around four subject areas, first language (Sinhalese and Tamil), mathematics, religion and environmental studies. Policy measures to improve the quality of teacher education and training include ensuring that all teachers are trained through a three year pre-service teacher education course before entering the teaching service, providing teachers opportunities for regular and continuing professional development during their teaching career, and making on-site academic support available to teachers in schools. Reforms in pedagogy have sought to promote child-friendly, student centered learning in primary schools.

5.31 Policy reforms in education governance, with greater empowerment of schools and the forging of stronger involvement of local communities in schools. This policy reform, which is about to commence, envisages strengthening the role of school principals and teachers in the administration of schools, and the involvement of local communities in school management through the establishment of school boards. Policies to provide training to principals in school leadership and management have also been initiated.

5.32 Monitoring and evaluation of education outcomes, with special emphasis on the measurement of cognitive achievement. A National Education Research and Evaluation Center (NEREC) has been established in the University of Colombo, to conduct independent evaluations of learning levels and provide policy relevant feedback to policy makers. The national assessment of learning outcomes in grade 4, conducted in 2003, was the first such rigorous nation-wide study with a sampling scheme valid at the provincial level. Further such national assessments, covering primary and higher grades, are planned for the future. In addition, the education system has internal agencies, such as the National Institute of Education (NIE), which conduct periodic assessments and evaluations, with a particular focus on qualitative methods.

6. CONCLUSIONS

6.1 There are several major findings and implications for policy that emanate from this report.

6.2 **First**, of the five MDGs analyzed here, Sri Lanka has already attained the numerical goals relating to universal primary enrollment and completion. Indeed, the country had almost met these goals as far back as 1990-91, and is far ahead of the other countries of South Asia in terms of having reached near-universal primary enrollment and completion. Sri Lanka also has attained the numerical MD goal of gender parity in primary and secondary school enrollments, again having met this target as early as 1990-91. However, Sri Lanka faces considerable challenges in ensuring good quality primary education, with substantial shortfalls in cognitive achievement in the country as a whole. Further, Sri Lanka experiences sharp regional disparities in learning outcomes. Improving the quality of primary education in the country, with special emphasis on educationally disadvantaged areas, will require strategic policy development, effective service delivery and efficient investment of resources.

6.3 Sri Lanka's achievements are remarkable for a country that has been ravaged by a 20-year civil war. While there are many reasons for this success, chief among them are the country's impressive growth performance during the past 20 years and Sri Lanka's strong human-capital base at the beginning of the period. Sri Lanka's experience suggests that a country's human capital base does not necessarily have to deteriorate during prolonged periods of civil strife.

6.4 **Second**, Sri Lanka has made great strides in bringing down its infant and under-five mortality rates. The country has sustained a rate of decline of more than 4% per year over the last half century to bring its infant mortality rate down to a mere 13 deaths per 1,000 live births in 2000. This rate is not only unusually low in comparison to the infant mortality rates of most developing countries but is lower than that observed in countries such as Russia, Ukraine and Argentina that are considerably wealthier than Sri Lanka. Indeed, an international comparison of infant mortality rates across 120 countries suggests that Sri Lanka enjoys an infant mortality rate that may be a fourth of what would typically be expected of a country at Sri Lanka's level of per capita income. The analysis in this paper suggests that it should be relatively easy for Sri Lanka to attain the infant mortality-related MDG of no more than 6.3 deaths per 1,000 live births by 2015, provided it maintains strong economic growth over the next decade and continues to expand access to infrastructure, particularly sanitation.

6.5 **Third**, the two areas where Sri Lanka has not made enough progress in the past are reduction of poverty and child malnutrition. Poverty reduction has been slow because of generally slow economic growth in the recent past. While growth of the Sri Lankan economy accelerated during the second half of the 1990s, there was a sharp increase in inequality, and this considerably reduced the poverty-reducing benefits of economic growth. However, the simulations undertaken in this report suggest that it should be possible for Sri Lanka to attain the MD goal of reducing the percent of population in poverty to no more than 13% by

maintaining strong economic growth, continued expansion of male and female schooling, and sustained improvement in infrastructure (viz., electricity coverage), and by preventing income and consumption inequality from rising in the years ahead.

6.6 **Fourth**, Sri Lanka's poor performance on child malnutrition is more difficult to understand. One would think that the same interventions that allowed Sri Lanka to achieve unusually low rates of infant and under-five mortality relative to its income would also have helped it attain low rates of child malnutrition. However, this obviously has not been the case. With nearly one out of three children aged 5 or under being underweight, Sri Lanka has unusually high rates of child malnutrition, not only in absolute terms but also in relation to its income. The disconnect between the country's infant mortality rate and its child malnutrition rate is even more striking; a cross-country comparison suggest that Sri Lanka has a child underweight rate that may be three times as high as what would be expected of a country with Sri Lanka's level of infant mortality.

6.7 Part of the reason for the high rates of child malnutrition must be social and cultural, since as many as 15% of children even in the richest quintile of households – a group that is likely to have very good economic access to food – are underweight and stunted. Among these cultural and social factors may be child feeding practices, such as denying the newborn child *colostrum*, short duration of exclusive breast-feeding, early introduction of solid foods in a child's diet, and insufficiency and inadequacy of weaning diets. This is seen in the sharply increased risk of malnutrition for most Sri Lankan children in their second year of life (beginning at age 12 months). Thus, the evidence suggests that stepping up of efforts to provide nutritional education and counseling to expectant mothers and to adolescent girls is likely to have large pay-offs in terms of reduced child malnutrition rates.

6.8 On the positive side, it is worth noting that even though moderate child malnutrition is pervasive in Sri Lanka, the rates of severe malnutrition are very low (only in the range of 3-5%). These results are in contrast to other countries in the region (such as Bangladesh and India), where severe malnutrition rates are 30-40% of the moderate malnutrition rates. In turn, this indicates that the weight and height gains required to lift the vast majority of underweight and stunted Sri Lankans out of under-nutrition are comparatively smaller and more attainable, which should make the task of eradicating child malnutrition relatively less difficult than in neighboring Bangladesh and India.

6.9 **Fifth**, even though there are no apparent gender disparities in schooling opportunities at the primary or secondary level in Sri Lanka, there is evidence of intra-household discrimination against girls in the allocation of nutritional inputs and medical services. This is reflected in generally higher rates of infant mortality for females than for males. The situation is even worse when gender disparities are disaggregated by birth order. For instance, the risk of infant mortality for girls of birth order 3 or higher is nearly 50% greater than that for boys of the same birth order. There are significant gender disparities in the risk of severe child malnutrition as well. The data suggest that girls under the age of 5 are nearly 40% and 70% more likely to be severely stunted and underweight, respectively, than boys. While these patterns of discrimination against girls are widely observed in other parts of South Asia (Pakistan, India and Bangladesh), their presence in Sri Lanka is surprising in

view of the high levels of adult female literacy and good access to health facilities for much of the population.

6.10 **Sixth**, even in areas where Sri Lanka's performance has generally been impressive (such as infant and child mortality reduction), there is evidence of significant regional disparities. For instance, in 1996, infant mortality in the district with the highest infant mortality rate in Sri Lanka (Anuradhapura) was almost 20 times as high as infant mortality in the district with the lowest infant mortality rate (Trincomalee). There are also wide variations across districts in the pace of infant mortality reduction over time; for instance, between 1991 and 1996, 13 districts (out of a total of 25) showed an increase in infant mortality. Likewise, the incidence of consumption poverty varies a lot across districts. In some districts, such as Badulla and Moneragala, the incidence of poverty is as much as 60% higher than the national average and 6 times as high as the incidence of poverty in Colombo district. There is also considerable variation in the pace of poverty reduction across districts, with some districts having seen a 15% increase in poverty incidence between 1995-96 and 2002 while other districts have recorded a 72% decrease in poverty incidence over the same period. Inter-district variations in the growth of mean consumption expenditure account for much of the variations in the pace of poverty reduction. Thus, it is clear that an important task for policy makers is to narrow the large geographical disparities that exist in the MD indicators. This would mean targeting economic growth opportunities and infrastructural investments to the neediest and under-served districts that have poor levels of the MD indicators and that have seen little progress in these indicators over time.

6.11 **Seventh**, the analysis in this report highlights the importance of infrastructure in attaining the MDGs. For instance, both poverty and child malnutrition are strongly correlated with electricity coverage; access to water and sanitation is associated with reduced rates of child malnutrition; and better sanitation is associated with lower levels of infant mortality. The simulations suggest that expanding electricity coverage from 57% to 72% would in itself reduce the child malnutrition rate by 5 percentage points. Investment in physical infrastructure (e.g., roads, electricity, water, etc.) has not received as much attention in the past from Sri Lankan policy-makers as investments in health and educational interventions. The analysis in this report suggests that infrastructural investments, especially targeted to the poor and under-served districts, would help the country with attaining the MDGs speedily.

6.12 **Eighth**, consistent with the findings of numerous empirical studies from around the world, this report finds evidence of strong associations between female adult schooling and some of the MD indicators. For instance, female schooling, especially at the post-primary level, is strongly associated with poverty reduction and with lower child underweight rates. These results suggest that continued increases in girls' secondary and tertiary enrollment in the coming years will fuel significant improvements in many of the MD indicators.

6.13 **Ninth**, while mean consumption per capita grew significantly (at the rate of about 4% per annum) between 1995-96 and 2002, consumption inequality also increased sharply. The Gini coefficient jumped up from 34% to 41% during this period. This large increase in consumption inequality makes the distribution of per capita consumption expenditure more unequal in Sri Lanka than in neighboring India, Bangladesh or Pakistan. More importantly, a

poverty decomposition exercise suggests that, instead of declining by 6 percentage points (29% to 23%), the poverty headcount ratio in Sri Lanka would have fallen by as many as 17 percentage points (from 29% in 1995-96 to 12% in 2002) if the distribution of consumption had remained unchanged. Thus, the sharp increase in consumption inequality witnessed by Sri Lanka during the late 1990s greatly reduced the poverty-reducing impact of growth. It will be important to ensure that future growth of the Sri Lankan economy is more pro-poor than past growth.

6.14 **Finally**, the importance of systematically monitoring MD outcomes at disaggregated levels and evaluating the impact of public programs cannot be overemphasized. There is a paucity of reliable, time-series data on many MD indicators, such as consumption poverty and child malnutrition, at the district level. The lack of such data makes it virtually impossible to monitor progress toward attainment of the MDGs at lower levels of administration. In addition, most public assistance programs and interventions in Sri Lanka, such as the *Samurdhi* program, have not been subjected to rigorous, independent evaluation. In order to choose the right set of interventions with which to attain the MDGs, it is critical to know which programs have been successful in improving MD indicators and which have not.

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ANNEX TABLES

Annex Table 1: Pooled District-level Regressions of Log of the Poverty Headcount Ratio (%), 1990-91, 1995-96 and 2002

<i>Independent Variable</i>	<i>OLS</i>		<i>District fixed-effects</i>	
	<i>Parameter</i>	<i>T-ratio</i>	<i>Parameter</i>	<i>T-ratio</i>
Log of mean real consumption expenditure per capita	-1.448	-10.82	-1.918	-9.02
Log of Gini coefficient of consumption inequality			1.247	3.88
Dummy variable for 1995-96			0.030	0.88
Dummy variable for 2002			-0.019	-0.25
Intercept	12.944	14.64	11.780	10.41
Control for district-level fixed effects?	No		Yes	
Number of observations	51		51	
F-ratio	117.1		34.12	
R-squared	0.762		0.967	

Notes: Estimation employs household-level data from the 1990-91, 1995-96 and 2002 HIES that were aggregated up to the district level. Standard errors are corrected for heteroscedasticity using the Huber-White method.

Annex Table 2: Maximum Likelihood Probit Estimates of the Probability of a Household being Poor, 2002

<i>Independent variable</i>	<i>Parameter</i>	<i>Asymp. z-ratio</i>
Schooling years of highest-educated female in household	-0.0186	-17.89
Schooling years of highest-educated male in household	-0.0132	-13.87
Household size	0.0096	5.49
Whether household head is female?*	0.0231	2.47
Whether rural or estate household?*	0.1008	10.37
Whether Tamil?*	0.0129	0.69
Whether Tamil in an estate?*	-0.0284	-2.20
Whether Moor or Malay?*	0.0478	3.44
Log of mean district consumption expenditure per capita	-0.5021	-6.85
Gini coefficient of inequality of consumption per capita in district	0.2904	2.46
% of households in district with electricity	-0.0012	-4.26
Number of observations	14,814	
Chi-squared test	1,688	
Pseudo R-squared	0.1131	
Log likelihood ratio	-6,620	

Notes: Estimation employs unit record data from the 2002 HIES, merged with relevant district-level data. Standard errors are corrected for heteroscedasticity using the Huber-White method. All coefficients are expressed as marginal effects (i.e., the change in probability of being poor with a one-unit change in the right-side variable.) An “*” implies the variable is dichotomous. Figures in bold indicate statistical significance of the marginal effect at the 10% or lower level.

Annex Table 3: Maximum Likelihood Probit Estimates of the Probability of a Child Aged 3-59 months being Underweight, 2000

<i>Independent variable</i>	<i>Parameter</i>	<i>Asymp. z-ratio</i>
Age of child (months)	0.01044	2.88
Age squared	-0.0001	-2.35
Whether child female?*	-0.2119	-2.81
Age of child x Whether child female?*	0.0133	2.47
Age squared x Whether child female?*	-0.0002	-1.98
Birth order of child	0.0249	3.03
Log household consumption expenditure per capita	-0.0469	-2.55
Whether child's mother has:		
primary schooling?*	0.0019	0.04
secondary schooling?*	-0.0450	-0.91
GCE O/L or equivalent?*	-0.0605	-1.14
GCE A/L or equivalent?*	-0.1675	-3.22
Whether child's father has:		
primary schooling?*	-0.0661	-1.47
secondary schooling?*	-0.1013	-2.26
GCE O/L or equivalent?*	-0.0980	-2.05
GCE A/L or equivalent?*	-0.1489	-2.93
Whether household has electricity?*	-0.3504	-1.88
Whether household has a flush toilet?*	-0.0720	-2.86
Whether household has piped water?*	-0.0914	-3.82
Number of observations	2,424	
Chi-squared test	278.91	
Pseudo R-squared	0.0944	
Log likelihood ratio	-1,338	

Notes: Estimation employs unit record data from the 2000 DHS, merged with relevant district-level data. Standard errors are corrected for heteroscedasticity using the Huber-White method. All coefficients are expressed as marginal effects (i.e., the change in probability of being poor with a one-unit change in the right-side variable.) An “*” implies the variable is dichotomous. Figures in bold indicate statistical significance of the marginal effect at the 10% or lower level.

Annex Table 4: Maximum Likelihood Probit Estimates of the Probability of a Child Dying before Age 12 and 60 months, 2000

<i>Independent Variable</i>	Infant mortality		Under-five mortality	
	<i>Parameter</i>	<i>Asymp. z-ratio</i>	<i>Parameter</i>	<i>Asymp. z-ratio</i>
Whether child twin?*	0.0170	3.00	0.0301	4.61
Child's birth order	-0.0032	-1.34	-0.0049	-1.86
Child's birth order x Whether child female?*	0.0036	2.15	0.0029	1.55
Whether child's mother has post-primary schooling?*	-0.0032	-0.85	-0.0031	-0.76
Whether household has access to piped water?*	0.0063	1.79	0.0108	2.74
Whether household has access to sealed toilet?*	-0.0065	-1.74	-0.0055	-1.35
Whether household has electricity?*	-0.0032	-0.93	-0.0016	-0.42
Whether household head is female?*	0.0002	0.06	0.0001	0.01
Whether child's mother has been immunized against rubella?*	-0.0022	-0.77	-0.0080	-2.52
Mother's age at child's birth	-0.0006	-2.02	-0.0006	-1.98
Log of mean district consumption expenditure per capita	-0.0315	-1.76	-0.0382	-1.91
Number of observations	3,513		4,708	
Chi-squared test	46.47		56.09	
Log likelihood ratio	-200		-350	
Pseudo R-squared	0.1042		0.0741	

Notes: Estimation employs unit record data from the 2000 DHS, merged with relevant district-level data. Standard errors are corrected for heteroscedasticity using the Huber-White method. All coefficients are expressed as marginal effects (i.e., the change in probability of being poor with a one-unit change in the right-side variable.) An "*" implies the variable is dichotomous. Figures in bold indicate statistical significance of the marginal effect at the 10% or lower level.

