

Rural-Urban Comparison of Human Resource Development in Northern Region of Bangladesh



Ph.D. Dissertation

*Submitted to the University of Rajshahi for the degree of
Doctor of Philosophy in Economics*

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June 2018

Dedicated

To

*My Parents, Wife
and Daughter*

Declaration

I do, hereby declare that the dissertation titled “**Rural-Urban Comparison of Human Resource Development in Northern Region of Bangladesh**” submitted to University of Rajshahi, Bangladesh for the Degree of Doctor of Philosophy is a completely new and original work of mine carried out under the supervision and guidance of Dr. Md. Abdul Wadud, Professor, Department of Economics, University of Rajshahi, Rajshahi.

I do also declare that no part of this thesis, in any form, has been submitted before to any other University or institution for any Degree.

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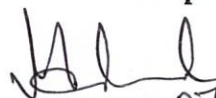
Certificate

This is to certify that the dissertation titled “**Rural-Urban Comparison of Human Resource Development in Northern Region of Bangladesh**” is a research work done by Md. Zahedur Rahman. This dissertation is carried out under my direct supervision and guidance. To the best of my knowledge, no part of the thesis has been submitted before for any degree to any University or Institute.

I also certify that I have gone through the thesis and found it satisfactory for submission to the University of Rajshahi, Bangladesh for the degree of Doctor of Philosophy.

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List of Acronyms

BANBEIS	Bangladesh Bureau of Educational Information and Statistics
BBS	Bangladesh Bureau of Statistics
BER	Bangladesh Economic Review
BMI	Body Mass Index
BTRC	Bangladesh Telecommunication Regulatory Commission
CBN	Cost of Basic Needs
CHNS	China Health and Nutrition Survey
DHS	Demographic and Health Survey
CMR	Child Mortality Rate
CPR	Contraceptive Prevalence Rate
GDI	Gender Development Index
GDP	Gross Domestic Product
GER	Gross Enrolment Ratio
GII	Gender Inequality Index
GNP	Gross National Product
GOB	Government of the People's Republic of Bangladesh
GPI	Gender Parity Index
HD	Human Development
HCR	Head Count Rate
HEPC	Health Expenditure Per Capita
HDI	Human Development Index
HDR	Human Development Report
HDSA	Human Development in South Asia
HIES	Household Income and Expenditure Survey

HRD	Human Resource Development
LFS	Labor Force Survey
IMR	Infant Mortality Rate
MDGs	Millennium Development Goals
MPI	Multidimensional Poverty Index
NIEs	Newly Industrialized Economies
NER	Net Enrolment Ratio
OECD	Organization of Economic Cooperation and Development
PSLM	Pakistan Social and Living Standards Measurement
PPP	Purchasing Power Parity
PQ LI	Physical Quality of Life Index
QLFS	Quarterly Labor Force Survey
RORE	Rates of Return to Education
SES	Structure of Earnings Survey
SOFI	State of Food In Security
SVRS	Sample Vital Registration System
UE	European Union
UN	United Nations
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nation's International Children's Emergency Funds
WB	World Bank
WDI	World Development Indicators

Abstract

Human resource development is an important issue in the socioeconomic arena of Bangladesh. It has now gained greater importance in the context of globalization. This study makes a comparison between rural and urban areas in terms of socioeconomic and human resource development indicators. It also attempts to estimate the rates of return to schooling in both rural and urban areas. In doing so, we use primary data collected from field household survey, using multistage stratified random sampling techniques. Secondary data are also used to make an overview of the study area. The study collects data from 600 households, among them 300 are selected from rural area and the rest 300 are taken from urban area, using random sampling technique. In order to estimate the private rates of returns to education in both rural and urban areas, we apply the basic and extended version of Mincerian earnings models. We also use regression equation to assess the influence of schooling on the life expectancy in both the areas. Logistic regression model is used to assess the effect of schooling on sanitation status in both the areas. We use similar specification for both the rural and urban areas.

Survey results show that the socioeconomic and human development related indicators such as schooling, income, life expectancy, access to better sanitation are significantly high in urban area compared to rural area. Through this study, it is found that the child mortality rates are higher in rural area than in urban, and mothers' education influences the rates of child mortality. As regards the level of literacy, there has been marked disparity between urban and rural population. Urban people receive more education and their earnings are higher than rural people.

Empirical findings indicate that the HDI value of urban area is higher than rural area. Results of the Mincerian earnings function suggest that returns to education increase with years of schooling in both rural and urban areas. Results show that returns to education are generally positive and significant both in rural and urban areas. The returns to education in rural areas (7.8 percent) are slightly higher than those in urban areas (7.5 percent). The rate of return on tertiary education is higher compared to primary, secondary and higher levels of education in both areas. Experience of individuals exerts no significant effect on earnings in rural area while experience leads to increase in earnings significantly in the urban area but has a non-linear effect both in rural and urban area.

Regression results report that there is a positive and significant relationship between schooling and life expectancy. When we include all levels of education using dummies in a single regression equation, results suggest that secondary education significantly contribute to increase life expectancy in rural area. Findings also suggest that secondary education in both rural and urban areas and higher education in urban area have positive relationship with life expectancy and are collectively significant. Regression result implies that there exists a positive and significant relationship between health expenditure and life expectancy in both the areas.

Logistic regression results signify that higher level of educated individuals are more likely to practice sanitation than their lower educated counterparts in both rural and urban areas, and urban population are more likely to have access to improved sanitation compared to rural population. Among the professions, service holders are more likely to have better access to sanitation facilities in both the areas. So there are marked disparities between rural and urban areas in terms of socioeconomic and human resource development indicators. Right and effective policies that can reduce the

inequality between rural and urban areas in terms of socioeconomic indicators are required. To eliminate urban-rural discrimination, budgetary allocation should be transferred to education and health in proportion to rural-urban population. So the government has to make investment in education, health and other social services for all classes of people, but much emphasis on the rural should be given.

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Chapter 1

Introduction

1.1 Background

Development of human resources in a country or a region is of paramount importance for economic development of the nation or region and also enhancing the quality of life of the people, residing rural or urban areas, that is, the changing structure would provide more opportunities for the individuals to develop. Coping with changes in market situation, rising expectations of the employees, development in science and technology and changes in management systems have necessitated increased emphasis on human resource development (Kaur, 1996, p. 2). In the age of globalization and repeated changing dimension of technology, the importance of human resource development is increasing day by day. A number of noted economists such as Schultz (1962), Harbison (1962), Denison (1962), Bowman (1964), Machlup (1962), Mincer (1962), Kuznets (1965), Becker (1964), Kendrick (1961) and Abramovitz (1956) have emphasized the importance of human capital formation in economic development. In the words of Lucas (1993), "The main engine of growth is the accumulation of human capital—of knowledge—and the main source of differences in living standards among nations is a difference in human capital". Even earlier economists, such as, Veblen and Marshall (1930) and Smith (1930) have stressed the importance of investment in human capital. Marshall (1930) looks upon education "as a national investment" and the wisdom of spending public and private fund is not measured in direct fruits alone. Education is widely regarded as one of the most important variables in determining the prosperity of individuals and the wealth of nations (Humphreys, 1999). Education turns

human into human resources or manpower or more appropriately into human capital. The scarcity of funds for human development and human capital formation is one of the major factors responsible for economic stagnation in LDCs. Underdeveloped countries are confronted with a contrast of a surplus of unskilled labor in the face of a scarcity of skilled labor and competent entrepreneurs. No sustainable development can be possible without human development and human capital formation, better utilization of the existing productive capacity, installation of additional capacity and management of the ecological and environment balance (Mandal, 2000, pp, 98-100). According to the World Bank's assessment for 192 countries, physical and natural capital, on an average, accounts for only 16 percent and 20 percent of total wealth respectively. And more important still is human capital, which accounts for 64 percent. The dominance of human capital is particularly marked in high-income countries. In some countries, such as, Germany, Japan and Switzerland, it accounts for as much as 80 percent of total capital. This underlines the importance in poor countries of using income from natural resources to develop human capabilities (World Bank, 1995b). By analyzing the experience of 192 countries, the World Bank concludes, that as much as two-thirds of the wealth of nations consist of human and social capital. In countries like Japan which lacked a good natural resource base, human and social capital have contributed 85 percent to the total national wealth, but share of physical capital is 14 percent and natural capital contributes only 1 percent (World Bank, 1995a).

So, human capital formation can rightly be regarded as an essential ingredient for sustainable development. The importance can be assessed from theoretical and empirical point of view. Harbison (1973, p. 3) has rightly said, "Human resources constitute the ultimate basis for the wealth of nations. Capital and natural resources are

passive factors of production; human beings are the active agents, who accumulate capital, exploit natural resources, build social, economic and political organizations, and carry forward national development. Clearly, a country which is unable to develop the skills and knowledge of its people and to utilize them effectively in the national economy will be unable to develop anything else.”

Bangladesh is the home of 161 million of populations in 2015. This population is growing rapidly and the rapidly increasing population poses one of the key challenges to human development particularly in rural areas. If the current population growth rates (1.2 percent) are not slowed down in Bangladesh, the total population in Bangladesh will be 185.1 million by the year 2030 (UNDP, 2016). The additional population of 24.1 million by 2030 will impose a tremendous burden on more slowly expanding food supplies, housing, basic social services, education and health, employment and the environment. The age structure of the population is not favorable for the economic development, since 44.9 percent of total populations are under 15 years and 105.6 millions of the total populations are between 15-60 years. About 7.6 percent of the population is above 65 years in 2015. The economically active population or labor force participation rate in Bangladesh is 62.2 percent in 2015. In 2010- 2014, about 47.5 percent of total economically active population are employed in the agriculture sector, while 35.3 percent are in services and other sectors and manufacturing contribute the rest (UNDP, 2016). For the development, the country must invest considerably more on human development than it is doing at present. If proper investment is made in human resource development today, demographic dividend may reap tremendous benefits in terms of economic growth and development.

1.2 Statement of the Problem

Human resource development has been an important issue in the socioeconomic arena in Bangladesh. The twenty first century is considered as the age of human resources. We are now in the age of knowledge based economy. In the changing economic order of the world today, sustained economic growth and development depend on intense competition through increased productivity and technological innovations. If a country is unable to develop its human resources, the development of material resources becomes meaningless. Human resource development is central to the pursuit of sustainable economic growth. So, the economic growth and development depends to a great extent on human resource development. The economy of Bangladesh is predominantly rural. About 65.7 percent of the country's population live in rural areas and only 34.3 percent reside in urban areas (UNDP, 2016). Higher proportion of rural population would mean lower level of human resource development (Housing and Building Research Institute, 2011). Poverty is widespread in the country and more so in the rural areas. Using the upper poverty line, the Head Count Rate (HCR) of incidence of poverty is estimated at 24.3 percent at national level, while 26.4 percent of rural population live in poverty, the corresponding figure for urban population is 18.9 percent. Using the lower poverty line, the HCR of incidence of poverty is estimated at 12.9 percent at national level, 14.9 percent in rural area and 7.6 percent in urban area in 2016 (Preliminary Report on Household Income and Expenditure Survey, 2017). There are largely disparities in income and expenditures patterns and the income gap between rural and urban areas are widening day by day.

There exists variation in income between rural and urban areas of the country. The average monthly household nominal income is Tk.15,945 at the national level, Tk.13,353 in rural area, and Tk.22,565 in urban area; and the monthly household expenditure is estimated at Tk.15,715 at the national level, Tk. 14,156 in rural area and Tk.19,6797 urban area in 2016 (Preliminary Report on Household Income and Expenditure Survey, 2017). The average monthly household expenditure is estimated at Tk.15,715 at the national level while it is Tk.14,156 in rural area and Tk.19,697 in urban area. The average monthly household consumption is accounted at Tk.15,240 at the national level while it is Tk.13,868 in the rural area and Tk.19,383 in the urban area in 2016. There exists urban-rural variation in access to toilet facilities. In the rural areas, 19.32 percent households have reported having sanitary latrine, while 41.73 percent households have reported the same in the urban areas in 2016. Water sealed *pucca* latrine is reported to own by 25.25 percent by urban households compared to 15.30 percent by rural households. *Pucca* latrine (not sealed) is reported to use by 15.14 percent of urban households as against 18.65 percent of rural households. Use of open space is 3.75 percent in rural areas as against 0.94 percent in urban areas. Sources of drinking water vary between rural and urban areas. In 2016, 2.14 percent rural households use supply water compared to 28.0 percent urban households. In rural areas, 94.94 percent households use tube-well water compared to 60.18 percent urban households. It is observed that 2.93 percent households in rural areas use water from all other sources (mostly unsafe) beyond supply water and tube well as compared to 2.53 percent in the urban areas in 2016 (Preliminary Report on Household Income and Expenditure Survey, 2017).

In the arena of education, despite improvements in literacy and enrollment rates, most indicators remain dismal-worse particularly in rural areas. At the national level, literacy rate for both sexes (aged 7 years and over) is estimated at 65.6 percent and the corresponding rates for rural and urban areas are 63.3 percent and 71.6 percent respectively. For males, literacy rate is 67.8 percent at the national level, while the rate stands at 65.5 percent in rural area as against 74.0 percent in urban area. At the aggregate level, female literacy rate is 63.4 percent and the corresponding rates for rural and urban areas are 61.2 percent and 69.3 percent respectively. The difference is about 8.10 percentage point in 2016. For rural area, the rates are substantially lower. Thus rural-urban differences are evident in literacy rates. In 2016, gross enrollment ratio at the primary level stands at 113.72 percent for both sexes at the national level. In rural areas, gross enrollment ratio of both sexes, boys and girls are respectively 115.56 percent, 115.39 percent and 115.75 percent. While in urban areas, gross enrollment ratio for both sexes, boys and girls, stand at 107.91 percent, 110.57 percent and 105.31 percent respectively. The rate of enrollment is higher in rural areas as compared to urban areas which is commendable (Preliminary Report on Household Income and Expenditure Survey, 2017). At the aggregate level, the highest literacy rate (7 years and over) of Barisal division is 56.75 percent, followed by Dhaka division (54.19 percent), Khulna (53.23 percent), Chittagong (52.69 percent), Rajshahi (48.05 percent, Rangpur (47.19 percent) and Sylhet (45.09 percent) in 2011 (BBS, 2012). Among the seven divisions, Rangpur has occupied the 6th position in term of literacy rate.

Bangladesh has performed well in the health field than in the education field with a much faster reduction in its infant and child mortality rates than the neighboring

countries. The infant mortality rates have declined substantially during the nineties and onward due to improvements in the health system in Bangladesh. The number of children dying at birth has been brought down significantly. Similarly, the number of children dying before reaching the age of five has been brought down in Bangladesh. This can mainly be attributed to improved immunization coverage in Bangladesh. In 2015, the infant mortality rate in Bangladesh at national level, is 29 per 1,000 live births and the corresponding rate in rural area is 29 per 1,000 live births as against to 28 per 1,000 live births in urban area. Although the infant mortality rate is very high in Bangladesh compared to both developed and developing countries, Bangladesh has displayed a higher infant mortality rate compared to Sri Lanka (8.2) and Maldives (8.4) (MDGs, 2016). However, Bangladesh has a lot of room for progress in reducing infant mortality rate. Water gives life to everything, including human development and human freedom. When people are denied access to clean water at home or when they lack access to water as a productive resource, their choices and freedoms are constrained by ill health, poverty and vulnerability (UNDP, 2005). Bangladesh has made great strides in improving the access of safe drinking water to its people. About 84.0 percent of total populations have access to improved water sources at national level, where 84.0 percent people in rural and 86.0 percent people in urban area have access to improved sources of water. Only 57.0 percent of total populations have access to improved sanitation facilities and the rest 43.0 percent people lack access to even basic sanitation facilities at the national level in 2014. About 57.0 percent and 56.0 percent populations in rural and urban areas respectively have access to improved sanitation facilities in 1990-2014. Though the urban-rural gap has narrowed, we are far yet from reaching the national target of 100 percent of

population having access to improved sanitation facility (Millennium Development Goals, 2016).

Bangladesh has achieved a strong and consistent upward trend in life expectancy during the post-independence period. The life expectancy, on an average, is 71.6 years in 2016. Multiple factors are responsible for increasing the life expectancy for Bangladesh, the major factor being responsible for the improvement is the health system in Bangladesh. People in Bangladesh can now expect to live longer than they used to do at the start of the past decade; though there exist variation in life expectancy between urban and rural areas. The life expectancy of rural people, on an average, is 69.2 years compared to 71.5 years of urban population in 2012. The gap between urban and rural areas in terms of life expectancy is widening day by day (Household Income and Expenditure Survey, 2017).

Bangladesh has done well, especially in recent years, showing that a country can achieve significant human and social development even at relatively low levels of income. In the education sector, there is notable progress, especially in regard to increasing access and gender equity, both at primary and secondary levels. Adult literacy has improved from 37.2 percent in 1991 to 64.6 percent in 2015. Afterwards, there has been consistent but slow increase in literacy rate; it has reached 64.6 percent in 2015 with 67.6 percent for male and 61.6 percent for female (Millennium Development Goals, 2016). It has sustained a GDP growth rate in excess of six percent in recent years that has played a positive role in eradicating poverty. The robust growth has been accompanied by corresponding improvement in several social indicators, such as, increased life expectancy, reduced infant and child mortality and lowered fertility rate despite having one of the world's population densities of 1252 persons per sq. km.

(World Bank, 2017). Bangladesh has made substantial progress in reducing poverty from 56.7 percent in 1991-92 to 24.8 percent in 2015; the rate of reduction being faster in the second decade of 21st century than the earlier ones (Preliminary Report on Household Income and Expenditure Survey, 2017). On the other hand, Bangladesh has lagged behind in some major areas, such as in reducing the extent of hunger and malnutrition, ensuring that girls and boys reach the last grade of primary education, improving maternal health provision, and providing basic sanitation. In Bangladesh though the poor are found everywhere, the northern region (mainly former Rangpur Division) is the most deprived and neglected region where the extreme poor live. The estimate of HCR of poverty by divisions using the upper poverty line in 2016 indicates that Rangpur division has the highest incidence of poverty at 47.2 percent (the corresponding poverty rates for rural and urban areas are 48.2 percent and 41.5 percent respectively), followed by Mymensingh division with 32.8 percent, (32.9 percent for rural and 32.0 percent for urban area) and Rajshahi division 28.9 percent (30.6 percent for rural and 22.5 percent for urban area) and Khulna division 27.5 percent (27.3 percent for rural and 28.3 percent for urban area). On the other hand, Dhaka division has recorded the lowest HCR of 16.0 percent (19.2 percent for rural and 12.5 percent for urban area) preceded by Sylhet division 16.2 percent (15.6 percent for rural and 19.5 percent for urban area) and Chittagong division 18.4 percent (19.4 percent for rural and 15.9 percent for urban area) in 2016 (Preliminary Report on Household Income and Expenditure Survey, 2017).

About 39.0 percent of the households are reported to be economically solvent with 34.7 percent in the rural area and 43.6 percent in the urban area. More than one-third (34.5 percent) of the households have been able to maintain a balanced livelihood.

Permanent insolvency is more prevalent (11.5 percent) among the rural households than among the urban households (7.5 percent). Rangpur suffers most (14.3 percent) from permanent insolvency, while Dhaka the least (7.3 percent) in 2016 (Report on Bangladesh Sample Vital Statistics, 2017). According to HIES 2010, the average monthly household nominal income is estimated at Tk.8359 for Rangpur division followed by Rajshahi division at Tk.9342, Barishal at Tk.9258, Khulna at Tk.9569, Sylhet at Tk.11629, Dhaka at Tk.13226 and Chittagong at Tk.14092. On the other hand, the lowest average monthly consumption expenditure is recorded in Rangpur division at Tk.8292 followed by Rajshahi at Tk.9254, Khulna at Tk.9304, Barishal at Tk.9826, Dhaka at 11643, Sylhet at Tk. 12003, and Chittagong at Tk.14360 (Household Income and Expenditure Survey, 2010). So, it is clear that Rangpur division falls well below the national average (Tk.10782) in terms of both the average monthly household income and expenditure respectively.

The northern region of Bangladesh has lagged behind nationally in terms of investment and development in general and in technical education, income, health, skilled labor and manpower in particular. Furthermore, Rangpur division has lagged behind all other regions of Bangladesh, both in its income and human development level. If a country or a region is unable to develop its human resources, the development of material resources will be meaningless. There is the crying need of hour to develop the human resources for further development of the economy and enhancing the socioeconomic status of the masses; otherwise, the area would be subject to further aggravating the situation towards growing regional disparities. This is no doubt a serious problem, which should be solved for our national interest. So, the emphasis must be on building human capabilities and enabling people both in

rural and urban areas to stand on their own feet so that they are able to compete in the market place. If the potentialities of human resources are developed and properly utilized, the country may meet the challenge of the time, thereby accelerating the pace of its development.

The above analysis shows that the indicators of human resource development in the northern region of Bangladesh are not satisfactory, particularly in rural areas. This study is designed to make an evaluation how human resources development varies in rural and urban areas, and how education influences on the basic indicators of human resource development in northern region of Bangladesh. To make a comparative study of rates of returns to education in both the rural and urban areas, this study also is designed to assess the effects of schooling and experience on the household earnings.

1.3 Significance of the Study

- 1) Human resource development is the most vital element in economic development of a country in the age of globalization but still it is neglected in Bangladesh. Many important research works have already been done in this field throughout the world but there exists very little literature available addressing this issue in Bangladesh. So far the knowledge of the researcher goes no comprehensive research work on rural-urban comparison of human resource development in northern region of Bangladesh has been conducted. Rangpur is one of the backward divisions (where the extremely poor people live) of Bangladesh almost on all counts, such as, low level of household income (Tk.8359.00), least literacy rate (about 47.19 percent) in comparison to other divisions in Bangladesh (Household Income and Expenditure Survey, 2010)). In this study, the priority factors which are marked to be most important for development are basic

education, income, health care facilities, reduced child mortality and problem arising from safe drinking water and sanitation facilities etc, especially in rural areas. Due to illiteracy, most of the rural people are still ignorant and innocent on several vital issues. Education is an effective means for the transformation of the society through the development of human resources, particularly in the rural areas. Education is the real essence of human development. Education is the key to build human capital and human capital is the vital element in building a nation (HDSA, 1998). Education turns human into human resources or manpower or more appropriately into human capital. Hence education is regarded as the most valuable capital that is invested in human beings (Mandal, 2000). Education, which is recognized as a major element in human resource development, plays a very significant role. The role of education is inevitable/ essential in overall development of the country, since it is an important and crucial input for human resource development, particularly in the rural areas. It develops human resource, which has a multiplier effect on utilization of all other resources. Lipton (1977) stresses the urban bias in development laments, "Everywhere, it is government by the city, from the city and for the city." In fact, the urban population does not have such opportunities as these are required, but the rural masses are at the bottom to get these opportunities in easy access to them. If the unity, integrity and the national development are to become a reality, there needs to be better balance and integration between rural and urban development. This study signifies the direction and need of human resource development in both rural and urban areas which gradually change the socioeconomic scenario of Bangladesh.

- 2) In this study, Mincerian regression models have been used to estimate the returns to schooling. Rates of returns to different human capital factors are helpful for students to make their decisions regarding investing in education by viewing their future possible earnings. This is also important for policy makers to make decision about the resource allocation, decision to discourage or eliminate the discrimination in economic rewards against different geographical areas. Particularly, the returns to education measure can be used to see the productive performance of education which is believed to increase productivity and monetary gains not only at individual level but also at macro level.
- 3) The study is expected to add several primary contributions to the existing literature in that rates of returns to various levels of education through Mincerian earnings models are estimated for both the rural and urban areas using survey data in addition to the assessment of HDI.

1.4 Research Questions

The study proceeds with addressing the following research questions:

- (i) What is the human development status in rural and urban areas of northern region of Bangladesh and difference between these two areas in this regard?
- (ii) What are the likely effects of schooling and experience on the income in both rural and urban areas?
- (iii) What are the factors associated with levels of life expectancy and child mortality in rural and urban areas?
- (iv) What are the status of hygiene, sanitation and use of safe drinking water?
- (v) What are policy suggestions we can prescribe to the policymakers.

1.5 Objectives of the Study

1.5.1 General Objective

The general aim of the study is to examine rural-urban variations in socioeconomic and human development indicators in the northern region of Bangladesh.

1.5.2 Specific Objectives

The specific objectives of the study are as follows:

- (i) To assess human resource development status by calculating HDIs for rural and urban areas and evaluate their differences.
- (ii) To estimate the effects of schooling and experience on earnings in both the rural and urban areas;
- (iii) To estimate the influences of schooling on sanitation practice in both rural and urban areas, and show the difference between rural and urban areas in terms of hygiene and use of safe drinking water;
- (iv) To explore the effects of schooling on child mortality between rural and urban areas;
- (v) To examine the impacts of schooling on life expectancy between rural and urban areas;
- (vi) To provide some suggestions to policy makers based on the findings.

The study is conducted on the basis of primary and secondary data. Using secondary data, we have made a comparative analysis in terms of socioeconomic and human development indicators of Bangladesh in relation to its neighboring countries. Household survey is used to collect primary data from the household heads with different kinds of socioeconomic status in northern region of Bangladesh. Sampling areas are selected applying stratified random sampling techniques, and 600 households, among them 300 households from the rural areas and the rest from urban households, are chosen using the simple random sampling technique. A well structure

questionnaire is used. Mincerian models, logistic and simple regression models are applied to analyze primary data.

1.6 Structure of the Thesis

This thesis comprises of nine chapters which are as follows.

Chapter 1 presents background, statement of the problem, significance of the study, objectives of the study, research questions, data and methodology and structure of the thesis.

Chapter 2 reviews some selected literatures on human resource development and Mincerian models assessing their effects in South Asian countries including Bangladesh and around the world. It is divided into two sections: first section deals with human development situation and second section gives review of literature related to the rates of returns to education around the world including Bangladesh.

Chapter 3 provides conceptual issues of human resource development, Mincerian and logistic regression models. This chapter is divided into two sections. The first section helps understand the human development concept. This section contains definition and concept of human resource development, dimension and indicators of human development and importance of human resource development. The second section covers theoretical aspect of Mincerian and logistic models and use of Mincer model.

Chapter 4 encompasses the human development situation in Bangladesh and other South Asian countries.

Chapter 5 covers an overview of the study area that helps understand the socioeconomic and demographic condition of the study area.

Chapter 6 deals with survey methods and results. The chapter divided into two sections. The first section contains selection of the study area, sample selection and data collection, questionnaire preparation, among others, and the second section provides survey results which are presented through diagrams and tables.

Chapter 7 highlights the specifications of various models such as human development index model, Mincerian models, a set of logistic regression models and discusses estimation procedures.

Chapter 8 deals with the empirical findings, where attempt is made to analyze and interpret results.

Chapter 9 gives the summary of survey results and main empirical findings. It also provides conclusion and some policy implications related to the findings of the study and identifies where future research is needed.

Bibliography and appendix are given at the end of the thesis.

Chapter 2

Review of Literature

2.1 Introduction

Human research development has been an important issue in the socioeconomic arena in Bangladesh in recent years. It is the central focusing point of issue in the arena of development literature now-a-days. The term human resource or human capital is used for the knowledge, skills, or competences and capabilities that individuals possess. These skills or competences and capabilities mainly come through schooling and training and many others factors (Bhatti, 2013). Human capital theory (Mincer 1958, 1974; Becker, 1964) states that education and training causes increase in the productivity of individuals by increasing their skills and knowledge. Increase in skill and knowledge result in increased earnings for individuals. There are many ingredients for the development of human resources. Among them, education is the most important instrument (Sharma and Sharma, 1989, p, 66). Education plays a crucial role in determining wages. Evidence suggests that more educated workers earn higher wages, work in better paying firms, sectors, and occupations than their counterparts with less education (Schultz, 2003; Psacharopoulos and Patrinos, 2004). Numerous researches have been undertaken by the researchers (Schultz, 1962; Denison, 1962; Becker, 1964; Hobcraft et al., 1984; Hossain, 1990, 2000; Sen, 1999; Haq, 1995, 2003; Kaur, 1996; Hye, 2002; Sahn and Stifel, 2002; and Islam, 2007) on human resource development and to estimate the rate of returns to education (Psacharopolous, 1972, 1973, 1985, 1989, and 1994; Mincer, 1958 and 1974; Ahmad, 2003; Harmon et al., 2003; Banerjee and Duflo, 2005; Assadullah, 2006; Shafiq, 2007; Abbsa and Peck, 2007; Colclough et al., 2010; Purnastuti et, al., 2011; Psacharopoulos and Patrinos, 2012; and Fink and

Peet, 2014; Montenegro and Patrinos, 2014; Patrinos, 2016; and many others) throughout the world.

The remainder of this chapter is organized as follows: section 2.2 discusses studies related to the human development situation in South Asia as well as in the world; section 2.3 looks at studies regarding to rates of returns to education; and section 2.4 gives a conclusion highlighting research gap.

2.2 Studies Related to Human Development Situation

World Bank (1980) shows that educating girls may be one of the best investments, a country can make in future economic growth and welfare, even if girls don't enter the labor forces. Most girls become mothers and their influence is much more than the father's on their children. Health studies in Bangladesh, Kenya and Colombia indicate that children of the more educated mothers are less likely to die, even allowing for differences in family income. More usually, education enhances the chance of paid employment for girls. In Brazil, married women having secondary education are three to four times more likely to be employed than those with primary education. The earnings expectations or job preferences of school leavers may not keep pace with changes in labor market situation occurred by increased numbers of workers with educational credentials.

Hobcraft et al. (1984) takes into account the socio-economic differences in infant and child mortality for 28 countries. It examines the impact of mothers' education and work status, husband's occupation and education, and location of residence on infant and child mortality. Considerable regional variations are found in the impact of mother's education. Mother's education is closely linked with mortality during the first five years of life in the Asian countries, but husband's education is more important in the

Americans. In the four African countries (such as Senegal, Lesotho, Kenya and Sudan), child mortality is found to be closely related with husband's education and occupation.

United Nations (1985) publishes a study on a large number of factors related with mortality in 15 developing countries. This study considers variables like the occupational and educational status of parents, urban/rural residence, religion, ethnic group, and the availability of health facilities, piped water and flush lavatories. All these variables are included in the UN's estimation equation, and the impact of one year more schooling of a mother decreases 3.4 percent infant mortality. The study indicates that about ten years of schooling would effect a reduction of mortality at least 34 percent, on an average. On the other hand, when other variables are held constant, all other factors in the UN's analysis show mild or weak effects. The sum of direct mortality effect would be less if a woman is imparted ten years of schooling than doubling (every ones) income.

Using the collected data on 400 households from the rural areas of Bathinda district of Punjab in India, Kaur (1996) estimates a regression equation to examine the impact of various levels of education on the quality of life and human resources development in rural areas. The researcher reports that the higher the level of family literacy, the higher is the quality of life, the greater is awareness and the quicker the decision making. The findings again suggest that literacy level of the respondents has greater impact upon the quality of life in rural areas. Higher level of literacy has a bearing on the people's outlook, the highly educated are prone to change and have no beliefs in destined status. So, literacy level and belief in destiny are negatively associated. Finally, the report has drawn the conclusion that education along with other factors of human resource development can transform the attitude of the rural areas.

The first report of Human Development in South Asia (1997) focuses on the human development situation of South Asia. The report reveals that the South Asian region is lagging behind all other regions of the world in the terms of its human development. South Asia has fallen behind Sub-Saharan Africa in terms of adult literacy. Starting from an average adult literacy rate of 32 percent in 1970, South Asia has reached a level of 48 percent by 1993. During the same period, Sub-Saharan Africa has almost doubled its adult literacy level, from 27 percent to 55 percent. Yet South Asia has performed well in the field of health with a much faster reduction in its infant mortality rate than Sub-Saharan Africa. Infant mortality has been cut down by one-half in the last three decades. Access to clean drinking water has increased by nearly 60 percent over the last decades. The report exhibits that life expectancy has increased by 17 years, from 44 in 1960 to 61 in 1993. South Asia has done better than Sub-Saharan Africa in economic growth. Its real per capita income (in PPP dollars) has increased by 2.3 percent a year between 1960 and 1993. The report suggests that South Asia can learn from the experience of East Asia because three decades ago, the two Asian regions launched at roughly the same nominal per capita income but the East Asia now enjoys 27 times the per capita of South Asia and twice of its Human Development Index. There are many factors, which have contributed to such a wide divergence in the relative performances of the two regions. Among them investment in education has played critical role to develop the human resource. East Asia invests two or three times more on education out of its GDP than does South Asia and it emphasizes universal, high-quality primary and technical education, accompanied by a largely self-financed university education system.

In analyzing the structure of education in South Asia, the second report of Human Development in South Asia (1998) presents a highly disturbing profile of education in

the countries of South Asia, excluding Sri Lanka and Maldives. The report focuses on the creation of relevant technical skills to promote South Asia for facing the challenge of globalization in the twenty first century. In this report it is noted that education is the passport to accelerated economic growth, especially in a rapidly globalizing world economy. Only societies that have achieved relevant knowledge and skills can compete heroically in global markets. This has been the experience of the East Asian countries. By combining their low wages with relevant education and skills, they turn their population into an asset and increase their economic productivity and growth. But in fact, South Asia is producing too low skills at present generally they are not fit for the job market. The systems of education and training in the region have failed to produce a critical mass of qualified workforce to compete in the global market. There is a high incidence of unemployment and underemployment among the young, which forces them into jobs that provide poor wages and do not contribute to increasing the productivity and efficiency of the economy. The experience in some parts of South Asia has been extremely encouraging. Sri Lanka and Maldives have already achieved over 90 percent adult literacy rate and near universal primary school enrolment. Bangladesh is beginning to make rapid strides in school enrolment, particularly through the vigorous efforts of its civil society organizations. Some states in India, such as Kerala, have already attained a very high rate of adult literacy and primary school enrolment. The report notes that whenever and whatever basic education is spread, the social and economic benefits are quite dramatic and visible.

Hye (2002) states human resource development is the central to the pursuit of sustainable economic growth. With 1.3 billion people and a cheap labor force of about 600 million South Asia has a comparative advantage. Even compared to other Asian countries in terms of labor cost, a South Asian laborer (in the manufacturing sector) is almost doubly

productive than his counterpart in the rest of Asia as a whole. But while other Asian nations, particularly the NIEs (Newly industrialized economies), and the world at large, have made tremendous technical progress, South Asia lags far behind. It is the poorest region of the world and the people of the region bear the heavy burdens of human deprivation. It contains more than 40 percent of the world's poor, having little or no access to adequate nutrition, health, housing, water, sanitation, education and employment. To come out of such deprivation and despair, particular attention should be given to basic and technical education. The world has entered the age of knowledge based economy. In the changing economic order of the world today, sustained economic growth and development depend on intense competition through increased productivity and technological innovations. That is why, the region needs to invest more in human development in such sectors as education, training, skill development, health and nutrition.

Considering the secondary data of 198 countries, UNICEF (2004) gives report on health, education, equality and protection for every child. The report suggests that there is no tool for development more effective than the education of girls. Education saves and improves the lives of girls and women. Girl's education is the most effective means of fighting many of the great challenges to human development. It is this power that produces all other developmental and social benefits. Regions like South East Asia, Latin America that have invested in girl's education have shown higher levels of economic development. GDP per capita increases in proportion to the girl's primary enrollment rate. This report focuses that countries, which cannot raise the education levels of men and women equally, have to incur more for development and face slower growth and lower income. This study shows that if girls gain literacy and language skill in school, it results in improved health outcome for themselves, for their children and

grand children. One benefit of educating girls is a greater balance between family resources and family sizes. If a society can ensure educated mothers, children will surely be healthier and only fewer will die. Children of more educated women are usually better nourished and less sick. The effect of the education of the mother on her child's health and nutrition is so significant that one additional year of maternal education decreases the mortality rate of children under 5 by between 5 to 10 percent.

UNICEF (2005) shows that the disparities between rural and urban areas in access to safe water and basic sanitation are large. Globally, access to improved drinking water sources is 95 percent in urban areas, compared with 73 percent in rural areas. The urban-rural divide in drinking water is at its widest in sub-Saharan Africa, where 81 percent of people in urban areas are served, compared with 41 percent in rural areas. Moreover, more than 1.2 billion people have access to improved drinking-water sources over the period 1990–2004, nearly two thirds live in urban areas. Of the more than 1 billion people who remain without access to safe drinking water, about 900 million live in rural areas, where journeys to collect water tend to be longer than in urban areas. Three quarters of the world's rural population must collect water from a communal source, and they must collect sufficient amounts not only for drinking but for the cooking and washing needs of the whole family. Urban sanitation coverage worldwide is more than twice as high as rural coverage in 2004, 80 percent in urban areas, compared with 39 percent in rural areas. Of the 2.6 billion people currently without access to basic sanitation, 2 billion live in rural areas. The urban-rural disparity is largest in South Asia, where 63 percent of the urban population versus 27 percent of the rural population is served. Access to water and sanitation is nearly always higher in urban than in rural settings, except for countries (only in industrialized countries) that have achieved universal coverage. Globally, 80 percent of people living in urban areas

and 39 percent of people living in rural areas have access to improved sanitation facilities. The largest regional disparities are found in South Asia.

HDSA (2005) shows that the improvements in reducing infant and child mortality rates have been particularly rapid in Bangladesh where it is estimated that both rates have been falling by more than 5 percent a year during 1990-2003. Despite the progress in reducing infant and child mortality rates the numbers are still among some of the highest in the world. The risks of infant and child mortality vary across countries in south Asia: Pakistan, for instance, has the greatest risk of infant and child mortality where the infant mortality rate is 81 per 1,000 live births and child mortality is 103 per 1,000 live births. The risk of child mortality in India is 87, Bhutan 85, Nepal 82, Maldives 72, Bangladesh 69 and Sri Lanka having the lowest risk of child death of 15 per 1,000 live births. The report also indicates that, in South Asia, overall life expectancy has increased by 43 percent during the period 1960-2002. This means on average an individual in South Asia can expect to live 19 years longer than he/she could expect in 1960. These gains in life expectancy have occurred across South Asia with life expectancy in 2003 ranging from 74 years in Sri Lanka to 62 years in Nepal. However, the region still has one of the lowest life expectancy in the world, second only to Sub-Saharan Africa- a region where HIV/AIDS has taken its toll.

UNICEF (2005) surveys of selected countries across Latin America and the Caribbean, South Asia and sub-Saharan Africa including Cameroon, Cote d'Ivoire, Eritrea, Guinea-Bissau, Guyana, India and Suriname and finds that on average, children with uneducated mothers are at least two times as likely to be out of primary school as children whose mothers have completed primary school. The role of mothers' education is supported by another study of children aged 7 to 14 years in 18 Sub-Saharan African countries; the study shows that 73 percent of children with educated

mothers have attended school, compared to only 51 percent of children with mother having no education. Furthermore, children with a formally educated primary care giver are less likely to repeat a grade or drop out school early.

UNDP (2005) shows that in the era of globalization the world has been marked by dramatic progress in technology, trade and investment and an impressive increase in prosperity. But gains in human development have been less impressive. Large parts of the developing world are lagging behind. Human development gaps between rich and poor countries, already large, are widening. Progress in child mortality, the most important human development indicators, is slowing, and the child death gap between rich and poor countries is widening. On average, people in developed countries are healthier, better educated and less impoverished and they are more likely to live in democracy. The report reveals that education of women is closely related with child mortality. The under-five mortality rate is twice more in case of the illiterate mother than that of literate mothers, who have completed middle school. Better educated mothers are less prone to under nutrition, are likely to use basic health services, get fewer children in advance and are more likely to have child at bigger gap. All these factors are closely related with child survival. The report also shows that since 1990 Bangladesh has recorded some of the developing world's most rapid advances in basic human development indicators. Child and infant mortality rate has been falling at more than 5 percent a year; the fertility rate has declined rapidly and malnutrition among mothers has reduced from 52 percent in 1996 to 42 percent in 2002. Primary school enrolment rates have stood more than 90 percent, up from 72 percent in 1990, with close to gender parity, and enrolment in secondary education has been increasing.

UNICEF (2006) suggests that in every developing country where disaggregated data by household income are available, children living in the wealthiest 20 percent households are significantly more likely to reach their fifth birthday than those living in the poorest

20 percent. Latin America and the Caribbean are the regions with the highest disparities in household income in the developing world; countries in this region also have among the highest inequalities in child mortality. Children born into the poorest household are five times more likely to die before their fifth birthday than children from the richest 20 percent of the population in Peru. On average, a child living in the poorest 20 percent of households is three times more likely to die than a child living in the richest quintile in East Asia and the Pacific region, a half times more likely to die in the Middle East and North Africa and around twice as likely in the South Asia. The report also exhibits that rural areas have a tendency to be poorer and more difficult to receive health services and education than urban areas. Accordingly, in all countries where household data on child mortality rates are available, rural children are more likely to die before the age of five than their urban peers. Some 30 percent of rural children in developing countries are out of school, compared with 18 percent of those living in urban areas and more than 80 percent of all children out of primary school live in the rural areas.

UNDP (2006) focuses that to have access to water for life is a basic human need and fundamental human right that profoundly influences human potential and human progress. Clean water and sanitation are among the most powerful preventative medicines for reducing child mortality. Clean water and sanitation would save the lives of countless children, support progress in education and save people from disease. Every year some 1.8 million children die as a result of diarrhoea and other diseases caused by unclean water and poor sanitation. At the start of the 21st century unclean water is the world's second biggest killer of children. This report states that one of the deepest disparities in water and sanitation is between urban and rural areas. For developing countries as a group, improved water coverage is 92 percent for urban areas but only 72 percent for rural areas. Part of the rural-urban gap can be traced to

differences in incomes and poverty: income deprivation is generally more marked in rural areas. Water for life in the household and water for livelihoods through production are two of the foundations for human development. If people have no access to clean water at home or they are unable to have access to water as a productive resource, their options and freedoms are restrained by ill health, poverty and vulnerability. Yet, in our increasing prosperous world, more than 1 billion people lack the right to clean water and 2.6 billion people lack access to adequate sanitation. The report points out that the root causes of the crisis in water can be attributed to poverty, inequality and unequal power relationships, as well as broken water management policies that exacerbate scarcity. Every man has a right to have access to at least 20 liters of clean water each day to meet the basic right since the minimum threshold is about 20 liters of water a day. The report indicates that the problem varies among and within countries. At the start of 20th century, in the rich countries clean water is available, but in some countries there are still shortages for clean water. In developing countries, some 1.1 billion people do not have access to a minimal amount of clean water. For example, coverage rate of clean water in Sub-Saharan Africa is lowest and in Asia most people live without clean water. Most of the 1.1 billion people are categorized as lacking access to clean water, use about 5 liters a day-which is one tenth of the average daily amount used in rich countries to clean toilet. On average, people in Europe use more than 200 liters; in the United States it is more than 400 liters. The fact is that income matters but basically public policy shapes the conversion of income into human development.

Drawing on Demographic and Health Survey (DHS) data from 60 countries, World Bank (2006) examines how the health of children varies across population groups defined by mother's education, urban or rural residence, and parent's economic status, proxied by an index of household ownership of consumer durables. This report shows

that for Colombia, Jordan, Mali, Niger, Mozambique, Indonesia and Brazil, infant mortality rates vary markedly from a low around 25 per 1000 live births in Colombia and Jordan, to more than 125 per 1000 live births in Mali, Niger and Mozambique. But even where overall infant mortality rates are high, the corresponding figures for child mortality whose mothers have a secondary education or higher are dramatically lower. The risk of death among children with well-educated mothers in Mali, for example, is about the same as that for the average child in Indonesia. While the overall infant mortality rate in Brazil lies below 50, the rate for children whose mothers have not been educated is roughly twice as high. Further analysis indicates that the infant mortality rates are rapidly differentiated across population groups defined by urban-rural residence and economic status proxied by asset ownership.

Islam (2007) empirically examines economic, social, human and composite indicators of development of Bangladesh in relation to its neighboring countries over the past 30 years. The neighboring countries such as India, Pakistan, Nepal, Sri Lanka and Bhutan of South Asia are included in the study for comparative analysis. Furthermore, a comparison is made with other countries in the world, particularly with an advanced country like Sweden. Empirical evidence shows that Bangladesh has achieved considerable progress in terms of various indicators of development and the country has a lot of room for improvement. The life expectancy in Bangladesh is 58.6 years in 1998 compared to 78 years in Sweden, which is a developed industrialized country. This represents a difference of 20.1 years. Similar large difference is observed for other South Asian countries in comparison to Sweden except Sri Lanka. For Sri Lanka, the difference between Sweden and Sri Lanka is 5.4 years. It is surprising to see that a developing country such as Sri Lanka has achieved a life expectancy that is quite close to that of Sweden. Empirical evidence shows that the life expectancy in Bangladesh is

58.6 years in 1998 compared to 73.3 years in Sri Lanka, a difference of 14.7 years. Further, the difference in life expectancy between Pakistan and Sri Lanka is 8.9 years, between India and Sri Lanka is 10.4 years, between Bhutan and Sri Lanka is 12.1 years and between Nepal and Sri Lanka is 15.5 years, in 1998. In terms of overall literacy rate, Bangladesh has the lowest adult literacy rates in the South Asian region. India has performed better than Bangladesh, but Sri Lanka is the star performer. The infant mortality rate in Bangladesh in 1998 is 79 per 1000 live births compared to 4 in Sweden, 17 in Sri Lanka, 69 in India and 72 in Nepal. Bangladesh displays a lower infant mortality rate compared to Pakistan (95) and Bhutan (84). With respect to providing access to sanitation, Pakistan, Bhutan and Sri Lanka have much better record than Bangladesh, India and Nepal. The achievement of Sri Lanka is similar to advanced industrialized countries, such as, Sweden and undoubtedly much better than all other South Asian countries. If one compares the performance of Bangladesh in comparison with other South Asian countries, performance of Bangladesh seems to be better than some South Asian countries such as Pakistan and Nepal, but not as good as India and Sri Lanka. Sri Lanka is much ahead of both India and other South Asian countries in terms of social development.

UNICEF (2007) deals with gender equality between girls and boys regarding equal access to food, health care, education and opportunity. The report indicates that women whose rights are fulfilled are more likely to ensure that girls have access to adequate nutrition, health care, education and protection from harm. Equal educational opportunities to girls and boys are most important and powerful steps to combating gender discrimination and ensuring children's rights. Every girl and boy has the right to education irrespective of social or economic status. Access of the girls to the intellectual and social benefits of basic education ensures that their rights are protected

and met and largely enhances the range of life choices available to them as women. Moreover, girl's education has profound and long-lasting benefits for families and whole communities. The facility which provides women with some formal education leads to delay marriage and childbirth or lower fertility, greater contraception use, better health of children and greater immunization rates of children. They are better informed about their own and the children's nutritional requirements and about birth spacing practices. As a result of this, their children have higher survival rates, are healthier and better nourished. Moreover, in many countries, if a mother completes one year more formal education, her children remain more years in school.

UNICEF (2009) shows that empowerment begins with education; educated women are better equipped to earn income to support their families, more likely to invest in their children's health care, nutrition and education and more incline to participate in civic life and to advocate for community improvements. Educated mothers are more likely to seek proper health care for themselves; the report indicates that according to the 2007 Millennium Development Goals Report, 84 percent of women having secondary or higher education are attended by skilled personnel during childbirth, more than twice the rate of mothers with no formal education. Children of educated mothers are 50 percent more likely to survive until the age of five and beyond than those whose mothers do not receive or complete schooling. For girls in particular, education can make the distinction between hope and despair.

Cundiff (2010) studies the relationship among life expectancy, health care spending, medical resource availability and lifestyle variables in the United States relative to other member countries in OECD. According to analyze result United States performs very poorly relative to its peers. While United States spends more per capita by far than any other country, because it has lower life expectancy and fewer medical resources

than most member countries is probably caused by the United States' lack of health care resources relative to the peers with high obesity rate.

Ogunbenle et al. (2013) show that there is no bi-directional causality between life expectancy and public health spending in Nigeria and the study also reveals that there is no bi-directional causality between life expectancy and economic growth in Nigeria over the years.

Analyzing the data in 2011 from World Health Organization of 181 countries, Deshpande et al. (2014) show the relationship between life expectancy independent variables: per capita expenditure on health, per capita GDP, percentage of government spending on health care, literacy rate, and density of physicians applying multiple regression technique. Findings indicate that there would be a positive correlation between healthcare expenditure and life expectancy, denoting that an increase in spending would increase life expectancy. Findings also suggest that an increase in spending is positively significant in developed countries. In developing countries, healthcare spending is an insignificant variable on life expectancy. The lack of significance of healthcare spending on life expectancy in developing countries may indicate that in these places, money is not allocated effectively towards health spending. Increasing spending does not guarantee that there is any kind of improvement in healthcare.

Jaba et al. (2014) analyze the relationship between the dynamics of the inputs and the output of the health care systems for the period 1995-2010 applying panel data method. Results show a significant relationship between health expenditures and life expectancy. Country effects are significant and show the existence of important differences among the countries.

Memarian (2015) shows that life expectancy and healthcare expenditures have significant positive impacts on GDP both in the short-term and in the long-term. An increase in life expectancy and health care expenditures causes an increase in economic growth.

HDSA (2015) manifests that economic growth has been robust in South Asia during the last few decades making it one of the fastest economically growing regions in the world. Yet despite impressive economic growth; South Asia contains a huge number of poor people and malnourished children, inefficient health systems, inadequate education system and 62 percent (in 2010) of people without any access to sanitation facilities. Although the region accounts for around 44 percent of the world's poor, recent poverty reduction strategies have generally become more holistic in their approach in South Asian countries. Life expectancy and adult mortality rates have both improved as health and educational outcomes have been enhanced. Sri Lanka in particular, stands out given the high priority she attaches to the social sector. Bangladesh and Nepal too have made great strides in improving their human development indicators, as have certain states in India like Tamil Nadu and Kerala and the province of Punjab in Pakistan. Already South Asia is performing better socially, economically and politically.

UNDP (2015) focuses that since 1990 the world has made major strides in human development. The global HDI value has increased by more than a quarter and that of the least developed countries by more than half. The number of people living in low human development falls from 3 billion in 1990 to slightly more than 1 billion in 2014. Today, people are living longer, more children are going to school and more people have access to clean water and basic sanitation. This progress goes hand in hand with rising incomes, producing the highest standards of living in human history. The child

mortality rate goes down by more than half, and under-five deaths fall from 12.7 million to 6 million. More than 2.6 billion people have gained access to an improved source of drinking water and 2.1 billion have gained access to improved sanitation facilities, even as the world's population rise from 5.3 billion to 7.3 billion. Human development has been uneven among regions, across countries and within countries. In 2014, Latin America and the Caribbean's HDI value is 0.748, compared with 0.686 in the Arab States. Added to the uneven human development achievements are widespread human deprivations. Worldwide 795 million people suffer from chronic hunger, 11 children under age 5 die every minute and 33 mothers die every hour. More than 660 million people use an unimproved source of drinking water, 2.4 billion people use an unimproved sanitation facility and nearly a billion people resort to open defecation.

UNDP (2016) provides some messages with hope and despair that even though the global population has increased from 5.3 billion in 1990 to 7.3 billion in 2015. During 1990-2015, more than 1 billion people have escaped extreme poverty, 2.1 billion have gained access to improved sanitation and more than 2.6 billion have gained access to an improved source of drinking water. In developing regions, 91 percent of primary school-age children are enrolled in 2015, up from 83 percent in 2000 and the number of out-of-school children worldwide fall by almost half over the same period. The greatest progress has been in Sub-Saharan Africa, where the net primary school enrolment rate rise from 52 percent in 1990 to 80 percent in 2015. As a result, a larger proportion of young people can now read and writes: the global literacy rate among people ages 15-24 is 91 percent in 2015, up from 83 percent in 1995. North Africa and South Asia show the greatest improvement in youth literacy, pushed by a strong increase in literacy among young women. The global under-five mortality rate is more

than halved between 1990 and 2015—from 91 per 1,000 live births to 43. Global life expectancy at birth is 4.9 years longer in 2015 than in 2000, though there are wide variations across regions and countries. The increase in life expectancy at birth from 2000 to 2015 is greatest in Sub-Saharan Africa (8.8 years), followed by South Asia (5.5 years) and Latin America and the Caribbean (3.8 years). The report presents some dismal failures in other areas. It shows that one person in nine in the world is hungry, and one in three is malnourished. Eleven children under age 5 die every minute and 35 mothers die during childbirth every hour. It manifests significant progress on some fronts. The global population suffering from hunger has declined from 15 percent in 2000–2002 to 11 percent in 2014–2016. In all regions women have a longer life expectancy than do men, and in most regions girls' expected years of schooling are similar to those of boys.

2.3 Returns to Education

The relationship between earnings and schooling has been studied for long. To show the relationship between schooling and earnings, for example, Walsh (1935) estimates life time earnings for people with different educational attainments using five different sources of data from United States. His findings indicate that individuals with higher schooling attainments have higher expected life time earnings.

Since the seminal works by Becker (1962 and 1964) and Mincer (1974) it is acknowledged that human capital is vital for firm productivity and is accumulated through experience and education. Therefore educated and experienced workers should earn more (Becker 1964 and Mincer 1974) as compared to non-educated workers. Thus returns to education are observable from higher earnings. Evidence from empirical studies using the Mincerian model (after Mincer 1974) suggests that the relationship

between education and earnings for most countries is concave with the implication that low levels of education have higher returns (Psacharopoulos, 1994 and 1985; and Psacharopoulos and Patrinos 2004). But much of the empirical evidence from developing countries, however, shows that returns to primary education may be lower than that of post-primary education, suggesting that the earnings–education profile is, in fact, convex (Ackah et al. 2014). Most of the works emphasize to understand the return to investment in education in terms of financial benefit (Psacharopoulos and Patrinos, 2002; Murphy and Welch, 1992; Card, 2001; Rouse, 1999). The rate of return for economic perspective is small, it may be higher in social development which is, somehow, nearly impossible to determine (Murphy and Welch, 1992; Card, 2001; Rouse, 1999). Factually, economic development and social development are interrelated, thus, it is worth to note that if education broadly contributes in social development, it would have an impact on economic development. Rate of returns is always higher for the provision of higher education. Post-secondary education ensures a higher income and greater opportunities for graduates (Altbach, 1999). Comparison between those who have attended college or university and those who have not attended shows consistent benefit to the degree holder. Even those who attend college or university but without earning a degree are better placed. There are variations between countries, but the pattern holds globally.

Mincer (1962) estimates the amount invested in such training of males in the U. S. labor force at \$5.7 billion in 1939 and \$12.5 billion in 1958, both stated in 1954 dollars. This study indicates that in high income countries, in spite of the fact that those with schooling up to the eighth grade earn less than those with more schooling, the difference, though considerable, is not so large as on the much larger costs, a rate equal

to the high rate realized on what is invested upon the completion of the elementary grades.

Schultz (1963) estimates the economic value of education in the United States. From the study, he suggests that (i) during the last three decades (till 1957); schooling has been a larger source of growth than material capital represented by structure, equipment and inventories; (ii) between 1909 and 1929, schooling plays a much smaller role in growth than it has since then; (iii) between 1909 and 1929, material capital contributes to growth twice that of schooling, but between 1929 and 1957, the contribution of schooling exceeds that of material capital. On the other hand, Denison's (1962) study based on the historical comparisons attributes about 21 percent of the economic growth in the United States between 1929 and 1957 to education. Other conclusions are that additional schooling contributes only a little more than half as much to growth between 1909 and 1929 as between 1929 and 1957.

Strumilin (1963) shows that even the most elementary schooling gives the industrial worker much more than a similar period of practical work at the bench or lathe for example, the elementary literacy gained during the year of schooling raises the worker's productivity by an average of 30 percent, while the training of illiterate workers at the factory bench increases their skill and output by no more than 12 to 16 percent. Finding also indicates that the productivity of trained workers completing 4 years of primary of schooling, with secondary and higher level of education is respectively 43 percent, 108 percent and 300 percent more compared to workers having no education.

After addition of the Mincerian wage regression to the literature devoted to relationship between education and earnings, a number of studies have used this model to explore

the wage gaps between groups. Due to its wide range of applicability in labor economics and economics of education as a research tool, there exist large number of studies that use the Mincerian earnings function in order to estimate the rates of returns to schooling. For example, using the Mincerian earnings function in order to estimate the rates of returns to schooling, Chiswick (1983b) compares the rates of returns to schooling for the American born Jews with those of white people belonging to other ethnic groups. Beyond the standard human capital variables of schooling and experience, the study estimates the Mincerian wage regression including some other control variables for region and type of residential area. Result shows that rates of returns are higher returns for Jews as compared to other white ethnic groups. Tomes (1983) and Kuch and Haessel (1979) are other examples that use the Mincerian earnings function to see the differences in returns to education based on religious affiliation of the people.

The Mincerian model estimates the difference in the effects of urban and rural area labor market conditions on wages of workers (Snipp and Sandefur, 1988; Johnson and Chow, 1997; McLaughlin and Perman, 1991). Studies that use the Mincerian wage regression to capture the difference in wages or returns due to ethnic belongings include Gwartney and Long (1978), Kimmel (1997).

The Mincerian wage model has been used in many studies to see the differences between earnings of different racial groups, differentials due to working in public or private sector, wage gaps between males and females (Chiswick, 1983a; Quinn, 1979; Shapiro and Stelcner, 1989; Assaad, 1997 among many others).

Psacharopoulos (1977) estimates the Mincerian wage model for a sample of the Moroccan male workers. This study reports that rate of return for each additional year of schooling is 15.8 percent.

Using data for British males, a study is carried out by Psacharopoulos and Layard (1979) estimates the Mincerian wage regression and reports marginal returns to schooling of about 9.0 percent.

Papanicolaou and Psacharopoulos (1979) using data from UK males compared educational effects on wages for different groups depending on father's occupation via estimation of the Mincerian function. Estimates from wage regressions of 9 different groups give different rates of returns that vary between 7 to 14 percent depending on the occupational group of father.

Sandefur and Scott (1983) use the Mincerian wage model to explain the wage differences among minorities in US and show higher returns to schooling in favor of Indians in comparison to other ethnic groups and in favor of Whites in comparison to Black people.

Behrman et al. (1985) apply the Mincerian approach using a sample of pre-revolutionary of Nicaragua in order to estimate the rate of return to schooling. The Mincerian model is separately estimated for men and women and also for three categories of urban, rural or metropolitan areas. In addition to the standard human capital variables, they have used region, migration, health and nutrition as controls. This study reports higher schooling returns for females at 12-13 percent in urban and 5.0 percent in rural areas as compared to those for men at 7-10 percent in urban and 3.7 percent in rural areas.

World Bank (1994b) reveals that primary education has the highest social rate of return, followed by secondary education. The report also indicates that South Asia and Sub-Saharan Africa show the highest rates of return on investment in primary education. But at present, knowledge and technology are ruling global economy. Following the 1990s, rate of return to education has increased significantly and the technologies are changing dramatically due to meeting market demand of modernization as well as globalization. Primary educated individuals are not well equipped with skills and information. Due to the low adaptable capacity, they could not cope with the changing dimension of technology and they are less likely to be employed in paid and formal jobs, which provide very little security in terms of income. So, in some cases, primary education does not contribute to generate income.

To see the changes in returns to education in Israel, Weisberg (1995) estimates Mincer's model using data collected in 1974 and 1983 respectively. This research shows that returns to education increase over the period considered. This study reports higher returns to education for higher educational levels.

World Bank (1995) indicates that more education generally means productive individuals in every country. Workers with more education lead to earn more than workers with less. Statistical analysis shows that there is a positive relationship between wages and schooling for both men and women for the countries such as Indonesia, Thailand, Cote d'Ivoire, Peru, Slovenia and the United States Indonesia. The association is found in both economies that are growing rapidly (Indonesia and Thailand) and in those with falling income per capita (Cote D'Ivoire, Peru, and Slovenia). The wage premium associated with education varies considerably and appears to the relative scarcity of educated workers-higher rewards where educated workers with high demand (Thailand) or low supply (Cote D' Ivoire), lower rewards where educated workers are

abundant (Slovenia and the United States). The wage premium also depends on the level of education-among the low and the middle-income countries, the wage ratio between secondary and primary school graduates and those with no schooling in all but one case. But in some cases wage premiums to education are higher for women than for men (in Indonesia, Peru, and Thailand, for instance). This does not mean that women earn more than men, but only that the economic return to their schooling can be higher.

By analyzing the experience of 192 countries, the World Bank (1995a) concludes that as much as two-thirds of the wealth of nations consists of human and social capital. In countries like Japan which lacks a good natural resource base, human and social capital have contributed 85 percent to the total national wealth, but share of physical capital is 14 percent, and natural capital contributes only 1 percent.

Kimmel (1997) compares the wages in rural US workers. This study shows that in rural areas, males belonging to American Indians community and females from Black ethnicity are economically less rewarded in comparison to males and females from other groups of males and females of White ethnicity.

Mincer's wage equation has been used for the explanation of wage gaps and differences in effect of different factors affecting wages due to urban or rural locality of the labor market. Snipp and Sandefur (1988) apply human capital earnings function to see the effect of metropolitan or non-metropolitan location of household on returns to education using a sample of Indian house holders in Alaska. This study reports that wages in metropolitan areas are higher while returns to schooling are also higher in metropolitan areas but statistically non-significantly different from non-metropolitan areas. Another study that applies the Mincerian model to see the urban-rural differences between wages and returns to human capital measures is conducted by Johnson and

Chow (1997) by using 1988 Chinese Household Income Project data. This study reports that being a resident of rural area makes no significant differences in wages. But separate urban-rural estimations uncover the fact that returns to schooling are higher for rural areas (about 4.02 percent) than those in urban areas (about 3.29 percent). However, they find higher returns to experience in urban China as compared to rural areas. Being a female has a negative effect on wages for both urban as well as in rural labor markets.

Lassibille (1998) uses Spanish data to investigate the differences between returns to human capital paid by public and private sectors of employment. Result reveals that private sector pays higher returns to human capital measures as compared to public sector. His results are similar for both genders. The similar direction of differences between public and private sectors rewards towards human capital factors are also found for Paraguay (Psacharopoulos et al., 1994) and Kuwait (Al-Qudsi, 1989).

Nasir (1998) uses the Mincerian model in order to judge the contribution of human capital and non human capital factors in the process of wage determination of waged and salaried workers in the Pakistani labor market. He uses data from the Labor Force Survey (LFS) 1993-94 wave. He includes schooling in the form dummies for different levels of education attained and age for experience. He finds significantly different labor market conditions for men and women. Earnings of men are higher than woman, and also men working in urban area enjoy a premium over their rural counterparts but such premium is not found for women. While endogeneity ignored, he does control for sample selection bias by using the Heckman two-step procedure and sample selectivity found significantly negative for females only. Finally, he makes a conclusion that human capital factors are significant explanatory factors in the determination of wages, as he finds that only these factors explain 38 percent variation in response variable:

while with the addition of all other factors, the model explains 45 percent of such variation. This highlights the importance of the accumulated human capital for economic rewards in the labor market. The importance of human capital measures in the determination of wages in the Pakistani job market is also signified in Siddiqui and Siddiqui (1998) by showing that model with just schooling and age (experience proxy) account for 37 percent of variation in log earnings function while the full extended model accounts for 47 percent of the variation in the dependent variable.

Ahmad (2003) analyzes private costs and benefits of primary versus secondary education in rural Bangladesh on the basis of household level data for the year 2000. Finding suggests that while social benefits for primary education are high in Bangladesh, private benefits are higher for secondary level of education than primary level. On the other hand, private costs are lower for primary education than for secondary education. Poor households in Bangladesh cannot afford to keep their children until they complete the secondary level because of high costs – both direct costs and opportunity costs. Inequality in the access to secondary education is the main cause of persistent poverty in Bangladesh.

Okuwa (2004) states that education is an essential determinant of earning in market economies. The higher an individual's educational attainment, the higher the individual's expected starting wage and the steeper the rise in earning capacity over time.

To show differential labor market returns to male and female education in Pakistan, Aslam (2005) conducts a study based on the nationally representative data from the Pakistan Integrated Household Survey (2002) applying Mincerian approach. Findings consistently reveal a sizeable gender asymmetry in economic returns to education, with

returns to women's education being substantially and statistically significantly higher than men's. The return to an additional year of schooling ranges between 7 and 11 percent for men and between 13 and 18 percent for women. There are also large, direct returns to women's education at low levels of schooling and the education-earnings profile is more convex for women than men. The study concludes that the total labor market returns are much higher for men.

Using data from the national Household Income and Expenditure Survey (HIES) 1999-2000 of Bangladesh Bureau of Statistics (BBS) applying Mincerian approach, Asadullah (2005) suggests that an additional year of schooling increases labor market earnings by 7.0 percent. Estimates of returns are separately reported for rural and urban work places, males and females, public and private sector individuals. Substantial heterogeneity in returns is observed; e.g. estimates are lower for rural sample (than urban sample) and higher for females (compared to their male counterparts). They also attempt to correct for the bias due to an endogenous selection in wage work. However, no evidence of selection bias is found: the OLS estimates are robust to non-random selection into wage work. Nonetheless, the estimates are found somewhat sensitive to the exclusion of the public sector employees. The return to education of wage workers in the private sector is 5.7 percent. A notable finding of their study is the substantial non-linearity in returns to education in Bangladesh: returns increase across levels of education. The finding that primary education having the lowest return does not imply that investment in primary schooling is necessarily inefficient, however.

Amaghionyeodiwe et al. (2007) report that the estimated economic rates of return to an additional year of schooling is compensated for by 11.02 percent increase in wage of individual and additional post-schooling year (i.e., experience) raises wage by 3.92 percent. Findings are similar to those of other studies like Nasir and Nazli, (2000) for

Pakistan and Johnson and Chow, (1997) and Liu (1998) for China. With respect to each level of education, their findings indicate that among the three levels of education under examination, the coefficient of post-secondary education dummy is found to have the expected sign (i.e., positive) and statistically significant, whereas that of primary education dummy is found to be statistically significant with the wrong sign. This implies that post-secondary educational attainment, on average, raises the earning(s) of the concerned workers by about 15 percent. Furthermore, secondary and tertiary education impact positively on workers' earnings. Findings also show that wage returns to additional years of schooling completed increase as the level of education increases, thus, the higher is the level of education; the higher is the rate of return to the individual. Findings suggest that higher level of education enhances the individual's experience in the labor market as well as increases earnings.

Using secondary data, Buchta and Štulrajter (2007) conducts a study in Slovakia from the point of view of urban and the rural regions in 1999–2005. Findings indicate that growth rate of average wages and salaries are slower in the rural regions compared to the urban ones and the average of the Slovak Republic. In the period of 1999–2005, the level of average wages and salaries in the rural regions accounts for 62.4 percent of average wages and salaries in the urban regions, during which the time trend of increasing wage disparity is continuing all the time.

Utilizing data of Bangladesh Household Income and Expenditure Survey (HIES) 2000, Shafiq (2007) undertakes a study and shows that rates of returns to education for rural boys are 13.5 percent for primary education, 7.8 percent for junior-secondary education, 12.9 percent for higher-secondary education, and 9.7 percent for higher education and the resulting option value from primary education is 5.3 percent. Investing in boys' primary education, however, provides the household with the

possibility of benefiting from rates of return to education (RORE) to higher levels of education; Findings indicate that the households of Bangladesh whose expected returns to physical capital, bank interest rates for educational loans, and household discount rates are less than 18.8 percent have economic rationale to invest in the primary education of boys.

Abbasa and Peck (2007) estimate and interpret returns to education for three sub-sectors of labor market by gender in Pakistan, using the data set of Pakistan Social and Living Standards Measurement (PSLM) survey, 2004-05. Results show that returns to an additional year of schooling are apparently greater for females than males in paid employment; the returns to an additional year of schooling are 9.2 percent and 14.0 percent for men and women respectively. In the self employment sector, the returns to an additional year of schooling are 8.3 percent for men and 10.3 percent for women. The returns to education in agriculture sector are 7.1 percent for males and 4.3 percent for females (a very small sample, reflecting very few opportunities). The coefficient of experience indicates substantial increase in wages with each additional year for males in each sector of the labor market but not for females outside paid employment. Increasing and significant marginal returns to each level of schooling identify a distinctive feature of Pakistani human capital supply. The coefficients on almost all education levels are positive and progressively increasing with higher levels of schooling in all sectors. This study indicates that the coefficients at all education levels across all sectors of the labor market tend to be higher for females than for males. The apparent returns to an additional year of schooling at various levels are substantially greater for women than men in both wage employed and self-employed sectors, though not in agriculture, except for the primary level. For agricultural sector males, the returns to education increase until the higher secondary level and decline afterwards while for

females the returns are high at the primary level. The magnitude of increase in coefficients with education levels is much greater for females than males. These estimates are similar to the returns at different levels of Jamal et al., (2003) in Pakistan for the total paid employed workers, which are 3, 4, 16, 11 and 13 for primary, secondary, higher secondary, tertiary general and tertiary technical. But these returns are greater for men than the estimates of Kingdon et al., 2007, which are 4.8 percent and 10.5 percent for young men and women respectively for primary, secondary, higher secondary, tertiary general and tertiary technical.

Korsun (2010) applies the Mincerian earnings regression to see the impact of being religious on the wages of individuals in Ukraine. This study reports that being religious lowers the wages in Ukraine. The negative relationship between wages and religiosity is reported for Canada using human capital earnings function (Dilmaghani, 2011). Result shows that Muslims earn lesser compared to people with other religious affiliations. However, Muslims face lower returns to experience while Jews enjoy higher returns to experience than workers having other religious beliefs.

Using sample data from Indonesian Family Life Survey 4 (IFLS 4) Purnastuti et al. (2011) utilize augmented Mincerian model to quantify the private return to schooling. Results confirm that the returns to schooling in Indonesia are low in comparison with the return to schooling in many other countries, particularly Asian and developing countries. The estimation of the augmented Mincerian earnings functions reveals that the return for an extra year of schooling is positive and significant. Employing the augmented Mincerian model that includes the control variables for tenure and its squared, marital status, and urban area of residence, the return to schooling are 4.6, and 5.4 for male and female samples respectively. Results also show that statistical control for tenure and its squared term is more important than potential work experience.

Marital status has a positive impact on earnings for males but it has a negative impact on earnings for females. Estimates also suggest that, on average, residents of urban areas receive significantly higher earnings than individuals living in the rural areas.

Fiaschi and Gabbriellini (2013) estimate the economic returns to education in Italy using cross-sectional data from the 1995 to 2010 waves of the Bank of Italy survey on the income and wealth of Italian household. This research applies instrumental variables estimation to solve the problem of endogeneity. Findings suggest that returns to schooling have not changed much over the period, 1995-2010, and are between 5.9 percent and 7.9 percent, recording the highest level for 2006. Looking at the different sector of employment, a relative convenience to work in the public sector emerges. In addition, there is an evidence of a gender pay gap, in favor of men for all the period. When the type of school attended is taken into consideration, the returns to education increase with higher levels of educational attainment.

OLS, conditional quantile regression and Blinder-Oaxaca decomposition methods are used to analyze four waves (about 7,000 observations in each wave from only 9 out of 31 provinces) of the China Health and Nutrition Survey (CHNS) household data by Su and Heshmati (2013). Findings indicate that, among all the individual characteristics, occupational type and education are the two most influential factors that determine one's income level. This means education and occupation are essential determinants of households' income level. These two factors exert heterogeneous effects at different percentiles of the income distribution. In urban areas, education is more valued for high income earners, while for rural areas, specialized or tertiary education are more beneficial for the poorer households. Among all occupational types, farm activities show much lower returns than other types; and this is more evident for individuals at the left tail of the income distribution. They also find that for the sampled provinces,

urban-rural income gap increases from the year of 2000 to 2004 but the gap decreases from 2004 to 2009. The income gap can be largely explained by the individuals' attributes, especially by level of education and type of occupation. Education reflects a positive relationship with one's income but returns to education reach the highest level in 2004 and then it decreases in 2006 and 2009.

Montenegro and Patrinos (2013) show that the average rates of return to additional year of schooling is 10.4 percent, based on 545 observations from 131 economies between 1970 and 2011. In 2000-2010, the average rate of return is 9.9 percent. The returns to schooling are highest in Sub-Saharan Africa (12.2 percent), significantly above the global average (10.0 percent). By level of schooling, the returns to schooling are highest at the tertiary level, (on average, at 16.8 percent, followed by primary at 10.3 percent and secondary at 6.9 percent), showing that the demand for higher levels of skills is increasing and that the demand for skills is global. Returns are lowest in the Middle East /North Africa region (5.6 percent) by a considerable margin. Healthy returns are also experienced in East Asia (10.3) and Latin America (10.3 percent). Low average returns are found in the relatively "schooled" Eastern European economies (8.2 percent) and the much less schooled economies of South Asia (7.0 percent). Returns are lowest in the Middle East /North Africa region (5.6 percent) by a considerable margin. Healthy returns are also experienced in East Asia (10.3) and Latin America (10.3 percent). By level of schooling, the returns are highest at the tertiary level, on average, at 16.8 percent, followed by 10.3 percent at primary and 6.9 percent at secondary. Returns to schooling are highest for all levels (13.4 percent at primary, 10.8 percent at secondary and 21.9 percent at tertiary level) in Sub-Saharan Africa, reflecting the scarcity of human capital in this region. Low returns throughout the Middle East/North Africa are puzzling (9.4 percent at primary, 3.4 percent at secondary and 8.9 percent at

tertiary level), yet relatively high returns to primary schooling signal this as a priority. There are very high returns to tertiary schooling in South Asia (18.4 percent). In East Asia and the Pacific, there are high returns at the primary (11.0 percent) and tertiary levels (21.9 percent). By country income group, the returns to primary schooling are highest in low income countries. In fact, returns are highest at each level in low income countries, reflecting the relative scarcity of human capital. Globally, except for high income economies, the returns are healthy at the primary and tertiary levels. The returns to secondary schooling are uniformly low at the secondary level. At the same time the returns to schooling are high at the primary level, signaling continued need for basic skills. Overall the returns to schooling are low at the secondary school level as a result of the increased demand for skills, prompting the best secondary school students to continue their education at the tertiary level.

Montenegro and Patrinos (2014) present comparable estimates of the rates of return to education in 139 economies, and they conclude that: (i) private returns to schooling are generally positive and the cross-economy average rate of return to schooling is 10 percent per year of schooling; returns seem to be higher in low or middle income economies than in high income economies; (ii) returns to schooling are highest at the primary level and become smaller (although still large) at the secondary and tertiary levels of schooling; (iii) estimated returns to schooling are higher for women than for men; (iv) returns to schooling have declined very modestly over time despite rising average levels of schooling attainment, suggesting that the world demand for skills has been increasing as world skill supply has also increased; and (vi) returns to schooling and labor market experience are strongly and positively associated; (vii) there is a decreasing pattern over time; and (viii) the returns to tertiary education are highest.

Fink and Peet (2014) utilize 61 nationally representative Living Standard and Measurement study surveys conducted between 1985 and 2012 to estimate standard Mincerian wage equations across 25 low to middle-income countries. Findings suggest that each year of completed schooling is associated with a 6.5 percent increase in income in developing countries. This aggregate return estimate masks a remarkably high degree of heterogeneity in the returns to education. On an average, the rates of returns in South America are about twice those in Asia, and generally higher in rural areas and among females. Even within countries, some of the observed variations are rather remarkable, with nations like Peru and Bulgaria experiencing both rates close to zero and rates over 10.0 percent in specific survey years. Overall, the results suggest that the returns to education in developing countries continue to be positive, but are likely lower on average than observed in developed economies like the US; in many settings, and in particular in the Asia region, returns to education seem to have fallen below 5.0 percent. Given that the demand for human capital is unlikely to have declined over the past decades, this suggests that either the quality of education has fallen or that increases in the supply of human capital have been more rapid than the concurrent increases in the demand (or both).

Using cross-section data, collected from European Union Structure of Earnings Survey (SES) (64 observations for every country) in 2010 from 22 EU countries, Pipień and Roszkowska (2015) conduct a study to estimate the Mincer equation. The SES provides comparable information on the level of remuneration and characteristics of employees, such as, sex, age, occupation. The results report that the highest average hourly remunerations are observed of Denmark, Ireland and Belgium. The lowest (almost 3 times lower) are reported in case of Bulgaria, Romania and Latvia. Analysis of wages by skill level shows that the lowest and the least diversified are the earnings in the

group with primary level of education. Higher and more diversified wages are in the group of better qualified workers. The group of those with tertiary education is the most heterogeneous. This set includes, among others, executive professionals, legislators, teachers, medical doctors and artists. The group of employees with secondary level of education is moderately within heterogeneous. This group includes, e.g., clerical support workers, sales workers and machine operators. It also shows that Denmark and Sweden have the lowest (17-19 percent) returns to education. Relatively low (under 30 percent) rates are in Netherlands, Finland, Ireland, Belgium and France. The labor force in this group of countries is well educated, expenditures on education are relatively substantial and the wages are relatively high and less diversified. In most cases of the analyzed countries, the work experience plays significant role in wage formation. The differences in returns to work experience are also diversified among countries. The values of estimated returns to education rate vary from 17 percent in Scandinavian countries to 40 percent and more in Southern Europe countries. In general, countries with low estimated returns to education can be characterized by higher labor force participation rates, better educated population, higher public expenditures on education and lower dispersion of wages. Moreover, in this group of countries the job experience seems to be much more valuable as compared to the remaining countries. Though the returns to schooling decline as the supply of schooling in a country increases, they tend to decline only modestly over time.

Ackah et al. (2016) estimate the basic Mincerian equation of returns to education using household survey data of Ghana. Findings show that returns to education are generally positive and significant. The magnitude of the coefficient on education increases progressively with educational levels. Compared to persons with no education, those with primary education attract 16 percent higher wages. Again completing junior

secondary raises real wages by 56 percent, while workers with secondary or higher education attract much higher wage (130 percent increase). Clearly there is an increasing trend in returns to education. Experience adds a 2 percent increase in real earnings but has a non-linear effect. Female workers earn 7 percent less than their male counterparts. Manual (unskilled) workers earn 62 percent less than their skilled counterparts. Urban workers earn 42 percent more in real wages than rural workers. This is representative of the concentration of the high earning jobs (especially in the public sector) in the urban areas. In regional terms, workers are likely to earn less if located in another region other than Greater Accra.

Using data of 139 economies, Patrinos (2016) estimate that the global private rate of return to schooling is 10.0 percent for every year of schooling. The returns are highest in Sub-Saharan Africa, namely in Ethiopia, South Africa and Tanzania. The returns are lowest in the Middle East and North Africa. While the relationship between schooling and earnings does not necessarily imply causality, evidence from natural experiments to increase schooling confirms that the effect of ability and related factors does not have a significant impact on the general results for returns to education. It suggests that schooling does indeed impart skills that enhance productivity. Increases in earnings are due to the increased productivity brought about by investments in human capital.

Applying the basic and extended Mincerian earning functions to three different groups: i) total sample, ii) males and iii) females, Rizk (2016) conduct a study to estimate the rate of returns to schooling in four Arab countries. This study employs 2010/2011 round of the Harmonized Household Income Expenditure Surveys of three Arab countries, namely, Egypt, Tunisia and Palestine. The study reports that the average rate of return to another year of schooling is 11.2 percent and 11.1 percent for both Palestine and Tunisia respectively. Average rate of return to additional year of

schooling is 8.8 percent and 7.6 percent for Egypt and Sudan respectively. When considering for males and females, result shows that rate of returns to additional year of schooling is much higher for females compared to males for Tunisia, Palestine, Egypt and Sudan. Results also indicate that the highest rate of return for Palestine is 13.2 percent, followed by Egypt (11.2 percent), Tunisia (11.1 percent) and Sudan (10.9 percent). This study reveals that rate of return to females at tertiary and secondary level of schooling are always higher than males for all Arab countries except for secondary level in Tunisia. On the contrary, higher returns for males at basic schooling compared to women are observed high for all countries. It is observed that education–experience profiles are convex in all four countries implying nonlinearity for Egypt. The nonlinearity for Egypt could be due to labor market rigidity where more attention is given to credentials rather than skills.

Using both basic and extended forms of the Mincerian earnings function, Boutayeba (2017) conducts a study to estimate the private rates of return to schooling in Algeria. The study has used data of a random sample of employees in Saida province, located in the west of Algeria. The study reports that: (i) the private rate of return to education in Algeria is estimated at 9.5 percent. This result is roughly equal to the world average rate of return to education (10 percent); nevertheless, more institutional reforms are needed in the labor market in order to enhance the returns to education in the future; (ii) the private rate of return to female schooling is higher compared to that of male schooling which means that female investment in education is profitable in Algeria. Therefore, it is important to strengthen both female education and women's employment, especially in tertiary sector; (iii) the private rate of return to secondary education is higher than the rates of return to the other levels of education. This finding

means that the labor market provides better rewards for graduates of secondary education.

2.4 Conclusion and Research Gap

In this chapter we review literature related to the basic indicators of human resource development and rates of returns to schooling. From the review of literature, it is found that in most of the cases, secondary and aggregated data have been used by the researchers in their studies, which do not reveal the real socioeconomic conditions of the country. National averages may, therefore, be quite misleading at times and national averages could not reveal the regional situation. On the other hand, disaggregated data provides a mirror to societies to see the real picture prevailing. Policy makers require more detailed information about various geographical regions, ethnic groups, rural-urban differences and male-female disparities. Secondary data are collected from various national sources, international reports and journals, such as, UNDP, UNICEF and WB. So most of the cases, they are primarily a user, not a producer of required information. Besides, most of the researchers have used one or two indicators of human resource development. But no efforts are made to cover the basic indicators of HRD in the northern region of Bangladesh. Besides, these studies are macro-studies in nature and do not reveal the situation at the household levels. These researches do not attempt to show how various levels of education influence the basic indicators such as income, life expectancy, child mortality rate, sanitation and safe drinking water of human development. So far the knowledge of researcher goes, no comprehensive research work on rural-urban comparison of human resource development, and on the impact of different levels of education and experience on earnings applying Mincerian model in northern region of Bangladesh has been conducted. Therefore this research is different from other studies and it is first of its kind.

Chapter 3

Conceptual Issues: Human Resource Development, Mincerian and Logistic Regression models

3.1 Introduction

Human Resource Development is an evolving and dynamic concept. In the age of globalization, this concept is gaining more and more importance and the subject of human resource development is being widely discussed. The concept of schooling as a personal investment goes back to at least Smith (1930). Education and training play significant role in improving human resources, and economic benefits of schooling is labor market earnings. The effect of schooling and training can be analyzed applying the model given by Mincer (1958, 1974). This chapter is designed to study of the concept of human resource development and the theoretical frame work of Mincerian and logistic regression models.

The chapter is divided into two sections. Section 3.2 deals with human resource development issue; section 3.3 contains the theoretical aspect of Mincerian; section 3.4 deals with logistic regression models and section 3.5 gives a conclusion.

3.2 Human Resource Development Issue

3.2.1 Origin and Concept of Human Resource Development

History of Human Resource Development (HRD) is not very old as this term is first used in the early seventies. But in real sense the history of mankind is the history of Human Resource Development. With the changes of new technology, man acquires capability to handle newer and newer tools in a better and better way. And the process does not end here. Still newer technology takes the reign. Man knew nothing about the knowledge, skills and creative abilities, which we are framing now. Various tools and things are made and people start expertise in their own field of work. The workers who have experience and

expertise are called as skilled and enjoy better benefits than the unskilled. With the development of new technologies, the unskilled workers are left behind. In other words, there are imbalances existing in the human resource development opportunities between the skilled and unskilled workers (Kaur, 1996, p, 12-14)).

Although the human resource development has developed significantly since the Second World War, the historical origins of human resource development cannot be separated from the histories of education and training. The history of human resource development is the history of training and education for work (Torraco, 2001). However, it was not until the 1960's that the theory of human capital was formally developed. The seminal works of three great economist—Schultz (1962 and 1963), Becker (1962) and Mincer (1958, 1962 and 1974) formally linked educational investments to human capital formation and economic development. The concept and idea of HRD is evolved in USA (UNDP, 1994). The term is first discussed in classroom as the topic in 1968 at the George Washington University. In 1969, it is applied and takes the formal shape in Miami at the American Society for Training and Development Conference. By the middle of 1970s, it gains more and more acceptance; and is being used by many as a more attractive term than training and development (Bhatia, et al., 1997, p. 274). Morris (1979) of Overseas Development Council, Washington, U.S.A introduces the Physical Quality of Life Index (PQLI) based on three indicators: infant mortality, life expectancy and literacy. The PQLI combines infant mortality, life expectancy, and basic literacy, transforming each indicator into an index by comparing the level to a fixed range of possible levels, and then taking the average of the three components. Morris (1979: 49) explains that, "The extremes that define each index affect the placing of countries on that particular index as well as on the composite index." The PQLI also presents sub-national measures by gender and by

region, where data are available (Stanton, 2007). Computationally, PQLI is given by: $PQLI = f(im, le, lit)$, where, im = infant mortality, le = life expectancy, lit = literacy. The average value derived from the summation of the three indicators produces the physical quality of life index (PQLI), i. e., $PQLI = (im + le + lit)/3$ (Morris, 1979).

Later attempts to construct a measure of social welfare include Camp and Speidel's (1987) International Human Suffering Index, which combines ten indicators including income, infant mortality, nutrition, adult literacy, and personal freedom (Srinivasan 1994). Slottje's (1991) study of 130 countries, which appears to have been written before the release of the HDR 1990, draws on the capabilities approach by constructing a composite of 20 indicators, arguing that Morris' three components are insufficient to capture the quality of life. However; the development economists have been trying to develop a method of measuring economic development for long. The primary objective is to find a measuring technique that could allow not only measure level to development of a country but also compare development internally.

That is why we had to wait till nineties. It is to be noticed that the essence of the concept 'HD' originally comes from 'UNDP's HDR Report, 1990 and its conceptual underpinning is found in the work of Sen (1985, 1987b and 1999). Since mid-90's the development specialists like Sen (1993 and 1995), Streeten (1994) and Haq (1995) write much on the issue of human development. Among them, Haq (1995) plays the role of a pioneer and he, in co-operation with others, identifies the indices of human development.

Traditionally, development is seen in terms of economic growth. Well-being of people is measured mainly by per capita GDP and it is assumed that higher economic growth would trickle down to the poor; countries with high rates of economic growth are seen

to be rapidly developing, while little attention is paid to rising income inequality within and among countries. Growth in the capital stock is seen as the means of achieving development and the growth rate of per capita GDP become the sole measure of development (UNDP, 1990).

Haq (1995) challenges this conventional wisdom and asserts that there is no automatic link between economic growth and human development. Economic growth is necessary, but not sufficient condition for human progress. GDP growth is not the end, but merely a means to development. The macroeconomic indicators such as per capita GDP and economic growth could not uphold the real situation of the people of a country.

After the publication of HDR of UNDP and human development indices in the nineties, there has been a major shift in development thinking. Development is thought in a broader context and it is now broadly accepted that economic growth and per capita GDP do not automatically translate into a better quality of life. The perception of development has since shifted from economic development to human development. Haq (1995) asserts, people's needs and their aspirations must be at the centre of all development efforts. Human being is the end and means of development. When development is discussed both in respect of the function of human capabilities and of the use of that acquired capabilities, it is called human development; the new perception of development. The first human development report (1990) of UNDP brings about a major change in the development thinking and gives a new interpretation of the human development; human development is defined as a process of enlarging people's choices and enhancing their capabilities. The term human development here denotes both the process of widening people's choices and the level of their achieved well-being. It also helps distinguish clearly between two sides of human development.

One is the formation of human capabilities, such as improved health or knowledge. The other is the use that people make of their acquired capabilities, for work or leisure. The process concerns the creation of an enabling environment in which people can develop their full potential and live productive and creative lives according with their needs, interests and own values. In this sense, human development paradigm promotes well-being in a society.

UNDP report (1990) states that human development is a process of enlarging people's choices. In principle, these choices can be infinite and change over time. Even though human development is a broad concept with infinite dimensions, it is stated that at all levels of development, the three essential ones are for people to lead a long and healthy life, to acquire knowledge and to have access to resources needed for a decent standard of living. If these essential needs are not fulfilled, people are deprived of many other opportunities that are supposed to be available in a well-functioned democratic society. Without these basic dimensions, other dimensions such as political freedom, the ability to participate in one's community, self respect and guaranteed human rights and sound environment and so on often remain inaccessible (UNDP, 1995).

Human development brings together the production and distribution of commodities and the expansion and use of human capabilities. It is people centered. People are the real wealth of a nation (UNDP, 1990). Human development is development of the people, for the people and by the people (Kaul and Menon, 1993). Development of the people refers to human capital (by human capital is meant the stock of people equipped with education, skill, health, etc) formation and human resource development through nutrition, health and education. Development for the people stresses that the benefits of economic growth must be translated into lives of people. Development by the people

means that people must be able to influence the process, which affects their lives. Development must be woven around people and not people around development.

The true aim of development is not only to boost incomes, but also to maximize human choices—by enhancing human rights, freedoms, capabilities and opportunities and by enabling people to lead long, healthy and creative lives (UNDP, 2015). The Human Development index (HDI) introduced by UNDP is a composite of most relevant indicators, provides the best way, to meet up the mentioned need. This index covers economic, social and human aspects of development. HDI is measured by three key components: (i) longevity (ii) knowledge (iii) decent standard of living. HDI is the heart of the HD (UNDP, 1990).

The basic use of HDI is to rank countries, regions or territories by level of human development: low, medium and high. To combine the basic indicators (such as longevity, knowledge and standard of living), the range of values for each one is put onto a scale of 0 to 1, where 0 is the minimum and 1 is the maximum. Countries with HDI below 0.5 are considered to have a low level of human development, those between 0.5 and 0.8 a medium level and those above 0.8 a high level. The HDI ranks all countries into four groups: low human development (0.0 to 0.499), medium human development (0.500 to 0.799), high human development (0.80 to 0.9) and very high human development (0.90 to 1.0) (UNDP, 1994).

Human development differs from GNP growth, human capital formation, human resource development, human welfare approach, basic needs approach. The underlying clarifications are as follows:

- GNP growth is necessary but not sufficient for human development.

- Human welfare approaches look at human beings more as the beneficiaries of the development process than as participants in it. They emphasize on distributive policies rather than on production structures.
- The basic need approach usually concentrates on the bundles of goods and services that deprived population groups need: food, shelter, clothing, health care and water. It focuses on the provision of these goods and services rather than on issue of human choices.
- Human development is a process of enlarging people's choices and enhancing their capabilities. The term human development here denotes both the process of widening people's choices and the level of their achieved well-being (UNDP, 1990). Human development, by contrast, brings together the production and distribution of commodities and the expansion and use of human capabilities. It applies equally at any stage of development. This concept is developed on the basis of four major elements- productivity, equity, sustainability and empowerment (Haq, 1995).
- The concept of human resource is a new addition of development in economic thought. The concept 'human resource' has many different meaning. Various theories, interpretations and meaning of the term 'human resource' have given birth to jargons like, human resource development, human capital formation, manpower development (Chowdhury, 2004). Theories of human capital formation and human resource development are concerned only with the supply side that considers human beings are the active agents of all production as well as the ultimate ends and beneficiaries of this process. Human Capital Formation is narrower concept that the UNDP experts use it to mean the "process of acquiring and increasing the number of persons who have the skills, education, and experience that are critical for the economic and political development of a country" (UNDP, 1990). Human resource development (HRD) indicates the

process of increasing the skill and capabilities of all the people in a society. Human resource development is a part of human development. Some has seen human development as “human resource development.” But investing in people, or human capital formation, is not one aspect of human development. It leaves out all discussion of participation-development by people and development for people (UNDP, 1991).

Human development has been an evolving concept. Each year the Human Development Report has re-examined it in light of criticisms or analyzed it in greater detail. In recent years this work has included extended discussion of such issues as participation, sustainability and gender equity. As a result, the basic approach has been broadened and deepened. Human resource development (HRD) indicates the process of increasing the skill and capabilities of all the people in a society. Human Development refers to the growth of an individual physically or mentally through education, healthcare, training etc. Thus it is the process of creating Human Capital through various developmental activities and programs like providing basic healthcare and educational services. It is a never-ending process and goes on till one dies. Job training, higher education, health facilities all lead to human development, ultimately creating human capital. Thus we can conclude that these two terms (Human Capital and Human Development) are inter-related to one another. Human Development occurs through spending in basic amenities like education, healthcare. The more we develop human beings, the more we convert them into Capital.

3.2.2 Component and Indicators of HDI

The HDI measures the overall achievements in a country in three basic dimensions of human development—longevity, knowledge and a decent standard of living. The HDI is a summary, not a comprehensive measure of human development (UNDP, 2001).

The basic indicators are discussed as follows:

- 1) Life expectancy at birth, as a proxy measure of a population's health and longevity.
- 2) Adult literacy rate and combined gross enrolment ratio, as measure of knowledge and education.
- 3) Finally, GDP per capita at purchasing power parity (PPP) as measure of a decent standard of living. Longevity and knowledge refer to the formation of human capabilities, and income is a proxy measure of the use of acquired capabilities (UNDP, 1994).

3.2.3 The Choice of Dimensions

The three dimensions of the HDI relate to one or many capabilities that they are expected to capture. Thus, longevity captures the capability of leading a long and healthy life. Educational attainment captures the capability of acquiring knowledge, communicating and participating in the life of the community. Access to resources needed for a decent standard of living captures the capability of leading a healthy life, guaranteeing physical and social mobility, communicating and participating in the life of the community (including consumption). The HDI constructs as a measure of human development, consists of these three components: longevity, knowledge and decent standard of living (UNDP, 1993).

3.2.4 Measurement Procedure of HDI since Inception in 1990

The measurement of HDI has introduced for the first time in HDR 1990. With lot of gradual modifications HDI measurement is being used today all over the world. To have clear idea about HDI one should have to go through the measurement procedure with modification from its inception. The measure of HDI captures the three essential components of human life-longevity, knowledge and basic income for a decent standard of living. The HDI is constructed in three steps.

The first step is to define a measure of deprivation that a country suffers in each of the three basic variables- life expectancy, literacy and (the log of) GDP per capita. A maximum and a minimum value are determined for each of the three variables, given the actual values. The deprivation measure is the ratio of the subtraction of the observed value from the maximum value to the subtraction of the minimum value from the maximum value. The maximum and the minimum value of each dimension are at the acquired level of the best-performing and the poorest-performing country respectively. Observed value is the respective value of the concerned country. The deprivation measure then places a country in the range of zero to one as defined by the difference between the maximum and the minimum.

The second step: a simple average of the three indicators defines an average deprivation indicator.

The third step: the human development index (HDI) is one minus the average deprivation index.

3.2.5 Mathematical Presentation of Measurement

First step: The three basic variables – life expectancy, literacy and (the log of) real GDP per capita are denoted as x_1 , x_2 and x_3 respectively. If I_{ij} is the deprivation indicator for the j^{th} country with respect to i^{th} variable, then the deprivation measure:

$$I_{ij} = \frac{\max_j x_{ij} - x_{ij}}{\max_j x_{ij} - \min_j x_{ij}} \quad (3.1)$$

Second step: Average deprivation indicator,

$$I_j = \frac{1}{3} \sum_{i=1}^3 I_{ij} \quad (3.2)$$

Third step: Human development index,

$$(HDI)_j = (1 - I_j) \quad (3.3)$$

Where, I_{ij} is the deprivation indicator for the j^{th} country with respect to the i^{th} variable

I_j is the average deprivation indicator. HDI is the human development index (UNDP, 1990).

3.2.6 Modifications in the Measurement of HDI

(i) Modifications in Knowledge Variable

Adult literacy is undoubtedly a basic requirement for the capability to acquire and to use information. HDR 1990 uses only adult literacy is used to measure of educational attainment. This fact needs to be reflected in the HDI. There is no more to knowledge and communication than literacy alone. HDR 1991 reflects this fact in the HDI by the combination of adult literacy with mean years of schooling. In the combination process adult literacy and mean years of schooling are given two-thirds and one-third weight respectively. The formula of calculating mean years of schooling is complex and it needs enormous data. So, the educational attainment is measured by a combination of adult literacy (two-thirds weight) and combined primary, secondary and tertiary enrolment ratios (one-third weight) since HDR 1995.

(ii) Modifications in income variable

The original HDI is based on the premise of diminishing returns from income for the human development. In HDR 1990, this fact is reflected by using the logarithm of income and giving a zero weight to income above the poverty line. In HDR 1991, a cut up-off income is introduced on the assumption that each person as a member of the global community requires that income to build basic capabilities. Based on the world average, this cut-off income is US\$ 5,000 per capita per year. This is also the poverty line. That is, income above the cut-off point is using Atkinson adjusted Atkinson formula. Atkinson formula has been introduced in lieu of logarithm for the diminishing return of income.

Atkinson formula of income:

$$\begin{aligned}
 w(y) &= y && \text{for } 0 < y \leq y^* \\
 &= y^* + 2(y - y^*)^{1/2} && \text{for } y^* \leq y \leq 2y^* \\
 &= y^* + 2(y^*)^{1/2} + 3(y - 2y^*)^{1/3} && \text{for } 2y^* \leq y \leq 3y^* \text{ and so on.}
 \end{aligned}$$

So, the higher the income relative to the poverty level, the more sharply the diminishing returns affects the contribution of income to human development. Income above the poverty line thus has a marginal effect, but not a full dollar for dollar effect. But according to Atkinson formula the discounted value of the maximum income of \$40,000 (PPP \$) is only \$6,311 (PPP \$). It reduces the \$34,000 (PPP\$) between the threshold (\$5990) and maximum level of income (\$40,000) to a mere \$321 (PPP \$). So it discounts the income above the threshold level very heavily and penalizes a lot the countries in which income exceeds the threshold level. In HDR 1990, this problem was rectified using the following formula introduced by Anand and Sen (UNDP, HDR, 1999, P, 159).

To summarize, in the construction of the HDI, income is treated using the following formula:

$$W(y) = \frac{\log y - \log y_{\min}}{\log y_{\max} - \log y_{\min}} \quad (3.4)$$

There are several advantages to this formula. First it does not discount income as severely as the formula used earlier. Second, it discounts all income, not just the income above a certain level (threshold). Third, the middle income countries are not penalized unduly; moreover, as income rises further in these countries, they will continue to receive recognition for their increasing income as a potential means for further human development. That means an income increase; its value is adjusted downwards through mathematical treatment before it enters the HDI.

(iii) Modification in Goal Posts

Till 1993, the minimum and the maximum value of each dimension are set at the acquired level of the poorest-performing and the best-performing country respectively. But maximums and minimums may change every year following the performance of the countries at the extreme ends of the scale. In that case, with even improved performance in its any dimension a country's HDI score may fall because the top or bottom countries have done even better. Shifting the goal posts annually preclude meaningful comparisons over time. With having any performance a country's HDI could change from year to year in effect of moving goal posts. To overcome these problem "normative" values are fixed for the indicators in HDR 1994. These minimums and maximums are the most extreme values observed or expected over a long period (say 60 years). The minimums are those observed historically, going back about 30 years. The maximums are the limit of what can be en-visioned in the next 30 years.

Table 3.1: Fixed maximum and minimum for HDI values

Indicator	Maximum value	Minimum value
Life expectancy at birth (years)	85	25
Adult literacy rate (%)	100	0
Combined gross enrolment ratio (%)	100	0
Income (real GDP per capita in PPP\$)	40,000	200

Source: UNDP, HDR 1994

Provided that the minimum value of income has been revised in 1995 as PPP\$ 100 instead of PPP\$ 200 (UNDP, HDR, 1995, P-134).

(iv) Modification of Dimension Index

HDR 1990 constructs HDI from a deprivational perspective. The deprivation index is measured as average deprivation of the three dimension indices. Then the HDI is represented as one minus composite average deprivation. It reflects a round about way of depriving the HDI. But beginning from 1994, the HDI starts to be calculated directly to avoid the round about way also to give it a positive spin. At first the dimension indices is calculated and then take the simple average of them. That tradition still continues.

Dimension index according to HDR 1990

Dimension Index for knowledge

$$\text{and longevity variable} = \frac{\text{maximum value} - \text{actual value}}{\text{maximum value} - \text{minimum value}} \quad (3.5)$$

Dimension Index according to HDR 1994

Dimension Index for knowledge

$$\text{and longevity variable} = \frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}} \quad (3.6)$$

3.2.7 Modified estimation model

The above discussion establishes that the HDI undergoes lot of modifications in the measurement procedure. After modifications the existing procedure to measure HDI is as follows

$$\text{HDI} = 1/3 (\text{Life Expectancy Index} + \text{Education Index} + \text{Income Index}) \quad (3.7)$$

According to the discussion the following refinements are made in the measurement procedure of HDI, since the introduction of HDI in 1990. In 1990, educational attainment is measurement with the combination of adult rate and mean years of schooling. Income above the cut-off point is adjusted using a highly regressive formula named Atkinson formula. In 1994, fixed minima and maxima are introduced for the variables. In 1995, mean years of schooling are replaced with combined gross enrollment ratio at the primary, secondary and tertiary levels of education. In 1999, the formulation of logging income throughout is introduced. Since 1999, UNDP is

following the above mentioned method for construction of HDI. Despite these changes, the underlying principle of the HDI remains the same.

3.2.8 Importance of Human Resource Development

The studies of a number of noted economists such as Schultz (1963), Becker (1962), Mincer (1962), Denesion (1962), Kuznets (1961), Lewis, Anderson, Machlup (1962), DeWitt (1961), Frederick (1961), Harbison (1973), Harbison and Myers (1964), among others, in the United States and Vaizey (1962), in the United Kingdom, have emphasized the importance of human capital formation in economic development. These studies suggest that one major factor contributing to rapid growth of the American economy has been a relatively outlays on education. The importance of education in economic development has been emphasized by several economists; early economists like Thunen (1921) and Marshall (1962) have recognized the importance of education in their works. As Galbraith (1962) states, "We get the larger part of our industrial growth not from more capital investment, but investments improvements brought about by improved men". According to Veblen (1908), the technical knowledge and skill development are a community's immaterial equipment or intangible assets without which physical capital could not be utilized productively.

The scarcity of funds for human development and human capital formation is one of the major factors responsible for economic stagnation in LDCs. Adequate resources need to be allocated to programs for low level of competence of entrepreneurs, high-level manpower and labor force. Otherwise, the productivity of physical capital remains at a low level. It is true; of course, that some growth can be possible due to accumulation of physical and financial capital. Sustainable development can be possible with human development and human capital formation, leading to better utilization of the existing productive capacity, installation of additional capacity and management of the ecological and environment balance (Mandal, 2000, p, 99). Investment in human resources in the developed countries has directly contributed to economic development

and growth by promoting the knowledge and application of science and technology to production process, developing innovations and research, training of workers in different technical skills and building up appropriate type of attitude, values and interests conducive to higher output. In many countries like Japan and most European countries that have suffered from the destruction of physical capital including factories, roads, and buildings etc, during 2nd World War, a rapid post-war recovery has been made possible because of the nations' resources in technical and skilled man power. Resources are often categorized into three types: Natural, Man-made and Human. Capital includes all man-made means of production, machinery plant, equipments, tools means of transport, etc. All these resources are complementary and important for a country's economic, social and political development. The human resources factor, however, seems to be the most strategic and critical. The development of human resources is fundamental and it is an unavoidable pre-requisite for overall development of the country (Kaur, 1996, p. 6, 11-12).

Human resource utilizes the capital and exploits the natural resources as well as environment for the well-being of a nation. A country may have abundant and inexhaustible natural and physical resources and the necessary machinery and capital equipment, but unless there are men, who can mobilize, organize and harness nature's bountiful resources for the production of goods and services, the country cannot make rapid strides towards economic and social progress. To achieve desired economic growth, development of human and physical resource is essential. It is clear that economic and all kinds of development of a certain country depend on the level of human resources. So, necessary expertise and knowledgeable manpower of a country is the basis of economic growth and development (Mandal, p, 100).

3.3 Theoretical Aspect of Mincerian Model

3.3.1 Background

The concept of schooling as a personal investment goes back to at least Smith (1930). One of the biggest economic benefits of schooling is labor market earnings. For many people, education and experience are their only assets. This is why, it is very important to know the economic benefits of investments in schooling. The rate of return equates the value of lifetime earnings to the net present value of costs of education. For an investment to be justified, the returns should be positive and higher than the alternative (Patrinos, 2016).

The pay-off to education is studied in different ways, before the emergence of human capital theory; most studies estimate the rates of returns to education through cost-benefit approach. In this approach, rates of returns has been computed by equating the costs of educational investment (which includes direct costs of schooling process and foregone earning during the investment period for more schooling) and discounted benefits in the form of expected future earnings after the investment for extra schooling. This cost-benefit approach has been used in many studies around the world (Psacharopoulos, 1973). But after the concept of human capital theory by Mincer (1958) and Becker (1964) and proposal of econometric model by Mincer (1974) in his famous book "Schooling, Experience and Earnings", this cost-benefit approach has rarely been used. Mincer's (1974) earnings function is so widely used that now it is also referred as the Mincerian function or Mincerian wage regression model (Bhatti, 2013).

The Mincer's econometric specification for relationship between wages and accumulated human capital is actually based on Ben-Porath (1967) schooling model according to which people make their decisions about schooling investments in a way that maximizes the net present value of their earnings. Private economic returns to education are estimated using Mincer's semi-logarithmic approach in a regression linking individual earnings with additional years (or levels) of schooling completed

(Mincer, 1974). Mincer identifies two kinds of investments in human capital, namely the investments in formal education (measured by years of schooling completed) and investments during the working life (measured by years of work experience). The contribution of Mincer to the research on human capital is enormous. He analyzes both the impact of the individual schooling, and well as the work experience on the properties of the distribution of earnings. He finds that inequality in wages increases with schooling level, age and occupational hierarchy (Chiswick, 2003, p. 5-8). According to the Mincer model, the earnings of an individual are on increasing function of the level of education, as measured by the years of formal schooling. Also, it is increasing and concave function of experience, measured simply by the age of an individual. The original version of the Mincerian model was subject to many generalizations. According to Lemieux (2006) the most important generalization concerns much more complicated nonlinear relationship between the rates of returns from human capital investment and earnings. In spite of many generalizations, it seems that the Mincerian model is still a base for empirical analyses of wage distribution, as well as the relation between wages and existing human capital (Chiswick, 2003, p. 25).

3.3.2 The Mincerian Wage Regression and its Econometric form

In human capital theory, education is an investment of current resources in exchange of future returns. In his classical book, Mincer (1974) develops the famous Mincerian wage regression; the statistical relationship between market wages, schooling and experience.

Assumptions of the economic model

- (i) An individual with S years of schooling has earnings which do not depend on age.
- (ii) PV (present value) of lifetime incomes is the same across individual regardless of schooling if no post school investments are made.

- (iii) The number of years spent at work is independent of the number of years of schooling.

The Earning-Schooling Connection

* Definition: $E(S, t)$ is the earnings at time t of a person with S years of schooling.

* PV of earnings of an individual who enters the labor market after S years of schooling:

$$V(S) = \int_S^R E(S, t) e^{-rt} dt$$

* Under Assumption 1, $E(S, t)$ does not depend on t .

$$\begin{aligned} V(S) &= \int_S^R E(S) e^{-rt} dt \\ &= E(S) \int_S^R e^{-rt} dt \\ &= E(S) \left[\frac{e^{-rt}}{-r} \right]_{t=S}^R = \frac{E(S)}{-r} [e^{-rR} - e^{-rS}] \\ &= E(S) [e^{-rS} - e^{-rR}] / r \end{aligned}$$

The Earning-Schooling Connection

Assumption (ii) states that $V(S)$ should not depend on S , so

$$V(S) = V.$$

Assumption (iii) states that for some T , $R = S + T$, such that everyone works the same number of years, T

Using these two pieces of information:

$$\begin{aligned} V(S) = V &= E(S) [e^{-rS} - e^{-rS} e^{-rT}] / r \Leftrightarrow \\ rV &= E(S) [e^{-rS} - e^{-rS} e^{-rT}] \\ rV &= E(0) [1 - e^{-rT}] = E(S) [e^{-rS} - e^{-rS} e^{-rT}] \Leftrightarrow \\ E(0) [1 - e^{-rT}] &= E(S) e^{-rS} [1 - e^{-rT}] \end{aligned}$$

$$\begin{aligned}
& [E(0)e^{-r0} = E(S)e^{-rS} \Leftrightarrow] \\
& \Leftrightarrow \frac{E(S)}{E(0)} = e^{rS} \\
& \Leftrightarrow \ln\left(\frac{E(S)}{E(0)}\right) = rS \\
& \Leftrightarrow \ln E(S) - \ln E(0) = rS \\
& \ln E(S) = \ln E(0) + rS \tag{3.8}
\end{aligned}$$

The assumptions that we have made lead to a log-linear relationship between earnings and schooling.

The Earning-Schooling Connection

Recall that we want to look at human capital investments and the effect on income distribution.

Post School Investment

We wish to add in post school investment. Make another assumption: The return to post school investment is a constant p . We assume that a worker devotes a fraction k of his time to investment in human capital, and a fraction $(1 - k)$ to actual work. This all implies that growth in earnings is determined by:

$$\frac{\partial E(S,t)}{\partial t} = pk(t)E(S,t)$$

Post School Investment solving the differential equation

- Solving this differential equation gives us:

$$\frac{1}{E(S,t)} \frac{\partial E(S,t)}{\partial t} = pk(t) \Leftrightarrow$$

$$\frac{\partial \ln E(S,t)}{\partial t} = pk(t) \Leftrightarrow$$

Integrating both sides with respect to t .

$$\int \frac{\partial \ln E(S,t)}{\partial t} = \int pk(t) \Leftrightarrow$$

$$\ln E(S, t) = p \int k(t)$$

For the specific solution, we know that

$$\ln E(S, t) = C + p \int_0^t k(u) du \quad (3.9)$$

We need one point to find the value of C:

- **Post School Investment solving the differential equation**

$$\ln E(S) = \ln E(0) + rS$$

If we insert $k(u) = 0$ into the differential equation, we get.

$$\ln E(S, t) = C + P \int_0^t k(u) du$$

$$C + P \int_0^t 0 du$$

$$= C$$

$$\ln E(S, t) = C,$$

This gives the solution:

$$\ln E(s, t) = \ln E(0) + rS + p \int_0^t k(u) du \quad (\text{using equation, 3.9})$$

We need to assume something about the frequency of investment in human capital.

Mincer assumes that:

$$k(t) = k^* \left(1 - \frac{t}{t^*} \right) = k^* - \frac{k^*}{t^*} t,$$

where t^* is the last period in which we invest in human capital.

- Note that this definition is consistent with t running from the time we finish school.

Post School Investment

- Then,

$$\begin{aligned} \ln E(S, t) &= \ln E(0) + rS + p \int_0^t k(u) du \\ &= \ln E(0) + rS + p \int_0^t \left[k^* - \frac{k^*}{t^*} u \right] du \end{aligned}$$

$$\begin{aligned}
&= \ln E(0) + rS + pk^* \left[u - \frac{1}{t^*} \frac{u^2}{2} \right]_{u=0}^t \\
&= \ln E(0) + rS + pk^* \left[u - \frac{u^2}{2t^*} \right]_0^t \\
&= \ln E(0) + rS + pk^* \left(t - \frac{1}{t^*} \frac{t^2}{2} \right) \\
&= \ln E(0) + rS + p^* t - pk^* \frac{t^2}{2t^*}
\end{aligned}$$

- This gives a relationship between potential earnings and schooling.
- Now note that since we only work part of the time.

$$Y(S, t) = (1 - k(t))E(S, t) \Leftrightarrow$$

$$\ln Y(S, t) = \ln E(S, t) + \ln(1 - k(t))$$

The Econometric Model

- Now we need to make the model linear so that we can do econometrics.

$$\ln Y(S, t) = \ln E(0) + rS + pk^* t - pk^* \frac{t^2}{2t^*} + \ln \left(1 - k^* + k^* \frac{t}{t^*} \right)$$

- We still have this investment term in the equation and it is no quite linear.

$$\ln(1 - k(t)) = \ln \left(1 - k^* + k^* \frac{t}{t^*} \right)$$

Taylor expansion around $t = t^*$:

$$\begin{aligned}
\ln \left(1 - k^* + k^* \frac{t}{t^*} \right) &= \ln(1) + \frac{k^*/t^*}{1} (t - t^*) - \frac{1}{2} \left(\frac{k^*}{t^*} \right)^2 (t - t^*)^2 \\
&= -k^* - \frac{1}{2} (k^*)^2 + \left[\frac{k^*}{t^*} + \frac{(k^*)^2}{t^*} \right] t - \frac{1}{2} \left(\frac{k^*}{t^*} \right)^2 t^2
\end{aligned}$$

Note: The error of the expansion is highest when $t = 0$.

The final equation is

$$\ln Y(S, t) = \ln E(S, t) + \ln(1 - k(t))$$

$$\begin{aligned}
&= \ln E(0) + rs + pk^*t - pk^* \frac{t^2}{2t^*} - k^* - \frac{1}{2}(k^*)^2 \\
&\quad + \left[\frac{k^*}{t^*} + \frac{(k^*)^2}{t^*} \right] t - \frac{1}{2} \left(\frac{k^*}{t^*} \right)^2 t^2 \\
&= \left\{ \ln E(0) - k^* - \frac{1}{2}(k^*)^2 \right\} + rS + \left\{ \frac{k^*}{t^*} + \frac{(k^*)^2}{t^*} + pk^* \right\} t \\
&\quad + \left\{ -\frac{1}{2} \left(\frac{k^*}{t^*} \right)^2 - \frac{pk^*}{2t^*} \right\} t^2
\end{aligned}$$

The Earnings Regression Model

$$\ln Y = \beta_0 + \beta_1 S + \beta_2 t + \beta_3 t^2 + \varepsilon$$

If $t = T - s = X$

$$\ln Y = \beta_0 + \beta_1 S + \beta_2 X + \beta_3 X^2 + \varepsilon \quad (3.10)$$

Then, this is the standard form of the Mincer earnings model, Where $\ln Y$ is the log of monthly earnings, S is the number of years of schooling of individual i , and X , X^2 are years of experience and its square respectively. The coefficient on years of schooling β represents the average private rate of return to one additional year of schooling, regardless of the level of education (Bunzel, 2008).

3.3.3 Use of Mincer Model

The estimation of causal links between schooling and earnings has been puzzling labor economists for several decades. One of the major questions about the relationship between education and earning is, then, how much the return to education is? Many methodologies have been proposed in the literature to answer this question, but one that has become a cornerstone in this area of empirical research is human capital earning function, proposed by Mincer (1974), which reveals how wages are related to schooling and work experience (Purnastuti et al., 2011).

Mincer (1974) has provided a great service and convenience in estimating returns to education by means of the semi-log earnings function (Becker and Chiswick, 1966). Chiswick (2002) states that the human capital earning function introduced by Mincer has several distinct characteristics that make it particularly attractive: **First**, the functional form is an equation based on the optimizing behavior of individuals and represents the outcome of a labor market process. **Second**, it converts the monetary cost of the investment in human capital into years of schooling and years of labor market experience. In other words, it converts 'immeasurable' into 'measurable'. **Third**, the function is adaptable to inclusion of other variables that affect earnings. **Fourth**, it allows comparisons across time and demographic groups, since the coefficients of the regression equation have economic interpretations (Purnastuti et. al., 2011). Its **simple structure and parsimonious** nature make the Mincer equation the most appropriate way to explaining the relationship between schooling, experience and earnings. On top of this, it is also a **flexible model**, which allows researchers to include other variables, while at the same time it delivers a precise method of modeling the relationship between earnings, schooling, and experience. The Mincer equation explains earnings as a function of schooling and labor market experience, giving a clear sense of the average monetary returns of one additional year of schooling. The rate of return to investment in schooling is presented in a simple and comparable format that permits estimates of the profitability of schooling, thus allowing people to use this information for investment decision purposes. It provides the estimations necessary to evaluate returns to schooling from a **monetary perspective**, and allows for the **direct comparison of results** (Patrinos, 2016). The interest in ascertaining the value of the investment in education has increased over time. Worldwide, education spending has increased from 3.6 percent of GDP in 1970 to about 5.0 percent of GDP in 2010-2015 (UNDP, 2016).

At the same time, individuals and their families invest a significant amount out of their own pockets for tuition and other education-related expenses.

The student's foregone earnings represent the largest costs incurred by individuals and their families while studying. Is this massive investment in schooling justified? One way to analyze this question is to estimate the costs and benefits of the investment, for which the Mincer equation is ideally suited (Patrinos, 2014). The regression has extensively been used in the literature devoted to returns to education and wage differences (Belzil, 2006). In fact, most studies focusing on the relationship between education and wage determination process have been conducted via estimation of the Mincerian wage regression (Card, 1999). In the words of Willis (1986), "Mincer earning function has been one of the great success stories of the modern labor economics. It has been used in hundreds of studies using data from virtually every historical period and country for which suitable data exists." Mincerian equation's popularity lies in its simplicity and availability of relevant data (Guille and Skalli, 1999).

3.4 Logistic Regression Model

3.4.1 Back ground

Logistic regression, or logit regression, or logit model is a regression model where the dependent variable (DV) is categorical. In binary logistic regression, the outcome is usually coded as "0" or "1", as this leads to the most straightforward interpretation. This study covers the case of a binary dependent variable, that is, where it can take only two values, "0" and "1", which represent outcomes. Cases where the dependent variable has more than two outcome categories may be analysed in multinomial logistic regression. The reason for using logistic regression is that the dependent variable is represented by

“1” and “0” is not cardinal numbers. Logistic regression is an alternative method to use other than the simpler linear regression.

Logistic regression is developed by statistician Cox (1958). Multinomial binary logistic regression exists to handle the case of dependent variables with more classes than two. When multiple classes of the dependent variable can be ranked, then ordinal logistic regression is preferred to multinomial logistic regression. Continuous variables are not used as dependent variables in logistic regression. Logistic regression can be used to predict a dependent variable on the basis of continuous or categorical independent variables and to determine the percent of variance in the dependent variable explained by the independent variable; to rank the relative importance of independent variable, to assess interaction effects, and to understand the impact of covariate control variables. Logistic regression applies maximum likelihood estimation after transforming the dependent variable into a logit variable (the natural log of the odds of the dependent variable occurring or not). In this way, logistic regression estimates the probability of a certain event occurred. Note that logistic regression calculates changes in the log odds of the dependent variable, not changes in the dependent variable itself as OLS regression does (Hosmer, et., al, 2000).

Logistic regression measures the relationship between the categorical dependent variable and one or more independent variables by estimating probabilities using a logistic function, which is the cumulative logistic distribution. Thus, it treats the same set of problems as probit regression using similar techniques, with the latter using a cumulative normal distribution curve instead. Equivalently, in the latent variable interpretations of these two methods, the first assumes a standard logistic distribution of errors and the second a standard normal distribution of errors. In practice, many

researchers choose the logit model because of its comparative mathematical simplicity (Gujarati, 2003, p. 627).

3.4.2 Logistic Distribution Function

Logistic regression analysis is the most popular regression technique available for modeling dichotomous dependent variables. Logistic regression is a mathematical modeling approach that can be used to describe the relationship of several predictor variables $X_1, X_2, \dots, X_k$ to a dichotomous dependent variable Y . Let's try to write the model as $Y_i = \beta_1 + \beta_2 X_i + u_i$

Where Y_i is a binary response variable and takes the values 0 and 1

$$\text{Now } E(Y_i/X_i) = \beta_1 + \beta_2 X_i = P_i \quad [E(u_i) = 0] \quad (3.11)$$

And let,

$$P_i = \frac{1}{1 + e^{-(\beta_1 + \beta_2 x_i)}} \quad (3.12)$$

$$P_i = \frac{1}{1 + e^{-z_i}}$$

Where $z_i = \beta_1 + \beta_2 X_i$ as $0 \leq P_i \leq 1$ so $-\alpha \leq z_i \leq \alpha$

And this equation is known as the logistic distribution function

We know that, $P_i = \frac{1}{1 + e^{-z_i}}$ is a non-linear relationship between P_i and z_i

Therefore

$$\begin{aligned} 1 - P_i &= 1 - \frac{1}{1 + e^{-z_i}} \\ &= \frac{1 + e^{-z_i} - 1}{1 + e^{-z_i}} \\ &= \frac{e^{-z_i}}{1 + e^{-z_i}} \\ &= \frac{(e^{-z_i})(e^{z_i})}{(e^{z_i})(1 + e^{-z_i})} \\ &= \frac{1}{(1 + e^{z_i})} \end{aligned}$$

$$1 - P_i = \frac{1}{(1+e^{z_i})}$$

$$\begin{aligned}\text{Now, } \frac{P_i}{1-P_i} &= \frac{\frac{1}{1+e^{-z_i}}}{\frac{1}{1+e^{z_i}}} \\ &= \frac{1+e^{z_i}}{1+e^{-z_i}} \\ &= \frac{(e^{z_i})(1+e^{z_i})}{(e^{z_i})(1+e^{-z_i})} \\ &= \frac{(e^{z_i})(1+e^{z_i})}{(1+e^{-z_i})} \\ &= e^{z_i}\end{aligned}$$

Therefore we can write

$$\frac{P_i}{1-P_i} = e^{z_i} \quad (3.13)$$

$$\text{Now, } \ln\left(\frac{P_i}{1-P_i}\right) = z_i$$

$$\ln\left(\frac{P_i}{1-P_i}\right) = z_i = \beta_1 + \beta_2 x_i \quad (3.14)$$

Here the ratio $\frac{P_i}{1-P_i}$ is known as odd ratio. The above relation is not only linear but also linear in parameter. Here $\ln\left(\frac{P_i}{1-P_i}\right)$ is called the logit and $\ln\left(\frac{P_i}{1-P_i}\right) = z_i = \beta_1 + \beta_2 x_i$ is called the logit model (Gujrarati, 2003).

3.4.3 Use of Logistic Model

- i. The binary logistic regression is appropriate when the response variable is categorical, categories (binary, dichotomous, etc). The response categories are often generally labeled "success" or failure.
- ii. One or more explanatory variables are involved. These can be either quantitative or categorical or a mixture of both.
- iii. One is interested in assessing the relationship between the binary response and the explanatory variables and/ or predicting the response category based on the values of the explanatory variables.

3.4.4 Feature of the logit model

The features of the logit model ($z_i = \beta_1 + \beta_2 x_i$) are as follows:

- i. As $0 \leq P_i \leq 1$ then z_i lies between $-\alpha \leq z_i \leq \alpha$.
- ii. Although z_i is linear in x but the probabilities are not.
- iii. In the logit model the slope β_2 measures the change in z_i for a unit change in x .

If we want to estimate not the odds but the probability. We can do it directly from $Y_i = \beta_1 + \beta_2 X_i + u_i$ provided that the estimate of β_1 and β_2 are available.

3.4.5 Odd Ratio or Odds Ratio

Let us consider the probability is P_i then the ratio $\frac{P_i}{1-P_i}$ is called the odd ratio.

Example: Let us consider a model

$$Y_i = \beta_1 + \beta_2 X_i + u_i$$

Where,

X_i = family income

$Y_i = 1$; family own a house

$= 0$; family doesn't own a house

Then, $E(Y_i/X_i) = \beta_1 + \beta_2 X_i = P_i$ and let $P_i = \frac{1}{1+e^{-z_i}}$

Therefore $1 - P_i = \frac{1}{1+e^{z_i}}$

Thus the simple odds ratio is

$$\frac{P_i}{1-P_i} = e^{z_i} \quad (3.15)$$

in favor of owning a house the ratio is probability that a family will own a house to the probability that the family doesn't own a house (Gujrarati, 2003).

The odds ratio is equal to $\exp(B)$, or sometimes written e^B . This odd ratio terminology is perhaps easiest to understand when we are dealing with a special case in which both X and Y are dichotomous. When they are both dichotomous, the odds ratio is the

probability that Y is 1 when X is 1 *compared* to the probability that Y is 1 when X is 0 (Newsom, 2015).

3.4.6 Dummy Variables

If one or more of the independent variables are nominal, the dummy variable technique is used, as in case of multiple regressions. Suppose that a study is concerned with the effects of income (X_1), education (X_2 , number of years of schooling) and profession (X_3) on the log of odds being a sanitation user. If the profession has four categories- agriculture, business, job, and day labor or service workers, the three dummy variables, say, D_1 , D_2 , and D_3 are needed and are defined as

$D_1 = 1$ for a agriculture

$= 0$ for a non- agriculture

$D_2 = 1$ for a business

$= 0$ for a non- business

$D_3 = 1$ for a job

$= 0$ for a non- job

with day labor and service workers as the reference category. The logistic model is to be fitted is

$$\log [p(X)/1-p(X)] = \log p/q = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 D_1 + \beta_5 D_2 + \beta_6 D_3 \quad (3.16)$$

Thus, instead of the variable X_4 representing the profession, the dummy variables

D_1, D_2 , and $D_3 = 0$, and hence

$$(\log p/q)_{DL \text{ or } SW} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$$

While for a respondents who is, say, an agriculture

$$(\log p/q)_{Agr.} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4$$

so that $\beta_4 = (\log p/q)_{Agr.} - (\log p/q)_{DL \text{ or } SW}$

hence, the coefficient β_4 of the dummy variable D_1 representing agricultures measures the difference in the log odds of a farmer sanitation user compared to the day laborers or service worker sanitation user. In other words, β_4 measures the change in the log odds when profession changes from day labor or service workers to agriculture. Or equivalently, e^{β_4} is the relative odds of a farmer becoming sanitation user compared to a day laborer or service worker becoming a sanitation user. The coefficient of β_4 and β_5 of the other two dummy variables and the corresponding odds ratios e^{β_5} , e^{β_6} can be similarly interpreted (Sufian, 1998).

3.5 Conclusion

The chapter aims to give a brief description of theoretical issues of human development index (HDI), Mincerian earnings model and logistic regression model. Human development is an important and widely discussed concept around the world. After Second World War, development was seen in terms of economic growth, but after the publication of HDR of UNDP and human development indices in the nineties, there has been a major shift in development thinking. Development is thought in a much broader context and it is now broadly accepted that economic growth does not automatically translate into a better quality of life. According to UNDP, HDR 1990, human development is a process of enlarging people's choices and enhancing their capabilities (UNDP, 1991). Even though human development is a broad concept with infinite dimensions, it is said that at all levels of development, there are three basic indicators: a long and healthy life, access to knowledge, and a decent standard of living. UNDP (1990) introduces HDI, which is called the heart of HD. HDI is measured by three key components: (i) longevity (ii) knowledge (iii) decent standard of living (UNDP, 1990). On the other hand, Mincerian models are widely used to estimate the rates of return to education, due to its flexibility, simple structure **and parsimonious** in nature and it

converts 'immeasurables' into 'measurables'. On the contrary, when independent variables are categorical, or a mix of continuous and categorical and the dependent variables are categorical, logistic regression is used. The "logistic" distribution is an S-shaped distribution function which is similar to the standard normal distribution but easier to work with in most applications. However, the logistic regression model is preferred because of its computational convenience. The study uses logistic regression model in explaining the sanitation status in relation to schooling in both the rural and urban areas.

Chapter 4

Socioeconomic and Human Development Scenario in Bangladesh

4.1 Introduction

Bangladesh is the youngest state in South Asia. As a newly independent (1971) state, Bangladesh is facing challenges with huge population, low per capita income, mass poverty, massive illiteracy, poor health, child labor, malnutrition, low resource base, low agricultural productivity, underdeveloped industrial sector, unemployment, recurrent natural disasters and socio-political instability. The economy of Bangladesh is predominantly based on agriculture and other activities related to agriculture sector. Rural-urban disparity in terms of per capita income, consumption, education, health facilities, and physical infrastructure is an important development issues in Bangladesh. This chapter is structured as follows: Section 4.2 presents socioeconomic and political situation of Bangladesh; section 4.3 focuses on the HDI for South Asian region; section 4.4 discusses on income and economic growth in Bangladesh; section 4.5 deals with education and health; section 4.6 presents human deprivation, especially socioeconomic condition of women and children; section 4.7 describes gender equality and gender empowerment of women; section 4.8 covers labor market, employment-unemployment; section 4.9 describes climate change, food security and nutritional status; section 4.10 progress of social indicators and section 4.11 gives a conclusion.

4.2 Socioeconomic and Political Condition

Bangladesh is a unitary state and parliamentary democracy. Bangladesh has confronted an alternation of parties in power in which the opposition forces have repeatedly tried to shutdown daily life through crippling strikes until their own demands for power are

met (UNICEF, 2000). The structure of the economy has witnessed significant changes over the time. At the aggregate level, agriculture is still the largest sector of employment although the non-farm sectors are gaining more importance over time. Although agriculture plays a vital role to our national economy and contributing more than 15 percent to the national GDP, the farm sector still employs about 43 percent of the labor force (BBS, 2017). About 35.3 percent are involved in service sectors while the rest of the population is involved in manufacturing sector (UNDP, 2016). There is dualism in the economy of Bangladesh. The technology in agriculture is changing, although it is constrained low investment and by small peasant holding. The per capita arable land of Bangladesh is only 0.05 hectares (World Bank, 2011). Employment growth in agriculture has been slow relative to the increase in the rural labor force. The agricultural labor force increases faster than agricultural land. As a result, land to labor ratio declines in Bangladesh. Land and labor productivity increases consistently in Bangladesh but the growth in labor productivity is lower than the growth in land productivity particularly during 1990-2010. The low growth of labor productivity, compared to land productivity, indicates increasing mechanization of agriculture of Bangladesh. The productivity of agriculture laborers of developed countries is 15 times higher than that of Bangladeshi laborers (FAO).

With a population of 163.0 million in 2016, Bangladesh is often cited as a country with one of the highest population densities in the world excluding the city-states like Singapore. The vast population has made the nation the ninth populated country in the world and created an adverse population resource ratio. The population density of 1252 persons per sq .km surpasses that of all major countries (World Bank, 2017). To put it more graphically, if the entire global population is moved into the territory of the United States, even then the US would not have as high a population density as that of Bangladesh (HDSA, 1997).

Table 4.1: Demographic Profile in South Asia Including Bangladesh

	Total population (Millions)			Annual population growth rate (%)		Urban population (% of total)		Increase in urban population	Dependency ratio (per 100 people aged 15–64)		Total fertility rate (births per woman)	
	1975	2015	2030	1975-2014	2010-2015	1975	2015	1975-2015	(0–14) 2015	(65 and older) 2015	2000/05	2010/15
India	613.8	1,311.1	1,527.7	11.1%	1.3	21.3	32.7	11.4%	43.9	8.6	3.1	2.5
Pakistan	68.3	188.9	244.9	10.9%	2.1	26.3	38.8	12.5%	57.9	7.4	4.2	3.7
Bangladesh	79.0	161.0	186.5	20.0%	1.2	9.9	34.3	24.4%	44.9	7.6	2.9	2.2
Nepal	13.5	28.5	33.1	13.2%	1.2	4.8	18.6	13.8%	52.9	9.0	3.6	2.3
Sri Lanka	13.7	20.7	21.1	-4.2	0.8	19.5	18.4	-1.1%	37.2	14.1	2.3	2.4
Bhutan	0.4	0.9	2.9	33.3%	1.5	4.6	38.6	34.0%	39.5	7.4	3.1	2.1
Maldives	0.1	0.4	1.7	27.2%	1.9	17.3	45.5	28.2%	40.5	6.9	2.6	2.2

Source: UNDP, 2016

Table 4.1 indicates that the total population of South Asian countries increases continuously and poses one of the key challenges to human development in the region. With its huge size and population of 1,311.1 million, India, is the largest democratic country, not only in the South Asian region but also in the world. Pakistan is the second largest country in South Asian region in terms of population (with a population of 188.9 millions) and area measuring scale. With a population of 161.0 million, Bangladesh has occupied the third position, and the population of Nepal is 28.5 million, followed by Sri Lanka of 20.7 million, Bhutan of 0.9 million and Maldives with a population of only 0.4 million people. Table 4.1 indicates that the annual population growth rate in Bangladesh is 1.2 percent, which is similar to Nepal, followed by India (1.3 percent), Bhutan (1.5 percent) and Maldives (1.9 percent). Within South Asia, Sri Lanka has experienced the lowest population growth rate (only 0.8 percent), while the population growth rate of Pakistan at 2.1 percent remains one of the highest in this region. Population statistics between 1975 and 2015 show that there is a huge increase in the urban population in South Asia: 34.0 percent in

Bhutan, 28.2 percent in Maldives, 24.4 percent in Bangladesh, followed by 13.8 percent in Nepal, 12.5 percent in Pakistan, 11.4 percent in India and -1.1 percent in Sri Lanka. Bhutan has experienced the highest increase in urban population between 1975 and 2014.

The population of Bangladesh is rapidly increasing day by day. Its total population has increased from 115.6 million in 1990 (to 161.1 millions in 2015 (UNDP, 2010 and 2016). Every year about two million people are being added to our population. The rapidly increasing population in Bangladesh poses one of the key challenges to human development in Bangladesh particularly in rural areas. If the current population growth rate (1.2 percent, a rate is still considered unacceptable for the poverty-stricken country like Bangladesh) is not slowed down in Bangladesh, the total population in Bangladesh will be 185.1 million by the year 2030 (UNDP, 2016). This additional population of 24.1 million by 2030 will impose a tremendous burden on more slowly expanding food supplies, housing, basic social services of health and education, employment and the environment (UNDP, 2016) and it is likely that the current low per-capita income will not increase substantially in the immediate future. The question remains: how to face the challenge of future population growth and to ensure accelerated human development in the country.

The age structure of the population in South Asian region is not favorable for the economic development; Bangladesh is not an exception. Table 4.1 shows that about 45.0 percent of the total population in Bangladesh are under 15 years where 57.9 percent in Pakistan, 52.9 percent in Nepal, 44.0 percent in India, 40.5 percent in Maldives, 39.5 percent in Bhutan, 37.2 percent in Sri Lanka. The age structure of the population in Bangladesh is not favorable for the economic development. Table 4.1 shows that about 45.0 percent of the total populations in Bangladesh are under 15 years.

About 58.0 percent of the total populations in Pakistan are under 15 years, followed by almost 53.0 percent in Nepal, 40.5 percent in Maldives, 44.0 percent in India, 39.5 percent in Bhutan, 37.2 percent in Sri Lanka. The 6.9 percent of the population in Maldives are above 65 years of age, which is lowest in South Asia. Pakistan and Bhutan have the similar number of population above 65 years of age (7.4 percent). The 7.6 percent of the population are above 65 years of age in Bangladesh. The highest, 14.1 percent, are in Sri Lanka, followed by Nepal (9.0 percent) and India (8.6 percent). The fertility rates have decreased in all the South Asian countries between 2000-2005 and 2010-2015 (UNDP, 2016). Bangladesh has achieved success in the area of population control. During 2010-2015, the fertility rate in Bangladesh is 2.2, which is lowest in South Asian region. Total fertility rate has declined from 6.2 percent during 1970-75, 2.9 percent during 2000-2005 to 2.2 percent in 2012 (UNDP, 2007/2008 and 2016). There are many factors that contribute to decline fertility rate in Bangladesh; among them, increase in income, women empowerment, increased rate of women literacy, a decline in infant and child mortality and improvement of medical science are mentionable.

4.3 Human Development Index (HDI) for South Asia

The Human Development Index values for all South Asian countries including Bangladesh shows continuous improvement over the nineties and onward. Although Bangladesh poses increasing trend, its human development index values are the lowest among the countries in South Asia excluding Nepal and Pakistan.

Table 4.2 demonstrates that, in the year 2015, the HDI value of Bangladesh counts 0.579, compared to 0.624 of India, 0.550 of Pakistan, 0.558 of Nepal, 0.766 of Sri Lanka, 0.607 of Bhutan and 0.701 of Maldives. Sri Lanka has the highest human development index (0.766) and Pakistan has the lowest (0.550). Further, compared to

1990, the changes in the HDI are higher in Bhutan (+0.457), followed by Bangladesh (+0.390), Nepal (+0.378), India (+0.315), Pakistan (+0.239), Maldives (+0.204) and Sri Lanka (+0.103). However, the level of human development varies considerably between different countries, with Pakistan and Nepal being at the bottom. Sri Lanka has HDI value far above regional average (0.621), indicating its relatively advanced level of human development. Table 4.2 exhibits that the HDI values of Bangladesh have risen from 0.189 in 1990 to 0.579 in 2015. It has done better than Pakistan and Nepal, but lags behind India, Sri Lanka, Bhutan and Maldives. In the latest HDI ranking of UNDP, Bangladesh stands at 139 with 0.579 HDI value among 188 countries and it is placed in Medium Human Development, whereas the ranks for Sri Lanka, Maldives, India, Bhutan, Pakistan and Nepal, in the same year, are 73, 105, 131, 132, 147 and 144 respectively (UNDP, 2016). The status of Sri Lanka is far better than Bangladesh and this is due to among causes, like its higher rate of literacy (above 90 percent) and higher life expectancy at birth and higher GDP per capita. Sri Lanka has attained high level of HDI, although its income level is low. Because, the adult literacy rate of Sri Lanka reaches 60 percent after independence in 1948. Till the mid 1950s, the government of Sri Lanka devotes as much as 32 percent of its budgetary expenditure (about 7.5 percent of its GDP) to the social welfare package. This is further increased in the sixties when expenditure on health, education, welfare payments, and food subsidies accounts for nearly 10 percent of GDP (i.e., 35 percent of total budgetary expenditure). Education expenditure predominates, accounting for almost half of the social service expenditure in the 1950s and the 1960s. As a result, health services expand immediately after independence of Sri Lanka with a very rapid increase in life expectancy within ten years from 1960 to 1970 (HDSA, 1997). On the contrary, it is not only that the lower income of Bangladesh is responsible for low human development positions; the adult literacy rate of Bangladesh is also the lowest among the South Asian region excluding Pakistan.

Table 4.2: HDI values in South Asia including Bangladesh

Year	India	Pakistan	Bangladesh	Nepal	Sri Lanka	Bhutan	Maldives
1990	0.309 (134)	0.311 (132)	0.189 (152)	0.170 (147)	0.663 (86)	0.150 (159)	0.497 (112)
1992	0.439 (135)	0.483 (132)	0.364 (146)	0.343 (149)	0.704 (90)	0.305 (162)	0.554 (118)
1993	0.436 (135)	0.442 (134)	0.360 (143)	0.332 (151)	0.698 (89)	0.307 (159)	0.610 (107)
1994	0.446 (138)	0.445 (139)	0.368 (144)	0.347 (154)	0.711 (91)	0.338 (155)	0.611 (111)
1995	0.451 (139)	0.453 (138)	0.371 (147)	0.351 (152)	0.716 (90)	0.347 (155)	0.683 (95)
1997	0.545 (132)	0.508 (138)	0.444 (150)	0.463 (144)	0.721 (90)	0.459 (155)	0.716 (95)
1998	0.563 (128)	0.522 (135)	0.461 (146)	0.474 (144)	0.733 (84)	0.483 (142)	0.725 (95)
1999	0.571 (115)	0.498 (127)	0.470 (132)	0.480 (129)	0.735 (81)	0.477 (130)	0.739 (77)
2000	0.577 (124)	0.499 (138)	0.478 (145)	0.490 (142)	0.741 (89)	0.491 (140)	0.743 (84)
2002	0.595 (127)	0.497 (142)	0.509 (138)	0.504 (140)	0.740 (96)	0.536 (134)	0.752 (84)
2003	0.602 (127)	0.527 (135)	0.520 (139)	0.526 (136)	0.751 (93)	0.536 (134)	0.745 (96)
2004	0.611 (126)	0.539 (134)	0.530 (137)	0.527 (138)	0.755 (93)	0.538 (135)	0.739 (98)
2005	0.596 (128)	0.555 (136)	0.527 (140)	0.537 (142)	0.752 (99)	0.602 (133)	0.755 (100)
2006	0.604 (134)	0.568 (141)	0.535 (148)	0.547 (144)	0.755 (102)	0.608 (133)	0.765 (97)
2007	0.612 (134)	0.572 (141)	0.543 (146)	0.553 (144)	0.759 (102)	0.619 (132)	0.771 (95)
2009	0.512 (119)	0.487 (125)	0.463 (129)	0.423 (138)	0.653 (91)	0.515 (-)	0.595 (107)
2010	0.519	0.490	0.469	0.428	0.658	0.520	0.602
2011	0.547 (134)	0.504 (145)	0.500 (146)	0.458 (157)	0.691 (97)	0.522 (141)	0.661 (109)
2012	0.599	0.538	0.565	0.545	0.757		0.683
2013	0.586 (135)	0.537 (146)	0.558 (142)	0.540 (145)	0.750 (73)	0.584 (136)	0.698 (103)
2014	0.609 (130)	0.538 (147)	0.570 (142)	0.548 (145)	0.757 (73)	0.605 (132)	0.706 (104)
2015	0.624 (131)	0.550 (147)	0.579 (139)	0.558 (144)	0.766 (73)	0.607 (132)	0.701 (105)
HDI Increase (1990-2015)	+0.315 (+3)	+0.239 (-15)	+0.390 (+13)	+0.388 (+3)	+0.103 (+13)	+0.457 (+24)	+0.204 (+7)

Source: UNDP, various issues (1990-2016), Note: Values in parenthesis indicates HD ranking.

The improvement of HDI ranks during the nineties and onward is most prominent in case of Maldives and Bhutan. Pakistan starts with a higher HDI than India in 1990, but India makes much faster progress. India and Pakistan have similar HDI rankings during 1993-1996, but in 2015 India ranks 131 and Pakistan 147. The HDI levels of Bangladesh and other South Asian countries in 1990 and 2015 are given in table 4.2. Bangladesh ranks the third lowest among the seven countries in terms of HDI in 2015. The absolute progress of Bangladesh between 1990 and 2015, however, is second fastest after Bhutan and, in percentage terms, it has the same position as well. This is not surprising as Bangladesh starts with a low base value compared with India or Pakistan.

Rankings by HDI and by GDP per capita are different, showing that countries do not have to wait for economic prosperity to make progress in human development. Sri Lanka and Maldives have made human development gains, reflected in HDIs of more than 0.650, but Sri Lanka has made much greater progress in translating income into human advance compared to Maldives. Sri Lanka do far better on its human development ranking than on its income ranking, showing that it has directed their economic resources more towards some aspects of human progress. Pakistan and India almost have similar incomes, but India has done much more in translating that income into human development. So, with the right policies, countries can advance faster in human development than in economic growth. And if they ensure that growth favors the poor, they can do much more with that growth to promote human development. Pakistan do considerably worse on its human development ranking than on its income ranking, showing that it has yet to translate their income into corresponding levels of human development.

4.4 Income and Economic Growth in Bangladesh

Bangladesh is a lower-middle-income country with a per capita income of US\$1,466 (World Bank, 2017). Bangladesh is the third largest economy in South Asian region with a GDP (purchasing power parity-PPP) worth \$ 505.0 billion and its GDP per capita (PPP) is \$ 3137 in 2015 (UNDP, 2016).

Strong economic growth is a prerequisite for human development in a country as it provides the required resources for improving the capacity of people through better education, health and other social services, as well as improving income-earning opportunities (HDSA, 2002). The economy of Bangladesh has reached a sustained growth with strong macroeconomic fundamentals. The growth rate of GDP over the last decade consistently remains around 6.0 percent (World Bank, 2016). This impressive performance is fuelled by growth in GDP in the manufacturing sector where the output of export-oriented, ready-made garment (RMG) enterprises grew by double-digit. Also, the remarkable growth in the inflow of remittances helps reduce poverty by supporting the expansion of construction and services GDP and by providing a strong safety net (SFYP, 2011-2015, P, 12). Table 4.3 shows that the average GDP growth rate of Bangladesh in 1974 is 9.59 percent but the startling fact is that in 1975, Bangladesh experiences a negative growth rate (-4.09 percent), while GDP growth rate of India, Pakistan, Nepal, Sri Lanka, Bhutan and Maldives in 1974 are 1.19 percent, 3.54 percent, 5.30 percent, 3.85 percent, 6.98 percent and 6.33 percent respectively. It indicates that GDP growth rate in the South Asian countries are fluctuating overtime. But the fluctuation of GDP growth rate is higher in Bhutan than countries of South Asia as Bhutan touches a record 28.7 percent GDP growth rate in 1987, while it experiences a negative (-0.41 percent) growth rate in 1991. In 1992, GDP growth rate of India and Bhutan increase.

Table 4.3: Growth Rate of GDP in South Asian Region

Year	India	Pakistan	Bangladesh	Nepal	Sri Lanka	Bhutan	Maldives
1974	1.19	3.54	9.59	5.30	3.85	6.98	6.33
1975	9.15	4.21	-4.09	1.50	6.13	8.45	1.46
1976	1.66	5.16	5.66	3.40	3.34	6.80	4.40
1977	7.25	3.95	2.67	2.12	5.10	8.34	3.02
1978	5.71	8.05	7.07	3.41	5.65	6.40	4.41
1979	-5.24	3.76	4.80	1.37	6.40	10.32	2.37
1980	6.74	10.22	0.82	-1.92	5.85	12.65	-2.32
1981	6.01	7.92	7.23	8.14	5.70	13.91	8.34
1982	3.48	6.54	2.13	2.78	4.14	3.41	3.78
1983	7.29	6.78	3.88	-3.98	4.81	11.31	-2.98
1984	3.82	5.07	4.80	9.62	5.10	4.48	9.68
1985	5.25	7.59	3.34	5.14	5.00	4.21	6.14
1986	4.78	5.50	4.17	4.17	4.36	11.73	4.57
1987	3.97	6.45	3.77	1.30	1.73	28.70	1.70
1988	9.63	7.63	2.42	6.70	2.47	4.99	7.70
1989	5.95	4.96	2.84	4.13	2.30	7.43	4.33
1990	5.53	4.46	5.62	4.64	6.40	10.88	4.64
1991	1.06	5.06	3.49	5.37	4.60	-0.41	6.37
1992	5.48	7.71	5.44	3.01	4.40	4.60	4.11
1993	4.75	1.76	4.71	3.80	6.90	1.99	3.85
1994	6.66	3.74	3.89	7.22	5.60	4.95	8.22
1995	7.57	4.96	5.12	3.40	5.50	7.07	3.47
1996	7.55	4.85	4.52	4.33	3.80	5.57	5.33
1997	4.05	1.01	4.49	5.05	6.41	5.37	5.05
1998	6.18	2.55	5.18	3.02	4.70	5.91	3.02
1999	8.85	3.66	4.67	4.41	4.30	7.98	4.41
2000	3.84	4.26	5.29	5.20	6.00	6.93	6.20
2001	4.82	1.98	5.08	4.80	-1.55	8.20	4.80
2002	3.80	3.22	3.83	0.12	3.96	10.73	5.39
2003	7.86	4.85	4.74	3.95	5.94	7.66	14.55
2004	7.92	7.37	5.24	4.68	5.45	5.90	13.16
2005	9.28	7.67	6.54	3.48	6.24	7.12	-8.12
2006	9.26	6.18	6.67	3.36	7.67	6.85	19.89
2007	8.61	4.83	7.06	3.41	6.80	17.93	10.17
2008	3.89	1.70	6.01	6.10	5.95	4.77	12.67
2009	8.48	2.83	5.05	4.53	3.54	6.66	-5.32
2010	10.26	1.61	5.57	4.82	8.02	11.73	7.17
2011	6.64	2.75	6.46	3.42	8.40	7.89	8.71
2012	5.62	3.51	5.89	4.78	9.14	5.07	2.50
2013	6.64	4.40	5.95	4.13	3.40	2.14	4.70
2014	7.24	4.67	6.02	5.99	4.88	5.75	6.00
2015	7.56	4.71	6.08	2.73	4.79	6.49	2.85
Average	5.86	4.85	4.76	3.88	5.08	7.76	5.16

Source: World Development Indicators (WDI), 2016 (28 December), The World Bank.

The fact is that in 1975, the GDP growth rate in Bangladesh falls from 9.56 percent in 1974 to -4.09 in 1975. This is perhaps because of the effect of famine, great damages of crops because of heavy rainfall and massive flooding, political unrest, reduction of foreign aids in 1974. The GDP growth rate has started increasing sharply and reaches 5.66 percent in 1976. Till 1990 from 1984 there is remarkable ups and downs in GDP growth rate. After that till 2004 the growth rate fluctuates slowly with an average rate of growth rate of around 5.00 percent. In 2007 the GDP growth rate reaches a peak of 6.4 percent. After 2011 the GDP growth rate is almost stable. GDP growth rate of Bangladesh is upward positive trends till 2015. India faces negative growth rate in 1979. After 2005, GDP growth rate are steady up to 2015. Maldives and Nepal experience negative growth rate in 1980 and in 1983. However, Pakistan always obtain positive growth rate and Sri Lanka is on positive growth rate, but only in 2001, it is negative. Bangladesh, India, Pakistan, Nepal, Sri Lanka, Bhutan and Maldives experience average growth rates of 4.76 percent, 5.86 percent, 4.85 percent, 3.88 percent, 5.08 percent, 7.76 percent and 5.16 percent GDP growth rate respectively over the period from 1974 to 2015. Table 4.3 shows that the average GDP growth rate of Bangladesh is 4.76 compared to 3.88 of Nepal, 4.85 of Pakistan, 5.08 of Sri Lanka, 5.16 of Maldives, 5.86 of India and 7.76 of Bhutan in 2015. So, on an average growth rate of Bhutan, India and Maldives are performed well over the 42 years relative to other countries in this region. It is seen that average GDP growth rate is highest in case of Bhutan and lowest in case of Nepal among the seven South Asian nations and Bangladesh has occupied the sixth position in terms of average GDP growth rate.

The economic growth record of Bangladesh has not been spectacular the following years after independence, although there has been a moderate acceleration in growth since the 1990s. The overall growth performance has been satisfactory, particularly in the last 15 years, Bangladesh has experienced real GDP growth rate of more than 6

percent per annum. However, the issue is not the quantum of growth, but its quality and distribution. Although the rate of poverty has declined in both urban and rural areas since the 1990s, income inequality is increasing and the benefits of economic growth have yet to be shared equitably by all (various socioeconomic) groups and the benefits of economic growth have yet to be translated adequately into reduction in poverty and human deprivation.

Income is an important means of enlarging the choices available to people: more income means that people spend more on their own education and health, more healthy and educated people in turn can be more productive and can have greater access to opportunities to improve their lives. However, GDP per capita is only a rough measure to capture their resources at the disposal and their choices that are available to them. The growth of per capita income is one of the critical elements in improving human development. Table 4.4 exhibits that the level of GDP per capita in Bangladesh is low compared to other countries in this region. Bangladesh is just above Nepal in terms of per capita GDP throughout the nineties and onward.

Table 4.4: Per capita GDP (US \$) in South Asia

Year	India	Pakistan	Bangladesh	Nepal	Sri Lanka	Bhutan	Maldives
1998	444	511	348	217	802	493	1247
2001	462	415	350	236	849	644	--
2002	487	408	351	230	873	695	2182
2003	564	555	376	237	948	795	2441
2004	640	632	406	252	1033	751	2345
2005	736	711	423	272	1196	1325	2326
2007	1046	879	431	367	1616	1668	3456
2008	1017	991	497	438	2013	--	4135
2012	1550	1260	840	700	2920	2420	5750
2015	1590	1440	1190	730	3800	2380	6950

Source: HDR of UNDP various issues (2003, 2004, 2005, 2006, 2007, 2009, 2010), World Bank, 2014, 2016

Table 4.5: Per capita GDP (PPP \$) in South Asian Countries

Year	India	Pakistan	Bangladesh	Nepal	Sri Lanka	Bhutan	Maldives
1987	1050	1590	880	720	2050	--	--
1988	870	1790	720	770	2120		
1989	910	1789	820	896	2253	750	1118
1990	1072	1862	872	920	2405	--	--
1991	1150	1970	1160	1130	2650	620	1200
1992	1230	2890	1230	1170	2850	750	--
1993	1240	2160	1290	1000	3030	790	2200
1994	1348	2154	1331	1137	3277	1289	2200
1995	1422	2209	1382	1145	3408	1382	3540
1996	1580	1600	1010	1090	2290	--	3140
1997	1770	1560	1050	1090	2490	1467	--
1998	2077	1715	1361	1157	2979	1536	4083
1999	2248	1834	1483	1237	3279	1341	4423
2000	2358	1928	1602	1327	3530	1412	4485
2001	2840	1890	1610	1310	3180	--	4798
2002	2670	1940	1700	1370	3570	1969	4798
2003	2892	2097	1770	1420	3778	1969	--
2004	3139	2225	1870	1490	4390	1969	--
2005	3452	2370	2053	1550	4595	--	5261
2007	2753	2496	1241	1049	4243	4837	5196
2009	3296	2609	1416	1155	4772	5113	5476
2013	5238	4454	2853	2173	9426	7167	11283
2015	5730	4745	3137	2313	11048	7601	11892

Source: HDR of UNDP, various issues (1990-2007/08, 2009, 2011, 2015, 2016).

The per capita GDP of Bangladesh is US\$1190, compared to US\$1590 in India, US\$ 1440 in Pakistan, US\$730 in Nepal, US\$3800 in Sri Lanka, US\$2380 in Bhutan, US\$6950 in Maldives in 2015 (World Bank, 2017). While the per capita GNI (PPP) of Bangladesh is \$3341 in comparison to \$ 5663 of India, \$5031 of Pakistan, \$ 2337 of Nepal, \$2337 of Sri Lanka, \$10789 of Bhutan and \$10383 of Maldives in 2015 (UNDP, 2016). Poor per capita income partly demonstrates the poverty situation of Bangladesh.

Table 4.5 indicates that per capita income (\$PPP term) in the new millennium, Bangladesh does better than only Nepal, but worse than India, Pakistan, Sri Lanka, Bhutan and Maldives. GDP per capita in Bangladesh (PPP \$3137) is half that of India (PPP \$5730) in 2015, and lower than those of Pakistan (PPP \$4745), Sri Lanka (PPP

\$11048), Bhutan (PPP \$7601) and Maldives (PPP \$11892). So, Bangladesh has to go a long way in terms of per capita GDP (PPP\$).

4.5 Education and health

Education is one of the principal tools for human resource development. There is no alternative to education to convert people in human resources. Table 4.6 exhibits that, in terms of the adult literacy rate, Maldives ranks first, Sri Lanka has occupied the second position; Nepal and Bhutan are nearly tied at the third position, followed by India, Bangladesh and Pakistan.

In 2005-2015, the adult literacy rate in Bangladesh is 61.5 percent, compared to 72.1 percent in India, 58.7 percent in Pakistan, 64.7 percent in Nepal, 92.6 percent in Sri Lanka, 64.9 percent in Bhutan and 98.4 percent in Maldives. Bangladesh has one of the lowest adult literacy rates in South Asia excluding Pakistan. Over the period 1993-2015, the increase of adult literacy rate in case of Bangladesh is 24.5 percent compared to 38.4 percent for Nepal that has experienced the second largest increase among the seven countries. Slightly lower gains are observed for Bhutan (24.7 percent), Pakistan (22.3 percent) and India (21.5 percent). It is seen that the gain is not as great for Sri Lanka (3.00 percent) and Maldives (6.5 percent). The relatively small gains for those two countries can be explained that they have started with high literacy rate, so further increase is hard to achieve due to the law of diminishing returns. Relatively speaking, the adult literacy rate in Bangladesh is not remarkable at all. The adult literacy rate in Bangladesh has increased from 35.4 percent in 1990 to 61.5 percent in 2015 and surpasses Pakistan (58.7 percent) but remains behind rest of the six south Asian countries. The adult literacy rate in Bangladesh is the lowest not only in the developing world, but also is the South Asian average (70.3) (UNDP, 2016).

Table 4.6: Adult literacy Rates in South Asia (aged 15 and above (%))

Year	India	Pakistan	Bangladesh	Nepal	Sri Lanka	Bhutan	Maldives
1985	43.0	30.0	33.0	26.0	87.0	25.0	93.0
1990	48.2	34.8	35.3	25.6	88.4	38.4	95.0
1992	49.8	36.4	36.6	27.0	89.1	40.9	92.0
1993	50.6	36.4	37.0	26.3	89.6	40.2	92.8
1994	51.2	37.1	37.3	27.0	90.1	41.1	93.0
1995	52.0	37.8	38.1	27.5	90.2	42.2	93.2
1997	53.5	40.9	38.9	38.1	90.7	44.2	--
1998	55.7	44.0	40.1	39.2	91.1	42.0	96.0
1999	56.5	45.0	40.8	40.4	91.4	42.0	96.2
2000	57.2	43.2	41.3	41.8	91.6	47.0	96.7
2001	58.0	44.0	40.6	42.9	91.9	--	97.0
2002	61.3	41.5	41.1	44.0	92.1	47.0	97.2
2003	61.0	48.7	41.1	48.6	90.4	47.0	97.2
2004	61.0	49.9	--	48.6	90.7	47.0	96.3
1995-2005	61.0	49.9	47.5	48.6	90.7	47.0	96.3
2006	66.0	54.2	53.4	56.5	90.8	52.8	97.0
2007	66.0	54.2	53.5	56.5	90.8	52.8	97.0
2008	62.8	53.7	55.0	57.9	90.6	--	98.4
2010	62.8	55.5	55.9	59.1	90.6	52.8	98.4
2005-2013	62.8	54.7	58.8	57.4	91.2	52.8	98.4
2005-2015	72.1	58.7	61.5	64.7	92.6	64.9	99.3
Increase in adult literacy rate (1993-2015)	21.5	22.3	24.5	38.4	3.00	24.7	6.5

Source: HDR of UNDP various issues (1990-1997, 1999-2003, 2005, 2008, 2009-2011, 2014- 2016) and World Bank, 2000.

The education system of Bangladesh is characterized by low enrolment amongst the poor and vulnerable groups, low quality (measured by pupil-teacher ratios and repetition rates) and high dropout rates. In addition, teachers are not well-trained to impart quality education. The primary level suffers the most from these inadequacies. The government's own financing for education has increased, but the government still spends relatively little on education and training, in terms of percentage GDP and per student expenditure. In 2005-2015, public expenditure on the education in Bangladesh is 2.0 percent of GDP, which is the lowest ratio in South Asian region excluding Sri

Lanka. Many children start schooling but drop out (school drop-out rate in Bangladesh is 33.8 percent in 2015) before completion, being discouraged by cost, distance, physical danger, and failure to progress. Many children are forced to leave school due to family circumstances and the compulsion to provide economic support to the household at a tender age. Only 43.1 percent of the populations have some secondary education in 2015 (UNDP, 2016).

Ultimately drop-outs can be reduced, and primary school enrolment rates increase, if efforts at human development focus not just on the number of schools but on the quality of education that these schools provide (HDSA, 1997). One of the main education-related MDGs is universal primary school enrollment. Bangladesh has nearly achieved the MDG target as the net enrolment ratio has increased to 97.94 percent in 2015 from 60.5 percent in 1991-92 and net enrollment ratio (NER) is higher in Bangladesh than in neighboring countries such as India, Sri Lanka, Maldives and Bhutan indicating large improvement in social sector. Proportion of pupils starting grade 1 has increased from 43 per cent in 1991 to 81.3 per cent in 2015. It may be noted that proportion of pupils starting grade 1 who reach last grade of primary schooling is higher in Bangladesh than in India, Pakistan and Nepal. Pupil-teacher ratio has come down from 71 in 1995 to 40 in 2010-2012. Adult literacy rate of persons aged 15 years and above has increased from 37.2 percent (44.3 percent for male and 25.8 percent for female) in 1991 to 64.6 percent (67.6 percent for male and 61.6 percent for female) in 2015 (UNDP, 2016).

Table 4.7: Education Profile in South Asia

Country	India	Pakistan	Bangladesh	Nepal	Sri Lanka	Bhutan	Maldives
Adult (%15 and older) 2005-2015	72.2	58.7	61.5	64.7	92.6	52.8	99.3
Population with at least some secondary education (% of ages 25 and older) 2005-2015	48.7	35.4	43.1	32.0	80.5	34.4	32.6
Pre-primary (% children of pre-school age) 2010-2015	32.6	70	32	85	95	9	..
Primary (% primary school age-population) 2010-2015	111	94	112	135	101	112	..
Secondary (% secondary school-age population) 2010-2015	59	42	58	67	100	74	..
Tertiary (tertiary school age population) 2010-2015	24	10	13	16	21	9	..
Primary school drop rates (% of primary school cohort) 2005-2015		20.4	33.8	29.9	1.8	5.1	17.4
Primary school teachers trained to teach (%) 2005-2015	..	84	58	94	80	..	86.0
Pupil teacher ratio (number of pupil per teacher) 2010-2012	32	47	40	23	24	24	12
Education expenditure (% of GDP) 2010-2015	3.8	2.5	2.0	4.7	1.6	4.7	5.2

Source: UNDP, 2016

Bangladesh has achieved gender parity both at primary and secondary levels well ahead of MDG target date. Interestingly, the proportion of girls is higher than boys at both levels of education. It may be noted that GPI (Gender Parity Index) in both primary and secondary education is higher in Bangladesh than the neighboring countries in South Asia like India, Pakistan and Sri Lanka. Despite significant progress in gender parity in tertiary education, GPI is still low with a value of 0.65 in 2015 though it has progressed much than 0.37 in 1990-91 (Millennium Development Goals, 2016). These achievements are particularly noteworthy when compared to countries in the South Asian region and other countries at similar levels of per-capita income.

Development of human resource depends on an improved health care system. Investment in health facilities means an investment on man and improving the quality of life. So, health in its totality is a part of any human resource development. Per-capita health expenditure in Bangladesh (both public and private) is also low. The World Health Organization estimates that lower income countries would require US\$30-45 per-capita as the minimum amount required to finance essential health services (HDSA, 2005). But in 2012, per capita health expenditure in Bangladesh is only US\$ 27, compared to US\$ 93 in Bhutan, US\$ 59 in India, US\$ 30 in Nepal, US\$ 97 in Pakistan, US\$ 33 in Sri Lanka and US\$ 545 in Maldives, per capita health expenditure of Bangladesh is lowest even among the countries of the region except Pakistan (World Bank, 2013).

Table 4.8: Health Expenditure in South Asia (% of GDP)

Year	India	Pakistan	Bangladesh	Nepal	Sri Lanka	Bhutan	Maldives
1990	3.9	2.6	1.5	2.0	2.6	4.2	4.0
1991	3.7	2.6	1.5	2.0	3.7	..	7.0
1998-2000	4.1	1.8	2.5	3.7	3.1	5.2	3.9
1999-2001	4.1	1.8	2.3	3.5	1.3	5.2	..
2002-04	3.3	2.0	2.4	3.4	..	..	8.1
2002-05	3.8	2.3	2.5	3.4	..	5.6	7.1
2009	4.2	2.6	3.4	5.8	4.0	5.5	8.0
2011	3.9	2.5	3.7	5.4	3.4	4.1	8.5
2013	4.0	2.8	3.7	6.0	3.2	3.6	10.8
2015	1.4	0.9	0.8	2.3	2.0	2.6	10.8

Source: Various issues of UNDP (2003, 2004, 2006, 2007/08, 2011, 2014, 2015, 2016)

Table 4.8 poses that in 2015, the public spending on health in Bangladesh is only 0.8 percent of its GDP, compared to 1.4 percent in India, 0.9 percent in Pakistan, 2.3 percent in Nepal, 2.0 percent in Sri Lanka, 2.6 percent in Bhutan and 10.6 percent in Maldives. In Bangladesh, public spending on health as percentage of GDP has fallen in 2015

compared to previous years during 2000-2013, despite sustained economic growth. This indicates that economic growth alone may not be adequate for increasing government expenditure on health.

Bangladesh has performed well in the health field with low cost than its neighboring countries. For instance, among the countries in South Asia, Bangladesh has occupied the sixth position in terms of per capita GDP, but in terms of life expectancy, it has stood third position after Sri Lanka and Maldives in 2015. Bangladesh has made encouraging progress in some areas of health such as child immunization rates and a decline in infant and under 5 mortality rates. Yet the health deprivation in Bangladesh is widespread. Overall, 77 percent of Bangladeshis lack the minimal requirements for a healthy human existence (World Bank, 2014). The budgetary allocation for health is inadequate, inefficient and inequitable. It is inefficient because first, public funds are allocated across priorities that do not yield significant health benefits for the majority of the population and, second, funds are misappropriated and misused. Public spending on health is also inequitable in the sense that the benefits of public subsidies on health are mostly captured by the richer income groups. Much of the government funding of the public sector health care goes into expensive tertiary level projects in urban areas. Most of the public health services are concentrated in urban areas. Corruption, mismanagement of financial resources and inefficiencies in monitoring and administration of the social sector expenditures have negatively affected the quality of health education, sanitation and provision of clean drinking water to millions of people of Bangladesh. There are also variations in health outcomes among rural and urban populations, among the rich and poor, and also among different communities. The worst hits are the poor particularly in rural areas (HDSA, 2005).

Table 4.9 exhibits that Bangladesh has performed well in the field of health with a much faster reduction in its infant mortality rate than some neighboring countries. Table 4.9 shows that in general, the infant mortality rates have decreased between 1990 and 2015 for all the South Asian countries but the largest reduction is achieved by

Bhutan (a reduction of -95.8 per 1000 live births) followed by Nepal (-93.6), Bangladesh (-83.3), Maldives (-53.6), India (-56.1), Pakistan (-38.2) and Sri Lanka (-17.6) in that order. It is to be noticeable that Sri Lanka's reduction is smallest. Mortality rates for infants in Bangladesh have declined from 114 per 1,000 live births in 1990 to 30.7 per 1,000 live births in 2015 (UNDP, 1992 and 2016). Bangladesh has therefore, a lot of room for progress in decreasing its infant mortality rates. In 2015, the best performers are Sri Lanka and Maldives, followed by Nepal, Pakistan and India.

Table 4.9: Infant Mortality Rates in South Asia (Per 1,000 live births)

Year	India	Pakistan	Bangladesh	Nepal	Sri Lanka	Bhutan	Maldives
1990	94	104	114	123	26	123	61
1991	90	101	111	102	25	133	58
1992	89	99	109	100	24	131	56
1993	81	89	106	98	17	122	58
1994	74	80	85	92	16	113	53
1996	73	95	83	82	17	90	54
1998	69	95	79	72	17	84	62
1999	70	84	58	75	17	80	60
2000	69	85	54	72	17	77	59
2001	67	84	51	66	17	74	58
2002	67	83	51	66	17	74	--
2003	63	81	46	61	13	70	55
2004	62	80	56	59	12	67	35
2005	56	70	54	56	12	65	33
2006	57	78	43	41	11	63	26
2008	52	72	43	41	13	--	24
2013	41.4	69.0	33.2	32.2	8.2	29.7	8.2
2015	37.9	65.8	30.7	29.4	8.4	27.2	7.4
Reduction in Infant Mortality (1990-2015)	-56.1	-38.2	-83.3	-93.6	-17.6	-95.8	-53.6

Source: Various issues of UNDP, HDR (1992-1994, 1996, 1997, 2000- 2007, 2008, 2010, 2015 and 2016).

Table 4.10 exhibits that during 1990-2015, Bhutan has seen the highest reduction of under 5 mortality rates (-156.1 per 1,000 live births), followed by Nepal (-153.3 per 1,000 live births), Bangladesh (-142.3 per 1,000 live births), India (-94.4 per 1,000 live births), Pakistan (-76.9 per 1,000 live births), Sri Lanka (-25.2) and Maldives (-76.4 per 1,000 live births), Sri Lanka has the lowest reduction in the region. The under 5 child mortality rates in Bangladesh (37.9 per 1000 live births) are very high in compared to Sri Lanka (9.8 per 1000 live births) in 2015. If we consider this decrease of infant mortality rate among the South Asian countries from 1990 to 2015, we see that Sri Lanka has experienced the smallest reduction. This is because the infant and under-5 mortality rates have been very low to begin with and, therefore, further reduction is difficult due to law of diminishing returns. It is noticeable that Bangladesh has achieved a significant decrease in infant and under-five mortality rates from 114 and 180 in 1990 to 30.7 and 37.7 respectively in 2015 (UNDP, 2005 and 2016).

Table 4.10: Under 5 Mortality Rates in South Asia (per 1,000 live births)

Year	India	Pakistan	Bangladesh	Nepal	Sri Lanka	Bhutan	Maldives
1990	142	158	180	189	35	189	85
1992	130	130	150	155	30	200	80
1993	164	137	122	128	19	197	--
1995	115	137	115	114	19	189	77
1998	105	136	106	100	19	116	87
1999	98	112	89	104	19	107	83
2000	96	110	82	100	19	100	80
2001	93	109	77	91	19	95	77
2002	93	107	77	91	19	94	77
2004	85	101	77	76	14	80	46
2005	74	99	73	74	14	75	42
2006	76	97	69	59	13	70	30
2008	69	89	54	51	15	--	28
2009	66	87	52	48	15	79	13
2013	52.7	65.5	37.9	39.7	9.6	36.2	9.9
2015	47.7	81.1	37.6	35.8	9.8	32.9	8.6
Reduction in infant mortality	-94.4	-76.9	-142.3	-153.3	-25.2	-156.1	-76.4

Source: HDR of UNDP (1990-1992, 1994, 1995, 2000, 2001-2006, 2008, 2009, 2011, 2015 and 2016).

The successful programs for immunization, control of diarrheal diseases and vitamin A supplementation are considered to be the most significant contributors to the decline in child and infant deaths along with potential effect of overall economic and social development (The Millennium Development Goals: Bangladesh Progress Report, 2013). Bangladesh has therefore, a lot of room for progress in decreasing its infant and under 5 mortality rates.

As seen in Table 4.11, the life expectancy at birth has increased for seven South Asian countries between 1990 and 2015 period. During 1990-2015, the best performer is Maldives, followed by Sri Lanka, Bangladesh, Nepal, Bhutan, India and Pakistan. During 2010-2015, this ranking is somewhat altered, with Bangladesh nearly to be for the third position. The overall life expectancy at birth in Bangladesh stands at 72.0 years by 2015 (UNDP, 2016), up from 51.8 years of life expectancy at birth in 1990 (HDSA, 1997).

Table 4.11: Life Expectancy in South Asia (years)

Year	India	Pakistan	Bangladesh	Nepal	Sri Lanka	Bhutan	Maldives
1990	59.1	57.7	51.8	52.2	70.9	48.9	62.5
1992	59.7	58.3	52.2	52.7	71.2	47.8	62.6
1993	60.7	61.8	55.9	53.8	72.0	51.0	62.4
1994	61.3	62.3	56.4	55.3	72.2	51.5	62.8
1995	61.6	62.8	56.9	55.9	72.0	52.0	63.3
1997	62.6	64.0	58.1	57.3	73.1	60.7	64.5
1998	62.9	..	58.6	57.8	73.3	61.2	65.0
1999	62.9	59.6	58.9	58.1	71.9	61.5	66.1
2000	63.3	60.0	59.4	58.6	72.1	62.0	66.5
2001	63.3	60.4	60.5	59.1	72.3	62.5	66.8
2002	63.7	60.8	61.1	59.6	72.5	63.0	67.2
2003	63.3	63.0	62.8	61.6	74.0	62.9	66.6
2004	63.6	63.4	63.3	62.1	74.3	63.4	67.0
2005	63.7	64.6	63.1	62.6	71.6	64.7	67.0
2007	63.4	66.2	66.7	66.3	74.0	65.7	71.1
2010	64.4	67.2	66.9	67.6	74.4	66.8	72.3
2011	65.4	65.4	68.9	68.8	74.9	67.2	76.8
2013	66.4	66.6	70.7	68.4	74.3	68.8	77.9
2014	68.0	66.2	71.6	69.0	74.9	69.5	76.8
2015	68.3	66.4	72.0	70.0	75.0	69.9	77.0
Life expectancy Gains 1990-2015	9.2	8.7	20.2	17.8	4.1	21.0	14.5

Source: HDR of UNDP various issues (1990, 1992-1996, 1998-2005, 2008-2011, 2014-2016).

The life expectancy at birth in Bangladesh has increased by 20.2 years between 1990 and 2015. Over this period, Bhutan has experienced the largest gain (21.0 years) within South Asia. Slightly higher gains are observed for Nepal (17.8 years), Maldives (14.5 years), India (9.2 years), Pakistan (8.7 years) and Sri Lanka (4.1). One can also see that the gain is not as great for Sri Lanka (4.1 years). The relatively small gains for Sri Lanka can be explained by the fact that they have started with a much higher level of life expectancy in 1990 and before; as a result, achieving further gains become increasingly more difficult due to the law of diminishing returns.

Over the entire period, Bangladesh has achieved a strong and consistent upward trend in life expectancy. This is the highest increase in the South Asian region excluding Bhutan. People in Bangladesh can now expect to live longer than they used to expect at the beginning of the nineties. Yet, Bangladesh still has to go a long way; because Bangladesh has lagged behind of Maldives (77.0 years) and Sri Lanka (75.0 years) in terms of life expectancy in 2015 (UNDP, 2016). Bangladesh has achieved commendable progress in increasing its life expectancy over time but not impressive compared to Maldives and Sri Lanka. Bangladesh has made substantial progress in the health indicators over the last two decades during 1995 to 2015. In South Asia itself, the much poorer economy of Bangladesh (excluding Nepal) has caught up with and surpassed India in terms of many social indicators (including life expectancy, immunization of children, infant and child mortality, child under-nourishment and girls' schooling). The contraceptive prevalence rate (CPR) among married women has increased to 62.1 percent in 2015 from 40 percent in 1991 with sluggish expansion in the last decade from 2005-2015. The sharpest increase in the contraceptive prevalence rate (CPR) actually takes place in the first decade of this period; since 2004, the increase in use of contraceptives has slowed down. Thus Bangladesh has been unable to

achieve the CPR target of 72 percent. However, CPR is still higher in Bangladesh compared with India, Pakistan, Nepal and Maldives (Millennium Development Goals, 2016). Traditional health indicators such as crude birth rate has reduced from 35 per 1,000 live birth in 1990 to 20 in 2012 and in the same period, crude death rate from 10 to 6 per 1,000 live birth, (UNICEF, 2014). The total fertility rate has reduced from more than 4 percent children per married women in 1990 to 2.2 children in 2015 (UNDP, 2016).

4.6 Human Deprivation, Especially Condition of Women and Children

Bangladesh is not only highly densely populated country, but also one of the poverty stricken countries in the world. Bangladesh falls into the category of a poor country in which social and human indicators are still areas of concern. Though, the population growth rate of Bangladesh is not so high in South Asian context, yet every year more than two million people are being added to its population.

Table 4.12: Multidimensional Poverty Index (MPI) in South Asia

Country	Survey Year 2005-2015	Multiple Poverty index value	Population in Multidimensional Poverty		Population near Multidimensional Poverty	Population in Severe Poverty	Contribution of Deprivation in Dimension to Overall Poverty (%)			Population below Income Poverty line (%)	
			Head Count (%)	Intensity of Deprivation			Education	Health	Living Standard	ational Poverty Line	PPP \$1.90 a day
India	2005/06D	0.282	55.3	51.1	18.2	27.8	22.7	32.5	44.8	21.9	21.2
Pakistan	2012/13D	0.237	45.6	52.0	14.9	26.5	36.2	32.3	31.6	29.5	6.1
Bangladesh	2014D	0.188	40.7	46.2	19.6	16.0	28.4	26.1	45.5	31.5	18.5
Nepal	2014M	0.116	26.6	43.7	14.4	9.3	32.2	25.6	42.2	25.2	15.0
Bhutan	2010M	0.128	29.4	43.5	18.0	8.8	40.3	26.3	33.3	12.0	2.2
Maldives	2009D	0.008	2.0	37.5	8.5	0.1	27.8	60.2	11.9	15.7	7.3

Source: UNDP, 2016.

The multidimensional poverty index (MPI) usually represents a national average, which can mask disparities and large areas of deprivation within countries. In Bangladesh an estimated 40.7 percent (constituting 75.6 million) people live in multidimensional poverty, but its prevalence varies greatly across divisions, with rural areas having a higher prevalence than urban areas (UNDP, 2016). If we go into details, 46.2 percent population come under “Intensity of deprivation” (which measures the “extent of deprivation”), and 19.6 percent under “severe poverty” (as rated by the MPI). If we compare with the neighboring countries mentioned in the Table 4.12, Bangladesh has the highest MPI value (0.188) based on 2014 survey data followed by Nepal, Bhutan and Maldives. The headcount ratio, (i.e., the percentage of the population suffering over-lapping deprivation) is 46.2 percent for Bangladesh and 45.6 percent for Pakistan, 26.6 percent for Nepal, 29.4 percent for Bhutan and only 2.0 percent for Maldives. About 28.4 percent people are deprived from education, 26.1 percent from health and 45.5 percent from standards of living. If we compare with method (PPP\$ 1.90 a day and national poverty line), we find that 18.5 percent of total population of Bangladesh survive in absolute poverty, with an income of less than PPP\$ 1.90 a day, 31.5 percent of whole population lives under the national poverty line and most of them are deprived of basic human capabilities (UNDP, 2016).

Bangladesh is the largest poverty pocket in South Asia after India. What is more distressing that more than three-fourth (76.4 percent) of its people treated as a working poor, with an income of less than PPP\$ 2 a day, about two-thirds are ‘capability poor’, i. e., they do not receive the minimum level of education and health care necessary for functioning human capabilities (HDSA, 2015). The benefits of economic growth have not been equally distributed and have not reached all the people. This means in spite of sustained economic growth, Bangladesh has failed to significantly improve the living

condition of the masses. As many people in Bangladesh are still poor and food insecure, poverty reduction does not necessarily translate into less hunger and malnutrition. The extent of human deprivation in Bangladesh is colossal. The women and children bear the heavy brunt of human deprivation. About 44.3 million (41.2 percent) adults are unable to read or write, among them 23.9 million (44.9 percent) are female in 2011 (HDSA, 2015).

The richest 10 percent of the population receives almost 27 percent of the national income whereas the poorest 10 percent of the population receives only 4.0 percent of the national income (World Bank, 2012). Although in recent years, public expenditure on human development has been increasing gradually, as the emphasis on social investment receives greater importance. The incidence of absolute poverty (in terms of percentage of total population with less than 2,212 kcal /person /day) has declined from 55.7 percent in 1985-86 to 40.4 percent in 2005 (HDSA, 2011). The incidence of income poverty (measured by CBN considering upper poverty line) has decline from 48.9 percent in 2000 to 40.0 percent in 2005. During this period, the compound poverty reduces yearly 3.9 percent. In urban areas, reduction rate is higher than that of rural areas (yearly 4.2 percent and 3.5 percent respectively). On the contrary, the rate of income poverty declined from 40.0 percent to 31.5 percent from 2005 to 2010. At the same period, compound poverty is reduced at 4.67 percent per year. Concurrently, in rural areas rate is higher (yearly 5.59 percent) than urban areas (BER, 2016).

Per capita daily calorie intake at the national level has significantly increased from 2,238.5 kcal in 2005 to 2,318.3 kcal in 2010 reversing the declining trend observed from 1991-92 to 2005. Significant increase in per capita daily calorie intake can be attributed to increase in per capita income of people, changing food habit of people and increase in quantity of food consumption (Millennium Development Goals, 2016).

According to the State of Food Insecurity (SOFI) 2014, Bangladesh has reduced the number of people undernourished by 27.3 percent during 1990-92 to 2012-14 periods (from 36 million in 1990-92 to 26.2 million in 2012-14). According to UN estimates, proportion of population below minimum level of dietary energy consumption has declined from 32.8 percent in 1991 to 16.4 percent in 2015 (Millennium Development Goals, 2016). Bangladesh has made noteworthy progress in respect of eradicating of poverty and hunger. It has sustained a GDP growth rate in excess of six percent in recent years that has played a positive role in eradicating poverty (Millennium Development Goals: Bangladesh Progress Report, 2014).

The inclusive growth has resulted in impressive poverty reduction from 56.7 percent in 1991-92 to 24.3 percent in 2016 (Preliminary Report on Household Income and Expenditure Survey, 2017), the faster rate in the previous decade than the earlier ones. In 2010, the poverty head count rate, using upper poverty line, is 31.5 percent which reduces to 24.3 percent in 2016. Using lower poverty line head count ratio is also reduced, it is 17.6 percent in 2010 which reduces to 12.9 percent in 2016. Using the upper poverty line in 2016, the Head Count Rates (HCR) of incidence of poverty is estimated at 24.3 at the national level, 26.4 percent in rural areas and 18.9 percent in urban areas. In HIES 2010, these rates are 31.5 percent at the national level, 35.2 percent in rural areas and 21.3 percent in urban areas respectively. It has recorded a reduction of HCR by 7.2 percent percentage point (approximately 1.2 percent per annum) at national level, 8.8 percent point in rural areas and 2.4 percent point in urban areas during the period 2010 to 2016. It is notable to mention that poverty reduction is higher in rural areas compared to urban areas. In rural areas, the reduction is 3.7 times higher than urban areas. This may be due to higher poverty reduction interventions, such as social safety net, in the rural area compared to urban areas. Using the lower

poverty line in 2016, the HCR of incidence of poverty is estimated at 12.9 percent at the national level, 14.9 percent in rural areas and 7.6 percent in urban areas. In HIES 2010, these rates are 17.6 percent at the national level, 21.1 percent in rural areas and 7.7 percent in urban areas respectively. It is recorded a reduction of HCR by 4.7 percent at the national level, 6.2 percent in rural areas and 0.1 percent in urban areas during the period 2010 to 2016 (Preliminary Report on Household Income and Expenditure Survey, 2017).

4.7 Gender Equality and Empowerment of Women

Gender equality and women's empowerment are fundamental dimensions of human development. Because half of humanity is not enjoying progress in human development, such development is not universal. Women are more likely than men to suffer from low human development. Table 4.13 shows that the HDI value of female is 0.556, compared to 0.599 of male. Despite the fact that in Bangladesh women have longer life expectancy than men do, and the fact that the expected number of years of schooling for girls is higher than for boys, women consistently have a lower HDI value than men do. Much of the variation in HDI between women and men is due to lower income among women relative to men and to lower educational attainment among women relative to men. Part of the variation in the HDI between men and women is generated by barriers to women working outside the home, to accessing education, to voicing their concerns in political arenas, to shaping policies and to receiving the benefits of high-quality and accessible health care (UNDP, 2016). Bangladesh has made substantial progress in promoting the objectives of ensuring gender equality and empowerment of women. Bangladesh has achieved gender parity in primary and secondary enrolment; its combined female enrolment is 52.5 percent, compared to 51.8 percent of male (UNDP, 2009); the expected years of schooling for female is 10.4 years

as against 9.9 years for male: female life expectancy is 73.3 years, compared to 70.7 years of male (UNDP, 2016). This, in turn, will help enhance women's employment opportunities.

Table: 4.13 Gender Development Index for South Asian Nations

Countries	HDI rank	Gender Development Index (GDI) 2015		Human Development Index (HDI) Value 2015		Life Expectancy at birth (years) 2015		Mean Years of schooling (years) 2015		Expected years of schooling (Years) 2015		Estimated gross national income per capita (2011 PPP \$) 2015	
		Value	Group	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
India	135	0.819	5	0.549	0.671	69.9	66.9	4.8	8.2	11.9	11.3	2,184	8,897
Pakistan	147	0.742	5	0.452	0.610	67.4	65.4	3.7	6.5	7.4	8.8	1,498	8,374
Bangladesh	139	0.927	3	0.556	0.599	73.3	70.7	5.0	5.6	10.4	9.9	2379	4,285
Nepal	144	0.925	4	0.538	0.582	71.5	68.6	3.2	5.0	12.7	12.2	1,979	2,718
Sri Lanka	73	0.934	3	0.734	0.785	78.4	71.7	10.3	11.4	14.3	13.6	6,067	15,869
Bhutan	132	0.900	5	0.573	0.637	70.1	69.6	2.1	4.2	12.6	12.4	5,657	8,308
Maldives	105	0.937	3	0.676	0.721	78.0	76.0	3.2	6.3	12.8	12.7	7,155	13,591

Source: UNDP, HDR, 2016

Bangladesh has achieved considerable success in mainstreaming women into the development process, especially at the grassroots level. In particular, Bangladeshi women are playing the key role in the success of micro-credit and readymade garments exports, reducing population growth, increasing child nutrition and in the spread of primary education. Trade liberalization has led to increased employment opportunities for women in export oriented industries such as readymade garments in Bangladesh (HDSA, 2003).

Table 4.14 exhibits that gender inequality is a serious concern in Bangladesh, as reflected by the poor 'Gender development index', value of 0.927 and it falls in the 3rd group. However, Bangladesh's GDI (0.927) in 2015 is still lower than those of Sri Lanka (0.934) and Maldives (0.937) (UNDP, 2016). In terms of gender inequality index (GII),

it stands at 119th position with 0.520 values while India and Pakistan have occupied at 125th and 130th respectively on this index (UNDP, 2016). A few women are currently holding powerful position with dominant leadership of women in national politics and government. Currently, the Speaker of the National Parliament, the Prime Minister, the Leader of the Opposition and the Deputy Leader of the House are all women. However, with some notable initiatives by the Government, women's participation in the Parliament stand at 20.0 percent in 2015 (UNDP, 2016) compared to 12.73 percent in 1991 (MDGs, 2016). In the last Parliament, the share of reserved seats for women was raised to 50 from 45. Moreover, the current Parliament has 20 directly elected women Parliamentarians. In addition, one women parliamentarian has been elected later on in a by-election in 2015.

Table: 4.14 Gender Inequality Index in South Asia Region

Country	Gender Inequality Index(GII)		Maternal Mortality Ratio	Adolescent Birth Ratio	Shares in Seats Parliament	Populations with at least Some secondary Education		Labor Force Participation Rate	
	Value 2015	Rank 2015	(Death per 100000 live births)	Birth per 1000 women ages(15-19)	(% held by Women)	(% ages 25 and older) 2005-2015		(% ages 25 and older) 2015	
			2015	2010/15	2015	Female	Male	Female	Male
India	0.530	125	174	24.5	12.2	35.3	61.4	26.8	79.1
Pakistan	0.546	130	178	38.7	20.0	26.5	46.1	24.3	82.2
Bangladesh	0.520	119	176	83.0	20.0	42.0	44.3	43.1	81.0
Nepal	0.497	115	258	71.9	29.5	24.1	41.2	79.7	86.8
Sri Lanka	0.386	87	30	14.8	4.9	80.2	80.6	30.2	75.6
Bhutan	0.477	110	148	21.4	8.3	5.8	13.4	58.7	72.8
Maldives	0.312	64	68	6.7	5.9	34.3	30.9	57.3	78.8

Source: UNDP, HDR, 2016

In order to ensure greater participation of women in important decision making positions, initiatives are now underway to increase the representation of women in the

legislative, judiciary and executive branches of the government (MDGs, 2016). In other areas of decision-making such as the bureaucracy and high levels jobs, women's presence is still negligible. Only 5.4 percent women occupy the top administrative (female legislators, senior officials) and managerial positions. In fact, Bangladesh enjoys the distinction of having not only a female Prime Minister but also a female opposition leader. Obviously, it is not enough to have a woman Prime Minister. What is more surprising in Bangladesh with so many female heads of government is the political marginalization of the majority of women. In Bangladesh, 42.0 percent of adult women have reached a secondary level of education compared to 44.3 percent of their male counterparts (UNDP, 2016).

Education is a dominant factor affecting decision making power of women. Hence, it is expected that with the increase of education level, decision making power of women is increasing and they would have more access to political power and decision making both at state, institution, community and household levels. It is certainly a strange phenomenon that the majority of women are totally marginalized in the society where a woman reached the pinnacle of political power.

Women also lag behind of men in labor market participation. About 81 percent of the male laborers are engaged in economic activities while female labor participation rate is only 43.1 percent in 2015 (UNDP, 2016). Though there has been a marked increase in labor force participation of women in Bangladesh since 1990. At present, Bangladesh has occupied the fourth position in term of economic activity rate for women among the countries of South Asia. More than two-thirds (57.4 percent) of the potential female labor force (age 15-64) is active in the labor market in Bangladesh (UNDP, 2015). About 81 percent of the male laborers are engaged in economic activities while female labor participation rate is 43.1 percent in 2015 (UNDP, 2016). Male labor force

participation rate (LFR) varies between about 82 percent to about 87 percent and is comparable to other developing countries. The female LFR is low at 33.5 percent in 2013. It indicates female LFR will constitute most of incremental LFR in the future. The share of women in wage employment in the non-agricultural sector has increased slowly from 19 percent in 1991-92 to 31.6 percent in 2013. Achieving gender parity in wage employment in non-agricultural sector has remained a formidable challenge in Bangladesh (MDGs, 2016). Millions of women workers are engaged in the informal economy, which is marked by low productivity, denial of workers' rights, a lack of adequate opportunities for quality work, insufficient social protection and an absence of social dialogue (UNDP, 2015).

Women in Bangladesh have poor nutritional status, perform undervalued work, have less access to credit, poor access to health care, less control over assets, and high insecurity (violence at home, workplace). Women have experienced many kinds of disadvantage and discrimination in health, education and employment (UNDP, 2014). No society can achieve its potential to meet the challenges of the 21st century without the full and equal participation of its entire people, this requires investments in human capital through education, health care, social protection, and jobs (World Bank, 2016). No society has ever liberated itself economically, politically or socially without a sound base of educated women. Women make important contributions to economic and social development. Keeping them outside the mainstream, the overall human resource development of the nation is not possible. Expanding their opportunities in the public and private sectors is a core development strategy, and education is the starting point. If the people of Bangladesh bear positive attitude towards women in their mind it would be helpful for us to increase economic development with equal efforts of male-female. There are, however, significant gender differences in the status of employment. Women

bear the heaviest burden of work inside and outside home. Women work long hours and contribute much to their families' welfare, but many are in the informal sector or are unpaid for their labor. In employment, gender discrimination is pervasive in specific sectors, occupations and wage rates.

Women work harder and for longer hours than men in agriculture, industry and services; in informal as well as formal sectors or as unpaid family workers; in rural as well as in urban settings; in public and private sectors though their earnings are significantly lower than their male counterparts. In general, women are less likely than men to be employed in paid and regular jobs and they are more likely to be employed in informal sector, which provides very little security in terms of income. Women are mostly concentrated in low paying, low productivity jobs. The economic opportunities for women are fairly limited. Women are less engaged in waged work, earn less than men, remain underrepresented in senior decision making positions, encounter uneven barriers to entrepreneurship and, in many countries, are more likely to be in vulnerable employment. Even when working for a salary, earnings between women and men diverge. The per capita GNI for women in Bangladesh is \$PPP 2,379, compared to 4,285 of man in 2015 (UNDP, 2016).

Children and women are among the highly vulnerable groups in the labor market. More than 52 percent of the female laborers (compared with only 12 percent of the males) work as unpaid family helpers whereas the share of female self-employed workers in total female employment is 25 percent compared with a similar share of 51 percent for males. About 58 percent of female workers have no schooling at all while another 15 percent have some primary schooling. Within the formal sectors, women are also concentrated in jobs with unstable earnings with a high risk of falling into poverty. Income is also unequally distributed at the household level, with frequent

discrimination against women and children in terms of their access to food, health care and education. High economic growth rate in Bangladesh has not adequately translated into employment opportunities for women and girls, who have the lower education and skilled level as compared to men (UNDP, 2008). Women's access to paid employment is an indication of their integration into the market economy. As women benefit from more regular income, they are more likely to achieve greater autonomy, self-reliance in the household and in their personal development and decision-making power. These disparities are the direct result of differences between women and men in terms of their control over resources, including income and asset ownership (MDGs Bangladesh Country Report, 2013).

The health status of women is insecure. Women are often the last to be fed in the household and they carry the greatest burden of work. Married women are often burdened with unwanted pregnancies, since only 61 percent women use any form of contraception in 2011 (World Bank, 2013). Children and women are particularly vulnerable and at risk of poor health. Child health and maternal health are the measurers for other areas of human development, such as, public health, nutrition and empowerment of women. Many health problems among pregnant women are preventable or treatable through visits with trained health workers before childbirth. Good nutrition, vaccinations, and treating infections can improve outcomes for mother and child. Skilled attendants at delivery and access to hospital treatments are essential for dealing with life-threatening emergencies such as severe bleeding and hypertensive disorders (World Bank, 2014). They bear the brunt of health deprivations and avoidable deaths in Bangladesh. Maternal mortality is one of the important threats to women in Bangladesh. The maternal mortality rate is very high at 176 per 100,000 live births in Bangladesh, compared to 258 in Nepal, 178 in Pakistan, 174 in India, 148 in Bhutan, 68

in Maldives and 30 in Sri Lanka in 2015 (UNDP, 2016). The reasons for high maternal mortality in Bangladesh can be attributed to a large number of factors varying from malnutrition of women, unsafe cultural and traditional practices and poverty of households to inability of healthcare systems to provide emergency obstetric care. In Bangladesh, many births are not attended by doctors, nurses, or trained midwives. Lack of skilled assistants during birth also another major factor that increases the risk of maternal mortality.

Among the countries of South Asia, the skilled attendants at birth is highest in Sri Lanka (99 percent) followed by Maldives (95 percent), Bhutan (65 percent), India (52 percent), Pakistan (38 percent), Nepal (19) and Bangladesh (27) in 2010 (HDSA, 2015). The doctor to population ratio is extremely low and Bangladesh has provided 3.6 doctors per 10,000 populations during 2001-2014 (UNDP, 2016). Children are often born without their mothers being attended by skilled health personnel. In fact, 32 percent of the deliveries are occurred by skilled health personnel and the rest 68 percent of the mothers struggle alone, by untrained though anxious relatives, at the time of their need (UNDP, 2014) It is, therefore, not surprising that, far too often, this miracle of birth turns into a nightmare of death, with too many children losing their mothers at the time of their arrival on this earth (HDSA, 1997). Better maternal health care and lower fertility can reduce maternal deaths. Dramatic reduction in the total fertility rate (TFR) represents a success story for Bangladesh. The current TFR stands at 2.1 which is below the target that is set at 2.2 for 2015 (MDGs, 2016). Family planning and access to contraception can help avoid the large number of births that are unwanted or mistimed. Birth and death rates are ultimately linked with reduction of poverty. The maternal mortality rate is also related to poverty. Again, poverty is very much linked with high birth rate (20 per 1000) as well as high death rate (6 per 1000) and the total fertility rate per women is 2.2 in 2015 (World Bank, 2016).

The women and children in Bangladesh bear the heavy burden of poverty disproportionately. Bangladesh has failed to protect the lives of millions of children in terms of ensuring equal access to education, health care and protection from exploitation. Child labor is one of the worst forms of exploitation of children. About 4.0 percent of the total children aged 5-14 are involved in child labor (UNDP, 2016). Bangladesh is virtually the child labor factory of the world, with nearly half the world's child laborers, large numbers of whom work unhealthy and hazardous conditions. Many of these children are under ten years old. Child laborers suffer multiple deprivations. They are over worked and deprived of their rights to health, education, recreation and childhood. As a result, they grow up to be illiterate, unskilled and open irresponsible adults, preparing the poverty cycle. Child labor results from socio-economic and political factors including deliberate exploitation, harmful cultural traditions, lack of legal provisions and enforcement and gender related discrimination. These basic and underlying causes of inequality and inequity exacerbate economic poverty and push children to work. The underlying causes of child labor in Bangladesh are also listed as poverty and deprivation, adult unemployment and high school dropout rates. Other reasons are high fertility in rural areas, lack of legal provisions and enforcement and social acceptance of child labor. Birth registration is important for providing various fundamental rights to children, such as protecting them from early marriage, trafficking, and different forms of child labor. It is also important for school enrolment. Every child has the right to an identity (UNICEF, 2014). Yet, in Bangladesh birth registration remains very low with only about 37.0 percent of under-five births having been registered compared to 72.0 percent in India, 34.0 percent in Pakistan, 58.0 percent in Nepal, 97.0 percent in Sri Lanka, 100 percent in Bhutan and 93.0 percent in Maldives (UNDP, 2016). To improve child survival rates, Bangladesh has taken a multi-sector approach, like expanding education and employment opportunities for women, improving women's social status, increasing political participation, social

mobilization and community participation, disseminating public health knowledge, and providing effective, community-based essential health services (UNDP, 2013).

4.8 Employment-unemployment, Labor Market and Gender Discrimination

In 2015-16, there are 106.1 million persons aged 15 years or older, 59.5 million of them (56.1 percent) are in employment or engaged in economic activity; 17.8 million of them (33.2 percent) are females. Almost 18.9 million or 31.9 percent of the employed population is in the younger age groups, 15–29 years old. About two-thirds (63.9 percent) of the employed population belongs to the adult age group (30-64), whereas 6.4 percent of the employed population from the age group 65+ years old. About 62.4 percent of the employed male in the rural areas is literate; it is 76.6 percent in the urban areas. Among the employed males, an estimated 26.2 per cent of them have completed their primary education, 30.2 percent who have completed secondary education, and 6.1 percent who have graduated university education. The highest 30.5 percent of the employed male have no education at all. At 37.1 percent of the female employed have no education, followed by 30.0 per cent have completed secondary education, 25.2 percent have completed primary school, and only 3.5 percent have completed tertiary level. The largest proportion of the employed population in urban areas, 31.7 per cent (5.2 million), have a secondary education, while the largest proportion of the employed population in rural areas, at 36.0 per cent (15.5 million) had no education (Quarterly Labor Force Survey, 2017).

Employment provides the key link between economic growth and poverty making it the major instrument for poverty reduction in Bangladesh. Another important aspect of the labor in Bangladesh is the formal-informal division in employment, which has significant consequences for return to labor and security of employment. Most of Bangladesh's laborers are engaged in informal, low-income jobs with limited

productivity. At the national level, 86.2 percent of the employed population engage in informal employment; it is 95.4 percent for females and 82.3 percent for the male counterparts, while the share of formal public sector jobs has remained unchanged. In urban areas, informal employment is 78.1 percent, and it is 89.3 percent in rural areas, where the largest number of informally employed persons engages. The percentage distribution of informal employment portrays a scenario, where both in rural and urban areas, the proportion of informal and formal employment in rural areas for females (97.0 percent) are higher than in urban areas (90.6 percent). Both in rural and urban areas, females and youths aged 15-29 are more likely to be in the informal employment than male counterpart. On the other hand, the incidence of formal employment is far higher among the highly educated (tertiary education 47.1 percent, followed by higher secondary education 33.2 percent, secondary levels 17.4 percent, primary levels 9.6 percent, and no education 4.6 percent). There exists a clear positive correlation between higher education attainment and formal employment i.e., highly educated persons are more likely to be in the sector of formal employment and less educated are more likely to be employed in the informal employment (Quarterly Labor Force Survey, 2017).

Unemployment is a serious problem in Bangladesh in comparison to South Asian nations, though accurate estimates are difficult to obtain. The current unemployment rate in Bangladesh is 4.4 percent compared to 3.5 percent in India and Sri Lanka, 4.7 percent in Nepal, 3.1 percent in Bhutan and 5.4 percent in Pakistan (UNDP, 2016). The overall estimated unemployment rate (defined as the unemployed as a percentage of the labor force) is 4.2 percent, it is 4.4 for urban and 4.4 for rural. Unemployment rate is highest in literate persons (5.2 percent) than that of illiterate persons (2.1 percent). Unemployment rate is highest for urban females (9.5 percent), followed by rural females at 8.3 percent. For both rural and urban areas, unemployment rate for male and

females is higher for literate persons than non-literate persons. Unemployment rate for the literate persons is higher than illiterate persons in both urban and rural areas for both sexes. Literate persons reflected the higher unemployment rate for females, at 9.5 percent, compared with 8.3 percent for females of the rural areas. A wide gap is evident between the unemployment rate by literacy and illiteracy, with the male literacy rate at 86.3 percent and the female literacy rate at 74.3 percent. Unemployment rate is highest in tertiary level (9.0 percent), followed by others education group (7.0 percent) and secondary or post-secondary (6.2 percent) level. For the less educated (primary 2.5 percent, none 2.2 percent) group (Quarterly Labor Force Survey, 2017). Unemployment is exclusively high among the educated youth, resulting in social unrest and tension in the country (HDSA, 2007).

It is apparent that labor market and economy are closely related with education system. If the investment in education sector decreases, the educated manpower would decrease. As a result, the economy of a country would envisage the scarcity of skilled manpower. On the contrary, skilled manpower could overflow if educated manpower is increased more than the demand of labor market. If there is no integration between education planning and economic planning especially in the planning of employment, the educated manpower would face unemployment. Actually education can change only the pattern or nature of employment but it can never reduce the rate of unemployment.

It is a debatable matter whether education increases or decreases unemployment. According to Blaug (1962), education increases the dimension of employment, as for example i) education system itself can provide employment opportunities; ii) it creates the demand of goods and services; iii) it encourages the productivity with a view to self employment and it helps earning money, improvement of physical and mechanical skill. Further, education causes unemployment as for example i) it creates ambitious

unemployed people whom the labor market cannot satisfy. Also education makes people reluctant to work in informal sectors or rural settings. It increases the tendency of serving in modern urban areas. As a result, the under-employment turns into unemployment. There is also mismatch between occupation and education. Government has to take some measures for improving the education and training system in order to keep them consistent with the present and future needs of competitive national and global markets. In the current global economy, it is important for educated people to be creative and innovative. One has to remain in touch with the development in one's field and has to evolve with these. To this end, it is extremely important that entrepreneurship be included as a significant component of education at post primary levels.

A key area needs uplift in Bangladeshis that of technical and vocational education. From the East Asian experience, it is clear that technical and vocational education can become one of the main solutions to the problems of unemployment. The information and communication technologies (ICT) sector may be a promising sector that can provide to the educated people in Bangladesh. The bulk of the workforce is not sufficiently educated to do this kind of high quality work that ICT requires. To link education and training to job market, Bangladesh needs to improve, both quantitatively and qualitatively, its education and training systems, including investment to promote ICT and other new technologies and encourage entrepreneurship (HDSA, 2003).

4.9 Climate Change, Food Security and Nutritional Status

Bangladesh is continuously facing demographic pressure, even after its success in population control, low land-man ratio, and low per capita income that is almost US \$1466 (World Bank, 2017) as well as environmental pressure, either man made or

brought by natural hazards. Bangladesh is particularly vulnerable to climate change. Two thirds of its territory is less than 5 meters above sea level, making it one of the most flood-prone countries in the world (IFAD). Scientists have estimated that if the sea level rises even 1 meter, then around 20 percent of its coastal area could become submerged, displacing 20 million people by the year 2050 (*The Daily Star*, 16 April 2010). Despite the formidable constraints, the country has experienced an impressive increase in food grain production, from 352.93 lakh metric tons in 2007-08, to nearly 386.93 lakh metric tons in 2015-16 (Bangladesh Economic Review, 2016). At present, the country has become nearly self-sufficient in food grain. But the rapid increase in food prices in Bangladesh over the few years has raised serious concerns about impacts on the country's nutritional situation. Bangladesh is placed in the bottom 25 percent of the "Global Hunger Index" (an alarming situation by its severity grade), an annual report whose rankings within the context of current food price hikes highlights countries that face the most risks. Food price increases can reduce quality and quantity of a household's food access, and these reductions are likely to have direct consequences on the nutritional status of vulnerable women and children.

The nutritional situation remains unacceptable with persistently elevated levels of underweight, chronic malnutrition (stunting) and acute malnutrition (wasting). Malnutrition presents an overwhelming national challenge for Bangladesh, especially amongst the vulnerable groups: infants, pre-school children, pregnant and lactating mothers. More than 41 of newborn babies are stunted and malnourished (UNDP, 2014). Among the malnourished children, 33.0 percent are underweight (below the standard for weight); 36 percent are stunted (below the standard for height) and wasted and overweight children are 14.0 percent and 1.0 percent respectively during 2010-2015 (UNICEF, 2016). Rural children are more likely to be stunted than urban children (38

percent compared to 31 percent). Children of mothers with no education are much more likely to be stunted (40 percent) than children whose mothers have completed secondary and higher education (29 percent). The differentials across wealth quintiles are larger. Children whose mothers are in the lowest wealth quintile are two and a half times more likely to be stunted (50 percent) than children whose mothers are in the wealthiest quintile (21 per cent). However, in recent years, the prevalence of severe malnutrition has declined among children. The proportion of underweight children under-five years of age has declined consistently from 66 percent in 1990 to 32.6 percent in 2014 (female: 33.1 percent and male: 32.2 percent). Bangladesh has achieved the MDG target of 33 percent hunger prevalence by 2015. The proportion of underweight children is lower in Bangladesh than in India. The level of stunting has declined consistently from 50.6 percent in 2004 to 36.1 percent in 2014 (Millennium Development Goals, 2016). Bangladesh has consistently improved its hunger situation and ranked 88th in Global Hunger Index among 119 countries ahead of India and Pakistan. This is evident from the decline in its Hunger Index from 53.6 in 1992 to 26.5 in 2017 (Global Hunger Index, 2017).

4.10 Progress of Social Indicators

Bangladesh has performed well, especially in recent years, showing that a country can achieve significant human and social development even at relatively low levels of income. The social indicators of Bangladesh are low by Asian standards, but significant improvements have been made in some areas such as child immunization rates, a decline in infant and under-five mortality rates, fertility rates, gain in life expectancy, a decline in the rate of growth of population, increase in primary school enrolment rates and gender parity at primary and secondary level. Bangladesh has made commendable progress in universalization of primary education through increasing equitable access to

education, reducing dropouts, improving completion of the cycle and implementing a number of quality enhancement measures in primary education. There has been a sharp increase in the number of women parliamentarians elected in 2014. According to the Global Gender Gap Report 2014, Bangladesh ranks 10th position out of 142 countries in the political empowerment sphere and is awarded the prestigious Women in Parliaments Global Forum Award in 2015.

Most people today live longer, are more educated and have more access to goods and services than ever before. In recent years, Bangladesh has made tremendous strides in improving the access to safe drinking water to its people. About 87 percent of the total populations have access to improved water sources and 61 percent of the total populations have access to improved sanitation facilities (World Bank, 2017). Immunization is a cost effective way of saving the lives of the children. In case of immunization coverage, Bangladesh has performed well; the proportion of one year old children immunized against measles has increased from 54 percent in 1991 to 86 percent in 2011 and remained at the same level in 2013. Thus Bangladesh has fallen short of universal coverage by 2015 though this performance is better than India and Pakistan (Millennium Development Goals, 2016). Dropouts are seen but not so marked for the series of DPT and Polio immunizations.

Despite the low levels of expenditure on health, this sector has recently been able to attract additional attention and resources. The allocations of funds and actual expenses have both increased over time. However, in the field of human and social progress, Bangladesh has done much better than many other countries with same income. According to Human Development Report 2016, Bangladesh is categorized as “medium human development” country in 2015.

New technologies are one of the most apparent changes in our current lives. They have lifted economies up, facilitated transportation and communication, led to major advances in health and education, expanded information and participation and created new security tools. ICT has spread exponentially. The impact of technology on the economy is undeniable (UNDP, 2016).

According to Bangladesh Telecommunication Regulatory Commission (BTRC), there has been a tremendous growth in the number for cellular subscriber per 100 population from 0 in 1990 to 79.76 in 2015. According to the HIES 2010 (BBS, 2011), mobile phone use has increased to 63.74 percent in 2010 from a meager 11.29 percent in 2005. This increase has occurred in both rural and urban areas. In rural areas, there has been increase in mobile phone use to 56.7 percent of the households in the rural areas in 2010 from 6.05 percent in 2005. In urban areas, the numbers have changed to 82.74 percent of the households in 2010 from 26.73 percent in 2005. According to BTRC, the internet users per 100 population have shot up to 24.37 in 2014 from a meager 3.4 in 2008 and up to June 2015, 30.39 per 100 people are using the internet (Preliminary Report on Household Income and Expenditure Survey, 2017).

All the major sectors agriculture, industry and service have witnessed reasonable growth during 1990-2015. In particular, the service sector has expanded greatly in Bangladesh; it now contributes at around 53 percent of GDP (World Bank, 2012). Bangladesh has rich manpower but the factors of production, such as, land, labor and capital are limited. Threatened by natural calamities and lacking other natural resources, people are its main resource. The people of Bangladesh and the vitality of its civil society are the greatest assets of Bangladesh. Some world-renowned and the best known NGOs, such as, Grameen Bank, BRAC are working in Bangladesh for the socio economic development of people. The vigor of civil society of Bangladesh exhibits that

a significant progress in human development can be achieved at fairly low cost (HDSA, 1997). Bangladesh can attain rapid progress if it spends liberally in human resource. Wherever, Bangladesh has invested in skill training, as in the garment industry, it has progressed much, but such investments in human capital have been inadequate and it should be greatly increased. For this, the country must invest considerably more on human development than it is doing at present.

4.11 Conclusion

This chapter examines empirically the performance and progress of Bangladesh in terms of various economic, social, human and composite indicators of development over the 25 years. In doing so, this chapter utilizes various measurable indicators of development in relation to its past history as well as in comparison to the performance of similar countries in the South Asian region. Bangladesh is a highly densely populated, poverty stricken and low resource based country in South Asia. This analysis manifests significant progress on some arenas but makes less progress in other areas in Bangladesh in comparison to the other countries in this region. The HDI values show an increasing trend for all South Asian countries during 1990- 2015. However, the level of human development varies considerably among the countries in South Asia, with Bangladesh and Nepal being at the bottom. Sri Lanka has the highest HDI value, indicating its relatively advanced level of human development. Bangladesh has made encouraging progress in some areas of health, such as, gain in life expectancy and Infant and under 5 mortality rates go down significantly, yet it has to go a long way in other areas of health such as maternal mortality rate. Malnutrition is still an overwhelming problem in Bangladesh especially amongst the vulnerable groups: infants, pre-school children, pregnant and lactating mothers (HDSA, 1997).

In the field of education, Maldives and Sri Lanka have achieved literacy rates of well over 90 percent, at the beginning of the new millennium. Pakistan has the lowest literacy rate in this region, followed by Bangladesh, Nepal, Bhutan and India. The level of GDP per capita (PPP\$) in Bangladesh is low compared to others countries of South Asian region. Bangladesh does better than only Nepal, but worse than India, Pakistan, Sri Lanka, Bhutan and Maldives. However, if one compares the performance of Bangladesh in comparison to the other South Asian countries, the performance of Bangladesh seems to be stronger than some countries in South Asian region, such as, Pakistan and Nepal, but not as strong as India and Sri Lanka, with Sri Lanka staying much ahead of both India and other South Asian countries. Its human development indicators are highest among the countries of South Asian region. Sri Lanka is often cited as a model of human development (HDSA, 1997). This analysis also indicates that, although Bangladesh has made considerable progress in terms of various indicators of development, and in the future it can make much progress in various aspects of development because, the country has a lot of room for improvement. If Bangladesh would like to catch up with other countries of South Asian region, such as, India, Sri Lanka in the near future, Bangladesh should mobilize adequate resources for human development and utilize them properly.

Chapter 5

An Overview of the Study Area

5.1 Introduction

The study aims to make a comparison between rural and urban areas in terms of socioeconomic and human resource development indicators of northern region in Bangladesh. Bangladesh comprises of three regions such as northern, southeastern and southwestern region. Northern region consists of mainly Rangpur and Rajshahi division. Bangladesh is divided into 7 administrative divisions. These are Dhaka, Chittagong, Khulna, Rajshahi, Sylhet, Barisal and Rangpur division. Among the regions, the northern region is the most deprived and neglected regions of Bangladesh having a significant proportion of poor people. Rangpur division suffers most (14.3 percent) from permanent insolvency followed by Sylhet (11.6 percent), Rajshahi (10.2 percent), Khulna (9.3 percent), Chittagong (9.1 percent), Barisal (7.3 percent), while Dhaka the least (7.3 percent) in 2016 (Report on Bangladesh Sample Vital Statistics, 2017). This chapter details the socioeconomic, demographic and geographic condition of the study area. Especially income, education, health, sanitation and child mortality are discussed using information collected from secondary sources.

The rest of the chapter is organized as follows: section 5.2 describes the socioeconomic profile of Rangpur division; section 5.3 presents the socioeconomic and demographic scenario of Rangpur district; section 5.4 discusses on socioeconomic status of Rangpur sadar upazila; section 5.5 covers socioeconomic condition of Mithapukur upazila; Dinajpur district profile is presented in section 5.6; section 5.7 deals with socioeconomic situation of Dinajpur sadar upazila; section 5.8 focuses on socioeconomic scenario of Nawabganj upazila; and finally, section 5.9 concludes the chapter.

5.2 Socioeconomic Profile of Rangpur Division

5.2.1 Area and Location

Rangpur division is located in northern part of Bangladesh. For administrative convenience, the division is divided into 8 districts. These are Rangpur, Kurigram, Nelphamari, Gaibanda, Lalmonirhat, Dinajpur, Panchogar and Tagoregoan. The total area of the division is 16185.01 sq.km. (6249.00 miles).

5.2.2 Demographic Characteristics

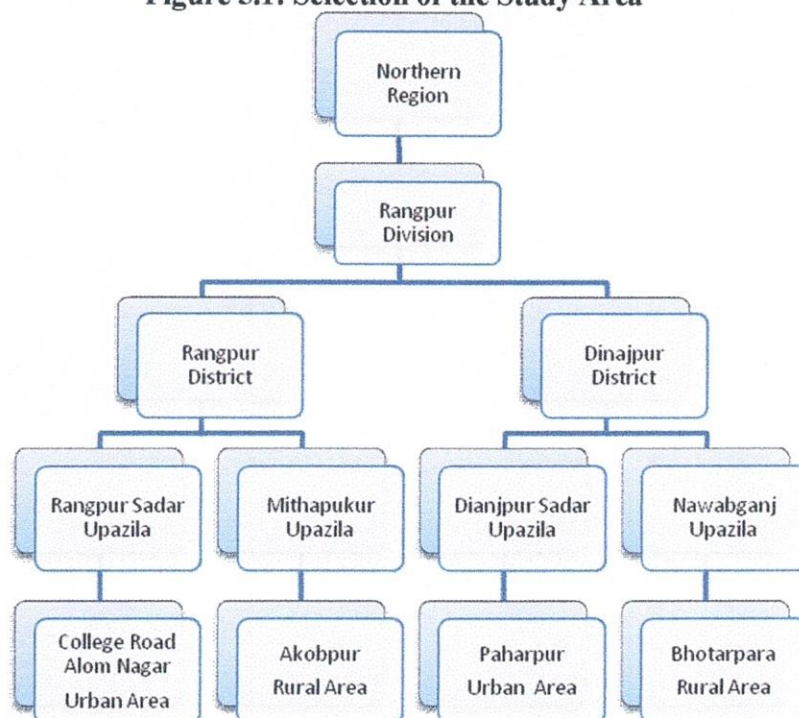
The total population of the division is 1,57,87,758 of which 78,81,824 are males and 79,05,934 are females. Of the total population, 21,09,071 reside in urban areas, while 1,36,78,687 live in rural areas. The annual population growth rate is 1.3 percent. The density of the population for the division is 975 persons per sq. km (Population and Housing Census, 2012). The male female ratio of the division is 102.3:100. Among the 7 administrative divisions, Rangpur shows the highest sex ratio (102.3 percent), while Sylhet division has the lowest (98.0 percent). The average household size for the division is 3.87. In the rural area, the average size of household is 3.86 while the average size of household in the urban areas is 3.94 in 2016. The urban household size is higher than rural household size (Report on Bangladesh Sample Vital Statistics, 2017).

5.2.3 Income, Education, Health and Sanitation

In Rangpur division, the average monthly household income is Tk.8359.00 in 2011 (HIES, 2012). Preliminary Report on Household Income and Expenditure Survey, 2017 reports that the incidence of upper and lower poverty levels (Head Count Rates, HCR) in Rangpur division are respectively 47.2 percent and 30.55 percent which are the highest among the divisions in Bangladesh (Preliminary Report on Household Income and Expenditure Survey, 2017). In 2015-16, the literacy rate of the division for both sexes is 66.9 percent of which male literacy rate is 70.6 percent and female literacy rate is 62.9 percent. The literacy rate in rural area is 65.6 percent for both sexes, 69.2 percent for male and 61.8 percent for female. While, the literacy rate in urban area is

73.4 percent for both sexes and the corresponding rates for male and female are 77.8 percent and 68.7 percent respectively (Quarterly Labor Force Survey, 2017). The school attendance rate for both sexes (5 to 24 years) is 55.0 percent, while it is 57.6 percent for male compared to 52.5 percent for female (Bangladesh Population and Housing Census, 2012). The infant and under 5 mortality rates in Rangpur division are respectively 29 and 33 per 1000 live births in 2016. In the division, 41.1 percent households use sanitary (with water sealed) latrine, 22.2 percent households have sanitary (without water sealed) latrine, 430.0 percent households have non-sanitary latrine and the remaining 6.6 percent households have no toilet facility in 2016. Rangpur division is the worst sufferer with 63 percent of the households having toilet facility. While about 84 percent of the households in Barisal division enjoy this facility followed by Khulna division (81.2 percent) in 2016 (Report on Bangladesh Sample Vital Regression, 2017).

Figure 5.1: Selection of the Study Area



5.3 Socioeconomic and Demographic Scenario of Rangpur District

5.3.1 Area and Location

Rangpur district is situated in the northern part of Bangladesh. The district is bounded on the north by Nilphamari and Lalmonirhat districts, on the east by Lalmanirhat, Kurigram and Gaibandha district on the south by Gaibandha and Dinajpur districts and on the west by Dinajpur and Nilphamari districts. The total area of the district is 2400.56 sq.km. (926.26 sq. miles) of which 15.95 sq.km. (6.16 sq. miles) is under forest. The district lies between 25°18' and 25°57' north latitudes and between 88°56' and 89°32' east longitudes. About 80 percent area of the district is composed of alluvial soil of Tista basin and 20 percent Barind land.

5.3.2 Administrative Unit

The district contains of 8 upazilas, 84 unions, 11191 mauzas, 1492 villages, 3 paurashavas, 33 wards and 197 mahallas. The upazilas are Badarganj, Gangachara, Kaunia, Rangpur sadar, Mithapukur, Pirgachha, Pirganj and Taraganj (Population and Housing Census, 2012).

5.3.3 Demographic Characteristics

In 2011, there are 2881086 populations in Rangpur district. Of the total population, 1443816 are males and 1437270 are females. The male female ratio of the district is 106:100. The district has a density of population of 1200 per sq. km. Of the total populations, 442713 reside in the urban areas and 2438373 live in the rural areas. The annual population growth rate is 1.24 percent. The average number of household size is 3.96 and the average household size in rural area is 4.24 and the urban population size constitutes 3.90 average household members (Population and Housing Census, 2012).

5.3.4 Income, Education, Health and Sanitation

The per capita GDP of Rangpur district is estimated Tk.32,232 and per capita monthly consumption expenditure is Tk.2420.708 in 2010-11 (BBS, 2012). Literacy rate is 48.5 of which male literacy rate is 51.2 percent and female literacy rate is 45.9 percent. The combined school enrollment (5 to 24 years) rate is 54.7 for both sexes and the corresponding rates for male and female are 56.9 and 52.4 respectively (Population and Housing Census, 2012). The infant and under 5 mortality rates are respectively 26.6 and 28.0 per 1000 live births in 2016 (Report on Bangladesh Sample Vital Statistics, 2017). Of the total households, 3.6 percent have access to *pucca* latrine, 15.9 percent, 77.3 percent and 3.2 percent have semi-*pucca*, *kacha* and *jhupri* latrines respectively. For rural area, 81.4 percent households have *kacha* latrine, followed by 13.4 percent, 3.3 percent and 1.5 percent households have semi-*pucca*, *jhupri* and *pucca* latrines respectively. While, 18.6 percent, 33.0 percent, 46.1 percent and 2.3 percent households respectively use *pucca*, semi-*pucca*, *kacha* and *jhupri* latrines in urban areas. In the district, 95.9 percent households get the facility of drinking water from tube-well, 1.9 percent from tap and the remaining 2.2 percent households get water from other sources (Population and Housing Census, 2012).

5.4 Socioeconomic Status of Rangpur Sadar Upazila

5.4.1 Area and Location

Rangpur sadar has the highest number of population among the eight upazilas of Rangpur district. The upazila occupies an area of 359.48sq. km (138.79 sq. mile). However, it ranks 3rd in area measuring scale. It is located between 25° 39' and 25°50' north latitudes and between 89°05' and 89°20' east longitudes. The upazila is bounded on the north by Gangachara upazila, on the east by Kaunia and Pirgachha upazilas, on the south by Mithapukur upazila and on the west by Taraganj and Badarganj upazilas.

5.4.2 Administrative Unit

The upazila comprises of 1 paurashava, 12 unions, 15 wards, 139 mauzas and 308 villages.

5.4.3 Demographic Characteristics

There are 7,18,203 population in Rangpur sadar upazila, of them 3,66,788 are males and 3,51,415 are females. The population density of the upazila is 1998 per sq. km. The male female ratio is 104:100 in the upazila in 2011 and it is 108:100 in urban areas compared to 102: 100 in rural areas. The annual compound population growth rate is 1.78 percent. The total households of this upazila is 1,65,017, of which 1,00,132 are in the rural areas and the rest 64,885 are in urban areas. The average household size in the upazila is 3.96 persons and the corresponding figures are 3.92 persons and 4.24 persons in rural and urban areas respectively sources (Bangladesh Population and Housing Census, 2012).

5.4.4 Education, Health, Water and Sanitation

The literacy rate (aged 7 years and above) of the upazila is 61.0 percent for both sex, 63.6 percent for male and 58.3 percent for female in 2011. In the rural area, the literacy rate (aged 7 years and above) is 52.7 for both sexes, while the literacy rate of males is 54.5 as against 50.8 of females. In the urban area, the literacy rate (aged 7 years and above) is 72.1 for both sexes, while the literacy rate of males is 75.4 compared to 68.5 of females. The school attendance rate for both sexes (5 to 24 years) is 58.7 percent while it is 61.2 percent for male compared to 56.3 percent for female. The infant mortality rate in this district is 37.04 per 1000 live birth. Of the total households, *pucca* latrine is used by 23.6 percent households. While 35.1 percent, 39.3 percent and 2.2 percent households have respectively semi-*pucca*, *kacha* and *jhupri* latrines. In the upazila, 41.2 percent households use sanitary (water sealed) latrine, followed by 34.7

percent sanitary (non-water sealed), 20.1 percent non-sanitary latrines and the remaining 4.0 percent have no toilet facility. In the upazila, 82.3 percent households use water from tube-well, 17.2 percent from tap and the remaining 0.5 percent household use water from other sources (Bangladesh Population and Housing Census, 2012).

5.5 Socioeconomic Condition of Mithapukur Upazila

5.5.1 Area and Location

Mithapukur came into existence in 1885 as thana. Among the eight upazilas of Rangpur district, Mithapukur is the largest upazila in area measuring scale. The Upazila occupies an area of 515.62 sq. km., of which 6.79 sq.km. is under forest. The upazila is bounded on the north by Rangpur sadar upazila, on the east by Pirgachha upazila and Sadullapur upazila of Gaibandha district, on the south by Pirgonj upazila and on the west by Badargonj upazila and Nawabgonj upazila of Dinajpur district.

5.5.2 Administrative Units

The upazila consists of 17 unions, 309 mauzas and 315 villages.

5.5.3 Demographic Characteristics

With population of 5,08,133, the upazila occupies an area of 515.62 sq. km. However, in respect of population, it is the second largest upazila. The total number of households in the upazila is 1,35,073.

5.5.4 Education, Health, Water and Sanitation

The literacy rate of the upazila in 2011 is 46.0 percent for both sex, 48.2 percent for male and 44.0 percent for female.. In the rural area, the literacy rate (aged 7 years and above) is 45.8 for both sexes, while the literacy rate is 47.9 for males compared to 43.8 for females. The literacy rate (aged 7 years and above) is 61.8 of both sexes, while the literacy rate of males is 64.6 as against 58.9 of females in the urban area. Of the total

households, about 1.7 percent have *pucca* latrine, 17.5 percent, 76.3 percent and 4.4 percent have semi-*pucca*, *kacha* and *jhupri* latrines respectively. In the upazila, 8.9 percent households use sanitary (water sealed) latrine, 18.4 percent sanitary (non-water sealed), 47.1 percent non-sanitary latrine and the remaining 25.5 percent have no toilet facility. In the rural area, 76.8 percent households have *kacha* latrine, followed by 17.2 percent, 4.4 percent and 1.6 percent have semi-*pucca*, *jhupri* and *pucca* latrines respectively. While, 7.9 percent, 35.6 percent, 55.1 percent and 1.3 percent households respectively use *pucca*, semi-*pucca*, *kacha* and *jhupri* latrines in the other urban areas. In the upazila, 97.4 percent households use water from tube-well, 0.3 percent from tap and the remaining 2.3 percent household use water from other sources (Bangladesh Population and Housing Census, 2012).

Figure 5.2: Map of Bangladesh



Figure 5.3: Map of Northern Region of Bangladesh

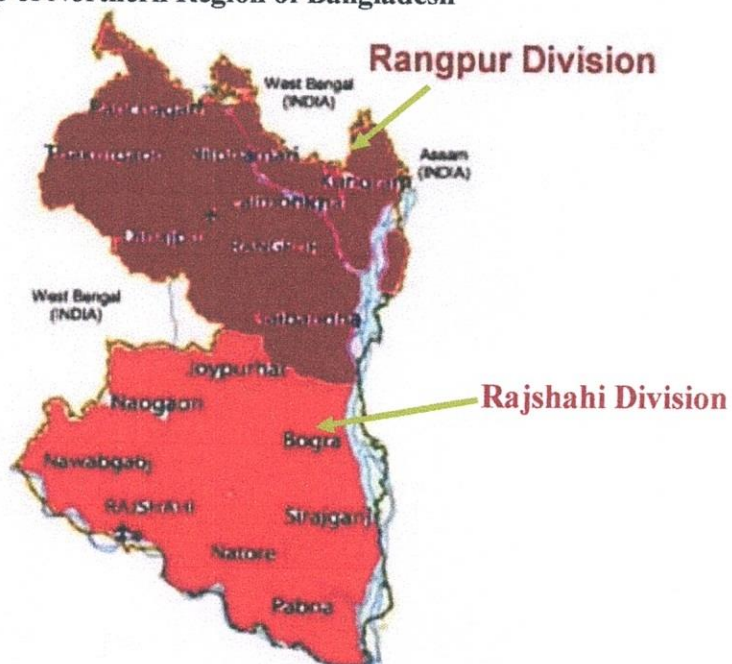
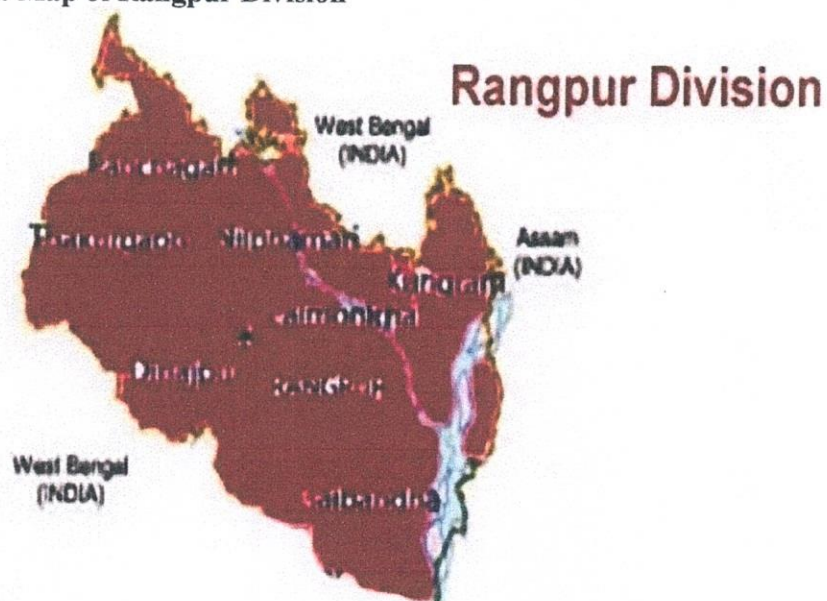


Figure 5.4: Map of Rangpur Division



5.6 Dinajpur District Profile

5.6.1 Area and Location

The district is bounded on the north by Panchagarh and Thakurgaon district, on the east by Panchagarh, Nilphamari, Rangpur and Gaibandha district, on the south by Gaibandha, Joypurhat district and West Bengal State of India and on the west by Thakurgaon district and West Bengal State of India. The total area of the district is 3444.30 sq.km (1329.85 sq. miles), of which 78.87 sq. km (30.45 sq. miles) is under forest. It lies between 25°10' and 26°04' north latitudes and between 88°23' and 89°18' east longitudes.

5.6.2 Administrative/Geographic Unit

The district consists of 13 upazilas, 101 unions, 1974 mauzas, 2131 villages, 8 paurashavas, 75 wards and 246 mahallas. The upazilas are Birampur, Birganj, Biral, Bochaganj, Chirirbandar, Fulbari, Ghoraghat, Hakimpur, Kaharole, Khansama, Dinajpur Sadar, Nawabganj and Parbatipur.

5.6.3 Demographic Characteristics

The total population of Dinajpur district is 29,90,128. The male population is 1508670 while the female population is 1481458. The annual population growth rate is 1.22. The sex ratio is 100 female to 102 male. The density of the population for the district is 868 persons per sq. km. The average household size in the district is 4.14 persons, for urban area the size is 4.13 persons and in rural area, the size is 4.14 persons which is slightly higher.

5.6.4 Education

The literacy rate (aged 7 years and over) of the district in 2011 is 52.4 percent for both sexes, 55.7 percent for male and 49.1 percent for female. School attendance rate (5-24

years) for both sexes is 56.7 percent, the corresponding rates for male and female are 59.1 percent and 54.3 percent respectively. Male school attendance rate (5-24 years) is higher than their male counterparts in 2011 (Bangladesh Population and Housing Census, 2014).

5.7 Socioeconomic Status of Dinajpur Sadar Upazila

5.7.1 Area and Location

Dinajpur Sadar Upazila is the largest upazila of Dinajpur district in respect of population. The Upazila occupies an area of 354.73 sq. km. including 0.49 sq km. forest area. It is located between 25°28' and 25°48' north latitudes and between 88°34' and 88°46' east longitudes. The Upazila is bounded on the north by Kaharole Upazila and Khansama Upazila, on the east by Atrai river and Chirirbandar Upazila, on the south by West Bengal State of India and on the west by Biraj Upazila.

5.7.2 Administrative Unit

The Upazila consists of 1 paurashava, 12 wards, 80 mahallas, 10 unions, 207 mauzas and 207 villages. In the Upazila, there are 111779 households. The average size of population of each ward and mahalla are 15561 and 2334 respectively. On the other hand, the average size of population of each union, mauza and village are 29787, 1439 and 1439 respectively.

5.7.3 Demographic Characteristics

According to Population and Housing Census 2011, the total population of the Upazila is 484597, of which 247792 are males and 236805 are females. The sex ratio for the Upazila is 100 females to 105 males. The annual compound population growth rate is 1.31 percent. In the Upazila, there are 111779 households. The average household size

(General) for the Upazila is 4.2 persons, for both rural and urban areas the size is also same which is 4.2.

5.7.4 Income, Education, Health and Sanitation

The per capita GDP of Dinajpur district is estimated at Tk.34811 and per capita monthly consumption expenditure is Tk.2073.377 in 2010-11 (HIES, 2012). The literacy rate of the upazila in 2011 is 64.3 percent for both sexes, 67.4 percent for male and 61.0 percent for female. In the upazila, the literacy rate is the highest, i.e., 83.2 percent in Ward No.05 of Dinajpur Paurashava and the lowest i.e., 50.8 percent in Sekhpura Union. In the upazila, 54.2 percent households use sanitary latrine, 23.0 percent have non-sanitary latrine and the remaining 22.8 percent have no toilet facility. In Dinajpur sadar upazila, 93.2 percent general households get the facility of drinking water from tube-well, 4.7 percent from tap and the remaining 2.1 percent households get water from other sources (Bangladesh Population and Housing Census, 2014).

5.8 Socioeconomic Scenario of Nawabganj Upazila

5.8.1 Area and Location

The Upazila occupies an area of 314.68 sq. km. including 36.72 sq km. forest area. It is located between 25°14' and 25°34' north latitudes and between 88°58' and 89°13' 'east longitudes. The Upazila is bounded on the north by Parbatipur Upazila, on the east by Badarganj Upazila, Mithapukur Upazila and Pirganj Upazila of Rangpur district, on the south by Hakimpur Upazila and Ghoraghat Upazila and on the west by Birampur Upazila and Fulbari Upzila.

5.8.2 Administrative/Geographic Unit

The Upazila contains of 9 unions, 204 mauzas and 272 villages. The average size of population of each union, mauza and village are respectively 25482, 1124 and 843 in (Bangladesh Population and Housing Census, 2014).

5.8.3 Demographic Characteristics

The total population of the Upazila is 229337, of which 114763 are males and 114574 are females. The male female ratio in the Upazila is 100:100. The population growth rate of the Upazila 1.14 percent. In the Upazila, there are 57851 households. The average household size (General) for the Upazila is 4.0 persons, for both rural and urban areas the size is also same which is 4.0 in 2011 (Bangladesh Population and Housing Census, 2014).

5.8.4 Education, Health, Water and Sanitation

In Nawabganj upazila, it is found that 42.8 percent populations aged 7 years and over are literate. The literacy rate of the upazila in 2011 is 42.8 percent for both sex, 44.9 percent for male and 40.7 percent for female. In the Upazila, the literacy is the highest i.e., 46.7 percent in Shalkhuria union and the lowest, i.e., 37.7 percent in Mahmudpur union. In the upazila, 52.4 percent general households use sanitary latrine, 27.2 percent have non-sanitary latrine and the remaining 20.4 percent have no toilet facility. In Nawabganj upazila, 97.1 percent households get the facility of drinking water from tube-well, 0.5 from tap and the remaining 2.4 percent households get water from other sources in 2011 (Bangladesh Population and Housing Census, 2014).

5.9 Conclusion

This chapter presents the socioeconomic, demographic and geographic condition of the study area. It also compares the socioeconomic and human development indicators

between rural and the urban areas of Northern region in Bangladesh. The northern region is the most deprived and neglected regions in Bangladesh having low literacy rate and substantial number of poor people. The incidences of poverty are the highest in Rangpur division among the divisions of Bangladesh. The socioeconomic status and human development indicators, such as, income, rate of literacy and sanitation facilities are not satisfactory particularly in rural areas. The socioeconomic and human development indicators in both Rangpur and Dinajpur district are almost similar but the indicators vary between the rural and urban areas. The socioeconomic and human resource development indicators are much higher in urban than in rural area.

questionnaire preparation, statistical techniques and data collection period. Section 6.2 presents survey results through diagrams and tables that portray the socioeconomic condition and human development related indicators in both the rural and urban areas.

6.1.2 Selection of the Study Area

The objective of the study is to compare the socioeconomic and human development indicators between rural and urban areas of northern region in Bangladesh. This study also estimates the rates of return to education in both rural and urban areas using the standard form of Mincer model and extended version of Mincerian earnings equations. Naturally the research would be more effective and useful, if the area selection is most appropriate from our point of view where human resource development is the crying need of the hour; otherwise, the area would subject to further aggravating the situation towards growing regional disparities. It is from this angle that northern region of Bangladesh is chosen. At the second stage, Rangpur division is selected from the Northern region of Bangladesh purposively. As a study area, Rangpur division is selected for many reasons. Firstly, it is one of the backward divisions of Bangladesh almost on all counts, such as, low level of household income (Tk.8359.00), having least literacy rate (about 48.5 percent) in comparison to other division in Bangladesh (HIES, 2012). Secondly, being a resident of the study area, the researcher is closely acquainted with the study area for a long period of time. Thirdly, practical situation, such as, easy access and convenient location for repeated field visits for data collection is considered. The third stage is the selection of district. There are 8 districts of Rangpur division. These are Rangpur, Kurigram, Nelphamari, Gaibanda, Lalmonirhat, Dinajpur, Panchogar and Tagoregoan. Among these, two districts, Rangpur and Dinajpur located in the Northern region of Bangladesh are selected purposively as the study area for the primary data considering practical situation including time and resources. So, the

selected area is easily accessible to him and could understand the regional dialect of respondents, that is why he could manage to obtain precise data within the limited resources and time available to the researcher and surveyors who make several follow up visits to these areas to check the quality of data for updating findings of the study. So, the selection of the study area is guided more by practical considerations, such as, easy access and convenient location for repeated field visits for data collection.

The fourth stage of sampling is the selection of upazilas. Altogether 4 upazilas are selected from the two districts, covering two upazilas from the each district for the study. There are 8 upazilas of Rangpur districts. The upazilas are Badarganj, Gangachara, Kaunia, Rangpur sadar, Mithapukur, Pirgachha, Pirganj and Taraganj. While there are 13 upazilas of Dinajpur district. These are Birampur, Birganj, Biral, Bochaganj, Chirirbandar, Fulbari, Ghoraghat, Hakimpur, Kaharole, Khansama, Dinajpur sadar, Nawabganj and Parbatipur. As the aim of the study is to make comparison between urban and rural areas in terms of socioeconomic and human development indicators. Therefore Rangpur sadar upazila from Rangpur district and Dinajpur sadar upazila from Dinajpur district as urban area are selected purposively; Mithapukur upazila from Rangpur and Nababgonj upazila from Dinajpur are selected as rural area randomly.

Fifth stage of sampling is the selection of villages and mahallas. Using simple random sampling technique, two mahallas called College Road Alom Nagar from Rangpur sadar upazila of Rangpur district and Paharpur from Dinajpur sadar upazila of Dinajpur district respectively are chosen as urban area. Two villages called Akobpur from Mithapukur upazila of Rangpur district and Bhotarpara from Nawabgonj upazila of Dinajpur district respectively are taken as rural area.

The sixth stage of sampling involves the selection of households. The study is planned to cover 600 households, among them 300 are taken from the rural area and the rest 300 are from urban area by using simple sampling techniques.

This is an empirical study in nature. It is evident that primary data is used in an empirical study. Besides this, as far the knowledge of the researcher goes, this kind of research is taken in this area for the first time. However, we take all possible care and measures in making sure the quality of data to achieve the desired objectives of the study.

6.1.3 Sample Selection and Data Collection

Data collection is the important task of study. Both primary and secondary data are collected considering the relevancy and appropriateness for the study. The study is attempted to show the distinctive nature of socioeconomic condition and human development indicators among the different socioeconomic group, which are observed between the rural and urban areas of Northern Region in Bangladesh. It is considered essential to select such respondents, who have various levels of education, so that the impacts of education on the basic indicators of human resource development both in rural and urban areas can be presented. For this purpose, stratified random sampling techniques are used for selecting the households having different levels of education, like the categories of illiterate, primary, secondary, higher secondary and higher education. After stratification, the researcher uses random sampling technique to select 300 households on the basis of each category of education (such as, no education, primary, secondary, higher secondary and higher education) proportionately from rural area and the rest 300 households are taken randomly from each stratum proportionately from the urban area. Again, 300 households are divided into two groups (150 and 150 households). Of them, 150 households are taken from a selected village and the rest 150 households are chosen from another village in the sampled rural area. The same

technique is applied for the urban area. There are 491 households in Akabpur village under Mithapukur upazila of Rangpur district (Population and Housing Census, 2012). Among them, using random sampling technique the researcher selects 150 respondents. Of the 150 respondents, 60 have no education, 40 have primary, 30 have secondary, 8 have higher secondary and the rest 12 have higher education.

There exist 520 households in Bhoterpara village of Nawabgonj upazila under Dinajpur District (Population and Housing Census, 2014). Among them, using random sampling technique, the researcher selects 150 respondents. Of the 150 respondents, the researcher selects 72 respondents from illiterate category, 40 from primary, 23 from secondary, 6 from higher secondary and 9 respondents from higher education category. The selected urban study area named College Road Alom Nagar of Rangpur sadar upazila, Rangpur, has 495 households in 2011 (Population and Housing Census, 2014). The researcher takes 150 respondents. Of the 150 respondents, 35 are from illiterate category, 25 from primary, 35 from secondary, 25 from higher secondary and the rest 25 are from higher education category respectively. On the other hand, there are 549 households in Paharpur of Dinajpur sadar upazila, Dinajpur, (Population and Housing Census, 2014) of which using random sampling technique 45, 25, 32, 20, and 28 respondents are selected from illiterate, primary, secondary, higher secondary and higher education categories respectively. We restrict our sample to male and female respondents (96.0 percent male and 4.0 percent female in rural area and 97.0 percent male and 3.0 percent female in urban area) who are at least 15 years old in the survey year. Female household heads are only chosen where male household heads are not available because of death.

Secondary information and other literature are also collected from various books, research works, journals, and newspapers, publications of different government and non-government organizations of Bangladesh, such as, Household Income and Expenditure Survey (HIES), Bangladesh Bureau of Statistics (BBS), Bangladesh Economic Review (BER) and Statistical Year Book of Bangladesh. Some related information is collected from various international organizations, such as, UNDP, World Bank, and UNICEF. Furthermore, information is collected from the website of various international organizations.

6.1.4 Questionnaire Preparation

Questionnaire preparation is an important task because the study is mainly based on primary data. At first, a draft questionnaire is prepared. In preparing draft questionnaire concentration is given on the inclusion of all related aspects of the households. After preparing the questionnaire, it is applied on 10 respondents for pre-testing. Out of these respondents, 5 are selected from rural and 5 from urban area. Completing the pre-testing, necessary corrections are done in the questionnaire and then questionnaire is finalized and taken for interview. Both open ended and close ended questions are incorporated in the questionnaire. The survey comprises of 50 questions in total. The questionnaire is prepared in English. The researcher translates the questionnaire into simple Bangla to make it understandable to the interviewers and interviewees.

The questionnaire is divided into five sections. The first section (Part A) contains general information, such as, ID no., Date of survey, Mouza/ Mahalla, UP/ Municipality or City Corporation, Upazila /Thana and District.

The second section (Part B) has seven questions about the respondents. It includes information, such as, name of the household head, contact address, age, sex, marital

status, household size, employment status and occupation, literate/illiterate and level of education or years of schooling of the respondents and educational status of households, such as, no education and primary, secondary and tertiary school enrollment.

The third section (Part C) contains monthly household income, earning members of households, working status and employment/type of work, sources of income, individual's income, wage rate/salary, age and work experience, total household wealth, household expenditure for food, clothing, health and education, transport and communication and miscellaneous expenditures of the respondent households.

The fourth section (Part D) deals with health, sanitation and hygiene related questions, such as, source of drinking water, types of latrine, after defecation how to wash hand and infant and child mortality related information.

The last and fourth section (part E) of the questionnaire provides the information of dead individuals, such as, age and level of education of dead individual, occupation, monthly income, health care expenditure and causes of death. It is decorated with 8 questions.

6.1.5 Statistical Techniques and Data Collection Period

Human development index (HDI) model, standard form of Mincer model, extended version of Mincerian model, simple regression and logistic regression models are used in this study. The study is conducted during the period of October to December 2013 in rural area and January to April 2014 in urban area. The researcher has maintained further visit and follow-ups in the area while there exist inconsistency of data.

6.2 Survey Results

6.2.1 Introduction

In order to know the socioeconomic status of the respondents, we present data and information using tables and graphs. Demographically, economically and educationally, there are significant differences between rural and urban respondents. The socioeconomic status and HRD related characteristics of the respondents are presented in the following sections.

6.2.2 Distribution of Residence of the Respondents

Rural-urban composition of population has a very significant bearing, because it determines the important aspects like the skilled and unskilled population, high productivity and low productivity, high wage rate and low wage rate, more job opportunity, employment status of formal and informal sectors and so on. Residence of the respondents is shown in Table 6.2.1.

Table 6.2.1: Distribution of Residence of the Respondents

Study Area	Households	Percentage of Household
Rural	300	50.0
Urban	300	50.0
Total	600	100.0

Source: Household Survey, 2013

Table 6.2.1 shows that the survey is conducted on 600 households with 300 households from the rural areas and 300 households are in the urban area.

6.2.3 Household Characteristics of the Study Area

Household characteristics such as monthly household income, family size, earning members, age and years of schooling are depicted in Table 6.2.2.

Table 6.2.2: Household Characteristics of the Study Area

Variables	Rural Area				Urban Area			
	Min	Max.	Mean	S.D	Min.	Max.	Mean	S.D
Monthly Household Income (Tk.)	1500	60000	10000	6987	2000	150000	20500	14202
Family Size	1	9	4.07	1.29	2	8	4.15	1.091
Earning members	1	3	1.15	0.36	1	3	1.28	0.504
Age (year)	20	75	41.41	10.88	21	75	43.68	11.27
Years of Schooling	0	18	4.40	4.80	0	18	7.88	5.93

Source: Household Survey, 2013.

Mean, standard deviation, maximum and minimum values of each variable are given. From Table 6.2.2, it is found that the average monthly household income in the rural area is Tk.10000.00, while it is Tk.20500.00 in the urban area and the corresponding standard deviations are Tk.6987.00 and Tk.14202.00 respectively. While the average nominal monthly household income is recorded Tk.11480.00 at national level, Tk. 9648.00 for rural area and Tk. 16477.00 for urban area in 2010 (HIES, 2012). The average family size in rural area is about 4.0 persons and standard deviation is 1.239; while in the urban area, the average family size is more than 4.15 members and standard deviation is 1.091. The average household size (general) for Rangpur district is 4.0 persons and the corresponding values of rural and urban area are respectively 3.9 and 4.20 persons. On the other hand, the average household size of Dinajpur district is 4.0 persons of rural area and the size of urban is 4.1 area, which is slightly higher in 2011 (Population and Housing Census, 2014). The average age of the respondents is 41.41 years in rural area, while the corresponding mean age of respondents is 43.68 years in urban area. Generally, urban residents are better educated than rural ones. Average years of schooling for the rural people are 4.40, while the urban residents are able to attain almost 8.00 years of schooling. The expected years of schooling and mean years of schooling are respectively 10.0 years and 5.1 years in Bangladesh (UNDP, 2015).

6.2.4 Level of Education

Education is the main foundation for human security and human development. Education means enrichment of life, enlightenment for the ignorant or providing the individuals with the opportunity to express their potentialities and development of human resources. Education affects the life of individuals, their participation in economic activities, and overall economic development in various ways. Level of education is considered as a good social indicator of development by policy makers and development thinkers. Various levels of educational status of the respondents are illustrated in Table 6.2.3, which exhibits that out of 300 respondents, 64.7 percent are literate whereas 35.3 percent are illiterate. Table 6.2.3 also shows that in the rural area, 44.0 percent of the respondents are illiterate, followed by 26.7 percent having primary, 17.7 percent with secondary, 7.0 percent having higher education and 4.7 percent with higher education.

Table 6.2.3: Educational Status of the Respondents

Level of Education	Rural Area	Urban Area	Total
Illiterate	132 (44.0%)	80 (26.7%)	212 (35.35%)
Literate			
Primary	80 (26.7%)	50 (16.7%)	130 (21.7%)
Secondary	53 (17.7%)	65 (21.7%)	118 (19.7%)
Higher Secondary	14 (4.7%)	45 (15.0%)	59 (9.85%)
Higher	21 (7.0%)	60 (20.0%)	81 (13.5%)
Total	168 (56.0%)	220 (73.3%)	388 (64.75%)
Grand Total	300 (100%)	300 (100%)	600 (100%)

Source: Household Survey, 2013, Note: Figures in parenthesis represent the percentages

In the urban area, 26.7 percent of the respondents have no education, 16.7 percent have primary and over 21.0 percent have the education up to secondary level and 15.0 percent with higher secondary and the rest 20.0 percent respondents have received higher education. From Table 6.2.3 we see that generally urban residents are better educated than their rural counterparts. On an average, 44.0 percent of rural residents

have no access to education; even for those who are able to attain education, most of them only manage to finish primary level of education. However, the situation is quite different for the urban group. More than 70.0 percent of urban respondents are educated and about 27.0 percent of them do not have any education. There are many causes for low adult literacy rate in rural area. Among them poverty, lack of awareness of the parents, distance of school from home, fatigue, homesickness, early marriage of girl child, involvement in domestic work, the cost of schooling in differing ways like, cost of books, transportation cost, and earning at early age as child labor are (children from poor family have high opportunity cost forcing them to involve in domestic works and different kinds of agricultural activities such as goat rearing, fishing, unpaid family workers and so on) the major causes of low literacy rate in rural areas in northern region of Bangladesh.

6.2.5 Adult Literacy Rate

Literacy or rate of literacy is one of the basic indicators of human resource development. A higher literacy rate indicates the population is better educated. The estimated adult literacy rates in the study area are shown in Table 6.2.4.

Table 6.2.4: Adult Literacy Rate and Combined School Enrollment Rate

Place of Residence	Adult Literacy Rate	Combined School Enrollment Rate
Rural	50.0%	45.0 %
Urban	70.0%	51.0%
Study area	57.0%	48.0%
National Rural	47.5%	
National Urban	69.5%	
National	53.0%	
Rangpur Zila	48.55%	

Source: Household Survey, 2013, and HIES, 2012 (Italic).

Table 6.2.4 demonstrates that the estimated adult literacy rate is 50.0 percent in rural area, compared to 70.0 percent in urban area and it is 57.0 percent in the study area. About 50.0 percent of rural residents do not have any formal education compared 30.0 percent of urban residents. The combined enrollment rate in the study area is 48.0

percent and the corresponding rates in rural and urban areas are respectively 45.0 percent and 51.0 percent.

6.2.6 Age Structure

Age is one of the important personal characteristics and basic to the socioeconomic environs, which largely demarcates the working and non-working population. In both the rural and urban areas, the age structure of the respondents is presented in Table 6.2.5.

Table 6.2.5: Age Distribution of the Respondents

Age group (years)	Rural	Urban
Below 25	15 (5.0%)	11 (3.7%)
26-45	181 (61.0%)	165 (55.0%)
46-60	90 (30.0%)	105 (35.0%)
61- above	12 (4.0%)	19 (6.3%)
Total	300 (100%)	300 (100%)

Source: Household survey 2013, Note: Figures in parenthesis represent the percentages

Table 6.2.5 illustrates that in rural area, 61.0 percent of the respondents are in the age group of 26-45 years, 30.0 percent in the age group 46-60 years and 5.0 percent in the group below 25 years and 4.0 percent are 61 years or above. The age group above 61 years is the lowest number of respondents in the rural area. While, among the respondents, 55.0 percent belong to the age group between 26-45 years, followed by 35.0 percent belonging to the 46-60 years age group and 6.3 percent of the respondents are above 61 years and 3.7 percent respondents' age is below 25 years in the urban area. The age group below 25 years is the lowest number of respondents in urban area. A significant number of the respondents concentrate in the 26-45 years age cohort both in rural and urban areas that signify the positive sign of an economy. This is because age composition is an important factor, which determines the level of the working people.

6.2.7 Sex Distribution

Sex is an important characteristic as it has economic and social implications. Sex ratio of the respondents in the study area is shown in Table 6.2.6. Table 6.2.6 presents that,

among the respondents, 96.0 percent are male, and 4.0 percent are female in rural area. While, in the urban area a vast majority 97.0 percent of the respondents are male and 3.0 percent of the respondents are female.

Table 6.2.6: Sex distribution of the Respondents

Sex	Rural Area	Urban Area
Male	288 (96.0%)	291 (97.0%)
Female	12 (4.0%)	9 (3.0%)
Total	300 (100.0%)	300 (100.0%)

Source: Household survey 2013, Note: Figures in parenthesis represent the percentages

From Table 6.2.6, it is clear that male respondents are more than female counterparts because female household heads are considered when male household heads are not available because of death. Bangladesh society is primarily a male dominant society and as a consequence, most families are headed by males.

6.2.8 Employment Status

Economic development mainly depends on the employment status. Work enhances human development by providing incomes and livelihoods, by reducing poverty and by ensuring equitable growth. It is critical for equitable economic growth, poverty reduction and gender equality. It also allows people to fully participate in society while affording them a sense of dignity and worth. Work can contribute to the public good and work that involves caring for others builds cohesion and bonds within families and communities (UNDP, 2015). The employment status of the respondents in both the rural and urban areas has been illustrated in Table 6.2.7.

Table 6.2.7 reveals that, among the respondents, a vast majority, 85.3 percent of them are self-employed (basically involved in agriculture sector), 10.0 percent are engaged in salaried/paid jobs, 4.0 percent respondents work as day laborers/casual workers and the

negligible number only 0.7 percent are unemployed in the rural area. It is noticeable that respondents, who are involved in agriculture sector, are also treated as self-employed. However, the rural-urban differences in self-employment activity rates are much smaller when farming is excluded. The number of rural workers engaged in farm self-employment has surpassed the number of non-firm self-employment workers. Individuals with higher education are more likely to obtain salaried jobs than others, resulting in higher incomes in households with educated adults. Agriculture is still the largest sector of employment in rural Bangladesh, although the non-agricultural sectors are gaining importance over time. In rural areas, dependence on agriculture for livelihood shows a declining trend with increasing importance of rural non-farm activities (HDSA, 2007).

Table 6.2.7: Employment Status of the respondents

Employment Status	Rural Area	Urban Area
Employed (Salaried)	30 (10.0%)	126 (42.0%)
Un-employed	2 (0.7%)	6 (2.0%)
Day laborers /casual workers	12 (4.0%)	18 (6.0%)
Self employed (agriculture and non-firm sector)	256 (85.3%)	150 (50.0%)
Total	300 (100%)	300 (100%)

Source: Household survey 2013, Note: Figures in parenthesis represent the percentages

Table 6.2.7 also indicates that, in the urban area, the highest 50.0 percent of the respondents are self-employed; the second highest number of respondents about 42.0 percent is engaged in salaried/paid job while 6.0 percent are day laborers/casual workers and 2.0 percent are unemployed. The expansion of urban employment is faster than employment in the rural areas, as a result of which the share of the urban employment in total employment increases. Table 6.2.7 vividly illustrates that in terms of employment status, the share of respondents in non-agricultural self-employment is

the highest in urban area, and job occupies the second position. These developments indicate commercialization of the economy and high mobility of the labor force across various activities. In urban areas, this increase has been dominantly in self-employment. Such expansion would indeed be a sign of a positive and dynamic process if it were also associated with rising real wages, or at least not falling real wages (HDSA, 2003).

Table 6.2.7 shows that both the rural and urban areas, a considerable numbers of the respondents are self-employed. This is because of the sharp increase in self-employment that result from the structural adjustment programs of the 1990s which led to the reduction of public investment, the cutting back of public sector jobs and increase in the demand for sub-contracted flexible labor to produce goods for global markets. It is noticeable that outside of agriculture, self-employment is more important in industry and trade than in services (HDSA, 2003). About 0.7 percent respondents living in rural areas who are in the labor force are unemployed. In urban areas the rate is 2.0 percent.

6.2.9 Occupational Status

Occupation gets prime importance in the economy of a country; it is the occupation which reflects the socio-economic status of individuals that is directly or indirectly related to the level of education. The level of development of human resources both in rural and urban areas can be judged through the occupational status. The percentage distribution of the respondents by occupation both the rural and urban areas are presented in Table 6.2.8. Table 6.2.8 demonstrates that in the rural area, 59.0 percent of rural people depend on agriculture and more than 20.0 percent are involved in business but most of them are engaged in small trading, while 10.6 percent are service holders and 10.4 percent of rural people work as a day laborer or service worker.

Table 6.2.8: Occupational Distribution of the Respondents

Occupation	Rural Area	Urban Area
Agriculture	177(59.0%)	8 (2.7%)
Business	60 (20.0%)	126 (42.0%)
Salaried Job	32 (10.6%)	123 (41.0%)
Day laborers/casual and service workers	31 (10.4%)	43 (14.3%)
Total	300 (100%)	300 (100%)

Source: Household Survey, 2013, Note: Figures in parenthesis represent the percentages

From Table 6.2.8, it is found that agriculture is still the leading sector. Looking at the occupational distribution of employment in rural areas, agriculture is by far the major employer of respondents. Table 6.2.8 poses that, in the urban area, 2.7 percent of the respondents are engaged in agricultural activities. About 41.0 percent of the respondents are involved in salaried/paid jobs and 42.0 percent are engaged in business, followed by 14.3 percent in others profession, such as, rickshaw pullers/auto rickshaw drivers and casual or service workers. On the other hand, the service sector, which comprises of mostly non-tradable activities, is becoming more important in country's growth process. In rural areas, agriculture is the dominant sector and most employed persons work in the agriculture sector. In contrast, most of the people in urban areas are engaged in business and service sectors. Rural and urban areas have a marked effect on occupation.

6.2.10 Monthly Average Household and Per Capita Income

Higher income is known to influence individual behavior. Certainly high income enables people to buy better health care services and invest more on education that causes human resource development. With higher income, people can afford to spend more on education and health with greater health and education, higher productivity and incomes. The percentage distribution of the respondents' monthly household and per capita income both rural and urban areas are presented in Table 6.2.9.

Table 6.2.9: Average Household Income and Per Capita Income (Tk.), US \$ and \$ PPP

Place of Residencee	Monthly Income Per Household (Tk.)	Monthly Income Per Household Member (Tk.)	Yearly Per capita Income (US\$ and PPP\$)
Rural	10000.00	2457.00	US\$ 379.6= PPP \$ 1090
Urban	20500.00	4940.00	US\$ 819 = PPP \$ 2350
Study Area	15185.00	3710.50	US\$ 573= PPP \$ 1445
<i>National Rural</i>	<i>9648.00</i>	<i>2130.00</i>	
<i>National Urban</i>	<i>16470.00</i>	<i>3740.00</i>	
<i>National</i>	<i>11475.00</i>	<i>2553.00</i>	
<i>Rangpur Division</i>	<i>8359.00</i>		

Source: Household Survey, 2013, Note: Figures in parenthesis represent the percentages and HIES, BBS, 2010 (Italic). Note: US dollar to Bangladeshi Taka (exchange rate), 1US\$=77.6801 BDT (www.exchange-rate-history.html Bangladesh taka US Dollar exchange rate on 31December 2013, accessed on 11.11.2016). Definition: Purchasing power parity conversion factor is the number of units of a country's currency required to buy the same amounts of goods and services in the domestic market as U.S dollar would buy in the United States. We use the conversion factor of PPP in case of Bangladesh is 27.05 in 2011-2015. Source: data. World bank.org/indicator/PA.NUS.PPP accessed on 29.02.2016. So, 77.6801/27.05=2.87

Table 6.2.9 provides monthly income per household and monthly per capita income. Average monthly income per household is estimated at Tk.10,000.00 for rural area and for the urban area; while, it is estimated at Tk. 15185.00 for the study area. While average monthly income per household at current price is estimated at Tk.11479.00 at the national level and it is Tk.9648.00 for national rural and Tk.16475.00 for national urban area in 2010. The monthly per capita income in the study area is Tk.3710.00 (US\$ 573= PPP \$1445) and the corresponding figures in rural and urban areas are respectively Tk.2457.00 (US\$ 379.6 = PPP \$1090) and Tk.4940.00 (US\$ 819= PPP \$ 2350). The per capita income in rural area is Tk.2130.00 compared to Tk.3740.00 in urban area and it is Tk.2553 at the national level in 2010 (BBS, 2012).

6.2.11 Household Income and Literacy

Education and income both are the basic indicators of human resource development. Income is an important means of enlarging the choices available to people: more

income means that people are likely to spend more on their own education and health and nutrition; more healthy and educated people in turn can be more productive and can have greater access to opportunities to improve their lives (UNDP, 2014). The percentage distribution of the respondents by literacy and income status is presented in Table 6.2.10.

Table 6.2.10: Education of the Respondents and Household Income

Income Level	Rural Area			Urban Area		
	Literate	Illiterate	Total	Literate	Illiterate	Total
Lowest-5000	13 (4.3%)	35 (11.7%)	49 (16.3%)	4 (1.3%)	7 (3.3%)	11 (3.7%)
5001-10000	98 (32.7%)	94 (31.3%)	191(63.7%)	21 (7.0%)	36 (12.0%)	57 (19.0%)
10001-20000	42 (14.0%)	2 (0.7%)	44 (14.7%)	90 (30.0%)	36 (12.0%)	126 (42.0%)
20001-50000	14 (4.7%)	1 (0.3%)	15 (5%)	92 (30.7%)	1 (0.3%)	93 (31.0%)
50001-above	1 (0.3%)	..	1 (0.3%)	13 (4.3%)	..	13 (4.3%)
Total	168 (56.0%)	132(44.0%)	300 (100%)	220(73.3%)	80 (26.7%)	300 (100%)

Source: Household Survey, 2013, Note: Figures in parenthesis represent the percentages

Table 6.2.10 exhibits that in rural area, over 4.0 percent literate respondents and about 12.0 percent illiterate respondents earn Tk.5000 or below, while the monthly household income of 32.7 percent literate and 31.3 percent illiterate respondents are in the range of Tk.5001-Tk10000 income group. About 5.0 percent literate and 0.3 percent illiterate respondents have a monthly income ranging between Tk.10001-Tk.20000. While the figure range between Tk.20001-Tk.50000 for close to 5.0 percent literate and negligible 0.3 percent illiterate respondents. The monthly household earnings of 0.3 percent literate respondents is above Tk. 50001 but no illiterate respondents fall in this income group in rural area. While in the urban area, among the respondents, only 1.3 percent literate and more than 3.3 percent illiterate respondents earn Tk.5000 or below. About 7.0 percent literate and 12.0 percent illiterate respondents' earnings fall in the range of Tk.5001-Tk.10000. The earnings of 30.0 percent literate respondents and 12.0 percent illiterate respondents fall ranging between Tk.10001-Tk.20000. More than 30.0 percent

literate and only 0.3 percent illiterate respondents' income range between Tk.20001-Tk.50000; and 4.3 percent literate respondents earns Tk.50001 or more. Table 6.2.7 also shows that literate workers have higher earnings than illiterate ones both in rural and urban areas.

6.2.12 Household Income and Level of Education

People with high income make them capable to spend more on education, health and nutrition that ultimately contribute to human resource development. "Income is a means to a better life, and a higher income indicates less binding material constraints than a lower income" (UNDP, 1993). The total household income with respect to various levels of education of the respondents in both the rural and urban areas is exhibited in Table 6.2.11.

Table 6.2.11 reports that, in rural area, among the respondents, 11.7 percent with no education, 3.0 percent having primary and about 2.0 percent with secondary education earn Tk.5000 or below. But no respondents with higher secondary and higher education fall in the income group. Over 31.0 percent of the respondents having no education, 20.0 percent with primary, more than 11.0 percent with secondary and only 1.0 percent with higher secondary education have monthly income ranging between Tk.5001-Tk.10000. Respondents having higher education are not available in the this income group. About 0.7 percent of the respondents with no education and 3.7 percent having primary education, 4.3 percent with secondary and 3.0 percent having higher secondary and 3.0 percent higher education are in Tk.10001-Tk.20000 income group. About 0.3 percent respondents with no education, 0.3 percent respondents with secondary and 0.7 percent having higher secondary and close to 4.0 percent having higher education earn in the range between Tk.20001-Tk.50000. No respondents with primary education fall

in this income group. On the other hand, about 0.3 percent respondents having higher education earns Tk.50001 and above in the rural area.

Table 6.2.11: Level of Education and Household Income of the Respondents

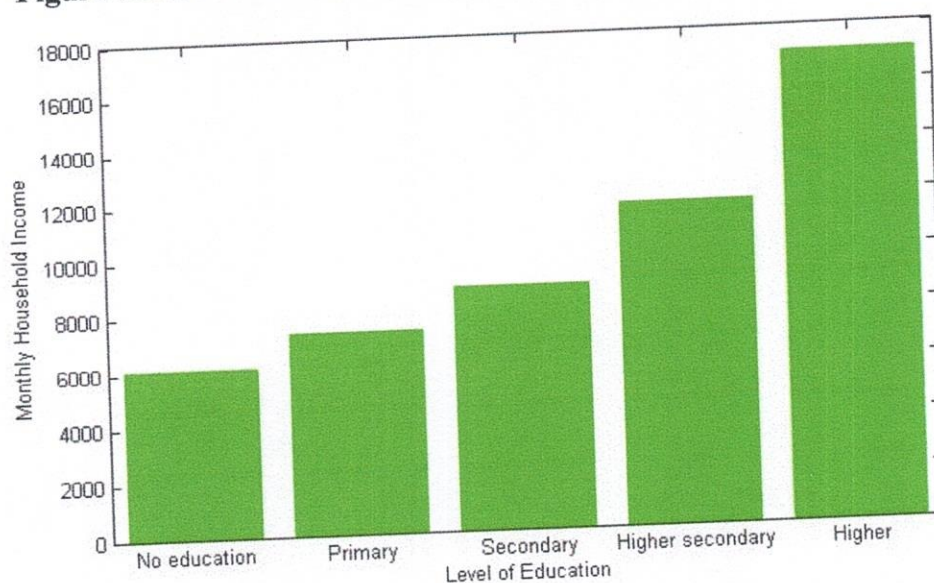
Rural Area						
Income Level	Level of Education					Total
	No Education	Primary	Secondary	Higher Secondary	Higher	
Below-5000	35 (11.7%)	9 (3.0%)	5 (1.7%)	..	..	49 (16.3%)
5001-10000	94 (31.3%)	60 (20.0%)	34 (11.3%)	3 (1.0%)	..	191 (63.7%)
10001-20000	2 (0.7%)	11 (3.7%)	13 (4.3%)	9 (3.0%)	9 (3.0%)	44 (14.7%)
20001-50000	1 (0.3%)	..	1 (0.3%)	2 (0.7)	11 (3.7%)	15 (5.0%)
50001-Above	..	..	..	..	1(0.3%)	1(0.3%)
Total	132 (44.0%)	44 (14.7%)	53 (17.7%)	14 (4.7%)	21 (7.0%)	300 (100%)
Urban Area						
Below-5000	7 (2.3%)	3 (1.0%)	1 (0.3%)	..	..	11 (3.7%)
5001-10000	36 (12.0%)	15 (5.0%)	2 (0.7%)	4 (1.3%)	..	57 (19.0%)
10001-20000	36 (12.0%)	32 (10.7)	36 (12.0%)	18 (6.0%)	4 (1.3%)	126 (42.0%)
20001-50000	1 (0.3%)	..	25 (8.3%)	23 (7.7%)	44 (14.7)	93 (31.0%)
50001-Above	..	..	1 (0.3%)	..	12 (4.0%)	13 (4.3%)
Total	80 (26.7%)	50 (16.7%)	65 (21.7%)	45 (15.0%)	60 (20.0)	300 (100%)

Source: Household survey 2013, Note: Figures in parenthesis represent the percentages

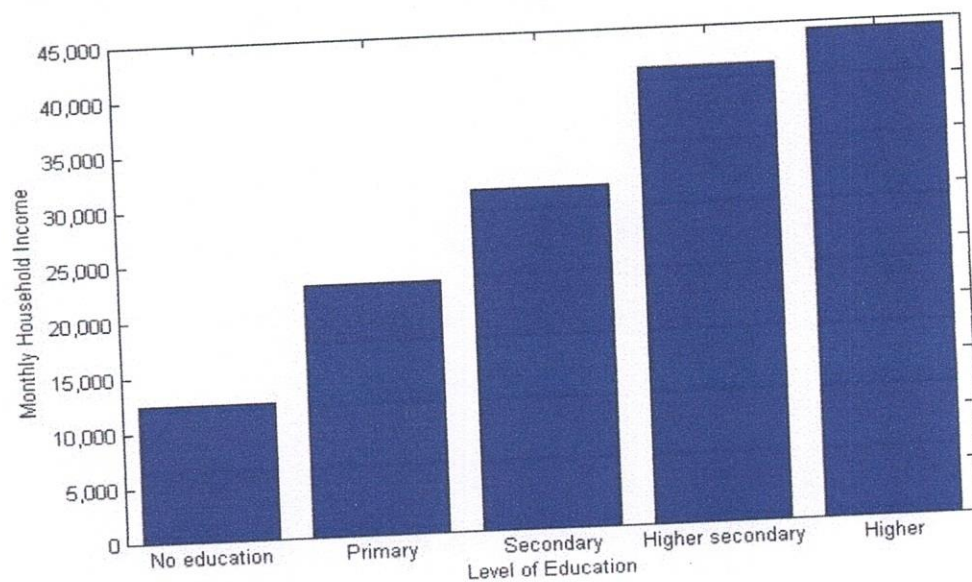
Table 6.2.11 shows that, in the urban area, among the respondents, 2.3 percent having no education and 1.0 percent with primary and only 0.3 percent having secondary education earn Tk.5000 or below. But no respondents having higher secondary and higher education exists in the mentioned income group. About 12.0 percent of the respondents with no education, 5.0 percent having primary and 0.7 percent with

secondary and 1.3 percent having higher education have monthly income ranging between Tk.5001-Tk.10000. No higher educated individual are found in this category. On the contrary, 12.0 percent respondents having no education, 11.0 percent with primary, 12.0 percent having secondary, 6.0 percent having higher secondary and 1.3 percent respondents with higher education belong to the Tk.10001-Tk.20000 income group. About 0.3 percent respondents having no education, 8.3 percent having secondary and 7.7 percent with higher secondary and 14.7 percent with higher level of education have monthly income ranging between Tk.20001-Tk.50000. Only 0.3 percent respondents with secondary and 4.0 percent with higher education earns Tk.50001 or above. No respondents having no education, primary and higher secondary education are found in the mentioned income group. Table 6.2.11 makes it clear the earnings of urban people are much higher than their rural counterparts at all levels of education.

Figure 6.2.1: Level of Education and Household Income in the Rural Area



6.2.2: Level of Education and Household Income in the Urban Area



Analyzing Table 6.2.11 we may draw the following conclusion:

- i) The earnings of educated people are much higher than their non-educated counterparts in both the rural and urban areas;
- ii) The earnings of individual raises as the level of education increases both the areas;
- iii) Rural workers tend to have lower wages and salaries than that of urban areas.

Because most of the illiterate individuals particularly in rural areas are engaged in primary sector activities (such as agriculture, fishing etc., or service workers) as these activities are the most essential for human survival. While the products of the primary sector are vital for survival, they are generally not very valuable products. Most of the illiterate people possess scanty of resources and only physical labors are their main asset for livelihood. What makes these poor laborers even more vulnerable to poverty is the fact that much of their work is seasonal, depending on the cultivation and harvesting of the crop, which are always full of risks. However, in general, primary sector activities are limited in scope and it is very difficult to raise productivity without the development of mechanization. Mechanization of agriculture of our country has just

the development of mechanization. Mechanization of agriculture of our country has just started. Labor investment in agriculture is seasonal and the remaining period they do not have adequate work. Agriculture plays an immense role to create disguised or seasonal unemployment that leads low income earnings. It is viewed that most of the illiterate individuals are not updated in manner, thinking and practices in daily life to make them well-capable of being carried out as per need of living with the modern socio-economic conditions in both the areas. In rural areas, they are not equipped with skill. In addition to that their social mobility is so limited that they have seldom information about the labor market and are not willing or reluctant to collect updated information that is releasing from different kinds of electronic and print media. Due to the low adaptable capacity, they could not cope with the changing dimension of technology and shifting professional skill of the modern technology. They are less likely to be employed in paid or regular jobs and they are more likely to be employed in informal sector or low paid jobs which provide very little security in terms of earnings and livelihood. With the informal sector, illiterate individuals are also concentrated in jobs with low and unstable earnings with a high risk of falling into poverty.

On the other hand, education helps individuals to be capable of getting jobs from formal, urban settings and lucrative private sectors including all others. Comparatively most of them are well equipped with skill, technology and competitive in manner to establish with higher economic condition and dignity that lead to higher productivity and earnings at the workplace. According to a study of World Bank, farmers who are educated produce on the average eight times more output than their non educated counterpart (World Bank, 1992). As technology changes, the skill required to operate it also change. In congruence with the repeated changing dimension of technology and demand of job market, educated individuals can make themselves to avail of the scope

and opportunities because they have capability to adapt with changing dimension of technology and market demand. They have greater scope and opportunities to enter into the job market. Individuals having primary and secondary levels of education are willing to work in any environment irrespective of formal as well as informal sectors or rural settings, and higher secondary educated individuals are not strongly unwilling to work in informal sectors. So, they can enter into the job market but illiterate individuals fail to do it.

Table 6.2.11 demonstrates that the earnings of individuals having higher level of education are much more than those of other levels of education. Higher educated individuals keep updated information about job market. They have bargaining power to increase the wage rates and raise their voice against discrimination. Higher level of education is needed to cope with the changing dimension of technology-based industrialization. In technology driven growth, higher skill level creates a higher probability of employment and earnings. Higher educated individuals can increase their income based on potentiality, productivity, expertise, innovation and adaptable capacity according to the changing dimension of economic order in the era of knowledge based economy.

Secondly, urban workers tend to have higher wages and salaries than the rural workers. Most of rural people are involved in agriculture related activities. Although, agriculture is the largest sector of employment in rural areas, the rural people of Bangladesh have the scope of work only for a specific period of the year and the remaining period is generally off-season in which they do not have adequate work. The sectorial trends in production and employment however, show that the agriculture sector is still overburdened with 'surplus labor' with low value added-employment ratio and average value added per worker compared with other sectors. Agriculture plays an immense

role to create disguised or seasonal unemployment that leads low earnings. Low wage rate, high rate of illiteracy, lack of employment opportunities, unskilled and semi-skilled laborers, inadequate information about job market, lack of skill and inadequate skill delivery institutions, comparatively limited job scope and opportunities both in the formal and informal sectors including all others and fluctuation of wage rate are the common scenarios of the rural area. Beyond these, natural disaster, such as, flood, drought, cyclone, excess population, lack of investment capacity, insufficiency of physical resources, lack of self-initiatives to work, stereotypical in manner, undeveloped means of transport and communication and backward geographical location are also responsible for the low earnings of the rural people.

On the other hand, most of the urban individuals are involved in secondary sector activities, such as, manufacturing and construction. Generally, secondary sector activities are greater/ broader in scope and opportunities to apply the modern technology that leads to raise productivity in these sectors. Manufacturing products are more valuable than the products of the primary sectors. The share of service sector in rich and poor countries is more complex. Developing countries like Bangladesh can have a large service sector because the absence of manufacturing jobs can force poor people to seek incomes in low productivity services, such as, domestic services or rickshaw pulling, and there exists high productivity services, such as, the modern financial sector. As the economy becomes richer, many of this people move out of these low value services into secondary sector job, such as, manufacturing or construction. However, when economies become rich, the value produced in the service sector can rapidly increase as a share of the total value of the economy as labor shifts into very high-value services such as advanced financial services, medicine, higher education and research. The rural people remain involved in low value added rural

service sector that provides low income earnings. But the urban people have a scope and greater opportunities and they are more likely to be involved in advanced financial sectors with high salary which provides better livelihood in comparison to their rural counterparts. Side by side, high rate of literacy, comparatively high wage rate, scope of market channeling of produced goods to global market, job market related information, skilled manpower and skill delivery institutions are available in the urban area. In urban areas, mobility to access to the job market of formal, informal and private sectors are broader than rural areas. In urban areas, there are multiple channels of job opportunities available in different sectors based on daily need of the citizen. Most of the employment opportunities have been created in the informal sector in the age of globalization in urban areas. In urban areas, available information about job market is exposing through the different electronic and print media including hearsay as well as daily demand to meet needs of different private and public institutions.

6.2.13 Sources of Drinking Water and Literacy

Water is central for people's life. Clean water save the lives of countless children, support progress in education and keep free from the diseases. Access to safe drinking water and basic sanitation are inevitable to primary health care and human development. It is a precondition for success in the fight against poverty, hunger, child mortality, gender discrimination and illiteracy (HDSA, 2007). Distribution of respondents by literacy and sources of drinking water both rural and urban area has been presented in Table 6.2.12.

Table 6.2.12 demonstrates that, in the rural area, 2.0 percent respondents having education use water from tap. But no illiterate respondents have any kinds of tap. On the other hand, 54.0 percent of the respondents having education and 44.0 percent of the respondents with no education use water from tube-well. Table 6.1.13 also poses

that, in the urban area, about 47.0 percent respondents having education and 26.0 percent respondents having no education use water from tube well. While, 0.7 percent respondents with no education and almost 27.0 percent respondents with education use water from tap in the urban area. There exists rural-urban variation in respect of sources of drinking water. It is revealed from the Table 6.2.13 that 2.0 percent rural households use supply water compared to 27.3 percent of urban households. Tube wells are the most common source of drinking water in both urban and rural areas. No person is found to use drinking water from other unhygienic sources, such as, open well, ponds and river.

Table 6.2.12: Sources of Drinking Water and Literacy of the Respondents

Education	Rural Area			Urban Area		
	Supply Water/Tap	Tube-well	Total	Supply Water/Tap	Tube-well	Total
Literate	6 (2.0%)	162 (54.0%)	168 (56.0%)	80 (26.7%)	140 (46.7%)	220 (73.3%)
Illiterate	..	132 (44.0%)	132 (44.0%)	2 (0.7%)	78 (26.0%)	80 (26.7%)
Total	6 (2.0%)	294 (98.0%)	300 (100%)	82 (27.3%)	218 (72.7%)	300 (100%)

Source: Household Survey 2013, Note: Figures in parenthesis represent the percentages

6.2.14 Sources of Drinking Water and Level of Education

Clean and safe drinking water is essential for good health. Water is life and water is death. Clean water is life. Contaminated water is death. Human health depends on the provision of safe, adequate, accessible and reliable drinking water supplies (McJunkin, 1983). Water is, and has been, an important source of livelihood for the people in Bangladesh, but it has been a cause of significant insecurity as well. One of the greatest threats to human security comes from the lack of safe drinking water (HDSA, 2005). Sources of drinking water and the level of education of the respondents in the study area are presented in Table 6.2.13.

Table 6.2.13 shows that, in rural area, 0.3 percent of the respondents with secondary and 1.7 percent of the respondents with higher education use water from tap. On the contrary, 44.0 percent of the respondents having no education, 26.7 percent having primary, 17.3 percent with secondary, 4.7 percent with higher secondary and 5.3 percent of the respondents with higher education use water from tube. Tube-wells are the primary source of drinking water in the rural area. About 16.3 percent of the respondents with higher education, 6.0 percent having higher secondary, 4.0 percent with secondary, only 0.3 percent with primary and 0.7 percent of the respondents with no education use water from tap.

Table 6.2.13: Sources of Drinking Water and Level of Education of the Respondents

Level of Education	Rural Area			Urban Area		
	Supply Water/Tap	Tube-well	Total	Supply Water/Tap	Tube-well	Total
No education	..	132 (44.0%)	132 (44.0%)	2 (0.7%)	78 (26.0%)	80 (26.7%)
Primary	..	80 (26.7%)	80 (26.7%)	1 (0.3%)	49 (16.3%)	50 (16.7%)
Secondary	1(0.3%)	52 (17.3%)	53 (17.7%)	12 (4.0%)	53 (17.7%)	65 (21.7%)
Higher Secondary	..	14 (4.7%)	14 (4.7%)	18 (6.0%)	27 (9.0%)	45 (15.0%)
Higher	5 (1.7%)	16 (5.3%)	21 (7.0%)	49 (16.3%)	11 (3.7%)	60 (20.0%)
Total	6 (2.0%)	294 (98.0%)	300 (100%)	82 (27.3%)	218 (72.7%)	300 (100%)

Source: Household Survey 2013, Note: Figures in parenthesis represent the percentages

While 26.0 percent of the respondents having no education, 16.3 percent with primary, 17.7 percent with secondary, 9.0 percent with higher secondary and 3.7 percent with higher education use water from tube well. Access to drinking water from tap is significantly higher in urban than in rural areas.

6.2.15 Sanitation Condition and Literacy

Access to safe water and sanitation are basic determinants of health. Sanitation protects public health and keeps free from various kinds of germs and diseases. Safe drinking water and adequate sanitation facilities have a tremendous impact in diminishing the risk of epidemic disease and improving general health conditions. Percentage distribution of the respondent households by literacy and access to different types of latrine facilities has been presented in Table 6.2.14.

Table 6.2.14 indicates that, in the rural area, 8.0 percent of the respondents with education and 0.7 percent having no education have their *pucca* latrine, while above 14.0 percent of the respondents having education and close to 2.0 percent with no education use semi-*pucca* latrine.

Table 6.2.14: Sanitation and Literacy of the Respondents

Type of Latrine	Rural Area			Urban Area		
	Literate	Illiterate	Total	Literate	Illiterate	Total
Pucca	24(8.0%)	2(0.7%)	26(8.7%)	163(54.3)	14(4.7%)	17(59.0%)
Semi-pucca	43(14.3%)	5(1.7%)	48(16.0%)	50(16.7%)	32(10.7%)	82(27.3%)
Ring-slab	85(28.3%)	83(27.7%)	168(56.0%)	7(2.3%)	33(11.0%)	40(13.3%)
Kacha	12(4.0%)	31(10.3%)	43(14.3%)	..	1(0.3%)	1(0.3%)
Open Space	4(1.3%)	11(3.7%)	15(5.0%)	..	..	..
Total	168(56.0%)	132(44.0%)	300(100%)	220(73.3%)	80(26.7%)	300(100%)

Source: Household Survey 2013, Figures in parenthesis represent the percentages

On the contrary, more than 28.0 percent of the literate respondents and about 28.0 percent of the illiterate respondents have *ring slab* latrine. About 4.0 percent of the respondents with education and 10.3 percent respondents having no education have their *kacha* latrine for defecation. While 1.3 percent literate respondents and about 4.0 percent of the respondents defecate in the open space.

Table 6.2.14 shows that more than 54.0 percent of the respondents having education and 4.7 percent with no education have *pucca* latrine, while about 17.0 percent of the respondents having education and 16.7 percent with no education use semi-*pucca* latrine. On the contrary, only 2.3 percent literate and 11.0 percent respondents with no education use *ring slab* latrine. But 0.3 percent of the respondents in the urban area use *kacha* latrine for defecation. The access to *pucca* latrine is also high among educated groups in both rural and urban areas. There exists urban-rural significant variation in access to toilet facilities. Urban households have greater access to improved sanitation and piped water or public taps than that of their rural counterparts. In recent years, Bangladesh has considerably improved access to safe drinking water, but its sanitation facilities are not satisfactory.

6.2.16 Sanitation Status and Level of Education

Clean water and sanitation are among the most powerful and preventive medicines for reducing child mortality (UNDP, 2006). Households without proper sanitation facilities have a greater risk of diseases like diarrhea, dysentery and typhoid than households with improved sanitation facilities. Level of education and access to different types of latrine facilities of the respondents has been presented in Table 6.2.15.

Table 6.2.15 shows that, in the rural area, only 0.7 percent, 0.3 percent, 1.0 percent and 1.7 percent of the respondents respectively having no education, primary, secondary, higher secondary education and 5.0 of the respondents with higher education use *pucca* latrine. Among the respondents, 1.7 percent of them with no education, 3.7 percent having primary, 6.0 percent with secondary, 2.7 percent with higher secondary and 2.0 percent with higher education have semi-*pucca* latrine for defecation. On the other hand, 27.7 percent with no education and 19.0 percent having primary, 9.0 percent with secondary and only 0.3 percent respondents with higher secondary education use *ring*

slab as a latrine. No respondents with higher education use ring *slab* for defecation. Among the respondents, above 10.0 percent with no education, 2.3 percent having primary and 1.7 percent with secondary education have *kacha* latrine. While 3.7 percent respondents having no education and 1.3 percent with primary education use open space for defecation. Respondents with primary, secondary and higher levels of education do not have any practice to defecate in open space. It indicates that higher level of education derives to increase in using *pucca* latrine in practice. So, higher levels of educated individuals practice more sanitation than lower ones.

Table 6.2.15: Sanitation Status and Level of Education of the Respondents

Level of Education	Sanitation Condition (Types of Latrine) in Rural Area					Total
	<i>Pucca</i>	Semi- <i>pucca</i>	Ring-slab	<i>Kacha</i>	Open space	
No education	2(0.7%)	5(1.7%)	83(27.7%)	31(10.3%)	11(3.7%)	132(44.0%)
Primary	1(0.3%)	11(3.7%)	57(19.0%)	7(2.3%)	4(1.3%)	80(26.7%)
Secondary	3(1.0%)	18(6.0%)	27(9.0%)	5(1.7%)	..	53(17.7%)
Higher Secondary	5(1.7%)	8(2.7%)	1(0.3%)	..	..	14(4.7%)
Higher	15(5.0%)	6(2.0%)	..	..	..	21(7.0%)
Total	26 (8.7%)	48 (16.0%)	168 (56.0)	43(14.3%)	15(5.0%)	300(100%)

Sanitation Condition (Types of Latrine) in Urban Area

No Education	14(4.7%)	32(10.7%)	33(11.0%)	1(0.3%)	..	80(26.7%)
Primary	21(7.0%)	23(7.7%)	6(2.0%)	..	..	50(16.7%)
Secondary	47(15.7)	17(5.7%)	1(0.3%)	..	..	65(21.7%)
Higher Secondary	36(12.0%)	9(3.0%)	..	..	..	45(15.0%)
Higher	59(19.7%)	1(0.3%)	..	..	..	60(20.0%)
Total	177(12.0%)	82(27.3%)	40(13.3%)	1(0.3%)	..	300(100%)

Source: Household Survey 2013, Note: Figures in parenthesis represent the percentages

Table 6.2.15 poses that, in urban areas, 4.7 percent with no education, 7.0 percent, 15.7 percent, 12.0 percent and 19.7 percent of the respondents having primary, secondary, higher secondary and higher education respectively have their *pucca* latrine. About 11.0 percent of the respondents with no education, almost 8.0 percent having primary, about 6.0 percent with secondary, 3.0 percent having higher secondary and only 0.3 percent respondents with higher education use *semi-pucca* latrine. On the other hand, 11.0 percent of the respondents with no education, 2.0 percent having primary and 0.3 percent with secondary education have ring-slab latrine. But no respondents with higher secondary and higher education use ring slab latrine, while 0.3 percent of the respondents with no education have *kacha* latrine in urban area. From Table 6.2.16, it is apparent that, in urban areas, no respondents use open space for defecation. In the rural area, *pucca* latrine is used by 0.7 percent households with no education, while such share for higher education groups is 5.0 percent. It shows that the percentage of use of *pucca* latrine increases with educational qualification of the head of household both in rural and urban areas. The access to *pucca* latrine is also high among higher education groups in both rural and urban areas. The coverage of sanitation in rural areas is less than the coverage of urban areas.

6.2.17 Cleanliness and Literacy

Hygiene practice is inevitable part of good health, sound and sustainable environment. Unsafe water and unhygienic sanitation is particularly dangerous for infants and children. Hygiene behavior directly affects the cleanliness of the environment. Hygiene practice and levels of education of the respondents are illustrated in Table 6.2.16.

Table 6.2.16: Cleanliness and Literacy of the Respondents

Education	Rural					Urban				
	Water & soap	Water & Ash	Water & Soil	Only Water	Total	Water & soap	Water & Ash	Water & Soil	Only Water	Total
Literate	154 (51.3%)	5 (1.7%)	7 (2.3%)	2 (0.7%)	168 (56%)	218 (72.7%)	1 (0.3%)	1 (0.3%)	..	220 (73.3%)
Illiterate	60 (20.0%)	43 (14.3%)	13 (4.3%)	16 (5.3%)	132 (44.0%)	58 (19.3%)	14 (4.7%)	5 (1.7%)	3 (1.0%)	80 (26.7%)
Total	214 (71.3%)	48 (16.0%)	20 (6.7%)	18 (6.0%)	300 (100%)	276 (92.0%)	15 (5.0%)	6 (2.0%)	3 (1.0%)	300 (100%)

Source: Household Survey 2013, Figures in parenthesis represent the percentages

Table 6.2.16 shows that, in the rural area, above 50.0 percent of the respondents with education and 20.0 percent having no education use water with soap for washing their hands after defecation. About 2.0 percent of the respondents having education and more than 14.0 percent with no education use ash with water for washing their hands after defecation. More than 2.0 percent of the literate respondents and over 4.0 percent of the illiterate respondents use water with soil after defecation. Only 0.7 percent of the respondents with education and more than 5.0 percent respondents having no education use only water to wash their hands after defecation. Table 6.2.16 indicates that, in the urban area, a vast majority of 72.7 percent of the respondents with education and 19.3 percent having no education use water with soap to wash their hands after defecation and 0.3 percent of the respondents having education and 4.7 percent with no education use water with ash to wash their hands after defecation. On the contrary, almost 0.3 percent of the literate respondents and 1.7 percent of the illiterate respondents use soil with water to wash their hands after defecation. On the other hand, 1.0 percent of the respondents with no education use water for washing their hands after defecation.

6.2.18 Cleanliness after defecation and Level of Education

Better access to water and sanitation would act as the catalyst for a giant advance in human development creating opportunities for gains in public health, education and economic growth (UNDP, 2006). Hygiene practices and level of education of the respondents are presented in Table 6.2.17.

Table 6.2.17: Cleanliness and Level of Education of the Respondents

Level of Education	Rural					Urban				Total
	Water & Soap	Water & Ash	Water & Soil	Only Water	Total	Water & Soap	Water & Ash	Water & Soil	Only Water	
Illiterate	60 (20%)	43 (14.3%)	13 (4.3%)	16 (5.3%)	132 (44.0%)	58 (19.3%)	14 (4.3%)	5 (1.7%)	3 (1.0%)	80 (26.7%)
Primary	69 (23.0%)	3 (1.0%)	7 (2.3%)	1 (0.7%)	80 (26.7%)	48 (16.0%)	1 (0.3%)	1 (0.3%)	..	50 (16.7%)
Secondary	50 (16.7%)	2 (0.7%)	..	1 (0.7%)	53 (17.7%)	65 (21.3%)	..	..	..	65 (21.7%)
Higher Secondary	14 (4.7%)	..	..	..	14 (4.7%)	45 (15.0%)	..	..	..	45 (15.0%)
Higher	21 (7.0%)	..	..	..	21 (7.0%)	60 (20.0%)	..	..	..	60 (20.0%)
Total	214 (71.3%)	48 (16.0%)	20 (6.7%)	18 (6.0%)	300 (100%)	276 (92.0%)	15 (5.0%)	6 (2.0%)	3 (1.0%)	300 (100%)

Source: Household Survey 2013, Figures in parenthesis represent the percentages

Table 6.2.17 indicates that, in the rural area, after defecation, 20.0 percent respondents having no education, 23.0 percent with primary, above 16.0 percent with secondary, about 5.0 percent with higher secondary and 7.0 percent with higher education use water with soap for washing their hands. No higher secondary and higher educated individuals fall in the category. While 14.3 percent of the respondents having no education, 1.0 percent with primary and 0.7 percent of the respondents having secondary education use water with ash for washing their hands after defecation. On the other hand, 4.3 percent of the respondents having no education, 2.3 percent with primary education use soil with water to clean hand and 5.3 percent of the respondents with no education, 0.7 percent with primary and 0.7 percent having secondary education use only water to clean their hands after defecation. Table 6.2.18 indicates that 19.3 percent respondents with no education, 16.0 percent with primary, 21.3 percent having secondary, 15.0 percent with higher secondary and 20.0 percent with higher education use water with soap for washing their hands after defecation in the urban area. More than 4.3 percent of the respondents with no education and only 0.3 percent with primary education use water with ash for washing their hands after defecation. While 1.7 percent of the respondents having no

education and only 0.3 percent respondents with primary education respectively use soil with water to clean hand after defecation. On the contrary, only 1.0 percent respondents with no education use merely water for washing their hands after defecation in the urban area.

Table 6.2.17 also reveals that no respondents with higher and secondary education use merely water, water with ashes and water with soil for washing their hands after defecation. Higher education leads to practice more hygienic than their lower ones both in rural and urban areas. The rural-urban difference in the provision of sanitation is even greater. The sanitation coverage of the rural population is on the average less than half that of the urban population. From Table 6.2.17, it is clear that sanitation practice in rural areas is noticeably worse in comparison to urban areas. This is because factors such as historical backwardness, cultural practices, lack of health awareness and large scale poverty have all restricted improvements in this area.

In this section, we try to assess life expectancy of individuals in both rural and urban areas. In doing so, we include the information of dead individuals of households obtained from the present household members. The information of dead individuals is depicted below.

6.2.19 Years of Schooling and Health Expenditure of Dead individuals

Life expectancy and years of schooling are basic indicators of human resource development. Life expectancy, years of schooling and monthly health expenditure of the dead individuals are presented in Table 6.2.18.

Table 6.2.18 depicts that the life expectancy of rural people, on an average is 66.50 years compared to 69.00 years of urban people. So, urban people, on an average, expect to live more than the rural people. Years of schooling and health expenditure of individuals living in urban area is almost double than their rural counterparts.

Table 6.2.18: Information about Dead Individuals

Variables	Rural Area				Urban Area			
	Min	Max.	Mean	S.D	Min	Max.	Mean	S.D
Life Expectancy	8.00	95.00	66.50	18.07	30.00	100.00	69.00	11.00
Years of Schooling	0.00	12.00	3.87	4.08	0.00	18.00	6.68	5.42
Health Expenditure	150.00	1000.00	355.40	190.45	200.00	2500.00	730.18	575.39

Source: Household Survey, 2013, Note: N=100 for rural area and 110 for urban area

It is to be noticeable that the life expectancy at birth in Bangladesh is 71.6 years in 2016 while it is 69.2 years for rural and 71.5 years for urban area in 2012 (HIES, 2017). The life expectancy in Bangladesh is 72.0 years in 2015 (UNDP, 2016).

6.2.20 Life Expectancy (Years) and Education

Life expectancy is perhaps the most important measure of health and important indicator of human resource development. People can work if they have good health. Life expectancy and education of the individuals are depicted in Table 6.2.19.

Table 6.2.19: Life Expectancy of Dead Individuals and Education of Individuals

Age Group of Dead Individual	Rural Area			Urban Area		
	Illiterate	Literate	Total	Illiterate	Literate	Total
0-30	4(4.0%)	3(3.0%)	7(7.0%)	..	..	..
31-50	9(9.0%)	7(7.0%)	16(16.0%)	5(4.5%)	1(0.9%)	6(5.5%)
51-70	19(19.0%)	11(11.0%)	30(30.0%)	22(20.0%)	31(28.2%)	53(48.2%)
71 and above	10(10.0%)	37(37.0%)	47(47.0%)	4(3.6%)	47(42.7%)	51(46.4%)
Total	42(42.0%)	58(58.0%)	100(100%)	31(28.2%)	79(71.8%)	110(100%)

Source: Household Survey 2013, Note: Figures in parenthesis represent the percentages

Table 6.2.19 exhibits that in rural area, 4.0 percent individuals with no education and 3.0 percent literate individuals survived 30 years or below. While 9.0 percent illiterate

and 7.0 percent literate individuals survived ranging between 31- 50 years. On the other hand, 19.0 percent individuals with no education and 11.0 percent having education died between 51-70 years. But 10.0 percent illiterate and 37.0 percent literate individuals survived 71 years or more. Table 6.2.19 shows that in urban area, 4.5 percent individual having no education and only 0.9 percent with education survived ranging between 31-50 years. About 20.0 percent illiterate individuals and 28.2 percent literate individuals died between 51-70 years. About 3.6 percent individuals with no education and close to 43.0 percent individuals having education survived at the age of 71 years or more.

6.2.20 Life Expectancy (Years) and Level of Education

Life expectancy is one of the major key indicators of population health condition and economic development of a country. The ability to live a long and healthy life is a fundamental human right and an important component of human development. Life expectancy is a standard yardstick to measure the status of health of a country (HDSA, 2007). Life expectancy and the levels of education of dead individual both in rural and urban areas are shown in Table 6.2.20.

Table 6.2.20: Life Expectancy (Years) of and Level of Education of Individuals

Level of education of dead individual	Age Group (years) of Dead Individual in Rural Area					Age Group (years) of Dead Individual in Urban Area			
	0-30	31-50	51-70	71 and above	Total	31-50	51-70	71 and above	Total
No Education	4 (4.0%)	9 (9.0%)	19 (19.0%)	10 (10.0%)	42 (42.0%)	5 (4.5%)	22 (20.0%)	4 (3.6%)	31 (28.1%)
Primary	1 (1.0%)	4 (4.0%)	16 (16.0%)	14 (14.0%)	35 (35.0%)	1 (0.9%)	11 (10.0%)	13 (11.8%)	25 (22.7%)
Secondary	1 (1.0%)	2 (2.0%)	3 (3.0%)	9 (9.0%)	15 (15.0%)	1 (0.9%)	12 (10.9%)	15 (13.6%)	28 (25.5%)
Higher Secondary	1 (1.0%)	1 (1.0%)	2 (2.0%)	4 (4.0%)	8 (8.0%)	..	5 (4.6%)	2 (1.8%)	7 (6.4%)
Higher	..	..	..	..	..	..	3 (2.8%)	16 (14.5%)	19 (17.3%)
Total	7 (7.0%)	16 (16.0%)	40 (30.0%)	37 (37.0%)	100 (100.0%)	7 (6.4%)	53 (48.2%)	50 (45.4%)	110 (100%)

Source: Household Survey 2013, Figures in parenthesis represent the percentages.

Table 6.2.20 shows that in the rural area, 4.0 percent individuals with no education, 1.0 percent having primary, 1.0 percent with secondary and 1.0 percent with higher secondary education would expect to live 30 years or less. About 9.0 percent individuals with no education, 4.0 percent having primary, 2.0 percent with secondary and 1.0 individuals having higher secondary education survived within 46-60 years of age, while the life expectancy of 19.0 percent individuals having no education, 16.0 percent with primary, 3.0 percent with secondary and 2.0 percent individuals with higher secondary education ranged between 61-70 years. On the other hand, 10.0 percent individuals having no education, 14.0 percent with primary, 9.0 percent with secondary and 4.0 percent individuals with higher secondary education would expect to live 71 years or above. Life expectancy is correlated with education. Table 6.2.20 poses that, in urban area, 4.5 percent of the individuals having no education 0.9 percent with primary and 0.9 percent with secondary education died in the 31-45 years of age. But there was no incident of demise in the mentioned age groups among the individuals with higher secondary and higher education. 20.0 percent individuals with no education, 10.0 percent with primary, 10.9 percent with secondary, 4.6 percent having higher secondary and 2.8 percent higher educated individuals would expect to live 71 years or more. On the other hand, 3.6 percent individuals having no education, over 11.8 percent primary, 13.6 percent with secondary, only 1.8 percent with higher secondary and 14.5 percent highly educated individuals survived 71 years or more.

Table 6.2.20 clearly indicates that in both the areas, educated individuals would expect to live more than illiterate individuals. Illiteracy keeps people chained to ignorance and superstition. It is an obstacle in the way of progress and prosperity. There are still many illiterate people particularly in the rural areas who do not believe in modern medicine and treatment rather prefers to go the village quack and *kabiraj* for treatment of their serious diseases.

Most of the illiterate individuals are engaged in agriculture related activities or primary sectors. Sometimes they have to work in hazardous condition which affects their health. Due to the lack of awareness about healthy life style and poor affordable capacity they could not receive health services from private sectors and poor medical infrastructure hindrance them to have access to free public health care through government hospitals. Besides, poor hygiene practices spread the disease and lack of knowledge leads to improper treatment. On the contrary, education helps individuals to understand the importance of health and nutrition, thereby lowering the incidence of diseases. People with more education lead to more awareness and more educated people are more likely to be used health care services. They keep some health related information and have access to free public health care services. The death rate from chronic diseases in case of illiterate individuals is also much higher than their literate counterparts.

Table 6.2.20 also exhibits that primary and secondary educated individuals particularly in rural areas are engaged in informal sectors of hard work. Physical labor is the best prevention to protect the body against diseases. Regular physical work prevents diseases and drowsiness and makes human body strong and healthy that helps to increase life expectancy. It is in fact education helps greater exposure to the mass media that can keep people better informed about the health issues. At present, the growing use of mobile phones, email and the Internet means that telemedicine can already reach people in interior region and could have much broader applications.

On the other hand, higher level of education contributes to boost up life expectancy significantly. Higher education helps individuals to understand the importance of health and nutrition. Higher education increases the ability of an individual to acquire more knowledge and resources. Again the effect of income could be regarded as more important in urban areas, where education produces more income and income, in turn, may more effectively produce health because of availability of basic goods and services, food, clothing, medical care, housing, sanitation and others health related

items. A better educated population is likely to be better informed about their health, and should contribute to a higher life expectancy.

From Table 6.2.20 it is vivid that life expectancy of urban people is higher than their rural counterparts. People in rural areas, are usually employed in low paying casual work and they are illiterate, malnourished and denied to have access to quality health care services. Health service providers such as doctors, nurses, hospitals, diagnostic centers and most of the public and private health service providers are concentrated in urban areas. Besides these, Bangladesh has inherited a system of health care that is urban based and curative biased. There is the presence of a parallel private health sector in urban areas, their service charge remains high. Due to poor affordable capacity rural people can not avail of these services from the private sectors. On the more positive side, urban areas offer more choices: greater availability of food, housing arrangements, health services and possibility of employment opportunities. Electricity, water and sanitation services are also, on an average, more widely available than in rural areas. So, the life expectancy of urban people is longer than that of their rural counterparts.

6.2.22 Level of Maternal Education and Child Mortality

The most sensitive indicator of mortality is infant and child mortality rate (IMR), which is considered an index of socio-economic development. Child survival is one of the most sensitive indicators of human welfare, the comparative health of nations and the effectiveness of public policy (UNDP, 2005). Child mortality rate is an important health indicator that reflects the level of socio-economic development and quality of life of a country. The relationship between level of mother's education and child mortality has been depicted in Table 6.2.21.

Table 6.2.21: Level of Mother's Education and Child Mortality

Level of Maternal Education	Number of Child Mortality in Rural Area				Number of Child Mortality in Urban Area		
	1	2	3	Total	1	2	Total
No Education	10 (40.0%)	4 (16.0%)	1 (4.0%)	15 (60.0%)	6 (30.0%)	2 (10.0%)	8 (40.0%)
Primary	5 (20.0%)	1 (4.0%)	..	6 (24.0)	5 (25.0%)	1 (5.0%)	6 (30.0%)
Secondary	3 (12.0%)	1 (4.0%)	..	4 (16.0%)	2 (10.0%)	1 (5.0%)	3 (15.0%)
Higher Secondary	..	..	..	..	2 (10.0%)	..	2 (10.0%)
Higher	..	..	..	..	1 (5.0%)	..	1 (5.0%)
Total	18 (72.0%)	6 (24.0%)	1 (4.0%)	25 (100%)	16 (80.0%)	4 (20.0%)	20 (100%)

Source: Household Survey 2013, Figures in parenthesis represent the percentages

Table 6.2.21 indicates that in the rural area, among the mothers with no education, 40.0 percent of them one child, 16.0 percent two children and 4.0 percent three children. Among the mothers having primary education, 20.0 percent lose one child and 4.0 percent lose two children. Among the mothers who have received secondary education, 12.0 percent lose one child and merely 4.0 percent lose two children. Mothers having primary and secondary education do not experience of having their children's death of three or more. It is to be noticeable that there is no demise of incident in case of mothers having higher secondary and higher education in rural area. Table 6.2.21 reveals that, in the urban area, among the mothers having no education, 30.0 percent lose one child, 10.0 percent lose two children. Among the mothers having primary education, 25.0 percent lose one child and 5.0 percent lose two children; while among mothers with secondary education, 10.0 percent of them lose one child and the rest 5.0 percent lose two children. On the other hand, only 5.0 percent higher educated mothers lose one child. There is no demise of incident of two children in case of mothers having higher secondary and higher education.

Table 6.2.21 shows that in both the areas, there is an inverse and significant relationship between maternal education and child mortality. There is the mystery that mothers' education is a vital tool for improving their children's health and development. Education, particularly women education greatly improves the ability of a household to manage basic childcare, increase the nutritional content of diets, ensure more effective diagnosis of diseases and improve elementary healthcare. Women's capability affects infant mortality primarily through its association with better medical care at birth of the child and secondarily due to its association with preventive and curative medical care during the post neonatal period. Education of women leads to lower fertility, greater contraception use, better health of children and greater immunization rates of children, among many other benefits to the family and the community (HDSA, 2005). Education increases the awareness of women about hygiene, health services, including vaccinations, about the importance of vitamin, mineral and protein intake both during pregnancy and the early years of child development. Educated mothers tend to have a better understanding of disease and child health management processes and to seek medical attention. Education brings about the importance of good hygiene and clean environment.

As a result, their children have a great chance of survival. On the other hand, children of uneducated mothers have high probability to be malnourished and deficient in micronutrient because of two reasons: firstly due to mothers' lack of awareness about the importance of vitamin, mineral and protein intake both during the pregnancy and the early years of child development; and secondly due to their lack of access to proper health facilities. It is in fact that women's educational attainment is related to the economic status. Women with higher levels of education are more likely to be employed in professional, technical and semi-skilled services. In contrast, women with

little or no education are more likely to be engaged as domestic servants and unskilled labor in informal sectors. In the long term, improving girls' formal education and women's literacy and job skills raise household income. Again the effect of income could be regarded as more important in cities /urban areas, education produces more income and income, in turn, may more effectively produce health because of availability of basic goods and services, food, clothing, medical care, housing, sanitation and other health related items (Alachkar and Serow,1988). Highly educated mothers make special efforts towards having their children immunized. The rate of child immunization increases as the level of mother's education goes up. Education helps greater exposure to the mass media, which can keep mothers better informed about the health issues. Mothers with higher level of education utilize modern health services more than do illiterate or lower levels of educated mothers. As a result, their children have a greater chance of survival. From Table 6.2.21, it is clear that in both rural and urban areas, children are born to mothers having education experience much lower levels of mortality rates than children born to mothers having no education and children are born to highly educated mothers are less likely to die.

In the context of urban area, educated mothers have their available facilities of medical care services and information. Standard health services and service providers such as doctors, nurses and skilled health attendants are available to foster medical care services for them in the urban area. On the other hand, health problems are particularly severe in rural areas. Poverty plays such a central role in most health problems faced by rural people particularly women, rural mothers have their poor and limited access to quality services as well as health information. In some cases, they have little or no access to adequate nutrition, health, housing, sanitation and employment. Apart from government and private hospitals, doctors and nurses and skilled birth attendants are

not available to provide proper health services in rural areas. Even when public clinics are available in poor rural areas, they are typically underequipped and understaffed. In Bangladesh, insufficient resources have been dedicated to maternal and neonatal health, with the result that the poor have been effectively denied access to clinics and hospitals, especially in rural areas. This may be due to the absence of health care facility, the poor quality and condition of health centers and hospitals, the lack of skilled or low skilled health personnel or the existence of users' fees and other costs the poor cannot afford (UNICEF, 2009). These differences are mostly attributed to the disparities in economic conditions and health facilities as well as inequitable and weak implementation of healthcare programs in rural areas. So child mortality in rural area is much higher than that of urban area. The above findings are almost similar with the findings of World Bank (2007) and World Bank (1980). The high level of literacy of urban area, especially female literacy, which is higher than that of rural area, has greatly contributed to making such difference between urban and rural area in terms of child mortality.

6.2.23 Household Spending on Various Items

A person's material standard of living is generally assumed to determine his or her well-being. The standard of living is usually measured using current expenditure or income, and a cut-off line is selected below which people are considered poor. The human development perspective focuses on many different ways in which consumption of goods and services affects people's lives. Household expenditures on various items are shown in Table 6.2.22.

Table 6.2.22 demonstrates that, in the rural area, the average monthly household expenditures for food, clothing, housing, health, education, and miscellaneous purposes are Tk.4998.00, Tk.331.73, Tk.541.62, Tk.323.83, Tk.769.17 and 427.17 respectively.

While, in the urban area, the average monthly household expenditures for food, clothing, housing, health, education, and miscellaneous purposes are Tk.8105.67, Tk.675.17, Tk.3091.13, Tk.710.17, Tk.2470.50, and Tk. 657.80 respectively. The average expenditures of urban households on various items such as food, clothing, housing, health care, education, and miscellaneous items are much higher than the rural households.

Table 6.2.22: Monthly Household Consumption Expenditure on Various Items

Variables	Rural Area				Urban Area			
	Min.	Max.	Mean	S.D	Min	Max.	Mean	S.D
Food (Tk.)	500.00	15000.00	4998.00	1888.88	1200.00	16000.00	8105.67	2564.08
Clothing (Tk.)	50.00	2000.00	331.73	236.55	100.00	5000.00	675.17	593.39
Housing (Tk.)	50.00	7500.00	541.62	968.40	50.00	20000.00	3091.13	3230.05
Health (Tk.)	50.00	1500	323.83	193.76	50.00	4000.00	710.17	482.04
Education (Tk.)	0.00	7000.00	769.17	1166.21	0.00	25000.00	2470.50	3376.73
Miscellaneous (Tk.)	50.00	3000.00	427.17	375.35	50.00	10000.00	657.80	688.78

Source: Household Survey, 2013, Note: N=300 for rural and N=300 for urban areas

6.2.24 Monthly Household Spending on Food and Level of Education

Food is an important material in the body and its consumption is necessary for survival. It supplies the body with all the vital nutrients and energy it requires to keep running, allowing an individual to grow and thrive. Food gives us energy and it provides material for tissue building, growth and body repair. It protects the body against diseases. It is essential for growth.

Table 6.23 : Household Expenditure on Food and Level of Education of Respondents

Level of Education	Rural Area					Urban Area				
	Below 3000	3001-5000	5001-10000	10001 and above	Total	Below 3000	3001-5000	5001-10000	10001 and above	Total
Illiterate	28 (9.3%)	96 (32.0%)	8 (2.7%)	..	132 (44.0%)	3 (1.0%)	23 (7.7%)	52 (17.3%)	2 (0.7%)	80 (26.7%)
Primary	5 (1.7%)	57 (19.0%)	18 (6.0%)	..	80 (26.7%)	1 (0.3%)	10 (3.3%)	38 (12.7%)	1 (0.3%)	50 (16.7%)
Secondary	..	28 (9.3%)	25 (8.3%)	..	53 (17.6%)	..	..	50 (16.7%)	15 (5.0%)	65 (21.7%)
Higher Secondary	..	4 (1.3%)	9 (3.0%)	1 (0.3%)	14 (4.7%)	..	1 (0.3%)	35 (11.7%)	9 (3.0%)	45 (15.0%)
Higher	..	..	18 (6.0%)	3 (1.0%)	21 (7.0%)	..	..	36 (12.0%)	24 (8.0%)	60 (20.0%)
Total	33 (11.0%)	185 (61.7%)	78 (26.0%)	4 (1.3%)	300 (100%)	4 (1.3%)	34 (11.3%)	211 (70.3%)	51 (17.0%)	300 (100%)

Source: Household Survey, 2013, Figures in parenthesis represents the percentages

Table 6.2.23 signifies that out of 300 respondents, 9.3 percent having no education and 1.7 percent with primary education spend Tk.3000 or below on food. About 32.0 percent of the respondents with no education spend on food ranging between Tk.3001-Tk.5000, followed by 19.0 percent having primary education, 9.3 percent with secondary and 1.3 percent having higher secondary education. About 3.0 percent of the respondents with no education, 6.0 percent with primary, 8.3 percent with secondary, 3.0 percent with higher secondary and 6.0 percent with higher education spend on food ranging between Tk.5001-Tk.10,000. On the other hand, only 0.3 percent respondents having higher secondary and 1.0 percent with higher education spend Tk.10001 or above for food in rural area. Table 6.2.23 poses that 1.0 percent of the respondents having no education and 0.3 percent with primary education spend Tk.3000 or below on food in urban area. The food consumption expenditure of 7.7 percent respondents with no education, 3.3 percent having primary and 0.3 percent with higher secondary education ranges between Tk.3001-Tk.5000. While over 17.0 percent respondents having no

education, close to 13.0 percent with primary, almost 17.0 percent with secondary, 11.7 percent having higher secondary and 12.0 percent with higher education allocate Tk.5001-Tk.10000 on food. On the contrary, the consumption expenditure on food of 0.7 percent respondents with no education, 0.3 percent with primary level, 5.0 percent having secondary, 3.0 percent with higher secondary and 8.0 percent higher educated respondents allocate their household budget of Tk.10001 or more on food. Table 6.2.23 also shows that the higher levels of educated respondents allocate more (but not proportionately to their income) on food than lower ones both the rural and urban areas. Higher level of education leads individual to more income that makes them capable to spend more on food in both the areas.

6.2.24 Monthly Household Expenditure on Clothing and Level of Education

Human being starts wearing clothes for protection. Clothing protects human body against extreme weather conditions such as strong sunlight, extreme heat or cold and protection against insects, noxious chemical weapons contact with abrasive substances- in sum against anything that might injure an unprotected human body. Monthly household spending on clothing and levels of education of the respondents are depicted in Table 6.2.24.

Table 6.2.24 demonstrates that, in rural area, 30.3 percent of the respondents with no education, 8.0 percent with primary, 3.0 with secondary education spend Tk.200 or less for clothing. About 14.0 percent of the respondents having no education, 18.3 percent with primary, 14.0 percent having secondary and 3.7 percent with higher secondary and 2.0 percent with higher education spend ranging between Tk.201-Tk.500 for clothing. No respondents with higher secondary and higher education spend Tk. 200 or less. Only 0.3 percent of the respondents having primary, 0.7 percent with secondary, 1.0

percent with higher secondary and 3.0 percent having higher education spend ranging between Tk.501-Tk.1000 for clothing. Only 2.0 percent of the respondents with higher education spend Tk.1001 or more. No respondents having no education, primary, secondary and higher secondary fall in this category.

Table 6.2.24: Monthly Household Expenditure on Clothing and Level of Education of the Respondents

Level of Education	Expenditure on Clothing in Rural Area					Expenditure on Clothing in Urban Area				
	Below -200	201-500	501-1000	1001-above	Total	Below -200	201-500	501-1000	1001-above	Total
Illiterate	91 (30.3%)	41 (13.7%)	..	..	132 (44.0%)	21 (7.0%)	57 (19.0%)	2 (0.7%)	..	80 (26.7%)
Primary	24 (8.0%)	55 (18.3%)	1 (0.3%)	..	80 (26.7%)	5 (1.7%)	42 (14.0%)	3 (1.0%)	..	50 (16.7%)
Secondary	9 (3.0%)	42 (14.0%)	2 (0.7%)	..	53 (17.7%)	..	36 (12.0%)	26 (8.7%)	3 (1.0%)	65 (21.7%)
Higher Secondary	..	11 (3.7%)	3 (1.0%)	..	14 (4.7%)	..	19 (6.3%)	20 (6.7%)	6 (2.0%)	45 (15.0%)
Higher	..	6 (2.0%)	9 (3.0%)	6 (2.0%)	21 (7.0%)	..	3 (1.0%)	19 (6.3%)	38 (12.7%)	60 (20.0%)
Total	124 (41.3%)	155 (51.7%)	15 (5.0%)	6 (2.0%)	300 (100%)	26 (8.7%)	157 (52.3%)	70 (23.3%)	47 (15.7%)	300 (100%)

Source: Household Survey 2013, Note: Figures in parenthesis represent the percentages

Table 6.2.24 illustrates that in the urban area, 7.0 percent of the respondents having no education and 1.7 percent with primary education spend Tk.200 or less for clothing. Out of the total respondents, 19.0 percent having no education, 14.0 percent with primary, 12.0 percent with secondary, 6.3 percent with higher secondary and only 1.0 percent with higher education allocate their budget ranging between Tk.201-Tk.500 for clothes per month. Among the respondents, 0.7 percent with no education, 1.0 percent having primary, 8.7 percent with secondary, 6.7 percent with higher secondary and 6.3 percent with higher education spend ranging between Tk.501-Tk.1000 for clothes. On the other hand, 1.0 percent of the respondents having secondary education, 2.0 percent with higher secondary and 12.7 percent with higher education spend Tk.1001 or above

for clothing. Higher levels of education leads individual to more earning that results more spending on clothes in both areas.

6.2.25 Monthly Household Expenditure on Education and Level of Education

Education is considered as a basic ingredient for human development. The most important asset of a country is its people, and to progress it must invest in their health and education. It increases access to income and employment opportunities. Education is generally considered to be a social service and expenditure on it is regarded primarily to be social welfare measure. Monthly household expenditure on education and level of education of the respondents are depicted in Table 6.2.25.

Table 6.2.25: Monthly Household Expenditure on Education and Level of Education

Level of Education	Rural Area					Urban Area				
	500 or below	501-1000	1001-5000	5001-above	Total	500 or below	501-1000	1001-5000	5001-above	Total
Illiterate	120 (40.0%)	9 (3.0%)	3 (1.0%)	..	132 (44.0%)	39 (13.0%)	24 (8.0%)	17 (5.7%)	..	80 (26.7%)
Primary	55 (18.3%)	15 (5.0%)	10 (3.3%)	..	80 (26.3%)	24 (8.0%)	11 (3.7%)	15 (5.0%)	..	50 (16.7%)
Secondary	28 (9.3%)	11 (3.7%)	14 (4.7%)	..	53 (17.7%)	15 (5.0%)	8 (2.7%)	36 (12.0%)	6 (2.0%)	65 (21.7%)
Higher Secondary	6 (2.0%)	2 (0.7%)	6 (2.0%)	..	14 (4.7%)	10 (3.3%)	8 (2.7%)	21 (7.0%)	6 (2.0%)	45 (15.0%)
Higher	1 (0.3%)	6 (2.0%)	13 (4.3%)	1 (0.3%)	21 (7.0%)	7 (2.3%)	3 (1.0%)	27 (9.0%)	23 (7.7%)	60 (20.0%)
Total	210 (70.0%)	143 (14.3%)	46 (15.3%)	1 (0.3%)	300 (100%)	95 (31.7%)	54 (18.0%)	116 (38.7%)	35 (11.7%)	300 (100%)

Source: Household Survey 2013, Figures in parenthesis represent the percentages

Table 6.2.25 displays that 40.0 percent of the respondents having no education, above 18.0 percent with primary, 9.3 percent with secondary, 2.0 percent with higher secondary and only 0.3 percent with higher level of education spend Tk.500 or less per month on education. On the other hand, education expenditure of 3.0 percent of the respondents with no education spends ranging between Tk.501-Tk.1000, followed by 5.0 percent with elementary education, 3.7 percent with secondary, 0.7 percent having

higher secondary and 2.0 percent with higher education. While the education spending of 1.0 percent of the respondents with no education, 3.3 percent having primary, 4.7 percent with secondary, 2.0 percent with higher secondary and 4.3 percent with higher education ranges between Tk.1001-Tk.5000. On the contrary, only 0.3 percent highly educated respondents spends Tk.5001 or more on education in rural area.

Table 6.2.25 exhibits that in the urban area, 13.0 percent of the respondents having no education, 8.0 percent with primary, 5.0 percent with secondary and only 3.3 percent with higher secondary and 2.3 percent with higher level of education spend Tk.500 or below per month for education. While the education spending of 8.0 percent respondents with no education, 3.7 percent having primary, 2.7 percent with secondary and 2.7 percent with higher secondary and only 1.0 percent with higher education ranges between Tk.501-Tk.1000. On the other hand, out of 300 respondents, 5.7 percent having no education, 5.0 percent with primary education, 12.0 percent with secondary, 7.0 percent having higher secondary and 9.0 percent with higher education allocates Tk.1001-Tk.5000 on education. But only 2.0 percent with secondary, 2.0 percent having higher secondary and almost 8.0 percent highly educated respondents spend Tk.5001 or more on education. The education spending of urban population is much higher than their rural counterparts. From Table 6.2.26, it is clear that increased levels of education are associated with increased level of household expenditure on education in both the areas. Higher levels of education and household expenditure often go together.

6.2.26 Monthly Household Expenditure on Health and Level of Education

Health is now universally recognized as an important component of human resource development. Development of human resources depends on an improved health care

system. Monthly household expenditure on health and level of education of the respondents are exhibited in Table 6.2.26.

Table 6.2.26: Monthly Household Expenditure on Health and Level of Education

Level of Education	Rural Area					Urban Area				
	Below 200	201-500	501-1000	1001-above	Total	Below -200	201-500	501-1000	1001-above	Total
Illiterate	77 (25.7%)	54 (18.0%)	1 (0.3%)	..	132 (44.0%)	9 (3.0%)	61 (20.3%)	9 (3.0%)	1 (0.3%)	80 (26.7%)
Primary	10 (3.3%)	69 (23.0%)	1 (0.3%)	..	80 (26.7%)	1 (0.3%)	42 (14.0%)	7 (2.3%)	..	50 (16.7%)
Secondary	14 (4.7%)	35 (11.7%)	4 (1.3%)	..	53 (17.7%)	1 (0.3%)	13 (4.3%)	43 (14.3%)	8 (2.7%)	65 (21.7%)
Higher Secondary	1 (0.3%)	10 (3.3%)	3 (1.0%)	..	14 (4.7%)	..	8 (2.7%)	33 (11.0%)	4 (1.3%)	45 (15.0%)
Higher	..	10 (3.3%)	8 (2.7%)	3 (1.0%)	21 (7.0%)	..	2 (0.7%)	21 (7.0%)	37 (12.3%)	60 (20.0%)
Total	102 (34.0%)	178 (59.3%)	17 (5.7%)	3 (1.0%)	300 (100%)	11 (3.7%)	126 (42.0%)	113 (37.7%)	50 (16.7%)	300 (100%)

Source: Household Survey 2013, Figures in parenthesis represent the percentages

Table 6.2.26 shows that, in the rural area, 25.7 percent of the respondents having no education, 3.3 percent with primary, 4.7 percent with secondary and only 0.3 percent having higher secondary education spend Tk.200 or less for health purpose. On the other hand, 18.0 percent respondents with no education, 23.0 percent with primary, 11.7 percent having secondary, 3.3 percent with higher secondary and 3.3 percent with higher level of education allocates Tk.201-Tk.500 on health. While the health spending of 0.3 percent respondents with no education, 0.3 percent having primary, 1.3 percent with secondary, 1.0 percent with higher secondary and 2.7 percent with higher education ranges between Tk.501-Tk.1000. About 1.0 percent highly educated respondents spends Tk. 1001 or more on health care services in rural area. Table 6.2.26 illustrates that, in the urban area, 3.0 percent of the respondents having no education, 0.3 percent with primary and 0.3 percent respondents with secondary education spend Tk.200 or below for health services. While the health expenditure of 20.3 percent respondents with no education range between Tk.201-500, followed by 14.0 percent

respondents with primary, 4.3 percent having secondary, 2.7 percent with higher secondary and only 0.7 percent with higher education. On the other hand, 3.0 percent respondents with no education, 2.3 percent having primary, 14.3 percent with secondary, 11.0 percent with higher secondary and 7.0 percent with higher education allocate their budget ranging between Tk.501-Tk.1000 on health care services. Merely 0.3 percent individual having no education, 2.7 percent with secondary education, 1.3 percent with higher secondary and 12.3 percent higher educated respondents spends Tk. 1001 or above on health services in urban area. The household expenditure increases on health care services with the increase in education level both in rural and urban areas and the urban people spend more on their health care services than the rural ones.

6.2.28 Monthly Household Expenditure on Miscellaneous and Level of Education

Miscellaneous expenditure is of the category of the recurring and non-recurring spending, such as, maintenance cost of furniture, carpets, matting, stationary, postal charges, entertainment, cost of additional food items, laundry, service charge of shaving and hair cutting, cell phone cost, maintenance and repairing cost of building and equipments. Monthly household expenditure on miscellaneous purposes and level of education of the respondents are demonstrated in Table 6.2.27.

Table 6.2.27 shows that, in rural area, miscellaneous cost of 40.0 percent of the respondents having no education, 23.0 percent of the respondents having primary and only 14.0 percent having secondary, 2.3 percent with higher secondary education is Tk.500 or less. No highly educated respondents fall in this category. Among the respondents, 3.0 percent with no education, 3.7 percent having primary, 3.0 percent with secondary, 2.0 percent having higher secondary and 3.7 percent with higher education spend ranging between Tk.501-Tk.1000 for miscellaneous purposes.

Table 6.2.27: Monthly Household Expenditure on Miscellaneous Purposes and Level of Education

Level of Education	Rural Area					Urban Area				
	500-below	501-1000	1001-5000	5001-above	Total	500-below	501-1000	1001-5000	5001-above	Total
Illiterate	120 (40.0%)	9 (3.0%)	3 (1.0%)	..	132 (44.0%)	37 (12.3%)	35 (11.7%)	7 (2.3%)	1 (0.3%)	80 (26.7%)
Primary	69 (23.0%)	11 (3.7%)	..	..	80 (26.3%)	15 (5.0%)	30 (10.0%)	5 (1.7%)	..	50 (16.7%)
Secondary	42 (14.0%)	9 (3.0%)	2 (0.7%)	..	53 (17.7%)	3 (1.0%)	21 (7.0%)	27 (9.0%)	14 (4.7%)	65 (21.7%)
Higher Secondary	7 (2.3%)	6 (2.0%)	1 (0.3%)	..	14 (4.7%)	1 (0.3%)	13 (4.3%)	27 (9.0%)	4 (1.3%)	45 (15.0%)
Higher	..	11 (3.7%)	8 (2.7%)	2 (0.7%)	21 (7.0%)	..	3 (1.0%)	20 (6.7%)	37 (12.3%)	60 (20.0%)
Total	247 (82.3%)	40 (13.3%)	11 (3.7%)	2 (0.7%)	300 (100%)	56 (18.7%)	102 (34.0%)	86 (28.7%)	56 (18.7%)	300 (100%)

Source: Household Survey 2013, Note: Figures in parenthesis represent the percentages

About 1.0 percent having no education, 0.7 percent having secondary, 0.3 with higher secondary and 2.7 percent with higher educated respondents spends Tk.1001-Tk.2000 for miscellaneous purposes. On the other hand, 0.7 percent respondents with higher education spends Tk.2001 or above for miscellaneous purposes. In urban area, miscellaneous cost of 12.3 percent of the respondents having no education, 5.0 percent having primary, 0.1 percent having secondary and only 0.3 percent with higher secondary education is Tk.500 or less. Almost 12.0 percent of the respondents with no education, 10.0 percent respondents having primary, 7.0 percent with secondary, above 4.0 percent having higher secondary and merely 1.0 percent with higher education spend ranging between Tk.501-Tk.1000 for miscellaneous purposes. Over 2.0 percent respondents with no education, 1.7 percent with primary, 9.0 percent having secondary, 9.0 percent having higher secondary, 6.7 percent with higher educated respondents spends Tk.1001-Tk.5000 for miscellaneous purposes. While 12.3 percent respondents with higher education spends Tk.5001 or more for their miscellaneous purposes, followed by 4.7 percent respondents having secondary, 1.0 percent with higher secondary and 0.3 percent with no education.

6.2.29 Conclusion

The aim of this chapter is to describe survey method and interpret survey results. This study makes a comparison between rural and urban areas in terms socioeconomic and human resource development indicators in Northern part of Bangladesh. The study is basically primary data base research; a household survey is conducted to collect data. In order to know the socioeconomic condition of the respondents, we present data and information using tables and graphs. In this study, multistage stratified random sampling technique is used in the selection of the units. The study is planned to cover 600 households. Out of the 600 households, 300 are selected from rural areas and the rest 300 are taken from urban areas. Secondary information are collected from various books, research works, journals, publications of different government and non-government organizations of Bangladesh and various international organizations, such as, UNDP, World Bank, UNICEF.

Survey results show that most of the socioeconomic indicators in urban area are much higher than those of rural ones. On an average, people with more education earn more than people with less education, and urban residents receive significantly higher earnings than individuals living in the rural area. Progress in access to safe water has also been impressive both in rural and urban areas. About 100 percent people have access to safe water both in the rural and urban areas and hygiene and sanitation practice are not satisfactory particularly in the rural areas. More educated individuals have access to better sanitation compared to people with less education and urban people practice sanitation more than their rural counterparts. There are inverse relationship between mother's education and child mortality rate. As mother's education increases, child mortality rate decreases in both the rural and urban areas and rate of child mortality is high in rural area compared to urban. The average household expenditures on various items, such as, food, clothing, health, education, etc increase with the increase levels of education both in rural and urban areas but the average household expenditures on various items in urban area are higher than similar expenditures in rural area.

Chapter 7

Empirical Methodology

7.1 Introduction

The objective of the study is to make a comparison between rural and urban areas in terms of human resource development indicators of northern region of Bangladesh. To estimate the human development index (HDI) in both rural and urban areas we use human development index (HDI) model of UNDP. The HDI is a summary measure of human development. It measures the average achievements in a country in three basic dimensions of human development-a long and healthy life, knowledge and a decent standard of living (UNDP, 2006). In order to assess the basic indicators of human resource development, such as, life expectancy and sanitation we use simple and logistic regression models. This study also estimates the rate of returns to schooling using Mincer model how schooling influences the earnings of individuals in both the rural and urban areas. In doing so, the study uses simple regression model, logistic regression model and Mincerian models. The econometrical formations of these models are depicted below.

This chapter is organized as follows: section 7.2 deals with estimate procedures of HDI; section 7.3 encompasses theoretical and econometric aspect of Mincer model; 7.4 discusses on logistic regression model and conclusion is given in section 7.5.

7.2 Model Specification of HDI

7.2.1 Background of HDI

The HDI is a composite of three basic components of human development: longevity, knowledge and standard of living. Longevity is measured by life expectancy. Knowledge is measured by a combination of adult literacy (two-thirds weight) and

combined primary, secondary and tertiary enrolment ratios (one-third weight). Standard of living is measured by purchasing power, based on real GDP per capita adjusted for the local cost of living (purchasing power parity, or PPP) (UNDP, 1994).

7.2.2 Component and Indicators of HDI

The HDI constructs as a measure of human development, consists of these three components: longevity, knowledge and decent standard of living (UNDP, 1993). Longevity and knowledge refer to the capital formation of human capabilities, and income is a proxy measure of the use of the acquired capabilities.

- (i) **Longevity:** Longevity is a component, and life expectancy at birth is the indicators of it. Longevity is measured by life expectancy. The importance of life expectancy lies in the common belief that a long and healthy life is valuable itself and the fact that various indirect benefits such as adequate nutrition, good health, sanitation and safe drinking water are closely associated with higher life expectancy.
- (ii) **Knowledge:** The knowledge component selects adult literacy rate or knowledge is measured by a combination of adult literacy (two-thirds weight) and combined primary, secondary and tertiary enrolment ratios (one-third weight) as indicators. In general, to select indicators of education, the output of higher level of education has given utmost emphasis but on the basis of basic human development adult literacy with gross enrolment ratio of primary, secondary and tertiary education should be emphasized because these are the first step in learning and knowledge- building of an individual. Adult literacy rate is the percentage of individuals aged 15 years and over who can with understanding both read and write a short simple statement on everyday life. The gross enrolment ratio is the number enrolled in a level of education,

whether or not they belong in the relevant age group (6⁺ but below 7) for that level. It is expressed as a percentage of the population in the relevant age group for that level.

- (i) **Income:** The control over resources which is needed for a decent standard of living is difficult to measure due to mainly of inadequacy of data. Per capita income is used to measure it. But per capita income data in nominal price is not very useful for international comparisons as the existence of non-tradable goods and services and the distortions from exchange rate anomalies, tariffs and taxes. To overcome these problems, purchasing power parity (PPP) adjusted GDP estimates is used. The United Nations International Comparison Project (ICP), using PPP, has developed measures of real GDP on an internationally comparable scale. By eliminating differences in national price levels, the method aids comparison of real values for income, poverty, inequality and expenditure patterns. At the PPP US\$ rate, PPP US\$ 1 has the same purchasing power in the domestic economy as \$1 has in the United States.

The formula for estimation of dimension index is as follows:

$$\text{Dimension index for longevity and knowledge} = \frac{\text{Actual value} - \text{minimum value}}{\text{Maximum value} - \text{minimum value}} \quad (7.1)$$

All the indicators of human development suffer from a common failing: they are averages that conceal wide disparities in the overall population. Income is distributed unevenly and average per capita income often conceals widespread human deprivation. The inequality in respect of life expectancy and literacy is much more limited as a person can be literate only one in life and human life is infinite. For time being, only for income variable the inequality is adjusted by using logarithm of real GDP per capita.

$$\text{Dimension index for income variable} = \frac{\text{Log } y - \text{Log } y_{\min}}{\text{Log } y_{\max} - \text{Log } y_{\min}} \quad (7.2)$$

For education index, at first the adult literacy index and gross enrollment ratio index are being estimated with the help of the above mentioned dimension index; model 3.2. Then this two indices are combined in education index with two-thirds weight of adult literacy index and one-third weight of combined enrollment ratio.

Finally, the HDI is then calculated as a simple average of the dimension indices of life expectancy index, education index and income index. In terms of a model the estimation procedure of HDI can be expressed as follows

$$\text{HDI} = 1/3(\text{Life Expectancy Index} + \text{Education Index} + \text{Income Index}) \quad (7.3)$$

7.2.3 Estimation Procedures

HDI measures the average achievements in a country in three basic dimensions of human development- longevity, knowledge and decent standard of living. To estimate HDI at first an index for each of the three dimensions is to be estimated. There are two types of models to estimate the dimension indices. One is for knowledge and longevity variables and other is for income variable. To calculate the dimension index, maximum and minimum values (goal posts) are chosen as follows:

Table 7.1: Fixed Maximum and Minimum Values for Three Indicators of HDI

Indicator	Minimum value	Maximum value
Life expectancy at birth (years)	25	85
Adult literacy rate (%)	0	100
Combined gross enrolment ratio (%)	0	100
Income (real GDP per capita (PPP \$))	100	40,000

Source: UNDP, 1994.

Calculation of the traditional HDI undergoes a number of changes since its inception in 1990. In particular, in the past a relatively complicated formula is used to convert PPP income into “adjusted” income (meaning income adjusted for diminishing marginal

utility so that well-being increases with income but at a decreasing rate). More recently, adjusted income is found by simply taking the log of current income. Then, to find the income index, one subtracts the log of 100 from the log of current income, on the assumption that real per capita income can not possibly be less than \$100 PPP. The difference gives the amount by which the country has exceeded this “lower goalpost.” To put this achievement in perspective, consider it in relation to the maximum that a developing country might reasonably aspire to over the coming generation. The UNDP takes this at \$40,000 PPP. So we then divide by the difference between the log of \$40,000 and the log of \$100 to find the country’s or region’s relative income achievement. This gives each country or a region an index number that ranges between 0 and 1 (Todaro and Smith, 2010).

For example, in our cases, in 2013, the per capita income of the whole study area (Northern region of Bangladesh) is \$ 1445 PPP, the income index is calculated as follows:

$$\text{Income index} = \frac{\text{Log}\{\text{real per capita income(PPP)}\} - \text{Log}(100)}{[\text{Log}(40000) - \text{Log}(100)]} \quad (7.4)$$

$$\text{Income index in the whole study area} = \frac{[\text{Log}(1445) - \text{Log}(100)]}{[\text{Log}(40000) - \text{Log}(100)]} = 0.446$$

In 2013, the per capita income in rural area is PPP\$ 1090.

$$\text{So, income index in rural area} = \frac{\log(1090) - \log(100)}{\log(40000) - \log(100)} = 0.400$$

per capita income in urban area is \$ 2350 PPP.

$$\text{Income index in urban area} = \frac{\log(2350) - \log(100)}{\log(40000) - \log(100)} = 0.527$$

Note that a few countries have already exceeded the \$40,000 PPP income target; in such cases, the UNDP assigns the maximum value of \$40,000 PPP income, and so the country gets the maximum income index of 1.

$$\text{Life expectancy index} = \frac{\text{Actual life expectancy} - \text{minimum life expectancy (25)}}{\text{Maximum life expectancy(85)} - \text{minimum life expectancy(25)}} \quad (7.5)$$

The life expectancy index measures the relative achievement of a country or an area in life expectancy at birth. To find the life expectancy (health proxy) index, the UNDP starts with a country's life expectancy at birth and subtracts 25 years. The latter is the lower goal post; the lowest that life expectancy could have been in any country over the last generation. Then the UNDP divides the result by 85 years minus 25 years or 60 years, which represents the range of life expectancies expected over the previous and next generations. That is, it is anticipated that 85 years is a maximum reasonable life expectancy for a country to try to achieve over the coming generation. For the case of life expectancy in rural area of northern region of Bangladesh, whose population life expectancy in 2013 is 65.50 years, the life expectancy index is calculated as follows:

With a life expectancy of 66.50 years in rural area of northern in Bangladesh in 2013, the life expectancy is index 0.691.

$$\text{The life expectancy index in rural area} = \frac{66.50 - 25}{85 - 25} = \frac{41.50}{60} = 0.691$$

With a life expectancy of 69.00 years in urban area of northern in Bangladesh in 2013, the life expectancy is index 0.791.

$$\text{The life expectancy index in urban area} = \frac{69.00 - 25}{85 - 25} = \frac{44.00}{60} = 0.733$$

With a life expectancy of 68.00 years in the study area of northern region in Bangladesh in 2013, the life expectancy is index 0.716.

$$\text{The life expectancy index in study area} = \frac{68.00 - 25}{85 - 25} = \frac{43.00}{60} = 0.716$$

$$\text{Adult literacy index} = \frac{\text{Actual adult literacy rate} - \text{minimum adult literacy rate}(0)}{\text{Maximum adult literacy rate}(100) - \text{minimum adult literacy rate}(0)}$$

$$\text{Gross enrollment index} = \frac{\text{Actual combined school enrollment rate} - \text{minimum combined school enrollment rate value}(0)}{\text{Maximum combined school enrollment rate}(100) - \text{minimum combined school enrollment rate}(0)}$$

$$\text{Education index} = \frac{2}{3}(\text{adult literacy index}) + \frac{1}{3}(\text{gross enrolment index}) \quad (7.6)$$

The education index measures a country's relative achievement in both adult literacy and combined primary, secondary and tertiary gross enrolment. First, an index for adult

literacy and one for combined gross enrolment are calculated. Then these two indices are combined to create the education index with two-thirds weight given to adult literacy and one-third weight to combined enrolment. It is mentionable that the education index is made up of two parts, with two-thirds weight on literacy and one-third weight on school enrolment. Because gross school enrolments can exceed 100 percent (because the older students going back to the school), this index is also capped at 100 percent. For the case in rural area of northern region of Bangladesh, with an adult literacy rate of 50 percent in 2013 and a combined gross enrolment ratio of 45 percent in 2014, the education index is 0.486.

$$\text{Adult literacy index in rural area} = \frac{50.0-0}{100-0} = 0.50$$

For the gross enrolment index, rural area estimates that 45 percent of its primary, secondary and tertiary age population are enrolled in school, so the rural area of northern region of Bangladesh receive the following value:

$$\text{Gross enrolment index in rural area} = \frac{45-0}{100-0} = 0.45$$

Then, to get the overall index, the adult literacy index is multiplied by two-thirds and the gross enrolment index is multiplied by one-third. This choice reflects the view that literacy is the fundamental characteristic of an educated person. In case of rural area of northern region of Bangladesh, this gives us:

$$\text{Education index in rural area} = \frac{2}{3} \times 0.50 + \frac{1}{3} \times 0.45 = 0.33 + 0.15 = 0.48$$

For the urban area, with an adult literacy rate of 70 percent in 2014 and a combined gross enrolment ratio of 51 percent in 2014, so

$$\text{Adult literacy index in urban area} = \frac{70.0-0}{100-0} = 0.70$$

$$\text{Gross enrolment index in urban area} = \frac{51-0}{100-0} = 0.51$$

In the above mentioned way, education index in urban area

$$\text{Education index in urban area} = \frac{2}{3}(\text{adult literacy index}) + \frac{1}{3}(\text{gross enrolment index})$$

$$\frac{2}{3} \times 0.70 + \frac{1}{3} \times 0.51 = 0.47 + 0.17 = 0.64$$

For the whole study area, the adult literacy rate and a combined gross enrolment ratio are respectively 57 percent 48 percent in 2013.

$$\text{Adult literacy index in the whole study area} = \frac{57.0-0}{100-0} = 0.57$$

$$\text{Gross enrolment index in the whole study area} = \frac{48-0}{100-0} = 0.48$$

$$\text{Education index in the study area} = \frac{2}{3}(\text{adult literacy index}) + \frac{1}{3}(\text{gross enrolment index})$$

$$= \frac{2}{3} \times 0.57 + \frac{1}{3} \times 0.48 = 0.34 + 0.16 = 0.50$$

$$\text{HDI} = 1/3(\text{Life Expectancy Index} + \text{Education Index} + \text{Income Index}) \quad (7.8)$$

$$\text{HDI in the rural area} = 1/3 (0.691 + 0.480 + 0.400) = 0.524$$

$$\text{HDI in the urban area} = 1/3 (0.733 + 0.640 + 0.527) = 0.633$$

$$\text{HDI in the whole study area} = 1/3(0.716 + 0.500 + 0.446) = 0.554$$

7.3 Specification of Basic Mincer and Mincerian Model

There is a thorough literature covering the link between education and earnings that goes back at least to Friedman and Kuznets (1954). Since Mincer (1974), the dominant approach to measure the benefit from education has been to use ordinary least squares (OLS) regression based on the Mincerian equation (Card 1999 and 2001). Covering different theoretical aspects Chiswick (2003) has documented the development of Mincer's human capital earnings function and its long time impacts on the empirical literature. Following the theoretical foundation, it is evident that years of schooling is a key explanatory variable in wage or earning function. On the basis of both theoretical and empirical arguments, Mincer models the natural logarithm of earnings as a function of years of schooling and years of potential labor market experience (Lemieux, 2003). The study begins with the basic linear human capital earnings function of Mincer:

7.3.1 The basic Mincer Model

$$\ln Y_i = \alpha + \beta S_i + \gamma X_i + \varepsilon_i \quad (7.5)$$

Where Ln = natural logarithm, Y = earnings, α = constant term, S = schooling, X = experience, β implies the marginal rate of return to schooling, ε = error term. We apply the same specification of Mincer model for both the rural and urban areas.

7.3.2 The Standard form of the Mincer Model

We also use the most widely used version of human capital model developed by Mincer (1974) where natural logarithm of monthly earnings are the linear function of years of schooling, experience and experience square. The now standard method to estimate private returns per month of schooling is to estimate log earnings equations of the form:

$$LnY_i = \alpha + \beta S_i + \gamma X_i + \delta X_i^2 + \varepsilon_i \quad (7.6)$$

Where LnY_i is the natural log of monthly earnings for the i th individual; S_i is years of schooling (as a continuous variable); X_i is labor market experience (schooling variable used as level of schooling and individual's age is used as proxy for experience.); X_i^2 is potential experience-squared; γ and δ are their coefficients respectively (a positive value of γ and negative value of δ reflects the concavity of the earning function with respect to experience) and ε_i is a random disturbance term reflecting unobserved abilities or ε_i is a random disturbance term which is assumed to satisfy the usual properties of mean zero and constant variance. The coefficient on years of schooling (β) represents the average private rate of return to one additional year of schooling, regardless of the level of education.

7.3.3 Expanded Version of Mincerian Model with Schooling Square

Most existing literatures directly follow Mincer earning function to study the economic returns to education. Years of schooling are a proxy for investment in human capital the only measure of education on entering the regression analysis. Thus, by employing Mincer earning function, previous studies simply assume the marginal returns to additional year of schooling is constant and ignore the possibility that returns to

schooling can vary at different level of education. A problem may arise in standard Mincer earning model as it assumes the average returns to schooling is constant and measure of education is assumed to be linear with the earning variable; This neglects the possibility that contributions of various education levels to earning can be different. Thus, this study adopts a modified version of Mincer earning model as follows:

$$\ln Y_i = \alpha + \beta S_i + \gamma S_i^2 + \delta X_i + \lambda X_i^2 + \varepsilon_i \quad (7.7)$$

where years of schooling S_i and work experience X_i appear in both linear and quadratic terms and α , β , γ , and λ respectively are their coefficients.

As we mention earlier that Mincer's (1974) proposed model takes natural log of wages as a function of linear term for schooling and linear and quadratic terms for experience. The typical Mincerian earnings function uses a limited number of variables—earnings, schooling, and experience. Most of the studies use number of years of completed schooling as indicator for educational attainment (Lorenz & Wagner, 1990). But in the literature, we find many studies that use schooling in the form of levels of education, i.e., they introduce dummy variables representing different educational levels (such as Tansel, 1994; Hawley, 2004; Falaris, 2004; Albrecht et al., 2003). The Mincerian equation is a flexible specification. Years of schooling can be replaced with other variables to represent the levels of schooling (e.g., specific types of degree programs). These become “dummy variables” (variables with two values: 0 and 1) for each level of schooling. Since levels of schooling are sequential, that is, we must complete primary to enter secondary and secondary to enter tertiary—the returns to schooling for each level also incorporate the benefit of previous levels of schooling. This type of conversion is justifiable as Jarousse and Mingat (1986) concludes that non-certified years are not rewarded in the labor market, so certified years can be taken from the level of schooling attained. Besides, some researchers add many other variables including sector of

employment, region, and so on. Now it is common to include social, demographic, and regional wage affecting factors in the set of explanatory variables of the Mincerian semi-log specification. We also specify the extended Mincerian model, which uses dummies of different levels of education in place of years of education and sector of employment as:

$$\ln Y_i = \alpha + \beta S_i + \gamma X_i + \delta X_i^2 + \lambda Z_i + \rho W_i + \varepsilon_i \quad (7.8)$$

where $\ln Y$ is the natural logarithm of the monthly earnings of individual i , α is the constant term, S_i is the vector of schooling dummies of individual i , β is the vector of unknown parameters to be estimated, and X_i and X_i^2 are labor market experience and square of labor experience of individual i respectively and γ and δ are their coefficients, Z_i is the vector of other control variables (including occupation such as agriculture, business and job), λ is the coefficients of Z_i , W_i is wealth of individual i , ρ is coefficient and ε_i is the error term.

The earnings model can be used to estimate returns at different schooling levels by converting the continuous years of schooling variable (S) into a series of dummy variables, say D_p , D_s , D_{hs} and D_t (where D_p is dummy for primary, D_s is dummy for secondary, D_{hs} is dummy for higher secondary and D_t is dummy for tertiary or higher education) to denote the fact that a person has achieved that level of schooling. The omitted level is people with no schooling and that dummy is not in the equation to avoid matrix singularity. With respect to occupation, dummy variables are included corresponding to four occupational groups-agricultural workers (such as peasant, fisherman), professionals (paid/salaried job), self-employed businessmen, laborers/service workers. Occupation has four categories -agriculture, business, paid job and others (such as, day labor and service workers), the three dummy variables (say, D_{Agr} , D_{Bus} , and D_{job} ,) are used, knowing that laborers/service workers are the omitted variables.

Here we regresses the natural logarithm of the monthly wage rate (LnY) on education and experience with the education broken into a set of dummy variable representing different educational levels and various categories of occupation. The extended Mincerian model is specified thus:

$$LnY_i = \alpha + \beta_p D_p + \beta_2 D_s + \beta_{hs_3} D_{hs} + \beta_t D_{St} + \gamma X_i + \delta X_i^2 + \lambda_1 D_{Agr} + \lambda_2 D_{Bus} + \lambda_3 D_{Job} + \rho W_i + \varepsilon_i \quad (7.9)$$

After fitting the extended earnings function in equation (7.14). The private return to different levels of schooling can be derived from the following formulas:

$$rp = (\beta_p) / (Sp) \quad (7.10)$$

$$rs = (\beta_s - \beta_p) / (Ss - Sp) \quad (7.11)$$

$$rhs = (\beta_{hs} - \beta_s) / (Shs - Ss) \quad (7.12)$$

$$rt = (\beta_t - \beta_{hs}) / (St - Shs) \quad (7.13)$$

here Sp , Ss , Shs and St stand for the total number of years of schooling for each successive level.

7.4 Interpretation of results from an earnings function

The form of the earnings function, that is, which variables to include and how they enter the equation—is important (Chiswick, 2006). Researchers typically use hourly earnings as the dependent variable (the outcome of interest) in these calculations. However, the time frame over which earnings are measured is often determined by necessity: some data sets report annual earnings whereas others report weekly or hourly wages. Because individuals with higher levels of schooling tend to work more, the resulting return to schooling will be greater when using weekly or annual earnings than hourly earnings (Card, 1999). This must be kept in mind when constructing and interpreting the results from earnings functions.

7.4.1 Log Monthly Wage as a Response Variable for the Earnings Equation

Log of annual earnings is used as response variable in Mincer's earning function in pioneering work presented in his famous book 'Schooling, Experience, and Earnings' (1974). But after that work, in following years, different earnings measures have been used in the literature as response variable in the human capital model like annual earning (Flabbi, 1999; Lorenz and Wagner, 1990; Uusitalo, 1999; Wahba, 2000; and many others), **monthly wages** (Ismail, 2007; Bhalotra and Sanhueza, 2004; Tansel, 1994; Shabbir, 1994; Siddiqui and Siddiqui, 1998 and many others) and hourly wages (Sanroman, 2006; Liu et.al, 2000; Trostel et al., 2002; Melly, 2005 and many others). We prefer to include log of monthly wages as response variable because both data sets under consideration in this research work collect this measure directly from respondents.

7.4.2 Explanatory Variables for Earnings Regression

Schooling or Education: The major determinant of wages considered in the Mincerian wage model is individual's educational attainment. Education has a significant and positive role in the probability of being a wage worker in the labor market (Tansel, 1994). The earnings premium associated with level of education suggests that productivity increases as people acquire additional qualifications.

Experience/age Like schooling, labor market experience is also an important and virtually an integral part of every wage function estimated in the Mincerian setting. Due to unavailability of actual measure of experience in most of cases, it is a common custom to use potential experience. As in the basic work by Mincer (1974), potential experience is generally calculated as age minus years of schooling attained minus 6. Here, 6 is taken as assumed age when individual started schooling. A number of studies used **individual's age as a proxy for experience** (Gwartney and Long, 1978; Sanroman, 2006; Hyder, 2007; Barnet-Verzat and Wolff, 2008). For those who have no

schooling we replace 6 by 14 in the above relationship. As it is general practice, experience is used in both linear and quadratic terms for the estimation.

7.5 Regression models for life expectancy

Life expectancy is an important indicator of how long someone lives on average. Life expectancy at birth is one of the basic indicators of human resource development. The ability to live a long and healthy life is a fundamental human right and an important component of human development. Life expectancy is a standard yardstick to measure the status of health of a country (HDSA, 2007). There are many critical factors that influence life expectancy; among them education and health expenditure are prominent. Health spending is an important indicator of health care quality and population health. In many empirical studies, there appears to be a significant relationship between life expectancy and health expenditure (Hermanowski et al. 2015). In most developed countries, there is a direct correlation between health care spending and life expectancy because healthcare is one of the major development challenges facing the continuously evolving world today (Deshpande, Kumar and Ramaswami, 2014). It is expected that the health expenditures will increase as the population ages (Bjorner and Arnberg, 2012). Health spending may change due to increases in life expectancy (Shiu and Chiu, 2008).

One independent variable chosen is schooling (education). We expect schooling (education) to be positively correlated with life expectancy. A better educated individual is likely to be better informed about his health, and should contribute to a higher life expectancy. The second independent variable used is expenditure on health. We would expect that individuals that spend more on health care would have a longer life expectancy. In this section we study the link between schooling and health care expenditure and life expectancy in both the rural and urban areas. So, we include both

the variables in a regression equation to show the relationship between schooling and health expenditure with life expectancy both in rural and urban areas distinctly. Life expectancy is influenced by schooling and health expenditure which are likely to affect positively. This relationship can be modeled as follows:

$$LE=f(S,Hexp.) \quad (7.14)$$

where $S = (S_1, S_2, S_3, S_4)$

$$LE_R = \beta_0 + \beta_1 S + \beta_2 Hexp. + \varepsilon_1 \quad (7.15)$$

$$LE_u = \beta_0 + \beta_1 S + \beta_2 Hexp. + \varepsilon_2 \quad (7.16)$$

$$LE_R = \beta_0 + \beta_1 S_1 + \beta_2 S_2 + \beta_3 S_3 + \beta_4 S_4 + \beta_5 Hexp. + \varepsilon_3 \quad (7.17)$$

$$LE_U = \beta_0 + \beta_1 S_1 + \beta_2 S_2 + \beta_3 S_3 + \beta_4 S_4 + \beta_5 Hexp. + \varepsilon_4 \quad (7.18)$$

where LE = Life expectancy, LE_R = Life expectancy in rural area, LE_u = Life expectancy in urban area, $Hexp.$ = Health expenditure, ε = Error term, S = Schooling, $S_i = 1$ if the education of the respondents are in category i and 0 otherwise. Where $i = 1$, if those who received 3 to 5 years of schooling, $2 =$ those who received 6 to 10 years of schooling, $3 =$ those who received 12 years of schooling, $4 =$ those who received 14 years of schooling and above.

7.6 Logistic Regression Model

Binary logistic and multiple logistic regression models are applied to examine the effects of schooling and others socio-economic factors on sanitation. As sum of the independent variables are binary in nature. Since this part of this study is concerned with the relationship among sanitation, schooling and others socio economic factors. Sanitation is used as dependent variable. We start with the logistic models to show the relationship between schooling and sanitation as follows:

$$\log[p/(1-p)] = \beta_0 + \beta_1 S + \beta_2 Y \quad (7.19)$$

Where p is the probability of having sanitation practice, $1-p$ = probability of not having sanitation, S = Schooling and Y = earnings. Education has five categories-illiterate, primary, secondary, higher secondary and higher education, the four dummy variables, say, DS_1 , DS_2 , DS_3 and DS_4 (say DS_1 , DS_2 , DS_3 and DS_4 (where S_1 is primary, S_2 is secondary, S_3 is higher secondary schooling and S_4 is tertiary or higher education) and profession has four categories- agriculture, business, job, and day labor or service workers, the three dummy variables, say, $DAgr$, $DBus$, and $Djob$ are needed and are defined as to denote the fact that a person has achieved that level of schooling) are needed and defined as

$$\begin{aligned} & \log[p/(1-p)] \\ &= \beta_0 + \beta_1 DS_1 + \beta_2 DS_2 + \beta_3 DS_3 + \beta_4 DS_4 + \beta_5 Y + \beta_6 DAgr + \beta_7 DBus \\ &+ \beta_8 DJob \end{aligned} \quad (7.20)$$

p = Probability of sanitation practice (coded 1) and

$1-p$ = Probability of no sanitation practice (coded 0)

β_0 = Intercept term

$DS_1=1$ for primary

= 0 for non-primary

$DS_2=1$ for secondary

= 0 for non-secondary

$DS_3=1$ for higher secondary

= 0 for non-higher secondary

$DS_4=1$ for higher

= 0 for non-higher education

with illiterate as the reference category. Where there are more than two categories, the last category is automatically the reference category. This means that all the other

categories are compared to the reference in the output, e.g. primary, secondary, higher secondary and higher are compared to illiterate category.

Similarly, occupation has four categories -agriculture, business, paid job and others (such as, day labor and service workers), the three dummy variables are used as follows:

$D_{Agri.} = 1$ for agriculture

$= 0$ for non-agriculture

$D_{Bus} = 1$ for business

$= 0$ for non-business

$D_{Job} = 1$ for paid job

$= 0$ for non-paid job

Monthly household income (continuous variable) = Y (<10000 vs ≥ 10000)

We use the same specification both the rural and urban areas.

7.7 Conclusion

This chapter describes the methods and techniques used to analysis the data. The HDI is a composite of three basic components of human development: longevity, knowledge and standard of living. Longevity is measured by life expectancy. Knowledge is measured by a combination of adult literacy (two-thirds weight) and combined primary, secondary and tertiary school enrollment ratios (one-third weight). Standard of living is measured by purchasing power, based on real GDP per capita adjusted for the local cost (purchasing power parity, or PPP). To estimate HDI at first an index for each of the three dimensions is to be estimated.

Human development index model of UNDP, the structure of basic Mincer model, expanded versions of Mincer models, multiple regression models and multinomial logistic regression models are discussed in this chapter. The simplest form of the Mincerian equation has (the log of) wages depending only on years of schooling and

years of experience, with a linear relationship between schooling and wages. Mincerian regression equations are widely used to estimate the rates of return to education. Logistic regression is used to predict the odds of being a case based on the values of the independent variables (predictors). The study applies logistic regression model in explaining the sanitation status in relation to schooling in both the rural and urban areas.

Chapter 8

Empirical Findings

8.1 Introduction

This chapter makes an analysis of estimation results with a comparison between the rural and urban areas in terms of human resource development and other socioeconomic indicators in northern region of Bangladesh. We also show the impacts of schooling on the basic indicators of HRD like income and life expectancy. Regression results of sanitation are also discussed. It starts with presenting results of human development index. Then, results of Mincerian earnings equations are presented to show the rates of returns to schooling for both the rural and urban areas. Results of multiple and logistic regression models are presented to assess the indicators of life expectancy and sanitation in both the areas.

The remainder of this chapter is organized as follows: section 8.2.1 provides results of HDI model; section 8.2.2 presents results of basic and standard form of Mincer model and expanded version of Mincerian models; section 8.3 concludes the chapter.

8.2 Results

8.2.1 Human Development Index

The human development index (HDI) is a simple average of the life expectancy index, educational attainment index and adjusted real GDP per capita (PPP \$) index, and so is derived by dividing the sum of these three indices by 3. Table 8.1 exhibits that the HDI value is 0.524 in rural area compared to 0.633 in urban area. The life expectancy index in rural area is 0.691 as against 0.733 in urban area, while it is 0.716 in the study area. While the education index and income index are respectively 0.480 and 0.400 in rural area and the corresponding figures are 0.640 and 0.527 in urban area.

Table 8.1: Result of Human Development Index Model

Place of residence	Life expectancy Index	Education index	Income index	Sum of the three indices	HDI value
Rural	0.691	0.480	0.400	1.571	0.524
Urban	0.733	0.640	0.527	1.90	0.633
Whole Study Area	0.716	0.500	0.446	1.662	0.554
National	..	..	..	..	0.579

Source: Household Survey, 2013 and UNDP, 2016 (Italic).

The education index and income index in the study area are respectively 0.500 and 0.446. Table 8.1 shows that the urban area has done better than rural area in all counts, such as, terms of HDI, life expectancy index (LEI), education index (EDI) and income index (II). There has been significant progress in the field of health in Bangladesh. Life expectancy has increased in both the areas but rural area lags behind of urban area. It is in the vital field of education that the most critical gaps emerge. The adult literacy rate in urban area (72.0 percent) is much higher than in rural areas (50.0 percent). Though the primary and secondary school enrollment rates are almost equal and encouraging and gender parity both at primary and secondary levels has achieved in both the rural and urban areas, but women illiteracy is more common in rural areas. The tertiary enrollment rate is higher in urban than in rural area.

8.2.2 Estimated Results of Mincerian Model

The estimated results of the Mincerian Models are depicted in Tables 8.2, 8.3, 8.4 and 8.5. Table 8.2 shows that R^2 value of the regression is 0.53, (indicating a fairly good correlation) signifying that 53 percent of the variations in earnings is explained by schooling and experience. The estimated coefficient of schooling for rural area is positive and significant at 1 percent level. The marginal effect of schooling on earnings is 0.081 and the corresponding t value is 19.192, indicating that those individuals who

have received additional years of schooling, their earnings increase by 8.1 percent. The coefficient of experience (0.001) in rural area is positive but it is statistically insignificant.

Table 8.2: Results of the Basic Mincer Model

Variables	Rural Area		Urban Area		Study Area	
	Coefficients	t values	Coefficients	t values	Coefficients	t values
Constant	8.810 ^{***}	92.664	8.569 ^{***}	99.291	8.623 ^{***}	119.066
Schooling	0.081 ^{***}	19.192	0.078 ^{***}	18.292	0.091 ^{***}	26.653
Experience	0.001	0.700	0.009 ^{***}	4.521	0.006 [*]	1.661
R ²	0.531		0.579		0.558	
Adjusted R ²	0.528		0.576		0.557	
F statistic	168.385		204.415		377.323	

Note: N=300, 300 and 600 for rural, urban area and total sample, ^{***} and ^{*} indicate significant at 1 percent and 10 percent level of significant respectively.

Table 8.2 exhibits that, in urban area, 57 percent of the differentials of earnings are expounded by schooling and experience. The coefficients of schooling and work experience are 0.078 and 0.009 and the corresponding t values are 18.292 and 4.521 respectively, signifying that these are positive and significant at 1 percent level. So, the marginal effects of schooling and work experience on earnings are 0.078 and 0.009 respectively, signifying that each additional years of schooling causes an increase of about 7.8 percent in earnings of individuals and every extra year of work experience enhances the wages of individuals by 0.9 percent in the urban area. So, the additional years of schooling and work experience exert effect on earnings in urban area. Table 8.2 signifies that 55 percent of the variations in earnings can be predicted by schooling and experience in the study area. The coefficient of schooling is positive and significant at 1 percent level. The marginal effect of schooling on earnings is 0.091, indicating that those individuals who have attained extra years of schooling their earnings go up by 9.1

percent. But the coefficient of experience (0.006) is positive and significant at 10 percent level. The co-efficient of work experience is 0.006, suggesting that each additional year of work experience increases earnings by 0.6 percent.

Table 8.3: Results of Standard Form of Mincer Model

	Rural Area		Urban Area		Study Area	
Variable	Coefficient	t value	Coefficient	t value	Coefficient	t value
Constant	8.569	99.291	7.910	26.454	8.220	30.251
Schooling	0.078***	19.118	0.075***	18.825	0.081***	18.303
Experience	0.017	1.346	0.052***	3.874	0.021***	2.502
Experience Squared	-0.0003	-1.350	-0.0007	-3.222	-0.0005**	-2.267
R ²	0.537		0.593		0.562	
Adjusted R ²	0.533		0.589		0.560	
F statistic	114.039		144.659		255.008	

Note: N=300, 300 and 600 for rural and urban area and total sample, ***, ** and * indicates significant at 1 percent and 10 percent level of significance respectively.

Table 8.3 indicates that the R² value of the model for rural area is 0.537, signifying that 53 percent of the variations in earnings can be explained by schooling, experience and experience squared. The marginal effect of schooling on earnings is positive and it is highly significant at 1 percent level. The coefficient of schooling for rural area is 0.078 and the corresponding t value is 19.118 signifying that earnings of an individual with each additional year of schooling increase by 7.8 percent. So, the schooling exerts effect on earnings. The coefficient of experience is (0.017) positive but statistically not significant. The estimate for quadratic term (coefficient of experience squared is negative) reveals that the relationship between wages and experience is concave in nature. This means the return to a year of schooling decreases as the years of schooling increase.

Table 8.3 reveals that, in the urban area, 59 percent of the differentials of earnings are expounded by schooling, experience and experience squared. The coefficients of schooling and experience, and experience squared are positive and these are statistically

significant at 1 percent level. The coefficients of schooling and experience are 0.075 and 0.052 and the corresponding t values are 18.825 and 3.847 respectively indicating that earnings of individuals having additional year of schooling go up 7.5 percent and for extra year of work experience rises by 5.2 percent. So the additional year of schooling and work experience exert influence on earnings. The estimate for quadratic term (coefficient of experience squared is negative) reveals that the relationship between wages and experience is also concave in nature in the urban area. Table 8.3 also demonstrates that 53 percent of the variations in earnings are explained by schooling, work experience and experience squared in the whole study area. The coefficients of schooling and work experience on earnings are positive and these are highly significant at 1 percent level. The coefficient of schooling is 0.081 and the corresponding t value is 18.303 denoting that earnings of an individual with additional years of schooling increase by 8.1 percent, compared to individuals with one year less experience. The coefficient of work experience is 0.025 and its t value is 2.502, suggesting that each additional year of work experience increases earnings by 2.5 percent. So, the additional years of schooling and work experience exert effect on earnings. The coefficient of experience squared is negative which shows that the link between wages and experience is also concave in nature.

Table 8.4: Results of Expanded Earnings Equation with Schooling Square

Variable	Rural Area		Urban Area		Study Area	
	Coefficient	t value	Coefficient	t value	Coefficient	t value
Constant	8.136	31.158	7.965	27.209	8.688	119.081
Schooling	0.050***	4.129	0.045***	3.444	0.048***	4.646
Schooling Squared	0.002*	1.847	0.004***	2.511	0.003***	4.395
Experience	0.017	1.349	0.052***	3.855	0.022***	2.672
Experience Squared	-0.0002	-1.334	-0.0006***	-3.160	-0.0004***	-2.446
R ²	0.545		0.602		0.576	
Adjusted R ²	0.539		0.597		0.573	
F statistic	88.286		111.542		201.963	

Note: N=300, 300 and 600 for rural, urban area and total sample, ***, ** and * represent significance at the 1 percent, 5 percent and 10 percent levels respectively.

Table 8.4 demonstrates that in rural area, 54 percent of the variations in earnings are expounded by schooling, experience and other variables. The marginal influence of schooling on earnings is positive and it is highly significant at 1 percent level. The coefficient of schooling is 0.050, signifying that earnings of individuals with extra year of schooling rise by 5.0 percent. As expected, the coefficient for schooling squared is positive and it is significant at 10 percent level. The estimated coefficient of quadratic schooling is convex in nature. That means the return to a year of schooling enhances as the years of schooling increase (higher premium for higher schooling). The experience coefficient (0.017) is positive but it is not statistically significant. The coefficient of experience squared is negative, indicating that the relationship between experience and earnings is concave in nature.

Table 8.4 reveals that in urban area, 60 percent of the differentials of earnings are explained by schooling, schooling squared, experience and experience squared. The coefficients of schooling, experience, schooling squared and experience squared are positive and these are statistically significant at 1 percent level. The coefficients of schooling and experience are 0.045 and 0.052 and the corresponding t values are 3.444 and 3.855 indicating that earnings of individuals having additional year of schooling go up by 4.5 percent and having an extra year of work experience rise by 5.2 percent. The coefficient of schooling squared (0.004) is positive and significant at 1 percent level. The quadratic term of schooling is convex in nature, denoting that the return to a year of schooling rises as the years of schooling increase. The estimate of quadratic term (coefficient of experience squared is negative) reveals that the relationship between wages and experience is also concave in nature. Result shows that returns to education are generally positive and significant both in rural and urban areas.

Table 8.4 also exhibits that in the study area, 57 percent of the variations in earnings are explained by schooling, experience and other variables. All the coefficients of variables are statistically significant at 1 percent level. The marginal effects of schooling and experience on earnings are 0.048 and 0.022 respectively, indicating that each additional year of schooling causes an increase of 4.8 percent in wages of individuals and extra year of work experience enhances the wages of individuals by 2.2 percent. The coefficient of schooling squared (0.003) is positive and significant at 1 percent level, signifying that quadratic term of schooling is convex in nature. This means that the return to a year of schooling rises as the years of schooling increase. The coefficients of experience squared (-0.0005) is negative and significant at 1 percent level. The negative coefficient of experience reveals that the relationship between wages and experience is concave in nature.

Table 8.5: Results of Extended Version of Mincer Model with Dummy Variable

Variables	Rural Area		Urban Area		Study Area	
	Coefficient	t value	Coefficient	t value	Coefficient	t value
Constant	8.289	35.610	8.005	87.542	8.343	39.020
Primary	0.250**	1.971	0.202**	1.992	0.225**	2.022
Secondary	0.453***	7.479	0.502***	8.081	0.476***	5.750
Higher Secondary	0.532***	5.004	0.580***	7.647	0.556***	7.390
Higher	0.920***	9.469	1.003***	12.979	0.965***	14.811
Experience	0.008	0.779	0.044***	3.834	0.028***	3.196
Experience Squared	-0.0003	-1.020	-0.0007***	-3.526	-0.0005***	-3.006
Agriculture	0.094	1.568	-0.129*	-1.947	0.055	0.820
Business	0.150*	1.788	0.307***	5.153	0.259***	3.824
Job	0.182**	2.026	0.288***	4.232	0.216***	2.997
Wealth	0.000012***	6.820	0.000037***	7.562	0.000025***	4.299
R ²	0.697		0.714		0.618	
Adjusted R ²	0.687		0.704		0.609	
F statistic	66.089		71.913		63.194	

N = 300, 300, and 600 for rural, urban area and total sample size, ***, ** and * represent significance at the 1 percent, 5 percent and 10 percent levels respectively.

The basic Mincer model assumes a linear relationship between (log of) wages and schooling. Over two decades ago, Card and Krueger (1992) conclude that the relationship is essentially linear, with the exception of the first few years and last few years. This finding is consistent with the recent literature and lends to further weight to the emerging view that “the non-linear (convex) shape of the wage schooling relationship is acute” (Belzil 2006, 14). However, since that time majority of evidence has suggested that education premiums are becoming increasingly convex (Mincer 1997, Deschenes 2001, Lemieux 2003, Belzil 2006). Another way to factor in non-linearity is to include “schooling squared” as an explanatory variable (Lemieux 2003, Kifle 2007, Diagne and Diene 2011). A positive coefficient would show that education premiums are convex (higher premiums for higher education) while a negative coefficient would show that education premiums are concave (lower premiums for higher education) (Humpreys, 2015).

Table 8.5 demonstrates that in rural area, 69 percent of the variations in earnings are expounded by schooling, schooling squared, experience, experience squared and other variables. The marginal influence of primary schooling on earnings is positive and it is statistically significant at 5 percent level. The coefficient of primary schooling is 0.250 and the corresponding t-statistic is 1.971, suggesting that earnings of individuals having additional year of primary level of schooling rises by 25.0 percent. The marginal influences of secondary, higher secondary and higher levels of education are positive and these are highly significant at 1 percent level. The coefficients of secondary, higher secondary and higher levels of education are 0.453, 0.532 and 0.920 and the corresponding t values are 7.479, 5.004 and 9.469, indicating that earnings of individuals having secondary, higher secondary and higher levels of schooling go up by 45.3 percent, 53.2 percent and 92.0 percent respectively, on an average, compared to

individuals with no education; all other variables remain the same. The coefficient of experience is positive, but statistically insignificant. The coefficient of experience squared is negative (-0.0003), which indicates that the link between wages and experience is concave in nature. The coefficient of agriculture is positive but insignificant. The coefficients of business and job are 0.150 and 0.182 and these are positive and significant at 10 percent and 5 percent levels respectively, signifying that earnings of individuals who are involved in business and job increase by 15.0 and 18.2 percent respectively, on an average, compared to the day laborers and casual workers. The coefficient of wealth variable is 0.000012 and it is statistically significant at 1 percent level, indicating that, one unit increase of wealth, earnings rises by 0.000012.

Table 8.5 also demonstrates that in urban area, 71 percent of the variations in earnings are expounded by different levels of schooling, schooling squared, experience, experience squared, wealth and others variables. The marginal effect of primary schooling on earnings is positive and it is significant at 5 percent level. The coefficient of primary schooling is 0.202, indicating that earnings of individuals having primary level of schooling go up by 20.2 percent. The marginal effect of secondary, higher secondary and higher levels of schooling on earnings are positive and these are highly significant at 1 percent level. The coefficients of secondary, higher secondary and higher levels of schooling are 0.502, 0.580 and 1.003 respectively, signifying that earnings of individuals with secondary, higher secondary and higher education go up 50.2, 58.0 and 100.3 percent respectively, on an average, in comparison to illiterate reference group; all other variables are held constant. The returns associated to other human capital variable, i.e., experience, increase by 4.4 percent for each additional year spent in the labor market. Though experience adds a 4.4 percent increase in real earnings but has a non-linear effect (squared term is negative). Clearly, there is an increasing trend in

returns to education. Results in the Table 8.5 show that returns to various levels of education are generally positive and significant both in the rural and urban area. The magnitude of the coefficient on education increases progressively with educational levels. The coefficient of agriculture is negative but it is statically significant at 10 percent level, suggesting that it exerts influence negatively on earnings in the urban area. Our results show that working in an elementary occupation entail a negative effect on workers earnings as an economy grows richer. This finding is consistent with the finding of Montenegro and Patrinos (2013). The coefficients of business and job are 0.307 and 0.288 and these are highly significant at 1 percent level, denoting that earnings of individuals who are engaged in business and job increase by 30.7 and 28.8 percent respectively, on an average, compared to the day laborers and casual workers. The coefficient of wealth variable is 0.000037 and it is highly significant at 1 percent level, which indicates that one unit increases the household wealth, earnings of individuals go up by 0.000037.

Table 8.5 manifests that in the study area, 61 percent of the variations in earnings are expounded by schooling, experience and other variables. The marginal influence of primary schooling on earnings is positive and it is statistically significant at 5 percent level. The coefficient of primary education is 0.225 and the corresponding t value is 1.943, indicating that earnings of individuals having primary level of schooling increase by 22.5 percent. The coefficients of secondary, higher secondary and higher levels of education are 0.476, 0.556 and 0.965 respectively, indicating that the magnitude of the coefficient on education increases progressively with education levels. Compared to workers having no education, those with primary education attract 22.5 percent higher wages. Again completing secondary and higher secondary raises real wages by 47.6 and 55.6 percent respectively, whilst individuals with higher education attract much

higher wage (96.5 percent increase). Clearly, there is an increasing trend in return to education. Experience adds a 2.8 percent increase in earnings but it has a non-linear effect (squared term is negative). The coefficient of agriculture is positive but it is insignificant. The coefficients of business and job are 0.259 and 0.216 and these are highly significant at 1 percent level denoting that earnings of individuals who are involved in business and paid job increase by 25.9 and 21.6 percent respectively, on an average compared to the day laborers and casual workers. The coefficient of agriculture is positive but statistically insignificant. The coefficient of wealth variable is 0.000025 and it is highly significant at 1 percent level, this indicates that one unit increase in the household wealth leads to rise in the household income by about 0.0000373.

Table 8.5 shows that, in both areas, primary, secondary, higher secondary and higher levels of education contribute to increase in income significantly. Better educated and trained workers can do more diverse work—and to a higher standard—and be more creative and innovative (UNDP, 2016). Education equips individuals with skills that leads to higher productivity and earnings at the workplace. Since educated individuals (having higher secondary, secondary and even primary levels of education) are comparatively equipped with skill, technology, and competitive and updated in manner to establish with higher economic condition and dignity. They are willing to collect information about job market that are releasing from various electro and print media including hearsay as well as daily demand to meet needs of different private and public institutions.

In the era of globalization, the workplace is changing fast. As technology changes, the skill required to operate it also changes. In congruence with the repeated changing dimension of technology and demand of job market, higher educated individuals can make themselves to avail of the scope and opportunities, and they can enter into the job

market with attractive/lucrative salary. Education boosts up individual to be capable of getting jobs from informal and formal sectors or urban settings and lucrative private sectors including all others. Individual having primary level of education are thought to be productive and more responsive to new technologies. Specially, trained artisans and mechanics that can read and write are assumed to be better able to keep up to date with changing products and materials. Bangladesh has achieved very strong rates of economic growth at about 6.2 percent during 2005-2015. Employment has grown relatively quickly over the past decade (particularly in low and semi-skilled areas), with many of the new jobs being in the industry and services sectors. Due to shifting surplus (unskilled, low-skilled and semi-skilled) labor force from agriculture sector in rural areas to urban settings, most of them (especially individuals having primary and secondary levels of education are in garment production and construction. Both of these industries grow quickly in the years up to 2010, absorbing many unskilled and low-skilled workers from rural areas into urban areas (HDSA, 2015).

About four million people are involved in RMG sector, of which 80 percent are women that leads to increase household income. The service sector has become important in the overall economy. In rural areas, dependence on agriculture for livelihood shows a declining trend with increasing importance of rural non-farm activities (HDSA, 2007). The expansion of non-farm activities, however, has led to gradually increase in per capita income. The labor force has increasingly been pushed out of agriculture into self-employment activities in the non-farm sector. In Bangladesh, real wages have increased over the last three decades, with significant variation across sectors. Between 1980 and 2010, real wages increase by 1.6 percent. The increase is the highest in the manufacturing sector (2.6 percent), followed by the agricultural sector (1.2 percent) and the construction sector (0.7 percent). Poverty is also high among the landless,

especially those who have agricultural wage labor as their principal occupation and for those who are engaged in marginal occupations and skills (HDSA, 2007).

Results in Table 8.5 show that returns to education are generally positive and significant. The magnitude of the coefficient on education increases progressively with educational levels. Clearly, there is an increasing trend in returns to education, and higher education attracts earnings significantly than other levels of education which is consistent with the findings of World Bank (2007). On the other hand, over the time, the development of Bangladesh economy will generate a higher demand for skilled labor (a relatively scarce factor) rather than the abundant unskilled labor. This contributes to faster rise in the wage of skilled labor than the unskilled wages and it expands the wage disparity between them (HDSA, 2007). In the era of knowledge based economy and the repeated changing dimension of technology, the life cycle of technology is not long lasting and the existing technology is being replaced by the new one. Rate of education has increased significantly and the technologies are changing dramatically due to meeting market demand of modernization as well as globalization. The skill learnt in one year may not be useful in the following year and what is learnt next year may redundant after another six months. Innovation is the order of the day. Unless one has to be creative and innovative, it would be difficult to survive in the changing world (HDSA, 2003). In technology driven growth, higher skill level creates a higher probability of employment and earnings. Higher level of education is needed to cope with the changing dimension of technology-based industrialization. Higher educated individuals can make themselves creative as well as innovative based on potentiality, productivity, expertise and adaptability. They have adaptable capacity with the repeated changing dimension of technologies and can make themselves to avail of the scope and opportunities.

In urban areas, higher educated individuals are more likely to be employed in formal sectors or paid jobs or private jobs with lucrative salary and their earnings are significantly high than rural higher educated ones. Because comparatively high wage rate, skilled workers, adequate information about job market as well as available skill development institutions and availability of job involvement with diversified categories of profession exist in the urban area. Furthermore, mobility to have access to job market of formal-informal and private sectors is broader. In urban areas, higher educated individuals can increase their income based on potentiality, productivity, expertise, innovation and adaptable capacity according to the changing dimension of economic order in the era of knowledge based economy. Side by side, low wage rate, unskilled and semi-skilled laborers, insufficient information about job market, inadequate skill delivery institutions, comparatively less job scope and opportunities including fluctuation of wage rate are the common scenario in the rural area.

Table 8.5 also indicates that agriculture does not contribute to increase income significantly. This is because the products of agriculture sector are vital for survival but they are generally not very valuable products. Agriculture in Bangladesh is yet to fully mechanize or modernize and therefore depends on the whims of nature for all the times. If nature favors, the farmers get good harvest and vice versa. This finally leads to marketing risky. It means that in the year of good production, prices fall and in the year of low production, prices increase. Mechanization of agriculture of our country has just started. Most of the rural workers are not equipped with skill and agricultural knowledge (HDSA, 2006).

(iii) Labor investment in agriculture is seasonal depending on the agro-climate conditions, and the remaining period is generally off-season in which they do not have

adequate work. The sectorial trends in production and employment, however, show that the agriculture sector is still over-burdened with 'surplus labor' with low value added-employment ratio and average value added per worker compared with other sectors. Agriculture plays an immense role to create disguised or seasonal unemployment that leads to low income earnings. Lack of proper marketing system of agriculture products is another impediment. Most of the agricultural products are perishable and bulky in nature. Undeveloped means of communication and inadequate number of motor vehicles hamper proper transportation of products from one place to another or desired places. Most of the farmers do not have proper storage facilities. The poor farmers cannot store or preserve their products. This compels the farmers to sell their products immediately after harvest at lower prices to avoid decay or wastage.

The rural poor farmers have no other sources of income other than agriculture and physical labor force and therefore, they have to meet their household expenses with the sale proceeds of their commodities. As soon as the crops are harvested, the farmers become eager to satisfy their principal wants among many others. This increases the supply of products in the market, and as a result of interaction of demand and supply, price tends to fall. Many times they cannot meet even the cost of production with the sales proceeds of the crops. Whole sale is much easier than retail sale. The whole sale markets of the country are controlled by different types of small and big middlemen. The small farmers become bound to go to the middlemen for expediting selling of their products as well as for convenient transaction. This situation forces the small and the marginal farmers to sell their products in the respective local markets, and as such they do not get fair and reasonable prices. That is why their earnings are not high.

Table 8.6: Incidence of Poverty by Main Occupation of Head of Household in 2016

Residence and Occupation of Head	Percentage of Population the below poverty lin	
	Lower	Upper
National		
Total	12.9	24.3
Professional, Technical and Related Works	7.6	16.2
Administrative & Management Works	2.3	4.0
Clerical, Related Works & Govt. Executive	11.8	24.4
Sales Workers	8.3	17.7
Service Workers	14.0	26.6
Agriculture, Forestry & Fisheries	18.2	32.0
Production, Transport and Related Workers	11.3	22.8
Head not Working/NAD	14.9	20.8
Rural		
Total	14.9	26.4
Professional, Technical and Related Works	9.4	18.8
Administrative & Management Works	9.3	11.0
Clerical, Related Works & Govt. Executive	15.6	28.6
Sales Workers	9.8	19.8
Service Workers	15.9	26.8
Agriculture, Forestry & Fisheries	18.4	31.7
Production, Transport and Related Workers	14.0	25.3
Head not Working/NAD	12.6	20.5
Urban		
Total	7.6	18.9
Professional, Technical and Related Works	3.7	10.8
Administrative & Management Works	0.5	2.2
Clerical, Related Works & Govt. Executive	7.5	19.6
Sales Workers	6.2	14.8
Service Workers	10.9	26.3
Agriculture, Forestry & Fisheries	16.0	35.3
Production, Transport and Related Workers	6.7	18.5
Head not Working/NAD	19.2	21.4

Source: HIES, 2017

Table 8.6 shows that the estimates of HCR using the upper poverty line show (Table 8.6) that at the national level, the incidence of poverty is the highest for “Agriculture, Forestry and Fisheries” with a HCR of 32.0 percent (the corresponding rates for the rural and urban areas are 32.2 percent and 35.3 percent respectively) followed by “Service Workers” with 26.6 percent (26.8 percent for rural and 26.3 percent for urban area) and “Clerical, Related Works and Govt. Executives” with 24.4 percent (28.6 percent for rural and 19.6 percent for urban area). The lowest HCR is observed for “Administrative and Management Works” with 4.0 percent at the national level, while it is estimated at 11.0 percent in the rural area compared to 2.2 percent in urban area.

The incidence of poverty for “Agriculture, Forestry and Fisheries” is accounted at 31.7 percent in rural compared 35.5 percent in urban area, which is the highest among the occupations of both areas. In terms of occupation, agricultural labor households have a high incidence of poverty as do non-agricultural casual and unskilled workers. In both rural and urban areas, the incidence of poverty is significantly high (75.0 and 67.0 percent respectively) for the households headed by casual wage laborers. Of the total number of the poor, 46 percent in the rural areas and 36.0 percent in the urban areas belong to this category. Similarly, households whose heads are self-employed in agriculture and non-agricultural sectors account for 40.0 and 35.0 percent of the poor in rural and urban areas respectively. The income profile likewise shows a high reliance on daily wage labor as the major source of income of the poor households. For the poorest 20.0 percent of the households, daily wage income provides nearly half of their total income. These characteristics indicate that labor is the main asset and the income source of the poor households in Bangladesh.

Table 8.7: Results of Private Rates of Return to Various Levels of Education

Level of Education	Rural Area	Urban Area	Study Area
Primary	5.0 percent	4.0 percent	4.5 percent
Secondary	4.0 percent	6.0 percent	5.0 percent
Higher Secondary	4.0 percent	4.0 percent	4.0 percent
Higher	13.0 percent	14.0 percent	13.3 percent

The results in the Table 8.7 show, that by the level of schooling, the returns are highest at the tertiary level, on average at 13.0 percent, followed by primary level (at 5.0 percent) and then secondary and higher secondary level of education(both are in a similar condition at 4.0 percent) in the rural area. While in the urban area, return to tertiary education is the highest (14.0 percent), followed by secondary (6.0 percent) primary and higher secondary, both are similar at 4.0 percent. On the other hand, in the study area, the returns at tertiary level (13.3.0 percent) are healthy, followed by secondary level (5.0 percent), primary level (5.0 percent) and higher secondary (4.0 percent).

Evidence from empirical studies using the Mincerian equation (after Mincer 1974) suggests that the relationship between education and earnings for most countries is concave and with the implication that low levels of education have higher returns (Psacharopoulos 1994; Psacharopoulos and Patrinos 2004). In recent times much of the empirical evidence from developing countries, however, shows that returns to primary education may be lower than that of post-primary education, suggesting that the earnings–education profile is, in fact, convex (Ackah, 2004). Montenegro and Patrinos (2013) show, that by country income group, the returns to primary schooling are highest in low income countries. In fact, returns are highest at each level in low income countries, reflecting the relative scarcity of human capital.

Findings also indicate that by level of schooling, the returns to schooling are highest at the tertiary level in both the rural and urban areas, showing that there is demand for more skilled workers as the production patterns become more biased towards skilled and technology-based production. At the same time, the returns to schooling are high at the primary level in rural settings, signaling continued need for basic skills. In the study area, the returns to schooling are comparatively low at the primary and higher secondary schooling levels as a result of the increased demand for skills, prompting the best secondary school students to continue their education at the tertiary level. On the other hand, in urban area, next to tertiary education, return to secondary education is healthy. The findings indicate that, in urban area, primary education has the lowest return does not imply that investment in primary schooling is necessarily inefficient, however. We have not looked at social returns to education and have ignored the impact of education on various non-econometric outcomes such as fertility choice, health and sanitation practices. This has important implications, as it will lead to an increase in demand for tertiary education and put pressure on policymakers to expand university education. This should not, however, come at the detriment of basic education, since primary education is a fundamental human service and access to primary (secondary and higher secondary) education is a prerequisite for entry into university. That means since levels of schooling are sequential, we must complete primary to enter secondary and secondary to enter tertiary-the returns to schooling for each level also incorporate the benefit of previous levels of schooling.

8.2.3 Regression Results on Life Expectancy

The regression results of life expectancy are given in Table 8.8. The regression results in the table 8.8 display that, in the rural area, 20 percent of the variations in life expectancy are explained by education and health expenditure. The marginal effect of education on life expectancy is positive, but statistically insignificant. There is a weaker, yet positive relationship between education and life expectancy; however there

is a positive relationship between health expenditure and life expectancy but insignificant. The coefficient of health expenditure variable is 0.008 and it is significant at 10 percent level signifying that a one-unit increase in health expenditure would result in a 0.008 increase in life expectancy.

Table 8.8: Regression Results of Life Expectancy

Variable	Rural Area		Urban Area		Study Area	
	Coefficient	t value	Coefficient	t value	Coefficient	t value
Constant	59.011	19.119	61.645	27.695	60.241	
Schooling	5.846	1.483	8.132**	2.030	9.103**	2.220
Health expenditure	0.008*	1.715	0.012**	2.058	0.010**	2.021
R ²	0.208		0.258		0.261	
Adjusted R ²	0.177		0.237		0.226	
F statistic	3.363		12.367		9.333	

Note: N=100 for rural and 110 for urban area. *, ** and *** indicate significant at 10%, 5% and 1% significance levels respectively.

While in the urban area, 25 percent of the variations in life expectancy are explained by education and health expenditure. The marginal effect of education on life expectancy is positive and it is statistically significant at 5 percent level. The coefficient of education is 8.132 and its t value is 2.030, denoting that education exerts effect on life expectancy in the urban area. The coefficient of health expenditure is significant at 5 percent level, which suggests that if there is a unit increase in health expenditure, the life expectancy of an individual goes up by 0.012 unit.

In the whole study area, 26 percent of the variations in life expectancy are explained by education and health expenditure. The marginal effect of education on life expectancy is positive and it is statistically significant at 5 percent level. The coefficient of education is 9.103 and its t value is 2.220, denoting that education exerts effect on life expectancy in

the urban area. The coefficient of health expenditure is significant at 5 percent level, which suggests that if there is a unit increase in health expenditure, the life expectancy of an individual goes up by 0.010 unit.

It is in fact that illiteracy keeps people chained to ignorance and superstition; on the other hand, education makes awareness and change individual's attitude positively that leads individuals by maintaining standard health services, hygiene and sanitation culture as well as caring practices and fulfillment of daily requirements to protect and prevent from diseases. It also helps individuals understand the importance of health and nutrition and thus lowers the risk/incidence of diseases. Education leads to better use of health services and healthcare practices, more hygiene practices and personal habits that raise the demand for community health services. However, education allows greater exposure to the mass media, which can keep people to have access better information about health issues. At present, the growing use of mobile phones, email and the Internet means that E-health and telemedicine has much broader applications which boost up life expectancy.

Regression results in the Table 8.9 signify that 25 percent of the variations in life expectancy are explained by primary, secondary, higher secondary levels of education and health expenditure in the rural area. The marginal effects of primary and higher secondary levels of education are positive but insignificant. But the coefficient of secondary level of education is 10.106, which is positive and statistically significant at 10 percent level, indicating that secondary level of education exerts effect on life expectancy in rural area. The marginal effect of health expenditure on life expectancy is positive and significant at 10 percent level, denoting that the life expectancy of an individual increases by 0.007 with a unit increase in health expenditure in the rural area.

Table 8.9: Regression Results of Life Expectancy with Dummy Variable

Variables	Rural Area		Urban Area		Study Area	
	Coefficient	t value	Coefficient	t value	Coefficient	t value
Constant	58.075	20.842	61.639	25.706	59.658	23.091
Primary	7.120	1.528	6.863	1.529	7.280	1.540
Secondary	10.106*	1.728	8.671**	2.031	10.810**	2.052
Higher Secondary	7.734	1.423	5.579	1.101	5.238	1.492
Higher	..	..	10.106*	1.683	8.409	1.548
Health expenditure	0.007*	1.623	0.010**	2.041	0.08*	1.661
R ²	0.202		0.255		0.271	
Adjusted R ²	0.187		0.213		0.232	
F-statistic	2.174		7.584		7.744	

Note: N=100 for rural and 110 for urban area, *, ** and *** indicate significance at 10%, 5% and 1% significance levels respectively.

While in the urban area, 25 percent of the variations in life expectancy can be predicted by various levels of education and health expenditure. The coefficients of primary and higher secondary levels of education are positive but insignificant. The marginal effects of secondary and higher levels of education are positive and significant at 5 percent and 10 percent levels respectively. The coefficients of secondary and higher education are 8.671 and 10.106 and the corresponding t values are 2.031, 1.683; and these are positive and significant, signifying that secondary and higher education exert effects on life expectancy. The coefficient of health expenditure is also positive and significant at 5 percent level, indicating that one unit increase in health expenditure would result in a 0.010 unit increase in life expectancy.

Table 8.9 also exhibits that 27 percent of the variations in life expectancy are explained by various levels of education and health expenditure in the study area. The marginal influences of primary and secondary levels of education on life expectancy are positive

and significant. The coefficient of secondary level of education are 10.810, which is positive and significant at 5 percent level, signifying that secondary level of education exert effects on life expectancy; while the coefficients of primary, higher secondary and higher levels of education are positive but these are statistically insignificant. The coefficient of health expenditure is also positive and significant at 10 percent level. The coefficient of health expenditure is .008 indicating that one unit-increase in health expenditure would result in a 0.008 unit increase in life expectancy.

Table 8.9 further demonstrates that, in both the rural and urban areas, primary level of education does not contribute to increase life expectancy significantly. This is because most of the individuals having primary level of education are engaged in agriculture related activities as well as informal sector of hard laboring with low wage rate that do not fulfill their daily requirements. Working conditions are often poor, with little food and no access to medical care (UNDP, 2015). In many cases they have to work in unhygienic and hazardous environment. Various communicable diseases and cancer are highly associated with unhealthy dietary consumption patterns, environmental degradation and tobacco use. Poor hygiene practices spread the disease and lack of proper knowledge leads to improper treatment that decreases life expectancy.

From Table 8.9, it is found that especially in urban areas, secondary and higher educated individuals are better in position in terms of life expectancy. Education leads to hygienic life and individuals with secondary education have their caring practices. People with more education are more aware than those with less education, and more educated people are more likely to be used health care services. Individuals having secondary level of education are also engaged in the profession of hard laboring that keeps their body strong and healthy. Due to awareness about their health, they are less likely to be suffered from non-communicable diseases such as cardio vascular diseases and diabetes

which are highly associated with physical inactivity. Physical labor is the best prevention to protect the body against diseases. Regular physical work prevents diseases and drowsiness, and makes human body strong and healthy that helps increase life expectancy.

On the other hand, in both the rural and urban areas, individual having higher secondary level of education would like to get job in formal sector or in urban settings as well as in the private sector jobs with lucrative salary. But they fail to get jobs according to their expectation because of numerous competitors with the same categories of education and similar level of job scarcity in the job market. A large majority of them are deprived of employment opportunities largely due to mismatch between supply and demand in the labor market. The said categories are not interested to make own job involvement. Sometimes, this level of education creates ambitious unemployed whom the labor market cannot satisfy, and as a result, they undergo dire frustration in life. In some cases, frustration leads to smoking and drug addiction that increase the incidence of diseases and reduces life expectancy.

According to Labor Force Survey 2016-17, unemployment rate is highest in higher secondary group (14.9 percent), followed by tertiary level (11.2 percent) level, others education group (4.6 percent) and secondary (4.6 percent) level. For the less educated (primary 2.7 percent, none 1.5 percent) group, the unemployment rate is less than the national average at 4.2 percent.

While in urban areas, higher educated individuals are aware of both the communicable and non-communicable diseases and they protect themselves by maintaining standard health hygiene and sanitation as well as caring practices, changing dietary consumption patterns and life style. Due to the health awareness, higher educated individuals keep

updated health related information and have access to free public health care through an extensive network to government hospitals. There is the presence of a parallel private health sector in urban areas that provides health care services, though their service charge remains high. Due to affordable capacity, they avail of these services from the private sectors. The regression results in the Table 8.9 exhibits that the urban people expect to live longer than their rural counterparts. In rural areas, where there is a high incidence of infectious diseases, maternal illness and nutritional deficiencies, health care centers are few and far between. Absence of adequate care in the primary health care system often forces people to resort to treatment from quacks or the exploitative private sector. Bangladesh has inherited a system of health care, that is urban based and curative biased. The distance of government hospitals and the unavailability of medicines at public health providers are the major reasons for not using these facilities. Other reasons are uncooperative staff, inability of providers to treat complications and the unavailability of doctors at these facilities.

Apart from this, general patients of the rural areas are being regularly cheated by the doctors and by the brokers. Many private practitioners of medicine are not properly qualified in rural areas. In our country, there are still many rural people who do not believe in modern medicine and treatment rather prefers to go to the village quack and *kobiraj* for treatment of their serious diseases. Due to the lack of awareness of individuals living in rural areas, they are not willing to collect updated health related information that are releasing from various electro and print media. These facilities tend to be more, widely available in urban areas than in rural. Although in recent years, there has been a notable expansion in the number and availability of healthcare institutions in Bangladesh, the quality of care in the public sector facilities, particularly in rural areas is poor leading to underutilization of these services. The poor quality of

care in these facilities is generally attributable to non-availability of adequately trained personnel, absence of transparent professional standards, poor patient-doctor interaction, substandard diagnostic and physical facilities and the non-availability of drugs and supplies.

Public spending on health in Bangladesh is both inefficient and inequitable. Public spending on health is also equitable in the sense that the benefits of public subsidies on health are mostly captured by the higher income groups. It is inefficient because, firstly, public funds are allocated across priorities that do not yield significant health benefits for the majority of the population, and secondly, funds are misappropriated and misused so that a dollar spent as input does not yield the required output. Public spending on health is also inequitable because it disproportionately benefits the rich as compared to the poor that needs such subsidies the most. In Bangladesh, the private sector offers the greater share of curative services. More than 50 percent of hospitals, dispensaries and beds are maintained by the private sectors in Bangladesh (HDSA, 2007). It is in fact that in comparison to our population, the number of qualified doctors is very small, especially in rural areas. For this reason, most of the cases the rural people are deprived of health facilities.

Dietary patterns, traditional health culture and sanitation practice, distribution of income and wealth, social structure, psychosocial aspects of socioeconomic health differentials and socioeconomic differentials in mortality and health between rural and urban areas including the progress of medical technology, improved access to and availability of medical services, better diet and nutrition, rise in the standard of living in various aspects of life, such as, housing and clothing, reduced episodes of infection and increased level of education are the main factors that contribute to increase life expectancy in the urban than in the rural area.

8.2.4 Logistic Regression Results on Sanitation

Table 8.10 shows the results of logistic regression on sanitation. The values of Loglikelihood, Nagelkerke R Square and Cox & Snell R Square are respectively 223.171, 0.444 and 0.296. The Nagelkerke R square value for the regression is 0.444, signifying that that 44 percent of the variations in sanitation practice are expounded by schooling and earnings in rural area.

Table 8.10: Logistic Regression Results on Sanitation

Variables	Sanitation Practice in Rural Area					Sanitation Practice in Urban Area				
	Coefficient	S.E.	Wald	P value	OR	Coefficient	S.E.	Wald	P value	OR
Constant	-3.195	0.334	91.344	0.000	0.041	0.272	0.222	1.512	0.219	1.313
Schooling	0.342	0.042	66.844	0.000	1.408	0.398	0.068	34.051	0.000	1.488
Earnings	0.977	0.361	7.337	0.007	2.656	1.106	0.305	9.993	0.002	3.022
Loglikelihood	223.171					158.083				
Nagelkerke R Square	0.444					0.432				
Cox & Snell R Square	0.296					0.237				

NB: OR= Odd Ratio

Table 8.10 demonstrates that in the rural area, the odds ratio associated with schooling is 1.408. Hence when schooling is raised by one unit (one year), the odds ratio is 1.408 times as large and therefore individuals having schooling are 1.408 times more likely to practice sanitation compared to individuals having no education. The odds ratio related to earnings is 2.656, signifying that individuals whose household income is more than or equal to Tk.10,000, are 2.656 times more likely to have access to sanitation facilities than individual whose household income is less than Tk.10000.

The values of Loglikelihood, Nagelkerke R Square and Cox & Snell R Square are respectively 158.083, 0.432 and 0.237. The Nagelkerke R square value of the logistic model is 43.2, indicating that, in the urban area, 43.2 percent of the variations in

sanitation practice is explained by schooling and earnings. Table 8.10 shows that, in the urban area, the odds ratio related to schooling is 1.488, signifying that when schooling is raised by one unit (one year), the odds ratio is 1.488 times as high and therefore individuals having schooling are about 1.488 times more likely to practice sanitation compared to individuals with no schooling. The odds ratio regarding in earnings is 3.022, denoting that individuals whose household income is more than or equal to Tk.10,000, are 3.022 times more likely to practice sanitation than individual whose household income is less than Tk.10000.

Table 8.11 demonstrates that the values of Loglikelihood, Nagelkerke R Square and Cox & Snell R Square in rural area are respectively 185.582, 0.561 and 0.373. Nagelkerke R square value for the logistic model is 0.561, denoting that 56 percent of the variations in sanitation practice is explained by various levels schooling and occupation in rural area. Table 8.11 demonstrates that the coefficients of secondary, higher secondary and higher levels of education and profession, such as, job have significant effects on sanitation practice excluding primary level of education, agriculture and business (which are not significant, the coefficients are not significantly different from 0). The odds ratio associated with secondary education is 2.206. Hence when secondary level of schooling is raised by one unit (one year), the odds ratio is 2.206 times as large and therefore individuals having secondary level of education are 2.206 times more likely to practice sanitation compared to individuals having no education. In this way, the odds ratio related to higher secondary education is 4.794, indicating that individuals having higher secondary education are 4.794 times more likely to practice sanitation compared to individuals with no education. While the odds ratio associated with higher education is 4.972, signifying that individuals having higher education are 4.972 times more likely to have access sanitation facilities compared to individuals who have never received education in the rural area.

Table 8.11: Logistic Regression Results on Sanitation with Dummy variable

Variable	Sanitation Practice in the Rural Area					Sanitation Practice in the Urban Area				
	Coefficient	S.E.	Wald	P-value	OR	Coefficient	S.E.	Wald	P-value	OR
Constant	-5.659	0.429	1.632	0.201	0.003	0.181	0.262	0.021	0.886	1.198
Primary	0.572	0.552	1.073	0.300	1.772	1.486	0.514	8.350	0.004	4.419
Secondary	0.716	0.420	2.912	.088	2.046	1.598	0.349	20.983	0.000	4.944
Higher secondary	1.567	0.428	5.394	0.044	4.794	2.026	0.782	6.707	0.010	7.581
Higher	1.602	0.533	9.030	0.003	4.962	2.847	0.709	4.993	0.025	11.931
Agriculture	0.114	0.720	.001	0.972	1.120	-1.494	0.829	.955	0.328	0.224
Business	0.600	0.771	.072	0.788	1.822	1.986	0.998	2.747	.097	7.286
Job	2.281	0.945	2.588	0.108	9.787	2.847	0.973	7.044	0.008	17.242
Loglikelihood	185.682					194.626				
Nagelkerke R Square	0.561					0.539				
Cox & Snell R Square	0.373					0.359				

NB: OR= Odd Ratio

Table 8.11 exhibits that the values of Loglikelihood, Nagelkerke R Square and Cox & Snell R Square in urban area are respectively 194.626, 0.539 and 0.359. The value of Nagelkerke R square is 0.539, implying that 53 percent of the variations in sanitation practice are explained by various levels schooling and occupation like agriculture, business and job in urban area. In the urban area, the coefficients of the independent variables such as primary, secondary, higher secondary and higher levels of education and other variables have significant effect on sanitation except agriculture. The odds ratios for primary, secondary, higher secondary and higher levels of education are respectively 4.419, 4.944, 7.581 and 11.931, suggesting that individuals having primary, secondary, higher secondary and higher levels of education are respectively 4.419, 4.944, 7.581 and 11.931times more likely to practice sanitation compared to

individuals with no education. The odds ratios for business is 7.286, denoting that individuals who are involved in business/ businessmen are 7.286 times more likely to practice sanitation than day laborers and service workers. While the odds ratio of job is 17.242, signifying that individuals who are engaged in job/ service holders are 17.242 times more likely to have access sanitation facilities compared to day laborers and service workers.

Sanitation practice among the people in rural areas is considerably lower compared to urban people. Factors such as historical backwardness, cultural practices, lack of health awareness and large scale poverty have all restricted improvements in this area. Equity also matters, because the poor are more likely to be less healthy than the non poor (UNDP, 2009). Poor hygiene practices spread the disease and lack of knowledge leads to improper treatment.

8.3 Conclusion

Result reports that the HDI value in urban area is higher than in rural area. The empirical findings (Table 8.3, 8.5 and 8.6) of the earnings equations show that that returns to education are generally positive and significant and the magnitude of the coefficient on education increases progressively with educational levels. This means, on an average, people with more schooling receive higher wages compared to the people with less schooling in both the rural and urban areas. The returns to schooling in rural areas (7.8 percent) are slightly higher than in urban area (7.5 percent). This unexpected result may be explained by the existence of more job opportunities in rural areas. Real wages in Bangladesh are rising, apparently faster in the second half of the 2000s than before (Wiggins and Keats, 2014). The return to tertiary education is the highest in both the rural and urban areas. Findings report that there is statistically significant and

positive relationship between job and business with earnings in both the rural and urban areas. The coefficient of agriculture is positive but statistically insignificant in the rural area and the coefficient of agriculture is negative in the urban area. This means that agriculture does not exert influence on earnings in urban area. Working in an elementary occupation entails a large negative effect on worker earnings as an economy grows richer (Montegro and Patrinos, 2013).

Multiple regression results indicate that there is a positive and significant relationship between schooling and life expectancy. The health care expenditure is positively and significantly correlated with life expectancy in both rural (significant at 10 percent level) and urban areas (significant at 5 percent level). Result also shows that secondary education in both rural and urban areas and higher education in urban area have positive and significant effects on life expectancy. The empirical findings also indicate that urban people expect to live more than their rural counterparts.

Logistic regression results imply that educated individuals are more likely to practice sanitation than their illiterate counterparts and individuals having more schooling are more likely to have access sanitation facilities than individual with less schooling. Findings also indicate that sanitation coverage of urban area is much higher than rural area.

Chapter 9

Summary of the Findings, Policy Implications and Conclusion

9.1 Introduction

Rural-urban disparity in terms of human resource development indicators has been a serious concern and persistent problem in relation with the development in economy of Bangladesh. Certainly, there is a risk of oversimplification in attempting to summarize our key findings and applying it to Bangladesh as a whole because it is a micro level study. After all, only 2 out of 64 districts (only two districts such as Rangpur and Dinajpur of Northern part of Bangladesh) are sampled and the core underlying data are based on household survey of 600 households in 2013. This study attempts to make a comparison between rural and urban area in terms of socioeconomic and human development indicators in the northern region of Bangladesh and estimate the rates of returns to schooling in both the rural and urban areas. Empirical analysis reveals that there have been significant differences of socio-economic as well as basic indicators of human resource development in both the rural and urban areas.

The rest of the chapter is structured as follows. Section 9.2 encompasses the summary of the thesis; section 9.3 provides the survey results of the study area and highlights the empirical findings of the study. Policy implications and policy suggestions are discussed in section 9.4, and conclusions are drawn in section 9.5.

9.2 Summary of the Thesis

Chapter 1 presents the background of the study, statement of the problem, research questions, objectives, significance, rational of the study and structure of the thesis.

Chapter 2 deals with review of literature of previous studies related to the indicators of

human resource development around the world including Bangladesh and presents review of literature on earlier studies regarding rate of returns to schooling using Mincerian approach. Evidence from empirical studies, using the Mincerian equation (after Mincer 1974) suggests that the relationship between education and earnings for most countries is concave and with the implication that low levels of education have higher returns (Psacharopoulos 1994; Psacharopoulos and Patrinos 2004). But much of the empirical evidence from developing countries, however, shows that returns to primary education may be lower than that of post-primary education, suggesting that the earnings–education profile is, in fact, convex. Estimated results also show that returns to education are generally positive and significant. The magnitude of the coefficient on education increases progressively with educational levels. Clearly there is an increasing trend in returns to education, and higher education attracts earnings significantly than other levels of education.

Chapter 3 discusses the theoretical issues and mathematical formation of human resource development and theoretical aspect and mathematical framework of Mincerian and logistic regression models. Empirical evidence on various socioeconomic, human and composite indicators of development in South Asia including Bangladesh is presented in chapter 4 which examines empirically the performance and progress of Bangladesh in terms of various economic, social, human, and composite indicators of development in relation to its neighboring countries in South Asia. Empirical results indicate that Bangladesh has achieved considerable progress in terms of various economic, social, human, and composite indicators of development. This analysis also manifests that Bangladesh has made significant progress on some fronts, (for example, gain in life expectancy and decline in infant and under 5 mortality rates, gender parity at primary and secondary levels), but less progress in some of the critical areas (such

as, malnutrition, particularly among children, high maternal mortality rate) in comparison to other countries in this region.

Chapter 5 encompasses an overview of the study area. The socioeconomic and demographic characteristics of the households are represented. Survey methods and results are discussed in chapter 6. The chapter is divided into two sections: section 6.1 gives the brief description of survey methods. Multistage and stratified random sampling techniques are used in the selection of units. The aim of the study is to make a comparison between rural and urban areas in terms of human development indicators in northern region of Bangladesh. Accordingly, the northern region of Bangladesh is selected purposively. At the second stage, Rangpur division is chosen from the Northern region of Bangladesh purposively. The third stage involves selection of districts. Rangpur and Dinajpur located in the Northern region of Bangladesh are selected purposively as the study area for the primary data considering practical situation including time and resources. The fourth stage is the selection of upazilas. Rangpur sadar upazila from Rangpur district and Dinajpur sadar upazila from Dinajpur district as urban area are selected purposively. While Mithapukur upazila from Rangpur and Nababgonj upazila from Dinajpur selected for the rural study area are taken randomly. The fifth stage of sample covers mahallas and villages, two mahallas called College Road Alom Nagar from Rangpur sadar upazila of Rangpur district and Paharpur from Dinajpur sadar upazila of Dinajpur district respectively are taken randomly. Two villages named Akobpur from Mithapukur upazila of Rangpur district and Bhotarpara from Nawabgonj upazila of Dinajpur district respectively are taken as a rural study area randomly. The sixth stage of sampling involves the selection of households. In all, 600 households are selected for the study. Of them, 300 are taken

from rural areas and the rest 300 are selected from urban areas using random sampling technique. Both primary and secondary data are used in this study.

Section 6.2 gives the survey results of the study area. These are as follows:

- i. Empirical results indicate that the socio-economic and human development related indicators such as schooling, income, life expectancy, access to better sanitation are much higher in urban than rural ones. Number of literate respondents is more than illiterate ones in both the rural and urban areas. As regards the level of literacy, there has been marked disparity between urban and rural population. Urban people receive more education and their earnings are higher than rural people. Around 73.3 percent of urban residents are educated compared to 56.0 percent of rural residents. The empirical findings manifest that adult literacy rate is 50.0 percent in rural area compared to 70.0 percent in urban area. The highest numbers of the respondents concentrate in the 26-45 years age group in both the rural and urban areas. Number of self-employed people is the highest (85.3 percent in rural areas and 50.0 percent in urban areas among the respondents. The highest numbers of the respondents are found from agricultural occupation in the rural area that's clearly consistent with the national statistical status, and service holders are the second highest in the study area. At the same time, various non-agricultural activities are playing an important role in providing the opportunities of employment and earnings to the labor force belonging to both farming and non-farming households. Majority of the rural people are engaged in agriculture as their main occupation, whereas in the urban area business and job are the main

occupations of the respondents. So, agricultural employment and self-employment are more common phenomenon in the study area.

- ii. Survey results (Table 6.2.9) show that average monthly income per household is estimated at Tk.10,000.00 in rural area and Tk.20,500.00 in urban area; while, it is estimated at Tk.15185.00 in the study area. Per capita monthly income for the rural, urban and for the study area are Tk. 2457.00, Tk. 4940.00 and Tk.3710.00 respectively. The average household income and per capita income in urban area are much higher than their rural counterpart. Ceiling of income earners (Table 6.2.10) between Tk.5001-Tk.10000 is the highest in number in rural area and majority (42.0 percent) of the respondents' income ranges between Tk.10001-Tk.20000 in urban area. The survey results also indicate that on an average, people with more schooling (Table 6.2.11) earn more than people with less schooling. Primary school graduates tend to earn more than those with no schooling, secondary school graduates earn more than their counterparts who have completed only primary school and those with tertiary education tend to earn the most. Of course these are average tendencies. Lower level of education is dragging to lower income earnings, side by side higher level of education boosts up to higher income earnings. Education provides people with skills that allow them to be more productive in their work, thereby creating for them the opportunity to earn higher wages in the labor market. On an average, residents of urban areas receive significantly higher earnings than individuals living in the rural area.
- iii. Almost 100 percent people in both rural and urban areas (Table 6.2.13, 6.2.15 and 6.2.17) have access to safe water and more than half of the people have access to sanitation facilities, but sanitation and hygiene

practice are not satisfactory in rural area. On the other hand, sanitation practice in the urban area is satisfactory. It is vivid that the more educated individuals have access to better sanitation facilities compared to people with less education and urban residents have access to more improved sanitation facilities than those of their rural counterparts.

- iv. Rural people have a shorter (Table 6.2.18) life expectancy (66.50 years) than their urban counterparts (69.0 years) and health care expenditure is two times higher in urban than rural ones. People in urban area would expect to live more than people in rural area.
- v. Through this study it is found (Table 6.2.21) that the child mortality rates are higher in rural area than in urban and mothers' education influences the rates of child mortality. Level of mother's education is inversely related to her child's risk of dying. Mothers with higher level of education contribute to reduce the rate of child mortality. This is because, education makes women aware that leads to better health and childcare, sanitation, adequate nutrition, hygiene practices and personal habits and raises the demand for community health care. So there exists a significant relationship between mother's schooling and child survival. Higher levels of educational attainment are generally associated with lower mortality risks, since education exposes mothers to information about better nutrition, use of contraception to limit and space births, health caring during pregnancy and childhood illness, vaccinations and treatments. Child mortality declines sharply with increased level of mother's education. It is in fact mother's education assist to afford requisite factors related to safe motherhood, like mother and child rights, proper child rearing and access to health services, proper reproductive health care and propagation, access to hospital for safe

delivery with economic security, fostering proper nutrition and other complementary issues. Empirical results shows that the child mortality rate in rural area is higher than in urban. In rural areas, poverty rates are higher and access to health services is lower. Income inequality reinforces unequal health outcomes for women.

9.3 Main Findings

The empirical findings of the study are depicted below in brief.

- i. This section gives the empirical results of this research in short. Empirical finding shows (Table 8.1) that the HDI value of urban area is higher than rural area.
- ii. Estimates of returns to schooling are separately reported for the rural and urban area. Results of the earnings model (Table 8.2) indicate that the coefficients of schooling in the rural and urban areas respectively are 0.081 and 0.078, signifying that the earnings of individuals who have received additional years of schooling increase by 8.1 and 7.8 percent respectively. We find that education is a little more rewarded in rural labor market than in urban labor market. The coefficient of experience in the rural area is positive but it is statistically insignificant. Results also show that the marginal effects of work experience on earnings is 0.009 in the urban area and it is statistically significant, denoting that every extra year of work experience enhances the wages of individuals by 0.9 percent.
- iii. Findings reveal that the coefficients of schooling are positively significant at 1 percent level implying that earnings of an individual with each additional year of schooling increase by 7.8 percent and 7.5 percent in the rural and urban areas respectively. The coefficient of experience in the rural area is

positive but statistically insignificant, while the coefficient of experience for the urban area is positive and significant at 1 percent level suggesting that earnings of individuals rise by 5.2 percent for extra year of work experience in the urban areas. The estimate for quadratic term (coefficient of experience squared is negative) reveals that the relationship between experience and earnings is concave in nature. Results show that returns to education are generally positive and significant both in rural and urban areas. Experience exerts no effect on earnings in the rural area while experience leads to increase in earnings significantly in the urban area but has a non-linear effect (squared term is negative) both in the rural and urban area.

- iv. Findings (Table 8.4) show that in the rural area, the coefficient of schooling (0.050) is positive and significant at 1 percent level, signifying that earnings of individuals with extra year of schooling rise by 5.0 percent. As expected, the coefficient for schooling squared is positive and significant at 1 percent level. The estimated coefficient of quadratic schooling is convex in nature. This means that the return to a year of schooling enhances as the years of schooling increase. The experience coefficient (0.017) is positive but it is not statistically significant, denoting that experience is not significant in attracting earnings. The coefficient of experience squared is negative, indicating that the relationship between experience and earnings is concave in nature. While in the urban area, the coefficients of schooling and experience are respectively 0.045 and 0.052 and these are positive and statistically significant at 1 percent level, denoting that earnings of individuals having additional year of schooling go up by 4.5 percent and for extra year of work experience earnings of individuals rise by 5.2 percent. The coefficient of schooling squared (0.004) is positive and significant at 1 percent level. The

quadratic term of schooling is convex in nature, signifying that the return to a year of schooling rises as the years of schooling increase. The estimate for quadratic term (coefficient of experience squared is negative) reveals that the relationship between wages and experience is concave in nature. Again we observe the convexity in returns to education. This result corroborates with that of Söderbom et al. (2006) and Fox and Oviedo (2008).

- v. When we include all the levels of education in Mincerian equations (Table 8.5) to examine the impacts on earnings, implying that in the rural area, the coefficient of primary schooling (0.250) is positive and statistically significant at 5 percent level but the coefficients of secondary, higher secondary and higher levels of education are 0.453, 0.532 and 0.920 and these are positive and highly significant at 1 percent level, indicating that earnings of individuals having primary, secondary, higher secondary and higher levels of schooling go up by 25.0 percent, 45.3 percent, 53.2 percent and 92.0 percent respectively, on an average, compared to individuals with no education. The coefficient of experience is positive but statistically insignificant. The coefficient of experience squared is negative (-0.0003), which suggests that the link between wages and experience is concave in nature. The coefficient of agriculture is positive but insignificant. The coefficients of business and job are 0.150 and 0.182 and these are positive and significant at 10 percent and 5 percent level respectively, signifying that earnings of individuals who are involved in business and job increase by 15.0 and 18.2 percent respectively, on an average compared to the day laborers and casual workers. The coefficient of wealth variable is 0.000012 and it is statistically significant at 1 percent level, indicating that there is one unit increase of wealth earnings rises by 0.000012. While, in the urban area,

the coefficient of primary schooling is 0.202, which is positive and significant at 5 percent level, while the coefficients of secondary, higher secondary and higher levels of schooling are 0.502, 0.580 and 1.003 respectively and these are positive and significant at 1 percent level. This signifies that earnings of individuals with primary, secondary, higher secondary and higher level of schooling go up 20.2, 50.2, 58.0 and 100.3 percent respectively, on an average, in comparison to individuals having no education. The returns associated to other human capital variable, i.e., experience, increase by 4.4 percent for each additional year spent in the labor market. Though experience adds a 4.4 percent increase in real earnings but has a non-linear effect (squared term is negative). Results (Table 8.5) show that the magnitude of the coefficient on education increases progressively with educational levels. The coefficients of business and job are 0.307 and 0.288 and these are highly significant at 1 percent level denoting that earnings of individuals who are engaged in business and paid job increase by 30.7 and 28.8 percent respectively, on an average, compared to the day laborers and casual workers. The coefficient of agriculture is positive but statistically it is insignificant in rural area. The coefficient of agriculture is negative and statically significant 10 percent level, suggesting that it exerts influence negatively on earnings in the urban area. The coefficient of wealth variable is 0.000037 and it is highly significant at 1 percent level, which indicates that one unit increases the household wealth earnings go up by 0.000037. Results suggest that the rates of return to education rise with the level of education.

- vi. The results (Table 8.7) show that by the level of schooling, the returns are highest at the tertiary level, on average at 13.0 percent, followed by primary

level (at 5.0 percent) and then secondary and higher secondary level of education (both are equal at 4.0 percent) in rural area. In urban area, returns to tertiary education are the highest (14.0 percent), followed by secondary (6.0 percent), higher secondary (4.0 percent) and primary at 4.0 percent. Montenegro and Patrinos (2013) show that by country income group, the returns to primary schooling are highest in low income countries. In fact, returns are highest at each level in low income countries, reflecting the relative scarcity of human capital.

- vii. The regression results in the Table 8.8 display that in the rural area, 20 percent of the variation in life expectancy are explained by education and health expenditure. The marginal effect of education on life expectancy is not statistically significant; however there is a positive relationship between health expenditure and life expectancy. The coefficient of health expenditure variable is insignificant. In the urban area, 25 percent of the variation in life expectancy can be explained by education and health expenditure. The marginal effect of education on life expectancy is 8.132 and it is statistically significant at 5 percent level, denoting that education exerts effect on life expectancy in the urban area. The coefficient of health expenditure is significant at 5 percent level, which suggests that the life expectancy of an individual goes up by 0.012 with a unit increase in health expenditure.
- viii. Regression results (Table 8.9) signify that 20 percent of the variations in life expectancy are explained by primary, secondary and higher secondary levels of education and health expenditure. The coefficients of primary and higher secondary levels of education are positive but insignificant. But the coefficient of secondary level of education is (10.106) positive and

statistically significant at 5 percent level, indicating that secondary level of education exerts effects on life expectancy in rural area. But in the urban area, 25 percent of the variations in life expectancy can be predicted from the various levels of education and health expenditure. The coefficients of secondary and higher levels of education are 8.671 and 10.106 respectively and these are positive and significant at 5 and 10 percent levels, signifying that secondary and higher levels of education exert effects on life expectancy. The coefficient of primary and higher secondary levels of education are positive but insignificant. The coefficient of health expenditure is also positive and significant at 5 percent level indicating that one unit increase in health expenditure would result in a 0.010 unit increase in life expectancy.

- ix. The results of logistic regression on sanitation (Table 8.10) show that in the rural area, the odds ratio associated with schooling is 1.408, indicating that individuals having of schooling are 1.408 times more likely to have access sanitation facilities than individuals having no education. The odds ratio related to earnings is 2.656, denoting that individuals whose household income is more than or equal to Tk.10,000, are 2.656 times more likely to practice sanitation than individual whose household income is less than Tk.10000. In the urban area, the odds ratio related to schooling is 1.488, signifying that individuals having schooling are about 1.488 times more likely to have access sanitation facilities compared to individuals with no schooling. The odds ratio associated to earnings is 3.022, denoting that individuals whose household income is more than or equal to Tk.10,000, are 3.022 times more likely to practice sanitation than individual whose household income is less than Tk.10000.

- x. Logistic regression results on sanitation (Table 8.11) reports that in the rural area, the odds ratios of secondary, higher secondary and higher levels of education are respectively 2.206, 4.794 and 4.972, indicating that individuals having secondary, higher secondary and higher levels of education are respectively 2.206, 4.794 and 4.972 times more likely to have access to sanitation facilities compared to individuals having no education. The odds ratio for job is 9.787, denoting that individuals who are involved in job are 9.787 times more likely to practice sanitation than day laborers and service workers. While in the urban area, the coefficients of all independent variables such as primary, secondary, higher secondary and higher levels of education and other variables have significant effect on sanitation practice except agriculture. The odds ratio for primary, secondary, higher secondary and higher levels of education are respectively 4.419, 4.944, 7.581 and 11.931, implying that individuals having primary, secondary, higher secondary and higher levels of education are respectively 4.419, 4.944, 7.581 and 11.931 times more likely to practice sanitation compared to individuals with no education. The odds ratio for business and job are respectively 7.286 and 17.242 signifying that individuals who are involved in business and job are respectively 7.286 and 17.242 times more likely to practice sanitation than day laborers and service workers.

9.4 Policy Implications and Conclusion

Based on the above mentioned findings the following policy and recommendations deserve consideration. The main underlying cause of low level of human development situation in Northern region of Bangladesh, particularly in rural areas is due to inadequate resource allocation for education, health and infrastructural development.

- i. The empirical findings show that the human development situation in the study area is not impressive; it represents a dismal picture particularly in the rural area. The basic human development indicators, such as, literacy rate, income and life expectancy are significantly lower, particularly in the rural area. There are many ingredients to develop human resources. Among them, education is an important and critical ingredient for human resource development. Bangladesh spends only 2.0 percent of its GDP on education in 2015 (UNDP, 2016). The share of spending on education must be increased. According to United Nations recommendation at least 7.0 percent of a country's GDP should be transferred to education.
- ii. Focusing on the social returns to education, primary education is an investment priority in low income economies like Bangladesh, followed by secondary and tertiary in order. More investment in public sector is necessary in both the areas giving emphasis on improving quality of education and training, and the emphasis should be shifted from general to technical and professional education particularly in rural areas. The free and compulsory primary education should be upgraded from grade five to grade twelve for both girls and boys and resource allocation for education must be determined by the requirement of manpower development in the country. Bangladesh needs to improve both the quality and quantity of education. The quality of education at all levels must be improved and the emphasis should be shifted from general to technical and professional education particularly in rural areas. At the same time, policies would have to be directed at improving the quality of basic education along with focusing on increasing enrolment rates. Infrastructure developments, provision of learning materials and supply of well qualified teachers are important for enhancing the quality of education. Teachers are the most important resource for ensuring high quality education. All teachers are human resource developers. Trained teacher, teacher-student ratio and reasonable student teacher

contact hours, efficient strategy of orienting students up to mark, congenial academic atmosphere and physical infrastructure are inevitable that help to develop human resource. The strength of education system largely depends upon the quality of its teachers and standard curriculum as well as well coordinated mechanism and correlated factors. Dramatic improvements are required in teacher's training and supervision, in learning materials and school facilities. Material and social status of the teachers should be improved without further delay. This would help increase returns to education at lower levels of education.

- iii. There must be massive changes in the educational system to suit the Bangladeshi masses, in acquiring the skill and knowledge required for their self-employment. Mismatch between education and occupation should be removed. Above all else, the rural educational system must be transformed to provide the same opportunities for rural students as is available in urban areas. If earnings are to be equalized, this differential in schooling and opportunities of getting higher education must be eliminated. To eliminate urban-rural discrimination, budgetary allocation should be transferred to education and health in proportion to urban-rural population. Population is not a curse; the population has to be converted into human assets. For this reason science and technology have to be used properly.
- iv. Ensuring a well-functioning uniform education system, with maximum attention being given to the rural areas and maximum enrolment of both genders at least at the secondary level should be prioritized. Like education, training is also essential for human resource development. Training makes an individual fit for the profession. Skilled and trained manpower is essential for maintaining agriculture, industry, ICT and service sectors both in urban and rural areas. Education and skill training is the most important component of human development. To arrange effective

training, unskilled and semi-skilled work force of different sectors can be converted into skilled manpower/ developed human resource.

- v. Policies should be made to focus on the development in rural areas. Rural area has lagged behind in all counts. Rural people need three things: jobs, services and infrastructure including a transport infrastructure that allow them to access to jobs and services of nearby towns and cities. Building rural roads reduces transport costs, connects rural farmers to markets, allows workers to move more freely and promotes access to schools and health care clinics.
- vi. First is to develop the agricultural sector in rural areas. To increase agricultural production subsistence farmers have to be given special emphasis on increasing yields. The agriculture system has to be made more effective, diversified and productive by increasing investment. A large number of mills and factories and agro-based industries (especially in rural areas) have to be established for employment generation. Farm activities in Bangladesh are low in productivity due to backwardness of technology, inadequate investment and distribution system. Income from non-farm activities is much higher than that from farming, exerting an equalizing influence on rural-urban income distribution. People with low income level should be offered more opportunities to get engaged in non-farm activities. Also to improve productivity and wage of workers, a sustained investment in skill improvement in new technologies are essential. Family farms are usually in small scale and vulnerable to natural disasters. However, the poorest rural residents might not be able to afford the cost that is needed for them to seek the jobs in urban areas, while at the same time such non-farm employment opportunities are very limited in rural areas. That is why, agriculture sector has to be brought under modernization so that more rural people could be involved in non-farm activities that can assist them enhancing income. Government should provide more technical and financial

supports to improve the productivity and crop diversification for family farms and set up more agro-processing businesses in the rural areas. Providing information about available opportunities and connecting those searching for better employment with new opportunities make labor markets work better. Those in informal employment, many of whom are self-employed, need better access to credit and markets. All these require public investment.

- vii. Human resource development depends on improved health services. Though, Bangladesh has made a considerable progress in this health field with low cost. The budgetary allocations for health are inadequate (only 0.8 percent of its GDP), inefficient and inequitable. It is inefficient because, first, public funds are allocated across priorities that do not yield significant health benefits for the majority of the population and, second, funds are misappropriated and misused. Public spending on health is also inequitable in the sense that the benefits of public subsidies on health are mostly captured by the richer income groups. Much of the government funding of the public sector health care go into expensive tertiary level projects in urban areas. So, the government has to make investment in education, health and other social services for all classes of people, but much emphasis on the rural should be given.
- viii. Bangladesh needs to substantially increase its health sector spending, and the health expenditure must be utilized properly. The management of the public sector healthcare system needs to be reformed urgently. The system is fraught with inefficiencies, leakages, corruption and wastage. A number of initiatives need to be taken simultaneously. Public sector health care provision needs to incorporate modern management system, including inventory and supply chain management, accounting and control, and modern human resource management systems. These need to be introduced at the national and local levels, and in all public sector

programs and healthcare institutions. Tighter monitoring and evaluation, resulting from the introduction of these new systems, and better incentive structures for health workers have large potential for improving the quality of healthcare provided by the public sector. Primary health care, quality health services, child and maternity services (neonatal and antenatal care) and preventive measures for infectious and awareness program should be extended all over the countries particularly in rural areas. People in rural areas are always deprived of health. To eliminate urban-rural discrimination, budgetary allocation should be transferred to health in proportion to urban-rural population. To ensure well-functioning health system with maximum availability of free-of-cost and quality essential medicines and vaccines to the poor community, policymaking process has to be decentralized and democratized to allow participation of all stakeholders. This is essential not only to make policy responsive to local needs, but also to involve the community in monitoring and evaluation of public health provision.

- ix. Primary healthcare facilities should focus more on preventive health measures rather than curative care. Providing extensive primary level facilities would ensure that diseases are controlled/treated at the first level at a lesser cost than would be required if the disease is ignored and dealt with at the tertiary level. Primary level facilities should be able to deal with most of the problems faced by people. The issues of doctor absenteeism, lack of storage facilities for drugs, attitudes of hospital staff, etc. all need to be improved.
- x. Health education campaigns on preventive issues, such as, immunization, awareness of communicable and non-communicable diseases, family planning, hand washing and sanitary practices are frequently conducted by both public and private nonprofit sectors. Health education for all women is necessary to attain better health outcomes for the whole family. Health education can best be provided

through community-based health workers and the media. The countries should focus more on programs that are based on health information and healthcare through community participation. The media has a wide reach and should initiate awareness raising campaigns to educate women and men on health issues. NGOs should also work actively, particularly in rural areas to increase women's awareness about their reproductive health.

- xi. Investment in access to safe water and improved sanitation facilities has significant casual connections with health outcomes, especially infectious and communicable diseases. Bangladesh's performance in providing its population with adequate sanitation facilities is extremely low. Universal access to sanitation facilities have to be ensured for all the people particularly for the rural people. So the government needs to make massive investment in education, health and other social services for all classes of people, but much emphasis on the rural should be given. More than 33 percent of its budgetary allocation should be spent on education, health and other social services for its human resource development of which the share of allocation would be proportionately provided to the rural population.
- xii. Reduction of poverty should be the top priority. The benefits of high economic growth have to be translated adequately to the rural masses into reduction in poverty and human deprivation.
- xiii. HRD should be emphasized utmost both in the public and private sectors. A separate ministry may be established to deal with various aspect of HRD. A country wide campaign should be undertaken for the development of human resources particularly in rural areas.

9.5 Scope of Future Research

The study is done to make a comparison between rural and urban areas in terms of socioeconomic and human development indicators of Northern region of Bangladesh. It also estimates the rates of returns to schooling in both the rural and urban areas. It indicates the following areas relating to issues of human resource development and assessing the rates of returns to schooling where future research is needed. Future researcher can make comparison between Northern and Eastern or South-western region in Bangladesh in terms of socioeconomic and human development indicators. Future researcher can estimate the rates of returns to schooling on wages between private and public sectors and examine the effects of technical and general education on earnings. Researcher can also see the differences between earnings of different racial groups, wage gaps between males and females using Mincerian model. In addition to these, more research on the social benefits of schooling can be conducted.

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Appendix

Title of the Study: **Rural-Urban Comparison of Human Resource Development in Northern Region of Bangladesh**

Aims of the Study: The aim of the study is to make a comparison between rural and urban areas in terms of socio economic and human resource development indicators.

Part A: General Information

Date of Survey

Village/ Mouza/Mahalla:

Household No:

Upazila/ Thana:

District:

Part B: Information about socio-economic status of the respondents

1. Name of the respondent (Household Head) Mobile No:
2. Age
3. Sex (i) Male (ii) Female
4. Family member/size of the household:
5. Education of the respondent: (i) Literate (ii) Illiterate
6. If educated/ Literate: Years of schooling
7. Employment status and occupation : (i) Self-employed: Agriculture,
Business, Service (ii) Salaried/ paid job (iii) Others
8. Educational status of the study area
 - (a) Adult literacy rate
 - (b) School enrollment ratio
 - (i) Primary
 - (ii) Secondary
 - (iii) Tertiary enrollment

Part C: Monthly Household Income Status:

9. (a) Number of earning/ working members of the household (household head and others members):
 - (i) Age

(iii) Type of work (a) Job/work/service

(iii) Work experience

(iv) Wages rate /salary/earnings (in terms of money)

b) Economic Status of the Respondents

No of working people in the household	Sources of income/ Profession/ Occupation	Earned income	Unearned income	Monthly total household income (Tk.)	Total household wealth (Tk.)
1. Household head	Agriculture: Business: Job: Services: Others sources:				
2. Others member	Agriculture: Business: Job: Service: Others sources:				
3.	Agriculture: Business: Job: Service: Others sources:				
4.	Agriculture: Business: Job: Service: Others sources:				

(c) Household Expenditure of the Respondents

Average Monthly Household Expenditure:		Amount (Tk.)
(i)	Food expenditure	
(ii)	Clothing expenditure	
(iii)	Housing expenditure	
(iv)	Health expenditure	
(v)	Education expenditure	
(vi)	Transport and communication expenditure	
(vii)	Miscellaneous expenditure	

Part D: (a) Health, hygiene and sanitation

Sources of drinking water	Sanitation condition: Type of latrine	Cleanliness: How to wash hand after defecation
1. Supply water/tap 2. Tube-well 3. Other sources	1. <i>Pacca</i> 2. <i>Semi- Pacca</i> 3. <i>Kacha</i> 4. Open space	1. Water with soap 2. Water with soil 3. Water with ash 4. Only water

(b) Had infant/under five aged children died in your family?

(i) Yes

(ii) No

If yes, then

Information about child mortality							
Age of the child (month/year)	Age of the mother	Occupation of mother	Occupation of father	Education of mother	Monthly household income	Causes of death	Child birth place

Part E: Information about the dead individuals

Had any individual from your family died during the last ten years?

(i) Yes

(ii) No

If yes, then

Information about dead individual							
Sl. NO.	Sex	Age (year)	Education	Occupation	Monthly household income	Monthly health expenditure	Causes of death