BANGLADESH DELTA PLAN 2100

Baseline Studies : Volume 5

Socio-Economic Aspects of the Bangladesh Delta

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BANGLADESH DELTA PLAN 2100

Baseline Studies on Socio-Economic Aspects of the Bangladesh Delta

Volume 5

Baseline Study 19:
Population Growth and Management
Baseline Study 20:
Socio-Economic and Demographic Condition
Baseline Study 21:
Socio-Economic Characteristics of Chittagong Hill Tracts

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Disclaimer
Baseline studies were conducted to review past performances to generate information and knowledge, identify caveats and draw policy lessons and observe inter-sectoral impacts relating to water resources, land and agricultural practices and analyse climate change impacts. All these have been done to formulate delta action plan based on strategies developed through research by eminent scientists and professionals. Data, information and statements provided in the studies entirely belong to the authors, as such, GED bears no responsibility of inaccuracy, if any of data or statement.

A H M Mustafa Kamal, FCA, MP
Minister
Ministry of Planning
Government of the People's Republic of Bangladesh

Message

I am happy to know that the General Economics Division (GED) of Bangladesh Planning Commission is publishing the Baseline Studies in six (6) volumes which were prepared for formulation of the Bangladesh Delta Plan (BDP) 2100.

Over the past 47 years since independence Bangladesh has secured tremendous gains in development. Bangladesh has achieved food self-sufficiency and the economy is gradually transforming from an agrarian base towards a modern manufacturing and services economy. Making this growth sustainable is even more challenging in the face of extreme adverse climate variability, with frequent storm and tidal surges, flooding, and droughts. I am confident that the BDP2100 will amply guide us in realizing the vision that is aspired in the plan of being a prosperous country beyond 2041 and also contribute directly in making the growth sustainable by ensuring long term water and food security, economic growth and environmental sustainability while effectively reducing vulnerability to natural disasters and building resilience to climate change and other delta challenges. I hope BDP 2100 will also contribute to the making of 5 year plans as well as contribute to achieving SDG's and other national policy goals.

The Baseline Studies generated both quantitative and qualitative benchmark information for relevant subject areas of the plan and identified critical areas for future intervention. It also forms the basis for determining strategies and measures that have been suggested in BDP2100 for different climatic Hotspots.

I am particularly pleased to note that BDP 2100 being a techno-economic plan, is the first attempt in our national planning history to formulate a real long term plan prepared by GED. The publication of the Baseline Studies in book form which served as basis for the preparation of the BDP 2100 has immense importance to keep the institutional memory preserved. These will be useful references to the policymakers, development partners, academics, researchers, students and professionals alike to further research endeavor and knowledge sharing.

In this instance, I would congratulate relevant officials of GED of Bangladesh Planning Commission for their hard work in compiling the Baseline Studies in book form. My sincere appreciation goes to the experts in their respective fields for completing the Background Studies for formulation of the BDP 2100.

(A H M Mustafa Kamal, FCA, MP)

M. A. Mannan, MP
State Minister
Ministry of Finance and Ministry of Planning
Government of the People's Republic of Bangladesh

Message

It gives me immense pleasure to learn that the General Economics Division (GED) of Bangladesh Planning Commission is going to publish 26 Baseline Studies in six (6) volumes which have been used as the inputs for preparing the country's first long term Plan i.e. Bangladesh Delta Plan (BDP) 2100. The Baseline Studies of BDP 2100 are the culmination of both quantitative and qualitative benchmark information for relevant subject areas of the plan and identified critical areas for future intervention. I believe, GED of Bangladesh Planning Commission has pursued with various eminent professionals, scientists, researchers, academia etc. at national and international levels for conducting these Baseline studies.

I know that BDP 2100 is the long term plan for the country to realize sustainable and a commonly agreed upon strategy with specific short, medium and long term interventions involving all relevant stakeholders for an optimum level of water safety and food security as well as sustained economic growth of Bangladesh and a framework for its implementation.

I congratulate the GED for taking up this bold initiative. I would like to thank the authors and also the reviewers who have contributed to prepare these Baseline Studies. Documented Baseline Studies will also be helpful for policy planners, development practitioners, researchers, academicians, professionals and even students as well. I also expect that the Baseline Studies will be useful for the officials of GED to prepare necessary policy briefs and write-ups they often prepare. I believe that not only GED but also other relevant officials will be immensely benefited with these Baseline Studies for upgrading and updating their knowledge and professional competences. Finally, I thank GED leadership for undertaking this endeavor for publishing Baseline Studies of the BDP 2100 for much wider use.

I wish all the best and all out success.

M. A. Mannan, MP

Shamsul Alam
Ph.D. (Newcastle), M.A. Econs. (Thammasat)
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Prefatory Comments

Bangladesh is one of the largest deltas of the world and its rivers and floodplains support life, livelihood and economy. The country is defined by the delta, with almost a third of the country lying less than 5 (five) metres above sea level, on the contrary however, coastal zone, the low-lying area, is highly vulnerable, especially to cyclones and storm surges. In addition, salt-water intrusion, floods, sea level rise intensify the vulnerability of the community of the areas. These problems are likely to become even worse due to climate change adverse impact.

Many more challenges lie ahead for Bangladesh, the most important being pressure on land use, environmental protection, governance, globalization and macro-economic development. Given the ambition to be a developed country by 2041, addressing the expected impacts of climate change, there is a need for an integrated approach to future land and water management in relation to water safety, agricultural growth and food security. The recent and future anthropogenic changes in the hydrological cycle due to e.g. climate change, construction of dams and barrages in the upstream countries in combination with increasing water demand are expected to make future water governance and management even more challenging.

With a view to meeting the above challenges, the Government of Bangladesh (GoB) requested the Government of the Netherlands (GoN) to assist for formulation of adaptive, multi-sectoral, comprehensive and holistic Delta Plan taking lessons from Dutch experiences. The GoN agreed to provide the necessary support through its Embassy in Dhaka. In accordance with the decision of the Government, the General Economics Division (GED) of the Planning Commission, Ministry of Planning was assigned to lead the formulation of Bangladesh Delta Plan 2100, as the GED is mandated for medium and long term planning at the national level.

Bangladesh Delta Plan 2100 has been conceived as a techno-economic, long-term, holistic, water centric, strategic plan. As such, formulation of strategies in the short (budgeting), medium and long term is the most significant part in the planning process. The long term strategies will help to fulfil the Delta Vision, whereas the short and medium term strategies will help achieve benefits within the country's 5 year planning horizon as well as contribute to achieving SDG's and other national policy goals. An interactive planning process has been followed comprising three major steps: i) Conducting Baseline Studies; ii) Formulation of Adaptive strategies; and iii) Development of the Delta Management Framework. These steps were supported by country wide consultation processes which eventually led to the outcome of an Investment and Implementation Plan.

The project has prepared 26 Baseline Studies on known delta problems, reviewing existing policies and governance challenges in the sector of water resources, land, environment, disaster, agriculture, fisheries, livestock, transportation, finance, governance, knowledge generation etc. The studies followed the basic steps of reviewing the current policy situation, assessing the status of individual sectors, identification of drivers or pressures, conducting integrated analysis for the right interpretation of problems, challenges and knowledge gaps. For starting an integrated analysis with stakeholders it was essential to create an overview of already established and agreed-upon policies as well as to rank

priorities for further investigation, research and discussion. The key elements in the approach were (a) knowing the present state, problems, impacts, challenges and current responses or interventions; (b) consideration of uncertainties of social and natural systems and knowledge gaps; (c) the evaluation of drivers, trends or events in the interaction between the delta and society.

These Baseline Reports have been clustered into Six Volumes on the basis of thematic issues and topics.

Volume 1: Water Resources Management consists of seven Baseline Reports: 1. Sixty Years of Water Resources Development in Bangladesh: Lessons Learnt; 2. River System Management; 3. Water Resources; 4. Groundwater; 5. Coast and Polder Issues; 6. Water Supply and Sanitation; 7. Part A- Sediment Management and Part B- Meghna Estuary Study;

Volume 2: Disaster and Environmental Management consists of four Baseline Reports: 8. Climate Change; 9. Disaster Management; 10. Environmental Pollution; 11. Ecological Setting;

Volume 3: Land Use and Infrastructure Development consist of three Baseline Reports: 12. Land Resources Management; 13. Urbanization and Settlement; 14. Sustainable Transportation and Infrastructure;

Volume 4: Agriculture, Food Security and Nutrition consists of four Baseline Reports: 15. Agriculture and Food Security; 16. Fisheries; 17. Livestock; 18. Forests and Biodiversity;

Volume 5: Socio-Economic Aspects of the Bangladesh Delta consist of three Baseline Reports: 19. Population Growth and Management; 20. Socio-Economic and Demographic Condition; 21. Socio-Economic Characteristics of Chittagong Hill Tracts;

Volume 6: Governance and Institutional Development consists of five Baseline Reports: 22. Institutional Framework and Arrangements; 23. Information and Knowledge Management; 24. Regional Cooperation; 25. Financial Mechanisms & Arrangements in the Water Sector in Bangladesh; and 26. Private Sector Engagement in Deltas.

Volume 5: Socio-Economic Aspects of the Bangladesh Delta

Population Growth and Management: Bangladesh is the 8th largest country in the world by population (157.85 million) and the 94th largest country in the world by total area (147,570 km2). It has one of the highest population densities in the world and is currently in a transitional phase in its economic development. All economic development is predicated on population demographics and economic development is ultimately about improving the lives of the general population. All aspects of planning, therefore, from adopting policies to foster economic growth to building climate change resilient infrastructure to raising education standards to implementing effective water resource management strategies for agricultural sector growth etc. all depend on the size, structure, composition and characteristics of the population.

According to the standard population-development model the changes in population occur during the transition phase between two stable equilibrium states. The first stable equilibrium state is characterized by high birth and death rates (thus low growth rates). With economic development and increased access to healthcare services and medical technology death rates tend to fall sharply; however, as birth rates follow cultural and other socioeconomic factors they tend to lag behind the declines in death rates. In very general terms this causes the population explosion. As birth rates decline, the population starts to stabilize again and this state is characterized by a higher total population with low birth and death rates (thus low growth rates). This period of transition, if properly managed and exploited can yield a population dividend that has far reaching consequences to future prosperity. Bangladesh is currently entering (if it has not already entered) this window of opportunity, thus planning for these probable futures is of vital importance.

This Study explores the historical trends of the population demographics and attempts to assess the probable future states of population.

Socioeconomic and Demographic Condition: For a quick socio-economic snap-shot, it may be stated that Bangladesh is ranked 146th out of 186 countries in the 2013 Human Development Index (HDI), and 68thout of 79 countries in the 2012 Global Hunger Index (GHI). Ethnic groups that are available in the country are - Bengali 98%, other 2% (includes tribal

groups, non-Bengali Muslims) and religions are Muslim 89.5%, Hindu 9.6% and other 0.9% (2004). Demographically, the total population in Bangladesh is estimated at 156.5 million people. The population growth rate was 1.37% in 2011 (BBS, 2014). According to the Population Census, 2011, the population density is 1015/km^2. The intercensal (estimate of population between census dates) growth rate is 1.4 % a year. The population is expected to increase to 181 million in 2025 and 224 million in 2050. The country's literacy rate of the population aged above 15 reached 59.82 percent while the illiteracy rate is 40.18 and the literacy of women is 55.71 per cent in 2011.

The Bangladesh economy is composed mainly of three sectors: Agriculture (18.7% contribution to GDP), Manufacturing/ industry (32% contribution to GDP), and Services (contributing 49.3% to the GDP). The Industrial Policy 2010 announced the number of 'Thrust Sector industries' down to 30. These industries shall be eligible for special fiscal incentives and supports, viz., tax exemption, tax at reduced rates, avoidance of double taxation, etc., and perhaps easier access to credit facilities from banks on concessional terms. Some of these sectors include light engineering, furniture, agribusiness, footwear, electronics, RMG, pharmaceuticals and fertilizers, among others.

There has been commendable progress in terms of poverty alleviation. The national headcount poverty index has declined by more than 25% during FY 1992- FY 2010. The absolute number of people living below the poverty line remains to be significant. The poverty incidence at lower poverty level at the national level is 17.6%, at the rural level 21.1% and at the urban level 7.7%, while the upper poverty level is 31.5%, 35.2% and 21.3% respectively (BBS, 2010). Despite the outstanding past progress, Bangladesh is still a low income country with substantial poverty, inequality and deprivation. It is estimated that 47 million people are living below the poverty line with a significant proportion living in households which are female headed, in remote areas, and consisting of socially excluded and other vulnerable people. Most of the labour force is engaged in informal low productivity and low income jobs. The access to secondary and tertiary education is limited and the quality of education at all levels is deficient. The poorest groups of the population are severely disadvantaged in terms of ownership of assets and have inadequate access to institutional finance as well as to basic services including quality education, healthcare, water and sanitation. These people, especially women and children, are also disproportionately affected by natural disasters and the adverse effects of climate change. Despite expansion, publicly supported mitigating measures in the form of social protection programs are still inadequate.

Addressing the future challenges facing Bangladesh will require a strategic plan with a long term horizon. While short term and medium term results are needed to solve urgent problems, contribute to achieving SDG's and to gain widespread socio-political support for Bangladesh Delta Plan 2100, a clear vision and set of goals must be set out now, with political commitment and engagement, and participation of all stakeholders.

Despite huge advances and sustained growth, unemployment rates have steadily increased since the 1980s and this has been largely due to a massive increase in population during the same period. It was just not possible for job creation rates to keep up with the increase in the labour force. A factor contributing to the rise in the unemployment rate is the increase in the sector activities and the need for more skilled labour force. There is a relationship here with the education levels where it is noted that there is significant need to address the tertiary education completion rates.

Socio-Economic Characteristics of Chittagong Hill Tracts: Chittagong Hill Tracts is a unique region in Bangladesh, differing ethnically, culturally, and topographically from other parts of the country. The diverse region extends over 13,295 square kilometres, or 10% of the country's land area. The population of CHT is 1.66 million (2011 Census) which includes twelve ethnic communities with unique cultures and traditions. The region has rich natural and environmental resources with hills, forests, rivers, and lakes, and a diverse flora and fauna. The scenic beauty of the hilly region is outstanding. The ecosystem plays an important role in economic development and environmental protection of the local community. An area of 319,614 ha of land is occupied by the forest in the CHT, which is about 40% of Bangladesh's forest area. The forest also plays a significant role in biodiversity conservation, erosion prevention, maintaining of water quality, reducing the severity of floods, and regulating water flow.
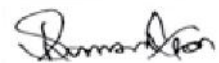
Despite possessing huge natural resources, the CHT has remained one of the most disadvantaged and poorest areas in the country. The region is lagging behind in development activities, food security, health and education, infrastructure and electricity and credit facilities. According to a survey conducted in 2009, the incidence of poverty in the CHT is

about 60%, much higher than the national average of 31%, and some of Bangladesh's poorest are found in this region. In fact, the Bandarban district in the CHT is one of the three poorest districts in Bangladesh. Even after the huge development efforts that followed the signing of the peace accord in 1997, a large part of the CHT remains physically and socioeconomically backward, much of which may be attributed to the rugged and inaccessible terrain in the area.

Although recent developments have brought considerable improvement, much remains to be done. Many studies and projects have been carried out in the CHT with assistance from the development partners, but the situation has not reached a satisfactory level. The Bangladesh Delta Plan 2100 prepared this Baseline Study on the CHT with the broad objective of presenting the existing situation of the region, and identifying some delta governance and water related solutions for possible improvement, including socio-economy, food security, agriculture, water supply, environment, governance, etc.

Chittagong Hill Tracts faces some unique challenges which are different to those in the rest of the country because of its special socio-cultural and geographic situation. The livelihoods of the people in the CHT are more dependent on economic and environmental changes than those in the plain lands. Remoteness and poor accessibility, poor infrastructure and social and economic services, and rapid socioeconomic changes are big challenges for sustainable development in the CHT. On top of this, the impacts of climate change without adequate measures to support adaptation only augment the existing problems. The challenges still to be faced are: poverty, poor accessibility and infrastructure, unemployment and dependence on agriculture, landlessness, deforestation, climate change impact, lack of safe water supply and poor sanitation, etc.

It is imperative to give immediate attention to the already deteriorating and degrading situation of the CHT for its rehabilitation and sustainability. Problems were not created overnight, but due to long negligence and lack of implementation of many projects has only added up to the problems. However, during the past few decades, there was substantial overall rural development; such as the mobile and internet technologies and the building of new roads only helped to improve the potential of progress in CHT. Remote villages are now connected to national, regional, and global markets. Subsistence farming like *jum* is being replaced by more modern methods to cultivate cash crops. Diversification of livelihood and value chains for rural products would reduce dependence on agriculture.

(Shamsul Alam)

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Abbreviations

ASFR	Age-Specific Fertility Rates
AF	Additional Financing
ARIMA	Autoregressive integrated moving average
ADB	Asian Development Bank
AFSP	Agriculture and Food Security Project
BADC	Bangladesh Agricultural Development Corporation
BBS	Bangladesh Bureau of Statistics
BCAS	Bangladesh Centre for Advanced Studies
BDP	Bangladesh Delta Plan
BFIDC	Bangladesh Forest Industry Development Corporation
BOD	Biological oxygen demand
BWDB	Bangladesh Water Development Board
BADC	Bangladesh Agricultural Development Corporation
BBS	Bangladesh Bureau of Statistics
BDHS	Bangladesh Demographic and Health Survey
BDP	Bangladesh Delta Plan
BMET	Bureau of Manpower , Employment and Training
BOESL	Bangladesh Overseas Employment and Services Limited
BADC	Bangladesh Agricultural Development Corporation
BBS	Bangladesh Bureau of Statistics
BDP	Bangladesh Delta Plan
BITs	Bilateral investment treaties
BLA	Bangladesh Literacy Association
BSCIC	Bangladesh Small and Cottage Industries Corporation
CBR	Crude Birth Rate
CDR	Crude Death Rate
CPD	Country Programme Document

CUS	Center for Urban Studies
CBN	Cost-of-Basic-Needs
CHT	Chattogram Hill Tracts
CPI	Consumer Price Index
CEGIS	Center for Environmental and Geographic Information Services
CHARM	Chattogram Hill Tracts Improved Natural Resources Management Project
CHT	Chattogram Hill Tracts
CHTDB	Chattogram Hill Tracts Development Board
CHTRC	CHT Regional Council
CITES	Convention on International Trade in Endangered Species
DAE	Department of Agricultural Extension
DoF	Department of Fisheries
DPHE	Department of Public Health Engineering
DTW	Deep tube wells
DCGE	Dynamic computable general equilibrium
ERD	Economic Relations Division
ESM	Employment Satellite Matrix
ETPs	Effluent treatment plants
Ecorys NL	Ecorys Nederland
ET	Evapotranspiration
FAO	Food and Agriculture Organization
FD	Forest Department
FGD	Focus group discussion
FDI	Foreign direct investment
FPIPPA	Foreign Private Investment Promotion and Protection Act
FYP	Five Year Plan
GBM	The Ganges- the Brahmaputra- the Meghna
GDP	Gross domestic product
GED	General Economics Division
GDP	Gross domestic product
GED	General Economics Division
GNI	Gross National Income
GoB	Government of Bangladesh
GDP	Gross domestic product
GED	General Economics Division
GNI	Gross National Income
HDCs	Hill District Councils
HDRC	Human Development Research Centre
HIES	Household Income & Expenditure Survey
HYV	High-yielding variety
HIES	Household Income & Expenditure Survey
HPNSDP	Health Population and Nutrition Sector Development Program
HIV/AIDS	Human immunodeficiency virus infection and acquired immune deficiency syndrome
HPNSDP	Health, population, and nutrition sector development programs

IMF	International Monetary Fund
IMR	Infant Mortality Rate
IPRSP	Interim Poverty Reduction Strategy Paper
ILO	International Labour Organization
IP	Investment Plan
ISCED	The International Standard Classification of Education
ISIC	International Standard Industrial Classification
ICIMOD	International Centre for Integrated Mountain Development
IUCN	International Union for Conservation of Nature
KHTP	Kaliakor Hi-Tech Park
LDC	Low Development Country
LFP	labour force participation
LMI	labour market intelligence
LDC	Low Development Country
LLP	low lift pumps
MDG	Millennium Development Goal
MoCHTA	Ministry of CHT Affairs
MDG	Millennium Development Goal
MMR	Maternal Mortality Ratio
MDG	Millennium Development Goal
MEF	Macroeconomic Framework
MoE	Ministry of Education
MoPME	Ministry of Primary and Mass Education
MoSPI	Ministry of Statistics and Programme Implementation
NEP	National Education Policy
NWMP	National Water Management Plan
NWRD	National Water Resources Database
NGO	Non-governmental organization
NTFP	Non-timber forest products
NWMP	National Water Management Plan
NWRD	National Water Resources Database
OECD	Organisation for Economic Co-operation and Development
PCU	Project Coordination Unit
PIF	Public Investment Facility
PPE	pre-primary education
PPP	public–private partnership
PRI	Policy Research Institute
PRSP	Poverty Reduction Strategy Paper
PCJSS	Parbatya Chattagram Jana Sanghati Samity
PF	Protected forests
RMG	Ready -made garment
RMMRU	Refugee and Migratory Movements Research Unit
RTIs	Reproductive tract infections
RF	Reserved forests

SDP	Sector Development Plan
SRDI	Soil Resource Development Institute
SDP	Sector Development Plan
SMA	Statistical Metropolitan Area
STIs	Sexually transmitted infections
SAFTA	South Asian Free Trade Area
SAM	Social accounting matrix
SDG	Sustainable Development Goals
SDP	Sector Development Plan
SEQAEP	Secondary Education Quality and Access Enhancement Project
SMEs	mall and medium enterprises
TPP	Technical Assistance Project Proposal
TVET	Technical and vocational training
TFR	Total fertility rate
UMIC	Upper Middle Income Country
UN	United Nations
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UN-Habitat	United Nations Human Settlements Programme
UGC	University Grants Commission
UMIC	Upper Middle Income Country
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UMIC	Upper Middle Income Country
UNDP	United Nations Development Programme
UNOs	Upazila Nirbahi Officers
USF	Unclassified State Forests
VSP	Village sanitation program
WB	World Bank
WB	World Bank
WDI	World Development Indicators (WDI)
WB	World Bank

BASELINE STUDY: 19

Population Growth and Management

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Executive Summary : Study 19

Bangladesh is the 8th largest country in the world by population (157.85 million) and the 94th largest country in the world by total area (147,570 km^2)[3]. It has one of the highest population densities in the world and is currently in a critical transitional phase in its economic development. All economic development is predicated on population demographics and economic development is ultimately about improving the lives of the general population. All aspects of planning, therefore, from adopting policies to foster economic growth to building climate change resislient infrastructure to raising education standards to implementing effective water resource management strategies for agricultural sector growth etc. all depends on the size, structure, composition and characteristics of the population.

According to the standard population-development model the changes in population occur during the transition phase between two stable equilibrium states. The first stable equilibrium state is characterized by high birth and death rates (thus low growth rates). With economic development and increased access to healthcare services and medical technology death rates tend to fall sharply; however as birth rates follow cultural and other socioeconomic factors they tend to lag behind the declines in death rates. In very general terms this causes the population explosion. As birth rates decline, the population starts to stabilize again and this state is characterized by a higher total population with low birth and death rates (thus low growth rates). This period of transition, if properly managed and exploited can yield a population dividend that has far reaching consequences to future prosperity. Bangladesh is currently entering (if it has not already entered) this critical window of opportunity, thus planning for these probable futures is of vital importance.[4]

This study explores the historical trends of the population demographics and attempts to assess the probable future states of population. The major highlights of the study are as follows:

Population & Population Growth: Bangladesh's population grew from a little over 50 million in 1961 to over 157 million in 2015. The current annual population growth rate is 1.2% (i.e. approximately 1.88 million annually). It is projected (according to the Medium Variant, see chapter 6) that by 2025 the population will be around 178 million and by 2050 it will be around 202 million. Further projections, given certain binding assumptions, indicate that by 2075 population will drop to 199 million and by 2100 population will fall to 182 million. The changes in total population are just one aspect of the projected changes. A far more important component is the expected change in the age structure of the population. One of the underlying assumptions assumes that Total Fertility Rate [5] will continue to fall; however the population momentum effect will continue to push the population up. This means that in the coming decades the 15-59 age cohort will account for the majority of the total population.

Implications: On one hand these changes mean that Bangladesh can expect a very large total available workforce but this also indicates the need for major investment in the education sector in the near future. The path to sustainable development is through ensuring that this future workforce is highly skilled and internationally competitive.

There are also has significant implications for other policies; for example it will become increasingly important to ensure that job creation matches this age demographic transition and thus it may be feasible to promote high employment generating sectors in the medium run switching over to high value sectors later on as population stabilizes. In the next few decades Bangladesh will also see a significant aging population. Social security initiatives and similar safety net measures and programs will need to be implemented to care for this segment of the population. There will also be a significant change in the cultural and socio-economic makeup of the society. Addressing income and wealth inequalities will become a major deciding factor in the form these cultural changes take.

In the short to medium run more active manpower export policies may be a viable strategy to reduce population pressure.

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[3] World Bank WDI, 2015

[4] United Nations (UN): Demographic Compponents of Future Population Growth

[5] the average number of children that would be born to a woman over her lifetime if: she were to experience the exact current age-specific fertility rates` (ASFRs) through her lifetime and were to survive from birth through the end of her reproductive life

1. Background

Bangladesh sits in southern Asia, on the delta of two largest rivers on the Indian subcontinent—the Ganges and Jamuna (Brahmaputra). It borders with India in the west, north, and east, Myanmar in the southeast, and with the Bay of Bengal in the south. The country's area is 144,000 square kilometers (55,598 square miles), and it is divided into 7 administrative divisions (Dhaka, Chittagong, Khulna, Barisal, Rajshai, Rangpur and Sylhet). Bangladesh is approximately the size of the state of Iowa in the US, yet as of 2014, the population stands at approximately 157 million[6]. Since the 1960s the size of population within the country has almost doubled and changing 209 percent during the last 50 years.[7] Population in Bangladesh averaged 99.09 Million from 1960 until 2013, reaching an all time high of 154.70 Million in 2013 and a record low of 50.10 Million in 1960[8]. In 2000 the birth rate stood at 25.44 per 1,000 (slightly higher than the world average), adding around 190,000 people every month. Meanwhile the death rate stood at 8.73 per 1,000. The estimated population growth rate is 1.59 percent, and if the current trend remains unchanged, the population could double within the next 45 years. Addressing the future challenges specifically with growing pressure of population and its management, Bangladesh will require a strategic plan with a long term horizon of 100 years, while short term results are needed to solve urgent problems, and to gain widespread socio-political support for BDP2100. Thus, in our approach, we emphasize on the population factors which play a critical role in this planning exercise and overall resource allocation of the country to manage. This report focuses on population aspects in Bangladesh, presenting a set of key areas within population. The rationale behind inclusion of urbanization is due to the critical role it plays in terms of intra and inter migration aspects. The management aspects of population to a greater aspect has been dealt with within the spatial planning baseline study. While attempts have been made to provide the most updated and validated information and data with regards to each driver, it is important to note that this report is not based on primary data collection, as a result of which, it may present some level inconsistencies, but we have addressed these in our approach.

1.1. Overall Objective

The overall objective of the project on the formulation of BDP 2100 is to realize a sustainable and commonly agreed strategy with all relevant stakeholders for an optimum level of water safety and food security, as well as sustained economic growth of Bangladesh and a framework for its implementation.

1.2. Objective of the Growth of Population and Management Study

The broader objective of this baseline is to provide an overview of the population and the related aspects with regards to management, which we define as urbanization to some extent. These drivers were analyzed on the basis of their relevance, impact levels, among others. The objectives of the thematic baseline study within the context of socio-economic analysis therefore include:

- Identification, evaluation and assessment of the population elements and factors
- Identification of key plans
- To establish a strong basis for all thematic areas in the BDP 2100 given the relevance of population in all themes and broader objectives of BDP2100

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[6] World Bank WDI, 2015

[7] Bangladesh Bureau of Statistics, 1991-2015, World Bank WDI, 2015

[8] Bangladesh Bureau of Statistics

2.   Methodology

As discussed in the previous chapter, this study aims to provide an overview of historical trends in case of population and urbanization. The analysis of these historical trends will show the broad evolution of Bangladesh since Independence and the patterns of growth and development that provide the context for any plan for the future. The methodology of this study consists of three major phases.

2.1.   Data Collection and Aggregation

As primary data collection is far beyond the scope of this study, the data collection, research and analysis efforts focused on desk research and secondary data collection from publically available, official and/or government approved sources. An important consideration that needs to be taken into account is the issue of comparability. That is to say, whatever data is collected, from whatever source, it is of the primary importance that the basic terms and definitions used across the drivers are common. For example, it must be assured that the period of historical trends are the same, viz. from 1970 to present. Though in some cases, such as using data from the Population Censuses, the data was available decade wise, the year to year trend will be the basic format that is to be followed.

2.2.   Data Validation and Crosschecking

Though the main sources of data were official and government databases/reports, validation and crosschecking is the hallmark of all sound research. Thus data on the same variables will be collected from different sources; in cases of conflict official BBS/Government data will be considered to be preferable However the veracity and accuracy of all secondary research depends entirely on the soundness of the primary research that was undertaken, it is, again, beyond the scope of this report to assess the quality of the primary research.

In this study, the historical trend analysis focuses on outlining the general trends and indicating major events and policy decisions that have a degree of explanatory power in the context of the specific variables. Changes in the general trends outlined and as much relevant linkages and patterns will be referenced as possible. The goal is to provide an overview and establish a sensible narrative that tries to explain the trends observed.

3.   Components of the Drivers

3.1.   Population

Population is one of the critical drivers as it impacts the overall forecasting and planning within the context of various thematic areas such as climate change, water resources, water supply, among others. Population is also seen to be a key driver in the majority of the thematic areas as it impacts various factors. In examining the population, we look at population as a whole, and the population growth rate i.e. the ratio of annual change to a number compared to the past expressed in percentage. Various key compositions within the population are further presented through overview of fertility rate, birth rate, death rate, mortality rate, and life expectancy. It is important to note here while providing an overview of the population, given the vast scope of BDP 2100, we attempted to look at national to local level data to present an exhaustive analysis. Bangladesh Bureau of Statistics' Population Census data at the national, regional (division and district/zila level) and the local level (sub-district/upazila) have been extensively used. Maps of population distributions will also be available and models that are publically available (or are used by the BBS and other national institutions) will be assessed.

3.2.   Urbanization

Urbanization has a key role within the context of population management and the other overall thematic linkages; it impacts employment, growth, poverty and overall distribution of population. Given that Bangladesh is thriving with key

urban centres, it is important to look at this specific driver closely and analyse its relationship with the population distribution within the country. The detailed treatment of urbanization will be expounded and explored in the Spatial Planning and Land Use Baseline Study.

3.3. Overview of Key Drivers

Key drivers with major components	
Main Key Drivers	**Component Metrics under key Drivers**
Population	Population growth & density
	Male – Female sex ratio
	Age Group/ Population Pyramid
	Mortality Rate
	Birth Rate and Life Expectancy Rate
	Total Fertility Rate
Urbanization	Intra country migration
	Inter country migration

4.   Population

Bangladesh, the 8th most populated country in the world[9], has encountered a massive population boom in the past few decades, going from approximately 50 million in 1960 to approximately 157 million in 2015. The country is now experiencing a demographic transition and the continuous decline of the total fertility rate should lead to a lower population increase and a change in the demographic composition in the coming decades. Major demographic characteristics have been provided below:

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[9] World Bank WDI, 2015

Historical Trend of Major Metrics

4.1. Population & Population Growth

Bangladesh has a current population of 157 million[10] with a corresponding population density of more than 1,115[11] persons per square km. Bangladesh has seen a massive population growth in the past fifty years, with the population growing from around 50 million in 1961 to 149 million in 2011; this represents an average growth rate of 1.98%[8]. As of 2015 the population has grown to around 157 million10.

Population Density – 1,015/km (BBS 2011)

Population Growth – 1.37 (BBS, 2011)

Population – **157 Million**(BBS, 2015)

Sex Ratio – 100.3 & Life Expectancy 68 years (BBS, 2011)

Infant Mortality rate- 50.13 (BBS, 2011)

Total Fertility Rate – 2.1 (BBS, 2011)

Birth Rate & Death Rate – 17.88 & 4.79 (BBS, 2011)

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[10] Bangladesh Bureau of Statistics, 1991-2015

[11] BBS: Population & Housing Census 2011, Vol I to IV
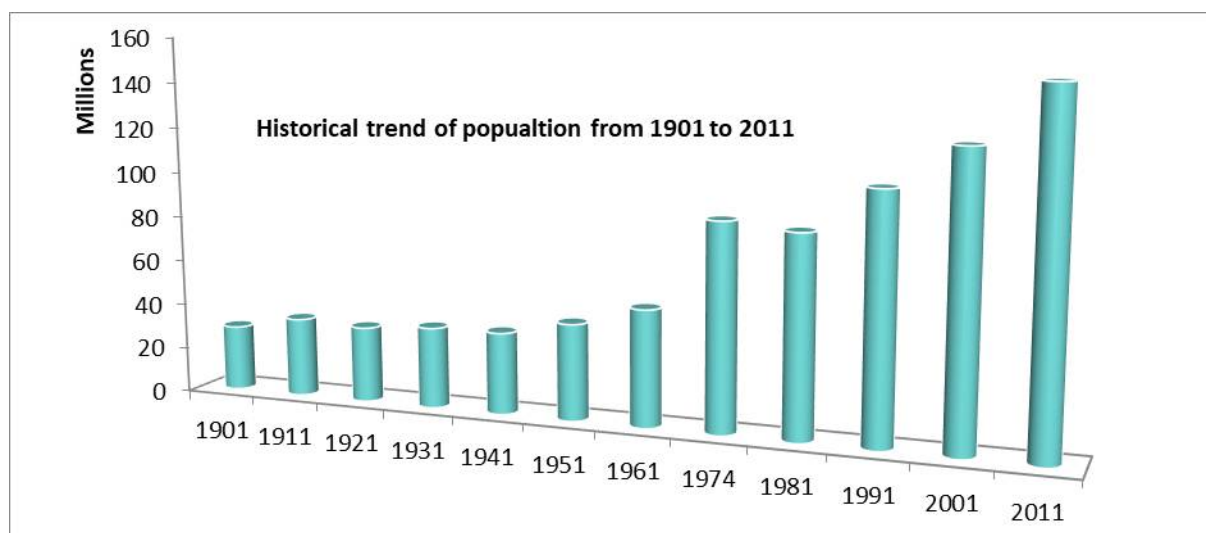
Figure 1: Historical Trend of Population

Source: BBS Statistical Yearbook 1991-2013

As mentioned earlier, Bangladesh has seen a significant population boom since 1960; it has grown by 209% over the last 50 years (till 2013) averaging an annual growth rate of 4.18% according to World Bank[12]. Compared to the enumerated population in 2001 of 123.85 million, by 2011 the population had grown to 149.04 million, which is around 25.19 million people added in 10 years, which represent a 20.34% population increase and a 1.63% average annual growth rate.

On the other hand, given this large addition to the total population, the annual growth rate has actually been decreasing over the past few decades.

Population trends in Bangladesh from the beginning of 20th century seem to follow a clear pattern:

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[12] World Bank WDI, 2015
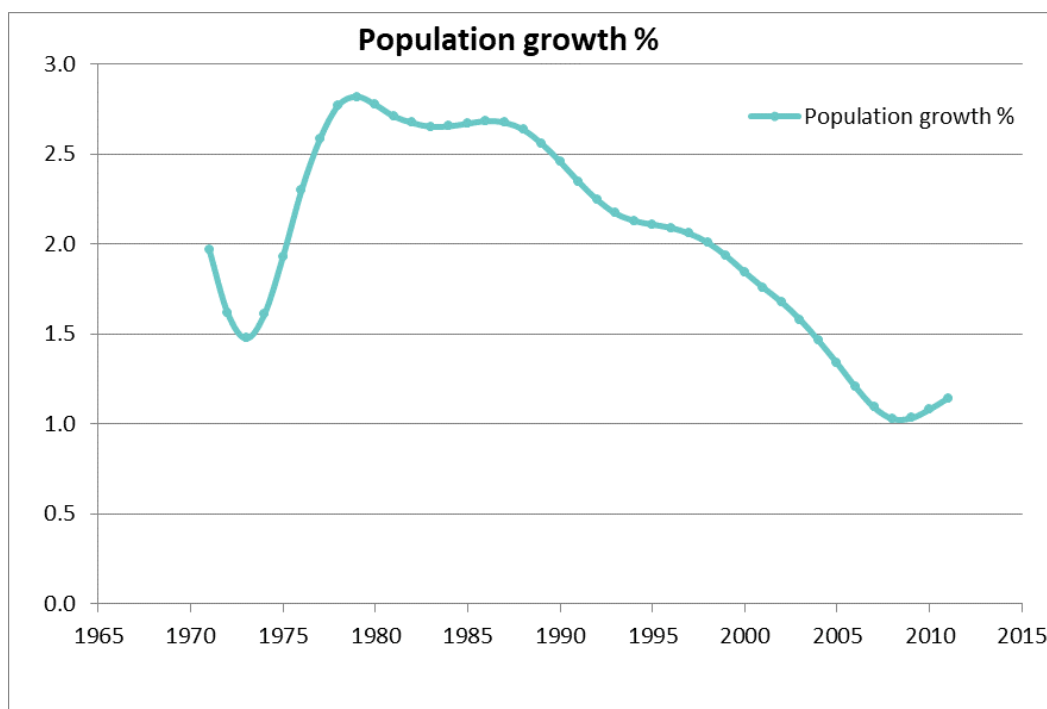
Figure 2: Population Growth: (World Bank WDI, 2015)

Steady[13]: Between 1900 to 1960 the Bangladesh (or the regions that comprise modern Bangladesh) population size was mostly steady, but with high birth and death rates of over 45 per 1000 persons; This is partly explained by lack of appropriate maternal care services and medical services coupled with lack of appropriate nutrition, access to basic necessities leading to high levels of birth and death rate.

Rapid rise: Between 1970 and 1980 there was a massive population boom with a growth rate peaking at 2.82%. The population size increased because of a rapid decline in the death rate from around 40 to 20 per 1000 persons over this period; while the birth rate remained high and steady between 40 and 45 per 1000 persons; This can be explained by expansion of services provided for maternal health care sector both with antenatal and postnatal care and provision of greater community health services reaching the poorest segments, resulting in declines in birth and death rates.

Decline: From the early 1980s to the early 2010s, there was a significant decrease in birth rates, from 37 births per 1000 persons to in 1978 to 18 per 1000 persons as of 2011, and as a result the growth rate started declining from 2.64% in 1988 to a low of 1.03% as of 2009. This is mostly explained by the introduction of population management policies by the major donors and the government and the natural effect of increased education and economic growth. The adoption of birth control measures specifically began to see results as more and more programs were able to scale up interventions in all districts through targeted intervention in the form of awareness programs, distribution of contraceptives, maternal health care and sexual reproductive health rights initiatives among the urban and rural poor populations.

However it is very important to note here that even if the trend continues and a the growth falls under the replacement fertility rate of 2.11 (which as of 2013 has happened in certain segments, such as in the urban population including the

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[13] World Bank WDI, 2015

urban poor segment) the population will not stabilize for several decades because of the backlog effect or population momentum created by the "bulge" in younger age groups moving towards parenthood[14].

[15]Based on the division level data, a large distinction is observed regarding the change in population size during the inter-censual period (1991-2011).
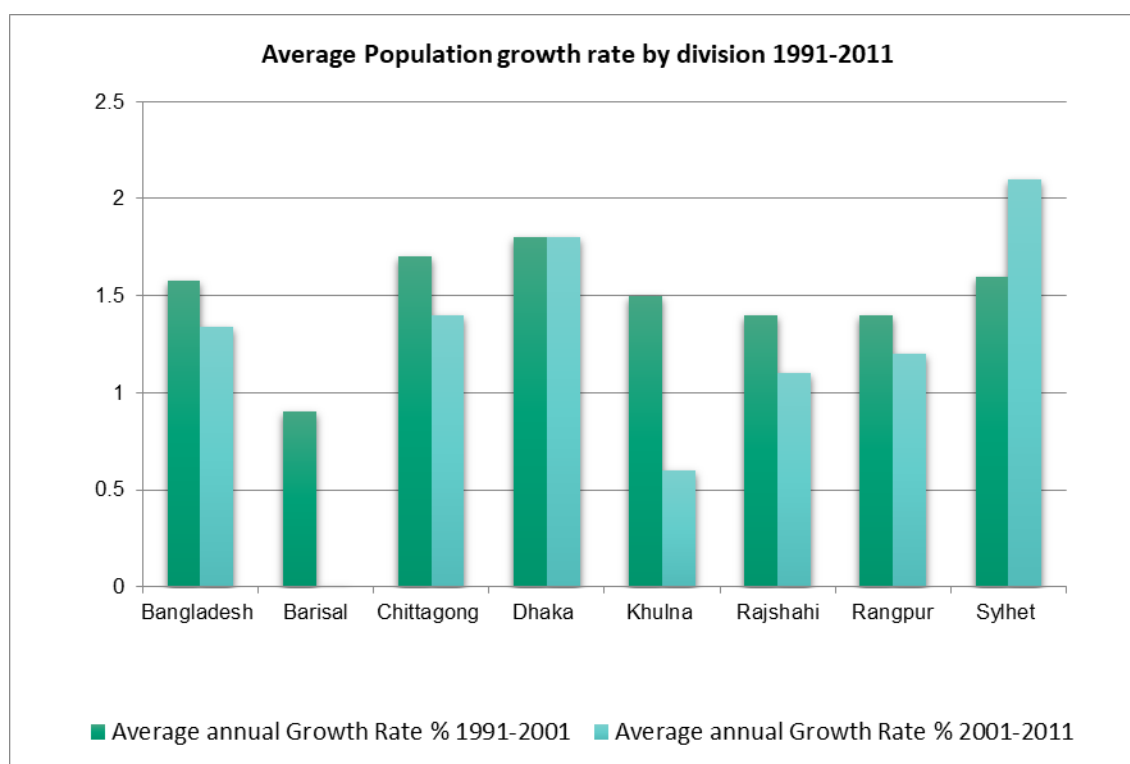
Figure 3: Population Growth Rate by Division

Source: BBS Statistical Yearbook 1991-2013

Table 1: Enumerated Population

	Population			Average annual growth rates (%)	
Divisions	**1991**	**2001**	**2011**	**1991-2001**	**2001-2011**
Bangladesh	*106,314,992*	*124,355,245*	*144,043,697*	*1.58%*	*1.48%*
Barisal	7,462,643	8,173,718	8,325,666	0.9%	0.2%
Chittagong	20,522,908	24,290,366	28,423,019	1.7%%	1.6%
Dhaka	32,665,975	39,044,716	47,424,418	1.8%	2.0%
Khulna	12,688,383	14,705,229	15,687,759	1.5%	0.7%
Rajshahi	14,212,065	16,354,723	18,484,858	1.4%	1.2%
Rangpur	11,997,979	13,847,150	15,787,758	1.4%	1.3%
Syhlet	6,765,039	7,939,343	9,910,219	1.6%	2.4%

Source: BBS: Population & Housing Census 2011 Volumes I to IV (full)

After Sylhet, Dhaka and Chittagong divisions have the highest growth rate. Khulna (0.6%) has shown the least growth rate after Barisal (less than 0.1%) where Rajshahi & Rangpur has similar rate of growth.

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[14] Banglaldesh Institute of Development and Dr. Abdul Bayes, Professor of Economics, Jahangirnagar University

[15] BBS: Population & Housing Census Volumes I to IV (full)

This is explained by the fast growing urban centres and the trend of more and more segments moving into these cities as result of increased demand and supply for jobs. In districts such as Barisal, extreme poverty and lack of access to proper health facilities due to poor infrastructure plays a critical role. It is important to note however that that increased aid and development efforts being targeted in Barisal through market development approaches and projects is likely to change the scene in the coming years.

4.2.   Population Maps

The following three maps show the change in the population up the Zila levels generated using data from the BBS Population Census from 1991, 2001 and 2011. These maps clearly show which zilas in Bangladesh experienced the highest population growth between 1991 to 2011.
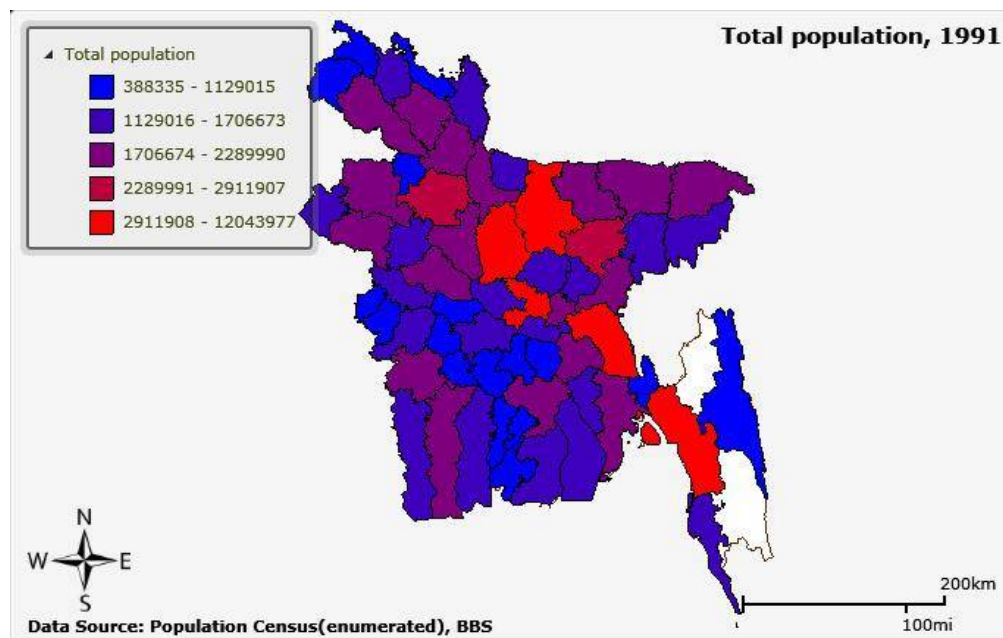
Figure 4: Total Population 1991

Source BBS: Population & Housing Census Volumes I to IV (full)
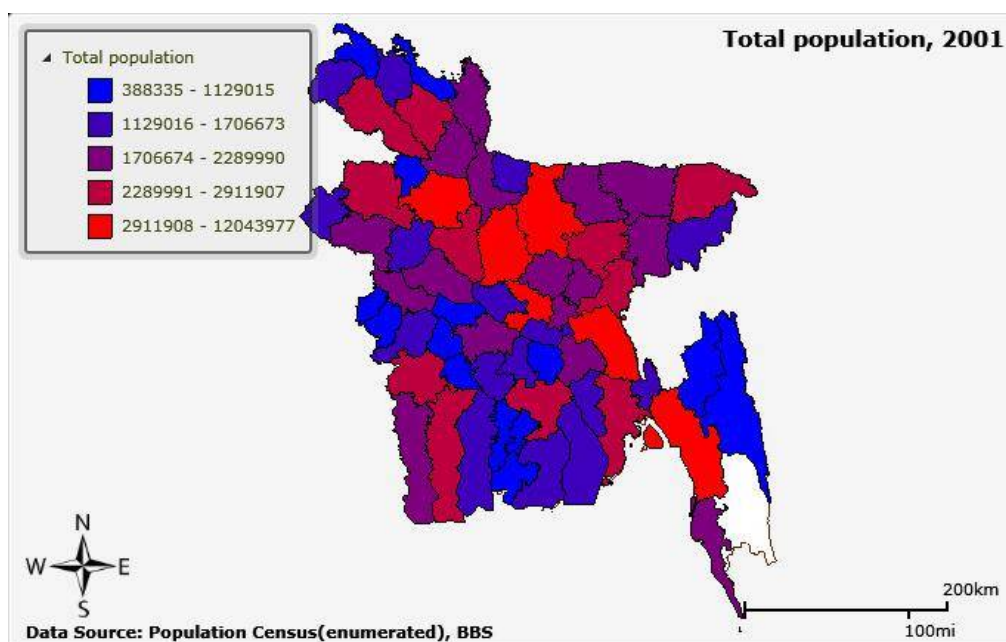
Figure 5: Total Population 2001

Source BBS: Population & Housing Census Volumes I to IV (full)
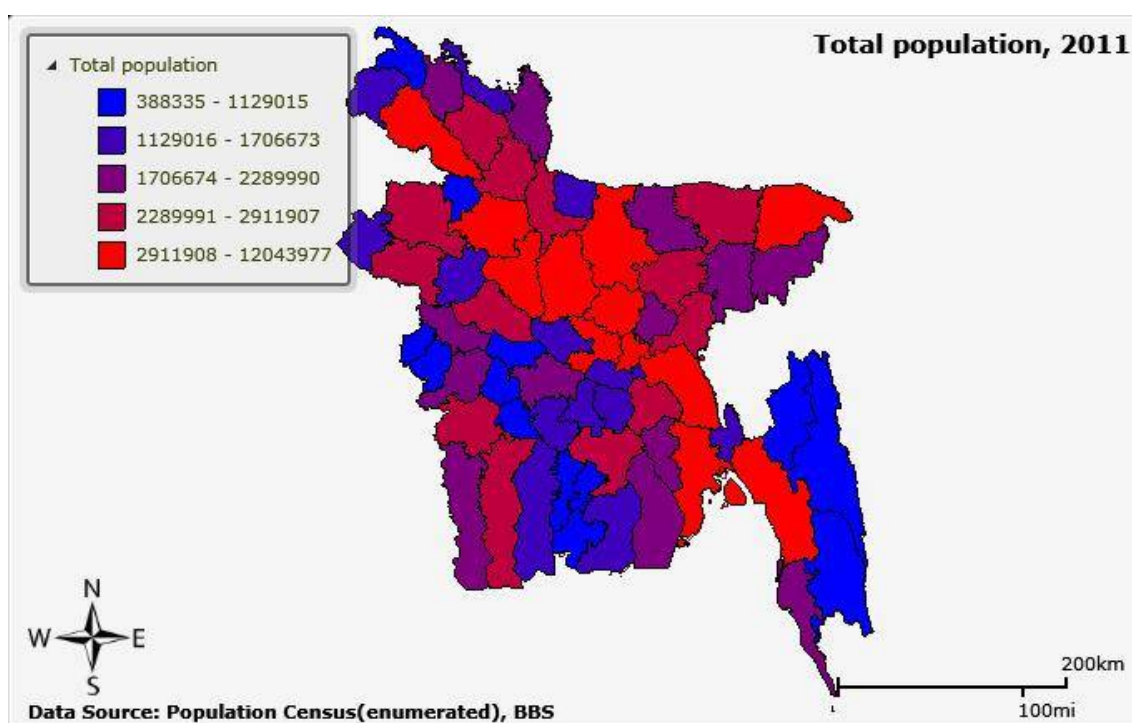
Figure 6: Total Population 2011

Source BBS: Population & Housing Census Volumes I to IV (full)

4.3.   Population Density

Population density is measured through the number of inhabitants per square kilometre.
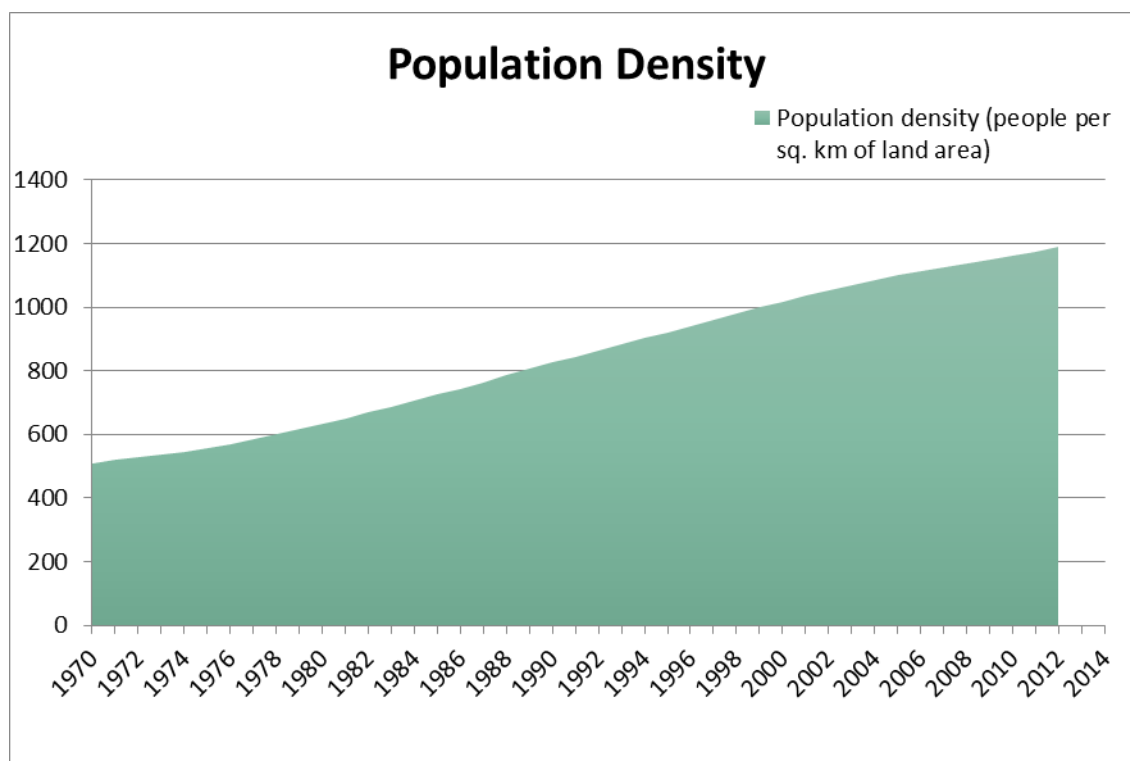
Figure 7: Population density (1970- 2012) (World Bank WDI, 2015)*)*
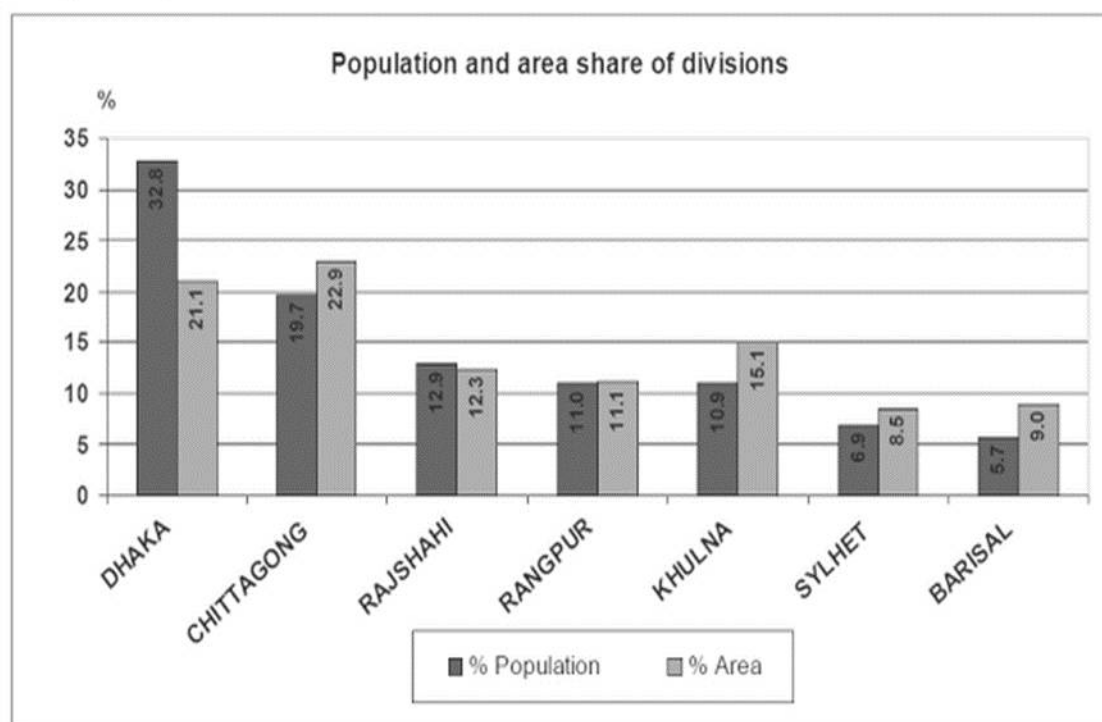
Figure 8: Share of total population

Source BBS: Population & Housing Census Volumes I to IV (full)

Bangladesh is one of the most densely populated countries in the world with an average of 1,015 inhabitants per square kilometer as of 2011 (834 in 2001). The male and female ratio is almost same 50.06 and 49.94. The World Bank estimate of population density is higher at 1,174 inhabitants per square kilometer in 2011 (1,035 in 2001)[16]

Between divisions and districts significant disparities has been observed. At the division level, the density figures range from 1,502 inhabitants per square kilometre in Dhaka division to 613 in the Barisal division.

At the district level, the highest density is found in Dhaka (8,111 inhabitants / km2) and Narayanganj (4,139) districts, and the lowest in Bandarban district (86) (based on population density map 2011, 2001 & 1991). After Dhaka, Chittagong division accommodates 19.7% of the population on 22.9% of the country area.

The explanation for the sharp increase of population density is due to the fact that population growth soared whereas the available land is fixed. The density disparities between divisions and districts are due to increased job opportunities and demand for jobs as a result of urbanization leading to movement into urban centres. Rapid industrialization during the 1990s and continued growth explains much of the rise in this density in the major urban centres such as Dhaka and Chittagong.

4.4.   Male – Female Sex Ratio

Male – Female sex Ratio: The index used for measuring the sex composition is the sex ratio, defined as the number of males per 100 females in the population. A sex ratio higher than 100 denotes a higher number of males, while less than 100 means that females are more numerous[16].

The total enumerated population comprises of 71.255 million males and 71.064 million females (as of 2011), which yields a sex ratio of 100.3 indicating equal numbers of men and women in the country in 2011 (BBS). The World Bank estimates the ratio at is 99.8 in 2012 which is an indication of lower number of male to each woman.

It is observed that the male –female sex ratio was had a greater disparity when looking at the division level as of 2011. Again, the Barisal and Chittagong division show a sharp decrease in the sex ratio from 1991 to 2011. The sex ratio has shown a drop from the year 1991 to 2011 leading to an almost equal balance between males and females on a national scale.

Table 2: Male/Female Population

Division	Enumerated Population 2011 in thousands		Sex Ratio		
	Males	Females	1991	2001	2011
Bangladesh	71,255	71,064	**106.1**	106.4	**100.3**
Barisal	4,006	4,140	103.5	103.6	96.8
Chittagong	13,763	14,316	105.6	104.4	96.1
Dhaka	23,814	22,915	108.3	109	103.9
Khulna	7,782	7,781	106.2	106.6	100
Rajshahi	9,183	9,146	105.1	106.3	100.4
Rangpur	7,824	7,840	104.8	104.8	99.8
Sylhet	4,882	4,925	104.2	104.9	99.1

Source BBS: Population & Housing Census Volumes I to IV (full)

According to the BBS Population Census 2011, Bangladesh has experienced an interesting change in the sex composition of its population, in the last decade. A six point decrease of the sex ratio from 2001 to 2011 represents a difference of 4 million people (fewer male and/or more female). An explanation for such a phenomenon may be found

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[16] Bangladesh Bureau of Statistics, 1991-2015

in a conjunction of several factors listed below, whose respective influence cannot be measured yet. Possible reasons for the drastic sex ratio fall that we observe over the last decade are:

- a significant increase of external emigration, mainly concerning males;
- an improved census coverage of the female population;
- the already documented important decrease of maternal mortality;
- possibly also the female child mortality decreasing faster than the male ;
- differences in life expectancy levels and gains, both in favour of females;[17]

4.5. Age Group/ Population Pyramid

Age Group/ Population Pyramid: The age structure or composition of a population is the distribution by age of the population.

Population momentum: The phenomenon of a large number of young people at reproductive age engendering a further increase in total population numbers is called population momentum. The demographic structure of Bangladesh's population suggests that its population will continue to grow for decades to come due to the population momentum (as more than 33 percent of the total population is under the age of 15) inherent in the young age structure, even if replacement level fertility is achieved by the year 2015. The standard demographic transition model that tries to explain how the population structure of a country changes over time posits that all countries at one point in their development pass through a state in which the population is stable with high birth and death rates (i.e. a low population growth rate) through stages with changing birth and death rates to an end state where the population is again stable with low birth and death rates (i.e. a low population growth rate again). The rapid population growth occurs during the transition phases between one stable state to the other. The demographic transition model thus indicates that the main challenge facing Bangladesh is how to ensure this change in stable population levels while ensuring that the average standard of living is held steady if not improved. Furthermore, population projections show that the structure of the population, i.e. the total size of the age cohort that comprises the population will drastically change. The coming decades will not only see the growth of an aging population but also a very large population that will comprise the available working population. Ensuring that there are policies and initiatives in place that answer to education and job creation needs of this age cohort is vital to future growth and prosperity. That being said, the rest of this chapter focuses on the historical trends of population demographics

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[17] BBS: Population & Housing Census 2011, Vol I to IV
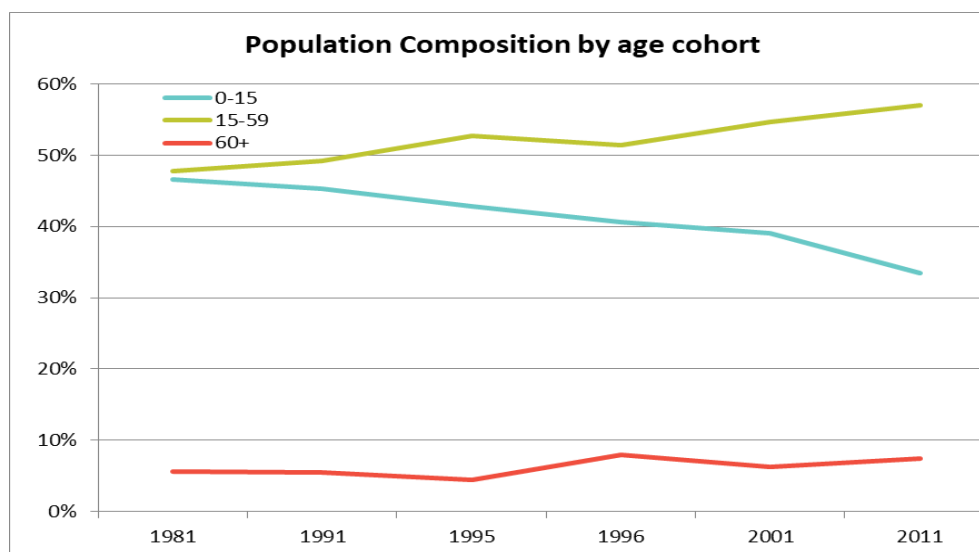
Figure 9: Trends in age division from 1981 2011

Source: BBS: Statistical Year Book 1991-2013

The under age (<15) population has declined from 46.7% in 1981 to 33.41% in 2011 due to a reduction in fertility

The proportion of population in the economically active age group (15-59) has marked an increase from 47.7% in 1981 to 57.03% in 2011 with a gradual increase. This can create a virtual cycle of growth, known as demographic dividend. There is a slight increase in the proportion of older population (>60) from 5.63% in 1981 to 7.40% in 2011. Thus Age-dependency ratio of the population has increased also which implies that there has been an increase in the life expectancy at birth 2011 (68 years).
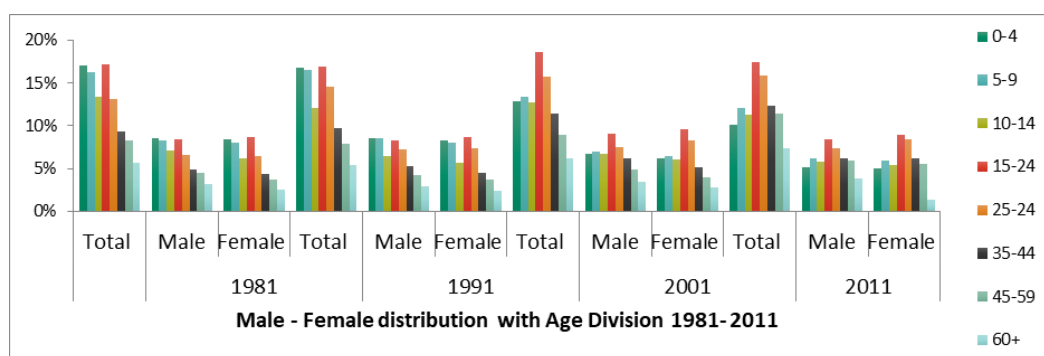
Figure 10: Male Female population distribution with age division

Source: BBS: Statistical Year Book 1991-2013

4.6. Birth rate & Life expectancy

Crude birth rate indicates the number of live births occurring during the year, per 1,000 populations estimated at midyear.

Figure 11: Crude Birth Rate from 1978- 2011 *(Source: World Bank WDI)*
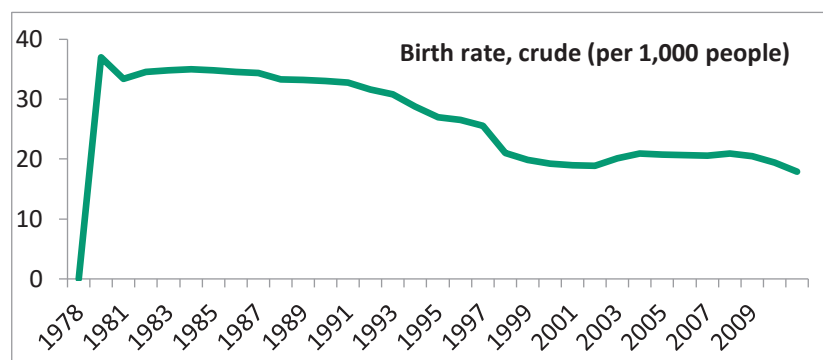
The value for Birth rate, crude (per 1,000 people) in Bangladesh was 17.88 as of 2011. As the graph below shows, over the past 30 years this indicator reached a maximum value of 37 in 1978 and a minimum value of 17.88 in 2011.

The value for Life expectancy at birth, total (years) in Bangladesh was 68.94 as of 2011. As the graph below shows, over the past 51 years this indicator reached a maximum value of 68.94 in 2011 and a minimum value of 38.97 in 1972[18]. Life expectancy trend has been increasing because of increased access to healthcare services and medical technology.

Figure 12: Life expectancy trend 1960- 2012: *(Source: World Bank WDI)*
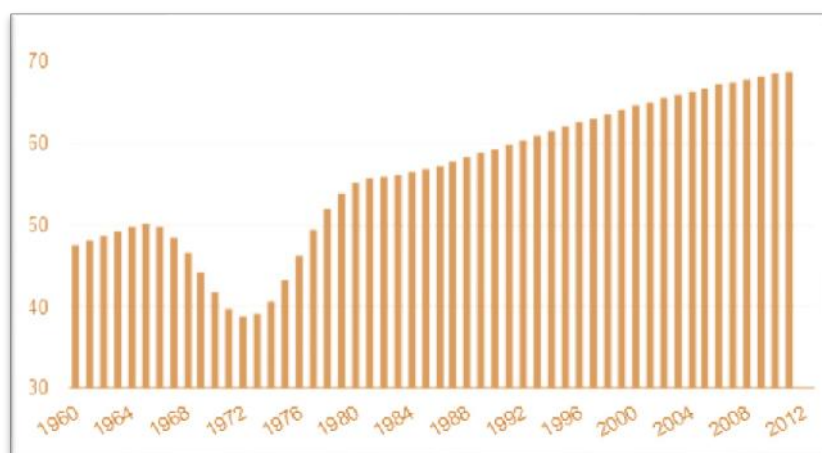
From the late 1970s the expansion of health and family planning services has drastically increased.

From the late 1980s large government initiatives have expanded the role of urban health care and access to efficient drugs has increased in the general population.

Continuing this trend, from the early 1990s community health services insurance schemes were started, initiative has taken to eradicate several treatable diseases and has good successes in reducing morbidity, TFR, mortality, birth rate. From the late 1990s to present a greater emphasis on primary health care and greater coverage to the poor has reduced the birth rate, and led to increased life expectancy. Access to better family planning methods, higher rates of female education, women getting married at a later age has all resulted in the lower birth rate in Bangladesh.

4.7. Total Fertility Rate (TFR)

Total Fertility Rate (TFR): The sum of the Age-Specific Fertility Rates (ASFR) over the whole range of reproductive ages for a particular period (usually a year). It can be interpreted as the number of children a woman would have during her lifetime if she were to experience the fertility rates of period at each age.

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[18] Bangladesh Bureau of Statistics and World Bank
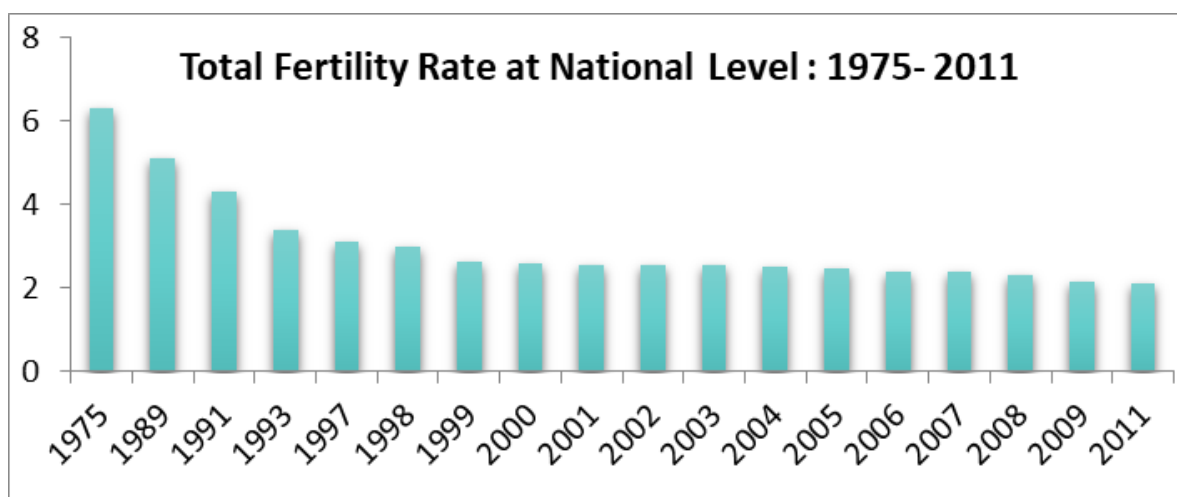
Figure 13: Total Fertility rate at national level

Source: BBS: Statistical Year Book 1991-2013

Bangladesh had been made more effective in the last two decades in TFR. As per BBS, the total fertility rate of the country is 2.3 at national level (rural 2.7 and Urban 2.1). Comparing the TFR rates from year 1974 to 2011, the overall total fertility rate (TFR) has declined from 6.3 to 2.3.
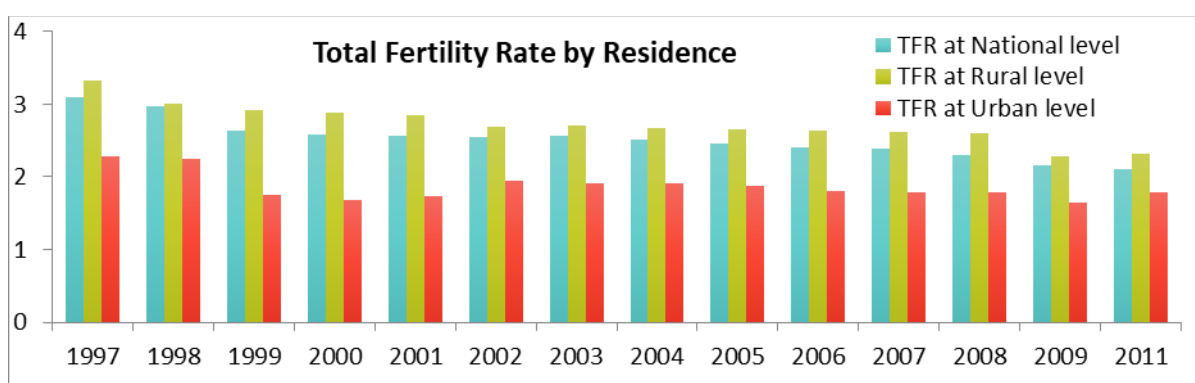
Figure 14: TFR by residence level 1997- 2011

Source BBS: Statistical Year Book 1991-2013

The fertility transition in Bangladesh has indicated a decline of 48 per cent in TFR, a decline of 1.9 percent per year (by observing time series estimates of TFR over the last 25 years, beginning with the1975 BFS to 2000).

Usage of Modern and Traditional Contraceptives and/or other birth control methods has helped in this regard. With this declining trend of TFR, data revealed that usage of birth control methods has increased from 44% (1993) to 66% (2011) (BDHS 2011). Women have become more conscious about their health, social and economic conditions which are also reflected in the decline trend on TFR.[19]

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[19] UNFPEA, CPD series paper

The yearly trend shows that the TFR has decreased in Rural Areas from 3.32 (1991) to 2.28 (2009) but then rose to 2.7 (2011). In the same manner in the Urban Areas the TFR decreased to 1.65 (2009) from 2.28 (1997) but then it increased to 2.1 (2011).[20]

Although the overall TFR has declined, it should be noted that there are regional disparities here. For example, in the Khulna Division in the southwest, the TFR estimated at two children per woman and has therefore already reached the replacement level of 2.2. In the Khulna Division in the southwest, for example, the TFR is estimated at two children per woman and has, therefore, already reached the designated replacement level of 2.2. In the Sylhet Division in the northeast, on the other hand, the TFR reached levels of up to 3.7 children per woman in 2006. Given these regional disparities and the exceptionally high population density, further reductions in regional and national fertility rates are still high on the agenda of policy makers.

The number of Bangladeshi women who use contraception has stagnated in recent years. Since 2000, only 54 to 56 percent of currently married women use a method of contraception. Added to this, almost 60 percent of contraceptive users discontinue using their chosen method within the first 12 months of use.

Why the fertility increased between 2001 and 2011 even though there has been significant success of family planning is a matter for further investigation. The contraceptive prevalence rates in these regions where family planning has been very successful either remained same (Rajshahi) or increased only slightly (Khulna). Similarly, prevalence of modern methods remained same in these regions, during 1996 -99. (UNFPA)

In 2011, fertility was lowest in the Khulna division (1.9 births per woman), followed by Rajshahi and Rangpur at 2.1 births per woman, and highest in Sylhet (3.1 births per woman) and Chittagong (2.8 births per women). Current health, population, and nutrition sector development programs (HPNSDP) aims to reduce fertility to 2.0 births per woman by 2016, in Bangladesh. Khulna has reached that level already, and Rajshahi and Rangpur are very close.[21]

4.8. **Mortality Rate**

Mortality Rate[22]: is a measure of the number of deaths (in general, or due to a specific cause) in a population, scaled to the size of that population, per unit of time. Indicators those are used for this study are:

Crude Death Rate (CDR): The crude death rate (CDR) is the number of deaths per 1000 midyear population in a given year. Crude death rate indicates the number of deaths occurring during the year, per 1,000 populations estimated at midyear. Subtracting the crude death rate from the crude birth rate provides the rate of natural increase, which is equal to the rate of population change in the absence of migration.

Under 5 Mortality Rate: Under-five mortality rate is defined as the number of deaths among children in age 1-4 per 1000 mid-year population in the same age group.

Child mortality: The probability of a child dying between the first and fifth birthday;

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[20] BDHS 2011, 2007, 2005

[21] BDHS 2011

[22] Definitions are based on Bangladesh Bureau of Statistics
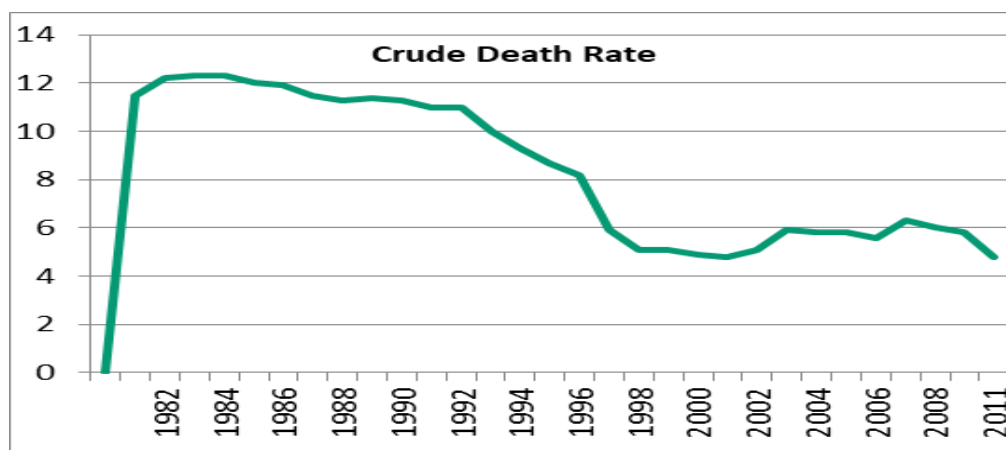
Figure 15: Crude death rate (1981-2011) (Source BBS: Statistical Year Book 1991-2013)

Infant Mortality Rate (IMR): The number of deaths occurring during a given year among the live-born infants who have not reached their first birthday divided by the number of live births in the given year. It is usually expressed per 1000 live births.

Crude Death rate (per 1,000 people) in Bangladesh was last measured at 4.8 in 2011, according to BBS. This was a decrease from 11.5 in 1982. There were variations in the CDR of Bangladesh in the previous years.

For the year 2004 to 2007 it is observed that Age Specific death rate was higher for women as compared to men in the age group 15-35 with a few exceptions, which may be explained by the might mortality in this age group due to maternal mortality.[23]

Childhood Mortality (Under age 5 mortality rate, Infant mortality rate, child mortality rate): Data from 1971 to 2011 indicates that mortality rates have declined in recent years. BDHS 2011 reveals that infant mortality has declined by 51% over the last 18 years, while child mortality and under-5 mortality have declined by 78% and 60%, respectively, over the same period.
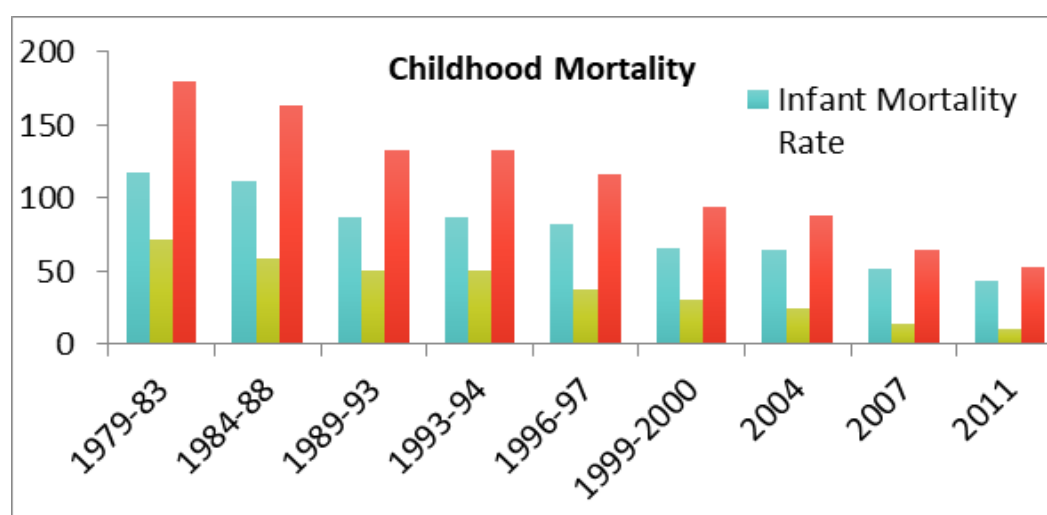
Figure 16: Childhood Mortality rates (1979-2011)

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[23] BDHS 2011, 2007, 2005; Bangladesh
Poverty Reduction Strategy Paper by IMF 2012

As under-5 mortality continues to decline, Bangladesh is on track to achieve the Millennium Development Goal (MDG) 4 target of 48 deaths per 1,000 live births by the year 2015.

Sylhet has the highest mortality rates for all mortality indicators except child mortality. (BDHS 2011; The BDHS 2011 asked all ever-married women age 15-49 to provide a complete history of their live births, including the sex, month, and year of each birth, survival status, and age at the time of the survey or age at death.)[24]

5.   Urbanization

Bangladesh is urbanizing rapidly. The annual exponential growth rate of Urban Population is approximately 4 per cent as per UN- HABITAT; State of the World's Cities 2008-2009 and the level of urbanization has been quoted at 28%. The decadal increase in urban population is 47%. As a result of this rapid urban growth, Bangladesh's urban areas have the fastest growing number of people living in slums. For example, the annual growth rate of slums in Dhaka is approximately 7 percent. Due to limited resources in rural areas, the lack of work and the decrease in land cultivation, many people seek better lives in urban areas, especially in Dhaka. The rural-urban migration means urban resources are also becoming scarcer. Overcrowding in urban areas –particularly in city slums – and the absence of sanitation and sewerage systems cause waterborne and airborne diseases to become prevalent. The lack of job opportunities and the high risk of disease drive slum dwellers even further into poverty. High population density within urban centres is also seen as a key issue that requires urgent attention.

Level of Urbanization 28% (BBS 2011)

Dhaka holds 40% of the total urban population

Eastern Divisions grow by some 36% versus only 20% in the lagging West (UNDP 2015)

Overseas migration by employment – 8,924,959 (BMET 2014)

Annual exponential growth rate of Urban Population is approximately 4% (UN HABITAT)
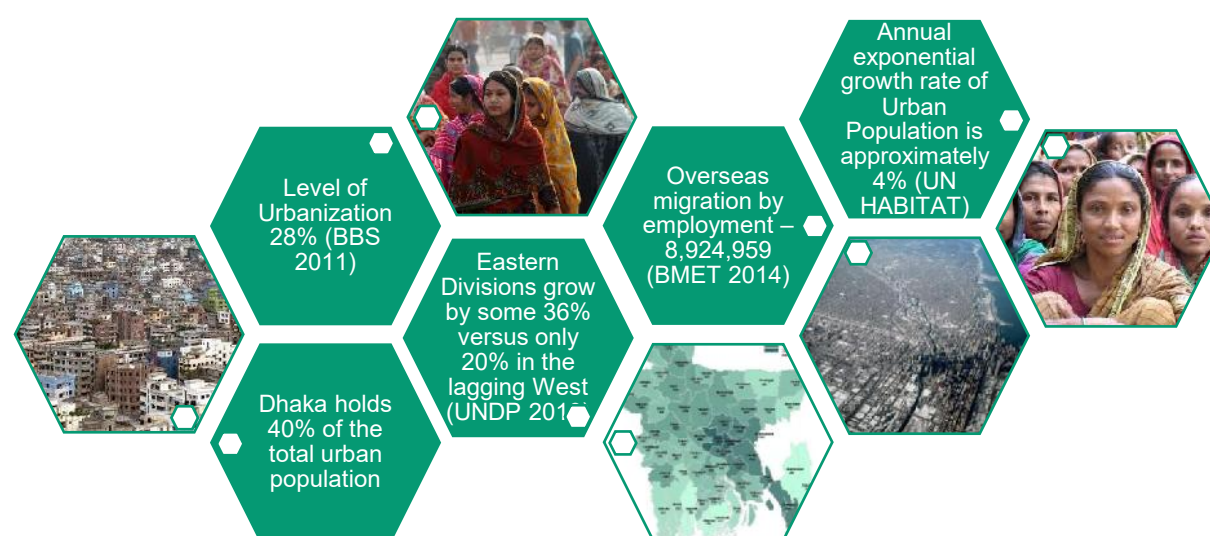
Historical Trend of Major Variables

It is important to note that the urban areas in Bangladesh follow a contextual definition and based on this the corresponding data is collected and collated by the national entities. In accordance to BBS (2011), urban area corresponds with area developed around a central place having "such amenities as metalled roads, improved communication, electricity, gas, water supply, sewerage, sanitation and also having comparatively higher density of

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[24] BDSH 2011, 2007, 2005

population with majority population in non-agricultural occupations". According to the census, the urban areas are classified into three categories:

- City Corporation: It includes city corporation area as declared by the Ministry of Local Government;
- Paurashava/Municipality Area (PSA): It includes paurashavas incorporated and administered by local government under Paurashava Ordinance, 1977;
- Other Urban Area (OUA): It includes those upazila headquarters which are not paurashavas. Nevertheless, the only exception is the 17 unions adjacent to Dhaka City Corporation under Dhaka Metropolitan Area. These unions are treated as other urban areas on the basis of their urban characteristics.

The share of urban population in Bangladesh varies to some extent based on the old and new definition of urbanisation.

5.1. Level of Urbanization and Rural- Urban People

The Urban population base has expanded rapidly from 7.6% to nearly 25% between 1970 and 2005 which makes Bangladesh a 'rapidly urbanizing country'. The most significant urban population growth in Bangladesh occurred during the 1961-74 inter-census period; over 6 million people were living in urban areas constituting roughly 8.0% of the total population. Thus the percentage increase of the urban population during these 13 years was striking. That accelerated growth is to a great extent the result of the very recent influx from rural villages. The growth rate of the urban population was 5.4% during the 1981-1991. By 2001 the total urban population stood at 28.6 million.

After 1971, there was an explosive growth of big cities. The number of cities with a population greater than 100,000 increased from 4 in 1961 to 6 by 1974, to 13 by 1981 and then to 23 by 1991. The total number of urban centres increased from 78 in 1961 to 492 in 1991, an increase of over 647% during a span of 30 years. The growth of urban centres by size/class indicates that there is a strong association between city size and city growth rates, i.e. the large and medium sized cities are increasing more rapidly simply because of the graduation of cities occurring in that class. Cities with a population between 25,000 and 49,999 increased from 15 in 1961 to 45 in 1981, an increase of 300%. During the same period cities with a population of 5,000 to 9,999 increased from 21 in 1961 to 129 in 1981 and those with a population less than 5,000 increased from 10 to 168. In summary, the urban population of Bangladesh grew at very high rate from 1961-1974 (8.8%) and reached its peak during the period 1974-1981 (10.97%). However about 30% of the total increase during 1974-1981 can be explained by the change in definition of urban areas in 1981.

In 1974 people living in urban areas accounted for only 8.8% of the population where in 2011 this urban population was 28% of total population.

The push factors driving people from rural to urban areas are the socio-economic, demo-graphic and cultural issues, which includes unemployment, poverty, floods, droughts, river erosion, political instability, social discrimination, disputes, etc. The pull factors attracting people to urban areas include the concentration of resources, employment opportunities, better living and educational facilities, etc. in the urban areas. For example, according to World Bank assessment, approximately 80% of the garments industry in Bangladesh, accounting for the overwhelming majority of the country's exports, is located in Dhaka city.
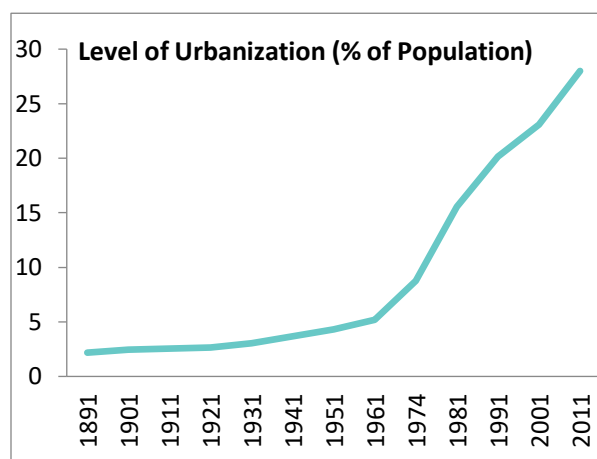
Figure 18: Level of Urbanization 1981- 2011
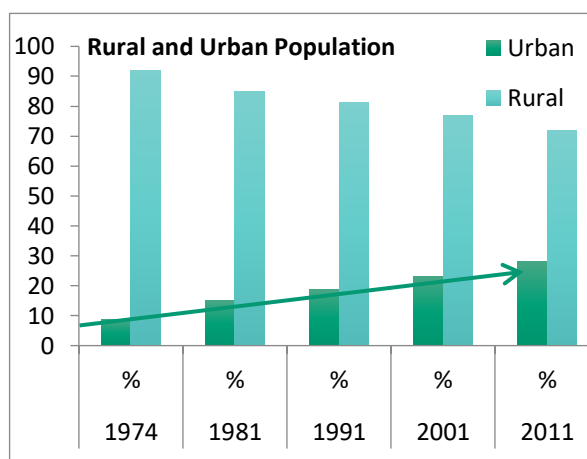
Figure 17: Total Rural and Urban Population Trend

(Source BBS: Statistical Year Book 1991-2013 & World Bank WDI)

It is also interesting to analyse the general movements in the form of **Intra country movement** (Rural to Urban, Rural to Rural, Urban to Rural, Urban to Urban) **and Inter country movement** (overseas).

Table 3: Facts regarding Urbanization

	Facts regarding Urbanization[25]					
Census year	Total national population (million)	Growth rate of national population (%)	Total urban population (million)	Level of Urbanization (%)	Decadal increase in urban population (%)	Annual exponential growth rate of urban population (%)
1951	44.17	0.5	1.82	4.33	18.38	1.69
1961	55.22	2.26	2.64	5.19	45.11	3.72
1974	76.37	2.48	6.27	8.87	137.57	6.66
1981	89.91	2.32	13.23	15.18	110.68	10.66
1991	111.45	2.17	20.87	19.63	57.79	4.56
2001	123.1	1.47	28.61	23.1	37.05	3.15
2011	150.4	1.37	42.11	28.4	47.19	4.12

Source BBS: Statistical Year Book 1991-2013

5.2. Regional Variations in Rural- Urban Population Movement within Country

It is interesting to explore the regional variation in the level of urbanization. It ranges from a high of 90% for the district of Dhaka to a low of less than 15% for Faridpur, Tangail, Patuakhali, Sylhet. Chittagong and Khulna, having large cities within the district, also had higher levels of urbanization. As noted earlier, urban population has also characterized by its heavy concentration in a few cities. Dhaka alone has nearly 40% of the total urban population, while the top four cities constitute 55%. [26]

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[25] Overview of Urbanization in Bangladesh by Dr. Nazrul Islam, Chairman, Center for Urban Studies; 2013 (Government of Bangladesh: Bangladesh Population Census, Census 1991, BBS, 2003, 1981; Report on Urban Areas 1997; and Preliminary Report)

[26] Overview of Urbanization in Bangladesh by Dr. Nazrul Islam, Chairman, Center for Urban Studies; 2013
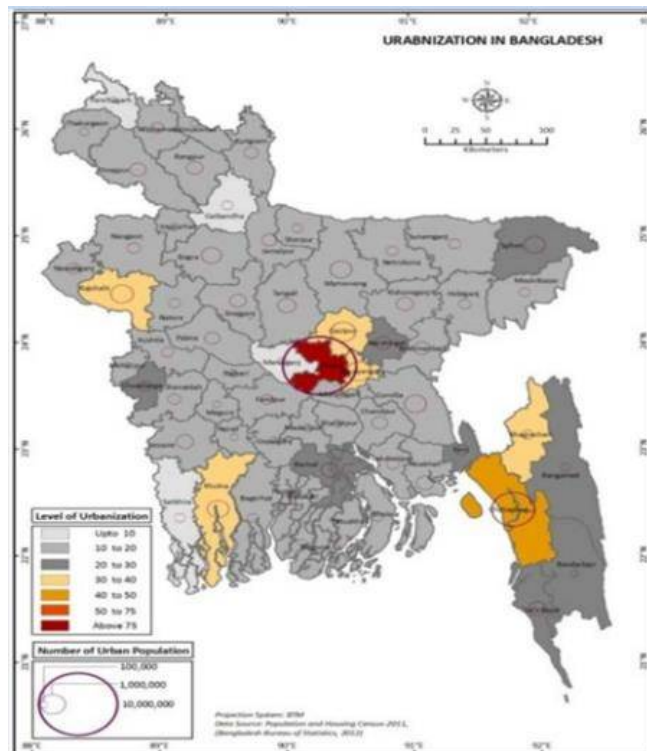
Map 1: Level of Urbanization in Bangaldesh

Source BBS: Center for Urban Studies, 2013

There is also Eastern and Western variations in the Urbanization movement. UNDP has described that the Eastern Divisions (Dhaka, Chittagong Sylhet) of Bangladesh grow by some 36% versus only 20% in the lagging West (Barisal, Khulna, Rajshahi and Rangpur) based on the population data of the year 1991-2010. These divisional differences caused because of a range of socio economic reasons.[27] In Dhaka more than 37% of city's population live in slums (CUS, 2006) and almost all them are rural poor migrants and for this reason Dhaka is now considered as 'city of urban poor' (Islam, 2001). It is obvious that the percentage is higher compared to 2006.
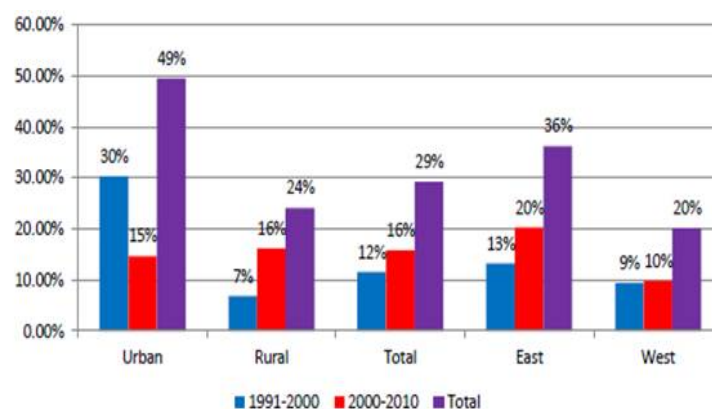
Figure 19: Change in rural – urban population in Eastern & Western divisions

Source: BBS: Statistical Year Book 1991-2013

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[27] Migration in Bangladesh: Character, Drivers & Policy Issues by Richard Marshall & Shihaab Rahman; UNDP

Percentage of changes in Urban- Rural Population in District level from 1991- 2001 & 2001- 2011 based on BBS data base

Changes in Urban &Rural Population in District level 2001- 2011

Urban
Rural

Sylhet, Comilla, Bogra, Cox's Bazaar, Noakhali, Mymensing, Kishorganj, Barishal, Feni, Chandpur, Sirajganj, Jessore, Brahmanbaria, Gazipur, Tangail, Narshingdi, Munshiganj, Dinajpur, Maulvibazar, Netrokona, Jamalpur, Nilphamari, Habiganj, Naogaon, Sherpur, Chapai Nababganj, Jhenaidah, Kurigram, Khagrachori, Faridpur, Thakurgaon, Sunamganj, Lakhsmipur, Natore, Chuadanga, Patuakhali, Narail, Satkhira, Panchagarh, Joypurhat, Kustia, Madaripur, Rajbari, Shariatpur, Pirojpur, Gopalganj, Barguna, Gaibandha, Meherpur, Magura, Rajshahi, Bhola, Jhalokathi, Bandarban, Rangamati, Bagerhat, Lalmonirhat, Rangpur, Manikganj, Pabna, Chittagong, Naraynganj, Khulna

-750,000 -250,000 250,000 750,000 1,250,000

Changes in Urban -Rural Population in District level 1991-2001

Urban
Rural

Dhaka, Chittagong, Naraynganj, Gazipur, Rajshahi, Khulna, Tangail, Comilla, Mymensing, Jamalpur, Chandpur, Jessore, Noakhali, Pabna, Sunamganj, Narshingdi, Bogra, Rangpur, Faridpur, Sylhet, Feni, Dinajpur, Habiganj, Cox's Bazaar, Kishorganj, Manikganj, Madaripur, Khagrachori, Chuadanga, Magura, Gaibandha, Sirajganj, Brahmanbaria, Netrokona, Shariatpur, Jhenaidah, Naogaon, Kurigram, Barishal, Joypurhat, Kustia, Nilphamari, Gopalganj, Patuakhali, Bhola, Chapai Nababganj, Pirojpur, Lalmonirhat, Satkhira, Rajbari, Maulvibazar, Sherpur, Natore, Meherpur, Lakhsmipur, Bandarban, Thakurgaon, Barguna, Narail, Jhalokathi, Panchagarh, Rangamati, Bagerhat, Munshiganj

-500,000 500,000 1,500,000

5.3.   Urban Centres, Slums and Squatters

Bangladesh had around 522 urban centre's back in 1991 which now stands at 570. Of these Dhaka in megacity, Chittagong, Khulna, Rajshahi, Sylhet are metropolitan areas, 25 cities (with population of over 100,000) each and rest are smaller towns.

Table 4: Number of Urban Centres by Census Year and Size Classes

Size/Classes	Number of Urban Centres					
	Census Year					
	1951	1961	1974	1981	1991	2001
5,00,000 and over	--	1	2	3	4	7
1,00,000 –4,99,999	2	3	4	10	14	26
50,000 –99,999	2	5	14	23	26	50
25,000 –49,999	14	16	23	45	76	116
Under 25,000	45	53	65	411	402	332
Total	63	78	108	492	522	531
Level of Urbanization	4.33	5.19	8.78	15.54	20.15	23.1

Source Population & Housing Census Volumes 2011 I to IV (full))

Today there are 7 city corporations and over 315 Municipalities. The spatial pattern of urban centres in Bangladesh is fairly well balanced.

Almost all 64 districts have a city or a town of reasonable size, and each of the old 460 upazilas have at least one small town. Figure 20: Map of Urban Centres depicts the urban centres based on size classification.[28]

Dhaka and Chittagong had more than 1 million residents in 1986. Seven other cities--Narayanganj, Khulna, Barisal, Saidpur, Rajshahi, Mymensingh, and Comilla--each had more than 100,000 people. A majority of the other urban areas each had between 20,000 and 50,000 people.

The Number of slums and squatter clusters in the same areas were 2991 in 1997 while it increased to 7300 in 2005. Due to differences in the definition of slum and squatter there might differences with the number and population of slum & Squatters.

Centre for Urban Studies has reported that, in 1997 there were only 1579 slums and cluster situated in Dhaka SMA whereas this figure reached at 4966 in 2005 with a broad definition of slums. The percentages of these numbers recorded as 52.9 and 54.9 respectively.[29]
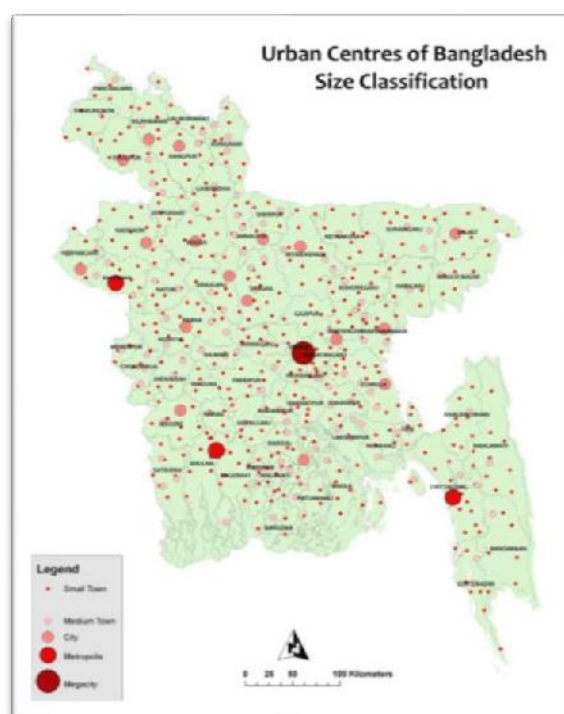
Figure 20: Map of Urban Centres

Source: Center for Urban Studies-2013

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[28] Overview of Urbanization in Bangladesh by Dr. Nazrul Islam, Chairman, Centre for Urban Studies; 2013

[29] http://economicsbd.wordpress.com/2011/03/06/a-brief-history-of-economics/ (Center for Urban Studies)

Table 5: Number of slum and cluster between 1997 and 2005 census; by Division *(Source: Centre for Urban Studies 2013)*				
City	1997	% of total	2005	% of total
Dhaka Mega city	1579	52.79	4966	54.9
Chittagong SMA	186	6.22	1814	20
Khulna SMA	202	6.75	520	5.7
Rajshahi SMA	84	2.81	641	7.1
Barisal	*		351	3.9
Sylhet	**		756	8.3
14 cities	293	9.8	***	***
100-Paurashavas	647	21.63	***	***
Total	2991	100	9048	100
*Included with Khulna** Included with Chittagong*** Not coverage				

Due to the variation in the definition of slum, the figures of the table ill matched for different years, but table depicted the tremendous increase in the slum, slum household as well as Slum population in Dhaka city.

Table 6: Number of Slums in Dhaka City 1974- 2005 *(Source: BBSCensus of Slum Areas and Floating Population 1997-2005)*			
Years of survey	Number of slums and squatter clusters	Number of slum households	Slum population
1974	-	-	275,000
1986	-	121,328	-
1991	2,156	-	718,143
1996	3,007	-	1,500,000
1997	1,579	185,917	754,866
2005*	4,966	673,883	3,286,770

In 1986, the number of slum households was 176745 in the three divisional Cities including Paurashavas. Later on in 2005 this number has increased and reported at 334431 in the six divisional Cities including Paurashavas and some urbanized areas, called SMA. Dhaka still occupied the first position in terms of living slum household, which was 68.65 and 64.6% in 1997 and 2005 respectively. Chittagong SMA secured the second position followed by Khulna SMA, Rajshahi SMA and Sylhet containing 25.5%, 3.6%, 2.6%, 1.9% and 1.7% respectively.[30]

Table 7: Number of slum Households and their % between 1986 and 2005 census						
City	1986	% of total	1997	% of total	2005	% of total
Dhaka Mega city	121,328	68.65	185,917	55.59	673,883	64.6
Chittagong SMA	30,854	17.45	45,143	13.5	266,182	25.5
Khulna SMA	24,563	13.9	28,184	8.43	37,826	3.6
Rajshahi SMA	-	-	6,998	2.09	27,665	2.6
Barisal	***	***	*	*	19,460	1.9
Sylhet	***	***	**	**	18,313	1.7
14 cities	-	-	24448	7.31	***	***
100-Paurashavas	-	-	43741	13.08	***	***
Total	176,745	100	334,431	100	1,043,329	100
*Included with Khulna** Included with Chittagong*** Not coverage						

In the year 1986, it has been observed that the total population in slum was 831645 with 53.69 % and 46.31% of male and female respectively in three divisional cities with adjacent Paurashavas.while in 1997. This figure reached at 1391458 with 51% and 48.99 % of male and female respectively in six divisional cities with adjacent Paurashavas and urban areas.[31].

[30] http://economicsbd.wordpress.com/2011/03/06/a-brief-history-of-economics/ (Center for Urban Studies)

[31] http://economicsbd.wordpress.com/2011/03/06/a-brief-history-of-economics/ (Center for Urban Studies)

Table 8: % of male and female In Distribution of population between 1986 and 1997 census						
City	1986	1986	1986	1997	1997	1997
	Total	% of male	%of Female	Total	% of male	%of Female
Dhaka Mega city	575,604	52.75	47.25	745,866	54.66	53.82
Chittagong SMA	138,282	58.58	41.42	188,839	14.05	13.07
Khulna SMA	117,750	52.5	47.5	119,305	8.05	9.15
Rajshahi SMA	***	***	***	29,766	2.11	2.17
Barisal	***	***	***	*	*	*
Sylhet	***	***	***	**	**	**
14 cities	***	***	***	109,012	7.77	7.9
100-Paurashavas	***	***	***	189,670	13.39	13.88
Total population	831,645	53.69	46.31	1,391,458	51	48.99

5.4.   Reason behind Rapid Urbanization

Inability of the agriculture sector to provide sufficient employment or sufficiently high household incomes to cope with a growing number of dependents can encourage people to seek employment outside agriculture. In the case of Bangladesh the rural to urban migration has contributed to more than 40 percent of the change in urban population. This is also reflected in the contribution rate to GDP. The share of the agricultural sector in GDP has come down from about 60 percent in 1972-73 to only 17.23 percent in 2013. The urban sector led by non-agricultural activities (commerce, trade, industry, service etc.) accounts for a relatively larger share of GDP compared to its rural counterpart. Its contribution to GDP has increased from a low of 25 percent in 1972/73 to over 80 percent in 2013.

Most of the industrial establishments and businesses as well as business services are concentrated in the largest cities. Dhaka alone accounts for 80 percent of the garments industry-the mainstay of manufacturing in Bangladesh. The major concentration of RMG (ready -made garment) industries took place in Dhaka (74%) followed by Chittagong (22%) (Islam 2008). About 4 million skilled and unskilled workers are employed in 5600 RMG industries. Not only that, Dhaka division has 16414 manufacturing industries, which is 47.29% of all industries in the country (BBS 2008), and most of these industries are located in urban centers, especially in Dhaka megacity.

From the environmental side Bangladesh has a long established seasonal pattern of temporary rural worker movement, associated with the annual cycle of rainy and dry periods. This affects two regions in particular – the *Monga*prone districts in the northwest which suffer prolonged and severe drought during the winter, and the north-eastern *Haor-affected* areas, which face flooding and waterlogging during the monsoon. Within the areas, which are dominated by subsistence agriculture, workers have always moved to secure their livelihoods, albeit temporarily. This was initially to

neighbouring agricultural localities, but in the last twenty years this cycle has expanded to include working within the core urban centres. Some evidence has shown that these movements have become more permanent in nature.[32]

5.5.   Overseas Migration

A number of populations are moving to overseas for different purposes like settlement, education, and employment each year. This number is quite difficult to obtain. There are five channels of recruitment from Bangladesh for overseas employment. As per 2007 data individual initiative constitutes 68%, Recruiting agents deal with 32% of recruitment (including BMET, BOESEL). BOESL recruits less than 1%.

For overseas employment as per BMET it has seen that in 1976 only 6,087 people went to overseas for employment reason where in 2008 it was 837,055 and in 2014 (up to date) it is 207,957[33]. The previous graph is showing the trend of movement and it has unstable rise & fall. Political situation of Bangladesh, international relationship with the foreign governments, political situation of the foreign countries, global
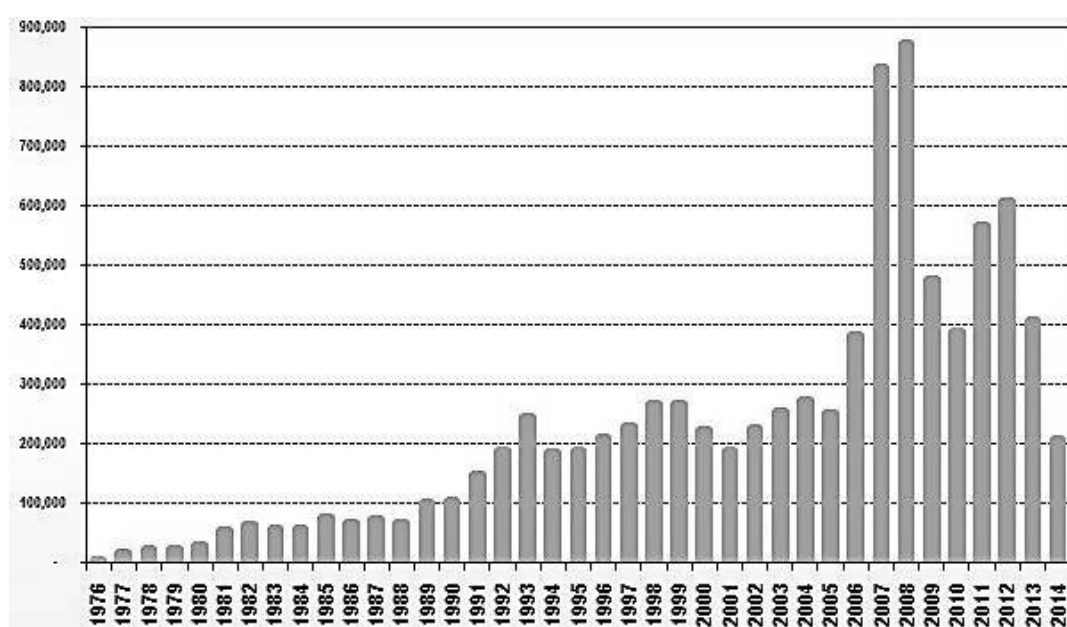
Figure 21: Overseas employment 1976- 2014

economy, man power demand of the foreign countries etc. is the main reason for this rise and fall. No figure is available on the returned migrants which may be estimated as 10%-15%.[34]

Between 1991 to 2000 female migrants constituted less than 1% of the total flow, after the relaxation of restriction during the years of 2005 or 2006, 6% of the total labor flow from Bangladesh was women. In 2009 and 2010 share of women were, 4.7% and 7% of the total flow respectively. In 2011 the flow of female migrants increased by 10.37 per cent over that of 2010[35].

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[32]http://www.bd.undp.org/content/dam/bangladesh/docs/Publications/Pub2013/Internal%20Migration%20in%20Bangladesh%20UNDP%20Final.pdf

[33] Migration Scenerio: Nature, Pattern and Trend by Dr. Md. Nurul Islam

[34] Bureau of Manpower, Employment and Training

[35] Siddiqui, Tasneem (2013); Remittance backed Financial Products in Bangladesh (Working paper series no. 37, Dhaka: RMMRU

There is district wise variation to this overseas employment. The BMET 2008 data describes the following features of the origin of migrants[36]:

Table 9: Flow of Male and Female migrants from 2004- 2009: *(Source BMET & UN)*

District	2004-05		2005-06		2006-07		2007-08		2008-09		Total	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Dhaka Division	181009	11131	176485	10462	236559	12807	144556	13007	197720	16640	936329	64047
Sylhet Divison	37537	257	47235	349	30202	477	22608	520	29973	506	167555	2109
Chittagong Division	122495	1831	142222	2031	241611	2345	222414	2220	290730	2331	1019472	10758
Rajshahi Division	55418	514	25608	706	32608	771	25510	1029	40608	975	179752	3995
Khulna Division	46267	614	41386	732	37927	1124	24479	1346	39602	1222	189661	5038
Barishal Division	20460	939	11964	1025	18640	1145	16821	1096	22257	1381	90142	5586

Dhaka and Chittagong Divisions comprising only 30 of the country's 64 districts account for the lion's share—78.20%-- of the migrants; the remaining 4 Divisions consisting of 34 districts chip in with only 21.20%

The poorest parts of the country have very small representation in the migration; the *manga* (seasonal famine) affected districts on the northwest fringe of the country are among the worst performers with insignificant migrant population.

At the district level, Comilla stands out as the leading supplier of male manpower for employment abroad, along with 5 other traditional suppliers.[37]

BMET and United Nation's 2010 data reveals that around 6% Bangladeshi migrant has stayed in overseas as Immigrant. But they have provided the data only based on the list of countries with Bangladeshi migrant population of over 5,000. So this number might be a bit higher.[38]

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[36] BMET and Study on the International Demand for Semi–skilled and Skilled Bangladeshi Workers by MAXWELL STAMP Ltd.

[37] BMET and Study on the International Demand for Semi–skilled and Skilled Bangladeshi Workers by MAXWELL STAMP Ltd.

[38] Country Paper Migration

Table 10: Intra-country Migration

Country	Total Migrants In Thousands	No. of B'desh	% of B'desh Migrants
	UN Estimate 2010		Migrants in thousands
1	2	3	4
Saudi Arabia	7,289	1797	24.65
UAE	3,293	810	24.6
USA	42,389	500	1.18
UK	6,452	500	7.75
Malaysia	2,358	444	18.83
Kuwait	2,098	315	15.01
Oman	826	176	21.31
Bahrain	315	112	35.56
Qatar	1305	93	7.13
Italy	4,463	70	0.16
Canada	7,202	35	0.49
Jordan	2,973	25	0.84
Japan	2,176	22	1.01
Spain	6,277	17	0.27
Libya	682	16	2.35
Lebanon	758	15	1.98
South Korea	37	14	37.84
Hong Kong	2,721	11	0.4
Greece	1,133	10	0.086
Mauritius	43	9	20.93
Germany	10,758	7	0.07
Sudan	753	5	0.66
Australia	4,711	5	0.11
TOTAL	51,848	3113	6

Source: BMET and United Nation's database

6. Population Forecasts

6.1. Population Projections up to 2100 by UN

6.1.1. Three (fertility) variants

Since 1951s the United Nations (UN) had been publishing country level population estimates and projections. These population projections have been prepared by the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat.

In 2013 the "2012 Revision" of the World Population Prospects[39] was published, containing among others **three fertility variants** (medium, high and low) up to 2100, each sharing the assumptions made with respect to mortality and international migration. Starting year for the projections is 2010.

For Bangladesh the assumptions about the three fertility variants are as follows:

- *Medium variant*: the total fertility rate (TFR) declining to 2.20 in the period 2010-2015, and further declining to 1.69 (lowest level) in the period 2040-2055 and slightly increasing in the next 45 years 1.82.
- *High variant*: the TFR is projected to reach a fertility level that is 0.5 children above the total fertility rate in the medium variant.
- *Low variant*: the TFR is projected to reach a fertility level that is 0.5 children below the total fertility rate in the medium variant.

Figure 22 shows total fertility rate for the *medium variant* for Bangladesh compared to Asia and to Southern Asia. The figure indicates that total fertility rate for Bangladesh is projected to be declining significantly faster than in Asia and Southern Asia, already reaching the replacement value of about 2.1 just after 2015, while in Southern Asia this will be the case only after 2040. At the end of the 21st century total fertility rate is converging in all three regions mentioned to about 1.8.
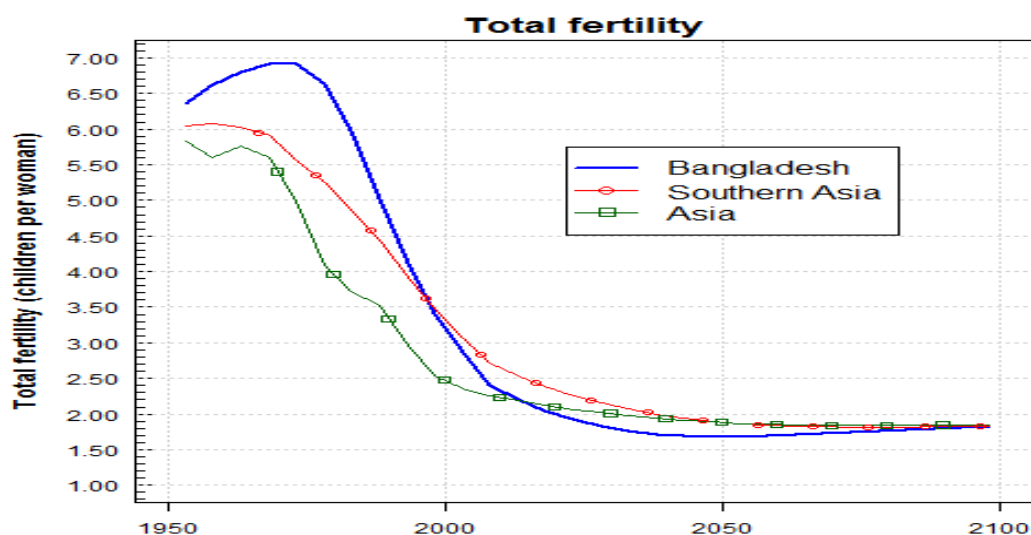
Figure 22: Total population in Bangladesh up to 2100 for three projection variants

Source: UN, World Population Prospects, the 2012 Revision: Volume II: Demographic Profiles

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[39] World Population Prospects The 2012 Revision: Volume I: Comprehensive Tables, UN, New York 2013.
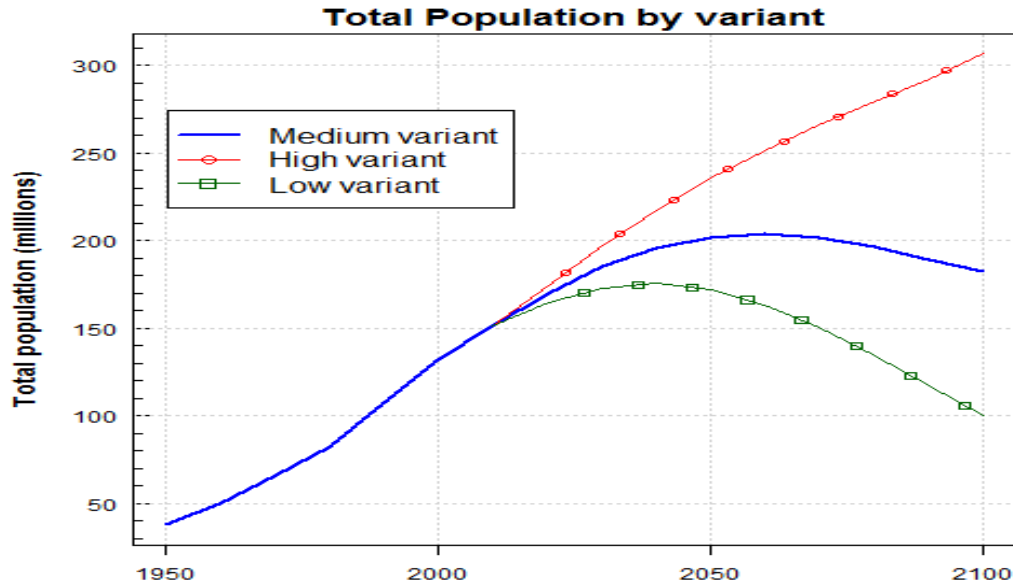
Figure 23: Total Population by variant

Source: UN, World Population Prospects, the 2012 Revision: Volume II: Demographic Profiles

In the *medium variant* total population in Bangladesh is projected to grow (from 151.1 million in 2010) to 201.9 million in 2050, reaching its maximum level of 203.7 million in 2060. In the next period 2060 -2100 total population is decreasing very slowly to 182.2 million in 2100.

In the *high variant* comparable figures for total population are 235.6 million in 2050, 251.7 million in 2060 and increasing to even above the 300 million level (306.8 million) in 2100.

In the *low variant* total population is increasing slowly to 175.0 million in 2035 (reaching its maximum level), and thereafter slightly declining to 171.9 million in 2050. In the period 2050-2100 total population is further decreasing significantly to about 100.3 million in 2100.

The above picture in the very long run (2050-2100) is deviating substantially over time (compare in particular the high and low variant) and its uncertainty is (no doubt) increasing. However, for the medium and long run (up to 2050) the estimates are more robust given the fact that most people who will live in 2050 are already born.

In later sections we will come back to the above variants in more detail, when dealing about the national population projections and the way these projections are regionalized on a district (and division) level. Below, just some issues will be dealt with briefly for the medium variant (up to 2050 and/or 2100).

Age groups and sex pyramids (up to 2100)

Due to the on-going demographic transition the population age structure is also changing substantially. In Figure 24 population pyramids for the medium variant are shown for the current situation (2010), 2050 and 2100.
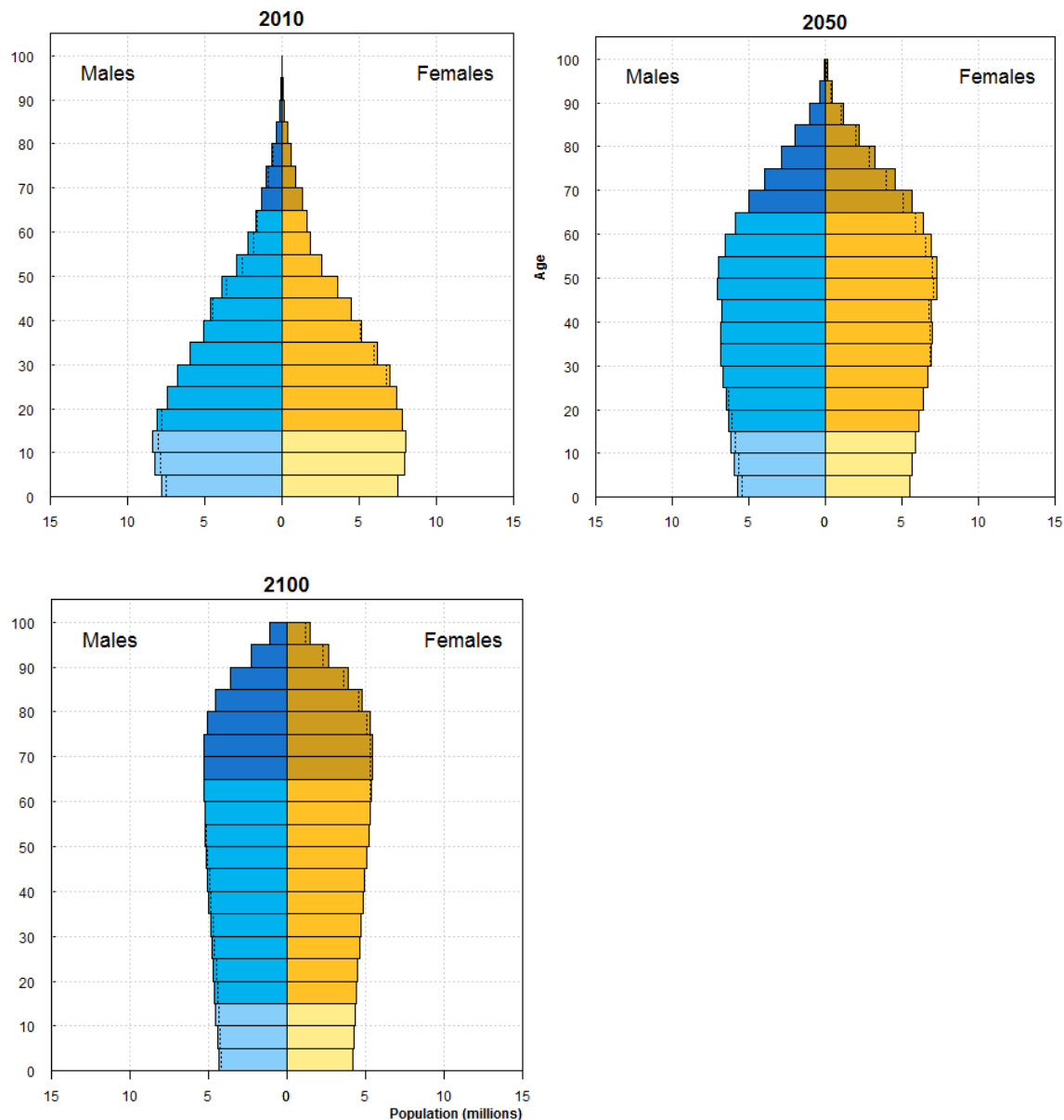
The dotted line indicates the excess male or female population in certain age groups

Figure 24: Total population in Bangladesh by age groups and sex (absolute numbers: in millions) for medium variant

Source: UN, World Population Prospects, the 2012 Revision: Volume II: Demographic Profiles

Once fertility rates decline to replacement level, or below, the proportion of the people under 15 will decrease gradually resulting in a narrower base of the population pyramid. For the year 2050 (about 15 years from now), the proportion of the youth (under 15 years) will fall substantially, while the proportion of the people between 15-64 years will stabilize. The number of older people (over 65) will increase steadily. In the year 2100 the entire picture (compared to 2010) is changed completely. More and more equally distribution over age groups is happening, and people are getting older (partly also reaching the last two age groups, up to 100 years).

Population growth (up to 2050)

The Population growth rates show various changes over the course of the years. After a major drop during 1970 to 1973, the population growth rose steadily by approximately 1%, till 1990. However, from 1990 the population growth slowly decreased over the next 20 years, falling to 1.19% by 2011. Data from 2012 showed signs of a slight increase but projected data for the next course of years show rapid falls in growth rate. It is projected to fall to around 1% by 2023. Growth rates are then projected to keep decreasing to 0.50% by 2038. By 2050 population growth rates are projected to fall to 0.20%.This is indicative of the demographic economic paradox where economic growth spurs lower fertility rates.
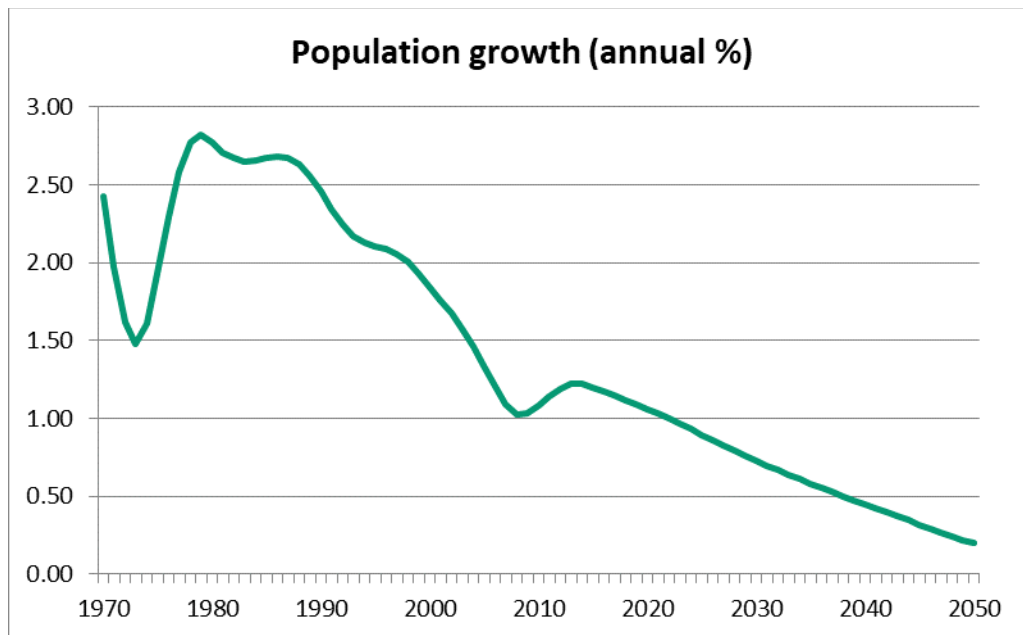
Figure 25: Population growth (in % annually) for the past as well as the future up to 2050

Source: UN, World Population Prospects, the 2012 Revision: Volume II: Demographic Profiles

Urban and Rural population

In the Figure below the development of urban and rural population up to 2050 is showed.
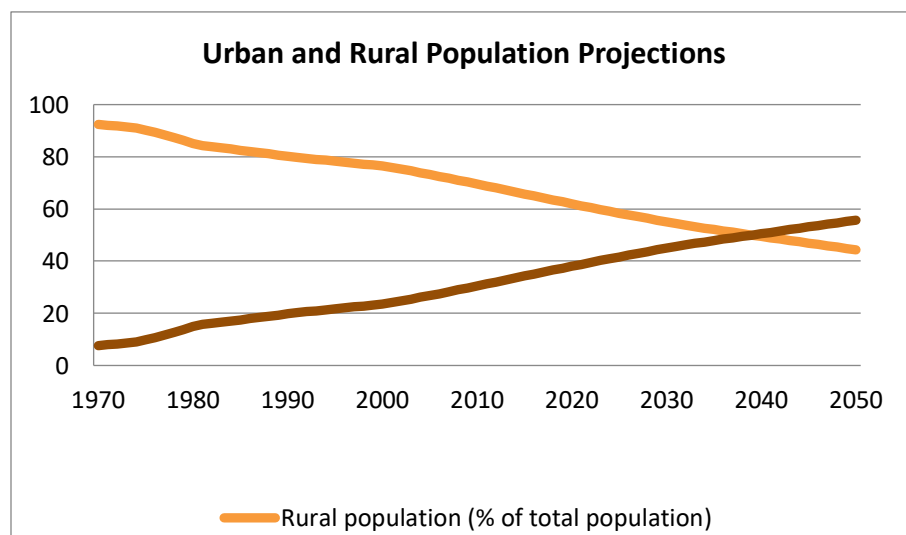
Figure 26: Urban and Rural Population Projections Medium Variant up to 2050

The data indicate that rural population has been steadily decreasing over the years whereas the urban population is seen to have a steady increase. It is projected that by 2040 both Urban and Rural populations will be equal. By 2050 it is projected that urban populations will stand at around 112 million and rural populations at around 90 million (total around 202 million). This has significant implications for land use and water resource management
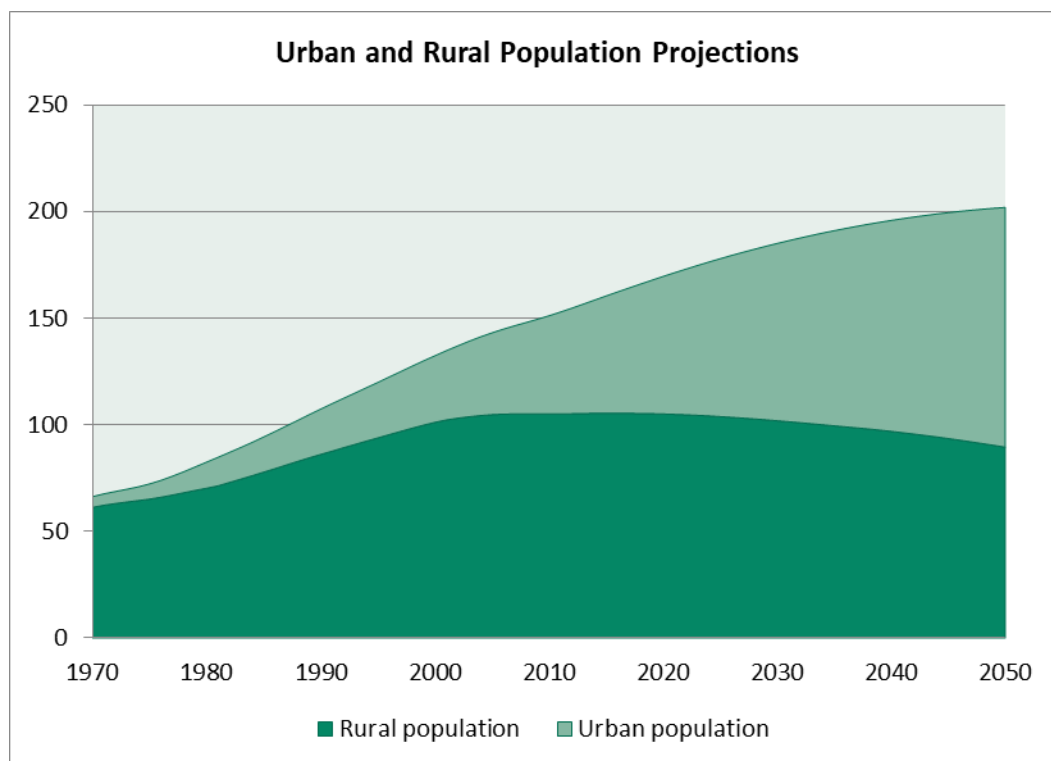
Figure 27: Urban and Rural Population projections added up (medium variant up to 2050)

Source: UN, World Population Prospects, the 2012 Revision: Volume II: Demographic Profiles

6.1.2.   Additional population projection variants

The UN Department of Economic and Social Affair's Population Division updated in late 2013 the population projections for Bangladesh using BBS data.

According to the "Technical Paper No. 2013/3 Demographic Components of Future Population Growth", the forecasts and analysis quantifies the contribution of the current age structure of a population, fertility, mortality, and migration to future population growth.

The series of projections starts with a Standard population projection, which incorporates effects of all four demographic components. For the analysis the **Standard population projection is set equal to the Medium variant** from the 2012 Revision of World Population Prospects (United Nations, 2013b), as discussed in the previous section. This projection also starts with population by age and sex in 2010 and projects future population trajectories up to 2100 based on expected trends in fertility, mortality and net international migration, computed according to the methodology used in the 2012 Revision of World Population Prospects (United Nations, 2013b).

The *effect of migration* is estimated by constructing a Natural population projection variant, which is derived from the Standard variant by setting net migration to zero. Population growth in this case is driven only by natural increase based

on assumptions about future fertility and mortality and by the initial age distribution. The difference in total population between the Standard and Natural variants shows the effect of net migration on future population growth.

The *effect of fertility* is estimated by a Replacement projection variant, which is derived from the Natural variant by setting total fertility at the replacement level for each five-year projection periods. The difference between the Natural and Replacement projection variants shows the effect of total fertility, above or below replacement level, on the overall population growth. Note that the Replacement projection variant is different from the instant-replacement variant published in the 2012 Revision of World Population Prospects (United Nations, 2013b), because the latter includes the effect of migration while the former does not. The last projection variant, Momentum, is constructed by using as of 2010 constant mortality rates, constant fertility at the replacement level and by setting net migration at zero. Computing the difference in total population between the Replacement and Momentum variants shows the *effect of anticipated mortality decline* on future population size. It is important to note that trends in mortality between birth and the reproductive ages are taken into account by the changes that occur in the replacement levels of fertility. The difference between the Replacement and Momentum projections therefore measures only adult mortality above the average age at childbearing. Lastly, the difference between the starting total population in 2010 and the Momentum variant is attributable to the initial age structure of a population. If fertility declines immediately to the replacement level as in the Momentum a few decades before it eventually tapers off and reaches the ultimate stationary level.

The different variants can thus be summed up as:

Standard Variant (=medium variant in section 6.1.1): This projection starts with population by age and sex in 2010 and projects future population trajectories up to 2100 based on expected trends in fertility, mortality and net international migration, computed according to the methodology used in the 2012 Revision of World Population Prospects (United Nations, 2013b).

Natural Variant: derived from standard variant setting net migration to zero

Replacement Variant: derived from the Natural variant by setting total fertility at the replacement level for each five-year projection periods.

Momentum Variant: is constructed by using as of 2010 constant mortality rates, constant fertility at the replacement level and by setting net migration at zero.

The results of the population projections for Bangladesh according to the Standard (=Medium), Natural, Replacement as well as Momentum Variant are shown in figure 6.7. covering the period up to 2100.

The below picture shows the variety in population developments related to the medium variant, based on different assumptions and concerning the entire period up to 2100.

From the above figure one might conclude that compared to the standard (=medium) variant for which total population in Bangladesh in 2050 is projected to be about 202 million, the natural variant (setting migration to zero) will add another 13.5 million people in 2050, summing up to 215.5 million.

In the momentum variant the picture changed slightly into an additional 18.5 million people compared to the standard variant. However, in the replacement variant setting total fertility at the replacement leve, the additional increase to the standard variant is even more than 30 million people in 2050.

For the year 2100 comparable population figures are 199 million (natural variant), 229 million (momentum variant) stable since 2075, and 269 million (replacement variant), compared to the standard variant which amounts to 182 million in 2100.
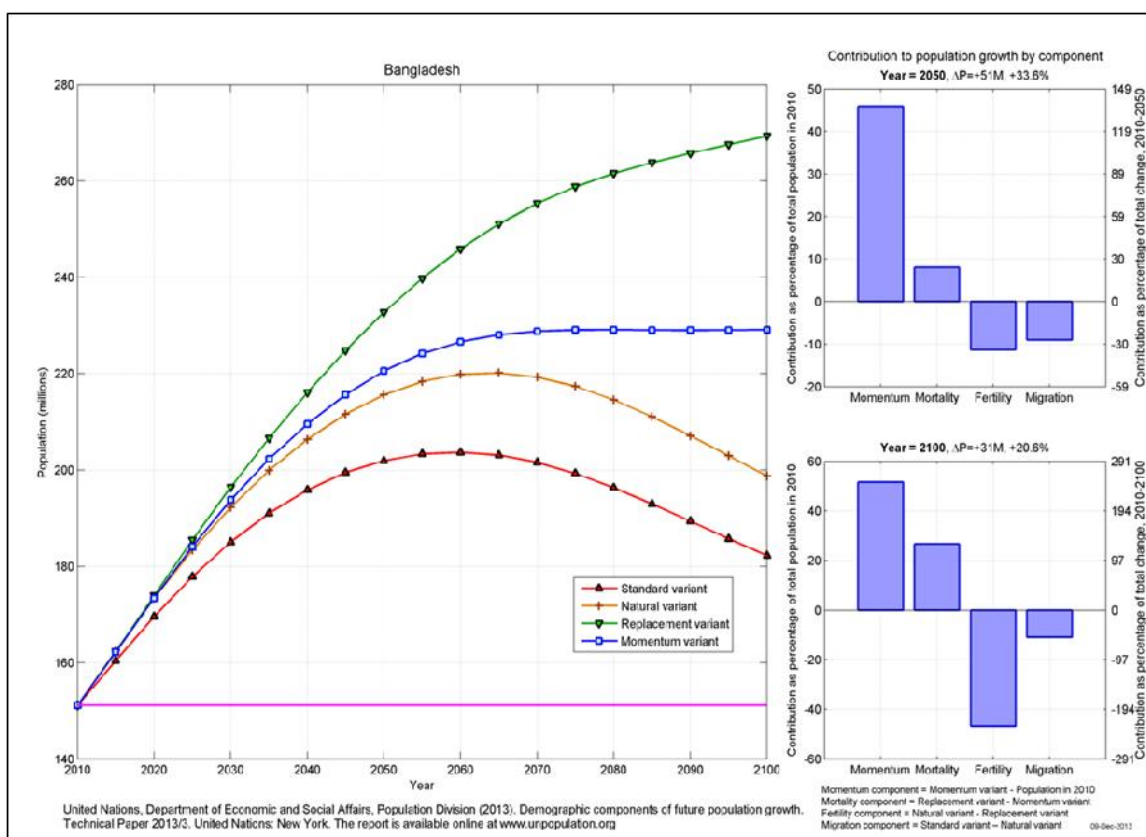
Figure 28: Additional population projection variants for Bangladesh up to 2100, based on the standard (medium variant)

Source: UN World Prospects 2012 website: database technical paper 2013/3 for Bangladesh

6.2. Various Population Projections up to 2050: a Comparison

Apart from the population projections up to 2100 from the UN (discussed in the previous sections), other projections from other sources are available, but only for a much shorter time period. Most of the projections are covering the period up to 2050 (and in one case to 2061).

In the **World Bank (WB)** discussion paper (92650) "Population, family planning, and reproductive health policy harmonization in Bangladesh", November 2014, **new population projections for Bangladesh** were made from 2001 up to 2051 and based on the following two TFR scenarios:

- The LF scenario: the TFR will reach 2.0 children per woman by 2016 and stay there (laissez-faire fertility of LF scenario);
- The AFT scenario; the TFR will reach 2.0 children per woman by 2016 and continue to decline to a below-replacement level of 1.7 (accelerated fertility or AFT scenario).

As already mentioned above, the starting year of these projections is 2001 starting with a total population in Bangladesh of 130 million. Therefore, the figures for 2011 are estimates (and not derived from the population census 2011). Compared to the Census data 2011 these figures in both scenarios are a bit overestimated.

A brief summary of the results are presented in the next table.

Table 11: WB Population projections for Bangladesh, 2001-2051, according to LF and AFT scenario (summary)

	Total population (in million)	
	LF scenario	**AFT scenario**
2001	130.5	130.5
2011	153.9	154.3
2051	218.1	201.3

Source: WB, discussion paper 92650, November 2014

In the same WB paper is referred to other projections from other sources like the most recent population projections **from UN and WB** (the medium variant from the UN 2012 Revision, as is discussed in section 6.1). As already presented total population in 2050 is projected at 201.9 million, which is very close to the 2015 result from the AFT scenario.

A second source are **the projections from Bangladesh Bureau of Statistics (BBS),** Population Census 2001, National Series, Volume 1, Dhaka, Ministry of Planning (2007), estimating total population in 2050 at 218.6 million. This is also close to the projection in table 6.1 but now according to the LF scenario.

Finally, the WB paper referred to the **US Census Bureau results** (assessed in 2009) for Bangladesh. Total population by US Census Bureau is estimated in 2050 at 233.6 million, which is substantially higher than the previous ones.

Next to the WB discussion paper, very recently (18th of January 2015), a background paper prepared for the Bangladesh Planning Commission of the General Economics Division in Support of the Development of the 7th FYP 2016-2020 has been published. This paper, which is called "The Impact of the Demographic Transition on Socioeconomic Development in Bangladesh: Future prospects and Implications for Public Policy", **UNFPA**, January 2015, presented **new population projections for Bangladesh specifically for the abovementioned report**, due to absence of up-to-date "official" population projections based on the 2011 census.

The **population projections by UNFPA** are covering the period 2011-2061. The base year of the projections was the age-sex distribution derived from the 2011 census after adjusting for the census undercount and smoothing the age distribution to remove the effects of "age-heaping".

For this report, three projections were prepared, a medium, high and low variant (comparable to the UN variants discussed in section 6.1.1):

- The Medium Scenario assumes that the Total Fertility Rate (TFR) drops to 2.1 (replacement level) in the 2011-2016 period, to below replacement (1.9) by 2016-2021 period and remains at 1.9 through to 2061.
- The High Scenario assumes that the TFR would remain constant at its present level (2.3) for the entire projection period.
- The Low Scenario assumes that the TFR declines to below replacement (2.0) during the 2011-16 period, and to 1.6 by the 2016-2021 period where it remains until the end of the projection period.

According to this report, it has also been assumed that the distribution of fertility by age of the mother will change through time. It stated that "Bangladesh has a distinctive pattern of early marriage and childbearing. Declining fertility in recent decades has occurred in older age groups with the result that the proportion of births in younger age groups has been increasing. In these projections it is assumed that the age distribution of fertility will shift again to the older ages in the longer run given the possible increase in the age of marriage and first birth.

The projected population for Bangladesh for three scenarios in the period 2011-2061 are presented in table 6.2. It only concerns a summary based on a selection of years. In the UNFPA report the projections are dealing with three age groups (0-14; 15-59; 60+) and covering each 5 year period from 2011 onwards.

Year	Population in millions		
	Medium scenario	**High scenario**	**Low Scenario**
2011	149.8	149.8	149.8
2051	218.4	245.6	201.3
2061	225.7	265.1	201.1

Source: UNFPA Background paper as input for 7th FYP2016-2020

Although the results of these three scenarios are also referring to the year 2061, we start our comparison with the year 2051. The population of Bangladesh in the UNFPA medium scenario is projected at about 218 million, which is (as also stated in the UNFPA report) very close to the WB LF scenario (see table 6.1). Moreover, it is very close to the "old" BBS forecast for 2050 (which was 218.6 million).

The UNFPA low scenario projected the population in Bangladesh at a level of 201 million in 2051. This is also very close to the other WB AFT scenario (201.3 million; see table 6.1). When comparing the UNFPA figure with the UN projections (discussed in section 6.1) the UNFPA figure of 201 million in 2051 is very close to the UN projected 201.9 million in 2050: however, the figure in the UN projection is presenting the medium variant and NOT the low variant. Concerning the TFR which is currently (2011) 2.3 in Bangladesh, the UN medium variant is more optimistic than the UNFPA about its decline. The TFR assumptions in the medium variant of the UN are close, but a bit more conservative than those used by UNFPA in their low scenario. However, in the UN low scenario the UNFPA assumptions concerning the development of TFR are surpassed leading to significant lower projections and a significantly declining population just from 2040 onwards. The UN figure for 2050 is 172 million and for 2060 is 163 million.

Looking at the UNFPA high scenario, we might conclude that the population figure for 2051 projected at 245.6 million is significantly higher than the UN high variant for 2050, which is projected at 235.6 million. Comparable projections for the year 2061 (or 2060 respectively) are 265 million (UNFPA) and 252 million (UN). In the UN high scenario the 265 million level is assumed to be reached 10 years later in the year 2070.

Conclusion

As discussed above various population projections for Bangladesh are available up to 2050, each with their own assumptions concerning TFR and other variables like mortality etc. The results are of course deviating from each other, because not all assumptions for various variables are the same, the starting year differs, model(s) used are not the same, etc. etc. Also differences between medium and high respectively low scenarios deviate for instance +- 20 up to +-30 million (in a particular year). Moreover, future policy directions are unknown and their effects somewhat unpredictable. But the rough picture is clear: has total population in Bangladesh in 2050 increased to even 245 million people, or stabilized at for instance 200 million, or after 25 years from today (2015) in which it increased to 175 million on the return back to 172 million?

For the purpose of scenario building exercises and the final development of the socio economic and climate change scenarios for Bangladesh for the Delta Plan 2100 (BDP2100), in which we are looking at drivers with high uncertainty and high impact, and also scenarios which does not include policy choices or preferences that can be influenced by e.g. water planners or decision makers, the above picture for the total population of Bangladesh is sufficient. Please, be aware that for the period 2050-2100 the uncertainty is even much higher.

Therefore, as a starting point for the discussion in the scenario exercises we suggest to make use of the UN projections (as dealt with in section 6.1.1 as well as in the next section). These projections include the bandwidth as discussed for the period up to 2050 and include also projections for the period after 2050 up to 2100 (the horizon of the BDP2100).

6.3. Population Projections to be used in the BDP 2100

6.3.1. Population projections on a national level and a district level: the method

As already discussed in section 6.1 UN (and WB) made population projections for Bangladesh at a national scale up to 2100 for three main variants (medium, high and low). However, within the BDP2100 project, a need exists to get more insight in the population projections on a regional scale: that is at the division level or even at the district level. A recent discussion with officials from BBS revealed that BBS is making population projections at the district level using Census data 2011. At the same time the BBS official argued that these population projections will not be ready before March/June 2015, which might be still optimistic! It has been agreed that until more official projections are available, the BDP2100 team can reference the UN/WB2012 population projection(s). Once the official new BBS reports come out, updating might be possible.

Because the UN projections are only available at a national level and designing and running a new population forecasting model at the national level as well as the division/district level is not included in the scope, timing and budget of the BDP2100 project, we have suggested the following:

- One of the methods that can be used for regionalizing national forecasts is the so-called "Shift & Share Method[40,41]. Main components are the difference in regional growth rate (read: district growth rate) against the national growth rate of population in a certain period/year and the difference in developments in growth rates between periods (district against national level). Although this method has some disadvantages, and is in principle not suitable for very long periods (>30 years of more) we believe that for our purpose of designing scenarios for BDP2100 as well as the way it will be used on a regional level in the Delta Ateliers, this method serves the purpose. However, because this method is pure mechanical, for long periods like in the BDP2100, possible corrections in some cases have to be made. This is open for discussion.
- The main condition of using this method is that the forecasted population on district level is adding up to the national figure (for every period or year which is chosen).
- Apart from national population forecasts per period or year, we do need (of course) historical population data on national level and on a district level. Moreover, the historical data (on a national, which are the sum of the regional data) have to be in line with the national forecasts. In other words: the latest historical data available (f.i. 2011 or 2010) on national level (and thus on a district level) have to be the starting point values for the national forecasts! (see also Box 1 in which an example in Turkey is presented, based on shift & share).

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[40] A Practitioners's Guide to State and Local Population Projections, Stanley K Smith, Jeff Tayman, David A Swanson, December 2013, Springer, USA/Dordrecht

[41] In Marmara Basin Socio-Economic Assessment, Turkey, ECORYS Nederland BV, 2006

Box 1: Population forecast 2010-2030 Marmara Basin Provinces, Turkey

To estimate the impact of population on total pollution load in Marmara Basin in the next 25 years, the population forecast is essential. Based on *a shift and share method* population forecasts for 8 provinces linked to the Marmara Basin have been developed for every 5-years period from 2000 up to 2030 according to three different population growth scenarios: medium , high and low growth. Below we show the medium population forecast method and final results.

The following steps have been taken for the medium population growth scenario:

1. For this medium growth scenario population growth rates from the United Nations' population projections for Turkey (UN, 2002) have been used as a basis for forecasting the population from 2010 onwards. The UN provides growth rates for urban, rural and total population for each 5-years period up to 2025 (unfortunately, only on a national level). Based on extrapolation also population growth rates have been estimated for the period 2026-2030.

2. Next, for urban as well as for rural areas deviations in growth rates between Turkey and each of the provinces within Marmara Basin have been calculated and analyzed for the period 2000-2010 (for two 5-years periods). Besides, for each 5-years period from 2010 up to 2030 the development of these deviations has been extrapolated (for each province separately). This is done in a conservative way by using the change from period 2000-2005 to 2006-2010 as a constant factor in time.

3. Finally, the projected deviations in growth rates between Turkey and each of the provinces within Marmara Basin are combined with the projected national growth rates for Turkey in the period 2010-2030 (from step 1). This exercise results in specific population growth rates for each of the provinces in Marmara Basin, distinguished for urban and rural settlements. Based on these growth rates the population per province is forecasted (totaling urban and rural settlements) for the period 2010-2030

The population results per province are shown in the table below.

Population Scenario –: Medium Growth (Marmara Basin Provinces, Turkey) 2005 -2030

Provinces	2005	2010	2015	2020	2025	2030
Istanbul	11,169,050	12,583,832	13,968,436	15,264,007	16,498,891	17,625,790
Bursa	2,117,838	2,359,554	2,596,347	2,819,887	3,038,125	3,244,531
Kocaeli	1,283,203	1,415,434	1,543,382	1,663,538	1,782,390	1,898,293
Balıkesir	839,643	852,395	855,725	849,565	838,901	823,716
Kütahya	309,938	313,652	314,858	313,546	311,558	308,894
Tekirdag	219,681	245,541	270,987	294,893	317,812	338,783
Çanakkale	359,656	360,198	357,687	352,804	348,149	344,006
Yalova	183,551	198,418	212,692	226,046	239,491	252,897
Total	**16,482,560**	**18,329,024**	**20,120,113**	**21,784,285**	**23,375,317**	**24,836,911**

Marmara Basin Socio-Economic Assessment , Turkey, 2006, ECORYS Nederland BV.

This study is part of the Environmental Master Plan & Investment Strategy for the Marmara Sea Basin, prepared by a consortium consisting of Grontmij NL (lead), WL/Delft Hydraulics and ECORYS Nederland BV, 2008, Turkey/The Netherlands

Taking into account the issues mentioned above (using the shift & share method) some inconsistencies in data have to be solved. Therefore, the following steps are taken (to compile the data sets needed):

1. Estimating the starting values at the district level (summing up to the national level) by up-scaling the 2011 census data (at district level) with a 96% coverage to 100% coverage (for each of the districts in the same way, using the factor 100/96!);
2. Calculating back the 2011 census data on a district level to the year 2010 (which will be used as starting year in the projections, based on the UN figures), taking into account (per district) the average annual growth rate in the last 10 years (derived from the two censuses 2001 and 2011);
3. Calculating the historical growth rates (per 10 years period, from 1991 – 2001 and from 2001 -2011) on district level (and summing up to the national level) using the original census data for 1991, 2001 and 2011 and taken the average of both periods (per district) as the regional growth rate for future periods; unfortunately more historical data on district level (64) for earlier years (f.i. census 1981) were not available (in 1981 only 22 districts were existing);
4. Calculating the national population growth rates (per 10 years period) from WB/UN, following the three variants (medium, low and high) up to 2100. The reason is that the starting value of the UN/WB projections deviates a bit from the last population census data 2011. Based on a discussion with officials from BBS, the latter will be taken (see a).

Based on the above mentioned data sets, and starting with the population figures for 2010 per district, the following (mechanical) procedure has been followed (based on shift and share) for each of the three variants distinguished by the UN to make population projections on a district level and a national level:

1. Applying the average 10 years population growth rate per district from the past (average 1991-2011) at the projection period 2010-2020;
2. Adding up the absolute population figures for 2020 to the national level;
3. Calculating the national 2020 population projection based on the 10 years growth rate derived from the UN projections;
4. Calculating the correction factor (scaling factor) based on the results found under 2 and 3, in order to fit the sum of the projections on a district level with the national projection;
5. Applying the correction factor found under "4" on all districts, leading to the new data set for the next period 2020-2030.
6. Repeating the above steps from 1 to 5 for each 10 years period up to the last period 2090-2100.

This has been done for all three variants: medium, high and low.

In the above procedure ONE assumption in particular has been introduced and ONLY with respect to the growth rate of population in Dhaka Zila for the next 90 years. The main reason is that in the past 20 years (1991-2011) the growth rate of Dhaka Zila is about 44 % in a 10-years period (average of two 10-years periods). Continuation of this 44% growth rate in each of the 10-years periods up to 2100 is only leading to absurd not realistic figures (in terms of total population and population density). Therefore, we have assumed that the growth rate of 44% is only VALID in the first 10-years period (2010-2020), but thereafter THE RATE will decrease with 10% points per 10-years period. So, in the next period (2020-2030) the growth rate will be 44%*0.9=39.6%; in the period thereafter (2030-2040) it will be 39.6%*0.9=35.6%. and so on. Of course: the 10% decrease in growth rate is a first best guess (open for discussion). But, it shows more realistic figures (looking at the absolute figures and population density in the Dhaka Zila in particular). This of course is influencing all other Zila's.

WARNING: Finally, it must be stated that CAUTION is needed with the above procedure and consequently the results of this exercise. Running the model gives a first picture on a regional (district) level. The estimates on this level are only very rough indications and have to be used in that way!

6.3.2. Population projections on a national level and a district level: the results

In this section the results of the population projections up to 2100 will be dealt with. For all details on a district level is referred to the Annex, in which the following tables are presented:

Table A1: Medium Variant: population projections for 2010, 2020, etc up to 2100 per district and division

Table A2: Medium Variant: population density projections for 2010, 2020, etc up to 2100 per district and division

Table B1: High Variant: population projections for 2010, 2020, etc up to 2100 per district and division

Table B2: High Variant: population density projections for 2010, 2020, etc up to 2100 per district and division

Table C1: Low Variant: population projections for 2010, 2020, etc up to 2100 per district and division

Table C2: Low Variant: population density projections for 2010, 2020, etc up to 2100 per district and division

As already said in the previous section: all results on a regional scale have to be treated with CAUTION! The results on district level (and on division level) are very rough estimates!

In the next tables a summary of the results is presented on division and national level for each of the three variants: medium, high and low (for selected years in the period 2010-2100).

Table 13: Projections Population Bangladesh on division and national level (Medium Variant) selected years

Code	Division name	Population (medium variant)						
		2010	2030	2050	2060	2070	2090	2100
10	Barisal Division	8,656,000	8,561,000	7,472,000	6,725,000	5,933,000	4,410,000	3,763,000
20	Chittagong Division	29,135,000	35,861,000	39,063,000	39,331,000	38,847,000	36,310,000	34,802,000
30	Dhaka Division	48,376,000	64,793,000	77,054,000	80,835,000	82,977,000	83,348,000	82,825,000
40	Khulna Division	16,232,000	17,831,000	17,319,000	16,455,000	15,327,000	12,712,000	11,461,000
50	Rajshahi Division	19,017,000	21,895,000	22,206,000	21,534,000	20,457,000	17,614,000	16,166,000
55	Rangpur Division	16,228,000	18,876,000	19,312,000	18,799,000	17,920,000	15,518,000	14,276,000
60	Sylhet Division	10,090,000	13,095,000	14,990,000	15,451,000	15,607,000	15,208,000	14,857,000
	Bangladesh total	147,735,000	180,912,000	197,417,000	199,131,000	197,067,000	185,121,000	178,150,000

Source: Own Calculations Ecorys NL

As can be seen from table 6.3 total population for Bangladesh according to the medium variant is projected to be 197 million in 2050 (a bit below the official UN forecasts of 202 million, due to a bit higher starting value in 2010). In 2060 the maximum level of population will be reached (about 199 million) and in 2100 population will be declined to the level of 178 million.

The biggest share of total population is taken by Dhaka division which is about 40% in 2050. In this division Dhaka, the capital city and Gazipur are responsible for the majority (51%). The share of Dhaka division is increasing slowly to about 45% in 2100. The share of both cities together is increasing to 66%.

Table 14: Projections Population Bangladesh on division and national level (High Variant) selected years

Code	Division name	Population (high variant)						
		2010	2030	2050	2060	2070	2090	2100
10	Barisal Division	8,656,000	9,121,000	8,718,000	8,310,000	7,828,000	6,810,000	6,334,000
20	Chittagong Division	29,135,000	38,205,000	45,577,000	48,598,000	51,255,000	56,071,000	58,583,000
30	Dhaka Division	48,376,000	69,029,000	89,903,000	99,881,000	109,481,000	128,709,000	139,423,000
40	Khulna Division	16,232,000	18,997,000	20,207,000	20,332,000	20,223,000	19,631,000	19,293,000
50	Rajshahi Division	19,017,000	23,326,000	25,909,000	26,608,000	26,991,000	27,200,000	27,213,000
55	Rangpur Division	16,228,000	20,109,000	22,532,000	23,228,000	23,644,000	23,964,000	24,031,000
60	Sylhet Division	10,090,000	13,951,000	17,490,000	19,091,000	20,592,000	23,485,000	25,010,000
	Bangladesh total	147,735,000	192,739,000	230,337,000	246,049,000	260,014,000	285,869,000	299,888,000

Source: Own Calculations Ecorys NL

As can be seen from table 6.4 total population for Bangladesh according to the high variant is projected to be 230 million in 2050 (a bit below the official UN forecasts of 235 million, due to a bit higher starting value in 2010). In the period 2050-2100 the level of population continued to increase to a level of 300 million in 2100.

The biggest share of total population is taken by Dhaka division which is a bit below 40% in 2050. In this division Dhaka as well as Gazipur are responsible for the majority (51%). The share of Dhaka division is increasing slowly to about 47% in 2100.Share of both cities together is increasing to 66%.

In the last table (see below) the results of the low variant are presented. From table 6.5 it can be concluded that the total population for Bangladesh according to the low variant is projected to be 168 million in 2050 (a bit below the official UN forecasts of 172 million, due to a bit higher starting value in 2010). In the period 2050-2100 the level of population continued to decrease to a level of about 98 million in 2100.

The biggest share of total population is taken by Dhaka division which is a bit below 40% in 2050. In this division Dhaka capital city and Gazipur are responsible for the majority (51%). The share of Dhaka division is increasing slowly to about 47% in 2100. Also in this variant share of both cities together is increasing to 66%.

Table 15: Projections Population Bangladesh on division and national level (Low Variant) selected years

Code	Division name	Population (low variant)						
		2010	2030	2050	2060	2070	2090	2100
10	Barisal Division	8,656,000	8,005,000	6,361,000	5,394,000	4,432,000	2,726,000	2,071,000
20	Chittagong Division	29,135,000	33,531,000	33,256,000	31,543,000	29,019,000	22,449,000	19,154,000
30	Dhaka Division	48,376,000	60,584,000	65,600,000	64,829,000	61,986,000	51,530,000	45,586,000
40	Khulna Division	16,232,000	16,673,000	14,745,000	13,197,000	11,450,000	7,859,000	6,308,000
50	Rajshahi Division	19,017,000	20,472,000	18,905,000	17,270,000	15,282,000	10,890,000	8,898,000
55	Rangpur Division	16,228,000	17,649,000	16,441,000	15,076,000	13,387,000	9,594,000	7,857,000
60	Sylhet Division	10,090,000	12,244,000	12,762,000	12,391,000	11,659,000	9,402,000	8,177,000
	Bangladesh total	147,735,000	169,159,000	168,071,000	159,700,000	147,214,000	114,451,000	98,052,000

Source: Own Calculations Ecorys NL

7. Analysis of Policies & Plans

Within the context of population and demography it is interesting to look at the policies and plans within this context. In this sense, the most critical policies and plans include the following:

The objectives of the National Population Policy are to improve the status of family planning, maternal and child health including reproductive health services and to improve the living standard of the people of Bangladesh through making a desirable balance between population and development in the context of Millennium Development Goals (MDGs) and Interim Poverty Reduction Strategy Paper (IPRSP)/Five year planning.

The policy emphasizes on improved quality of care and increased utilization of services that will be needed for reducing fertility, maternal mortality and morbidity, infant and child mortality. Besides, ensuring the availability of family planning materials is one of the cornerstones of the population policy. Some strategies proposed in this area are:

(a) Provision for Maternal, child and reproductive health services through a comprehensive client centred approach. These services should be provided along with health services at Upazila and Union levels, through a one-stop service and home delivery system. Both system should be complementary to one another;

(b) Ensure full coverage of safe delivery through skilled birth attendants;

(c) Special attention to young, low parity and newly married couples and those with unmet need for RH information and services. Freedom and right to choose contraceptive methods according to individual needs and preferences will be emphasized. In addition, supply of contraceptives should be ensured through home visitation and poor community should get supply of contraceptives free of cost;

(d) Priority should be given in the provisions of social services to the couples with one child for their adopting small family norm;

(e) Establishment of Union level Health and Family Welfare Centres, wherever needed and appointment of a doctor in these centres will be pursued in a phased manner to increase availability and access to quality care;

(f) Uninterrupted supply of required medicines, equipment for all the service centres and strengthening of the contraceptive security system so that supplies are available wherever and whenever they are needed;

(g) Ensure access to essential information and services especially amongst high risk behaviour groups for prevention of STIs, RTIs and HIV/AIDS infection;

(h) Ensure supply of Vitamin A and other micronutrients and prevention of malnutrition among children and pregnant women; and

(i) Support and ensure full coverage of child immunization.

The policy further focuses on addressing the overall planning and management of population however, there is no linkage to appropriate forecasting and how the management aspects will take into consideration of long term planning processes. The Challenges of urbanization while addressed to some extent, does not include specific actions to address the growing density in specific urban centres and formal organization of slums and squatters.

Appropriate financial assessments to address the visions of the policy, as in case of numerous plans and policies are not addressed.

Urbanization Policy: To be covered in the Spatial Planning and Land use Baseline Study.

8. Knowledge Gaps

8.1. Population

Population can be considered a driver of primary importance; it has significant policy implications when assessing the kinds of measures that need to be taken in various sectors in the context of water resource management and investment planning. Population data, ranging from current population figures to future prospects is thus a vital component in

effective planning and decision making. However there exists significant knowledge gaps in the current publically available datasets and sources.

8.1.1. Lack of Current Disaggregated Trend Data

The main issue with population data is that the most accurate assessment requires a full national wide population census. These censuses are currently conducted every decade (the currently available digital versions are 1981, 1991, 2001 and 2011 i.e. 4 data points) and are very expensive. These censuses are the main source of disaggregated data (in terms of sub-national disaggregation). The census data are available at the village/ward level disaggregation. However accurate annual growth trends (that would allow a better understanding of the demographic changes) are difficult to obtain using only five data points. All annual trend data are therefore *estimates* and given the fact that the initial reports are difficult to identify (reports sometimes cite each other) the underlying assumptions that are used are also difficult to assess. Thus the following knowledge gaps have been identified:

- Lack of disaggregated trend data for various metrics: i.e. upazila level trend data that is nationally sanctioned/ accepted by the government are not available or date back at least a decade.
- TFR, mortality, CBR and CDR data for different demographic components (e.g. urban slum, rural etc.) are not available within comparable dates; e.g. TFR for urban slums are available as of 2009 but CBR and CDR data are available as of 2005 whereas TFR for rural is available as of 2012. This makes it difficult to assess trends.

8.1.2. Lack of updated population projections

Population forecasts are of the utmost importance in drafting an acceptable planning document, adjusting policy measures or assessing investment plans. However the last updated population forecast that is available from BBS is from 2006. BBS is planning to generate a national population forecast using the Population Census 2011. However no concrete date for the completion of this report is officially available. There are UN and World Bank forecasts of Bangladesh's population to 2100 but those are only at the national level and not disaggregated to sub-national geographical locations. These forecasts can only be used if there is an official sanction; the Statistics Act 2013 limits the use of non-BBS source data in Government Documents. Thus the following knowledge gaps have been identified

- Sub-national i.e. regional forecasts (at least up to the 64 district level) are not available from BBS.
- Updated data and robust estimations of various population metrics (e.g. TFR, CBR, CDR, Net Migration, etc) need to be standardized and available for comparable year ranges.

8.2. Urbanization

Changes in the level of urbanization will have significant policy implications. This baseline study mostly looks at the population aspect of Urbanization and therefore the knowledge gaps are Most of the knowledge gaps for the Urbanization driver are identified in the spatial planning baseline. Some of the basic ones are closely linked with the Population Driver Knowledge Gaps. It is vital to bear in mind that future forecasting is vital for proper planning and infrastructure investment plans.

8.2.1. Updated Data

- Updated population figures for major cities are often dated.
- Trends of various metrics are missing as annual data is missing.
- Definitions of metrics change as do administrative boundaries; making available historical data no longer relevant

8.2.2. Forecasts

- There are very few forecasts (updated) available for urban centre growth and expansion.
- Demographic metrics (such as IMR, MMR, TFR) are difficult to assess or have significant gaps.

9. Limitations of the Study

9.1. Historical Data

The accuracy of available historical data depends completely on the quality of the primary data collection. All levels of accuracy depend on quality and methodology of the primary data collection.

9.2. Forecasts

The uncertainty levels associated with the forecasts largely depends on the accuracy of the primary data that it is based on and the validity of the assumptions that underpin the methodology used. It is often difficult to generate accurate forecasts given that assumptions are subject to interpretation and the selection of the same depends on the needs of the forecaster. As already said in the previous section: all results of the forecasts used in this study (in particular on a regional level) have to be treated with CAUTION! The results on district level (and on division level) are very rough estimates based on the best available data.

9.3. Recommendations

The recommendations outlined in this study are at best very general indications of the direction that policy and implementation programs should take. This is because a great deal of further study and assessment of the feasibility and impact of the issues are needed before actionable, target based policies can be drafted. The recommendations are thus a starting point for thinking about strategies to tackle the challenges that are expected and thus should form general guidelines for future debate and investigations.

10. General Recommendations

The changing nature of the structure of Bangladesh's population has major implications for the types of policies that need to be enacted in the near future to ensure that the demographic dividend is fully realized. The demographic dividend itself is based on the assumption that in the near future, given the changing nature of age structure of the population, there will be a significantly large percentage of the population in the 15-51 age group that are geographically mobile, educated and in general have no dependents (young or old) and thus can be the engine for a significant boost in economic growth. However in order to enable the ideal conditions for this large and productive labour force it is vital that there is an increased focus on education, health care and social protection schemes that increase the productivity and reduce the extent of the burden of dependents of this growing workforce. The population projections do strongly indicate that it will be vital to heavily invest in human resource development in the immediate future.

The General Economic Division's Report "The Impact of the Demographic Transition on Socioeconomic Development in Bangladesh: Future prospects and Implications for Public Policy" which makes up part of the series of Background Studies that were conducted for the 7th Five Year Plan goes into comprehensive depth on the implications of the trends of population growth and urbanization. The results presented in this report mirror very closely the findings in the above mentioned report and thus the recommendations will be very similar. As the main objective of this particular baseline study is to provide an overview of the current and potential trends and the no-regret strategies are to be explicated in the final Bangladesh Delta Plan 2100 document, this section will be brief and very general.

10.1. Policy Recommendations

- Reducing the fertility level to the replacement level and further below is vital and should be a top prority. Even given the low projection, the population growth has dire implications for population density, labour force absorption, urban population growth, climate change refuguess etc.
- Policies that focus on lowering morbidity and mortality levels among the poor should be considered a priority
- A major drive needs to be initnated that places extreme importance on educational investment
- Developing a comprhenisve urban development strategy is vital.
- Develop skill development programmes for international labour migration programs with the aim of ensuring continued remittances

10.2. Conclusion

In the near term policies that focus on human resource development, targeting in a tiered strategic manner the expected growth is the best way forward. As absolute population size will continue to increase it is extremely important to be able to absorb the growing labour force into the active economy. Otherwise, if business as usual practices are followed, then the wealth gap and income inequality will increase and that will put severe pressure on social harmony and cohesion.

A lot of the development can be left up to the private sector market forces but there needs to be farsighted government policies that break the poverty trap and reduce income and wealth inequality. The core of any policy recommendation would thus be: invest heavily in human resource development and create a business enabling environment coupled with effective and comprehensive urban development strategies that harmonize all these disparate /elements into a cohesive whole.

References

Please note that all papers and reports referenced in this study are based on primary data obtained from the following reports:

Bangladesh Bureau of Statistics:

1. Population Census, 1991, National Series Vol. I, Analytical Report
2. Population Census 1991, National Series, Vol. III, Urban Area Report
3. Population Census 1991, National Series, Vol-IV, Socio-Economic and Demographic Report
4. Census of Slum Areas and Floating Population 1997, Volume 1
5. Preliminary Report, Population Census 2001
6. Population Census 2001, National Report (Provisional) July 2003
7. Population Census, 2001, Zila Series
8. Population Census, 2001, Community
9. Population Census 2001, National Series, Vol-II Union Statistics
10. Population Census 2001, National Series, Vol-I Analytical Report
11. Population & Housing Census Volumes 2011 I to IV (full)
12. Statistical Year Book 1991-2013
13. Household Income and Expenditure Survey 2000
14. Household Income and Expenditure Survey 2005
15. Household Income and Expenditure Survey 2010
16. Labour Force Survey 1999-2000
17. Labour Force Survey 2009

United Nations (UN), 2013, World Population Prospects, the 2012 Revision: Volume I: Comprehensive Tables, UN.

United Nations (UN), 2013, World Population Prospects, the 2012 Revision: Volume II: Demographic Profiles, UN.

United Nations (UN), 2013, Technical Paper No. 2013/3 Demographic Components of Future Population Growth, UN.

World Bank (WB), November 2014, Discussion paper (92650), Population, family planning, and reproductive health policy harmonization in Bangladesh, World Bank.

UNFPA, January 2015, The Impact of the Demographic Transition on Socioeconomic Development in Bangladesh: Future prospects and Implications for Public Policy", UNFPA.

World Bank: World Development Indicators Database

A Practitioners's Guide to State and Local Population Projections, Stanley K Smith, Jeff Tayman, David A Swanson, December 2013, Springer, USA/Dordrecht

Marmara Basin Socio-Economic Assessment, Turkey, ECORYS Nederland BV, 2006; study is part of: Environmental Master Plan & Investment Strategy for the Marmara Sea Basin, prepared by a consortium consisting of Grontmij NL (lead), WL/Delft Hydraulics and ECORYS Nederland BV, 2008, Turkey/The Netherlands

Appendix: Population and population density figures on district level for 3 variants.

Table A1 Population forecasts Medium Variant (rounded off to the nearest 1000 people) 2010 (base year) up to 2100

Code	DISTRICT NAME ZILA	Population (medium variant)									
		2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
	Barisal Division										
4	**Barguna Zila**	**925,000**	948,000	940,000	901,000	839,000	762,000	678,000	592,000	511,000	438,000
6	**Barisal Zila**	**2,424,000**	2,375,000	2,253,000	2,066,000	1,840,000	1,599,000	1,361,000	1,137,000	938,000	769,000
9	**Bhola Zila**	**1,843,000**	1,930,000	1,958,000	1,919,000	1,827,000	1,698,000	1,544,000	1,379,000	1,217,000	1,067,000
42	**Jhalokhati Zila**	**712,000**	688,000	644,000	583,000	512,000	439,000	369,000	304,000	247,000	200,000
78	**Patuakhali Zila**	**1,592,000**	1,669,000	1,694,000	1,662,000	1,584,000	1,473,000	1,341,000	1,199,000	1,058,000	929,000
79	**Pirojpur Zila**	**1,159,000**	1,133,000	1,072,000	980,000	870,000	754,000	640,000	533,000	439,000	359,000
	Chittagong Division										
3	**Bandarban Zila**	**394,000**	488,000	585,000	679,000	764,000	840,000	904,000	955,000	997,000	1,034,000
12	**Brahmanbaria Zila**	**2,908,000**	3,198,000	3,405,000	3,503,000	3,502,000	3,416,000	3,262,000	3,058,000	2,832,000	2,607,000
13	**Chandpur Zila**	**2,501,000**	2,603,000	2,624,000	2,556,000	2,419,000	2,234,000	2,020,000	1,793,000	1,572,000	1,370,000
15	**Chittagong Zila**	**7,821,000**	8,954,000	9,928,000	10,637,000	11,071,000	11,245,000	11,182,000	10,917,000	10,527,000	10,092,000
19	**Comilla Zila**	**5,522,000**	6,093,000	6,512,000	6,724,000	6,745,000	6,604,000	6,329,000	5,955,000	5,535,000	5,114,000
22	**Cox's Bazar Zila**	**2,324,000**	2,818,000	3,310,000	3,756,000	4,141,000	4,455,000	4,692,000	4,853,000	4,956,000	5,033,000
30	**Feni Zila**	**1,475,000**	1,612,000	1,706,000	1,745,000	1,734,000	1,682,000	1,596,000	1,488,000	1,369,000	1,253,000
46	**Khagrachhari Zila**	**629,000**	805,000	996,000	1,191,000	1,384,000	1,570,000	1,743,000	1,900,000	2,045,000	2,189,000

Code	DISTRICT NAME	Population (medium variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
51	Lakshmipur Zila	1,774,000	1,944,000	2,064,000	2,116,000	2,108,000	2,050,000	1,951,000	1,823,000	1,683,000	1,544,000
75	Noakhali Zila	3,176,000	3,590,000	3,931,000	4,158,000	4,273,000	4,285,000	4,207,000	4,055,000	3,860,000	3,654,000
84	Rangamati Zila	611,000	711,000	801,000	872,000	922,000	951,000	961,000	954,000	934,000	910,000
Dhaka Division											
6	Dhaka Zila	12,103,000	16,593,000	21,365,000	25,831,000	29,546,000	32,187,000	33,562,000	33,658,000	32,708,000	31,058,000
29	Faridpur Zila	1,976,000	2,126,000	2,216,000	2,231,000	2,183,000	2,084,000	1,948,000	1,787,000	1,620,000	1,460,000
33	Gazipur Zila	3,358,000	4,645,000	6,222,000	8,054,000	10,128,000	12,429,000	14,932,000	17,613,000	20,519,000	23,767,000
35	Gopalganj Zila	1,221,000	1,225,000	1,191,000	1,118,000	1,020,000	909,000	792,000	678,000	573,000	482,000
39	Jamalpur Zila	2,368,000	2,500,000	2,557,000	2,526,000	2,425,000	2,271,000	2,083,000	1,876,000	1,668,000	1,475,000
48	Kishoreganj Zila	2,998,000	3,216,000	3,342,000	3,355,000	3,272,000	3,114,000	2,902,000	2,655,000	2,399,000	2,155,000
54	Madaripur Zila	1,212,000	1,209,000	1,167,000	1,089,000	987,000	873,000	756,000	643,000	540,000	451,000
56	Manikganj Zila	1,439,000	1,495,000	1,505,000	1,463,000	1,382,000	1,274,000	1,150,000	1,019,000	892,000	776,000
59	Munshiganj Zila	1,489,000	1,568,000	1,599,000	1,576,000	1,508,000	1,409,000	1,289,000	1,157,000	1,026,000	905,000
61	Mymensingh Zila	5,254,000	5,700,000	5,989,000	6,081,000	5,997,000	5,773,000	5,439,000	5,033,000	4,598,000	4,178,000
67	Narayanganj Zila	2,976,000	3,683,000	4,414,000	5,111,000	5,750,000	6,313,000	6,785,000	7,160,000	7,462,000	7,732,000
68	Narsingdi Zila	2,280,000	2,526,000	2,711,000	2,811,000	2,831,000	2,782,000	2,677,000	2,530,000	2,360,000	2,190,000
72	Netrokona Zila	2,296,000	2,488,000	2,610,000	2,647,000	2,607,000	2,506,000	2,359,000	2,180,000	1,989,000	1,805,000
82	Rajbari Zila	1,083,000	1,159,000	1,201,000	1,203,000	1,171,000	1,112,000	1,034,000	944,000	851,000	762,000

Code	DISTRICT NAME	Population (medium variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
86	Shariatpur Zila	1,196,000	1,257,000	1,280,000	1,260,000	1,204,000	1,123,000	1,026,000	920,000	814,000	717,000
89	Sherpur Zila	1,406,000	1,467,000	1,481,000	1,445,000	1,370,000	1,267,000	1,148,000	1,021,000	896,000	783,000
93	Tangail Zila	3,721,000	3,892,000	3,944,000	3,861,000	3,672,000	3,408,000	3,097,000	2,762,000	2,434,000	2,132,000
Khulna Division											
1	Bagerhat Zila	1,545,000	1,498,000	1,406,000	1,276,000	1,125,000	967,000	815,000	673,000	550,000	446,000
18	Chuadanga Zila	1,163,000	1,313,000	1,435,000	1,517,000	1,557,000	1,560,000	1,529,000	1,473,000	1,400,000	1,324,000
41	Jessore Zila	2,847,000	3,114,000	3,298,000	3,375,000	3,355,000	3,255,000	3,092,000	2,883,000	2,656,000	2,432,000
44	Jhenaidah Zila	1,824,000	1,986,000	2,095,000	2,135,000	2,114,000	2,042,000	1,932,000	1,794,000	1,645,000	1,500,000
47	Khulna Zila	2,421,000	2,482,000	2,465,000	2,365,000	2,204,000	2,004,000	1,785,000	1,560,000	1,347,000	1,157,000
50	Kushtia Zila	2,005,000	2,179,000	2,294,000	2,333,000	2,305,000	2,223,000	2,098,000	1,945,000	1,780,000	1,620,000
55	Magura Zila	946,000	1,017,000	1,060,000	1,066,000	1,042,000	994,000	928,000	851,000	771,000	694,000
57	Meherpur Zila	676,000	745,000	795,000	819,000	821,000	803,000	768,000	722,000	670,000	618,000
65	Narail Zila	749,000	750,000	728,000	682,000	621,000	552,000	480,000	410,000	346,000	290,000
87	Satkhira Zila	2,056,000	2,188,000	2,256,000	2,248,000	2,175,000	2,055,000	1,900,000	1,725,000	1,546,000	1,379,000
Rajshahi Division											
10	Bogra Zila	3,499,000	3,771,000	3,936,000	3,969,000	3,888,000	3,717,000	3,479,000	3,197,000	2,902,000	2,619,000
38	Joypurhat Zila	945,000	986,000	996,000	972,000	922,000	854,000	774,000	689,000	605,000	529,000
64	Naogaon Zila	2,686,000	2,821,000	2,870,000	2,821,000	2,694,000	2,510,000	2,290,000	2,051,000	1,815,000	1,596,000

Code	DISTRICT NAME	Population (medium variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
69	Natore Zila	1,757,000	1,860,000	1,908,000	1,890,000	1,819,000	1,709,000	1,571,000	1,419,000	1,265,000	1,121,000
70	Chapai Nawabganj Zila	1,691,000	1,915,000	2,099,000	2,224,000	2,289,000	2,300,000	2,261,000	2,183,000	2,082,000	1,974,000
76	Pabna Zila	2,589,000	2,834,000	3,004,000	3,076,000	3,061,000	2,972,000	2,825,000	2,637,000	2,431,000	2,228,000
81	Rajshahi Zila	2,669,000	2,988,000	3,240,000	3,395,000	3,455,000	3,432,000	3,337,000	3,187,000	3,005,000	2,817,000
88	Sirajganj Zila	3,181,000	3,553,000	3,843,000	4,016,000	4,077,000	4,040,000	3,919,000	3,732,000	3,510,000	3,283,000
Rangpur Division											
27	Dinajpur Zila	3,076,000	3,378,000	3,592,000	3,692,000	3,685,000	3,590,000	3,424,000	3,207,000	2,966,000	2,727,000
32	Gaibandha Zila	2,452,000	2,586,000	2,642,000	2,607,000	2,500,000	2,340,000	2,143,000	1,928,000	1,713,000	1,513,000
49	Kurigram Zila	2,124,000	2,304,000	2,421,000	2,457,000	2,423,000	2,332,000	2,197,000	2,032,000	1,856,000	1,686,000
52	Lalmonirhat Zila	1,292,000	1,416,000	1,503,000	1,541,000	1,535,000	1,492,000	1,420,000	1,327,000	1,225,000	1,124,000
73	Nilphamari Zila	1,881,000	2,094,000	2,258,000	2,353,000	2,381,000	2,352,000	2,274,000	2,159,000	2,025,000	1,888,000
77	Panchagarh Zila	1,012,000	1,137,000	1,239,000	1,303,000	1,332,000	1,329,000	1,298,000	1,244,000	1,178,000	1,110,000
85	Rangpur Zila	2,963,000	3,267,000	3,489,000	3,599,000	3,608,000	3,529,000	3,379,000	3,177,000	2,950,000	2,723,000
94	Thakurgaon Zila	1,428,000	1,599,000	1,734,000	1,816,000	1,848,000	1,836,000	1,785,000	1,704,000	1,607,000	1,506,000
Sylhet Division											
36	Habiganj Zila	2,138,000	2,388,000	2,583,000	2,699,000	2,740,000	2,715,000	2,634,000	2,508,000	2,359,000	2,206,000
58	Maulvibazar Zila	1,964,000	2,214,000	2,417,000	2,549,000	2,613,000	2,613,000	2,558,000	2,459,000	2,334,000	2,204,000
90	Sunamganj Zila	2,518,000	2,889,000	3,211,000	3,447,000	3,596,000	3,661,000	3,648,000	3,570,000	3,450,000	3,315,000

Code	DISTRICT NAME	Population (medium variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
91	Sylhet Zila	3,470,000	4,184,000	4,885,000	5,512,000	6,041,000	6,462,000	6,767,000	6,957,000	7,065,000	7,133,000
	Total	147,735,000	165,762,000	180,912,000	191,467,000	197,417,000	199,131,000	197,067,000	191,932,000	185,121,000	178,150,000
10	Barisal Division	8,656,000	8,743,000	8,561,000	8,110,000	7,472,000	6,725,000	5,933,000	5,144,000	4,410,000	3,763,000
20	Chittagong Division	29,135,000	32,815,000	35,861,000	37,938,000	39,063,000	39,331,000	38,847,000	37,751,000	36,310,000	34,802,000
30	Dhaka Division	48,376,000	56,749,000	64,793,000	71,662,000	77,054,000	80,835,000	82,977,000	83,633,000	83,348,000	82,825,000
40	Khulna Division	16,232,000	17,273,000	17,831,000	17,816,000	17,319,000	16,455,000	15,327,000	14,037,000	12,712,000	11,461,000
50	Rajshahi Division	19,017,000	20,727,000	21,895,000	22,364,000	22,206,000	21,534,000	20,457,000	19,095,000	17,614,000	16,166,000
55	Rangpur Division	16,228,000	17,781,000	18,876,000	19,368,000	19,312,000	18,799,000	17,920,000	16,778,000	15,518,000	14,276,000
60	Sylhet Division	10,090,000	11,674,000	13,095,000	14,208,000	14,990,000	15,451,000	15,607,000	15,494,000	15,208,000	14,857,000
	Bangladesh total	147,735,000	165,762,000	180,912,000	191,467,000	197,417,000	199,131,000	197,067,000	191,932,000	185,121,000	178,150,000

Table A2 Population density forecasts (inhabitants per km2) Medium Variant 2010 (base year) up to 2100

Code	DISTRICT NAME	Population Density: inhabitants per km2 (medium variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
Barisal Division											
4	Barguna Zila	505	518	513	492	458	416	370	323	279	239
6	Barisal Zila	871	853	809	742	661	574	489	408	337	276
9	Bhola Zila	542	567	575	564	537	499	454	405	358	314
42	Jhalokhati Zila	1,009	975	913	825	725	622	522	430	350	283
78	Patuakhali Zila	494	518	526	516	492	457	416	372	329	288
79	Pirojpur Zila	908	887	839	767	681	591	501	417	343	281
Chittagong Division											
3	Bandarban Zila	88	109	131	152	171	188	202	213	223	231
12	Brahmanbaria Zila	1,546	1,700	1,810	1,862	1,862	1,816	1,734	1,626	1,505	1,386
13	Chandpur Zila	1,520	1,583	1,595	1,554	1,471	1,358	1,228	1,090	955	833
15	Chittagong Zila	1,481	1,695	1,880	2,014	2,096	2,129	2,117	2,067	1,993	1,911
19	Comilla Zila	1,755	1,937	2,070	2,137	2,144	2,099	2,012	1,893	1,759	1,626
22	Cox's Bazar Zila	933	1,131	1,329	1,508	1,662	1,788	1,884	1,948	1,990	2,021
30	Feni Zila	1,490	1,628	1,724	1,763	1,752	1,699	1,612	1,503	1,383	1,266
46	Khagrachhari Zila	229	293	362	433	504	571	634	691	744	796
51	Lakshmipur Zila	1,232	1,350	1,433	1,470	1,464	1,424	1,355	1,266	1,169	1,073

		Population Density: inhabitants per km2 (medium variant)									
Code	DISTRICT NAME	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
	ZILA										
75	Noakhali Zila	862	974	1,067	1,128	1,159	1,163	1,142	1,100	1,048	992
84	Rangamati Zila	100	116	131	143	151	156	157	156	153	149
Dhaka Division											
26	Dhaka Zila	8,272	11,342	14,603	17,656	20,196	22,001	22,941	23,006	22,357	21,229
29	Faridpur Zila	963	1,036	1,080	1,087	1,064	1,016	949	871	789	711
33	Gazipur Zila	1,859	2,572	3,445	4,460	5,608	6,882	8,268	9,753	11,361	13,160
35	Gopalganj Zila	831	834	811	762	695	619	540	462	390	328
39	Jamalpur Zila	1,120	1,182	1,209	1,194	1,146	1,074	985	887	789	697
48	Kishoreganj Zila	1,115	1,197	1,243	1,248	1,217	1,159	1,079	988	892	802
54	Madaripur Zila	1,078	1,074	1,037	968	877	776	672	571	480	400
56	Manikganj Zila	1,041	1,081	1,088	1,058	999	921	831	737	645	561
59	Munshiganj Zila	1,483	1,562	1,593	1,569	1,502	1,403	1,284	1,153	1,022	901
61	Mymensingh Zila	1,196	1,297	1,363	1,384	1,365	1,314	1,238	1,145	1,046	951
67	Narayanganj Zila	4,351	5,384	6,453	7,473	8,406	9,229	9,919	10,468	10,909	11,305
68	Narsingdi Zila	1,983	2,197	2,357	2,444	2,462	2,420	2,328	2,200	2,053	1,904
72	Netrokona Zila	822	890	934	947	933	897	844	780	712	646
82	Rajbari Zila	992	1,061	1,100	1,102	1,072	1,018	947	864	779	698
86	Shariatpur Zila	1,019	1,071	1,091	1,073	1,026	957	874	783	694	611

Code	DISTRICT NAME	Population Density: inhabitants per km2 (medium variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
89	Sherpur Zila	1,031	1,075	1,086	1,060	1,004	929	842	748	657	574
93	Tangail Zila	1,090	1,140	1,155	1,131	1,076	998	907	809	713	625
Khulna Division											
1	Bagerhat Zila	390	378	355	322	284	244	206	170	139	113
18	Chuadanga Zila	990	1,118	1,223	1,292	1,326	1,328	1,303	1,254	1,193	1,128
41	Jessore Zila	1,093	1,195	1,265	1,295	1,287	1,249	1,186	1,106	1,019	933
44	Jhenaidah Zila	929	1,011	1,067	1,087	1,076	1,040	984	913	838	764
47	Khulna Zila	551	565	561	538	502	456	406	355	307	263
50	Kushtia Zila	1,247	1,355	1,427	1,451	1,434	1,382	1,305	1,210	1,107	1,008
55	Magura Zila	911	979	1,020	1,026	1,003	957	894	819	742	668
57	Meherpur Zila	900	991	1,058	1,091	1,093	1,069	1,023	961	892	823
65	Narail Zila	775	776	753	706	642	571	497	424	358	300
87	Satkhira Zila	539	573	591	589	570	538	498	452	405	361
Rajshahi Division											
10	Bogra Zila	1,208	1,301	1,358	1,370	1,342	1,283	1,201	1,103	1,001	904
38	Joypurhat Zila	933	974	984	961	911	844	765	680	598	522
64	Naogaon Zila	782	821	835	821	784	731	667	597	528	465
69	Natore Zila	925	979	1,004	995	957	899	827	747	666	590

Code	DISTRICT NAME / ZILA	Population Density: inhabitants per km2 (medium variant)									
		2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
70	Chapai Nawabganj Zila	994	1,125	1,234	1,307	1,345	1,351	1,329	1,283	1,223	1,160
76	Pabna Zila	1,090	1,193	1,264	1,295	1,288	1,251	1,189	1,110	1,023	938
81	Rajshahi Zila	1,101	1,232	1,336	1,400	1,425	1,415	1,376	1,314	1,239	1,162
88	Sirajganj Zila	1,324	1,479	1,600	1,672	1,697	1,682	1,631	1,554	1,461	1,367
Rangpur Division											
27	Dinajpur Zila	893	981	1,043	1,072	1,070	1,042	994	931	861	792
32	Gaibandha Zila	1,160	1,223	1,250	1,233	1,183	1,107	1,014	912	810	716
49	Kurigram Zila	946	1,026	1,078	1,094	1,079	1,039	978	905	827	751
52	Lalmonirhat Zila	1,036	1,135	1,205	1,236	1,231	1,197	1,139	1,064	982	901
73	Nilphamari Zila	1,217	1,354	1,461	1,522	1,540	1,521	1,471	1,397	1,310	1,221
77	Panchagarh Zila	720	810	882	928	949	947	924	886	839	790
85	Rangpur Zila	1,235	1,361	1,454	1,500	1,503	1,470	1,408	1,324	1,229	1,135
94	Thakurgaon Zila	802	898	973	1,020	1,038	1,031	1,002	957	902	846
Sylhet Division											
36	Habiganj Zila	811	906	980	1,024	1,040	1,030	999	952	895	837
58	Maulvibazar Zila	702	791	863	911	933	933	914	879	834	787
90	Sunamganj Zila	672	771	857	920	960	977	974	953	921	885
91	Sylhet Zila	1,005	1,212	1,415	1,597	1,750	1,872	1,960	2,015	2,047	2,066

Code	DISTRICT NAME	Population Density: inhabitants per km2 (medium variant)									
		2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
	ZILA										
	Total	1,001	1,124	1,226	1,298	1,338	1,350	1,336	1,301	1,255	1,207
10	**Barisal Division**	655	661	647	613	565	509	449	389	333	285
20	**Chittagong Division**	859	968	1,058	1,119	1,152	1,160	1,146	1,113	1,071	1,026
30	**Dhaka Division**	1,552	1,820	2,078	2,299	2,472	2,593	2,661	2,683	2,673	2,657
40	**Khulna Division**	728	775	800	800	777	738	688	630	570	514
50	**Rajshahi Division**	1,048	1,142	1,206	1,232	1,223	1,186	1,127	1,052	970	891
55	**Rangpur Division**	1,003	1,099	1,166	1,197	1,193	1,162	1,107	1,037	959	882
60	**Sylhet Division**	799	924	1,036	1,124	1,186	1,223	1,235	1,226	1,204	1,176
	Bangladesh total	1,001	1,123	1,226	1,298	1,338	1,349	1,335	1,301	1,254	1,207

Table B1 Population forecasts High Variant (rounded off to the nearest 1000 people) 2010 (base year) up to 2100

Code	DISTRICT NAME	Population (high variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
Barisal Division											
4	Barguna Zila	925,000	973,000	1,001,000	1,000,000	979,000	942,000	895,000	842,000	789,000	738,000
6	Barisal Zila	2,424,000	2,440,000	2,401,000	2,293,000	2,147,000	1,976,000	1,795,000	1,616,000	1,448,000	1,295,000
9	Bhola Zila	1,843,000	1,983,000	2,086,000	2,130,000	2,132,000	2,098,000	2,038,000	1,961,000	1,879,000	1,796,000
42	Jhalokhati Zila	712,000	707,000	686,000	647,000	597,000	543,000	486,000	432,000	382,000	337,000
78	Patuakhali Zila	1,592,000	1,714,000	1,805,000	1,844,000	1,848,000	1,820,000	1,769,000	1,705,000	1,635,000	1,564,000
79	Pirojpur Zila	1,159,000	1,163,000	1,142,000	1,087,000	1,015,000	932,000	844,000	758,000	677,000	604,000
Chittagong Division											
3	Bandarban Zila	394,000	501,000	624,000	753,000	892,000	1,038,000	1,193,000	1,358,000	1,539,000	1,741,000
12	Brahmanbaria Zila	2,908,000	3,284,000	3,627,000	3,888,000	4,085,000	4,220,000	4,303,000	4,348,000	4,373,000	4,389,000
13	Chandpur Zila	2,501,000	2,674,000	2,796,000	2,837,000	2,822,000	2,760,000	2,665,000	2,549,000	2,427,000	2,306,000
15	Chittagong Zila	7,821,000	9,197,000	10,577,000	11,804,000	12,917,000	13,895,000	14,753,000	15,523,000	16,256,000	16,989,000
19	Comilla Zila	5,522,000	6,258,000	6,937,000	7,462,000	7,870,000	8,159,000	8,350,000	8,468,000	8,547,000	8,609,000
22	Cox's Bazar Zila	2,324,000	2,894,000	3,526,000	4,168,000	4,831,000	5,505,000	6,191,000	6,900,000	7,654,000	8,472,000
30	Feni Zila	1,475,000	1,656,000	1,818,000	1,937,000	2,023,000	2,078,000	2,106,000	2,115,000	2,115,000	2,110,000
46	Khagrachhari Zila	629,000	826,000	1,061,000	1,322,000	1,615,000	1,940,000	2,300,000	2,701,000	3,158,000	3,685,000
51	Lakshmipur Zila	1,774,000	1,997,000	2,199,000	2,349,000	2,460,000	2,533,000	2,574,000	2,593,000	2,599,000	2,600,000

Code	DISTRICT NAME	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
	ZILA						Population (high variant)				
75	Noakhali Zila	3,176,000	3,688,000	4,188,000	4,614,000	4,985,000	5,294,000	5,550,000	5,766,000	5,961,000	6,151,000
84	Rangamati Zila	611,000	730,000	853,000	967,000	1,075,000	1,176,000	1,268,000	1,356,000	1,443,000	1,532,000
Dhaka Division											
26	Dhaka Zila	12,103,000	17,044,000	22,761,000	28,664,000	34,473,000	39,771,000	44,282,000	47,857,000	50,509,000	52,281,000
29	Faridpur Zila	1,976,000	2,184,000	2,360,000	2,476,000	2,547,000	2,575,000	2,570,000	2,541,000	2,501,000	2,457,000
33	Gazipur Zila	3,358,000	4,771,000	6,629,000	8,938,000	11,817,000	15,358,000	19,701,000	25,044,000	31,686,000	40,007,000
35	Gopalganj Zila	1,221,000	1,258,000	1,269,000	1,241,000	1,191,000	1,123,000	1,045,000	964,000	885,000	811,000
39	Jamalpur Zila	2,368,000	2,568,000	2,724,000	2,803,000	2,829,000	2,807,000	2,748,000	2,667,000	2,576,000	2,482,000
48	Kishoreganj Zila	2,998,000	3,304,000	3,560,000	3,723,000	3,818,000	3,848,000	3,829,000	3,775,000	3,704,000	3,627,000
54	Madaripur Zila	1,212,000	1,242,000	1,243,000	1,208,000	1,152,000	1,079,000	997,000	914,000	833,000	758,000
56	Manikganj Zila	1,439,000	1,536,000	1,603,000	1,624,000	1,613,000	1,574,000	1,517,000	1,449,000	1,377,000	1,306,000
59	Munshiganj Zila	1,489,000	1,611,000	1,704,000	1,749,000	1,760,000	1,741,000	1,700,000	1,645,000	1,585,000	1,523,000
61	Mymensingh Zila	5,254,000	5,855,000	6,381,000	6,748,000	6,997,000	7,133,000	7,177,000	7,156,000	7,101,000	7,032,000
67	Narayanganj Zila	2,976,000	3,783,000	4,702,000	5,672,000	6,709,000	7,800,000	8,952,000	10,180,000	11,523,000	13,016,000
68	Narsingdi Zila	2,280,000	2,595,000	2,888,000	3,119,000	3,303,000	3,438,000	3,533,000	3,597,000	3,645,000	3,686,000
72	Netrokona Zila	2,296,000	2,555,000	2,781,000	2,937,000	3,042,000	3,097,000	3,112,000	3,099,000	3,071,000	3,038,000
82	Rajbari Zila	1,083,000	1,190,000	1,280,000	1,335,000	1,366,000	1,374,000	1,364,000	1,342,000	1,313,000	1,283,000
86	Shariatpur Zila	1,196,000	1,292,000	1,364,000	1,398,000	1,405,000	1,388,000	1,353,000	1,308,000	1,257,000	1,207,000

| Code | DISTRICT NAME | Population (high variant) | | | | | | | | | |
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
89	Sherpur Zila	1,406,000	1,506,000	1,578,000	1,604,000	1,598,000	1,566,000	1,514,000	1,451,000	1,384,000	1,318,000
93	Tangail Zila	3,721,000	3,998,000	4,202,000	4,285,000	4,284,000	4,211,000	4,086,000	3,928,000	3,759,000	3,589,000
Khulna Division											
1	Bagerhat Zila	1,545,000	1,539,000	1,498,000	1,416,000	1,312,000	1,195,000	1,075,000	958,000	849,000	752,000
18	Chuadanga Zila	1,163,000	1,348,000	1,529,000	1,683,000	1,816,000	1,927,000	2,018,000	2,094,000	2,163,000	2,229,000
41	Jessore Zila	2,847,000	3,198,000	3,513,000	3,745,000	3,915,000	4,022,000	4,079,000	4,100,000	4,101,000	4,094,000
44	Jhenaidah Zila	1,824,000	2,040,000	2,232,000	2,369,000	2,466,000	2,523,000	2,549,000	2,551,000	2,541,000	2,526,000
47	Khulna Zila	2,421,000	2,550,000	2,626,000	2,624,000	2,571,000	2,477,000	2,355,000	2,219,000	2,080,000	1,947,000
50	Kushtia Zila	2,005,000	2,238,000	2,444,000	2,589,000	2,690,000	2,747,000	2,769,000	2,766,000	2,749,000	2,728,000
55	Magura Zila	946,000	1,045,000	1,129,000	1,183,000	1,216,000	1,228,000	1,225,000	1,211,000	1,191,000	1,169,000
57	Meherpur Zila	676,000	765,000	847,000	909,000	958,000	992,000	1,014,000	1,026,000	1,035,000	1,041,000
65	Narail Zila	749,000	771,000	776,000	757,000	725,000	682,000	634,000	583,000	534,000	488,000
87	Satkhira Zila	2,056,000	2,248,000	2,404,000	2,494,000	2,538,000	2,539,000	2,507,000	2,452,000	2,388,000	2,321,000
Rajshahi Division											
10	Bogra Zila	3,499,000	3,873,000	4,193,000	4,404,000	4,537,000	4,593,000	4,591,000	4,546,000	4,481,000	4,408,000
38	Joypurhat Zila	945,000	1,012,000	1,061,000	1,079,000	1,076,000	1,055,000	1,021,000	979,000	934,000	890,000
64	Naogaon Zila	2,686,000	2,898,000	3,057,000	3,130,000	3,143,000	3,102,000	3,021,000	2,917,000	2,802,000	2,687,000

Code	DISTRICT NAME	Population (high variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
69	Natore Zila	1,757,000	1,911,000	2,032,000	2,097,000	2,122,000	2,111,000	2,073,000	2,017,000	1,953,000	1,888,000
70	Chapai Nawabganj Zila	1,691,000	1,967,000	2,237,000	2,468,000	2,671,000	2,842,000	2,984,000	3,104,000	3,215,000	3,323,000
76	Pabna Zila	2,589,000	2,911,000	3,200,000	3,414,000	3,571,000	3,673,000	3,728,000	3,749,000	3,754,000	3,750,000
81	Rajshahi Zila	2,669,000	3,069,000	3,452,000	3,767,000	4,031,000	4,241,000	4,404,000	4,531,000	4,640,000	4,742,000
88	Sirajganj Zila	3,181,000	3,649,000	4,094,000	4,457,000	4,757,000	4,992,000	5,170,000	5,306,000	5,421,000	5,526,000
Rangpur Division											
27	Dinajpur Zila	3,076,000	3,469,000	3,827,000	4,097,000	4,300,000	4,436,000	4,518,000	4,559,000	4,579,000	4,590,000
32	Gaibandha Zila	2,452,000	2,656,000	2,814,000	2,894,000	2,917,000	2,891,000	2,828,000	2,741,000	2,645,000	2,546,000
49	Kurigram Zila	2,124,000	2,367,000	2,579,000	2,727,000	2,827,000	2,881,000	2,898,000	2,889,000	2,866,000	2,838,000
52	Lalmonirhat Zila	1,292,000	1,454,000	1,601,000	1,710,000	1,791,000	1,844,000	1,874,000	1,887,000	1,891,000	1,892,000
73	Nilphamari Zila	1,881,000	2,151,000	2,406,000	2,611,000	2,778,000	2,906,000	3,001,000	3,070,000	3,126,000	3,177,000
77	Panchagarh Zila	1,012,000	1,168,000	1,319,000	1,446,000	1,554,000	1,642,000	1,712,000	1,769,000	1,820,000	1,868,000
85	Rangpur Zila	2,963,000	3,356,000	3,717,000	3,994,000	4,209,000	4,360,000	4,458,000	4,517,000	4,555,000	4,585,000
94	Thakurgaon Zila	1,428,000	1,642,000	1,847,000	2,015,000	2,156,000	2,268,000	2,355,000	2,423,000	2,481,000	2,535,000
Sylhet Division											
36	Habiganj Zila	2,138,000	2,453,000	2,752,000	2,995,000	3,197,000	3,355,000	3,475,000	3,566,000	3,643,000	3,714,000
58	Maulvibazar Zila	1,964,000	2,274,000	2,575,000	2,829,000	3,048,000	3,228,000	3,375,000	3,496,000	3,605,000	3,709,000
90	Sunamganj Zila	2,518,000	2,968,000	3,420,000	3,826,000	4,196,000	4,523,000	4,813,000	5,076,000	5,327,000	5,580,000

Code	DISTRICT NAME	Population (high variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
91	**Sylhet Zila**	**3,470,000**	4,297,000	5,204,000	6,116,000	7,049,000	7,985,000	8,928,000	9,893,000	10,910,000	12,007,000
	Total	**147,735,000**	**170,263,000**	**192,739,000**	**212,471,000**	**230,337,000**	**246,049,000**	**260,014,000**	**272,903,000**	**285,869,000**	**299,888,000**
10	**Barisal Division**	**8,656,000**	8,980,000	9,121,000	9,000,000	8,718,000	8,310,000	7,828,000	7,314,000	6,810,000	6,334,000
20	**Chittagong Division**	**29,135,000**	33,706,000	38,205,000	42,100,000	45,577,000	48,598,000	51,255,000	53,677,000	56,071,000	58,583,000
30	**Dhaka Division**	**48,376,000**	58,290,000	69,029,000	79,524,000	89,903,000	99,881,000	109,481,000	118,916,000	128,709,000	139,423,000
40	**Khulna Division**	**16,232,000**	17,742,000	18,997,000	19,771,000	20,207,000	20,332,000	20,223,000	19,959,000	19,631,000	19,293,000
50	**Rajshahi Division**	**19,017,000**	21,290,000	23,326,000	24,817,000	25,909,000	26,608,000	26,991,000	27,150,000	27,200,000	27,213,000
55	**Rangpur Division**	**16,228,000**	18,264,000	20,109,000	21,493,000	22,532,000	23,228,000	23,644,000	23,856,000	23,964,000	24,031,000
60	**Sylhet Division**	**10,090,000**	11,991,000	13,951,000	15,767,000	17,490,000	19,091,000	20,592,000	22,031,000	23,485,000	25,010,000
	Bangladesh total	**147,735,000**	**170,263,000**	**192,739,000**	**212,471,000**	**230,337,000**	**246,049,000**	**260,014,000**	**272,903,000**	**285,869,000**	**299,888,000**

Table B2 Population density forecasts (inhabitants per km2) High Variant 2010 (base year) up to 2100

Code	ZILA	Population Density: inhabitants per km2 (medium variant)									
		2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
Barisal Division											
4	Barguna Zila	505	518	513	492	458	416	370	323	279	239
6	Barisal Zila	871	853	809	742	661	574	489	408	337	276
9	Bhola Zila	542	567	575	564	537	499	454	405	358	314
42	Jhalokhati Zila	1,009	975	913	825	725	622	522	430	350	283
78	Patuakhali Zila	494	518	526	516	492	457	416	372	329	288
79	Pirojpur Zila	908	887	839	767	681	591	501	417	343	281
Chittagong Division											
3	Bandarban Zila	88	109	131	152	171	188	202	213	223	231
12	Brahmanbaria Zila	1,546	1,700	1,810	1,862	1,862	1,816	1,734	1,626	1,505	1,386
13	Chandpur Zila	1,520	1,583	1,595	1,554	1,471	1,358	1,228	1,090	955	833
15	Chittagong Zila	1,481	1,695	1,880	2,014	2,096	2,129	2,117	2,067	1,993	1,911
19	Comilla Zila	1,755	1,937	2,070	2,137	2,144	2,099	2,012	1,893	1,759	1,626
22	Cox's Bazar Zila	933	1,131	1,329	1,508	1,662	1,788	1,884	1,948	1,990	2,021
30	Feni Zila	1,490	1,628	1,724	1,763	1,752	1,699	1,612	1,503	1,383	1,266
46	Khagrachhari Zila	229	293	362	433	504	571	634	691	744	796
51	Lakshmipur Zila	1,232	1,350	1,433	1,470	1,464	1,424	1,355	1,266	1,169	1,073

Code	DISTRICT NAME	Population Density: inhabitants per km2 (medium variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
75	Noakhali Zila	862	974	1,067	1,128	1,159	1,163	1,142	1,100	1,048	992
84	Rangamati Zila	100	116	131	143	151	156	157	156	153	149
Dhaka Division											
26	Dhaka Zila	8,272	11,342	14,603	17,656	20,196	22,001	22,941	23,006	22,357	21,229
29	Faridpur Zila	963	1,036	1,080	1,087	1,064	1,016	949	871	789	711
33	Gazipur Zila	1,859	2,572	3,445	4,460	5,608	6,882	8,268	9,753	11,361	13,160
35	Gopalganj Zila	831	834	811	762	695	619	540	462	390	328
39	Jamalpur Zila	1,120	1,182	1,209	1,194	1,146	1,074	985	887	789	697
48	Kishoreganj Zila	1,115	1,197	1,243	1,248	1,217	1,159	1,079	988	892	802
54	Madaripur Zila	1,078	1,074	1,037	968	877	776	672	571	480	400
56	Manikganj Zila	1,041	1,081	1,088	1,058	999	921	831	737	645	561
59	Munshiganj Zila	1,483	1,562	1,593	1,569	1,502	1,403	1,284	1,153	1,022	901
61	Mymensingh Zila	1,196	1,297	1,363	1,384	1,365	1,314	1,238	1,145	1,046	951
67	Narayanganj Zila	4,351	5,384	6,453	7,473	8,406	9,229	9,919	10,468	10,909	11,305
68	Narsingdi Zila	1,983	2,197	2,357	2,444	2,462	2,420	2,328	2,200	2,053	1,904
72	Netrokona Zila	822	890	934	947	933	897	844	780	712	646
82	Rajbari Zila	992	1,061	1,100	1,102	1,072	1,018	947	864	779	698
86	Shariatpur Zila	1,019	1,071	1,091	1,073	1,026	957	874	783	694	611

Code	DISTRICT NAME	Population Density: inhabitants per km2 (medium variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
89	Sherpur Zila	1,031	1,075	1,086	1,060	1,004	929	842	748	657	574
93	Tangail Zila	1,090	1,140	1,155	1,131	1,076	998	907	809	713	625
Khulna Division											
1	Bagerhat Zila	390	378	355	322	284	244	206	170	139	113
18	Chuadanga Zila	990	1,118	1,223	1,292	1,326	1,328	1,303	1,254	1,193	1,128
41	Jessore Zila	1,093	1,195	1,265	1,295	1,287	1,249	1,186	1,106	1,019	933
44	Jhenaidah Zila	929	1,011	1,067	1,087	1,076	1,040	984	913	838	764
47	Khulna Zila	551	565	561	538	502	456	406	355	307	263
50	Kushtia Zila	1,247	1,355	1,427	1,451	1,434	1,382	1,305	1,210	1,107	1,008
55	Magura Zila	911	979	1,020	1,026	1,003	957	894	819	742	668
57	Meherpur Zila	900	991	1,058	1,091	1,093	1,069	1,023	961	892	823
65	Narail Zila	775	776	753	706	642	571	497	424	358	300
87	Satkhira Zila	539	573	591	589	570	538	498	452	405	361
Rajshahi Division											
10	Bogra Zila	1,208	1,301	1,358	1,370	1,342	1,283	1,201	1,103	1,001	904
38	Joypurhat Zila	933	974	984	961	911	844	765	680	598	522
64	Naogaon Zila	782	821	835	821	784	731	667	597	528	465
69	Natore Zila	925	979	1,004	995	957	899	827	747	666	590

Code	DISTRICT NAME ZILA	Population Density: inhabitants per km2 (medium variant)									
		2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
70	Chapai Nawabganj Zila	994	1,125	1,234	1,307	1,345	1,351	1,329	1,283	1,223	1,160
76	Pabna Zila	1,090	1,193	1,264	1,295	1,288	1,251	1,189	1,110	1,023	938
81	Rajshahi Zila	1,101	1,232	1,336	1,400	1,425	1,415	1,376	1,314	1,239	1,162
88	Sirajganj Zila	1,324	1,479	1,600	1,672	1,697	1,682	1,631	1,554	1,461	1,367
Rangpur Division											
27	Dinajpur Zila	893	981	1,043	1,072	1,070	1,042	994	931	861	792
32	Gaibandha Zila	1,160	1,223	1,250	1,233	1,183	1,107	1,014	912	810	716
49	Kurigram Zila	946	1,026	1,078	1,094	1,079	1,039	978	905	827	751
52	Lalmonirhat Zila	1,036	1,135	1,205	1,236	1,231	1,197	1,139	1,064	982	901
73	Nilphamari Zila	1,217	1,354	1,461	1,522	1,540	1,521	1,471	1,397	1,310	1,221
77	Panchagarh Zila	720	810	882	928	949	947	924	886	839	790
85	Rangpur Zila	1,235	1,361	1,454	1,500	1,503	1,470	1,408	1,324	1,229	1,135
94	Thakurgaon Zila	802	898	973	1,020	1,038	1,031	1,002	957	902	846
Sylhet Division											
36	Habiganj Zila	811	906	980	1,024	1,040	1,030	999	952	895	837
58	Maulvibazar Zila	702	791	863	911	933	933	914	879	834	787
90	Sunamganj Zila	672	771	857	920	960	977	974	953	921	885
91	Sylhet Zila	1,005	1,212	1,415	1,597	1,750	1,872	1,960	2,015	2,047	2,066

Code	DISTRICT NAME	Population Density: inhabitants per km2 (medium variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
	Total	1,001	1,124	1,226	1,298	1,338	1,350	1,336	1,301	1,255	1,207
10	Barisal Division	655	661	647	613	565	509	449	389	333	285
20	Chittagong Division	859	968	1,058	1,119	1,152	1,160	1,146	1,113	1,071	1,026
30	Dhaka Division	1,552	1,820	2,078	2,299	2,472	2,593	2,661	2,683	2,673	2,657
40	Khulna Division	728	775	800	800	777	738	688	630	570	514
50	Rajshahi Division	1,048	1,142	1,206	1,232	1,223	1,186	1,127	1,052	970	891
55	Rangpur Division	1,003	1,099	1,166	1,197	1,193	1,162	1,107	1,037	959	882
60	Sylhet Division	799	924	1,036	1,124	1,186	1,223	1,235	1,226	1,204	1,176
	Bangladesh total	1,001	1,123	1,226	1,298	1,338	1,349	1,335	1,301	1,254	1,207

Table C1 Population forecasts Low Variant (rounded off to the nearest 1000 people) 2010 (base year) up to 2100

Code	ZILA	Population (low variant)									
		2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
Barisal Division											
4	Barguna Zila	925,000	922,000	879,000	807,000	714,000	611,000	507,000	406,000	316,000	241,000
6	Barisal Zila	2,424,000	2,311,000	2,107,000	1,851,000	1,566,000	1,282,000	1,016,000	779,000	580,000	423,000
9	Bhola Zila	1,843,000	1,878,000	1,831,000	1,719,000	1,556,000	1,362,000	1,154,000	946,000	752,000	587,000
42	Jhalokhati Zila	712,000	670,000	603,000	522,000	436,000	352,000	275,000	208,000	153,000	110,000
78	Patuakhali Zila	1,592,000	1,623,000	1,584,000	1,489,000	1,348,000	1,181,000	1,002,000	822,000	654,000	511,000
79	Pirojpur Zila	1,159,000	1,102,000	1,002,000	878,000	741,000	605,000	478,000	365,000	271,000	197,000
Chittagong Division											
3	Bandarban Zila	394,000	475,000	547,000	608,000	651,000	674,000	675,000	655,000	616,000	569,000
12	Brahmanbaria Zila	2,908,000	3,111,000	3,184,000	3,139,000	2,981,000	2,739,000	2,436,000	2,096,000	1,751,000	1,435,000
13	Chandpur Zila	2,501,000	2,533,000	2,454,000	2,290,000	2,059,000	1,792,000	1,509,000	1,229,000	972,000	754,000
15	Chittagong Zila	7,821,000	8,711,000	9,283,000	9,530,000	9,425,000	9,018,000	8,353,000	7,483,000	6,508,000	5,555,000
19	Comilla Zila	5,522,000	5,928,000	6,089,000	6,025,000	5,743,000	5,296,000	4,728,000	4,082,000	3,422,000	2,815,000
22	Cox's Bazar Zila	2,324,000	2,741,000	3,095,000	3,365,000	3,525,000	3,573,000	3,505,000	3,326,000	3,064,000	2,770,000
30	Feni Zila	1,475,000	1,568,000	1,596,000	1,564,000	1,476,000	1,349,000	1,192,000	1,020,000	847,000	690,000
46	Khagrachhari Zila	629,000	783,000	931,000	1,067,000	1,179,000	1,259,000	1,302,000	1,302,000	1,264,000	1,205,000

Code	DISTRICT NAME	Population (low variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
51	Lakshmipur Zila	1,774,000	1,892,000	1,930,000	1,896,000	1,795,000	1,644,000	1,458,000	1,250,000	1,041,000	850,000
75	Noakhali Zila	3,176,000	3,493,000	3,675,000	3,725,000	3,637,000	3,436,000	3,142,000	2,779,000	2,387,000	2,011,000
84	Rangamati Zila	611,000	691,000	749,000	781,000	785,000	763,000	718,000	654,000	578,000	501,000
Dhaka Division											
26	Dhaka Zila	12,103,000	16,143,000	19,977,000	23,143,000	25,154,000	25,813,000	25,072,000	23,069,000	20,222,000	17,094,000
29	Faridpur Zila	1,976,000	2,068,000	2,072,000	1,999,000	1,858,000	1,671,000	1,455,000	1,225,000	1,001,000	803,000
33	Gazipur Zila	3,358,000	4,519,000	5,818,000	7,216,000	8,623,000	9,968,000	11,154,000	12,072,000	12,686,000	13,081,000
35	Gopalganj Zila	1,221,000	1,192,000	1,113,000	1,002,000	869,000	729,000	592,000	465,000	354,000	265,000
39	Jamalpur Zila	2,368,000	2,432,000	2,391,000	2,263,000	2,064,000	1,822,000	1,556,000	1,286,000	1,031,000	812,000
48	Kishoreganj Zila	2,998,000	3,129,000	3,125,000	3,006,000	2,786,000	2,498,000	2,168,000	1,820,000	1,483,000	1,186,000
54	Madaripur Zila	1,212,000	1,176,000	1,091,000	976,000	840,000	700,000	565,000	440,000	334,000	248,000
56	Manikganj Zila	1,439,000	1,455,000	1,407,000	1,311,000	1,177,000	1,022,000	859,000	698,000	551,000	427,000
59	Munshiganj Zila	1,489,000	1,525,000	1,495,000	1,412,000	1,284,000	1,130,000	963,000	793,000	634,000	498,000
61	Mymensingh Zila	5,254,000	5,545,000	5,600,000	5,448,000	5,106,000	4,630,000	4,063,000	3,449,000	2,843,000	2,299,000
67	Narayanganj Zila	2,976,000	3,583,000	4,127,000	4,579,000	4,895,000	5,063,000	5,068,000	4,907,000	4,613,000	4,256,000

Code	DISTRICT NAME ZILA	Population (low variant)									
		2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
68	Narsingdi Zila	2,280,000	2,458,000	2,535,000	2,518,000	2,410,000	2,231,000	2,000,000	1,734,000	1,459,000	1,205,000
72	Netrokona Zila	2,296,000	2,420,000	2,441,000	2,372,000	2,220,000	2,010,000	1,762,000	1,494,000	1,230,000	993,000
82	Rajbari Zila	1,083,000	1,127,000	1,123,000	1,078,000	997,000	892,000	772,000	647,000	526,000	420,000
86	Shariatpur Zila	1,196,000	1,223,000	1,197,000	1,129,000	1,025,000	901,000	766,000	630,000	503,000	395,000
89	Sherpur Zila	1,406,000	1,427,000	1,385,000	1,295,000	1,166,000	1,016,000	857,000	700,000	554,000	431,000
93	Tangail Zila	3,721,000	3,787,000	3,688,000	3,459,000	3,126,000	2,733,000	2,313,000	1,893,000	1,505,000	1,174,000
Khulna Division											
1	Bagerhat Zila	1,545,000	1,457,000	1,315,000	1,143,000	957,000	776,000	609,000	462,000	340,000	246,000
18	Chuadanga Zila	1,163,000	1,277,000	1,342,000	1,359,000	1,325,000	1,251,000	1,143,000	1,009,000	866,000	729,000
41	Jessore Zila	2,847,000	3,029,000	3,083,000	3,024,000	2,856,000	2,611,000	2,310,000	1,976,000	1,642,000	1,338,000
44	Jhenaidah Zila	1,824,000	1,932,000	1,959,000	1,913,000	1,799,000	1,638,000	1,443,000	1,230,000	1,017,000	826,000
47	Khulna Zila	2,421,000	2,415,000	2,305,000	2,119,000	1,876,000	1,608,000	1,333,000	1,070,000	833,000	637,000
50	Kushtia Zila	2,005,000	2,120,000	2,145,000	2,090,000	1,963,000	1,783,000	1,568,000	1,333,000	1,101,000	892,000
55	Magura Zila	946,000	990,000	991,000	955,000	887,000	797,000	694,000	584,000	477,000	382,000
57	Meherpur Zila	676,000	724,000	743,000	734,000	699,000	644,000	574,000	495,000	414,000	340,000
65	Narail Zila	749,000	730,000	681,000	611,000	529,000	443,000	359,000	281,000	214,000	160,000
87	Satkhira Zila	2,056,000	2,129,000	2,110,000	2,014,000	1,852,000	1,648,000	1,419,000	1,182,000	956,000	759,000

Code	DISTRICT NAME	Population (low variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
Rajshahi Division											
10	**Bogra Zila**	**3,499,000**	3,669,000	3,680,000	3,556,000	3,310,000	2,981,000	2,599,000	2,191,000	1,794,000	1,441,000
38	**Joypurhat Zila**	**945,000**	959,000	931,000	871,000	785,000	685,000	578,000	472,000	374,000	291,000
64	**Naogaon Zila**	**2,686,000**	2,744,000	2,683,000	2,527,000	2,293,000	2,013,000	1,711,000	1,406,000	1,122,000	878,000
69	**Natore Zila**	**1,757,000**	1,810,000	1,784,000	1,693,000	1,549,000	1,370,000	1,174,000	972,000	782,000	617,000
70	**Chapai Nawabganj Zila**	**1,691,000**	1,863,000	1,963,000	1,993,000	1,949,000	1,844,000	1,689,000	1,497,000	1,287,000	1,086,000
76	**Pabna Zila**	**2,589,000**	2,757,000	2,809,000	2,756,000	2,606,000	2,384,000	2,111,000	1,807,000	1,503,000	1,226,000
81	**Rajshahi Zila**	**2,669,000**	2,907,000	3,030,000	3,042,000	2,942,000	2,753,000	2,493,000	2,184,000	1,858,000	1,550,000
88	**Sirajganj Zila**	**3,181,000**	3,456,000	3,593,000	3,598,000	3,471,000	3,240,000	2,927,000	2,558,000	2,170,000	1,807,000

Code	DISTRICT NAME	Population (low variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
Rangpur Division											
27	Dinajpur Zila	3,076,000	3,286,000	3,359,000	3,307,000	3,137,000	2,879,000	2,558,000	2,198,000	1,833,000	1,501,000
32	Gaibandha Zila	2,452,000	2,516,000	2,470,000	2,336,000	2,129,000	1,876,000	1,601,000	1,321,000	1,059,000	833,000
49	Kurigram Zila	2,124,000	2,242,000	2,263,000	2,201,000	2,063,000	1,870,000	1,641,000	1,393,000	1,148,000	928,000
52	Lalmonirhat Zila	1,292,000	1,377,000	1,405,000	1,381,000	1,307,000	1,197,000	1,061,000	910,000	757,000	619,000
73	Nilphamari Zila	1,881,000	2,037,000	2,111,000	2,108,000	2,027,000	1,886,000	1,699,000	1,480,000	1,252,000	1,039,000
77	Panchagarh Zila	1,012,000	1,106,000	1,158,000	1,168,000	1,134,000	1,066,000	969,000	853,000	729,000	611,000
85	Rangpur Zila	2,963,000	3,178,000	3,262,000	3,225,000	3,071,000	2,830,000	2,524,000	2,177,000	1,824,000	1,499,000
94	Thakurgaon Zila	1,428,000	1,555,000	1,621,000	1,627,000	1,574,000	1,472,000	1,333,000	1,168,000	993,000	829,000
Sylhet Division											
36	Habiganj Zila	2,138,000	2,323,000	2,415,000	2,418,000	2,333,000	2,178,000	1,967,000	1,719,000	1,459,000	1,214,000
58	Maulvibazar Zila	1,964,000	2,154,000	2,260,000	2,284,000	2,224,000	2,095,000	1,911,000	1,685,000	1,443,000	1,213,000
90	Sunamganj Zila	2,518,000	2,811,000	3,002,000	3,089,000	3,062,000	2,936,000	2,725,000	2,447,000	2,133,000	1,824,000
91	Sylhet Zila	3,470,000	4,070,000	4,568,000	4,938,000	5,143,000	5,183,000	5,055,000	4,769,000	4,368,000	3,926,000
	Total	147,735,000	161,261,000	169,159,000	171,547,000	168,071,000	159,700,000	147,214,000	131,553,000	114,451,000	98,052,000

| Code | DISTRICT NAME | Population (low variant) | | | | | | | | | |
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
10	Barisal Division	8,656,000	8,505,000	8,005,000	7,267,000	6,361,000	5,394,000	4,432,000	3,526,000	2,726,000	2,071,000
20	Chittagong Division	29,135,000	31,924,000	33,531,000	33,991,000	33,256,000	31,543,000	29,019,000	25,875,000	22,449,000	19,154,000
30	Dhaka Division	48,376,000	55,208,000	60,584,000	64,207,000	65,600,000	64,829,000	61,986,000	57,323,000	51,530,000	45,586,000
40	Khulna Division	16,232,000	16,804,000	16,673,000	15,963,000	14,745,000	13,197,000	11,450,000	9,621,000	7,859,000	6,308,000
50	Rajshahi Division	19,017,000	20,164,000	20,472,000	20,037,000	18,905,000	17,270,000	15,282,000	13,088,000	10,890,000	8,898,000
55	Rangpur Division	16,228,000	17,298,000	17,649,000	17,353,000	16,441,000	15,076,000	13,387,000	11,500,000	9,594,000	7,857,000
60	Sylhet Division	10,090,000	11,357,000	12,244,000	12,730,000	12,762,000	12,391,000	11,659,000	10,620,000	9,402,000	8,177,000
	Bangladesh total	147,735,000	161,261,000	169,159,000	171,547,000	168,071,000	159,700,000	147,214,000	131,553,000	114,451,000	98,052,000

Table C2 Population density forecasts (inhabitants per km2) Low Variant 2010 (base year) up to 2100

Code	DISTRICT NAME	Population Density: inhabitants per km2 (low variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
Barisal Division											
4	Barguna Zila	505	504	480	441	390	334	277	222	173	132
6	Barisal Zila	871	830	757	665	563	461	365	280	208	152
9	Bhola Zila	542	552	538	505	457	400	339	278	221	173
42	Jhalokhati Zila	1,009	949	853	740	617	499	390	295	217	156
78	Patuakhali Zila	494	504	492	462	419	367	311	255	203	159
79	Pirojpur Zila	908	863	785	687	580	474	374	286	212	155
Chittagong Division											
3	Bandarban Zila	88	106	122	136	145	150	151	146	138	127
12	Brahmanbaria Zila	1,546	1,654	1,693	1,669	1,585	1,456	1,295	1,114	931	763
13	Chandpur Zila	1,520	1,540	1,492	1,392	1,252	1,089	917	747	591	458
15	Chittagong Zila	1,481	1,649	1,757	1,804	1,784	1,707	1,581	1,417	1,232	1,052
19	Comilla Zila	1,755	1,884	1,935	1,915	1,825	1,683	1,503	1,297	1,088	895
22	Cox's Bazar Zila	933	1,101	1,242	1,351	1,415	1,434	1,407	1,335	1,230	1,112
30	Feni Zila	1,490	1,584	1,612	1,580	1,491	1,362	1,204	1,030	855	697
46	Khagrachhari Zila	229	285	339	388	429	458	474	474	460	438
51	Lakshmipur Zila	1,232	1,314	1,340	1,317	1,247	1,142	1,012	868	723	590

Code	DISTRICT NAME	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
	ZILA	Population Density: inhabitants per km2 (low variant)									
75	Noakhali Zila	862	948	997	1,011	987	933	853	754	648	546
84	Rangamati Zila	100	113	122	128	128	125	117	107	94	82
Dhaka Division											
26	Dhaka Zila	8,272	11,034	13,655	15,819	17,194	17,644	17,137	15,769	13,822	11,684
29	Faridpur Zila	963	1,008	1,010	974	906	814	709	597	488	392
33	Gazipur Zila	1,859	2,502	3,222	3,996	4,774	5,519	6,176	6,685	7,024	7,243
35	Gopalganj Zila	831	812	758	683	592	496	403	317	241	181
39	Jamalpur Zila	1,120	1,150	1,130	1,070	976	861	736	608	488	384
48	Kishoreganj Zila	1,115	1,164	1,162	1,118	1,036	929	806	677	552	441
54	Madaripur Zila	1,078	1,045	970	867	747	622	502	392	297	220
56	Manikganj Zila	1,041	1,052	1,017	948	851	739	621	505	399	309
59	Munshiganj Zila	1,483	1,519	1,489	1,406	1,279	1,126	959	790	632	496
61	Mymensingh Zila	1,196	1,262	1,274	1,240	1,162	1,054	925	785	647	523
67	Narayanganj Zila	4,351	5,238	6,033	6,695	7,157	7,402	7,410	7,175	6,745	6,222
68	Narsingdi Zila	1,983	2,137	2,204	2,190	2,096	1,940	1,739	1,508	1,269	1,048
72	Netrokona Zila	822	866	874	849	794	719	631	535	440	356
82	Rajbari Zila	992	1,032	1,029	987	913	817	707	592	482	384
86	Shariatpur Zila	1,019	1,042	1,020	961	873	767	653	537	429	336

Code	DISTRICT NAME	Population Density: inhabitants per km2 (low variant)									
	ZILA	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
89	Sherpur Zila	1,031	1,046	1,015	949	855	745	629	513	406	316
93	Tangail Zila	1,090	1,109	1,080	1,013	916	801	678	555	441	344
Khulna Division											
1	Bagerhat Zila	390	368	332	289	242	196	154	117	86	62
18	Chuadanga Zila	990	1,088	1,143	1,158	1,129	1,065	973	860	737	621
41	Jessore Zila	1,093	1,162	1,183	1,160	1,096	1,002	886	758	630	514
44	Jhenaidah Zila	929	984	997	974	916	834	735	626	518	420
47	Khulna Zila	551	550	524	482	427	366	303	243	190	145
50	Kushtia Zila	1,247	1,318	1,334	1,300	1,221	1,109	975	829	685	555
55	Magura Zila	911	953	954	919	854	767	668	562	459	368
57	Meherpur Zila	900	964	989	978	931	857	764	659	552	453
65	Narail Zila	775	755	704	632	547	458	371	291	221	165
87	Satkhira Zila	539	558	553	528	485	432	372	310	250	199
Rajshahi Division											
10	Bogra Zila	1,208	1,266	1,270	1,227	1,142	1,029	897	756	619	497
38	Joypurhat Zila	933	947	920	861	776	677	571	466	370	288
64	Naogaon Zila	782	799	781	736	668	586	498	409	327	256
69	Natore Zila	925	953	939	891	815	721	618	512	412	325

Code	DISTRICT NAME	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
	ZILA	Population Density: inhabitants per km2 (low variant)									
70	**Chapai Nawabganj Zila**	994	1,094	1,153	1,171	1,145	1,084	993	879	756	638
76	**Pabna Zila**	1,090	1,160	1,182	1,160	1,097	1,003	888	761	632	516
81	**Rajshahi Zila**	1,101	1,199	1,249	1,254	1,213	1,135	1,028	901	766	639
88	**Sirajganj Zila**	1,324	1,439	1,496	1,498	1,445	1,349	1,219	1,065	904	752
	Rangpur Division										
27	**Dinajpur Zila**	893	954	975	960	911	836	743	638	532	436
32	**Gaibandha Zila**	1,160	1,190	1,168	1,105	1,007	888	757	625	501	394
49	**Kurigram Zila**	946	998	1,008	981	919	833	731	620	511	413
52	**Lalmonirhat Zila**	1,036	1,105	1,127	1,107	1,048	960	851	729	607	496
73	**Nilphamari Zila**	1,217	1,318	1,366	1,363	1,311	1,220	1,099	957	810	672
77	**Panchagarh Zila**	720	788	825	832	808	759	690	607	519	435
85	**Rangpur Zila**	1,235	1,324	1,359	1,344	1,280	1,179	1,052	907	760	625
94	**Thakurgaon Zila**	802	873	910	914	884	827	749	656	558	465
36	**Habiganj Zila**	811	881	916	917	885	826	746	652	553	461
58	**Maulvibazar Zila**	702	769	807	816	795	749	683	602	516	433
90	**Sunamganj Zila**	672	750	801	824	817	784	727	653	569	487
91	**Sylhet Zila**	1,005	1,179	1,323	1,431	1,490	1,501	1,464	1,381	1,265	1,137
	Total	**1,001**	**1,093**	**1,147**	**1,163**	**1,139**	**1,082**	**998**	**892**	**776**	**665**

BASELINE STUDY: 20

Socioeconomic and Demographic Condition

Author

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Executive Summary : Study 20

The socioeconomic evolution of Bangladesh is a story of dynamism and extraordinary resilience. The country suffered overwhelming institutional and physical damages after the war for Independence; the nation emerged in a state of extreme poverty. Coupled with an extremely low income levels per head, in fact among the lowest in the world along with poor socio-economic and human development indicators, Bangladesh was a nation struggling to retain its identity, struggling to settle itself and move to a stable stage. Four decades on, there is enough evidence to suggest that Bangladesh has come out of the "basket case".

Over the past 40 years since independence, Bangladesh has made huge strides in economic and social developments; the country is well set to achieve most of the millennium development goals. There have been some impressive economic and social gains in the past decade and these include:

- Increased its real per capita income by more than 130%;

- Cut poverty rate by 60%

- Doubled per capita growth

- Significant strides towards reaching many of the MGDs

- Outperforming most low-income countries across various social indicators

- Gender parity in both primary and secondary level school enrolment

- Child mortality cut in half

Despite this outstanding past progress, Bangladesh is still a low income country with substantial poverty, inequality and deprivation. It is estimated that 47 million[2] people are living below the poverty line with a significant proportion living in households which are female headed, in remote areas, and consisting of socially excluded and other vulnerable people. Most of the labour force is engaged in informal low productivity and low income jobs. The access to secondary and tertiary education is limited and the quality of education at all levels is deficient. The poorest groups of the population are severely disadvantaged in terms of ownership of assets and have inadequate access to institutional finance as well as to basic services including quality education, healthcare, water and sanitation. These people, especially women and children, are also disproportionately affected by natural disasters and the adverse effects of climate change. Despite expansion, publicly supported mitigating measures in the form of social protection programs are still inadequate.

Addressing the future challenges facing Bangladesh will require a strategic plan with a long term horizon of 100 years. While short term results are needed to solve urgent problems, and to gain widespread socio-political support for Bangladesh Delta Plan 2100, a clear vision and set of goals must be set out now, with political commitment and engagement, and participation of all stakeholders. Thus, in our approach, we emphasize on the socio-economic factors which play a critical role in this planning exercise due to its broad nature and inherent interrelationship with various thematic areas such as climate change, water resource management, among others. These thematic have been presented in separate reports to ensure that they can be used as stand-alone documents for planning purposes.

This report focused on socioeconomic issues in Bangladesh, presenting a set of key factors/drivers which have strong interrelationship with the various themes of the Bangladesh Development Plan 2100.

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[2] Sixth Five Year Plan FY 2011-FY2015, Accelerating Growth and Reducing Poverty, Planning Commission, Ministry of Planning, People's Republic of Bangladesh

The objectives of this thematic baseline study within the context of socio-economic analysis include:

- Identification, evaluation and assessment of the key socioeconomic drivers;
- Identification of key plans and context within the main drivers and BDP 2100;
- To establish a strong basis for each of the key driver for all thematic areas in the BDP 2100

The key drivers/factors assessed in this report are:

- Economic growth measured by GDP, and employment;
- Economic composition measured by, sectoral (Agriculture/Industry/Services) contribution to GDP
- Poverty: measured by Poverty head count within $1.25/day line - $2/day line and Poverty gap at $1.25/day and $2/day
- Education measured by enrolment and drop out in Primary, secondary and tertiary level.

Due to the breakdown of the "Population Growth and Population Management report" and the socioeconomic sections, attempts were made to not repeat the population and urbanization analysis in this report. It is however, suggested that the report is not read as a stand-alone socioeconomic assessment given that the key factors/drivers such as population, migration and urbanization are critical areas that needs to be focused upon.

In a long term planning processes, one of the most important prerequisites is the need for analysing historical trends- there is a story for Bangladesh in terms of each of its push and pull factors. Through time, and various stages, these factors either drove the economy towards what can be termed as "positive" development and pulled the economy back due to specific constraints and barriers. It is here that we present the evolution of the last forty years – an output that will ultimately assist in the design of broader scenario development in BDP2100. We have presented the trends of key factors such as economic growth, economic composition, poverty, education in the past four decades - from 1970s to date.

In addition to this, we have attempted to present the existing models which are being used and can be used as a basis of the planning process for GED. We did not intend to repeat these models, rather provide an overview of these models and the key areas of focus.

The methodology used in this socioeconomic study consists of two phases. Firstly, desk research and secondary data collection from publically available was conducted. Only official and/or government approved sources were used such as the Bangladesh Bureau of Statistics databases and other such prestigious national research institutions. Secondly, validation and crosschecking of the data was done as is the hallmark of all sound research. In this study, the historical trend analysis focussed on outlining the general trends and indicating major events and policy decisions that to a degree, at least, explain the specific variables. Changes in the general trends were pointed out and relevant linkages will be referenced as much as possible. The goal was to establish a sensible narrative that tries to explain the trends observed.

Significant and notable trends found were that the Bangladesh economic factors/drivers have generally grown substantially since 1970. The once agricultural based economy has been rapidly transformed to a mixed one with the manufacturing and service sector dominating the economy. Real GDP growth rates for example show that between 1970 and 1980 the economy was extremely volatile with very large fluctuations. However, from the 1990s GDP growth rates were never again negative. This trend is largely explained by the expansion of the industries and growth of key sectors such as ready-made garments industry that opened up the market for employment. The 1990s also brought forward the new economic programs which included financial sector reform and liberalization measures.

Despite huge advances and sustained growth, unemployment rates have steadily increased since the 1980s and this has been largely due to a massive increase in population during the same period. It was just not possible for job

creation rates to keep up with the increase in the labour force. A factor contributing to the rise in the unemployment rate is the increase in the sector activities and the need for more skilled labour force. There is a relationship here with the education levels where it is noted that there is significant need to address the tertiary education completion rates.

From the analysis it is very evident that different sectors are susceptible to varying kinds of exogenous shocks, the figure below shows the evolution of various sectors in relation to various shocks. For example, the 1971 Independence War clearly had significant impact on the economy in general; the Industrial sector was most affected. This sector's growth rates fell from 0.74% in 1970 to around a -46.68% in 1972. Agricultural growth rates have tracked the major natural disaster events quite closely. The services industry has shown steady growth all throughout.
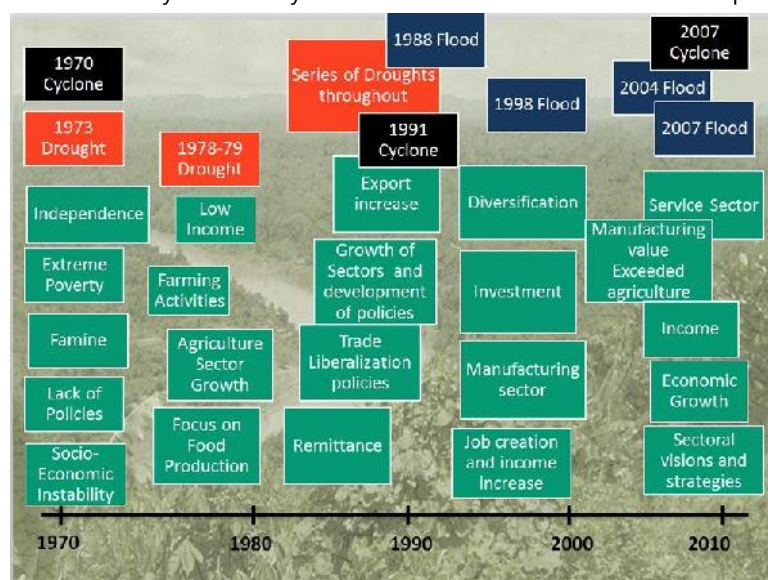
Figure 1: Economic Timeline 1970-2010

In Bangladesh, poverty levels still remain to be significant. A key issue facing the socioeconomic health of the country is the fact that with increased growth, the country continues to face growing inequality. Over the period 1991-92 to 1995-96, inequality rose the least with agricultural growth, and as a result "the net elasticity of poverty" with respect to growth was the largest in agriculture. Assuming these elasticities continue in the future, growth in agriculture would tend to reduce poverty and limit inequality more than identical growth in industry and services.

The access to education in the country has increased significantly over the last decade particularly at the primary and secondary levels but it is also important to point out again that the labour force continues to lack the education to match the market needs. Enrolment in tertiary education, on the other hand, has been low for most of the period between 1976 to the early 2000s with a steady increase in the late 2000s.

In carrying out this assessment, the following knowledge gaps were identified:

- Long run (20 to 25 years) macro-economic forecasting models (including economic sectors on a 1-digit level or more)

- Annual figures on GDP (total and a breakdown into economic sectors (15+) on division level

- Annual figures on employment (total and a breakdown into economic sectors (15+) on division level

- Annual figures on un-employment by division

We hope in the years ahead, these gaps will be addressed by relevant entities to ensure there is a richer database for analysis and planning purposes.

We have also provided an overview/snapshot of the key policies that form a critical area surrounding the socioeconomic evolution in Bangladesh. Given the number of baseline studies and themes, we attempted not to repeat the overview of policies and plans, rather provide the key areas that are most relevant,

The final outcome of this report is a set of recommendations which were developed based on the assessment of the factors/drivers. In addition to this, attempts have been made to propose recommendations that are in line with the vision of embracing a long term and strategic direction for Bangladesh and the post-millennium development agenda. This, without any doubt is a work-in-progress and should be backed by detailed primary data collections and specific assessments. However, we tried to provide some specific directions for the planning processes, which we hope can be developed on further.

It is also important to note that the recommendations have been designed specifically to ensure they are in line with the overall national vision of Government of Bangladesh. Given that the upcoming five year plan aims to be more action oriented and introduce the culture of strategic direction, the recommendations in this report should act as a sub component or component to these directions.

Our recommendations include overarching themes and areas for intervention: growth poles, population management, skills development, economic diversification, regional integration are some of the key areas mentioned. While Bangladesh has performed well in ensuring an economic transition rooted in labour-intensive industries, there is much evidence that this has not been achieved with sufficient structural transformation, and that insufficient focus and/or resources have been given to the quality of jobs (skills development), expansion of hotspots (growth poles), diversification of the economy and moving into regional integration in line with the post millennium agenda of inclusive growth. In addressing and achieving the essence of inclusive growth, Bangladesh should also set an example in terms of looking beyond a basic yet important indicator such as GDP, and adapt a vision that looks at growth in terms of equality, equity, quality of life and quality of jobs.

Part I: Background and Characteristics

This section of the report provides an overview of socioeconomic features, background and key characteristics that one needs to consider before reviewing the assessment of historical trends of key socioeconomic drivers outlined in Part II of this report. It is important to note that our data analysis on key socioeconomic factors is assessed in further detail in Part II of this report.

1   Introduction

Over the past 40 years since independence, Bangladesh has increased its real per capita income by more than 130%, cut poverty rate by 60% and is well set to achieve most of the millennium development goals. There have been some impressive economic and social gains in the past decade and these include:

- Doubled per capita growth

- Significant strides towards reaching many of the MGDs

- Outperforming most low-income countries across various social indicators

- Gender parity in both primary and secondary level school enrolment

- Child mortality cut in half

Notwithstanding this past progress, it is recognized that Bangladesh is still a low income country with substantial poverty, inequality and deprivation. An estimated 47 million[3] people live below the poverty line with a significant proportion living in households which are female headed, in remote areas, and consisting of socially excluded and other vulnerable people. Most of the labour force is engaged in informal low productivity and low income jobs. The

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[3] Sixth Five Year Plan FY 2011-FY2015, Accelerating Growth and Reducing Poverty, Planning Commission, Ministry of Planning, People's Republic of Bangladesh

access to secondary and tertiary education is limited and the quality of education at all levels is deficient. The poor are severely disadvantaged in terms of ownership of assets and has inadequate access to institutional finance as well as to basic services including quality education, healthcare, water and sanitation. These people, and especially women and children among them, are also disproportionately affected by natural disasters and the adverse effects of climate change. Despite expansion, publicly supported mitigating measures in the form of social protection programs are still inadequate.

Addressing the future challenges facing Bangladesh will require a strategic plan with a long term horizon of 100 years. While short term results are needed to solve urgent problems, and to gain widespread socio-political support for Bangladesh Delta Plan 2100, a clear vision and set of goals must be set out now, with political commitment and engagement, and participation of all stakeholders. Thus, in our approach, we emphasize the socio-economic factors which play a critical role in this planning exercise due to its broad nature and inherent interrelationship with various thematic areas such as climate change, water resource management, among others.

This report focuses on socioeconomic aspects in Bangladesh, presenting a set of key drivers which have strong interrelationship with the various themes of the BDP 2100.

The aim of this baseline assessment is to identify key socio-economic drivers that cut across all themes within the remit of the BDP2100. While attempts have been made to provide the most updated and validated information and data with regards to each driver, it is important to note that this report is not based on primary data collection and we have addressed the limitations and approach of this report.

This document, while exhaustive in terms of information and analysis, should be treated as a living document and updated. We also hope that this will be updated further in the future with support from other agencies to enrich the existing analysis from primary and rich data sources.

1.1 Objective of the Project

The overall objective of the project on the formulation of BDP 2100 is to realize a sustainable and commonly agreed strategy with all relevant stakeholders for an optimum level of water safety, food security, as well as sustained economic growth for Bangladesh and a framework for its implementation.

1.2 Objective of the Socio Economic and Demographic Study

The broader objective of this baseline is to understand the core socioeconomic drivers within the context of BDP2100. These drivers have been analysed on the basis of their relevance and impact levels, among others. The objectives of the thematic baseline study within the context of socio-economic analysis therefore include:

• Identification, evaluation and assessment of the key socioeconomic characteristics and drivers;

• Identification of key plans and context within the main drivers and BDP 2100;

• To establish a strong basis for each of the key drivers for all thematic areas and further scenario development in the BDP 2100;

• Provide indications on areas that need to be considered in the long term planning process;

It is important to note here that this report sets the scene for the context within Bangladesh and does not intend to carry out a comprehensive impact assessment in 50 or 100 years' time. Rather, this report attempts to provide the basis for further exercises in relation to impacts and scenario development, which is the final output of the BDP 2100.

2 Context

The socioeconomic evolution of Bangladesh is a story of dynamism and extraordinary resilience. Reeling from overwhelming damage from the war of independence to its institutional and physical capital, the country emerged afterwards in a state of extreme poverty. With per head income along the lowest in the world, along with poor socio-economic and human development indicators, Bangladesh was a nation struggling to stabilize. Four decades on, there is enough evidence to suggest that Bangladesh is no longer the "basket case" that Kissinger had labelled it as during the 70s.

With sustained food production and an impressive record of disaster management, issues of famine have become a phenomenon of the past. Bangladesh's per capita GDP has more than doubled since 1975. Life expectancy has risen from 50 to 63 years, population growth rates of 3 percent a year have been halved, child mortality rates of 240 per 1,000 births have been cut by 70 percent and literacy has more than doubled.

In 2000, following the introduction of Millennium Development Goals (MDGs), Bangladesh introduced numerous interventions and programs, through which it was able to meet several targets such as reduction of poverty gap ratio, gender parity at primary and secondary education, reduction in child mortality rates, nutrition and various other indicators. There have been numerous debates in relation to MDG and its nature of "one-size-fits-all" approach. In addition to this, significant number of assessments revealed the need for a broader approach to measuring human progress, quality of life and standard of living. Countries, such as Bangladesh, have not only adopted the Goals, but also adapted them to meet local needs; for example, Bangladesh set new targets and indicators for promoting women in local government bodies, as well as separate goals and targets on access to reproductive health services.

But in general, the MDGs emphasis have been on outcomes; the overall post-2015 framework, in addition to being based on the three pillars of sustainable development, will need to be more specific about the means, and in particular, about how the necessary financial resources can be mobilized. One way to do this will be to move away from the "one size fits all" approach as done earlier in case of promoting women and acknowledging the specific drivers of national development plans. This means setting goals, with targets being set at national and local levels; some indicators could focus on specific groups who are marginalized specifically ethnic minorities in the Chittagong Hill Tracts, among others.

In recognition of the long-term development challenges, the Government has adopted its Vision 2021 and associated Perspective Plan 2010-2021, which have set solid development targets for Bangladesh by the end of this period, with a goal of graduation from LDC to middle-income status. These targets, if achieved, will further transform Bangladesh, so that people enjoy a higher standard of living, will be better educated, will face strengthened social justice, will have a more equitable socioeconomic environment, and will enjoy enhanced protection from climate change and natural disasters. The associated political environment is intended to be based on democratic principles, with an emphasis on human rights, rule of law, freedom of expression, equality of citizens, and equality of opportunities.

Despite significant changes in the overall economy and several decades of moderately high economic growth, Bangladesh remains a poor country. If we look at the HIES and the data presented in the sections below, the incidence of poverty has been declining at a rate of 2.47 per cent each year since 1991-92. There still seems to be significant gaps in terms of poverty reduction, job creation, increases in education completion, skills development, environmental up gradation and coverage on information and communication technology.

This largely influences the long term planning processes and economic growth outlook. It is here that population demography (outlined in detail within the Population Growth and Population Management report[4]) and transition has key importance. Bangladesh ranked 186 out of 213 countries in per capita Gross National Income (GNI), placing it in the bottom fifth of countries ranked by income (World Bank 2014a). In South Asia, only Afghanistan and Nepal ranked lower than Bangladesh in per capita GNI. Although income is rising, Bangladesh remains classified as a "low income" country by the World Bank, whereas neighbouring Pakistan, India, Sri Lanka and Bhutan have all graduated to "lower middle-income" status.

While the population of Bangladesh remains 70 percent rural, and nearly 50 percent of the labour force is in agriculture, the dominant economic sector in terms of output is manufacturing and services. During the year 2000 only, the output and value of the manufacturing sector far exceeded that of agriculture. The service sector generated 55 percent of GDP in 2010-11 while agriculture comprised 18 percent and industry 27 percent[5]. The proportion of agriculture in GDP has been declining over several decades, as would be expected in a developing economy, but relatively slowly. The services sector is by far the largest sector, although its share is also declining, while the contribution of manufacturing has been increasing.

On the other hand, the on-going dominance of agriculture in the labour force, suggests that the productivity of labour, although rising somewhat over this period, remains comparatively low in this sector. The implied higher productivity of labour in the service sector provides strong incentives for rural-urban migration, whether permanent, seasonal or circular. A detailed analysis in relation to economic contributions has been detailed out in section 3.

Ethnicity and religious stratification

Whilst section 3 of this report outlines detailed assessments of key socioeconomic drivers and factors, and the separate report on Population Growth and Population Management covers the aspects of urbanization and migration in great detail, a brief snapshot of ethnicity and religious stratification has been outlined here to provide a backdrop to the socioeconomic evolution in Bangladesh. It is important to note that this is by no means as detailed due to the lack of data and secondary information, but attempts have been made to provide a national overview of these stratifications.

In the era after its independence, the society in Bangladesh, with the exception of the Hindu caste system was not rigidly stratified. Instead it was fluid, without a cohesive social organization and structure. Social class distinctions, however, still existed and there was considerable mobility among classes. Even the structure of the Hindu caste system in Bangladesh was relatively lax because most Hindus belonged to the lower castes.

It is important to note here that with the larger portion of the population being Muslims, the extent of egalitarian principles of Islam were the basis of social organizations. Although Hindu society was formally stratified into caste categories, caste did not figure prominently in the Bangladeshi Hindu community. About 75 percent of the Hindus in Bangladesh belonged to the lower castes, notably *namasudras* (lesser cultivators), and the remainder belonged primarily to the outcaste or untouchable groups. Through various sources of research, it is also important to mention that Bangladesh is going through transitions at the moment and the fluid nature of the social and religious stratification is not present to the extent it was. In the recent times, there have been numerous incidences of social unrest spurred either by religious, cultural or societal divisions and rigidity. While the backdrop of this occurrence requires more sociological and anthropological assessments, it is important to note that they also play a critical role in

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[4] The reason for exclusion of key socioeconomic drivers such as population and migration in this report is due to TPP requirements which specify that all studies must be aligned with the titles initially allocated. Therefore, it is strongly suggested that the Population and Demography report is referred to for a comprehensive analysis.

[5] Bangladesh Buraue of Statistics

the socioeconomic push and pull factors to a great extent. And it remains to be seen how strategic directions can be taken which are more tolerant, pro-equity and equality for social and economic cohesions.

The Bangladeshi population is ethnically homogenous—this is one of its most important characteristics. 98% of the Bangladesh population is ethnic Bengalis with the remaining 2% are Biharis and other indigenous groups[6]. A member of the Indo-European family of languages, Bangla/Bengali is the official language of this country. People speaking Arabic, Persian, and Turkic languages have also contributed to the ethnic characteristics of the region. For example the dialects of Sylhet, Chittagong, and Noakhali have been strongly marked by Arab-Persian influences. English has remained nonetheless an important language in Bangladesh since the late 1980s. With international development and globalization coming into the forefront, English has increasingly become a prominent language of use.

Biharis, the Urdu-speaking non-Bengali Muslim refugees from Bihar and other parts of northern India, numbered about 1 million in 1971 but decreased to around 600,000 by the late 1980s as Bangladesh became independent in 1971. Official figures suggest that 1981 163,000 Biharis had been repatriated to Pakistan[7].

Bangladesh's indigenous population consisted of 897,828 people, just over 1 percent of the total population, at the time of the 1981 census. 778,425 of them lived in rural settings, where many practiced shifting cultivation.

The four largest indigenous groups were the Chakma, Marma (or Maghs), Tipra, and Mros (or Moorangs). Other indigenous groups are the Kuki, Lushai, Pankho, Bawm, Mm, Kayang, Kulru, Riang, Tanchangya, Chaknia, Khasi, Mamburi, Hajaong, Garo, Hadi, Dalu, Santal, Mahili, Oraon and Munda—all distinct in their dialect, dress, and customs. Only the Chakmas and Marmas are tribally organized. Most of the indigenous population are of Sino-Tibetan descent, with distinctive Mongoloid features. They lived primarily in the Chittagong Hill Tracts and in the Pleistocene terraces of Mymensingh, Sylhet, and Rajshahi.

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6 http://worldpopulationreview.com/countries/bangladesh-population/
7World Directory of Minorities and Indigenous Peoples - Bangladesh : Biharis; http://www.refworld.org/docid/49749d58c.html

Part II: Present Circumstances and Future Projections

This is the main part of the report, where we present historical trends in key socioeconomic indicators/factors in Bangladesh over last 40 years that have ultimately shaped Bangladesh as it is today. We also provide an overview of existing models and forecast, that is a living document our consulting experts will update.

3   Methodology of Data Analysis

As discussed in the previous chapter, this socioeconomic study aims to outline historical trends of the selected factors/drivers. The analysis of these historical trends showcase the broad evolution of Bangladesh since independence and the patterns of growth and development that provide the context for any future plan. Given that this means working with a vast quantity of data, great care has been taken to ensure that the theoretical framework underpinning the research is sound and efficacious.

It is therefore important to lay out the guiding principles that have been followed in carrying out this assessment. The methodology of the socio-economic study thus consists of two major phases.

3.1   Data Collection and Aggregation

As primary data collection is beyond the scope of this study, the data collection, research and analysis efforts will be focused on desk research and secondary data collection from publically available, official and/or government approved sources. Following numerous consultations, and support from GED, some levels of primary databases of Bangladesh Bureau of Statistics were obtained in addition to recognized sources such as World Bank, especially in case of global comparative assessments. Disaggregated data to various levels of geographic/administrative areas allow for meaningful comparison between the different regions of the country. One of the key challenges in collection of 40 years of data and carrying out this analysis was comparability. It was important that the basic terms and definitions used across the drivers were common among all data collected. For example, attempts were made to ensure that the period of historical trends are the same—from 1970 to present. In some cases, however, such as when using data from the Population Censuses, the data was only available decade wise, instead of year to year trend.

Every attempt was made to ensure that all sources used in this document are primarily from the officially recognized Bangladesh Bureau of Statistics data base.

3.2   Data Validation and Cross-checking

Although the main sources of all data cited in this document are official and government databases/reports, we carried out comprehensive validation and crosschecking. Thus data on the same variables were collected from different sources; in cases of conflict official BBS/Government data was considered to be preferable. However, since the veracity and accuracy of all secondary research depends entirely on the soundness of the primary research undertaken, it is, again, beyond the scope of this report to assess the quality of the primary research and the definitions of each of the factors considered.

The underlying definitions that comprise the various variables in some case were different from source to source even if on the surface they referred to the same concept. For example, the stated real GDP per capita, were reported differently in different sources though it is commonly thought to be same. The stated surface level discrepancies arised out of the fact that the calculation of "real GDP per capita" used in these different database depends on what the choice of the index (base) year is, whether different sectors are considered in the calculation of GDP from one database to another, whether the mid-year population or the end-year population is used and so forth. There, significant attention was placed on ensuring that the definitions, assumptions and parameters of each of the variables used in this report are clearly stated.

In this study, the historical trend analysis focused on outlining the general trends and indicating major events and policy decisions that to a degree, at least, explain the specific variables. Changes in the general trends have been pointed out and relevant linkages are referenced as much as possible. The goal has been to establish a sensible narrative that tries to explain the trends observed.

4   Limitations of the Study

Lack of consistent data: Bangladesh includes a plethora of data for the selected drivers. Be that as it may, one of the key challenges we faced in this study is the lack of consistent and validated data. While there is data available for various drivers, we found that the definitions used for the surveys varied significantly. There were cases where the data presented were not consistent with the actual context in Bangladesh. Despite this limitation, we have made use of the available public data specifically from Bangladesh Bureau of Statistics.

Lack of disaggregated data: Although attempts have been made to provide some analysis behind the data presented in this report, due to lack of disaggregated data in relation to some of the key drivers, our analysis is yet to be complete. Much of the analysis therefore has been provided on the basis of the common trends and areas as experienced first-hand in Bangladesh.

Lack of access: One of the key issues faced in the preparation of this report was the lack of access to information. Whilst the Planning Commission has been supportive, several difficulties were faced in terms of gaining access to the input/raw data of some of studies and the focal ministries/agencies. In addition to this, the access to (the scarce available) existing models and the theories underpinning each are restricted. Thus it was difficult to gain complete insights into the models used by relevant national level agencies. We have however, presented information that was available.

Primary data and forecasting: Primary data collection is not within the scope of this study. In countries such as Netherlands and Vietnam where the Delta Planning process (initiated till date) was founded on the basis of work done earlier and strong entities that carried out data collection and also forecasting. Due to the nature of this project, no primary data collection has taken place. As a result, we had to rely on the existing information available. It is important to note that there is a lack of future outlooks and forecasts on the drivers presented in this report- again forecasting exercises are a separate project all together and require among others more time, and resources.

Models: We understand that the Planning Commission is interested in exploring the existing models and/or ideas on the kind of models that can be integrated within the institutional framework of relevant agencies/ministries. Our attempts to obtain available models and details on them have not been successful thus far. This has been either due to restricted access or concerted efforts from part of the agencies involved. We have tried to provide some levels of details from our discussions with the agencies but given the limited information and restrictions in terms of being able to analyse the actuals models, our assessment remains limited. Moreover, the discussions also reveal that the scarce existing models are only dealing with a 5 to 10 years period ahead (as a maximum).

Resources: From the start of the project, it was expected that three Economists would be mobilized from the Planning Commission for the purpose of (among others) this baseline study and input would be provided for the purpose of forecasting exercises and analysis of this report. Due to numerous reasons and delays, this was not achieved and as a result, we had to re-allocate our resources to complete this assessment.

5   Overview of Key Socio-economic Factors

5.1   Rational

In a long term planning processes, one of the most important areas that need to be focused upon is the need for analysing historical trends- there is a story for Bangladesh in terms of each of its push and pull factors. Within the evolution of the country, these factors either drove the economy towards what can be termed as "positive" development and pulled the economy back due to specific constraints and barriers. It is here that the importance of laying out the evolution is important so that it is able to feed into the broader scenario development.

5.2   Component of Drivers/Factors

One of the key outputs for this socioeconomic assessment is the identification and assessment of the key drivers. During the quick scan and assessment stage in June 2014, the following socioeconomic drivers/factors were examined:

- Economic Growth
- Foreign Direct Investment
- Economic Composition
- Poverty
- Demography
- Education
- Health
- Employment
- Migration

Based on several brainstorming sessions and key thematic areas of BDP 2100, it was agreed that the key socioeconomic drivers/factors should play a direct role within the context of the thematic areas and feed into scenario development exercises. Therefore, the relevance of each driver should be embedded within the thematic clusters, and there should be a cross cutting role in majority, if not all of the selected drivers.

In line with the TPP, the driver population/demography forms a separate baseline study and therefore not included within this report. But, there is significant linkages between this assessment and the population demography and transition- we have made efforts to spell out these linkages without repeating the key areas and trends.

Based on assessment of these issues the following **key drivers/factors** were identified by the team:

5.2.1   Economic Growth

Economic Growth is the increase in market value of the goods and services produced by an economy over time. Across the world, it is used as a key indicator for the performance of the economy. In Bangladesh, GDP is treated as a key indicator for country's performance in both national and local levels. Within the context of BDP2100, and long-term planning, this driver will play a key role in determination of performance of the economy and more importantly the trends and directions it heads towards. Our assessment includes examination of metrics of GDP (nominal and real) and employment.

5.2.2   Economic composition

This includes the composition of sectors within the economy which contributes significantly to growth of the economy. Given that there are various sectors relevant to the plan, the economic composition is an important area to explore. Given the time and scope (national level planning), our assessment looks at the larger sector composition i.e. agriculture, industry and services. Disaggregation to selected sectors that are deemed to be promising for future

development and growth has also been assessed. These sectors included are in line with "Thrust Sectors" selected by the government for the Export Policy 2012-2015. Given the recent nature of the thrust sectors and lack of information relating to some of the new or upcoming sectors???

5.2.3   Poverty

Whilst it is agreed that poverty itself cannot be defined as a "driver", it is rather the impact of development and the economic transition, we feel poverty has a significant role in driving the socioeconomic development in Bangladesh. We also feel examining the levels of poverty will be important as it impacts the overall growth and long term planning. The poverty variables that will be used are the poverty head count ratio at the $1.25/day poverty line and the $2/day poverty line. For assessing the depth and intensity of the poverty gap at the $1.25/day and the poverty gap at $2/day will be used. Available poverty maps that are disaggregated at the regional level will also be used.

5.2.4   Education

It is assumed that a prerequisite to economic growth and therefore employment is the level(s) of education within the country. During the project, this driver will be analysed and current status of levels of education and their possible relationship with employment will be explored in detail.

5.3   Overview of Key Drivers/Factors

Table 1: Key drivers/factors with major components

Key drivers with major components	
Main Key Drivers/Factors	*Components under key Drivers/Factors*
Economic Growth	Annual real Gross Domestic Product (GDP) growth rate GDP per capita
	Employment (Unemployment & Labour Force Participation)
Economic Composition	Sector base contribution to GDP (Agriculture/ Industry/ Service' contribution to GDP) as well as more disaggregated economic sectors (15+)
Poverty	Poverty head count within $1.25/day line - $2/day line Poverty gap at $1.25/day and $2/day
Education	Enrolment and Drop out at Primary Education
	Enrolment and Drop out at Secondary Education
	Enrolment and Drop out at Tertiary Education

6 Economic Growth

Economic Growth is defined as the increase in market value of the goods and services produced by an economy over time. In general, across the world, economic growth is used as a reference to performance of the economy. As such, in Bangladesh, economic growth is a key indicator of the "health" of the country. Conventionally, economic growth is measured by the percent rate of increase of the real Gross Domestic Product (real GDP). In the context of BDP 2100 we will discuss the following metrics: GDP growth rate, GDP in values, GDP per capita as well as Employment which is directly related to GDP. Finally, we also pay some attention to Unemployment as a share of total labor force.
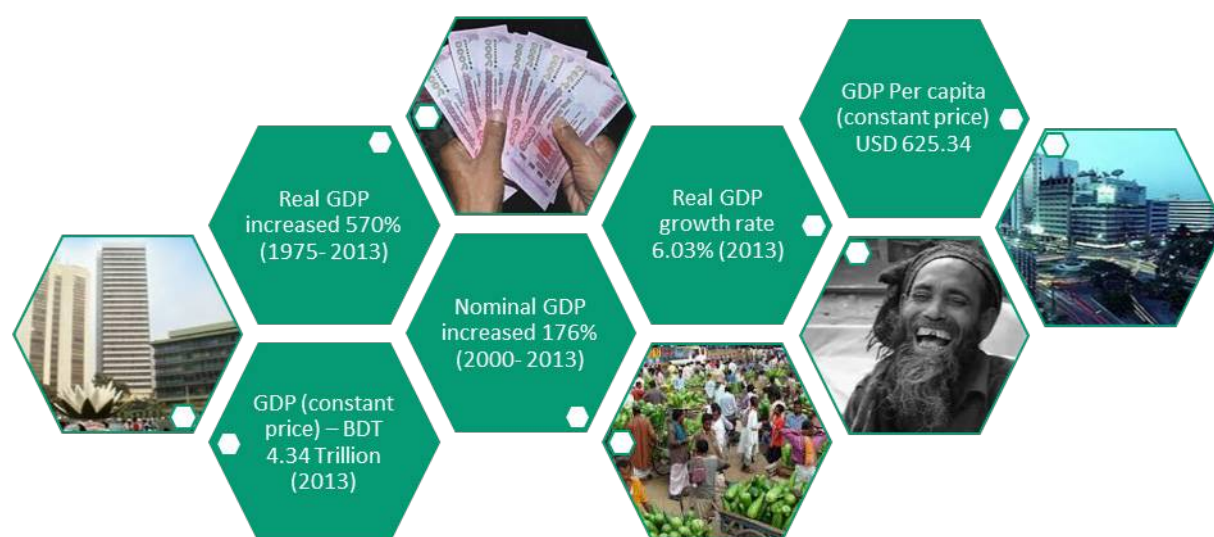
6.1 Current Situation

How the Gross Domestic Product is measured ultimately depends on the definitions and parameters used to construct it. The differences in these definitions and parameters give one widely different measures of the indicator, even if the units are the same. This explains why, e.g. World Bank measure of real GDP (i.e. GDP at constant prices) is different from the official Bangladesh Bureau of Statistics measure. The basic raw data used is the same in both cases however the parameters used are different. In this report both are referenced; the BBS data is considered to be official measure and sets the national standard whereas in some cases it may be efficacious to use the WB measure, especially when comparing between countries. The following sections explore in more detail the major metrics used and more importantly provides an overview of economic growth in Bangladesh till date.

There have been discussions in relation to why GNI has not been selected for this assessment. The reason for this due to the fact that firstly GDP is a relatively straightforward measure of output and gives an idea of how well-off a country is, compared with competitors and past performance. This is important in relation to the Delta scenario development. It is agreed that Gross National Income, accounts for these flows in and out of the country. For many countries, the flows tend to balance out, leaving little difference between GDP and GNI. But this is not the case for transitional economies, especially where comparative assessments are being carried out as outflows of profits and income, largely from global business giants located there, often exceed income flows back into the country. This

means that in a GNI ranking, rather than being in the top, drops. In other words, while a country can produce a lot of income per inhabitant, GNI shows that less of it stays in the country than GDP might suggest.

Currently, the GDP growth in Bangladesh has expanded to 6.03% in comparison to previous year (2012 to 2013). New economic activities like shipbuilding, software development, event management, security services, mobile banking services and others are widely taking place. Agro based economy has been rapidly transforming to a mixed one with considerable income and employment opportunities. The employment rate within the agriculture sector remains to be significantly high and there is a direct relationship between poverty levels and agricultural sector, which will be elaborated further in the next sections. According to the Labour Force survey 2010, the economically active population stands at 56.7 million. The total employed labour force stands at approximately 54.1 million and the unemployed (those not economically engaged at the time of the survey) stands at 2.6 million.

It is worth exploring Bangladesh's growth by comparing it against similar countries in terms of size, patterns and various economic characteristics. The table below provides an overview of the current economic growth composition of Bangladesh against Thailand, India, Pakistan and Malaysia.

Table 2: An overview of the current economic growth composition of Bangladesh against Thailand, India, Pakistan and Malaysia

	Bangladesh	Thailand	India	Pakistan	Malaysia
Real GDP (constant 2005 dollars)	$97.93 billion per year *(world rank: 54th) (2013)*	$230.4 billion per year *(world rank: 31st) (2013)*	$1.459 trillion per year *(world rank: 8th) (2013)*	$146.9 billion per year *(world rank: 46th) (2013)*	$207.7 billion per year *(world rank: 34th) (2013)*
GDP per capita	$829.3 per year per person *(world rank: 205th) (2013)*	$5779 per year per person *(world rank: 125th) (2013)*	$1499 per year per person *(world rank: 188th) (2013)*	$1299 per year per person *(world rank: 192nd) (2013)*	$10514 per year per person *(world rank: 93rd) (2013)*
GDP real growth	+6.03% per year *(world rank: 42nd) (2013)*	+1.766% per year (world rank: 156th) (2013)	+5.017% per year *(world rank: 64th) (2013)*	+6.07% per year *(world rank: 41st) (2013)*	+4.688% per year *(world rank: 68th) (2013)*
Unemployment rate	4.5% *(world rank: 155th highest) (2012)*	0.7% *(world rank: 204th highest) (2012)*	3.4% *(world rank: 179th highest) (2012)*	5.1% *(world rank: 146th highest) (2012)*	3.1% *(world rank: 187th highest) (2012)*

Source: Compiled from World Bank

As can be seen from the above comparisons, while Bangladesh has demonstrated significant progress, it significantly lags behind from its neighbouring country such as Pakistan and India. Similarly, while Thailand kicked off almost at the same time as Bangladesh, the development stirred by significant investments in infrastructure and technology is reflected in GDP per capita income. In comparison the real GDP growth rates, we can that Bangladesh presents enormous success and ranks 42nd in the world and has managed to move beyond even Thailand and Malaysia. While this is significant and worth the investments and growth of the economy, it is important to keep in mind that GDP growth is not the strongest indicator when assessing the economy especially in terms of income distribution, poverty, level of debt, and quality of life, all of which remain to be key issues in Bangladesh.

6.2 Historical trend of Major Components

6.2.1 Real GDP Growth Rate (annual)[8]

As expected, real GDP growth rates show that between 1970 and 1980 the economy was extremely volatile with very large fluctuations.[9] These large deviations are due to the large exogenous shocks caused by the Liberation War and the subsequent rebuilding efforts. Post 1980 the economy became much less volatile and kicked off with series of economic activities as a result of growth of sectors and employment creation.

1990s is an interesting phase in Bangladesh as there were slight fluctuations where real GDP growth rates dipped, but they were never again negative; which means that even if real GDP growth rate was low, the economy still grew. This is explained by the expansion of the industries and growth of key sectors such as RMG which opened up the market for employment. There was substantial employment opportunities and this resulted in
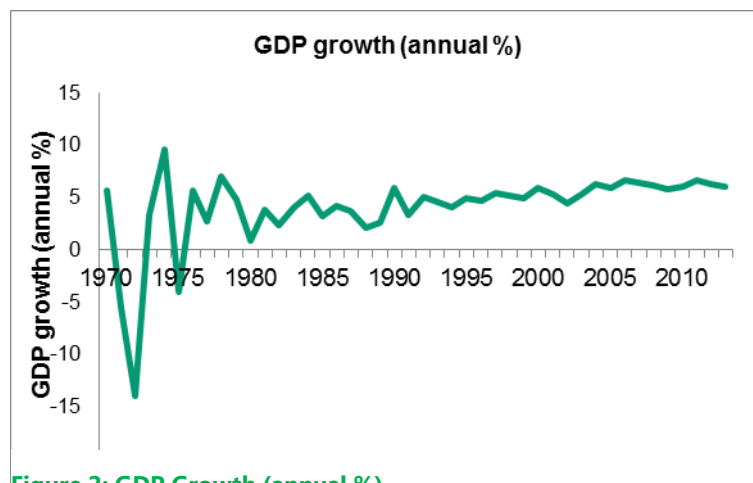
Figure 2: GDP Growth (annual %)

increased inter country migration (more details available in Population and Demography baseline study). The increase in GDP has been experienced also through the growth of services sector. As a result we can an upward trend the annual growth in GDP.

The 1990s also brought forward the new economic programs which included financial sector reform and liberalization measures. Numerous donor funded programs also kicked off during this time such as food-for-work programs, asset transfer, and livelihood development to address extreme poverty implications among the poorest segment of the population.

It is important to note that during 1994-1996 the country experienced political turmoil impacting the growth only slightly (4.15% as opposed to targeted 5%) however the growth rate picked up following the 1996 elections

The 1996 elections brought renewed economic stability. Exports grew 14% in 1996, and GDP growth for 1996/97 rose to 5.5% as the economy rebounded. Floods during 1998 and 1999 caused some economic slowdown but this was balanced by unprecedented growth in gas production and electricity production sectors. Average annual GDP growth under the Fourth Five-Year Plan rose to 5.3%.

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[8] Annual percentage growth rate of GDP per capita based on constant local currency. Aggregates are based on constant 2005 U.S. dollars. GDP per capita is gross domestic product divided by mid year population. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.

[9] World Bank national accounts data: In the context of Bangladesh this refers to databases provided to World Bank by BBS

6.2.2 Real GDP in BDT (1990 to 2013)

While looking at the economic growth, the real GDP metric (in value) is considered to be the most enlightening. Using Bangladesh Bank data for the metric of real GDP (that is GDP at constant prices in a base year 1995-1996) resulting from GDP at current prices adjusted for annual inflation) the recent trend since 1990 is shown.[10]
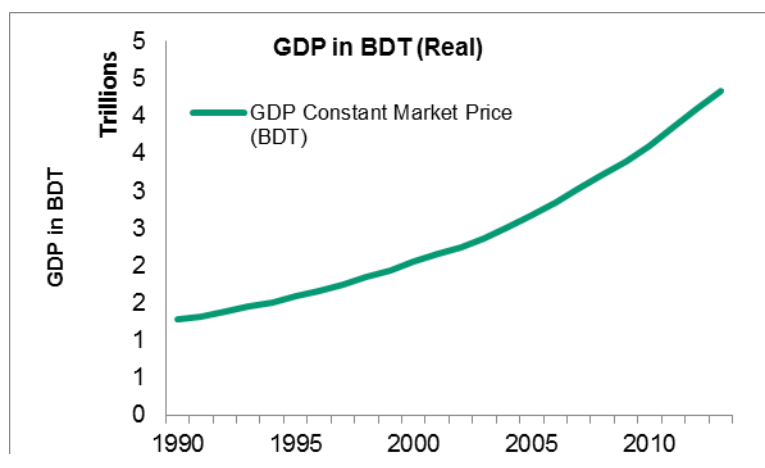
Figure 3: Real GDP in BDT

As can be seen from Figure 3: Real GDP in BDT, real GDP at constant prices (base year 1995-1996) rose from approximately BDT 1.28 trillion in 1990 to approximately BDT 4.34 trillion in 2013 which translates to an average annual growth rate of around 10.4%. The trend clearly shows a steady and relatively stable growth of the economy over this 23 year period. The last decade has shown a slight increase in the rate of growth. It is also of note that the Global Financial Crisis (2008) did not have any noticeable significant impact on the trend of real GDP.

6.2.3 Real GDP in BDT (1970 to 2013)[11]

Real GDP is a more accurate indicator of the actual economic state of the country. Bangladesh has shown an overall steady increase since 1970. As in the case of nominal GDP, real GDP shows a dip right after the post war period. The severe dislocations caused nearly a decade of slower economic growth; the immediate 5 year period right after 1970 shows that recovery was slow but steady. Immediately after independence there was a general movement towards nationalization which led to inefficiency and economic stagnation, post 1975 the increased focus on privatisation led to better results.

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[10] Bangladesh Bank

[11]GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant U.S. dollars. Dollar figures for GDP are converted from domestic currencies using 2005 official exchange rates.
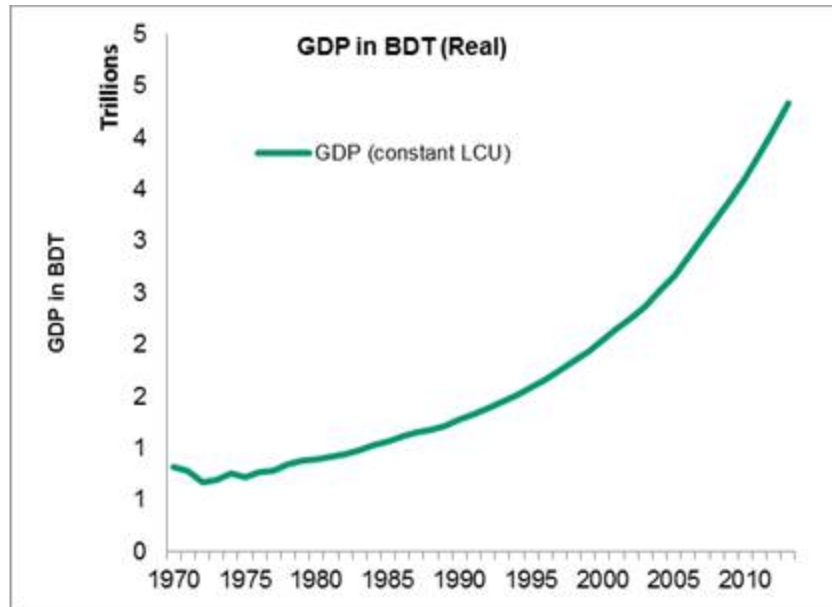
Figure 4: GDP in BDT (Real)

The real GDP grew by about 77% between 1975 and 1990, an average annual rate of approximately 5.13%. Post 1990 there was a period of rapid growth at a rate much higher than in previous decades. The increase in real GDP in between 1990 to 2013 has shown sustained growth; this was mainly due to the significant focus on developing new industrial capacity and rehabilitating the economy. As mentioned earlier, the economy saw significant expansion in various sectors such as RMG. Between 1975 and 2013 real GDP increased by around 570% and at an average annual growth rate of around 15% over this 38 year period. This impressive growth highlights the fact that there has been genuine and sustained expansion and economic development. There are three significant values that need to be added to ensure that there is holistic growth.
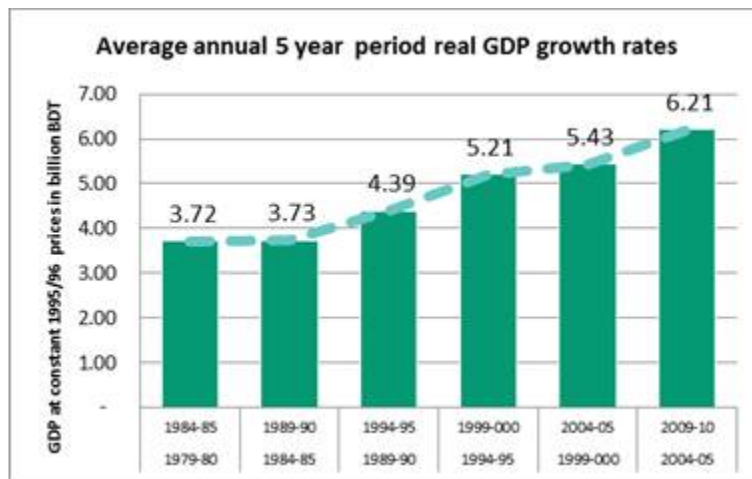
Figure 5: Real annual GDP growth rate per 5 year period

In Figure 5 we have summarized the real annual growth rate for GDP per 5-years period, showing after 1990 a significantly increasing annual growth rate from 4.39% in 20 years' time to 6.2% up to 2010. This trend is more or less stabilizing in the period up to 2013 with 6.7% in 2011, 6.23% in 2012 and 6.03% in 2013.

6.2.4 GDP per capita (BDT)[12]
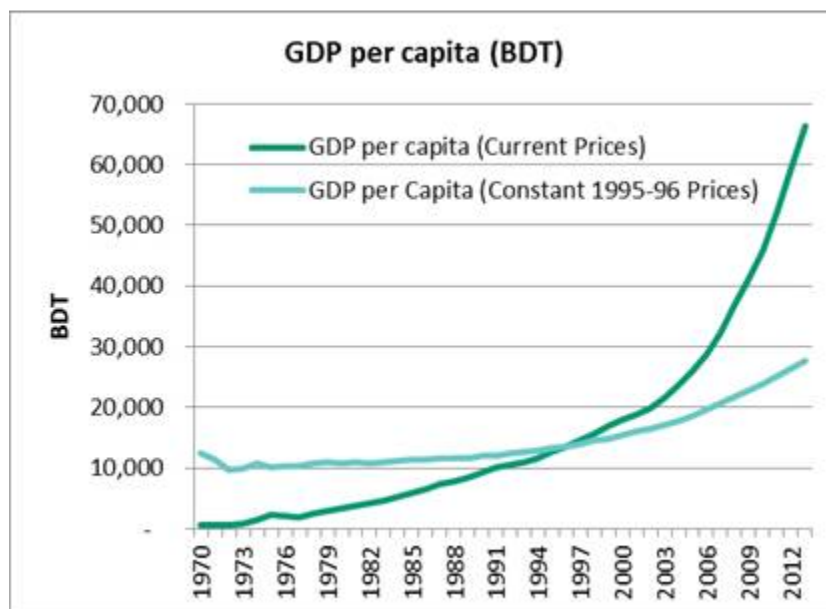
Figure 6: GDP per capita in BDT, 1970- 2010

GDP per capita is gross domestic product divided by midyear population.

Data presented here are in current BDT and constant 1995-1996 BDT. The GDP per capita at takes into account changes in population and gives a clearer picture of the changes in the standard of living of the average citizen in Bangladesh. The trend for the real GDP per capita shows an upward trend and indicates the increased productivity of the labour force. The annual average growth rate between 1975 and 1990 is approximately 1.17% and between 1990 and 2013 is approximately 3.73%; these levels of growth are in line with what we know of the increased access to and use of technology and rapid industrialization of the country as well as the various nationalized industries became more and more privatized.

For more detailed figures per year about GDP, GDP per capita and population (in current prices and in constant 1995/96 prices) we refer to 0

6.2.5   Employment & Unemployment

The standard definition of unemployed persons is those individuals without work, seeking work in a recent past period and currently available for work. Persons who did not look for work but have an arrangement for a future job are counted as unemployed. It is the labour force or the economically active portion of the population that serves as the base for this indicator, not the total population. Data presented here are based on labour force sample surveys, general household sample surveys, censuses, official estimates, and administrative records. The unemployment rates presented here are the ILO estimates from the ILO's Key Indicators of the Labour Market database.

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[12] It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.
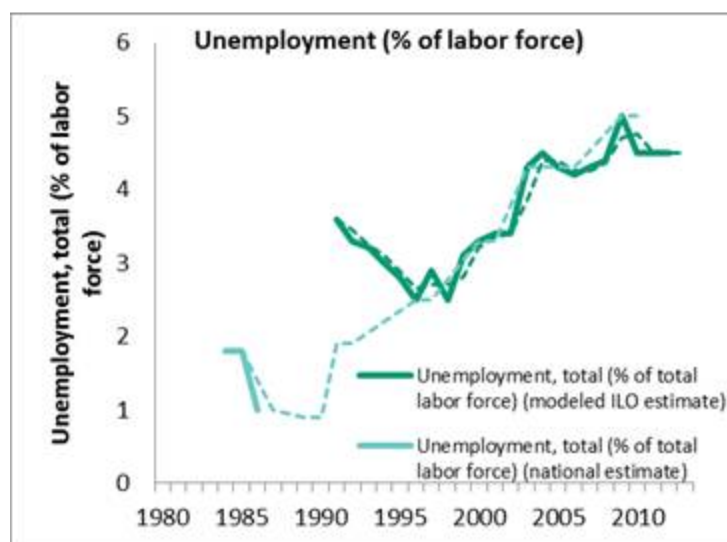
Figure 7: Unemployment (% of labor force)

The ILO estimates are harmonized to account for inconsistencies resulting from data source, definition, reference period, coverage, age group, and collection methodologies.

The adjusted rates are based on household labour force sample surveys and include both nationally reported and imputed data. Caution should be used when comparing the ILO estimates against other national estimates such as employment data.

The data from 1970s to 1980s are unavailable due to absence of a formal survey system and also the transition that the country was under-going post-independence. Unemployment rates reported by the national sources place the rate between 4.5% to 5%, in the years, between 2003 and 2013. Unemployment rates have steadily increased since the 1980s and this has been largely due to a massive increase in population during the same period. It was just not possible for job creation rates to keep up with the increase in the labor force. There is an inherent mismatch between the demand and the labour supply and this is reflected in the overall trend of unemployment patterns as presented in the above figure. Another factor contributing to the rise in the unemployment rate is the increase in the sector activities and the need for more skilled labour force. There is a relationship here with the education levels where it is noted that there is significant need to address the tertiary education completion rates.

6.2.6 Employment by Sector[13]

The Bangladesh economy can be divided into three broad sectors (data available up to 2010) only:

- Agriculture

- Industry

- Services

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[13] Employees are people who work for a public or private employer and receive remuneration in wages, salary, commission, tips, piece rates, or pay in kind.
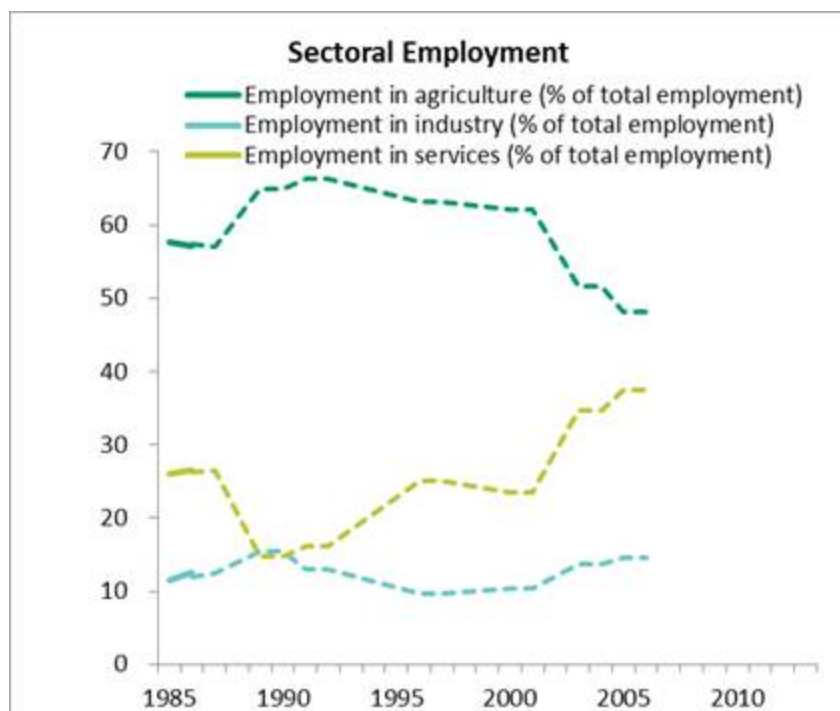
Figure 8: Sectoral Employment: 1985 to 2010

Agriculture includes hunting, forestry, and fishing. *Industry* includes mining and quarrying (including oil production), manufacturing, construction, and public utilities (electricity, gas, and water) whereas *services* include wholesale and retail trade and restaurants and hotels; transport, storage, and communications; financing, insurance, real estate, and business services; and community, social, and personal services.

Since the 1970s, post dependence era, Bangladesh started off with its economic activities chiefly through agriculture. As can be seen in the figure the agricultural sector has consistently accounted for more than half of total employment until the 2000s[14]. Post 2000 it has dropped to a little less than half of total employment. This is accounted by the fact that key divisional districts such as Dhaka, Chittagong Narayanganj saw a rapid expansion in the industrial sectors. The service sector has also grown in leaps and bounds, from around 15% of total employment to around 38% by the late 2000s. This was mainly through the expansion of the telecommunication sector and wholesale and retail trade- it is estimated that with increasing demand this area will see a further increase in the employment. The share of industrial sector's employment has stayed more or less steady at around 15% into the late 2000s.

Following 2000, we can see that the services sector experienced significant growth in terms of employment- this is explained by increased investment and entry of telecommunications and service industries within the country. The manufacturing sector continued to rise at a steady rate but not significantly- it is estimated that the industrial sector growth will follow an upward trend despite the numerous regulatory reforms requirements and hurdles that exists till date. However, the transfer of increasing numbers of people from agriculture to industry and organized services will require much better education opportunities and skill acquisitions.

As indicated in the table below, employment in various key sectors indicate significant average growth rates during the period 2005 up to 2010[15] chiefly in real estate, renting and business activities, followed by mining and quarrying,

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[14] Its contribution to GDP will be dealt with in the next chapter on economic composition
[15] Unfortunately, no data are available for the period after 2010 up to 2013/14

electricity, gas and water supply. This is against the backdrop of negative growth experienced in crucial sectors such as education, financial intermediation, public administration and defence where factors such as lack of investments, cut back on expenditure, profitability, social climate could have played a significant role. Disaggregated data in relation to this is not available at this point for us to carry out a thorough analysis.

Table 3 Employment in various key sectors

Employment in various sectors (in thousands)[16]	2005-2006	2010	Average Growth Rates
Agriculture, hunting and forestry	21,672	25,727	4.29
Mining and quarrying	51	109	18.98
Manufacture	5,224	6,731	6.34
Electricity, gas and water supply	76	123	12.04
Construction	1,524	2,617	13.52
Wholesale & retail trade; repair of Motor vehicles, motor	7,108	7,557	1.53
Hotels and restaurants	712	832	3.89
Transport, storage and communication s	3,976	4,037	3.81
Financial intermediation	507	364	-8.28
Real estate, renting and business activities	239	636	24.47
Public administration and defence;	882	539	-12.31
Education	1,306	1,287	-0.37
Health and social work	362	497	7.92
Other community, social and Personal service activities	2,622	3,374	6.3
Total	47,357	54,084	3.32

In 2010 employment is totalling to approximately 54 million people of whom 48 percent is working in the agriculture sector, 18 percent in the industrial sector and the remaining 34 percent in the service sector.

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[16] Bangladesh Bureau of Statistics

7   Economic Composition

Contribution to GDP by Service sector: 48.4% (1980) to 53.91% (2013); Increasing

Contribution to GDP by Industry sector: 20.6% (1980) to 28.88% (2013); Increasing

Contribution to GDP by Agriculture sector: 31 % (1980) to 17.21% (2013); Decreasing

7.1 Current Situation

The GDP of a country is a composition of the value added gained in the various economic sectors in the national economy and is defined by the OECD as "an aggregate measure of production equal to the sum of the gross values added of all resident institutional units engaged in production (plus any taxes, and minus any subsidies, on products not included in the value of their outputs)." Thus looking at the composition of the sectoral contribution to GDP allows a much richer understanding of the structure and nature of the economy.

The Bangladesh economy has been growing fast over the last two decades. New economic activities like shipbuilding, software development, event management, security services, mobile banking services and others are widely taking place. Agro based economy has been rapidly transforming to a mixed one with considerable income and employment opportunities. Currently (based on the year 2013), the service sector dominates the economy with significant share in GDP. Out of total GDP (which is adding up to in 2013 to about 10,380 billion BDT, see Annex 3) service sector constitutes 49.30 percent, industry 31.99 percent and agriculture only 18.70 percent. This is interesting because the employment patterns outlined in the previous section does not indicate the same. The employment rate within the agriculture sector remains to be significantly high and there is a direct relationship between poverty levels and agricultural sector, which will be elaborated further in the next sections.

While looking at the current trends, it is worth comparing the economic composition of Bangladesh against the same countries. Again, it can be noted that while the performance of the country has been substantial, there is scope for further expansion. On the positive end though, we can see Bangladesh surpassing Malaysia in terms of contribution in Agriculture, understandably so due to the long-standing focus on agriculture as means of economic development and livelihood- but at the same, it continues to lag behind countries such as Thailand and even Pakistan. Various factors play a role in this sense which can be seen through lack of research and investment in the sector and sheer nature of low value production due to lack of technology and more diversification.

In terms of Industry and Services, Bangladesh economy performance remains to be impressive albeit behind similar countries.

Table 4 Economic composition

Economic Composition (real GDP contribution, constant 2005 dollars)	Bangladesh	Thailand	Malaysia	India	Pakistan
Agriculture	$16 billion per year (world rank: 23rd) (2013)	$21.74 billion per year (world rank: 17th) (2013)	$14.81 billion per year (world rank: 25th) (2013)	$194 billion per year (world rank: 2nd) (2013)	$28.02 billion per year (world rank: 15th) (2013)
Industry	$29.11 billion per year (world rank: 55th) (2013)	$99.16 billion per year (world rank: 24th) (2013)	$80.84 billion per year (world rank: 31st) (2013)	$355 billion per year (world rank: 9th) (2013)	$37.09 billion per year (world rank: 49th) (2013)
Services, etc.	$49.67 billion per year (world rank: 51st) (2013)	$109.5 billion per year (world rank: 37th) (2013)	$112.1 billion per year (world rank: 36th) (2013)	$799.8 billion per year (world rank: 8th) (2013)	$74.33 billion per year (world rank: 44th) (2013)

Source: World Bank

7.2   Historical trends of Major Components

7.2.1   Sectoral Composition

In this section, the historical trends for the three major components of GDP, Agriculture, Industry and Services are examined. In subsequent subsections, analysis of some of the important sectors is conducted. The sectors of importance are in line with thrust sectors identified by the government and sectors that have a major economic potential. For more detailed figures on all economic sectors (as classified by BBS) we refer to 0.
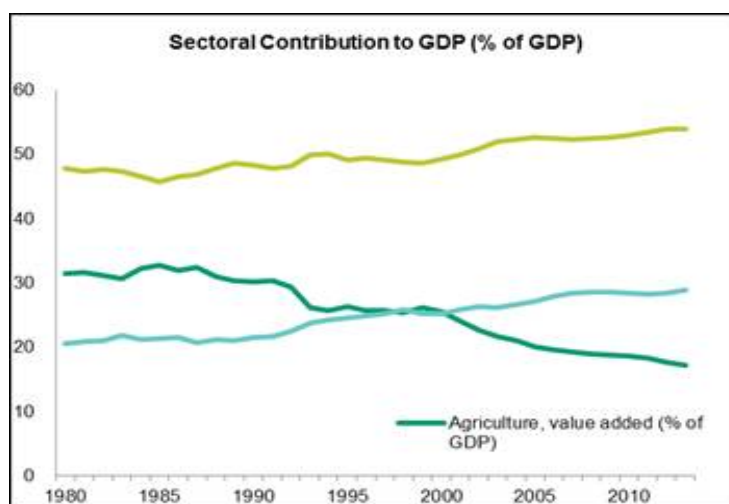
Figure 9: Sectoral Composition to GDP (% of GDP)

Agriculture corresponds to ISIC divisions 1-5 and includes forestry, hunting, and fishing, as well as cultivation of crops and livestock production.

Industry corresponds to ISIC divisions 10-45 and includes manufacturing (ISIC divisions 15-37). It comprises value added in mining, manufacturing construction, electricity, water, and gas. Services correspond to ISIC divisions 50-99 and they include value added[17] in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services.
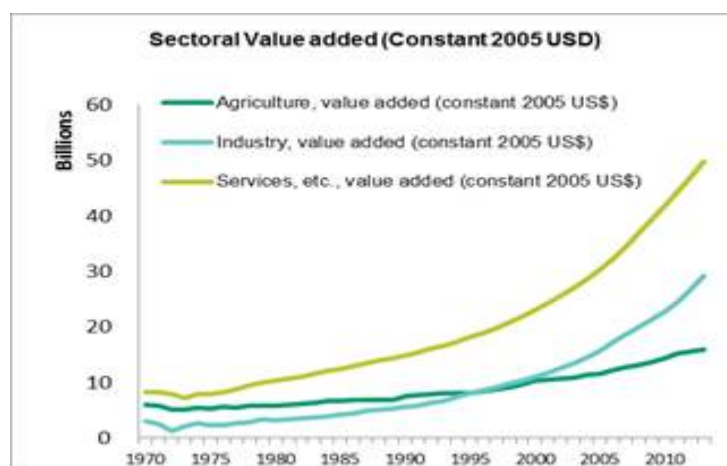
Figure 10: Sectoral Value added (constant 2005 $)

Also included are imputed bank service charges, import duties, and any statistical discrepancies noted by national compilers as well as discrepancies arising from rescaling.

The Sectoral composition of Bangladesh's economy has changed significantly since 1970. Agriculture's share in the economy has decreased from 31% in 1980 to around 25% in 2000 to 18.5% in 2010. This is explained by the transfer and rapid growth of the industry and services sectors. Industry's share in the economy has increased from 20.6% in 1980 to 28.4% in 2010. The service sector has accounted for around half of economy all throughout. As of 2013 the shares of agriculture, industry and services are 17.21%, 28.88% and 53.91% respectively.

7.2.2 Sectoral value added and annual growth

As can be seen, since 1970 the economic acceleration and growth has been spread evenly over three sectors. Agriculture's value added has increased at lower rates than either services or industries however.

This is mainly due to the fact that by nature agricultural products are inexpensive whereas both industrial goods and services are more valuable. An important moment in Bangladesh's economic history is 1996; it marks the first time Bangladesh's industrial output value exceeded that of agricultural output value. This is marked by significant expansion of some of the sectors such as RMG (Ready-Made Garments Industry) which experienced an all-time high in terms of the contribution to the GDP. Interestingly, in in 1990-91, there were approximately 834 garment factories

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[17] Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources.

contributing to export earnings of 50.47%. In 1995-96 alone, the number of factories went up to 2353 with export earnings of 65.61%.[18]

Since 1996 the value added by Bangladesh's industrial sector has grown sharply whereas the agricultural, while still growing, has levelled off.
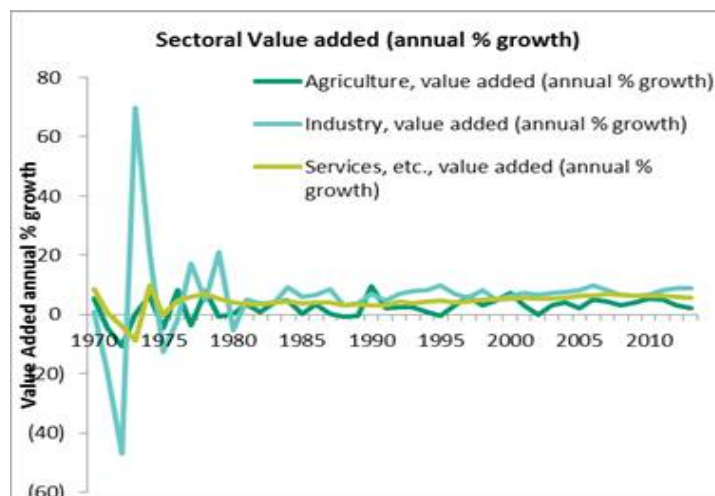
Figure 11: Sectoral Value added (annual % growth)

Annual growth rate for the sectors are value added based on constant local currency. Aggregates are based on constant 2005 U.S. dollars.

The value added by the three different sectors closely follows the real GDP growth rates in previous sections. This level of decomposition clearly illustrates the degree to which each of the sectors is susceptible to different kinds of exogenous shocks. For example, even though the 1971 Independence War had an understandably significant impact on the economy in general, the Industrial sector was most affected by it with growth rates falling from 0.74% in 1970 to around a -46.68% in 1972.

Growth rates fluctuated widely between 1970 and 1980 with rates stabilizing in the post 1980 period. Agricultural growth rates have been tracked the major natural disaster events quite closely. The services industry has shown steady growth all throughout. It is important to note that Industrial growth rates have been higher than services and agricultural growth rates since the mid-1980s and has remained so till date. Post 2000, the country has seen significant acceleration in the industry and services sector leading to an increased value added percent growth- again the factors outlined above has led to this impressive growth which is expected to move forward further given the regulatory conditions coupled with investment and technology are embedded further. The agricultural sector, while still contributing to a significant percentage lags behind, primarily due to the comparative low value added characteristics of the sector.

7.3 Disaggregated Sectoral Composition

The Industrial Policy 2010 had identified a number of thrust sectors. Unfortunately GDP contribution data on these thrust sectors are very difficult to obtain. This is mainly due to the fact the sectors do not readily conform to standard economic activity classifications nor product classifications and are rather broadly defined. Furthermore some of these

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[18] Ahmed, S and Sattar Z (2004). Trade Liberalization, Growth and Poverty Reduction: The Case of Bangladesh. Washington, D.C., World Bank.

sectors that have been identified are still considered to be sectors with great potential; hence do not currently significantly contribute to the GDP. However there is a correspondence between the IP2010 Thrust Sectors and the BSIC Codes used by Bangladesh Bank and BBS.

Given this type of correspondence between the thrust sectors and the Bangladesh Bank data, the sectors that have contributed to GDP to a great extent and showcase significant potential are as follows:

- Agriculture and Forestry
- Fishing
- Manufacturing
- Constructions
- Wholesale and Retail Trade
- Hotel and Restaurants
- Transport, Storage and Communication
- Education
- Health and Social Works

A full table of disaggregated growth figures is available in 0

7.3.1 Manufacturing

The Manufacturing sector has increased greatly over the period and continues to show an increasing trend.
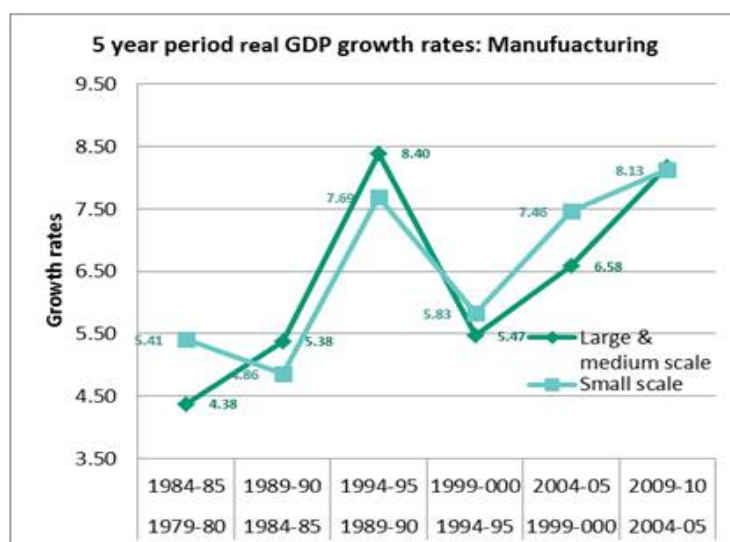
Figure 12: 5 year period real GDP growth rates: Manufacturing

It is instructive to note that in the manufacturing sector both large and medium firms as well as small firms have experienced very similar growth patterns. Although between the five year period between 1980-85 small scale industries grew at a smaller rate than medium and large firms during the next few periods their growth patterns were very similar following the economic cycles very closely. In the past decade smaller firms have higher growth. As it can be argued that SMEs are the engine of growth for any developing economy, this trend of is both good news and a significant opportunity. Government policy focusing on fostering this growth will result to a more robust economy in the future.

7.3.2   Agriculture

Agriculture remains to be a predominant sector follows an increasing trend - it is important to note here that due to the nature of the sector and also low wages, even if the growth of the sectors has been steady, the value remains to be low as opposed to the manufacturing sector.
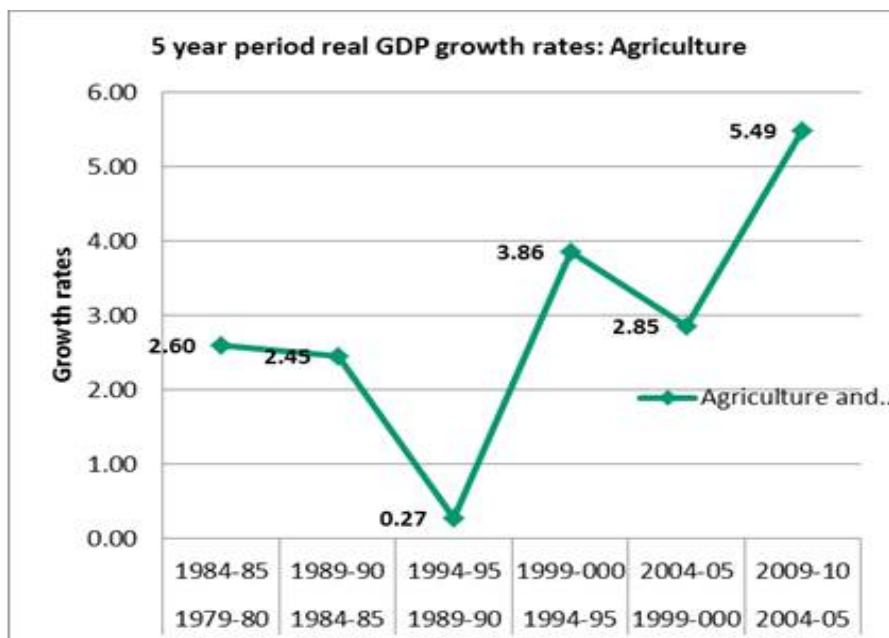
Figure 13: 5 year period real GDP growth rates: Agriculture

The 5 year average annual growth also shows that while the agricultural sector's growth has been low, it has never decreased. In recent years the growth figures have been high and hopefully will continue this trend as more efficient agricultural technologies and processes are adopted. It is also important to note that given approximately half of the total labour force is still employed in agricultural pursuits it is of high importance that this sector grow and prosper; both in terms of a long term food security perspective and ensuring economic prosperity.

7.3.3   Wholesale and Retail sector

Wholesale and retail trade has experienced a positive trend and expected to grow at a faster rate. It is also important to note that the sector also constitutes of a high number of informal entities and it is evident that the actual value of the sector is much higher. In recent years the retail and whole sale sector has shown significant growth. The 5 year period between 1980-5 did show a decline, but following that this sector has shown strong growth. As the wholesale and retail sector can be thought of as a proxy for consumer demand/confidence such stead and strong growth shows a growing economy.
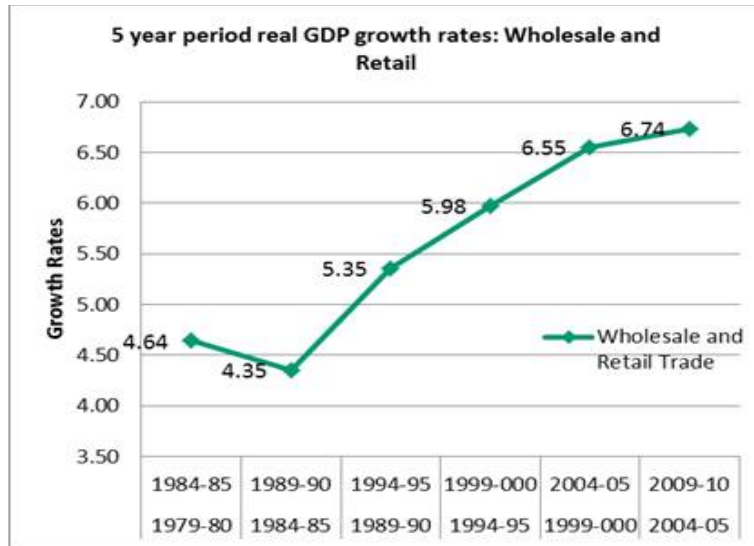
Figure 14: 5 year period real GDP growth rates: Wholesale and Retail

7.3.4 Other sectors

In the figure below other promising sectors are shown (including also the three sectors we already presented in the previous sections). The figure presents the development of GDP per subsector in the period 1989 up to 2012 in billions BDT (constant 1995 prices). As can be seen, manufacturing sector continues to show impressive growth far exceeding agriculture. Sectors such as constructions, wholesale and retail trade, transport, storage and communication continue to contribute to this growth due to increase in the demand in numerous subsectors and also large scale investments by private sector. Transport storage and communication as expected remains to follow an upward trend, with fishing, constructions, and others following through. Evidently, the education sector chiefly requires more focus and investments and levelled of not just for sectoral contributions but also to contribute to the economic growth through employment.
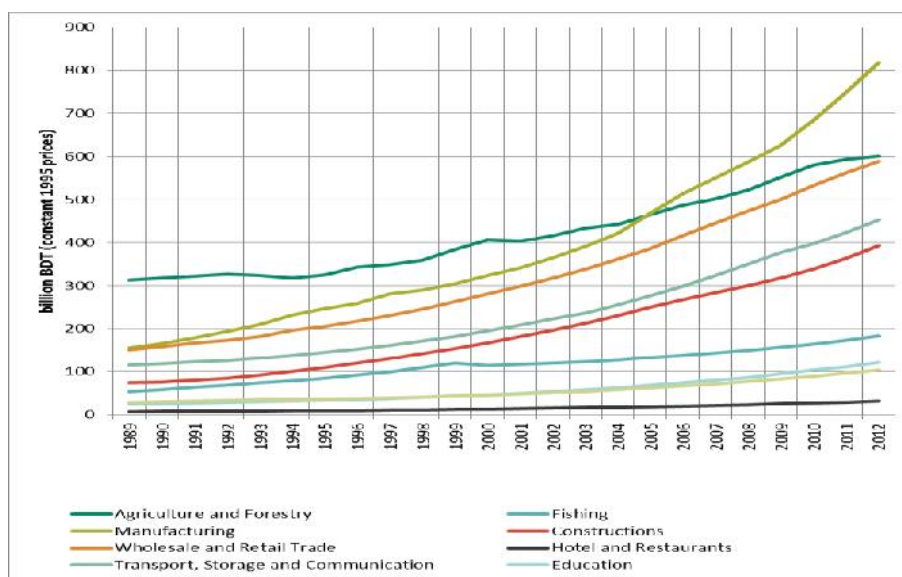
Figure 15: Real GDP, Sectoral Disaggregation

Source: BBS

8   Poverty

The key poverty metrics that are used in this report are the poverty head count ratio and the poverty gap. The poverty head count ratio is assessed using two different methods:

- the internationally comparable $1.25/day (PPP) and the $2/day (PPP) poverty lines, and

- the CBN method preferred by BBS.

The poverty gap used is based on the $1.25/day (PPP) and $2/day (PPP) method as the CBN method is infrequently calculated.

Since 1975, Bangladesh has made significant progress in reducing overall poverty. The percent of population living below the $1.25 poverty line went down from 60.6% in 1984 to 43.3% in 2010.

However, it is also important to note that the poverty levels still remain to be significant. A key issue facing the socioeconomic health of the country is the fact that with increased growth, the country continues to face growing inequality.

The poverty headcount ratio at $1.25 a day (PPP) is defined as the percentage of the population living on less than

$1.25 a day at 2005 international prices. The poverty headcount ratio at the $2 a day (PPP) is the percentage of population living on less than $2 a day at 2005 international prices.

The CBN (Cost of Basic Needs) Method uses a food basket that is atypical of the expenditure pattern of the poor, having a higher proportion of higher value food items compared to staples rice and wheat. This method is used by BBS and is reported as the "national poverty line" in this report.

This accounts for the differences between the two metrics of the poverty headcount ratio.

8.1   Current Situation

The incidence of poverty in Bangladesh is still one of the highest in the world. About one-third of the population are still living below the poverty line. In this context, poverty is still a vital concern and challenge for Bangladesh. The average annual rate of poverty reduction in Bangladesh during 2000-2005 was the second highest among south Asian countries. The pace of poverty reduction in Bangladesh is, however, much lower than in faster-growing east Asian countries like China, Thailand, and Vietnam, which underscores the importance of higher growth for achieving even faster reduction in poverty.

Discussion on determinants, trends and incidence of poverty in Bangladesh is based on the Household Income & Expenditure Survey (HIES) conducted at the household level by the Bangladesh Bureau of Statistics (BBS) since FY 1973-74. Poverty estimates, patterns and trends are determined by analysing data on household consumption expenditures and poverty lines are compared to separate the poor from the non-poor and estimate the extent of poverty. Poverty situation in accordance to the current data indicates that the rates are better in the central region, moderate in north-eastern and south-eastern region while the rest - north-west and south-west, is most poverty prone.

Currently, the poverty headcount ratio at national poverty lines stands at 31.5% (HEIS, 2010). If we compare Bangladesh against similar countries, Bangladesh remains to be highest in terms of both poverty fraction at $1.25/day and $2/day-poverty rate and using the CBN method at the national, rural and urban levels again remains the highest in comparison to similar countries. Although the poverty rates in India and Pakistan are ought to be significantly high and in specific regions more than others, at the national levels as can be seen the countries fare better than Bangladesh.

Table 5: Poverty fraction and poverty rate

	Bangladesh	**India**	**Pakistan**	**Thailand**	**Malaysia**
poverty fraction at $1.25/day	43.3% of population (world rank: 104th) (2010)	23.6% of population (world rank: 85th) (2012)	12.7% of population (world rank: 70th) (2011)	0.31% of population (world rank: 22nd) (2010)	0% of population (world rank: 1st) (2009)
poverty fraction at $2/day	76.5% of population (world rank: 110th) (2010)	68.8% of population (world rank: 103rd) (2010)	60.2% of population (world rank: 94th) (2008)	4.05% of population (world rank: 27th) (2010)	2.27% of population (world rank: 24th) (2009)
national poverty rate	31.5% of population (world rank: 95th) (2010)	21.9% of population (world rank: 63rd) (2012)	12.4% of population (world rank: 27th) (2011)	13.2% of population (world rank: 28th) (2011)	1.7% of population (world rank: 1st) (2012)
rural poverty rate	35.2% of population	25.7% of population	27% of population	16.7% of population	3.4% of population

	Bangladesh	India	Pakistan	Thailand	Malaysia
	(world rank: 49th) (2010)	(world rank: 34th) (2012)	(world rank: 36th) (2006)	(world rank: 17th) (2011)	(world rank: 2nd) (2012)
urban poverty rate	21.3% of population (world rank: 57th) (2010)	13.7% of population (world rank: 33rd) (2012)	13.1% of population (world rank: 30th) (2006)	9% of population (world rank: 22nd) (2011)	1% of population (world rank: 2nd) (2012)

Source: World Bank & Other National Statistics Bureaus (BBS, MOSPI, PBS etc.)

The poverty gap at the $1.25/day (PPP) and $2/day (PPP) are the only two metrics of poverty that are comparable between countries. This is because the methodology used to determine the national metrics, (CBN method in the case of Bangladesh) differs between countries making it difficult to compare those figures directly. However, it can be seen that inequality is higher in Bangladesh that comparable countries.

8.2 Historical trends of Metrics

8.2.1 Poverty Head count ratio at CBN Method

The CBN method (i.e. BBS's poverty metric) has been very infrequently updated. Hence it is difficult to obtain a trend with many years of observations.

However, given the estimates and data points that are available it is evident that both the lower and the upper poverty indicate a significant decline in poverty after 1991-92. The incidence of the very poor declined from 43% of the population in 1991-92 to 36% in 1995-96; the incidence of the poor declined from 59% to 53%. Although poverty has declined in both rural and urban areas, rural poverty is still higher than urban poverty. Reducing the poverty of the very poor living in rural areas -still at 40% of the rural population in 1995-96 -remains a significant challenge for Government of Bangladesh.

Headcount rates based on both the upper as well as lower poverty lines show poverty in Bangladesh to have declined considerably during the 90s.

In 2000, 50% of Bangladesh's population was poor (as measured by the upper poverty line) as compared to 59% in 1991-92. Similarly, 34% of the country's population was very poor (i.e. below the lower poverty line) in 2000 as compared to 43% in 1991-92. Thus, according to both the upper and lower poverty estimates, the incidence of poverty in Bangladesh declined by about 9 percentage points over the course of the decade. Throughout the decade, poverty in rural areas remained higher than in urban areas; however, the overall decline in poverty incidence over time was roughly equal across the two.[19]

It is evident that the country is experiencing higher inequality with the growth rates speeding up. Whilst, faster growth is needed if poverty is to be reduced faster, the net effect of growth on poverty reduction is positive, but in addition to faster growth, efforts to limit rising inequality are required. Over the period 1991-92 to 1995-96, inequality rose the least with agricultural growth, and as a result "the net elasticity of poverty with respect to growth was the largest in agriculture. Assuming these elasticities hold unchanged in the future, growth in agriculture would tend to reduce poverty and limit inequality more than identical growth in industry and services"[20]. As can be seen from the sector

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[19] During the 1990s, the overall decline in poverty in Bangladesh as a whole (9.0%) was greater than in either urban (8.3%) or rural (8.2%) areas because (i) the share of population living in urban areas increased significantly during the period, and (ii) the incidence of poverty in urban areas was considerably lower than in rural areas.

[20] Poverty Reduction and the World Bank: Progress in Fiscal 1998, World Bank, Page 879, 1999 Publication

compositions, industry and services continues to grow much faster than agriculture and the net contribution of faster industrial and service growth to poverty reduction should be quite high.

Table 6: Poverty gap

	Bangladesh	India	Pakistan	Thailand	Malaysia
poverty gap at $1.25/day	11.17% (world rank: 95th) (2010)	4.84% (world rank: 75th) (2012)	1.94% (world rank: 63rd) (2011)	0.04% (world rank: 18th) (2010)	0% (world rank: 1st) (2009)
poverty gap at $2/day	30.35% (world rank: 101st) (2010)	24.47% (world rank: 94th) (2010)	17.94% (world rank: 83rd) (2008)	0.68% (world rank: 25th) (2010)	0.16% (world rank: 12th) (2009)
national poverty gap	6.54% (world rank: 41st) (2010)	4% (world rank: 26th) (2012)	7% (world rank: 44th) (1999)	3% (world rank: 18th) (1998)	0.8% (world rank: 4th) (2009)
rural poverty gap	7.35% (world rank: 29th) (2010)	4.6% (world rank: 17th) (2012)	7.9% (world rank: 36th) (1999)		1.8% (world rank: 3rd) (2009)
urban poverty gap	4.28% (world rank: 36th) (2010)	2.5% (world rank: 17th) (2012)	5% (world rank: 42nd) (1999)		0.3% (world rank: 1st) (2009)

Source: World Bank & Other National Statistics Bureaus (BBS, MOSPI, PBS etc)

8.2.2 Poverty headcount ratio (PPP) Method
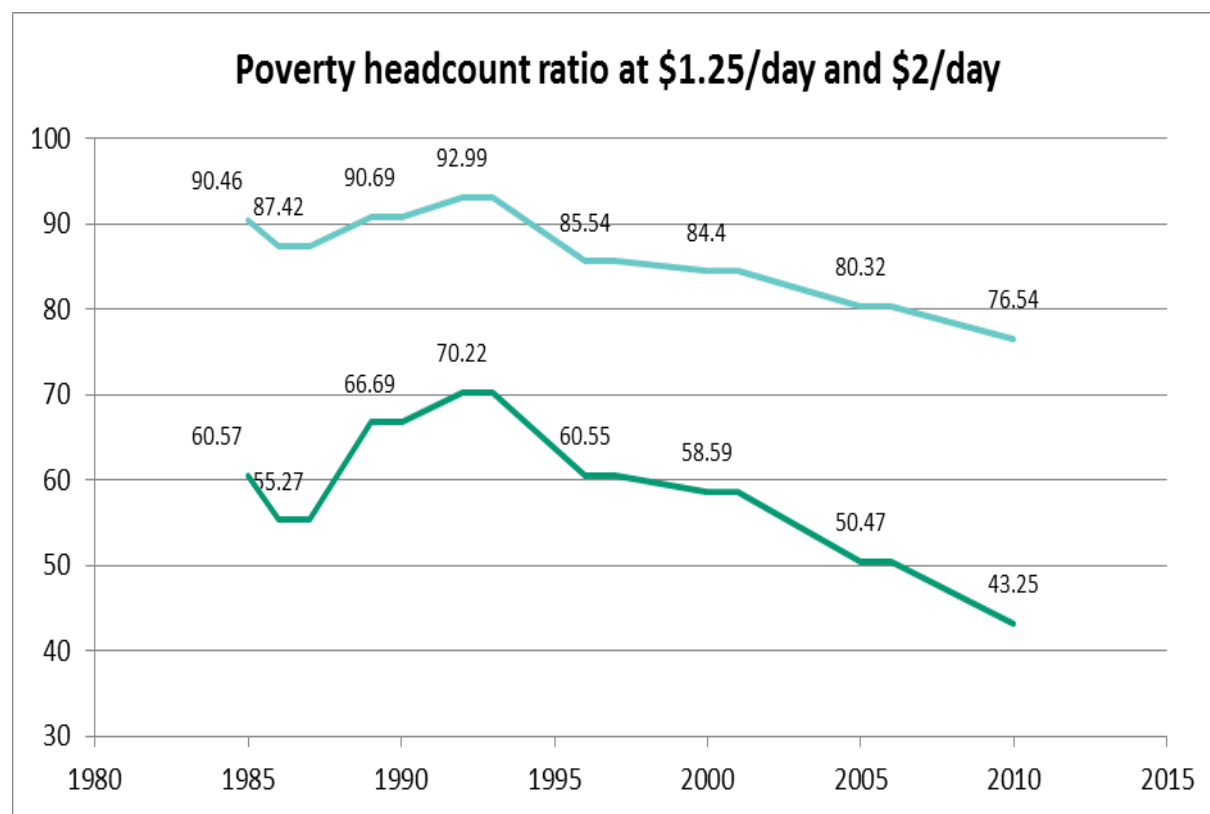
Figure 16: Poverty headcount ratio (PPP)

The internationally comparable PPP method also shows a ysimilar trend. Between 1990 and 2010 the poverty headcount ratio at the $1.25/day PPP line dropped from around 70% to around 43%. The upper line, $2/day PPP line dropped 93% to around 76% during the same period. The downward trend shows that poverty reduction strategies will continue to improve the situation.

8.2.3 Poverty gap at $1.25/day and $2/day[21]

The poverty gap index is considered to be an improvement over the poverty headcount ratio which simply counts all the people below a poverty line, in a given population, and considers them equally poor. The Poverty gap index estimates the depth of poverty by considering how far, on the average, the poor are from that poverty line and this for Bangladesh is more relevant given the persistent spread and inequality. The CBN method (i.e. the national poverty metric) has very few data points; this is why to understand the trend of how the depth of poverty changed the poverty gap at $1.25/day and $2/day PPP is used.

It is interesting to note that historically the levels of poverty reduction over the 1980s were slow or almost non-existent. If we compare this with the growth levels where the average GDP growth was roughly around 4 percent and exceeded the declining population growth rate, interesting aspects of rising inequality that started from this period come into the scene.
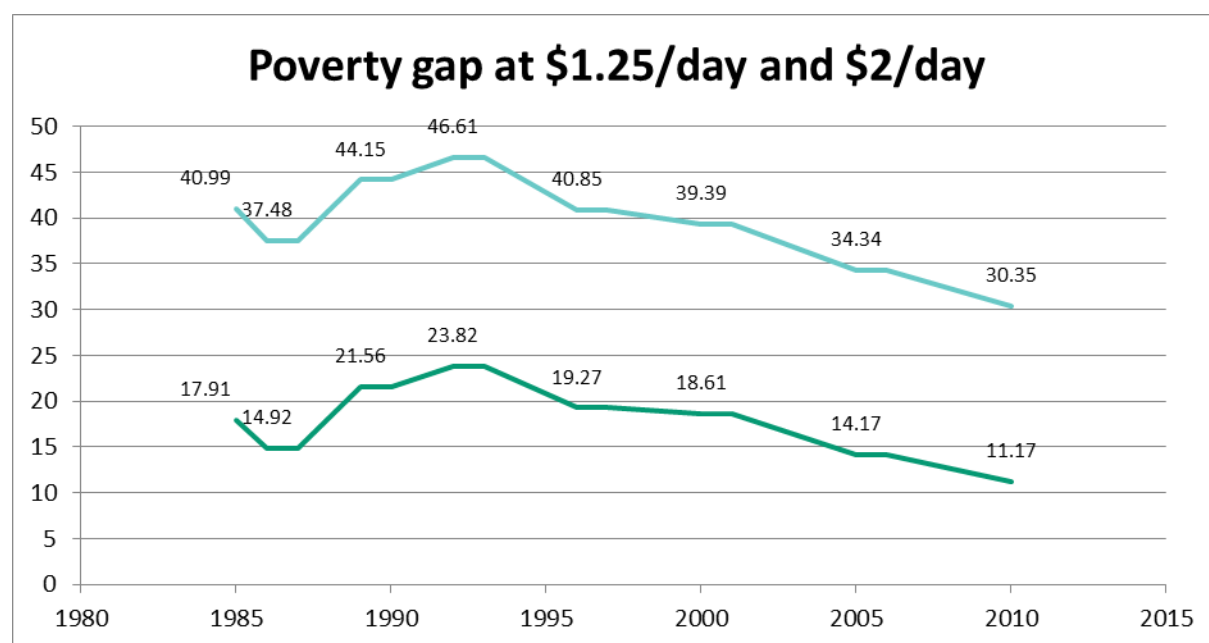
Figure 17: Poverty gap (PPP)

During the 1990s the poverty gap seemed to have experienced a decline, this is in part due to increased programs targeted at poverty reduction measures, microfinance programs, and food for work programs which indicated a slight decline.

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[21] The poverty gap is the mean shortfall from the poverty line (counting the non-poor as having zero shortfall), expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence.

8.2.4 Division wise Poverty trend CBN Method

In this section we present the lower and upper poverty in the year 2010 for all divisions in Bangladesh.

Table 7: The lower and upper poverty in the year 2010 for all divisions in Bangladesh

Division	Total Lower poverty (%)	Total Upper poverty (%)
National	17.60	31.50
Barisal	26.70	39.40
Chittagong	13.10	26.20
Dhaka	15.60	30.50
Khulna	15.40	32.10
Rajshahi	16.80	29.80
Rangpur	30.10	46.20
Sylhet	20.70	28.10

Source: BBS, 2010

The Division wise poverty shows significant differences between different regions of Bangladesh. BBS, 2010

If we look at the six divisional district poverty data, it is evident that there are sharp variations in the rate of poverty across regions, with the eastern part of the country outpacing the West and South West. The largest decline in poverty occurred for Dhaka, Chittagong, and Sylhet divisions, while Barisal and Khulna saw little change. Dhaka and Chittagong divisions, with just over half the country's population in 2000, contributed 79 percent of the reduction in national poverty. All divisions with high consumption growth also saw substantial reductions in poverty and there was no apparent association between growth and distributional changes. The following maps provide a visual representation of the total upper and lower poverty situation in the divisional districts. Due to lack of disaggregated data, it is difficult to point out the key factors leading to such sharp variations. But, data from a spread of other areas such as economic contributions and understanding of the regions, some of the factors could be the defining characterisations such as location, sectoral concentration, investments, migration among others.

Total Upper poverty(%), 2010

Total Upper poverty(%)
26.200000 - 30.500000
30.500001 - 33.800000
33.800001 - 45.700000
45.700001 - 52.000000

Data Source: Household Income & Expenditure Survey, BBS

Total Lower poverty(%), 2010

Total Lower poverty(%)
13.100000 - 16.100000
16.100001 - 20.700000
20.700001 - 30.100000
30.100001 - 35.600000

Data Source: Household Income & Expenditure Survey, BBS
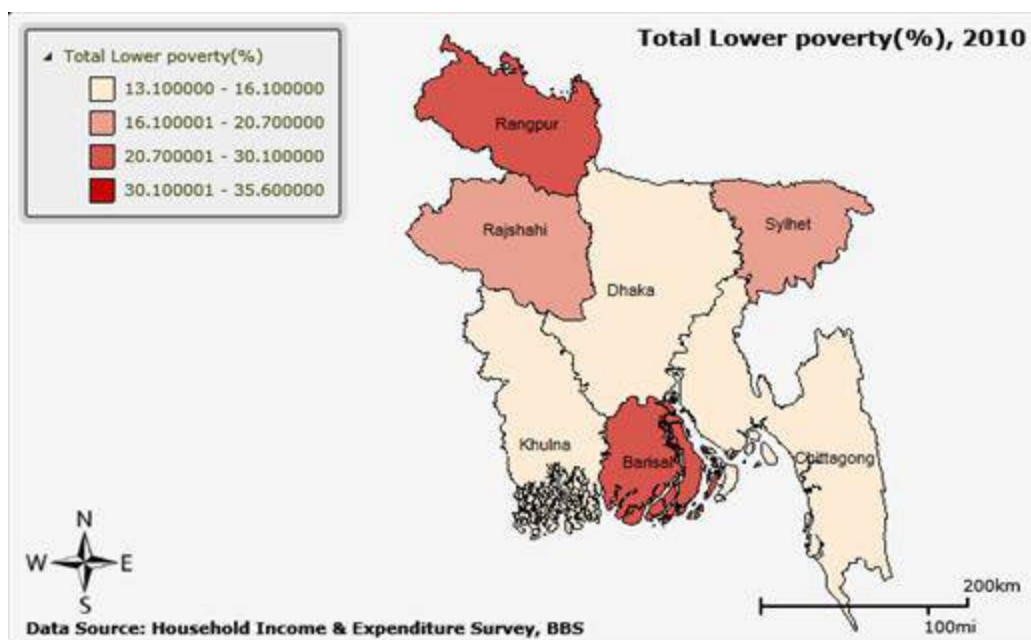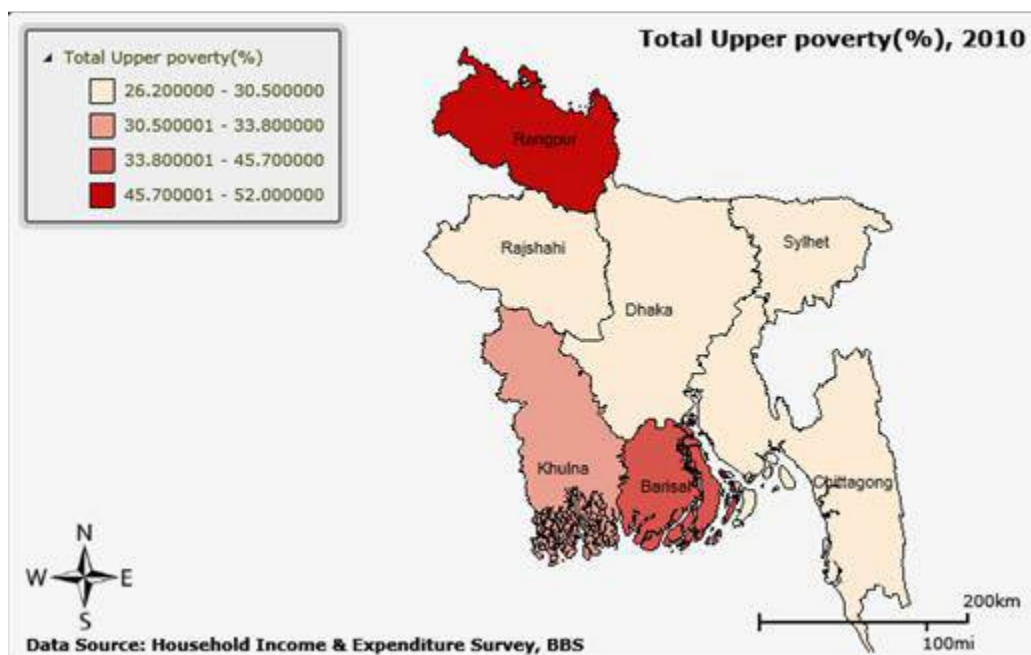
Box 1 Are Poverty Estimates Across Countries in South Asian Comparable?[22]

While *trends* in poverty reduction are comparable across countries in South Asia, estimates of poverty incidence *levels* are not. The national statistical offices in India, Pakistan, and Bangladesh all prepare poverty estimates using data from fairly similar national household surveys conducted on a regular basis in their respective countries. In India, the NSSO Consumer Expenditure Survey Series is used to estimate the incidence of poverty in the country. The Government of India Planning Commission's latest estimates using the 1999-00 survey show poverty in India to be 26.1 percent. In Pakistan, the Household Income and Expenditure surveys (HIES) conducted by the Federal Bureau of Statistics are used to estimate the incidence of poverty. Using data from the 1998-99 HIES, the incidence of poverty in the country was estimated to be 32.6 percent. In Bangladesh, two measures of poverty are estimated by BBS, corresponding to the upper and lower poverty lines. Using the upper poverty line, poverty was estimated to be 49.8 percent in 2000, while the lower poverty line yielded estimates of extreme poverty of 33.7 percent. Is poverty in Bangladesh so much higher than in India or Pakistan, as indicated by these estimates?

Cross-country comparisons of poverty are fraught with complex measurement and comparability issues and, amongst other factors, depend on the yardstick used to assess poverty levels in the respective countries. However, comparing the poverty lines used across these three countries suggest that part of the reason why poverty estimates in Bangladesh are so much higher than in either India or Pakistan is that a considerably higher poverty line is used to assess poverty (see table below). In US dollar terms, the upper poverty lines in use in Bangladesh are considerably higher than those in India and Pakistan (at prevailing exchange rates, not PPP-adjusted like the often used $1 per person per day line)

Poverty Lines in India, Pakistan, and Bangladesh

Country		Year	Poverty line per capita per month (local currency)	Poverty Line US$ (prevailing exchange rate)	Ratio to upper line (in US$) in Bangladesh
India	Urban:	1999/00	Rs. 454	9.88	0.62
	Rural:		Rs. 328	7.14	0.57
Pakistan	Urban:	1998/99	Rs. 665	13.27	0.84
	Rural:		Rs. 589	11.76	0.95
Bangladesh					
Upper line: Urban:		2000	Tk. 832	15.85	1.00
Rural:			Tk. 652	12.42	1.00
Lower line: Urban:			Tk. 628	11.96	0.75
Rural:			Tk. 549	10.46	0.84

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[22] Poverty Trends In Bangladesh During The Nineties, World Bank, 2006

9   Education

Getting access to basic education has been a fundamental right of every citizen of a country. This right has however been denied to a major segment of the population in Bangladesh; especially to those under the poverty line. Acknowledging the fact that these particular segment of people needs to be transformed into contributing citizens have resulted in having access to primary education a major agenda in the Millennium Development Goals. From 1970 to present, the number of educational institutions, teachers as well as students has been steadily increasing; primarily due to fulfilling the commitment to the international forum has instigated several initiatives in the area of primary education.

The Government of Bangladesh recognises education as a means of reducing poverty and improving the quality of life for children. As a signatory to the Convention on the Rights of the Child, the Government of Bangladesh, with assistance from development partners, has made positive steps towards fulfilling children's rights to education, according to the "for All and Millennium Development Goals" review. As a result, the country has made significant progress towards achieving universal primary education and gender parity in schools.

9.1 Background

The education system in Bangladesh comprises of a mix of heterogeneous providers, ranging from secular formal schooling to religious information education. Primary education in Bangladesh spans grades 1-5 and falls under the purview of the Ministry of Primary and Mass Education (MoPME).Secondary education includes grade 6-10, whereas higher secondary education covers grades 11-12 under the Ministry of Education (MoE). Technical and vocational training (TVET) remains to be a relatively small subsector heavily subsidized and overly centralized- data in relation to this area is yet to be collected by the relevant authorities and consolidated. It is however, a significant sector that requires a lot of support and efforts, specifically to meet the demand and labour supply mismatch that exists within the economy.

For tertiary education, traditionally the public sector has played dominant role, until the last two decades where private universities have come into the scene (of varying quality and standards). As of 2013, according to World Bank estimates, of the 103 universities, 71 are currently privately operated. Both public and private universities are managed by an autonomous University Grants Commission (UGC)- the oversight apex body for all universities to regulate university affairs.

As can be seen in the following sections, the educational access has increased significantly over the last decade particularly at the primary and secondary levels but it is also important to point out that the labour force continues to lack the education to match the market needs. Approximately 96% of the labour force has less than a secondary education, and two-thirds have less than a primary education. About a third of the primary graduates are able to acquire the basic literacy skills they are expected to have by the time they complete their schooling.[23]

9.2 Current Trends

9.2.1 Enrolment Rates for Primary, Secondary and Tertiary Education[24]

Enrolment rates are the total number of pupils enrolled in a particular level of education expressed as percentage of the corresponding population of the same eligible official age group. Essentially it is the percentage of the total number of children of a particular age group that are enrolled in school

The graph shows the enrolment in the three levels of education in Bangladesh since 1976. It can be clearly seen that the rates of primary and secondary enrolment have increased steadily since the late 1980s with significant growth till the late 2000s when there was a moderate dip and then a stabilisation to a plateau. Primary and secondary education enrolment stood at 91.55% and 46.04% respectively as of 2010.

Enrolment in tertiary education, on the other hand, has been low for most of the period between 1976 to the early 2000s with a steady increase in the late 2000s. Tertiary education enrolment stood at 13.15% as of 2011.

Figure 18: Enrollment Rates

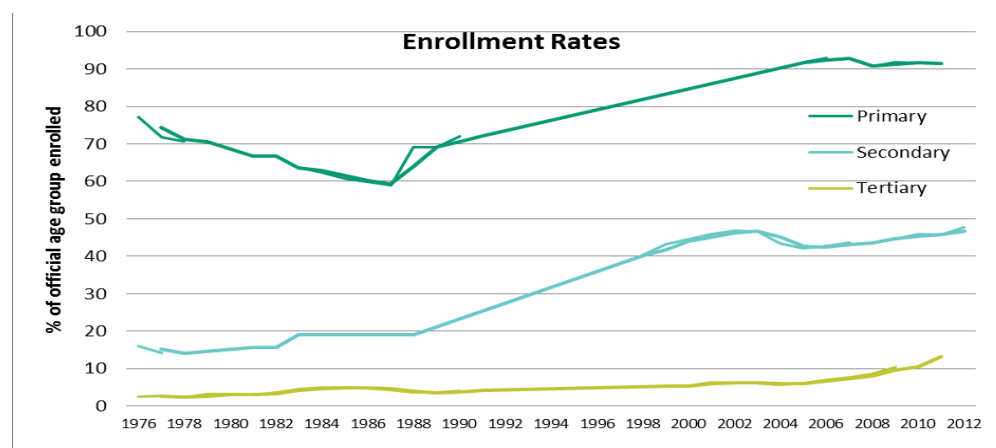[23] Seeding Fertile Ground: Education that works for Bangladesh, World Bank, September 2013

24 Enrollment rates are the total number of pupils enrolled in a particular level of education expressed as percentage of the corresponding population of the same eligible official age group. Essentially it is the percentage of the total number of children of a particular age group that are enrolled in school

Primary Education Enrollment: This is the ratio of children of the official primary school age who are enrolled in primary school to the total population of the official primary school age. After Bangladesh's independence in 1971, the enrolment in primary schools increased significantly as there was a number of development projects and the government provided incentives to set up more schools and encourage enrolment. The programmes became effective after the late 80's and enrolment rate has been increasing since then. These initiatives included stipend programs, media promotion, creation of village based schools and recruitment of female teachers. Other focused and substantive initiatives by the government such as distribution of free textbooks up to the secondary level, holding public examinations and announcing results within a specified time also helped in increasing primary enrollment rates.

Secondary Education Enrollment: This is the ratio of children of the official secondary school age who are enrolled in secondary school to the population of the official secondary school age. Secondary enrolment during the late 1970s to late 1980s period was relatively low because there primary students who would not continue to secondary levels. This changed in early 1990s with secondary level enrollment increasingly sharply. Since 2008, programmes such as the Secondary Education Quality and Access Enhancement Project have aimed to improve the quality of secondary education and achieve access and equity across the country Net Enrolment Rates for Tertiary Education

Tertiary Education Enrollment: This is the total number of students enrolled at public and private tertiary education institutions. Tertiary education enrollment remained low till the mid-2000s due to minimal level of funding for research, labs, equipment, computers, books or electronic journals, and infrastructure maintenance for improvement of teaching, learning and research. There was also a lack of an appropriate funding mechanism to encourage basic and applied research in the universities. However since the mid-2000s these issues started being addressed with positive results and an increase in enrollment rates.

9.2.2   Survival Rates to last grade for Primary and Secondary[25]

Survival Rates are the percentage of the pupils who entered in the first grade of a given level of education that continue till the last grade. While large numbers of students do fail to complete their primary education, data indicates that a substantial number continue in non-formal or unregistered schools. Low primary survival rates can be due to the high opportunity cost of sending one's child to school. However, it is interesting to note that higher secondary education survival rates across Bangladesh indicate higher rates than expected.
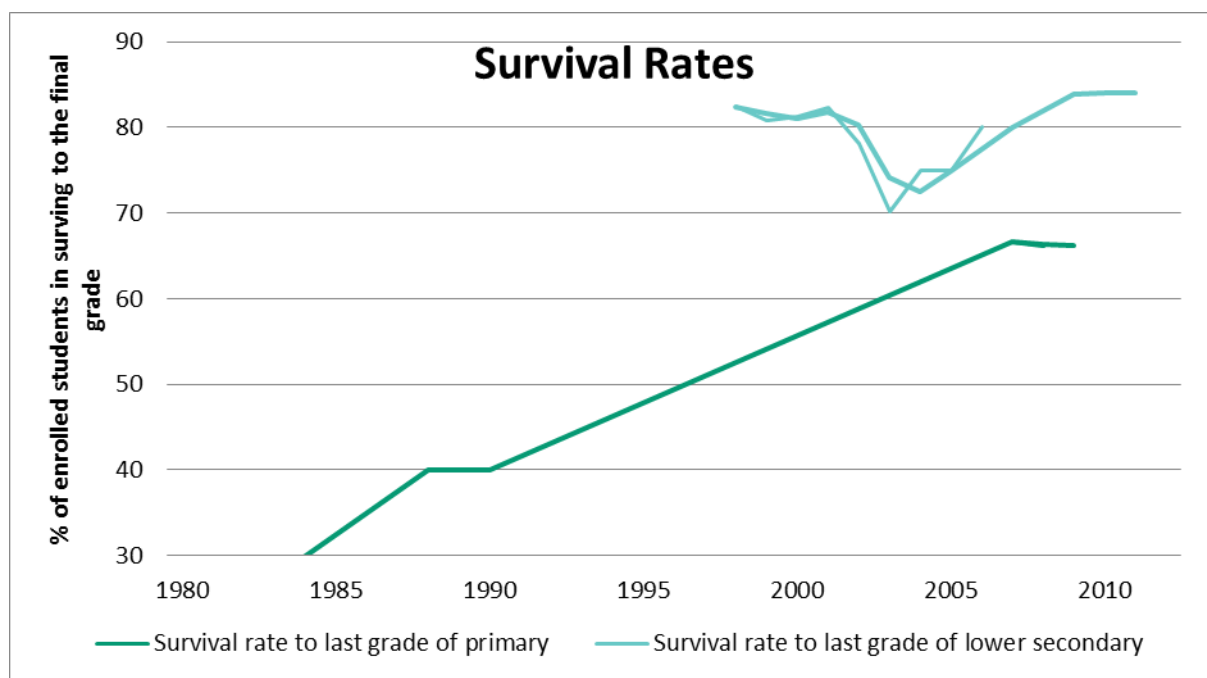
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[25] Ministry of Education

Figure 19: Survival Rates

9.2.3 Gross Tertiary Graduation Rates

The Gross Tertiary Graduation rate is the total number of graduates in tertiary ISCED 5A programmes (first degree) expressed as a percentage of the total population of the age where they theoretically finish the most common first degree programme.
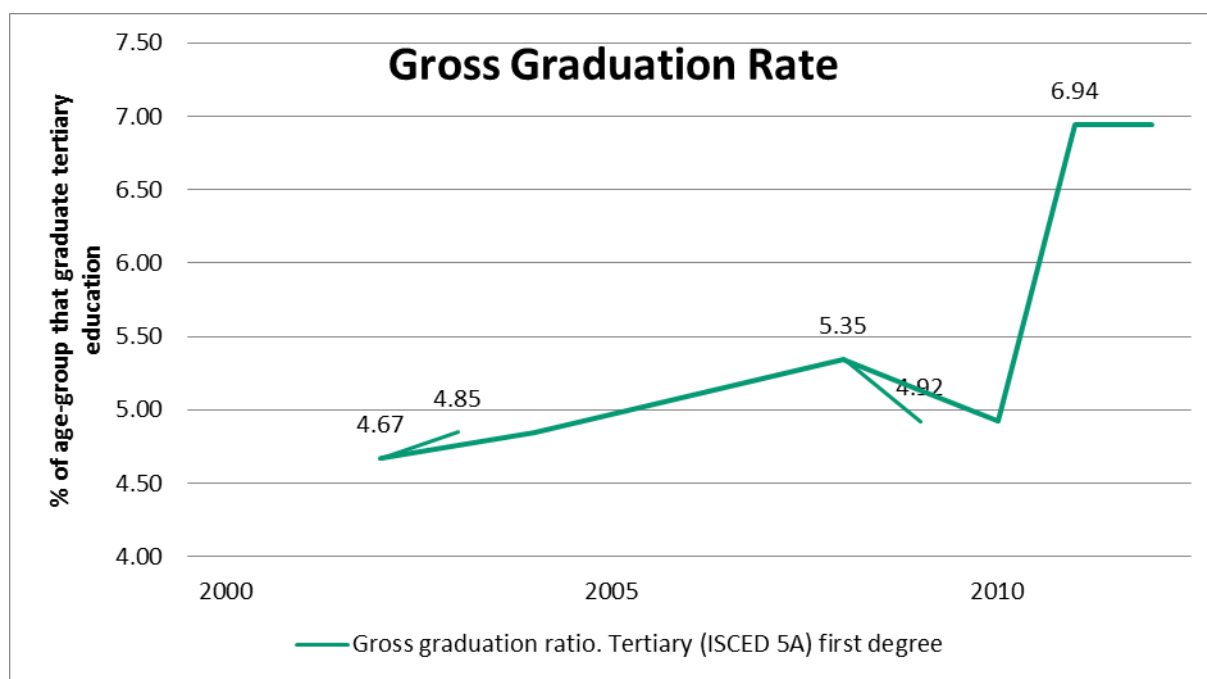

Figure 20: Graduation Rates

This low gross graduation rate for tertiary education has unfortunate implications for labour market linkages as this indicate that highly skilled or highly educated graduates are a very small portion of the total population of the comparable age range.

10 Forecasts and Models

The aim of the BDP 2100 is to look at long term (30 to 50 years if not more) forecast based on modelling exercises. The tasks within the remit of the baseline studies have been to record such forecasts. However, given the context in Bangladesh, this is a key challenge faced by the team. If we look back at the policy and action plan exercises in Bangladesh, since independence the long term outlook, or rather the medium term outlook came into place only recently with the emergence of five year planning exercise. In this sense, Planning Commission was the first institution to have brought about a significant change in Bangladesh's strategic vision. Before this the concept of looking ahead beyond a year was non-existent. Following on the five year planning path and beyond, several action plans and policies are being redesigned with the view of looking at long term planning. While this is a positive step, there are yet to be rich forecasting exercises that are in place, with the exception of recent forecasts done on population. There is clearly a need for strong investments in relation to carrying out such forecasting exercises to ensure that the long-term plans and policies such the BDP2100 to be backed by considerable data and forecasts.

Despite this key challenge, the team examined and analysed what currently exists within the remit of key drivers, some of the key findings and observations are outlined below.

10.1 Publically Available Models

Given the breadth and depth of technical expertise required it was not deemed probable that publically accessible forecasting models would be available. In our research and numerous consultations with experts and key focal points for knowledge sharing in the Bangladesh Delta Plan 2100 project it was found that this was indeed the case.

10.2 Public/Government Forecasting Models with Limited Access

General Economic Division, Planning Commission, Government of Bangladesh: In accordance with the Planning Commission's mandate and the General Economics Division has worked closely with the World Bank on a number of modelling strategy papers dealing with macroeconomic frameworks. For GED's SMPEP project, the Policy Research Institute (PRI) created and (currently maintains) an input/output model which uses forecasting methodology to assess economic benefits of major government decisions and policies. Furthermore this input/output model was recently updated. GED has also worked closely with UNDESA to identify and develop forecasting methodologies and models that are planned for implementation in the near future. In addition to this, in connection with the Sixth Five year plan (SYFP) prepared by GED, a centre piece behind the strategies is the delineation of the country's macroeconomic outlook during SFYP. Based on the technical framework, background studies and related work, the analysis provides three scenarios of macroeconomic outlook. These have been supplemented by sectoral outlooks as well as employment and poverty implications. This is by far the only projection as such which can be used as a foundation for scenario development within the remit of BDP2100.

The technical framework within SYFP includes scenarios using four linked models as outlined below[26]:

- **A macro-economic framework** containing five accounts delineating the economy to generate consistent macro-economic outlook over 2003 to 2015 period.

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[26] 6th Five Year Plan FY2011-2015, Accelerating growth and reducing poverty, GED, Planning commission, Results of the dynamic CGE model of Bangladesh

- **A dynamic computable general equilibrium (DCGE) model** based on an updated input-output table and a social accounting matrix for Bangladesh for FY07. The key outcomes of the macroeconomic framework are fed into the DCGE model to derive the sectoral implications.
- **An employment Satellite Matrix (ESM),** constructed for FY07. The sectoral value additions and outputs are linked with the ESM to calculate sectoral employment impacts under alternative scenarios.
- The **Distribution and Poverty** has been developed using the information of Household Income and Expenditure survey (HIES) 2005. Household income, consumption and sectoral price information generated in the DCGE are linked with this module to assess the poverty situation

Further to this a Macroeconomic Framework (MEF) has been developed to assist the preparation of short and medium term macroeconomic outlook for SFYP. The MEF architecture is best described as an extension of the 'Finance Programming' family of models. The MEF extends the characteristics of the Finance Programming Model by incorporating an explicit specification of output generation that takes into account production and factor market behaviour, incorporation of response parameters for key behaviours. It accounts for the linkages of production with money and credit, the balance of payments, and the government budget. The system has an integrated distribution and poverty module for examining the linkage between growth and poverty, which further extends MEF analytical capability. The key features within MEF which could be a basis for scenario development within BDP2100 are:

- The MEF consists of five accounts: (i) real side (ii) fiscal (iii) money and credits (iv) balance of payments and (v) poverty and distribution. In addition to these blocks, a debt block is appended to capture debt dynamics.
- Behavioural specifications for some key variables namely the production function; revenue functions; capital formation; private investment function; private consumption; CPI etc are defined. Real income generation is specified by a Cobb-Douglas function. Real private consumption, real private investment, CPI, real exports and imports are specified using estimated response parameters.
- There are three ways of estimating the parameters of individual equations of the specified model. The choices are: (i) econometric/statistical estimation, (ii) exact computation/calibration, (iii) a mixture of econometric and calibrated estimates. In MEF, parameters of the framework are specified using a mixture of econometric and calibrated estimates.
- All accounts are inter-linked. Inter dependence between variables of difference blocks namely between real side and government budget, government budget, money and BoP; money and real side are active. For instance, domestic revenue generation critically depends on two components: (i) revenue base and (ii) tax rate. The normal growth of revenue base depends on the growth of the economy i.e. the revenue base is linked to the estimated GDP and import values.[27]

The macroeconomic framework for the SFYP has been used to generate consistent macro-economic projections for the plan period. A dynamic computable general equilibrium (DCGE) model, based on and updated input-output table and a social accounting matrix (SAM) for Bangladesh for FY07, has been used to derive the sectoral implications of the macro projections considered in SFYP. The key outcomes of the macroeconomic framework are linked to the DCGE model. Furthermore, and Employment Satellite Matrix (ESM), constructed for FY07 has been linked to the sectoral output growth derived from the DGE model to generate the sectoral employment impacts.

The reason for employing a dynamic CGE model is due to fact that a dynamic CGE model is capable of capturing the growth effects to policy reforms. The inability of the static CGE model to account for growth effects make them inadequate for long-run analysis of the economic policies. They exclude accumulation effects and do not allow the study of transition path of an economy where short run policy impacts are likely to be different from those of the long-run. To overcome this limitation we use a sequential dynamic CGE model. This needs to be strongly considered

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[27] SANEM, Findings from consultation meeting, January 2015 and quoted from SYFP 2011-2015

within the BDP 2100 scenario development processes and also operational vision of GED in the long term. This kind of dynamics will not be the result of inter-temporal optimization by economic agents. Instead, these agents have myopic behaviour. It is a series of static CGE models that are linked between periods by updating procedures for exogenous and endogenous variables. Capital stock is updated endogenously with a capital accumulation equation, whereas population (and total labour supply) is updated exogenously between periods. Also other variables such as public expenditure, transfers, technological change or debt accumulation are updates over time. The sequential dynamic CGE model has two major modules: static module and dynamic module. Descriptions of the static and dynamic modules of the model are presented in the annexes of the Five year plan. .

Ministry of Finance: The Economic Research Division of the Ministry of Finance maintains a macroeconomic forecasting model that is said to use a growth accounting framework methodology. However access to ERD is restricted and obtaining further information is contingent on receiving the proper Government Clearances and Letters.[28]

Bangladesh Bank[29]: Bangladesh Bank does maintain a simple excel based forecasting model however as their mandate is focused on maintaining monetary stability their efforts are focused on ARIMA (autoregressive integrated moving average) Models that are used to forecast inflation. However Bangladesh Bank does intend to build a DSGE (Dynamic stochastic general equilibrium) Model in the near future. Bangladesh Bank's current excel based GDP forecasting model uses dis-aggregated broad sector data (i.e. what ISIC Rev 4. refers to as Sections, e.g. "Agriculture, forestry and fishing" is one section or broad sector and "Mining and quarrying" is another section or broad sector). Each of the different sectors' trends are assessed using simple OLS regression tools and then given appropriate weights are incorporated into the consolidated model that is used to estimate GDP trends.

10.3 Private Forecasting Models with Restricted Access

PRI: The Policy Research Institute maintains a forecasting model linked to an input/output model for which results are publically available. Access to the actual model is highly restricted and PRI is understandably unwilling to share access permissions without the proper government mandate.

10.4 Knowledge Gaps

Based on currently available forecasting models on one hand and based on data for some important indicators only available at BSS on a national scale, the following knowledge gaps have been identified:

- Long run (20 to 25 years) macro-economic forecasting models (including economic sectors on a 1-digit level or more)
- Annual figures on GDP (total and a breakdown into economic sectors (15+) on division level
- Annual figures on employment (total and a breakdown into economic sectors (15+) on division level
- Annual figures on un-employment by division

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[28] Ministry of Finance, findings from consultation meeting, 2014
[29] Bangladesh Bank, findings from consultation meeting, 2014

Part III: Connecting the Dots- Policies and Management

The review of existing plans is an important area so as to ensure that some of the key elements of the plans are taken into consideration within the BDP2100. Furthermore, it also provides an opportunity to engage key stakeholders within this context, and also provide a more holistic overview when designing specific recommendations for the BDP2100 final document. It is important to note here that not all plans in relation to the drivers have been covered here due to the specific focus and also in order to avoid repetition.

11   Analysis of Policies & Plan

Based on drivers/factors presented above, an assessment of existing plans which are related to the socio-economic issues was undertaken. The review of existing plans is an important area so as to ensure that some of the key elements of the plans are taken into consideration within the BDP2100. Furthermore, it also provides an opportunity to engage key stakeholders within this context, and also provide an indication of key areas that should be covered within the broader context of socioeconomic assessment. It is important to note here that given that there are 19 thematic studies under the umbrella of BDP 2100, and given that socio-economic area is a crossed cutting and overlapping area, we have assessed very specific policies and plans without repeating the assessments carried out in other studies. This is true in case of areas such as agriculture (covered in Agriculture and food security baselines study),

11.1 Drivers relevance to Strategy

Policies and plans within the context of each drivers/factors were assessed comprehensively. The selected policies and plans within this context include:

Table 8 Policies and plans

Drivers/Factors	Policies/Plans
Economic Growth	Labour Law 2006, Labour Policy 2012, Sixth Five Year Plan 2010-15, Perspective Plan of Bangladesh (2010-2021):
Economic Composition	Industrial Policy, 2010, National Agricultural Policy30
Poverty	Poverty Reduction Strategy Paper (PRSP), 2013/Sixth Five year plan FY2011-FY2015
Education	Bangladesh National Education Policy, 2010

Attempts were made to assess the following questions:

- What are the key areas of relevance within the plan?
- How does the plan take into account long term developments? Are scenarios used?
- Does the plan provide an integrated approach, making links to other sectors and plans?
- Is the plan financially sustainable?
- Is the plan socially acceptable? Has the plan been developed including all relevant stakeholders?

It is important to note here that with regards to:

- Long term planning and scenarios are non-existent in almost all plans reviewed and the reasons for this has been outlined in the previous section.
- Majority of the plans (relevant in case of the plans reviewed in this document) are not backed by financial sustainability plans rather they take a more indicative form and laying out actions that each line ministry/agencies are ought to carry forward
- Social assessments of the plans again remains to be a key gap in the policy formulation process in most cases. Although there are several plans which are in place backed with solid social assessments, other plans look into social aspects and stakeholder engagement arenas from a more generic perspective than expected.

11.2 Policy/plans Assessments: Brief Overview

Name of the Policy/Plan	Sixth Five Year Plan, FY 2011-2015, General Economic Division, Planning Commission
Overview	Bangladesh government has drawn up "Vision 2021" program and the Sixth Five Year Plan with a view to raise growth rates to 8 percent by 2015 and further to 10 percent by 2021in line with the objectives to further reduce poverty and achieve the middle-income country status over the next decade. In brief, key objectives within this plan includes a significant step up in the rate of growth of the economy, the promotion of efficiency in the use of resources and improved productivity; strengthening the impulses of modernisation for the achievement of economic and '. technological self-reliance, reduction in the incidence of poverty and unemployment, speedy development of indigenous sources of energy, with proper emphasis on conservation and efficiency in energy use; improving the quality of life of the people in general with special emphasis^ to the economically and socially handicapped population, through a minimum needs programme whose coverage is so designed as to ensure that all parts of the country attain within a prescribed period nationally accepted standards. Additionally, focus is also placed on reduction in inequalities, regional disparities and others. Despite a broad range of focus and overarching visions, the plan does not include a set of action oriented measures that will enable achieving these visions. Having said, however,

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[30] We refer to the baseline study on Agriculture

Name of the Policy/Plan	Sixth Five Year Plan, FY 2011-2015, General Economic Division, Planning Commission
	significant public investment in power, energy, roads, bridges, railways and ports are envisioned. Power generation capacity will increase to 15,457 MW by FY15 and further more in line with the growing demand by FY17. In order to make the growth inclusive in nature, the development strategy emphasizes human development and human capital formation, ensuring food security, poverty alleviation, empowerment of women, coping and mitigating the impacts of climate change, and improvement of governance through reliance on internet based service provision and institutional development. The objectives and strategies underpinning these are appropriately ambitious and implementation of the supporting policies and reforms will be challenging.
Key areas	Another key strategic element of the Sixth Plan is a firm commitment to pursue an environmentally sustainable development process. Natural resources like land and water are limited and their per capita availability is diminishing due to rising population on the one hand and also due to excessive use of common pool resources on the other hand. Excessive and indiscriminate use of our natural common pool resources has degraded them to an unusable state. The degradation of natural resources reduces the well-being of people; especially the poor and women suffer more, as they depend much more on natural common property resources for fuel and water. Thus, the focus of the Sixth Plan's environmental management strategy would be the conservation and maintenance of natural resources, reducing air and water pollution, and liberating encroached rivers, water bodies, forest areas and khas land.
Forecasts	Forecasts of up to five years have been carried out within the Five Year Plan, as outlined in the earlier section. However, improvements are required with regards to how the visions and actions of this plan is connected to the forecasts.
Linkages	Given the holistic and overarching nature of this plan, linkages are made to numerous sectors and plans- however, how actions and measure are carried out to achieve these, is not clear.

Name of the Policy/Plan	**Bangladesh Industrial Policy, 2010**
Overview	The industrial policy envisages an increase in the industry sector's share in GDP to 40 percent by 2021, and seeks to raise the proportion of the workforce employed in industry to 25 percent of the country's total labour force by 2021 from 16 percent now. To ensure the growth and expansion of the industrial sector, the Policy stresses on making available adequate opportunities for establishing both import-substituting industries that will cater for the domestic market and expanding and developing export-oriented ones. To create higher value addition in exports, the policy aims to encourage transforming resource-based export industries into process-based ones. The Policy gives priority to providing the industrial sector with adequate facilities of electricity, gas and water, and other physical infrastructure like road, rail transport and telecommunications which is where we see an increased emphasis on PPP. While this is the case, there are no direct linakge made to various

Name of the Policy/Plan	Bangladesh Industrial Policy, 2010
	infrastructure plans/policies. Agro-based, food processing, and labour-intensive industries is to receive priorities in matters of getting fiscal and other incentives. Steps will be taken to raise investment in the tourism industry and raise its efficiency. The policy further classifies industries into five categories: Large, Medium, Small, Cottage, and Micro. The industrial policy of 2005 classified industries into only three categories: Large, Medium and Small. Cottage and micro industries are new additions in the industry classification under the 2010 Policy. In addition to reclassifying industries, the Policy has given a uniform definition of the size (large, medium, small, and cottage) of Manufacturing and Service industries in terms of both fixed capital and labour employment. The policy includes more industries in the category of 'Service industries', raising their number to 32, from 19 in the 2005 and 5 in the 1999 policy. The number of 'Reserved industries' (industries reserved for only public sector investment), however, remains unchanged at 4 (four) – the same as in the 2005 policy. The number of 'Thrust Sector industries' has been brought down to 32 in the 2010 policy from 33 in the 2005 policy. Thrust sector industries are defined as those industries, which have high growth potential. According to the policy these industries "shall be eligible for special fiscal incentives and supports".
Key areas	The industrial policy of 2011 has introduced a list of 'Regulated industries'. There are 17 industries in the list, which will be regulated due to social concerns over national security or to protect the environment, public health, and national interest. The policy states that there will be specific rulings to ensure appropriate regulations- it is not yet confirmed if there has been any tangible regulations in place to address this. The Industrial Policy 2010 allows the private sector to set up such regulated industries, but only subject to government rules and only upon approval from the government. The proposed Policy provides for special incentives to encourage Women Entrepreneurs. According to the policy, women entrepreneurs, who may either be sole proprietors or hold 51 percent of shares in partnership or joint stock companies, shall be eligible for receiving a set of special incentives in the form of ease in access to finance, and other support services. The proposed industrial policy puts strong emphasis on the protection of the environment and directs manufacturing entities to control environmental pollution by setting up effluent treatment plants (ETPs) and strictly comply with environment-related laws and regulations. This is connected with the Environmental Policy and the Environment law, 1955 where measures to ensure appropriate use of ETP and others to lower waste water discharge is taken.
Forecasts	Whilst the policy sets targets and offers a direction for the industrial growth of the country, it is backed by very little data and forecasts. The ambitious targets do not seem to set against short or long term forecasts.
Linkages	The policy clearly puts emphasis in other areas such as infrastructure and sectors for the growth of the industries. One of the key connections within the policy is the referenc to the PPP processes and the PPP policy which has now been approved.

Name of the Policy/Plan	Bangladesh Labour Act, 2006
Overview	The Labour Act in Bangladesh is the most important labour legislation in the country. Several other legislations exists which regulates and sets standards and restrictions for the labour market. But in 2006, the labour act consolidated 25 separate acts into one labour code. It regulates employment relations, working hours, wages, trade unions and industrial relations. It sets maternity benefits, compensations for injury and accidents, Occupational Safety and Health Standards, the labour inspectorate and prohibits child labour. It also establishes the Wage Board, the Labour Court, the National Council for Industrial Health and Safety, the procedures for industrial disputes including strikes and lockouts. Several provisions of the Labour Act such as regulation of trade unions does not apply to workers in the Export Processing Zones, but are governed under separate laws. Bangladesh has also ratified to the ILO Convention and these include: - ILC 29 (Forced Labour), - ILC 87 (Freedom of Association and Protection of the Right to Organize), - ILC 98 (Right to Organize and Collective Bargaining), - ILC 100 (Equal Remuneration), - ILC 105 (Abolition of Forced Labour), - ILC 111 (Discrimination in Employment and Occupation), and - ILC 182 (Elimination of the Worst Forms of Child Labour).
Key areas	The only core convention not ratified by Bangladesh is ILC 138 (Minimum Age Convention). However, the BLA provides that the minimum age to work is 14 (although a special clause states that children between the ages of 12 and 14 may be employed to do "light work" that does not endanger their health, development and education).
Forecasts	Whilst the policy sets targets and offers a direction, it is backed by no data and forecasts regarding the labour market and other areas.

Name of the Policy/Plan	Foreign Private Investment Promotion and Protection Act, 1980
Overview	The Foreign Private Investment Promotion and Protection Act (FPIPPA) of 1980 is the core law which enables the Government to regulate FDI entry but its scope and coverage are too limited. Also, the latest Industrial Policy (2010) establishes 17 "controlled industries" in which a proposed foreign investment requires approval of the relevant ministry. This list includes backbone industries such as hydrocarbons and electricity/infrastructure which typically account as garments and pharmaceuticals and more recently in telecommunications. While FDI entry policy is implemented at the industry level, negative attitudes towards foreign investment in one industry affect the overall perception of whether Bangladesh is open and welcoming to FDI. The FPIPPA provides fair and equitable treatment for foreign investors, the usual protections in relation to expropriation and, in conjunction with regulations of the central bank, provisions for foreign exchange. This is backed by 29 bilateral investment treaties (BITs). FPIPPA covers may restrict repatriation of divestment proceeds by restricting them to net asset value. A new favourably.
Forecasts	Whilst the policy sets targets and offers a direction, it is backed by very little data and

	forecasts regarding the investment levels within the country.

Name of the Policy/Plan	**Perspective Plan of Bangladesh (2010-2021)**
Overview	Making Vision 2021 a Reality" is a strategic articulation of the development vision, mission, and goals of the Government in achieving a prosperous Bangladesh grounded in political and economic freedoms a reality in 2021, 50th year of Bangladesh's independence. Specific strategies and the task of implementation are being articulated through the two five-year plans: Sixth Five Year Plan (2011-2015) as outlined in the earlier and the Seventh Five Year Plan (2016-2020). Development priorities of the Perspective Plan are outlined from the vision statement formulated to take Bangladesh to where it ought to be in the year 2021, given its human potential and natural resource endowments. Those development priorities include: - ensuring broad-based growth and reducing poverty; - ensuring effective governance and sound institutions but creating a caring society - addressing globalization and regional cooperation; - providing energy security for development and welfare; - building a sound infrastructure and managing the urban challenge; - mitigating the impacts of climate change; and - promoting innovation in a knowledge-based society.
Forecasts	Whilst the policy sets targets and offers a direction, it is backed by very little data and forecasts of any form.

Name of the Policy/Plan	**National Education Policy 2010**
Overview	The National Education Policy, approved by the National Parliament in December, 2010, provided a framework for fulfilling the role of the educational system in the nation's human resource development. The NEP emphasizes enrolling all students in primary education, raising literacy levels, narrowing disparities, and improving the quality of education with a focus on teacher quality, school level leadership, more effective application of teacher training in the classroom, more resources for the education sector, targeting improvements, and monitoring key results. The government's emphasis is on English, information and communication technology, science, and mathematics. Under the Sixth Five-Year Plan, FY2011–FY2015, the government's main objective is to reverse the low completion rates at all levels.4 A related goal is to reduce the gap between rich and poor, particularly in post-primary levels. Improving education quality, particularly in secondary school, is central to addressing these objectives and will require improved infrastructure; sufficient teachers, particularly in peripheral areas; more recruitment of female teachers; better teaching and learning aids; greater use of computers; training in information and communication technology; the establishment of technical schools in upazilas (subdistricts);curriculum improvement; the modernization of madrasah education; and improved teacher development.

Key areas	A key recommendation of the policy is providing pre-primary education (PPE) for all children and extending compulsory education to grade 8 within the next decade. It also foresees common core curricula and minimum standards of provision for different types of primary and secondary level institutions. It proposes that teachers' recruitment, training, professional development and remuneration should be key elements of the strategy to improve quality of education. A consolidated education law is proposed as the legal framework for education management in line with purposes of the policy (GOB 2010).
Forecasts	Whilst the policy sets targets and offers a direction, it is backed by very little data and forecasts regarding the education providers and levels of education.
Linkages	N/A

12   ecommendations: The Road Ahead

12.1 Backdrop

The following recommendations have been outlined based on the assessment of the factors/drivers as outlined in the above sections. In addition to this, attempts have been made to propose recommendations that are in line with the vision of embracing a long term and strategic direction for Bangladesh and the post-millennium development agenda.

It is important to note that the following recommendations have been designed specifically to ensure they are in line with the overall national vision of Government of Bangladesh. Given that the upcoming five year plan aims to be more action oriented and introduce the culture of strategic direction, the below recommendations should act as a sub component or component of these.

The initial draft of Post MDG targets play a critical role in terms of the design of these recommendations outlined below. As outlined in the RIO20+, Sustainable Development Goals (SDG) is accompanied by targets and will be further elaborated through indicators focused on measurable outcomes. As outlined in the recent reports, these goals aim to be action oriented, global in nature and universally applicable. The goals and targets further integrate economic, social and environmental aspects and recognize their inter linkages in achieving sustainable development in all its dimensions[31]. While we have outlined the post-MDG goals below, not all our recommendations cover all of the goals outlined below and will require deeper assessments to create clear linkages. Therefore, the recommendations outlined below should be an indication or a starting point for further assessments required to do justice to effective and output oriented outcomes at the backdrop of national strategic and planning processes.

Post MDG goals

Goal 1. End poverty in all its forms everywhere

Goal 2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture

Goal 3. Ensure healthy lives and promote well-being for all at all ages

Goal 4. Ensure inclusive and equitable quality education promote life-long learning opportunities for all

Goal 5. Achieve gender equality and empower all women and girls

Goal 6. Ensure availability and sustainable management of water and sanitation for all

Goal 7. Ensure access to affordable, reliable, sustainable, and modern energy for all

Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Goal 10. Reduce inequality within and among countries

Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable

Goal 12. Ensure sustainable consumption and production patterns

Goal 13. Take urgent action to combat climate change and its impacts*

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[31] Introduction to the proposal of the open working group for SDG, July, 2014

12.2 Recommendations

Stimulation of growth poles

As can be seen from the historical trends and future projections, population growth is a major issue within the country and the policy remit; however population management remains to be also a critical area to focus upon. As more and more, rural to urban migration takes places, concentrated cities or key hotspots such as Dhaka move beyond their existing capacity.

There have been a number of assessments in relation to growth poles in Bangladesh. One of the key areas of recommended intervention has been to increase concentration of economic activities in specific areas beyond the concentrated locations/key hubs such as Dhaka and Chittagong. While this is a valid area of intervention that the Government of Bangladesh needs to focus upon, it is important to note that the concentration of economic activity into growth poles does not necessarily bring agglomeration effects and productivity gains. Concentration may increase the possibility of agglomeration but coordination between economic agents may be required for this potential to be realized. In this regard, there needs to be effective coordination strategies as coordination failures may prevent strategic complementarities between agents due to information asymmetries. In in context of Bangladesh, the government can seek to address the underlying coordination failures- this is chiefly required in complementary investments in infrastructure, targeted skills development or the establishment/strengthening of more effective institutions for the coordination of activities.

Consequently, if this arena of growth poles needs to be taken forward within the long term planning process and consequent annual development plans- an integrated approach (across sectors, space and time) focusing on the delivery of basic services in areas with actual or demonstrated growth potential, creating synergies with existing projects, optimizing the utilization of new infrastructure, forging public-private partnerships and leveraging private and public sector investments.

A national level overview and design of a growth pole strategy in this regard is required that covers targeted interventions and focused investments in strategic locations (ranging from the remaining key divisions or beyond) within the country. The selection of strategic locations would rely heavily on regional development planning and spatial analysis to help focus investments and achieve cross-sectoral integration and re-alignment of projects (if needed) to maximize impact. We can already see potential areas such Khulna, Rajshahi, Sylhet as potential starters where connectivity is improving and trade activities can be stimulated significantly.

Theory of growth poles: The key idea of the growth poles theory is that economic development, or growth, is varied over an entire region, and it takes place around a specific pole (or cluster) or areas. This pole is often characterized by

core (key) industries around which linked industries develop, mainly through direct and indirect effects or linkages. Core industries can involve a wide variety of sectors such as automotive, agribusiness, electronics, steel, etc.[32] For a country such as Bangladesh, the key issue is to examine specific areas where there already exists economies of scale, or potential advantages of location for development of specific sectors. Further exploration of downstream and upstream linked industries will need to be undertaken. The expansion of the core industry such as those outlined above implies the expansion of output, employment, related investments, as well as new technologies and new industrial sectors. In this regard transportation will play a critical role in terms of connectivity such as areas of investment on areas such as in land terminals, infrastructure connectivity and regional integration is crucial.

Investments in Infrastructure

A number of research and assessments have now established that infrastructure is a key prerequisite for sustained growth within an economy. Studies based on panel data combining industrial and developing countries suggest that a 1 percent increase in physical infrastructure stocks, given other variables, temporarily raises GDP growth by as much as 1-2 percentage points. The growth acceleration gradually tapers off as the economy approaches its long-run per capita income. In addition to this, numerous assessments have now concluded that appropriate provision of infrastructure, by raising labour productivity and lowering production and transaction costs, are beneficial for economic growth. As a result, investments on infrastructure have become a significant tool for South Asian economies in the recent times. Not only has it also proven to reduce poverty and raise standards of living, at the same time, investments in transport, water, sanitation, irrigation, telecommunications and energy clearly improves the welfare of the poor simply by providing access to basic needs.

In 2013, the World Bank estimated that Bangladesh needs to invest USD 74 to USD 100 billion in infrastructure until 2020. In terms of GDP, if infrastructure investments are spread evenly over the years, Bangladesh needs to invest between 7.4 to 10 percent per year. The infrastructure gap within Bangladesh needs to be addressed urgently- as noted in World Bank assessments "a mix of investing in infrastructure stock and implementing supportive reforms will enable Bangladesh to close its infrastructure gap".

It is here that the role of private sector becomes critical- we have seen significant engagement of private in a vast range of sectors, specifically the energy and telecommunication sector has seen private sector engagement in finance, technology and management. However, in critical areas such as transport, water and other forms of infrastructure, the engagement of private sector needs to be enhanced. With the Public Private Partnership arena coming into the forefront in Bangladesh, backed by a policy, a coordination body among others, there are attempts to engage private sector through PPP modalities. However, this engagement can be further strengthened through transparent regulation only. An on-going assessment by the BDP 2100 team reveals that although the largest private sector in Bangladesh have the interest, mandate and level of commitment to invest in infrastructure, the lack of transparency in corresponding public sector agencies deter them from such engagement. Further to this, they require concrete government support and corresponding protection measures for investment.

It is clear that the key issue to be addressed is prioritisation and clear commitment from the government. In terms of financial allocation, there is a clear need to increase the allocation on infrastructure given its role in bringing about sustained economic growth. A firm commitment to ensure efficiency and transparency in PPP modalities through establishing clear regulatory actions will no doubt provide the Bangladeshi private sector to engage.

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[32] https://people.hofstra.edu/geotrans/eng/ch2en/conc2en/growthpoles.html

Expansion on indicators on country's performance

Bangladesh economy has been growing at a rate of 5% over the last two decades, and GDP, as in other South Asian countries, has become a key indicator of country's performance and achievement. While this has stimulated various sectors and actors to move forward and build on attaining further growth, the GDP indicator in itself has been to a great extent superficially applauded and celebrated. For example, job creation has been termed in every planning and policy documents, but the transition to high value added jobs or "skilled" jobs have not been explored. In 2000, manufacturing sector of Bangladesh far exceeded the value contribution to GDP than agriculture making a huge mark in terms of shift to high value added sector focus- however, the assessments on various component of GDP and employment as outlined in this report clearly indicate that Bangladesh is yet to have a strong and diversified manufacturing base, which requires significant diversification of sectors, corresponding skills development, technology and removal of policy induced, and supply side constraints.

It is also important to note that while GDP is growing in Bangladesh the income inequality and wealth gap remains to be significantly unimpressive. According to Sixth Five Year Plan, there are approximately 47 million people living under the poverty line despite in reduction of poverty by half in the last 40 years. Firstly, the measure for poverty head count is highly underestimated as evidenced by numerous research. Secondly, while growth has presumably reached a "sustained" stage in Bangladesh, other aspects of poverty such as education, health, and basic infrastructure remain to be serious issues that need to be considered.

Economic diversification from a narrow base to productive diversification has been a need for the economy for the last decade, however, instruments to ensure such transition can take place has not moved beyond policy documents. It has been argued that linkages with various plans and policies will address this issue- but the country faces challenges in two folds one, in terms of actual execution of policies and secondly prioritization of basic infrastructure to and enabling environment to open up that diversification road. The focus on GDP is a positive indicator for the country's performance, but in order to move forward in a national level, the Government needs to expand the set of indicators that do justice to the "health "of the economy. In this regard, areas such as quality or levels of jobs, contribution of high value added sectors should be added to stimulate national interest to strive for a more ambitious vision.

Regional integration

Regional integration has become a key issue within South Asia. Numerous evidence based assessments have revealed that greater regional integrations within South Asia is imperative specifically for promotion of growth and poverty alleviation. One of the key areas that have come in the fore front in regional conferences on economic and trade is the need for intra-regional trade in agricultural and food products. Additionally integration in terms of trade and transport facilitation is a requirement for increasing the competitiveness of the country to trade globally. Against this backdrop, despite the political areas in relation to neighbouring countries, some attempts for integration needs to be established from an economic and trade perspective.

Despite numerous limitations SAFTA, it is important to take stock of its achievements and move beyond SAFTA and underpin key requirements such as intra-SAARC tarrif structures, rules of origin, effective financial instruments that can stimulate such integration processes. Regional integration is not a one-off area and needs to be taken forward and nurtured through underpinning the above and also exploring appropriate "trade "focused partnerships with neighbouring countries notwithstanding the existing political tensions.

Focus on social protection

One of the greatest challenges before Bangladesh remains to be poverty and tackling such significant portion of poverty incidence requires a short, medium and long term planning processes. As outlined within our assessment, there are various factors that further strengthen the poverty cycle making it harder to break- however; there is

enough evidence to suggest that the social protection programs and interventions have a pivotal role in cutting down poverty significantly.

Background research suggests that social protection interventions have expanded to a great extent in Bangladesh. According to data the allocation for social protection has increased from 133,713.5 million taka in 2009 to 253,713.5 million depicting a rise by more than 83%. But, the corresponding budget allocation has declined from 1.85% to 1.67% during this same period.[33] If a long term perspective is embraced within the country, the focus on social protection is instrumental to address the inequality gap and growing number of under provilaged population that are in need for appropriate safety net measures and social protection. Social protection services also needs to addressed through the perspective of linking the labour force participation (LFP) specifically for the case of women- this is

backed by the fact that although sufficient data suggests that women LFP has been on the rise, the coverage of LFP needs to address key areas such child care services, health service accessibility and old age dependency. In addition to this, social protection programs may have expanded in the past decade, but the key limitation has been the lack of coverage- majority of the programs which are on-going through government funds and donor support are targeted purely towards the rural population. However, if we look at the poverty incidence data as outlined in PART II of this report, the incidence of poverty remains to be the highest in urban areas due to increased rural to urban migration. In addition to this, due to increased concentration of industrial and manufacturing activities within the urban centers, the jobs are pulling significant population who earn less than $1.25-2/day. This has in turn led to increased slums and population of poor within the urban centres.

Another key area which has been underpinned in the social protection draft strategy is looking into the life cycle within the social protection arena- provision of services from child birth to insurance moving on to pension schemes. While the document covers all aspects such as primary stipend, secondary stipend, widow, disability, freedom fighters, among others, the coverage of expenditure in this relation remains to be poor. There is a definite need to ensure that this coverage is addressed urgently backed by solid awareness and visibility campaigns.

Education and skills development

Whilst Bangladesh has achieved impressive growth in both enrolment and completion re medium-term perspective, high priority must be given to training and development of the human resource base. There must be a focus on developing a population base that is motivated and able to create new businesses and another with the technical skills required by the growth sectors.

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[33] SANEM, Thinking Aloud, Vol 1, Issue 3, August 2014

While there are numerous skills development institutions in Bangladesh, either they lack quality and resource or they have no linkages with the private sector which creates the jobs. If a long term strategic action oriented plan is to be taken forward to tackle poverty and skills, the key focus must be placed on improving the capacity of these institutions and establishing clear linkages with private sector and institutions. Given the sectoral overview presented in the economic sectors section, it is worth mentioning that there should be considerations places on establishing employer sectoral alliances which is also best done in countries in which there are at least one or two industry sectors which are experiencing growth and which have some medium-large companies- for Bangladesh there are multiple sectors that are experiencing considerable growth. The alliances are also more likely to flourish if they build on an existing body which has the capacity and willingness to expand its purpose and activities (e.g. a trade association or chamber). Specialist training providers may be members of a sectoral alliance. Depending on the needs, sectoral alliances may fulfil the role of producer of labour market intelligence (LMI), developer of occupational standards and training programmes, manager of apprenticeship training scheme, quality assurance agency, certification body, employment services agency, micro-financier and disseminator of careers information, all focused solely on a single sector.

A broad based programme on improving the capacity of these institutions and stimulation of private sector to establish linkages could be an effective mechanism to address this issue. This would certainly require large scale expenditure and funding but the long term outcomes of this can be truly effective. In addition to expenditure, in these programs some key lessons must be captured, among others these include:

- Education systems must become more comprehensive and linked to the labour market, so that secondary school graduates have both the academic and practical skills which small businesses or self-employment require.
- Bangladesh economy is characterised by a significant informal economy and informal apprenticeship and this informal apprenticeship training must be recognised as this is the route to becoming skilled which most young people follow and is one in which the mainstream TVET system currently has little or no role.
- Guidance for young people on jobs and the labour market must be available at all stages of the education system;

While Bangladesh has introduced a series of policies, including education, these policies must recognise and nurture the entrepreneurial talent which exists in the informal labour market.[34]

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[34] Adapted from Engaging Private Sector in Skills development, Muriel Dunbar

Project Factsheets

Employment Project Factsheet(s)

1. **Sector**: Employment
2. **Name of the Project:** BD Private Sector Development
3. **Type: Development project – short term**
4. **Status:** Active, March 1 2011- June 30 2016
5. **Location:** South Asia Bangladesh
6. **Objective**: The objective of the Private Sector Development Support Project for Bangladesh is to facilitate investment in growth centers in the emerging manufacturing and services sectors of the economy with the aim of generating employment
7. **Project Description**: The project has three components: a) capacity building of government institutions; b) Public Investment Facility (PIF) to finance off-site, last-mile infrastructure to facilitate the licensing and development of private-sector led economic zones, starting with the Kaliakor Hi-Tech Park (KHTP) and extending to other zone projects. The project will also meet resettlement compensation where applicable; and c) Business linkages, product and process improvement of local firms supplying to or situated in the economic zones to build better linkages between firms within the zones and related suppliers by providing training, improving skills in the labor pool, quality standards and certification of local firms.
8. **Benefits: Improvement in capacity for employment**
9. **Implementing Agency:** Ministry of Finance
10. **Costs:** $140.41 million
11. **Priority assigned by respective implementing agency: High**

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1. **Sector:** Employment
2. **Name of the Project**: National Leveraging ICT Growth, Employment and Governance Project
3. **Type: Development project – short term**
4. **Status**: Active. Project approved in September 20, 2012.
5. **Location:** South Asia, Bangladesh
6. **Objectives:** To catalyze the growth of Bangladesh's IT and IT-Enabled Services (IT/ITES) industry for employment creation and export diversification; and establish basic e-government foundations to support public sector modernization.
7. **Project description:** There are three components to the project. The first component is IT/ITES industry development. This component will increase the competitiveness of Bangladesh's IT/ITES industry by increasing the quantity and quality of skills, awareness and perception of the country. The second component is e-government. This component will provide critical e-government technological foundations to support public sector modernization and the e-government agenda for the years ahead, and build the human capacity to leverage technology within government. The third component is project management support. This component will support the creation and functioning of the Project Coordination Unit (PCU), hire the required specialists, and support its operational needs.
8. **Implementing agency:** Ministry of Science and ICT
9. **Cost:** $ 70 million
10. **Priority assigned by respective implementing agency: High**

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1. **Sector:** Employement
2. **Name of the Project:** Better Work Bangladesh
3. **Type: Development Project – medium term**
4. **Status**: The program has started in 2014.
5. **Location:** Bangladesh

6. **Objectives:** To improve compliance with labour standards and promote competitiveness in global supply chains, in particular in labour intensive industries.
7. **Project description:** The program will provide assessments of factory compliance with national law and core international labour standards, paired with transparent public reporting on findings. The programme will also provide advisory services to factories, concentrating on building worker/management dialogue to improve working conditions and competitiveness, and engage with national partners to promote sectoral changes, including effective industrial relations. Given the current array of efforts in the country focused on improving working conditions, Better Work Bangladesh will work collaboratively with other organizations and programmes already providing high-quality services in order to avoid duplication of efforts.
8. **Implementing agency:** United States Department of Labor
9. **Cost: TBD**
10. **Priority assigned by respective implementing agency: High**

Education Project Factsheet(s)

1. **Sector:** Education
2. **Name of the Project**: BD Higher Education Quality Enhancement Project - AF
3. **Type: short term**
4. **Status**: Active. The project is approved in December 3, 2013 and is expected to be completed by Dec 31, 2018.
5. **Location:** South Asia, Bangladesh
6. **Objectives:** The development objective of the Additional Financing (AF) for Higher Education Quality Enhancement Project for Bangladesh is to improve the quality and relevance of the teaching and research environment in higher education institutions through encouraging both innovation and accountability within universities and by enhancing the technical and institutional capacity of the higher education sector.
7. **Project description:** The AF will support five components, including the original four components as follows: (i) promoting academic innovation; (ii) building institutional capacity; (iii) raising the connectivity capacity of the higher education sector; (iv) establishment of quality assurance mechanism and (v) project management, communication, monitoring and evaluation. The AF and restructuring will also entail: (i) changes in results framework to reflect revised and new activities and (ii) a change in the project closing date to the December 31, 2018.
8. **Implementing agency:** Ministry of Education
9. **Cost:** US$ 146.20 million
10. **Priority assigned by respective implementing agency:**

1. **Sector:** Education
2. **Name of the Project**: Secondary Education Quality and Access Enhancement Project- AF
3. **Type: short-term**
4. **Status**: Active. Project approved in December 3, 2013.
5. **Location:** South Asia, Bangladesh
6. **Objectives:** The development objective of the Additional Financing (AF) for Secondary Education Quality and Access Enhancement Project (SEQAEP) for Bangladesh is to improve quality of education and monitor learning outcomes systematically, and to increase access and equity in project upazilas.
7. **Project description** The AF will: (i) extend the current SEQAEP project to December 2017 and implement the expanded project activities (across more schools and for more students within SEQAEP upizilas) to deepen the impact of a well-performing project; (ii) initiate replication of successful activities in 90 additional upazilas for national roll-out of successful SEQAEP interventions; and (iii) allow adequate time for the Ministry of Education (MOE) to evaluate and institutionalize successful interventions from the ongoing project under a more harmonized secondary education sector program that the Government of Bangladesh (GOB) is planning to initiate by 2018.

8. **Benefits:**
9. **Implementing agency:** Ministry of Education
10. **Cost:** US$ 280.00 million
11. **Priority assigned by respective implementing agency:**

Population Project Fact Sheet

1. **Sector:** Population
2. **Name of the Project:** Health Population and Nutrition Sector Development Program (HPNSDP)
3. **Type: Development- short term**
4. **Status**: On-going. Project Duration: 2011 to 2016
5. **Location:** Bangladesh
6. **Objectives:** To stimulate demand and improve access to and utilization of HPN services in order to reduce morbidity and mortality; reduce population growth rate and improve nutritional status, especially of women and children**.**
7. **Project description:** HPNSDP is the third sector-wide program for overall improvement of health, population and nutrition sub-sectors to stimulate demand and improve access to and utilization of HPN services by focusing the issue of maternal, neonatal, child and adolescent health, a new Operational Plan (OP) is being implemented under DGHS and continuous skill and capacity development training to the service providers.
8. **Implementing agency:** Ministry of Health and Family Welfare (MOHFW), Government of Bangladesh (GOB)
9. **Cost:** US$ 7.7 billion
10. **Priority assigned by respective implementing agency:**

Poverty Project Factsheet(s)

1. **Sector:** Poverty
2. **Name of the Project**: Bangladesh Safety Net Systems for the Poorest Project
3. **Type: short term**
4. **Status**: Active. The project is approved in June 26, 2013 and is expected to be completed by December 31, 2017.
5. **Location:** South Asia, Bangladesh
6. **Objectives:** The objective of the safety Net Systems for the Poorest Project for Bangladesh is to improve the equity and transparency of major social safety net programs to benefit the poorest households.
7. **Project description**: The proposed project includes three components: (i) support to five safety net programs by financing a portion of program costs in line with progress against a set of Disbursement Linked Indicators; (ii) strengthening of Ministry of Disaster Management and Relief (MoDMR) program administration and transparency; and (iii) development of the Bangladesh Poverty Database. The first component will reimburse the Government of Bangladesh for results, while the other two components will be seen as a financing instrument for the inputs needed to achieve the results under first component. Second and third components will finance all inputs such as personnel, design of IT systems as well as hardware, monitoring systems, vehicles and other equipment, consultants, and incremental operating costs
8. **Implementing agency:** Department of Disaster Management & Bangladesh Bureau of Statistics
9. **Cost:** US$ 2672.00 million
10. **Priority assigned by respective implementing agency:**

1. **Sector:** Poverty
2. **Name of the Project:** INSPIRED
3. **Type: Development- Short term**
4. **Status**: On-going.-
5. **Location:** Bangladesh
6. **Objectives:** To develop SMEs in Bangladesh - SMEs are Small And Medium Sized Enterprises - the driving force behind modern economies.

7. **Project description:** The project aims to deliver a multi- sectoral and inter-ministerial national strategy and action plan for SME development, provide a SME Competitiveness Grant Scheme of €6.5m to Business Intermediary Organisations, support clusters by using value chain development initiatives that seek to increase SME competitiveness in agreed sectors and provide capacity building to business intermediary organisations (BIOs) and support Bangladesh bank training institutions for the benefit of the entire banking industry by providing training courses for bank staff on providing appropriate banking services to SMEs.
8. **Implementing agency:** Ministry of Industries
9. **Cost: TBD**
10. **Priority assigned by respective implementing agency:**

1. **Sector:** Poverty
2. **Name of the Project:** Poverty Reduction through Inclusive and Sustainable Markets (PRISM) In Bangladesh
3. **Type: Short term**
4. **Status**: In Planning
5. **Location:** Bangladesh
6. **Objectives:** The objective of the project is to enhance the competitiveness of cottage and small enterprises in order to provide increased job opportunities in targeted areas and sectors.
7. **Project description**: Component 1: Development and Implementation of Pro-poor Economic Development Projects in the SMCI Sector. Component 2: Increasing Supply and Quality of Vocational and Technical Training Support to the SMCI Sector. Component 3: Strengthening the Capacity of BSCIC and Other Business Intermediaries (BIOs) Active in the Area of SMCI Support. Component 4: Improving the Quality of Institutional and Policy Support Provided to the SMCI Sector
8. **Implementing agency:** European Union
9. **Cost:** EUR 32.49 million
10. **Priority assigned by respective implementing agency:**

Agriculture Project Factsheet(s)

1. **Sector:** Agriculture
2. **Name of the Project**: National Agricultural Technology Project - Additional Financing
3. **Type: Short term**
4. **Status**: Active. Project approved in March 2014.
5. **Location:** South Asia, Bangladesh
6. **Objectives:** The development objective of the National Agricultural Technology Project (NATP) for Bangladesh is to improve the effectiveness of the NAT system in Bangladesh.
7. **Project description:** It is an extension of NATP-1 that involves (a) aligning the closing date of NATP-I to match with that of the grant additional financing (September 30, 2016); (b) integrating the baseline and target values of performance indicators of the grant into the Results Framework of NATP-I; slightly adjusting the number of intermediate indicators to be limited to the most relevant ones and upgrading those target values considered to be underestimated based on current achievements; (c) reallocating Credit proceeds by category of expenditure to reflect current NATP-I needs;(d) including an additional expenditure category for "unallocated" to ensure uninterrupted implementation of activities between completion of phase-1 and initiation of phase-2.
8. **Benefits:** The project will build on lessons learned and good practices emerging from NATP and similar other programs in the sector to better address farmer expectations and to achieve longer term impacts.
9. **Implementing agency:** Ministry of Agriculture of Agriculture/Fisheries and Livestock
10. **Cost:** US$ 23.72 million
11. **Priority assigned by respective implementing agency:**

1. **Sector**: Agriculture
2. **Name of the Project**: Integrated Agriculture Productivity Project

3. **Type: Short term**
4. **Status**: On-going. Project Duration: September 2011-August 2015.
5. **Location :**South Asia, Bangladesh
6. **Objectives:** The overall objective of the IAPP is to sustainably enhance productivity of agriculture (crop, livestock and fisheries) in two agro-ecologically constrained and economically depressed areas — Rangpur and Barisal.
7. **Project description**: The IAPP has 4 components: (i) Technology Generation; (ii) Technology Adoption; (iii) Water Management; and (iv) Technical Assistance for Capacity Development (referred to as IAPP TA). The first 3 components are referred to as the 'direct investment' components
8. **Benefits:**
9. **Implementing agency:** Ministry of Agriculture and the Ministry of Fisheries and Livestock and are supervised by the World Bank
10. **Cost:** $ 63.55 million
11. **Priority assigned by respective implementing agency:**

13   References

1. Sixth Five Year Plan FY 2011-FY2015, Accelerating Growth and Reducing Poverty, Planning Commission, Ministry of Planning, People's Republic of Bangladesh
2. Sixth Five Year Plan FY 2011-FY2015, Accelerating Growth and Reducing Poverty, Planning Commission, Ministry of Planning, People's Republic of Bangladesh
3. Bangladesh Buraue of Statistics
4. http://worldpopulationreview.com/countries/bangladesh-population/
5. World Directory of Minorities and Indigenous Peoples - Bangladesh : Biharis; http://www.refworld.org/docid/49749d58c.html
6. Bangladesh Bank
7. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in constant U.S. dollars. Dollar figures for GDP are converted from domestic currencies using 2005 official exchange rates.
8. Ahmed, S and Sattar Z (2004). Trade Liberalization, Growth and Poverty Reduction: The Case of Bangladesh. Washington, D.C., World Bank.
9. During the 1990s, the overall decline in poverty in Bangladesh as a whole (9.0%) was greater than in either urban (8.3%) or rural (8.2%) areas because (i) the share of population living in urban areas increased significantly during the period, and (ii) the incidence of poverty in urban areas was considerably lower than in rural areas.
10. Poverty Reduction and the World Bank: Progress in Fiscal 1998, World Bank, Page 879, 1999 Publication
11. The poverty gap is the mean shortfall from the poverty line (counting the non-poor as having zero shortfall), expressed as a percentage of the poverty line. This measure reflects the depth of poverty as well as its incidence.
12. Poverty Trends In Bangladesh During The Nineties, World Bank, 2006
13. Seeding Fertile Ground: Education that works for Bangladesh, World Bank, September 2013
14. Enrollment rates are the total number of pupils enrolled in a particular level of education expressed as percentage of the corresponding population of the same eligible official age group. Essentially it is the percentage of the total number of children of a particular age group that are enrolled in school
15. Ministry of Education
16. 6th Five Year Plan FY2011-2015, Accelerating growth and reducing poverty, GED, Planning commission, Results of the dynamic CGE model of Bangladesh

17. SANEM, Findings from consultation meeting, January 2015 and quoted from SYFP 2011-2015
18. Ministry of Finance, findings from consultation meeting, 2014
19. Bangladesh Bank, findings from consultation meeting, 2014
20. We refer to the baseline study on Agriculture
21. Introduction to the proposal of the open working group for SDG, July, 2014
22. https://people.hofstra.edu/geotrans/eng/ch2en/conc2en/growthpoles.html
23. SANEM, Thinking Aloud, Vol 1, Issue 3, August 2014
24. Adapted from Engaging Private Sector in Skills development, Muriel Dunbar

Annex 1. GDP per capita (in BDT and annual growth rate), population growth rate, GDP growth rate (in current and in constant 1995/6 prices)

Year	in BDT in current prices GDP/capita in BDT current prices	annual growth in %	population growth in %	BDT current prices GDP growth in %	in BDT in constant 1995/6 prices GDP/capita in BDT constant prices	annual growth in %	population growth in %	BDT constant 1995/6 prices GDP growth in %
1970	651				12,380			
1971	621	-4.58%	1.99%	-2.68%	11,473	-7.32%	1.99%	-5.48%
1972	549	-11.63%	1.63%	-10.19%	9,712	-15.35%	1.63%	-13.97%
1973	902	64.33%	1.49%	66.77%	9,888	1.81%	1.49%	3.33%
1974	1,406	55.88%	1.62%	58.41%	10,663	7.84%	1.62%	9.59%
1975	2,389	69.88%	1.95%	73.19%	10,032	-5.92%	1.95%	-4.09%
1976	2,032	-14.94%	2.32%	-12.97%	10,359	3.26%	2.32%	5.66%
1977	1,968	-3.16%	2.62%	-0.62%	10,365	0.05%	2.62%	2.67%
1978	2,574	30.83%	2.81%	34.50%	10,795	4.15%	2.81%	7.07%
1979	2,952	14.69%	2.86%	17.97%	10,999	1.89%	2.86%	4.80%
1980	3,403	15.28%	2.81%	18.52%	10,785	-1.94%	2.81%	0.82%
1981	3,800	11.66%	2.75%	14.73%	10,896	1.03%	2.75%	3.80%
1982	4,155	9.33%	2.71%	12.29%	10,861	-0.32%	2.71%	2.38%
1983	4,567	9.92%	2.69%	12.87%	11,001	1.29%	2.69%	4.02%
1984	5,335	16.81%	2.69%	19.96%	11,268	2.43%	2.69%	5.18%
1985	5,960	11.71%	2.71%	14.73%	11,325	0.50%	2.71%	3.22%
1986	6,533	9.61%	2.72%	12.59%	11,494	1.49%	2.72%	4.25%
1987	7,315	11.98%	2.71%	15.02%	11,608	0.99%	2.71%	3.73%
1988	7,832	7.07%	2.67%	9.92%	11,550	-0.50%	2.67%	2.16%
1989	8,500	8.52%	2.59%	11.33%	11,553	0.02%	2.59%	2.61%
1990	9,343	9.92%	2.49%	12.65%	11,942	3.37%	2.49%	5.94%
1991	10,053	7.60%	2.37%	10.16%	12,055	0.94%	2.37%	3.34%
1992	10,633	5.76%	2.27%	8.17%	12,381	2.71%	2.27%	5.04%
1993	10,911	2.62%	2.19%	4.87%	12,669	2.33%	2.19%	4.57%
1994	11,537	5.74%	2.15%	8.01%	12,909	1.89%	2.15%	4.08%
1995	12,724	10.28%	2.13%	12.63%	13,262	2.74%	2.13%	4.93%
1996	13,588	6.80%	2.11%	9.05%	13,588	2.46%	2.11%	4.62%
1997	14,462	6.43%	2.08%	8.64%	14,029	3.24%	2.08%	5.39%
1998	15,703	8.58%	2.03%	10.78%	14,469	3.14%	2.03%	5.23%
1999	16,904	7.65%	1.95%	9.75%	14,883	2.86%	1.95%	4.87%
2000	17,909	5.94%	1.86%	7.91%	15,480	4.01%	1.86%	5.94%
2001	18,819	5.08%	1.77%	6.94%	16,012	3.44%	1.77%	5.27%
2002	19,941	5.96%	1.69%	7.75%	16,442	2.68%	1.69%	4.42%
2003	21,596	8.30%	1.59%	10.02%	17,035	3.61%	1.59%	5.26%
2004	23,576	9.17%	1.47%	10.78%	17,840	4.73%	1.47%	6.27%
2005	25,899	9.85%	1.35%	11.33%	18,652	4.55%	1.35%	5.96%
2006	28,697	10.80%	1.21%	12.14%	19,650	5.35%	1.21%	6.63%
2007	32,260	12.42%	1.10%	13.65%	20,687	5.27%	1.10%	6.43%
2008	36,887	14.34%	1.03%	15.52%	21,743	5.10%	1.03%	6.19%
2009	41,123	11.48%	1.04%	12.64%	22,755	4.66%	1.04%	5.74%
2010	45,944	11.72%	1.09%	12.94%	23,877	4.93%	1.09%	6.07%
2011	52,119	13.44%	1.15%	14.75%	25,189	5.50%	1.15%	6.71%
2012	59,352	13.88%	1.20%	15.24%	26,442	4.97%	1.20%	6.23%
2013	66,285	11.68%	1.23%	13.05%	27,697	4.74%	1.23%	6.03%

Annex 2. Sectoral Shares in GDP and Growth Rates

Sectoral Share of GDP (%) at current market prices

	Industrial Origin Sector	1979-80	1984-85	1989-90	1994-95	1999-000	2004-05	2009-10
1	Agriculture and Forestry	27.66	28.93	25.8	20.33	18.85	15.15	14.98
i)	Crops & horticulture	22.34	24.17	20.01	15.12	14.1	11.19	11.22
ii)	Animal farming	4.1	3.42	3.85	3.31	2.89	2.34	2.42
iii)	Forest and related services	1.22	1.34	1.93	1.9	1.86	1.62	1.34
2	Fishing	3.1	3.08	3.62	5	5.77	4.17	3.61
3	Mining and Quarrying	0.47	0.55	0.82	1.01	0.97	1.09	1.21
i)	Natural gas and crude petroleum	0.14	0.26	0.53	0.61	0.54	0.62	0.6
ii)	Other mining & quarrying	0.34	0.3	0.29	0.41	0.44	0.47	0.61
4	Manufacturing	13.48	13.83	12.74	14.72	14.69	15.86	17.89
i)	Large & medium scale	9.48	9.81	9.01	10.51	10.52	11.2	12.64
ii)	Small scale	4	4.02	3.74	4.21	4.18	4.66	5.24
5	Electricity, Water Supply and Gas	0.47	0.97	1.51	1.49	1.3	1.32	1.07
i)	Electricity	0.38	0.86	1.36	1.25	1.09	1.1	0.87
ii)	Gas	0.04	0.07	0.1	0.17	0.14	0.14	0.13
iii)	Water	0.05	0.05	0.05	0.06	0.06	0.08	0.07
6	Construction	5.69	5.59	5.8	6.36	7.43	7.84	8.29
7	Wholesale and Retail Trade	12.59	12.87	11.94	12.37	12.32	13.56	14.94
8	Hotel and Restaurants	0.56	0.59	0.57	0.58	0.62	0.68	0.77
9	Transport, Storage and Communication	10.38	9.94	9.66	8.87	8.33	10.33	10.7
i)	Land transport	6.57	6.5	6.65	6.25	6.1	7.92	8.07
ii)	Water transport	3.29	2.75	2.2	1.49	1.05	0.81	0.63
iii)	Air transport	0.07	0.13	0.16	0.16	0.16	0.13	0.09
iv)	Support transport services, storage	0.22	0.27	0.26	0.35	0.33	0.32	0.29
v)	Post and telecommunication	0.23	0.29	0.39	0.62	0.69	1.16	1.63
10	Financial Intermediations	1.28	1.25	1.34	1.47	1.54	1.6	1.83
i)	Bank (Monetary Intermediation)	1.14	1.13	1.13	1.27	1.19	1.2	1.35
ii)	Insurance	0.15	0.13	0.19	0.17	0.28	0.34	0.4
iii)	Others (Financial Intermediation)	0	0	0.02	0.03	0.07	0.06	0.08
11	Real Estate, Renting and Business Activities	8.49	7.2	8.3	8.59	8.92	8.02	6.8
12	Public Administration and Defense	1.37	1.51	1.99	2.42	2.63	2.6	2.79
13	Education	1.93	1.84	1.83	2.01	2.27	2.37	2.67
14	Health and Social Works	2.27	2.13	2.22	2.22	2.27	2.19	2.26
15	Community, Social and Personal Services	7.75	7.39	9.1	8.57	8.59	9.14	10.2

	(based on constant prices 1995-1996) Industrial Origin Sector	REAL ANNUAL GROWTH RATE in %					
		1979-80 1984-85	1984-85 1989-90	1989-90 1994-95	1994-95 1999-000	1999-000 2004-05	2004-05 2009-10
1	Agriculture and Forestry	2.60	2.45	0.27	3.86	2.85	5.49
i)	Crops & horticulture	2.66	2.53	-0.45	4.06	2.17	4.45
ii)	Animal farming	2.01	2.18	2.38	2.63	4.84	4.18
iii)	Forest and related services	3.11	2.23	2.82	4.42	4.69	5.36
2	Fishing	3.04	1.63	7.86	8.56	1.31	4.09
3	Mining and Quarrying	8.26	8.95	6.35	5.54	7.49	9.03
i)	Natural gas and crude petroleum	16.05	14.01	7.62	4.48	9.13	8.62
ii)	Other mining & quarrying	3.72	4.02	4.63	7.04	5.17	9.67
4	Manufacturing	4.68	5.23	8.19	5.58	6.84	8.16
i)	Large & medium scale	4.38	5.38	8.40	5.47	6.58	8.17
ii)	Small scale	5.41	4.86	7.69	5.83	7.46	8.13
5	Electricity, Water Supply and Gas	14.79	11.53	6.52	4.41	8.20	5.92
i)	Electricity	15.66	13.13	5.71	4.46	8.08	5.54
ii)	Gas	12.60	2.62	11.89	3.81	7.80	8.08
iii)	Water	8.40	4.84	10.53	5.12	11.28	7.36
6	Construction	6.43	5.58	6.22	8.81	8.38	6.54
7	Wholesale and Retail Trade	4.64	4.35	5.35	5.98	6.55	6.74
8	Hotel and Restaurants	3.76	4.48	4.98	6.01	7.02	7.54
9	Transport, Storage and Communication	5.56	3.74	3.45	5.66	7.09	8.05
i)	Land transport	6.43	4.33	4.02	6.12	6.00	4.80
ii)	Water transport	2.29	0.68	-2.26	0.02	0.62	1.94
iii)	Air transport	23.76	12.80	0.98	8.20	-2.37	5.97
iv)	Support transport services, storage	10.13	4.58	8.53	6.19	2.48	8.25
v)	Post and telecommunication	9.32	9.54	15.88	11.59	22.27	20.04
10	Financial Intermediations	3.63	3.74	4.32	5.24	6.96	9.44
i)	Bank (Monetary Intermediation)	3.91	2.43	4.72	3.10	6.24	9.08
ii)	Insurance	1.36	10.96	0.50	14.53	10.48	10.11
iii)	Others (Financial Intermediation)	-	124.16	13.58	20.48	3.91	12.44
11	Real Estate, Renting and Business Activities	3.19	3.19	3.34	3.68	3.52	3.78
12	Public Administration and Defense	5.96	7.89	8.01	5.44	6.42	7.62
13	Education	2.90	1.91	6.05	6.15	7.58	8.62
14	Health and Social Works	2.47	2.99	3.90	4.11	5.88	7.55
15	Community, Social and Personal Services	2.39	2.51	2.72	2.89	3.54	4.54

Annex 3. GDP Current Prices in BDT (Billions) for 1970-2013.

TABLE B: GDP in current prices (BDT in billion)

	GDP current prices		GDP current prices
	BDT in billion		**BDT in billion**
1970	43	**1993**	1,254
1971	42	**1994**	1,354
1972	38	**1995**	1,525
1973	63	**1996**	1,663
1974	100	**1997**	1,807
1975	173	**1998**	2,002
1976	150	**1999**	2,197
1977	149	**2000**	2,371
1978	201	**2001**	2,535
1979	237	**2002**	2,732
1980	281	**2003**	3,006
1981	322	**2004**	3,330
1982	362	**2005**	3,707
1983	408	**2006**	4,157
1984	490	**2007**	4,725
1985	562	**2008**	5,458
1986	633	**2009**	6,148
1987	728	**2010**	6,943
1988	800	**2011**	7,967
1989	891	**2012**	9,181
1990	1,003	**2013**	10,380
1991	1,105		
1992	1,195		

Source: BBS

BASELINE STUDY: 21

Socioeconomic Characteristics of Chittagong Hill Tracts

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Executive Summary: Study 21

Chittagong Hill Tracts is a unique region in Bangladesh, differing ethnically, culturally, and topographically from other parts of the country. The diverse region extends over 13,295 square kilometres, or 10% of the country's land area. The population of CHT is 1.66 million (2011 Census) which includes twelve ethnic communities with unique cultures and traditions. The region has rich natural and environmental resources with hills, forests, rivers, and lakes, and a diverse flora and fauna. The scenic beauty of the hilly region is outstanding. The ecosystem plays an important role in economic development and environmental protection of the local community. An area of 319,614 ha of land is occupied by the forest in the CHT, which is about 40% of Bangladesh's forest area. The forest also plays a significant role in biodiversity conservation, erosion prevention, maintaining of water quality, reducing the severity of floods, and regulating water flow.

Despite possessing huge natural resources, the CHT has remained one of the most disadvantaged and poorest areas in the country. The region is lagging behind in development activities, food security, health and education, infrastructure and electricity and credit facilities. According to a survey conducted in 2009, the incidence of poverty in the CHT is about 60%, much higher than the national average of 31%, and some of Bangladesh's poorest are found in this region. In fact, the Bandarban district in the CHT is one of the three poorest districts in Bangladesh. Even after the huge development efforts that followed the signing of the peace accord in 1997, a large part of the CHT remains physically and socioeconomically backward, much of which may be attributed to the rugged and inaccessible terrain in the area.

Although recent developments have brought considerable improvement, much remains to be done. Many studies and projects have been carried out in the CHT with assistance from the development partner countries, but the situation has not reached to a satisfactory level. The Bangladesh Delta Plan 2100 prepared this baseline study on the CHT with the broad objective of presenting the existing situation of the region, and identifying some solutions for possible improvement, including socio-economy, food security, agriculture, water supply, environment, governance, etc.

The CHT Peace Pccord was signed in 1997, "*with an objective to elevate political, social, cultural, educational and financial rights and to expedite socio-economic development process of all citizens in CHT.*" Unfortunately, it has failed to ensure the social harmony crucially needed for social and economic development in the area. Grievances are still aplenty in the area for the full implementation of the peace accord. Also, some suggestions were given to the Planning Commission by the relevant ministry to include in the 7th Five Year Plan certain critical issued of the CHT including land rights, better access to education, empowering of ethnic communities, human resources development and better job market, micro-finance activities, tourism development, improvement of water supply and sanitary condition, etc.

Over the past few decades, there has been highpopulation growth in the CHT. In fact, the population has increased by more than 300% between 1971 and 2011, compared to 96% in Bangladesh overall. This increased population is putting much pressure on the natural resources and also on the people themselves in terms of housing, employment, agriculture, water supply, sanitation, and the overall environment. While the national average of availability of safe drinking water from tube well is 89%, the figure is just 49% for the CHT. Similarly, sanitation facility is not satisfactory in CHT; only 9% people get water-sealed toilets, while 48% households use non-sanitary latrines. In Bandarban district, alarmingly, 37% population do not use any toilet.

The educational statistics is also not good; it is lower in case of CHT; 44% against 56% nationally.

The 1997 Peace Accord was signed to install permanent peace in the CHT region. Accordingly, a special administrative system has been established with the Ministry of CHT Affairs (MoCHTA), CHT Regional Council (CHTRC) and three Hill District Councils (HDCs). MoCHTA with a full-pledged Minister from among the indigenous peoples constitutes a part

of the Cabinet in the government. MoCHTA mainly deals with the issues relating to CHT, apart from its routine responsibilities. Though there have been sharp contentions of differences between the government and regional council, respective laws for the councils have been formulated and introduced but these laws are yet to be made functional to their fullest by formulating regulations while repelling the conflicting sections of the other existing laws to make them compatible to the later laws.

Like the other regions in the country, the climate plays an important role for the production of agricultural crops and vegetation in the CHT. But extreme climatic factors increase environmental hazards like landslides, droughts and soil erosion. Heavy rainfall damages crops in the field and washes out the top soil nutrient from barren land. The erratic behaviour of rainfall distribution poses a threat for timely agricultural crop production. Droughts hamper crop production with reduction in yield level. Its severity reduces the amount of available water for domestic and drinking purposes and puts the community in a more vulnerable situation. The climate in the Chittagong Hill Tracts is tropical monsoon. The total mean annual rainfall varies from 2400-3800 mm in the CHT. The Bandarban district experiences the highest rainfall. The wet season rainfall is approximately 70-80% of the annual total and the dry season rainfall varies from 18-24%.Annual temperatures vary from 10° to 35°C. A mean minimum temperature of 24°C is experienced during the months of December to January and a maximum temperature of 34°C during March to May. Thunderstorms usually occur in April followed by rain.

Food security is a crucial indicator of livelihood for any people. Food security in the CHT at the household level is largely determined by individual farm level production in a subsistence economy. In the CHT, households cannot meet both ends with their farm level production; for example, the people have to buy rice, the main staple, from the market during certain lean periods of the year. Food deficiency in the CHT in general, is met by net imports from outside the CHT and suppressed consumption. Rice is the main staple food for the hill people. Current level of rice production in the region falls short of the demand to the extent of 13 percent. The prevalence of stunting, underweight and wasting among children under five years is 42.2%, 34.1% and 7.3% respectively. The poor water and sanitation conditions compound the vulnerability of children to morbidity and mortality from diarrhoea and other preventable diseases. Certain sections of the population, such as female-headed households, marginal farmers, households with many children and the elderly, are considered most vulnerable in terms of food and nutrition.

Chittagong Hill Tracts' economy is mostly dominated by agriculture. The land is characterized by the traditional shifting 'slash-and-burn' cultivation, known as *Jum*, practiced for thousands of years by the indigenous *Pahari* population (hill people). The authorities tried to improve the hill peoples' lifestyle by introducing other forms of cultivation, but *Jum* continues to be the main livelihood for most of the hill people. Now the term agriculture has expanded from plainland crop production to include all forms of proper utilization of natural resources. This relates to the production, development, preservation, processing, marketing, and extension of crops, as well as other agricultural commodities such as fish, meat, egg, and forest products.

When the Kaptai dam was constructed on Karnaphuli River in 1962 for hydroelectric power, an area of about 68,000 ha of the Kaptai Lake was inundated, causing displacement of 20-25% of the indigenous population and flooding 40% of the most fertile arable, alluvial lands.

Land use in Chittagong Hill Tracts may be broadly categorized into four classes including agricultural, non-agricultural, forest and fallow land. Agricultural land includes areas under perennial cultivable lands, *Jum*, annual crops, and single, double and triple crops. Non-agricultural is the area of land that is used for non-agricultural purpose. It also covers the area under settlements and water bodies. Forest land is the one under forest cover. It includes reserved forest areas and private planted forests. Lastly, the land which is not normally cultivated falls under the category of fallow land. Since land is a dominant feature of the CHT, it is necessary to understand the land use pattern for present and future use. Present land use pattern is: Agricultural land 20%, non-agricultural land 6%, forest 38%, and fallow land 36%. Agriculture or cultivation is not possible in large areas of fallow land; this is mainly due to non-availability of water for cultivation, and also because of non-availability of groundwater for irrigation. The

distance to the source of water makes it uneconomic for raising any crop. Different cropping patterns including perennial, *Jum*, annual, single, double and triple define the classification of the agricultural land in CHT.

In addition to *Jum* cultivation and major impacts from the felling of trees for the timber industry, erosion related problems in the CHT have increased due to unsuitable tillage techniques like deep ploughing on hill slopes to grow tuber crops such as arum potato, ginger, and turmeric. Non-local migrants from the plain areas mainly practice these techniques, often without awareness of proper agricultural management methodologies. Soil erosion can lead to increased landslides and flash floods. Also, animal habitats are destroyed, decreasing biodiversity. As sediment and other pollutants enter water bodies, there is a decline in water quality. Decreased dissolved oxygen levels and settling of sediment on fish breeding grounds can disrupt aquatic habitats. Sedimentation can also cause the river bottom rising, which may lead to faster flood times and disrupt navigation of water bodies. Therefore, the need for an integrated approach to natural resource management is evident.

Fishing provides supplemental income and nourishment for many of the people in the Chittagong Hill Tracts. Numerous rivers flow through the hills, bringing fish along with them. Floodplains and *beels*, a local name for fresh water lagoons, also provide habitat for fish. However, at present, an increase in production is unlikely because moderate fishing methods in the short term are required to sustain and nurture a larger fish population; while the fish population has been hurt by continuous overfishing, environmental degradation, lack of proper management, and poor enforcement of fishing regulations. This sharp fall in fish catch may be the result of the destruction of natural fish habitats, and the reasons mentioned above. The natural fish in the rivers and floodplains are fragile and sensitive to changes in environment and habitat.

Water in any part of the country, or for that matter, any part of the world, is indispensable to life and livelihood for the people, and it is no exception for the CHT. In fact, the difficulties associated with the availability of water make it more crucial for the people of CHT. The people depend on different sources of water for drinking, bathing, washing, sanitation and other domestic needs. The main sources of water in the CHT are the surface water from rivers, lakes, canals and springs, and groundwater from both shallow and deep aquifers. The rivers in CHT are mostly secluded and confined in the hilly areas, and not connected to the main river system of the country. Rainwater is another source of water in most of the CHT areas. Though water is an essential item in life, it sometimes creates problems also. Safe water is not always available in the CHT, and as a result, the people suffer from various water-related diseases. Sometimes the diseases are caused by the ignorance of the hill people about proper hygiene.

The demand and availability of water in the CHT are not easy to estimate as there are not much data available and also, the data collection is difficult and expensive. Primary information, as well as different studies and projects carried out by other agencies, were considered to assess the demand, availability, and degree of impact of water scarcity on other natural resources in the region. However, unlike most parts of Bangladesh which has a complicated river networks, the rivers in the CHT are either mostly independent or have one or two tributaries or distributaries.

In order to improve water supply in rural areas (union level) of CHT districts and water supply and drainage system of seven *Pourashavas* (municipalities) of the CHT, the Department of Public Health Engineering (DPHE) carried out a study (DPHE Master Plan 2012) in the CHT in 2012 through a consulting group, which included baseline survey, feasibility study, preparation of Master Plan and investment projects. The objectives of the project were: provision of adequate water supply in urban andruralareas, improvement of drainage for urban areas, and reducing environmental hazards. The project used a demand driven approach to enhance water supply and environmental sanitation facilities to the in-habitants of the hill districts. The report discussed the present situation of water availability, status of drinking water and sanitation, access of sanitation facilities in urban areas, the water supply and sanitation technologies used in the CHT, etc. In addition, the problems/ constraints and some recommendations were given at the end of the report.

Rainfall is the main source of surface water in the CHT. Surface and groundwater resources are reliant on each other. Depending upon climatic conditions and the connection between surface and groundwater, many streams receive a major portion of their flow from groundwater. On the other hand, surface streams can also be the key sources of groundwater recharge. In general, groundwater flows into the surface water bodies in the dry season and surface water enters into the ground during the monsoon. Therefore, use of one source usually affects water availability from other sources. In the overall CHT region, surface water mostly comes from springs, streams, canals, rivers and lakes.

The CHT is very rich in biodiversity, though the situation is worsening with increasing human interventions and encroachments. The negligence of the customary use and management rights of forests has accelerated deforestation. Deforestation is caused by both natural and manmade factors. Encroachment occurs as there is no clear boundary demarcation supported by cadastral maps (showing records of extent, value and ownership of lands). No data is available on the encroachment of the forest areas of the CHT. The government declared the natural forests of the hilly areas as protected areas, game sanctuaries and national parks in order to preserve biodiversity. The National Environment Policy, declared in 1992, has a clear mandate for the enhancement of biodiversity, but it is yet to be implemented fully. Measures should be taken to preserve local knowledge and to implement techniques of natural resource management. A joint effort of the government agencies and involvement from the local people is essential to improve the situation and protect biodiversity.

An integral part of Bangladesh Delta Plan is holding of workshops with experts and stakeholders to share knowledge and jointly develop ideas; these workshops are known as Delta Ateliers. These ideas, comments and other forms of contributions are gathered and put forward to face the challenges and ultimately strengthen the output of the Delta Plan. For Chittagong Hill Tracts, a series of Delta Ateliers were organised in five locations in greater Chittagong area in early September 2015. The ateliers (workshops) were attended by over 200 participants/representatives of the region. During the workshops, the people from the region were invited to share their knowledge on key issues and the potential solutions. In order to identify the strategies as part of a 50 to 100 year plan for the country, different 'hot spot' areas in the CHT region were identified, and discussions were held for arriving at a solution. Though a large range of issues (e.g. natural disasters, water supply and sanitation, biodiversity and environment, governance, infrastructure and tourism, etc) were discussed, the core issue remained unresolved; the land and water management system, as a whole, was not functioning in a sustainable way. The reason may be attributed to high population, uncertain land rights issues, unsustainable tree plantation, current climate variable regime (more extremes are expected under climate change), low operation and maintenance budgets, poor coordination between local, district and national government result in landslides, sedimentation, breaching embankments, etc. Coordination between these branches of the government (local, district and national levels) should be ensured for all possible solutions in the area.

Chittagong Hill Tracts faces some unique challenges which are different to those in the rest of the country because of its special socio-cultural and geographic situation. The livelihoods of the people in the CHT are more dependent on economic and environmental changes than those in the plain lands. Remoteness and poor accessibility, poor infrastructure and social and economic services, and rapid socioeconomic changes are big challenges for sustainable development in the CHT. On top of this, the impacts of climate change without adequate measures to support adaptation only augment the existing problems. Over last few decades, some progress has been made, but the expected benefits in terms of socioeconomic development and environmental protection are yet to take shape. The problems and challenges standing in the way of a meaningful development may be listed under – poverty, population pressure, poor accessibility and infrastructure, unemployment and dependence on agriculture, landlessness, deforestation, climate change impact, lack of safe water supply and poor sanitation, etc.

Opportunities: It is imperative to give immediate attention to the already deteriorating and degrading situation of the CHT for its rehabilitation and sustainability. Problems were not created overnight, but due to long negligence and lack of implementation of many projects has only added up to the problems. However, during the past few decades, there

was substantial overall rural development that have changed significantly due to globalization, and increased the connectivity of the rural population. The mobile and internet technologies and the building of new roads only helped to improve the potential of progress in CHT. Remote villages are now connected to national, regional, and global markets. Subsistence farming like *jum* is being replaced by more modern methods to cultivate cash crops. Diversification of livelihood and value chains for rural products would reduce dependence on agriculture.

1.   Introduction

1.1.   Background

The Chittagong Hill Tracts (CHT) is situated in the south-eastern corner of Bangladesh and is characterized by extensive hilly areas, a large number of scattered springs and mountain streamlets. The territorial boundary of the region is: Arakan State of Myanmar and the Mizoram state of India on the east, Tripura state of India on the north, Chittagong District on the west, and Cox's Bazar district on the south. The CHT region is as high as over 4,000 feet in certain areas, the hill ranges contain limited cultivable lands that distinctly vary from the fertile multi-yield alluvial plains of the rest of the country.

Chittagong Hill Tracts is a unique region in Bangladesh, differing ethnically, culturally, and topographically from other regions of the country. The diverse region extends over 13,295 square kilometres, or 10% of the country's land area. The population of CHT is 1.66 million (2011 Census) which includes twelve ethnic communities with unique cultures and traditions. The region has rich natural and environmental resources with hills, forests, rivers, and lakes, and a diverse flora and fauna. The scenic beauty of the hilly region is also outstanding. The CHT ecosystem plays an important role in economic development and environmental protection of the local community. An area of 319,614 ha of land is occupied by the forest in the CHT, which is about 40% of Bangladesh's forest area. The forests also play a significant role in biodiversity conservation, erosion prevention, maintaining of water quality, reducing the severity of floods, and regulating water flow.

Despite possessing huge natural resources in the area, the CHT has remained one of the most disadvantaged and poorest regions in the country. The region is lagging behind in development activities, food security, health and education, infrastructure and electricity and credit facilities (Zohir 2011; Sen 2014). According to a survey conducted by Barakat et al. in 2009, the incidence of poverty in the CHT is about 60%, much higher than the national average of 31%, and some of Bangladesh's poorest are found in this region. The Planning Commission lists Bandarban in the CHT as one of the three poorest districts in Bangladesh. Even after the huge development efforts that followed the signing of the peace accord in 1997, much of the CHT remains physically and socioeconomically backward. There are several reasons for this, including the rugged and inaccessible terrain. Although recent developments have brought considerable improvement, much remains to be done.

Bangladesh has just published its 7th Five Year Plan (2015/16 to 2019/20), which has set development goals, identify priority areas, and develop strategies and instruments to guide and influence the country's development. The Planning Commission has commissioned 25 background studies to generate relevant data and information to feed into the Plan, but so far no background paper has been commissioned on the CHT. As a result of its specific geographical, cultural, and social setting, the CHT faces specific challenges and has specific needs. Poor understanding of this specificity may lead to inadequate attention in formulation and implementation of the Plan. Livelihood security, economic growth, and equity are prerequisites for peace and stability in the CHT, and a failure to address the specific needs of the area creates potential risk of social and political instability. As mentioned in the Sixth Year Plan (page 159), there is a "lack of comprehensive understanding of the problems of ethnic communities" and "lack of specific objectives concerning the needs and concerns of ethnic people in the mainstream policies of respective ministries/divisions". The CHT deserves special attention in order to address the development challenges it faces and to redress past grievances and marginalization. This will also contribute to meeting the government's aim of creating a more inclusive and equitable society, and the vision of ensuring that ethnic, religious, and cultural minorities have access to education, healthcare, food and nutrition, and employment, as well as protection of rights to land and other resources, so that they become a part of the national force.

In view of the preparations for the 7th Five Year Plan, it is important to assess the current situation, development issues, challenges, and opportunities in the CHT, and articulate a clear goal and future course of action. This paper

aims to briefly assess the development challenges and opportunities and suggest some broad strategies and approaches for socioeconomic development in the CHT.

1.2. Objectives

The Baseline Study of Chittagong Hill Tracts has been included in the Bangladesh Delta Plan, to address the specific issues of the CHT region and the challenges faced by the hill people, despite huge potential and opportunities for development there. The objectives of the baseline study of CHT may be elaborated as follows:

1) To review the existing policies and plans of the Govt with respect to CHT, and to present some activities/ plans proposed to be included in the 7th Five year plan
2) To discuss the Governance and Institutional issues
3) To present the current socioeconomic status of the CHT
4) To review the current water resources availability, water supply and sanitation situation, and possible suggestions to improve
5) To review food security situation and the status of agriculture including land use in the CHT
6) To review the environmental and biodiversity issues, and forest resources and forest degradation
7) To present report on Delta Ateliers held in the greater Chittagong area and discuss results and suggestions from various participants so as to arrive at probable strategies at a later stage
8) To discuss challenges and opportunities

1.3. Scope of the Study

The report is prepared in line with the goals and objectives of the Bangladesh Delta Plan 2100, for which there has been no scope for collection of primary data; as such, the study used data and information from the secondary sources wherever applicable. The report gathered information from other relevant studies also. The baseline study encompasses the current situation on the socioeconomic condition of the CHT population, and focus on other critical issues such as water supply and sanitation, food security and agriculture, forest and biodiversity, etc. The report describes the baseline condition of the above issues and some possible suggestions for improvement. It discusses the challenges faced by the hill people and the present and future opportunities to meet those challenges.

1.4. Structure of the Report

The report consists of 11 chapters. The first chapter (Chapter 1: Introduction) gives an overview of the background, scope and objectives of the study. Chapter 2 reviews the policies and plans while Chapter 3discusses the governance and institutional issues. Chapter 4 and Chapter 5 describe the socio-economic condition, and general physiography and climate respectively. Chapter 6 presents the present status of food security and agriculture. Chapter 7 discusses the water resources while Chapter 8 presents the condition of water supply and sanitation. Chapter 9 describes forest resources, biodiversity and environmental condition. Chapter 10 presents the results based on the discussions and comments from the Delta Ateliers held at various locations under the greater Chittagong region in early September 2015. The final chapter, Chapter 11, presents the challenges faced by the region and the opportunities to face these challenges.
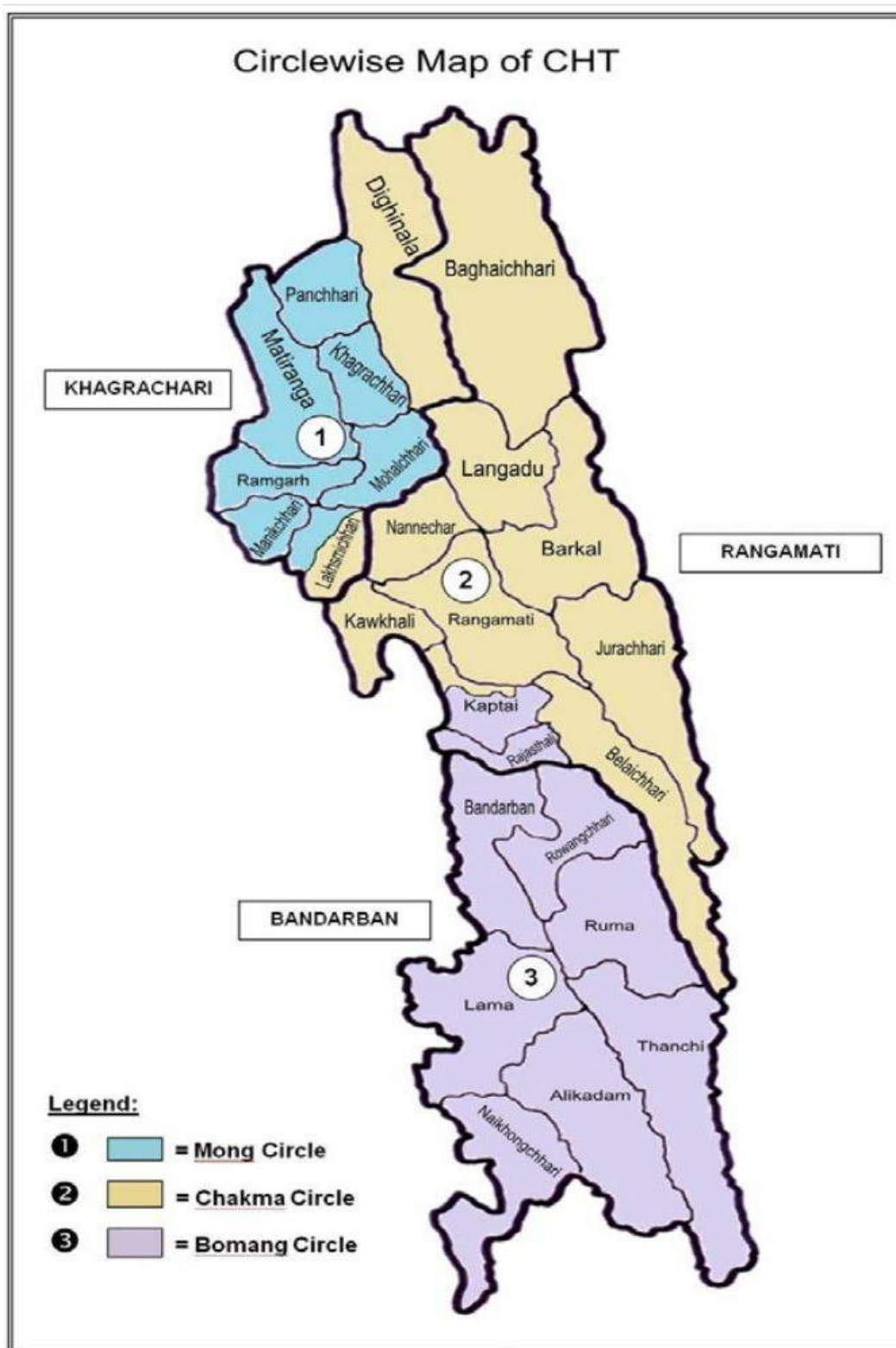
Figure 1.1: Map of the Chittagong Hill Tracts showing district, upazila and circle

Source: ANZDEC Ltd (2011) FAO CHT Report

2.   Overview of Policies and Plans

2.1.   Policies and Plans

2.1.1.   Chittagong Hill Tracts Treaty 1997

The Chittagong Hill Tracts Treaty was signed on December 2, 1997 between the government and the *ParbatyaChattagram Jana SanghatiSamity* (PCJSS in short, meaning, party of the indigenous peoples) "*with an objective to elevate political, social, cultural, educational and financial rights and to expedite socio-economic development process of all citizens in CHT.*" The treaty created conditions for the establishment of Hill District Councils, whose functions, among others, were earmarked as follows:

- Land and land management
- Environment preservation and development
- Proper utilization of water resources available in lakes, canals, rivulets, ponds, etc, except Kaptai Lake; also for irrigation
- Jum cultivation

It has been particularly mentioned that "the government shall allot additional fund, on priority basis, with an aim to implement more number of projects in CHT. New projects are to be formulated with an aim of making necessary superstructure for development in the area; shall be implemented on priority basis and the government shall provide fund for these purposes." Reference: www.mochta.gov.bd, official website of the Ministry of Chittagong Hill Tracts Affairs (MoCHTA)

2.1.2.   Perspective Plan of Bangladesh 2010-2021

The Perspective Plan aims to create a more inclusive and equitable society through the inclusion of ethnic, religious, and cultural minorities into a national and social force. The full implementation of the 1997 Chittagong Hill Tracts Treaty will be a move in this direction. In addition, the Plan puts major emphasis on environmental issues and sustainability, mentioning that "ecological balance and bio-diversity conservation are in critical state. In hill forests, the most common problems are erosion, over-exploitation and loss of soil fertility" (GED, 2010).

2.1.3.   7thFive Year Plan (2016-2020)

The Government recently launched the 7th Five Year Plan (2015/16 to 2019/20). In line with earlier such plans, the Govt plans to improve further the overall situation for the country including socio-economic condition, water supply and sanitation, food security and reduction of gaps between rich and poor. The plan is very important for the CHT, as it needs support from the Govt. It is also important for the CHT to have an explicit strategy in line with the socio-cultural context. No background paper was commissioned on the CHT, though the specific challenges in the CHT has specific needs. Understanding of the socio-cultural and geographical characteristics of the CHT is crucial for developing an effective plan for the CHT. The (perspective) Plan aims to create a more inclusive and equitable society, with a vision of ensuring that ethnic, religious, and cultural minorities have access to education, healthcare, food and nutrition, and employment as well as protection of rights to land and other resources, so that they become a part of the national force. CHT deserves serious consideration and special attention in the 7thPlan in order to redress past grievances and marginalization.

The CHT has specific needs, requires differentiated measures and approaches, and delivery mechanisms that are appropriate to the local cultural and social context. In the input given to Planning Commission, the Ministry of Chittagong Hill Tracts Affairs (MoCHTA) requested to include the following important issues in the 7th Five Year Plan (taken from a publication of MoCHTA titled *Regekhyong* in Bangla).

- UN Declaration: The Government will consider implementing the UN Declaration on the Rights of Indigenous People 2007 and ratifying the ILO Convention 169.
- CHT Peace Accord: The Government will consider implementation of the CHT Peace of the Accord signed in 1997. The Ministry of CHT Affairs, CHT Regional Councils, and three Hill District Councils will be strengthened to support the development of the CHT.
- Land rights: The Land Commission will resolve the land disputes in the CHT following the amended Land Commission Dispute Resolution Act 2001 to ensure the rights to land. Community ownership of land in the CHT will be honoured. An appropriate land policy will be formulated which can deal with land disputes involving ethnic groups.
- Empowering ethnic communities: The Government will ensure participation of local people in development activities and management of natural resources and will recognize the traditional customs and knowledge of the various ethnic peoples. The Government will provide appropriate training and support to people for development of their vocational skills and knowledge.
- Access to education, language, and culture: A national language policy will be formulated to safeguard the languages of ethnic people. The Government will ensure establishment of cluster-based residential primary and secondary schools for children of extremely poor parents in remote and inaccessible areas of the CHT.
- Developing a Perspective Plan for CHT: The Government will formulate a Perspective Plan for the development of CHT through consultation process with key stakeholders. The basis of development planning and programmes in the CHT will be the CHT Peace Accord.
- Accelerated development of CHT: Additional finance will be allocated on priority basis for implementation of programmes/projects to reduce poverty and to attain middle income status by 2021.
- Strengthening coordination of development work: To avoid duplication and make any development sustainable, development work in the CHT needs to be well coordinated and integrated.
- Agriculture research and development centres: The Government will establish Agricultural Research and Development Centres on the basis of local agricultural practices and the need of the hill people. The Government will encourage among farmers to popularize growing advance varieties of fruits, vegetables, flowers, and medicinal plants, and will arrange micro-finance for farmers to create horticulture/vegetable gardens and home gardens.
- Rural Development and non-farm economic activities: Income generating activities through small and cottage industries, trading, poultry and livestock rearing, beekeeping, mushroom cultivation, and others will be expanded.
- Livelihood of *Jum* cultivators: Special programmes/ projects will be undertaken to promote alternative livelihoods options and reduce dependency on traditional livelihoods like Jum cultivation, which is sustainable and socially acceptable. Promotion of additional farm and non-farm economic activities for income generation towards attaining improved lifestyle will be ensured.
- Marketing facilities: Proper market infrastructure and rural road and market facilities will be developed so that farmers/producers can achieve a better price from selling their products. Measures will be taken to eliminate barriers so that agricultural and other local products have easy access to national and international markets. Private investment in processing, packaging, and marketing CHT products and services will be encouraged.
- Human resources development programs: Existing human resource development programs will be augmented to address the special needs of ethnic people and strengthen their vocational and social skills.
- Labour mobility: The Government will make special arrangements targeting ethnic communities to prepare them to take up the opportunities provided by national and global labour markets, including overseas employment, and thus enable them to increase their income.
- Internet facility and ICT training: The Government will provide effective internet facilities throughout the CHT region and will arrange ICT training for the youth to prepare them for better education and employment.

- Electrification and telecommunication: The national power grid and distribution system for electricity supply in the different upazilas of the hill districts will be expanded. The Government will expand electrification in rural and remote areas of CHT and will set up solar-based electric power stations in remote and inaccessible areas.
- Expansion of micro-finance: Micro-finance activities for poor people and farmers will be expanded (in place of micro-credit) and vocational training provided to the poor.
- Development of tourism: Tourism, especially ecotourism and community based tourism will be encouraged without affecting the local culture as a means of income generation for the local people. Private local investment will be encouraged to develop sustainable tourist spots and facilities in Rangamati, Bandarban and Khagrachhari by engaging tribal people.
- Adaptation to climate change: Innovative and sustainable adaptation strategies and methods will be ensured to protect people and the environment from hazards caused by climate change and disaster mitigation.
- Village/mouza community forest: Village/mouza community forest will be created and expanded in the CHT to conserve biodiversity and the watersheds and ensure that people have access to water.
- Afforestation: A massive effort will be undertaken involving the local communities for afforestation over the region. Measures will be taken to protect wildlife and biodiversity.
- Creeks, falls and water bodies: Special initiatives will be undertaken to ensure the flow of water in creeks, water bodies and waterfalls by preserving the natural sources and integrated watershed.

2.2. Sustainable Development Goals (SDGs)

At the Sustainable Development Summit on 25 September, 2015, UN Member States have adopted the 2030 Agenda for Sustainable Development, which includes a set of 17 Sustainable Development Goals (SDGs) to end poverty, fight inequality and injustice, and tackle climate change by 2030. The SDGs, otherwise known as the Global Goals, build on the Millennium Development Goals (MDGs) eight anti-poverty targets that the world committed to achieving by 2015. The MDGs, adopted in 2000, had aimed at an array of issues that included slashing poverty, hunger, disease, gender inequality, and access to water and sanitation. Good progress was made on the MDGs, showing the value of a unifying agenda underpinned by goals and targets. The new Global (sustainable) Goals, and the broader sustainability agenda, are expected to go much further than the MDGs, addressing the root causes of poverty and the universal need for development that works for all people.

Bangladesh Delta Plan is expected to play a substantial role in the Sustainable Development Agenda. As the country is already facing adverse impact of climate change, the plan should be prepared incorporating science-based knowledge and authentic data to ensure sustainable development. It should be formulated to include all relevant sectors of development and key knowledge-generating organizations to make it effective. Relevant to mention that the CHT region should also be integrated with the overall planning scenario, as there are much potential in the region to improve the socioeconomic condition of the hill people. As it is explained later in this report, private financing, along with the Government initiatives, would be an ideal combination for the region towards advancement and sustainability. Some international organizations and NGOs have been involved in the studies/activities in the CHT; such as: UNDP, FAO, ICIMOD, and NGOs like Worldfish, Wateraid, etc. Despite some success stories, the indignity of poverty has not ended for all in the CHT. The hill tracts should form an effective part of the implementation process of the country.

3. Governance and Institutional Issues

3.1. Institutional Setting

3.1.1. Background

The Chittagong Hill Tracts always had a special position in the governance system of the country. Before the British colonization, the vast area even beyond the present CHT region was an independent kingdom. During the whole period of the Mughal rule in this Indian sub-continent, the Chakma Kings were internally supreme and externally free. There had been no external interference by any outside power in the affairs of the CHT until 1787 when an agreement was signed with the British, and the British colonization started since 1860. So the Kings of the CHT reigned independently during the whole pre-British Era. During the British Period, the local administration of CHT was different from the other many areas of India sub-continent. The British has enacted the CHT Regulation in 1900. The nature of the Regulation was like a constitution. After partition of the subcontinent in 1947, the then Pakistan government changed the status of CHT and was renamed as 'Tribal Area' in the constitution. In later years, the successive governments of Pakistan brought in drastic changes to the CHT Regulation 1900 directing to removal of legal bar to having access to CHT for the outsiders from plains. The norm did not change much after the liberation of Bangladesh in 1971, when non-indigenous people from outside the CHT were allowed to settle in the region. Also the supremacy of the Deputy Commissioners prevailed over the tribal headmen and reduced the traditional powers of the hill Chieftainships.

In 1997 the system was revised as a consequence of the CHT Peace Accord. Also, a CHT Regional Council was established charged with overall supervision and co-ordination of all development activities of regional and local agencies. At the national level a new co-ordinating instrument was created in the form of the Ministry of CHT Affairs, headed by a Minister of CHT indigenous origin.

3.1.2. CHT under the National Government set-up:

According to the peace accord, the Ministry of CHT Affairs (MoCHTA) with a full-pledged Minister from among the indigenous peoples constitutes a part of the Cabinet in the government. MoCHTA mainly deals with the issues relating to CHT, apart from its routine responsibilities as part of the government. The government machinery also includes Divisional Commissioner at Division level and Deputy Commissioner and Superintendent of Police at the district level. Besides, there are also Executive Officers called Upazila Nirbahi Officers (UNOs) at Upazila level. These administrative layers discharge their functions under the Ministry of Establishment and other line ministries.

The purpose of the 1997 peace accord was to install permanent peace in the CHT region. Accordingly, a special administrative system has been established with MoCHTA, CHT Regional Council (CHTRC) and three Hill District Councils (HDCs). Though there have been sharp contentions of differences between the government and regional council, respective laws for the councils have been formulated and introduced but these laws are yet to be made functional to their fullest by formulating regulations while repelling the conflicting sections of the other existing laws to make them compatible to the later laws.
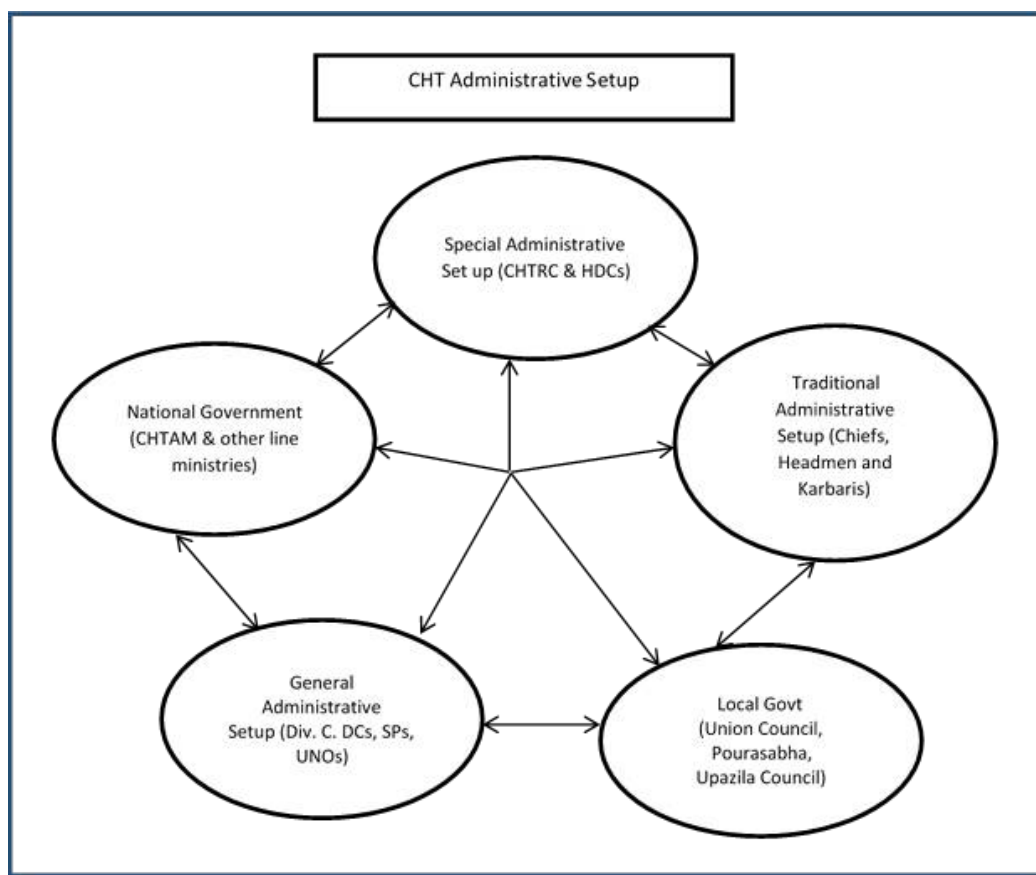
Figure 3.1: Chittagong Hill Tracts: Administrative Setup

Source: www.pcjss-cht.org/administrative-setup-in-cht/

Ministry of CHT Affairs (MoCHTA): The ministry was created as a result of the peace accord and headed by an indigenous Minister, is responsible for overseeing all activities in the CHT and recommends the staffing for the Regional Council and three Hill District Councils.

CHT Regional Council (CHTRC): The council was established in 1998 and was set up in appreciation of the fact that special arrangements are essential for the underdeveloped region and it was necessary to expedite the process of political, social, cultural, educational and economic development and to uphold the socio-political rights of all people of the CHT regions including the tribal inhabitants. Moreover, it was desirable and essential to establish, as part of the implementation of the Agreement, a regional council for the purpose of co-ordination of the activities of the three Hill District Councils and for performing other related activities. The functions of the Regional Council are overall supervision and co-ordination of all development activities carried out by the Hill District Councils and other affairs vested in the District Councils, local councils including municipalities, CHT Development Board and supervision and co-ordination of general administration, law and order and development activities in the Hill Districts. The Chief Executive Officer, who holds the rank and status of Joint Secretary to the Government, a position for which preference shall be given to officers from tribal groups.

For managing the affairs of the Council till the elected Regional Council is formed, an interim arrangement has been made as per the provision of the Act. The Government has nominated the Chairman and other members of the Council. The Chairman of the PCJSS currently heads the Council. This interim Council is now carrying out the functions of the regional body.

Hill District Councils (HDCs): In 1989, three Hill District Local Government Councils were established in CHT for the three hill districts. Later the 'Local Government' part was deleted from the names. The councils were re-organized and renamed as Bandarban Hill District Council, Rangamati Hill District Council and Khagrachari Hill District Council as per the Accord. Amendment was brought in the three Hill District Council Act(s) in 1998. HDC is an elected body and consists of 34 members representing most of the ethnic communities including 10 from non-indigenous origin and 3 seats for women with Chairman of the council mandatorily from the ethnic indigenous groups.

As per the Accord and the Hill District Council Act, the HDCs are to be transferred with 33 subjects including overall co-ordination, maintenance and improvement of the law and order of the district; control over the police administration of the district; land and land management, agriculture, primary and secondary education, youth welfare, justice related to the tribal affairs, according to the customs, culture of the tribal people; and co-ordination of the development activities of the local authorities, environmental protection and development, local tourism etc. of the district monitoring the implementation of its development projects and audit thereof, rendering assistance, cooperation and encouragement etc with several other subjects. The Hill District Councils may formulate and implement development plans on the subjects transferred to them but are largely dependent on funds provided by the central government and have limited capacity to raise their own revenue. In the transferred subjects, the concerned Ministries or Departments are to implement all development works undertaken by the Government through the Hill District Councils.

3.1.3. Traditional Governance System

Alongside the central government administrative system and Local Government systems, the CHT practices a traditional system based on customs and practices of the indigenous peoples. Although this traditional system has been in place for hundreds of years, the administrative areas in existence today, known as 'Circles' were not formally constituted until the CHT Regulation of 1900. There are three administrative Circles in the Chittagong Hill Tracts (Mong, Chakma and Bohmong) each with their own Chief or Raja. The administrative areas of the Mong, Chakma and Bohmong Chiefs broadly correspond to the decentralised Local Government administrative areas of Khagrachari, Rangamati and Bandarban Hill Districts respectively. The Circle Chiefs are members of their relevant Hill District Council(s) and are engaged in other formal Governance networks.

Headmen are appointed by the Deputy Commissioners on recommendation from the Circle Chiefs and *Karbaris* are appointed by the Circle Chiefs. In rare instances where there are disputes, headmen may be selected by popular election. Headman (who may also be a woman) is the traditional leader of a Mouza – an area which constitutes several *Paras* (village) and *Karbari* is the leader of a Para (village). Headman and *Karbari* are considered 'learned persons' within the community with responsibilities for maintaining social law and order, revenue collection and land use registration of their communities.

The post of the Circle Chief is hereditary, as is the case with Headmen. Generally, the child of past Headman is given priority for the Chief. Both the Circle Chiefs and the Headmen used to discharge their duties and functions according to customs and traditions (partially recognized by the CHT Regulation of 1900). Among the important duties and responsibilities of the Headmen are – collection of land tax, providing recommendation for distribution and settlement of land, maintenance of land records, preservation and maintenance of community forest resources and settlement of social disputes in accordance with the indigenous peoples' customary laws. The responsibility of land settlement and land management is primarily vested with Headmen. Thus, proper management and control of the above issues depended on the respective Headman's capacity and efficiency.

3.1.4. Other local governance bodies:

There are the local government councils, such as, Union Councils, Municipalities and Upazila Councils who look after the development activities in their respective areas. These local government councils discharge their duties under the

Local Government Ministry in one hand, and under the supervision and coordination of CHTRC and HDCs on the other.

3.1.5. Weakness in the Governance

1. A deputy Minister is in charge of the Ministry of CHTs; a full-fledged Minister should be posted there.

2. Laws have been formulated to streamline the possible differences of opinions between the government and the CHT Regional Council, but these laws are yet to be made functional to their fullest by formulating regulations while repelling the conflicting sections of the other existing laws to make them compatible to the later laws.

3. Members of the Hill District Councils (HDCs) are planned to be elected representatives of the local people. However, up till this day, no election for the Hill District Councils has been held. In the mean while, the Hill Councils are overloaded with work and lack of human resources at all fronts. The government, instead of holding elections, has passed a bill to increase the number of members for the interim councils and issued an order to send in opinions of the Hill District Councils within prescribed limit regarding increase of the members up to 15. This may not be accepted well in the hill community.

4. The traditional institutions like Headman and Karbari have been more and more weakened over the period of time. The peace accord signed in 1997 has with provisions for amalgamation of the traditional Raja-Headman-Karbari administrative system with the democratic institutions for better and meaningful role.

4. Socioeconomic Baseline

4.1. Introduction

As mentioned under Chapter 1 (Introduction), Chittagong Hill Tracts (CHT) is an area with a diverse ethnic culture that has its own traditions, social norms and values, knowledge base and agricultural practices. Each of the twelve ethnic groups has its own language, dress and customs, which influence the way of life, economic activity, and livelihood strategies. The ethnic groups include Chakma, Marma, Tripur, Tanchangya, Khiyang, Chak, Murong, Pankhu, Bawm, Khumi, Lushai and Usui. All the groups have rich traditional knowledge of the ecosystem, and have developed their own agricultural practices and resources management systems (see section 6.2).

The institutional structure consists of CHT Regional Council, Hill District Council, Circle Chiefs, Headmen and Karbaris, CHT Development Board, District Administration, Upazila and Union Parishads. The Ministry of CHT Affairs is in overall charge of the CHT and coordinates with the agencies mentioned above. While there are multiple and overlapping roles of all the concerned agencies, the issue of co-ordination needs to be redressed (detail in Chapter 3).

4.2. Demography

Population Density: The population density per square kilometre in the CHT region is very low compared to the rest of the country. The most densely populated district is Khagrachhari (223 per sq km) and the lowest density is Bandarban district (97 per sq km), while Rangamati has 97% (BBS 2011). Average household size in most cases includes 4-5 members in all CHT areas similar to national level (BBS 2011). Sex ratio refers to the number of males for 100 females in national level whereas average 108.6 in all CHT regions against 100 nationally.

Housing Condition: In all CHT areas, overall housing condition is not satisfactory. On an average only 3.5% households have *pucca* house whereas 84.6% have *kutcha* house in all CHT areas. Khagrachhari covers the highest *kutcha* household (86.9%) against only 2.2% *pucca* households. This is a good indicator that the people living in the CHT area belong to poorer category in term of housing condition.

Occupation: The most popular occupation of the people in CHT is agriculture. **Table 4.1** shows that for 49.4% of households in CHT, about 32.5% of people are involved in *Jum* cultivation. Only 0.2% of household are engaged in fish cultivation, which is not very prospective for food security of the region. It is observed that there is no fish cultivation at all in Bandarban and Khagrachhari districts (for more information on fisheries, see section 6.4).

Migration: Usually the unemployed day labourers and farmers of CHT areas migrate to the nearby cities and towns in search of some employment. These labourers prefer to go to Bandarban, Rangamati, Khagrachhari, Chittagong, Cox's Bazar and Dhaka, and are normally engaged in physical occupation, like in land filling, brickfield, hotels & restaurants, rickshaw pulling, industries, etc. The migration scenario (**Figure 4.1**) shows that 3.33 percent of households of CHT people migrate from rural to urban areas, whereas only 0.6 percent from urban to rural areas. This only indicates there is a tremendous shortfall of work and good job opportunities exist in rural areas of the CHT.

Table 4.1: Occupation in the CHT region

Occupation	Bandarban (%)	Khagrachhari (%)	Rangamati (%)	All CHT (%)
Agriculture	41.0	71.4	36.0	49.4
Day labour	2.4	2.4	7.0	3.9
Fish cultivation/keeping	0.0	0.0	0.6	0.2
Housewife	9.5	10.1	2.3	7.3
Jum cultivation	38.7	12.5	45.9	32.5
Petty trader	3.0	1.2	4.7	3.0
Rickshaw/van puller	0.0	0.0	0.6	0.2
Service	4.8	1.2	1.2	2.4
Shop keeper	0.0	0.0	1.2	0.4
Others	0.6	1.2	0.6	0.8

Source: Agriculture and Food Security Project (AFSP), 2010
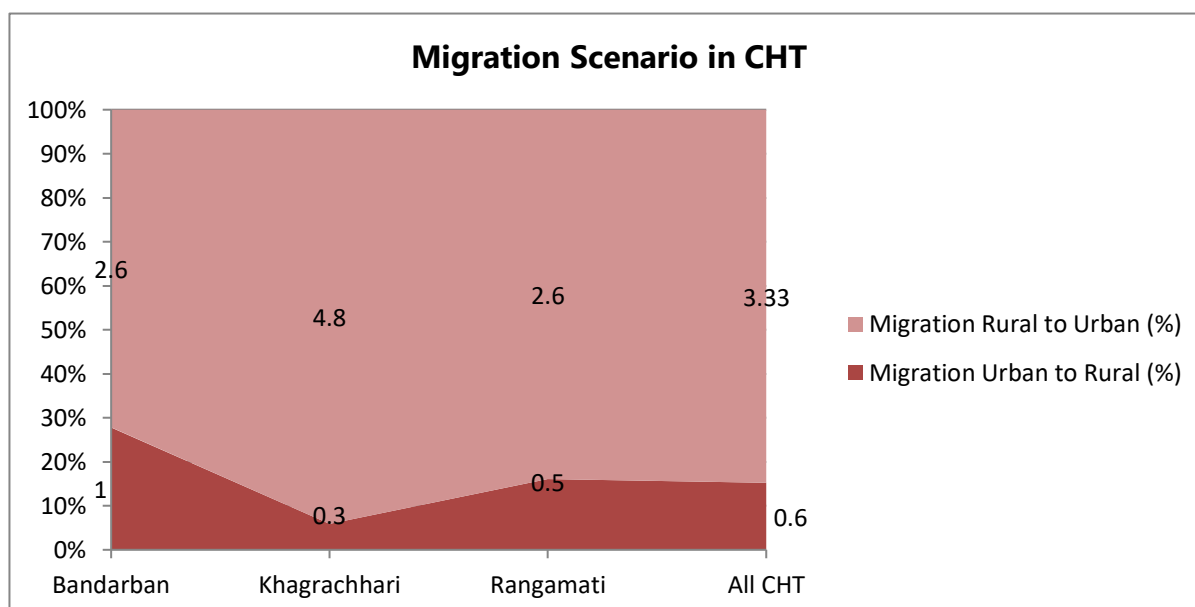

Figure 4.1: Chittagong Hill Tracts: Administrative Setup

Source: Population Census, BBS, 2011

Electricity connection: Electricity is an important basic amenity in the modern-day world. It is a significant indicator of measuring development in an area. An average of 34.23% household is under electricity coverage in all CHT areas, which is only moderate compared to the national coverage of 56.13%. Maximum electricity coverage is in Rangamati (41.8%), whereas electricity coverage in Bandarban is very low (28.2%). People complain that they are not happy about the grid connection. They are compelled not to use any modern electronic gazette due to non-availability of electricity.

Drinking Water and Sanitation: (detail in Chapter 8) The status of safe drinking water is not good in CHT districts; overall about 49.16% of households drink tubewell water in CHT, whereas the national average is about 89.1%. The collection of water is very difficult during dry season and natural calamities. Sanitation facility is also not satisfactory in CHT; only 9% of households get water-sealed sanitary latrines whereas 48% households still use non-sanitary latrine in all CHT region. The alarming issue is that 18% households meet their need by using open toilets in all CHT districts. About 8.9% of the households have sanitation facilities i.e. water-sealed latrines in Khagrachhari; while 37.5% do not use toilet in Bandarban.

4.3. Population Pressure

Over the past few decades, the CHT has experienced massive population growth. The population in the CHT increased by more than 300% between 1974 and 2011, compared to 96% in Bangladesh overall. In 1901, the CHT population was 124,762, which increased to 508,199 in 1974 and 1,663,274 in 2011 (Establishment Division 1971, BBS 2007, 2012).

Due to rapid population increase, the impact of its pressure on the land, water and biological resources of the CHT is changing the per capita entitlement of those resources over time. The hill people are shaping their future by cultivating its soil, by fishing in its streams, and by harvesting its forests. Their livelihoods and their future are intricately linked with the land and the natural resources of the region. With increased population, through natural growth and migration influx, the pressures on the environment have multiplied, which in turn, exerted additional economic pressure on the people of the CHT. The poor are more dependent on common natural resources for their livelihoods, whether through agriculture, timber harvesting, or fishing. Attention must be paid to the overall economic situation of the people in this region in order to fully address the sustainable development.

4.4. Economic Condition

Household income: The life standard of Rangamati households is better than those of Bandarban and Khagrachhari, because the yearly income of Rangamati households is higher than those two districts. The average income of Rangamati households was found about BDT 89,221 whereas for Bandarban and Khagrachhari districts, the figures were BDT 77,997 and 81,268 respectively. The average figure for the entire CHT is about BDT 82,928 (Agriculture and Food Security Project, AFSP, 2011). The average national income for Bangladesh is $1314, equivalent to BDT 105,000 (BBS 2015).

Household expenditure: The CHT rural expenditure is lower than Bangladesh rural area. Bangladesh (rural) people spend about (Tk. 73,402), while similar comparison indigenous (rural) households (Tk. 62,282) per year (estimated by consultants on the basis of Household Income & Expenditure Statement, BBS, 2005, 2007a).

Income source: Overall, CHT people are mainly engaged in five types of occupation; agriculture, business, salaried employment, traditional occupation and others like gratuity, etc. These main five categories are again sub-divided in more types of sub-occupation, like timber business, lending money, cottage industries, hunting and other traditional occupations. Agriculture land cultivation (in plain areas) and *Jum* cultivation (on hill) are major occupation in CHT areas (Agriculture and Food Security Project, AFSP, 2011)

Poverty scenario: The overall poverty level in CHT districts is better than the national average, 28.6% in CHT to 31.5% national, while the extreme poverty level is also lower in the CHT (12.83%) than the national figure (17.60%). **Table**

3.5 indicates that the Bandarban district has the highest percentage of extreme poor (40.1%), and in fact, it is one of the poorest districts in the country; people are deprived of their basic needs there due to poverty.

Table 4.2: Poverty scenario in the CHT region

Poverty Level	Bandarban	Khagrachhari	Rangamati	All CHT	National
Poor (upper poverty line) %	40.1	25.5	20.3	28.63	31.50
Extreme Poor (lower poverty line) %	21.6	10.1	6.8	12.83	17.60

Source: Household Income & Expenditure Survey (HIES) 2010, BBS 2011

4.5.   Education

The status of education is measured as the backbone of a nation. In CHT areas, literacy rate is not good if compared to the national level. The overall percentage of education is only 44% in CHT compared to 56% national average (BBS-2011). The literacy rate of male (49.53%) is higher than female (37.76%), in all CHT.

4.6.   Gender issue: Role of women

An elderly male person is perceived as the "head of the household", though most households are "woman-managed". Women in the villages perform all chores in addition to agricultural activities, yet they are categorized as "unpaid family helpers" in some official literature. In reality, however, women as well as men are full and active players in the agriculture sector, taking part in all activities from production to processing to marketing.

Households are overwhelmingly male-headed with only 7.7 percent being headed by women in the CHT and 6.2 percent in the country. However, an inverse correlation exists between socio-economic status and the number of female-headed households (BBS, 2010). In successive higher land-holding strata, lower is the proportion of female headed households (**Figure 3.4**). This means, women in poorer households more often manage their respective households on their own, which indicates their strength, as well as vulnerability. While women are just as involved as men in agricultural life, as primary caretakers they are primarily responsible for household food security and the decisions they make have a profound effect on nutrition. Women engage in agriculture mainly to produce food for their households. Surplus produce is sold in the local market.

During the period of deficit, many women eat just one meal a day. Gender dynamics clearly manifests that women and girls suffer first and most profoundly during prolonged food shortage. With the shrinking of *jum* area, women are to spend more time and energy scavenging for wild foods, which raises their calorie demand. Due to marriage at early age, food shortages and micronutrient deficiencies have stark implications for nutrient-deficient adolescent mothers (HKI, 2008).
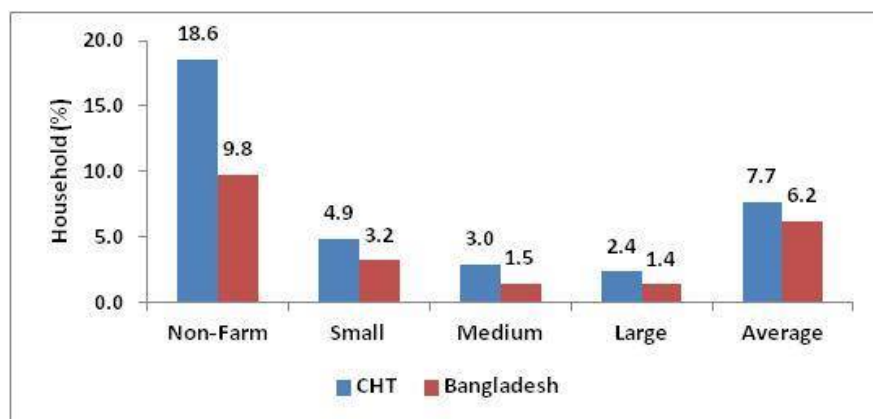
Figure 4.2: Female headed households by farm size

Source FAO Report 2013

5.   Physiography and Climate

5.1.   Physiography

The topography of the terrain of Chittagong Hill Tracts is totally in contrast with the rest of Bangladesh. While Bangladesh in general, has a very flat topography and plain lands, the CHT area is mostly hilly and at some places, dotted with small mountains. The landform of the CHT is characterized by a succession of pitching anticlines and synclines aligned almost north–northwest to south–southeast. It increases eastwards in elevation and consists of mainly consolidated beds of tertiary sandstone, shale and siltstone with recent alluvial deposits in the valleys.   This section briefly focuses on physiography and landform, soil, and potential limitations for development.

Six major landforms are identified in the CHT as mentioned below; they comprise small mountains and hills, plains and valleys. The maximum elevation is 1,027m PWD; 79% lies between the elevations of 0m and 200m (Figure 5.1).

- Medium-gradient mountains
- High-gradient hills
- Medium-gradient hills
- Dissected plains
- Plains
- Valleys

Land cover includes forest, herb/shrubs, fallow/agricultural land, river and water bodies, settlements, hill shades etc. The maximum area (44.9%) is covered with medium dense forest in 2003 which was reduced to 17.4% in 2010. Similarly, the area of dense forest was about 15.2% in 2003 which declined to 5.9% in 2008 (FAO, 2011).

In the high hill ranges, soils are very shallow to deep, pale brown, slightly strongly acid, sandy loams to clays, usually overlying decomposing bedrocks at variable depths. In the low hills, soils developed in soft rock materials are usually deep, brown to red brown, strongly to very strongly acidic, sandy loams to clay loams, locally overlying plinthite (iron rich humus-poor mixture of clay and quartz). Soil patterns generally are complex due to local differences in sand, and silt clay contents of the underlying sedimentary rocks and in the amount of erosion that has occurred. Brown hill soils are the predominant general soil type of the area. Organic matter content and general fertility level is low.

The medium-gradient mountains range from 600 m to the highest summits. The cores of the higher anticlines consist of semi-consolidated to consolidated sedimentary rocks – mainly sandstones – that have been strongly and deeply dissected. The mountains have very steep slopes and conical sharp peaks.

The high-gradient hills are characterised by steep slopes - median slopes 21 % with extremes of over 100% - and by a high relief intensity of about 180 m km^{-2}. They stand out as elongated parallel ridges aligned almost north–northwest to south–southeast (NNW-SSE). Towards east, the ridges get higher until they reach the highest mountain ranges, over 1000m, which marks the boundary between Bangladesh, Myanmar and India. The elevation of the high-gradient hills ranges from about 50 to 600 m above MSL.

The medium-grading hilly areas between the high-gradient hills are formed by synclines mainly consisting of unconsolidated sandstone and siltstone of the late Tertiary age. The hill summits are generally less than 300 m above MSL. Most of the areas are rolling to steep low hills, with rounded tops, with strongly dissected edges and very steep slopes. However, some have almost level relief.

Figure 5.1: Landform in the CHT

Source: CHARM Report, CEGIS, 2007

Within the plains two groups are distinguished: those in the areas adjacent to the hills and those in the west of the CHT. The first group hills are somewhat higher and steeper and have a higher relief while the latter have a subdued relief, lower elevation and gentler slopes. These units are classified as dissected plains: they show the remnants of a plain that is visible in the summits of the area. Valleys have cut the old surfaces resulting into an area of sloping landforms. Slopes are in general less than 10% with occasional extremes up to 30%.

Only small areas in the southwest of the region are the parts of the Chittagong coastal plain. This part of the CHT is a relatively narrow strip of land sloping gently outward from the adjoining hills. Sediments washed off the hills and/or deposited by small streams flowing out of the hills form this land. The relief is often rather irregular. The deposits are mainly loamy and sandy in the rather elevated areas and clayey in depressions. Seasonal inundation is mainly intermittent and shallow that occurs from heavy rainfall in the adjoining hills.

Valleys occur within these dissected hills. Most of the valleys, particularly those occurring between the high-gradient hills, are very narrow with sharp gradient, and as a result have little accumulation of sediments. The deep valleys were later filled up by sediments as the sea level rose. In the central and northern part of the CHT the Karnaphuli River and its major tributaries have substantial areas of alluvial deposits along their courses. The recent floodplains are subject to annual flooding but the older sediments of the higher terraces are not.

5.2.   Climate

5.2.1.   Introduction

Like the other regions in the country, the climate plays an important role for the production of agricultural crops and vegetation in the CHT. But extreme climatic factors increase environmental hazards like landslides, droughts and soil erosion. Heavy rainfall damages crops in the field and washes out the top soil nutrient from barren land. The erratic behaviour of rainfall distribution poses a threat for timely agricultural crop production. Droughts hamper crop production with reduction in yield level. Its severity reduces the amount of available water for domestic and drinking purposes and puts the community in a more vulnerable situation. This section provides an overview of the climate in the CHT including rainfall and temperature.

The climate in the Chittagong Hill Tracts is tropical monsoon. Annual temperatures vary from 10° to 35°C. A mean minimum temperature of 24°C is experienced during the months of December to January and a maximum temperature of 34°C during March to May. The dry and cool season is from November to March; the pre-monsoon season (April-May) is hot and sunny; and the monsoon season (June to October) is warm, cloudy and wet. Wind blows from a south-westerly direction during the warm season, but from a northerly direction during the cool season. Thunderstorms usually occur in April followed by rain.

5.2.2.   Rainfall

Rainfall: The total mean annual rainfall varies from 2400-3800 mm in the CHT. The rainfall distribution in the CHT area is shown in Table 5.1 for both dry and wet seasons. The Bandarban district experiences the highest rainfall, with the other two districts having similar rainfall distribution. The wet season rainfall is approximately 70-80% of the annual total and the dry season rainfall varies from 18-24%.Rainfall intensity is gradually increasing from North to South.

Table 5.1: Rainfall distribution in the CHT area

CHT Districts	Mean annual rainfall (mm)	Dry season		Wet season	
		Rainfall (mm)	% of annual rain	Rainfall (mm)	% of annual rain
Bandarban	3121	550	18	2571	82
Rangamati	2419	544	23	1874	77
Khagrachhari	2508	607	24	1901	76

Note: Rainfall increases from North to South-West-South in the CHT

The annual total rainfall pattern for Bandarban District is shown in **Figure 4.1**. A prominent change in rainfall distribution on a decadal basis (average 10 year window) is observed in the CHT. The figure also shows the decreasing trend of rainfall from 1960 to 1970 and the increasing trend for the next 10 years' time period in Bandarban District. Similar trends are observed for the Khagrachhari and Rangamati districts.

The distribution of rainy days shows no prominent variation in the CHT. In the dry season there is precipitation 14% of the time but during the monsoon season, rainy days are observed 75% of the time.

Low rainfall results in high water demand from alternative sources for agriculture crop production as well as domestic and industrial uses. Rainfall distribution is a causative parameter for observing climate change.
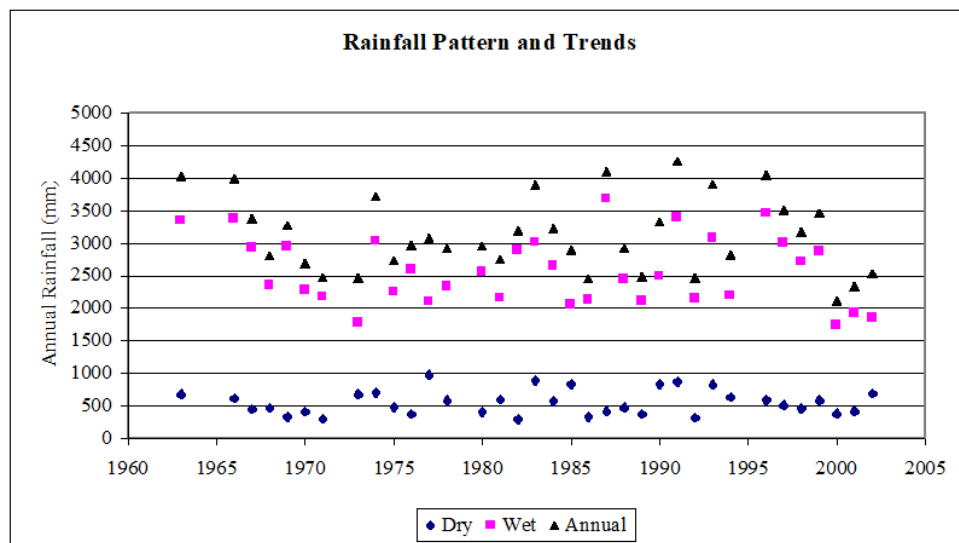
Figure 5.2: Annual rainfall trends in the CHT (Bandarban District)

Source: CEGIS, CHARM Report 2007

Rainfall plays an important role in mitigating water scarcity during the dry months of the year. Measurements of rainfall excess and deficit are essential in understanding the position of meteorological drought situation and vulnerability of the area. The agriculture water demand (ET) is higher than the total rainfall during dry months, which means water deficit exists in the dry months. During the dry season, the rainfall meets only 60-80% of the ET requirement indicating a shortage of rainfall for meeting agricultural demands. Demand builds up during the dry months of the year and maximizes in April. During the monsoon season, the availability of rainfall matches the crop water demand. Due to the onset of the monsoon season, the rainfall amount increases in the CHT area and water deficit is reduced appreciably, showing a surplus beginning from June.

5.2.3. Temperature

The mean annual temperature is approximately 26°C and the mean minimum and maximum temperature varies from 22-30° C. High temperatures are observed between March and October, and the lowest temperatures during January. The maximum highest temperature was recorded at 40.5° C during May 1995 and the lowest recorded minimum temperature was 5.5° C in February 1961. Over the last few decades, the yearly maximum temperature has been increasing whereas the minimum temperature has remained almost stable. An increasing trend in temperature is observed from 1995 onwards.

The mean humidity is approximately 78% in Bandarban and 76% in Khagrachhari and Rangamati. Like other parts of the country, the maximum humidity is observed during July and August and the minimum in the months of January and February.

The daily total sunshine hours range from 4 to 8 hours in the CHT area. In the monsoon season the mean sunshine hours are around 4 to 5 hours; and during the dry season, it varies from 7 to 8 hours. High wind velocity is observed in the southern part of the CHT area. Mean wind speed is approximately 170 knots per day (kpd), or 315 kilometres per hour, in Bandarban, and 103 kpd (190 kph) in Rangamati and Khagrachari. High wind speed is generally observed in the months of June, July and August and low wind speed in the months of November and December.

The annual total Evapo-transpiration (ET) in the CHT area varies from 1250-1350 mm. The highest ET is generally observed in the southern part of the CHT, especially in the Bandarban area.

6. Food Security and Agriculture

6.1. Food Security

6.1.1. Food security and consumption

The people in the CHT generally take three meals a day. Rice is universally consumed, and so also are the vegetables. Consumption of meat is very low, while more people eat dry fish than fresh fish. Families usually do not drink milk and do not use oil in cooking vegetables. June-August is the period of relative scarcity across communities. Current level of rice production in the region falls short of the demand to the extent of 13 percent (FAO 2013).

The prevalence of stunting, underweight and wasting (debilitating disease causing muscle and fat tissues to 'waste' away) among children below five years is 42.2%, 34.1% and 7.3% respectively. The poor water and sanitation conditions compound the vulnerability of children to morbidity and mortality from diarrhoea and other preventable diseases. Certain sections of the population are considered most vulnerable in terms of food and nutrition (FAO 2013). They are: female-headed households, marginal farmers and casual labourers with limited or no access to land, households with many children and the elderly.

The physical quantity of daily food intake per person in the CHT is about 780 g. Over 50% food intake comes from rice followed by vegetables (30%). In terms of energy intake of food, rural CHT people consume 1798 k cal per day which is below the level of the hardcore poor (1842 k cal) in the country. Food security is a crucial indicator for livelihood security in the CHT. As stated by FAO following World Food Summit of 1996, food security "is a situation when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life." Food security at the household level is largely determined by individual farm level production in a subsistence economy. In the CHT, households cannot meet both ends with their farm level production; for example, the people have to buy rice, the main staple, from the market during certain lean periods of the year.

Table 6.1 shows food consumption scenario by selected communities in the CHT. Rice and vegetables form the normal diet for all the hill people, and are equal in consumption by all communities, but neither non-poor nor poor

community can afford to consume any flour. Relatively non-poor people consume meat and fresh fish more than their poor counterparts. Likewise, non-poor and poor people of Rangamati are better-off than those of Khagrachhari and Bandarban, so far consumption of fruit and dry fish is concerned.

Table 6.1: Food consumption by selected communities

Food	Consumption (number of days)												
	Khagrachhari	Bandarban									Rangamati		
	Chakma		Tangchangya		Mro		Bawm		Marma		Pangkhua		Chakma	
	Poor	Non poor	Poor	Non poor	Poor	Non poor	Poor	Non poor	Poor	Non poor	Poor	Non poor	Poor	Non poor
Rice	365	365	365	365	365	365	365	365	356	356	365	365	365	365
Flour	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vegetables	365	365	365	365	365	365	365	365	365	365	365	365	365	365
Meat	24	48	22	48	24	45	10	125	36	12	36	60	36	48
Fresh fish	48	84	77	120	15	14	12	145	48	24	36	48	48	60
Dry fish	300	365	8		65	97	300	365	300	365	300	300	300	300
Milk	-	-	8	24	-	-	-	200	-	48	-	-	-	-
Fruits	115	200	120	200	250	285	85	300	365	365	365	365	365	365

Source: FGD, Agriculture and Food Security Project (AFSP), 2010

6.1.2. Food Secured Month

The FAO (2013) report reveals the food security is not ensured in the CHT for certain periods of the year. All indigenous people are unsecured in the Bangla months of Ashar (June-July) and Sravan (Sep-Oct). On the other hand, Kartik (Oct-Nov), Agrahayan (Nov-Dec) and Poush (Dec-Jan) are secured or more or less secured months for the CHT regions. While the Pangkhua community is secured, the Khyang, Chakma, Tripura and Marma communities are unsecured for food security for several months of the year.

The food balance is not satisfactory based on the demand of CHT people. While Rangamati district suffers from huge food deficit, food production of Khagrachhari seems to be surplus. This deficit is generally met by net imports from outside the CHT and suppressed consumption. The data shows that about 8% of food production is surplus in Khagrachhari. On the other hand, the people of Rangamati and Bandarban are suffering due to food deficit in the tune of -42% in Rangamati and -1% in Bandarban
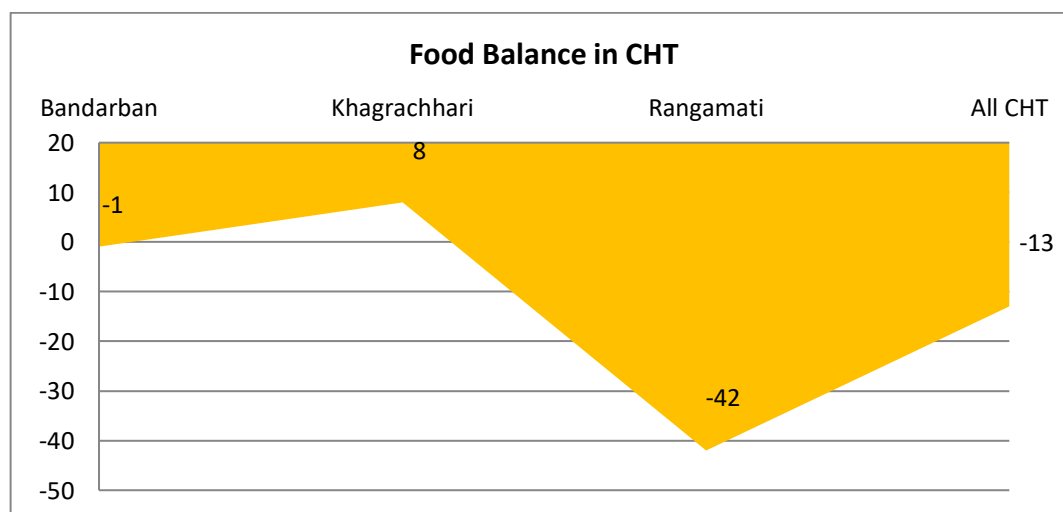

Figure 6.1: Food balance in the CHT

Food "self-sufficiency" or "surplus" at the macro (district) level does not necessarily imply that everybody will have access to food. At the micro (household) level, many people may remain underfed or even starve, as they have low purchasing power and cannot buy food from the market all the time.

6.2.   Agriculture

Chittagong Hill Tracts' economy is mostly dominated by agriculture. The land is characterized by the traditional shifting 'slash-and-burn' cultivation, known as *Jum*, practiced for thousands of years by the indigenous *Pahari* population (hill people). The authorities tried to improve the hill peoples' lifestyle by introducing other forms of cultivation, but it seems that *Jum* continues to be the main livelihood for most of the hill people. So it is important how the *Jum* cultivation can be brought to a sustainable standard, following proven agricultural practices. Unfortunately, BBS do not take into account *Jum* production, and only refer to plainland cultivation and horticulture. Now the term agriculture has expanded from plainland crop production to include all forms of proper utilization of natural resources. This relates to the production, development, preservation, processing, marketing, and extension of crops, as well as other agricultural commodities such as fish, meat, egg, and forest products.

When the Kaptai dam was constructed on Karnaphuli River in 1962 for hydroelectric power, an area of about 68,000 ha of the Kaptai Lake was inundated, causing displacement of 20-25% of the indigenous population and flooding 40% of the most fertile arable, alluvial lands. Many displaced people took up *Jum* cultivation, which remains the most widespread form of agriculture in the CHT, covering 35,000-40,000 ha of land. Rice is mainly grown in the hill slopes and valley areas, in approximately 31,000 ha. Perennial crops, such as fruit, rubber, and tea, cover 17,000 ha area. The Kaptai Lake fringeland (valleys, foot slopes and hillocks) covers approximately 15,000 ha (ADB, 2001).

6.2.1.   Land use

The CHT mainly contains hills and valleys. The hills are formed with the unconsolidated sediments from the tertiary age, and centuries later, dissected to form linear ranges. The height of the hills influences the local rainfall and temperature. The average temperature decreases with height. The physical and chemical characteristics of the soil change with the elevation of hills and consequently determine the suitability of crops.

Land use in Chittagong Hill Tracts may be broadly categorized into four classes including agricultural, non-agricultural, forest and fallow land. Agricultural land includes areas under perennial cultivable lands, *Jum*, annual crops, and single, double and triple crops. It is the cultivated area actually cropped regardless of the number of crops grown. Non-agricultural is the area of land that is used for non-agricultural purpose. It also covers the area under settlements and water bodies. Forest land is the one under forest cover. It includes reserved forest areas and private planted forests. Lastly, the land which is not normally cultivated falls under the category of fallow land. Since land is very dominant feature of the CHT, it is necessary to understand the land use pattern for present and future use. The land use pattern is shown in

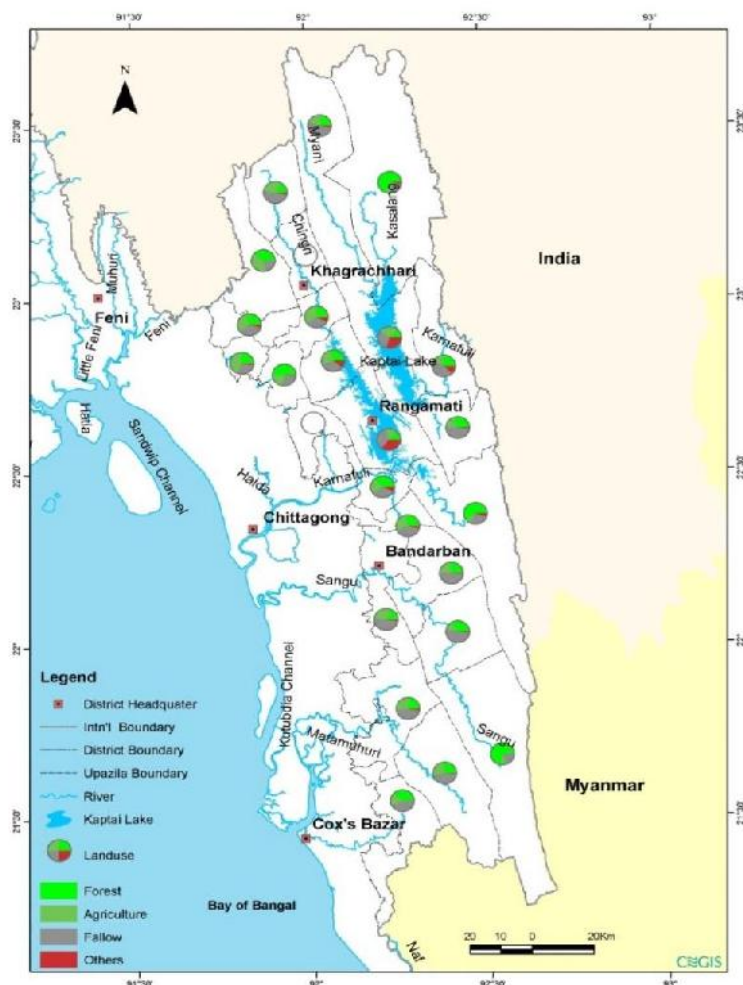**Figure 6.1** and use by districts is presented in **Table 6.2**.

Figure 6.2: Land Use Patterns in CHT

Source: Charm Project – State of Environment of Chittagong Hill Tracts CEGIS, ISRIC, January 2007

Table 6.2: Present Land use in CHT by District

District	Total Area (ha)	Non-Agricultural Land		Agricultural Land		Forest		Fallow land	
		Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%
Bandarban	438131	6746	1.5	86581	19.8	163552	37.3	181252	41.4
Khagrachhari	269079	9495	3.5	79409	29.5	78108	29.0	102066	37.9
Rangamati	618267	61577	10.0	100907	16.3	266276	43.1	189505	30.7
All CHT	1325477	77818	6	266897	20	507936	38	472823	36

Source: SRDI, 1996-2002

At present, 38% of the CHT region comprises forest area, 36% fallow land, 20% agricultural land and 6% non-agricultural land. Agriculture or cultivation is not possible in large areas of fallow land; this is mainly due to non-availability of water for cultivation, and also because of non-availability of groundwater for irrigation. The distance to the source of water makes it uneconomic for raising any crop. A comparative picture may be obtained from **Table 5.3**, to see the amount of land in each category under the three hill districts. Rangamati has the highest percentage of non-agricultural land (10%), which includes settlement also.

Table 6.3: Percentage of land use in three districts

District	Fallow land %	Forest land %	Agricultural %	Others %
Bandarban	42	38	20	-
Khagrachhari	38	29	30	3
Rangamati	31	43	16	10

Source: Charm Project – State of Environment of Chittagong Hill Tracts (CEGIS, ISRIC, January 2007)

Land holdings: According to the Agricultural Census, BBS 2011, a number of 215,035 holdings are involved in farming work while 73,447 are non-farming holdings in the CHT area. Of these, 45,423 of the farm holdings are in Bandarban, while the figure for Khagrachhari and Rangamati are 89,333 and 80,279 respectively. The people under farming holdings depend on agricultural cultivation for their livelihood; this indicates farming is very important to the people of CHT areas.

6.2.2. Land utilization

Different cropping patterns including perennial, *Jum*-annual, annual, single, double and triple define the classification of the agricultural land in CHT (see section 6.2.7). A cropping pattern is the sequence of crops grown on a single plot of land throughout the year. The different cropping patterns as defined by the Census (BBS, 1999) are given below:

- Perennial crops: the area of agricultural land with permanent crops or planted with fruit trees that occupy the land for a long period of time and do not need to be planted for many years after each harvest, e.g. mango, jackfruit, coconut, and banana.
- *Jum*-annual crops: the area under *Jum* cultivation, which is also part of agricultural land, where the crop growth cycle or length of life is 2/3 years. Aus paddy, cotton, melon, cucumber and other vegetables are grown on this land.
- Annual crops: the area used for temporary crops (also part of agricultural land) where crops whose growth cycle or length of life is one year or less. These crops are paddy, jute, sugarcane, pulses, potato and other vegetables.
- Single crop: the single cropped area where one crop was raised. Only the actual area of the land is taken into account.
- Double-cropped: the double cropped area where two crops were grown. Only the net area of the land is taken into account as double-cropped area.
- Triple-cropped: the triple or more cropped area where three or more crops were grown. Only the net area is counted as triple or more cropped area.
- Other areas

The utilization of agricultural land by cropping pattern is shown in **Figure 6.3**.
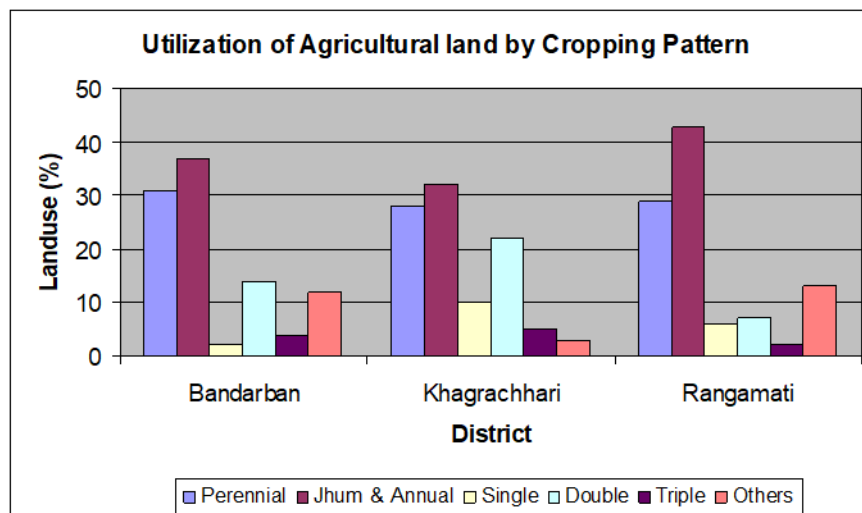
Figure 6.3: Utilization of agricultural land by cropping pattern

Source: SRDI 1996-2001

The major parts of the agricultural land of the CHT (39%) are used for *Jum*-annual crop cultivation, 30% for perennial crops, 13% for double crops, 9% for annual crops, 6% for single crops and 3% for triple crops. Apart from Jum cultivation, the farmers also plant such as T Aman, rabi crops, rabi and kharif vegetables. Different perennial crops (fruits) such as mangoes, jackfruits, guavas, and cashew nuts are grown in some agricultural lands. Forest trees such as teak, garjan, and gamari and *Jum* and annual crops, such as bananas, spices, rice, cotton, and kharif vegetables, are also cultivated.

6.2.3. Cropping intensity and production

The cropping intensity represents the ratio between the total cropped area and the net-cropped area expressed in percentage. The total cropped area represents the aggregate area of the various crops raised in the same land of the farm. The net-cropped area is the cultivated farm area actually cropped during the respective census year regardless of the number of crops grown. It includes the area used for temporary and permanent crops (fruit trees), with the actual area or physical area used for perennial and non-perennial crops. The cropping intensity is lowest in Bandarban (127%) in 2006-07, where the total cropped area is 80,000 ha. The cropping intensity of Khagrachhari is higher compared to Rangamati and Bandarban (Agriculture Census, BBS, 2011).

The most commonly grown type of crop in the CHT is *AUS*, including the high yield variety (HYV); in 2014, it was grown on over 15,859 ha (**Table 5.4**). Local AUS is popular in Bandarban (Area: 5,616 ha, Production: 10,142 M Tons) and Rangamati (Area: 4,566 ha, Production: 7,354 M Tons) whereas at the lowest in Khagrachhari (Area: 703 ha, Production: 1053 M Tons).

Table 6.4: Crop production in the CHT 2014

District	AUS (HYV), Area (Ha)	Production (M. Ton)	AUS (Local), Area (Ha)	Production (M. Ton)	AUS Rice (TOTAL= LOCAL+HYV), Area (Ha)	Production (M. Ton)
Bandarban	2089	4812	5616	10142	7705	14955
Khagrachhari	1771	3517	703	1053	2474	4570
Rangamati	1114	2614	4566	7354	5680	9968
All CHT	**4974**	**10943**	**10885**	**18549**	**15859**	**29493**

Source: BBS, 2014

The agricultural pattern in the CHT is quite different from the rest of the country. With unique features of physiography, soils, and climatic patterns in the area, the types of crops grown are also different. Unlike the rest of Bangladesh, horticultural crops, many of which are grown as *Jum*, are the most common form of agricultural production, making up 15% of the regional products. CHT is a hilly area, and not a broad floodplain like the rest of Bangladesh, the plainland rice production is not as common (ADB, CHT Region Development Plan Final Report, 2001).

From **Table 5.5** below, it is seen that the common fruits that are grown in the CHT are banana, pineapple, jackfruit, mango, guava, ripe papaya, orange, watermelon, litchi etc. The table indicates that Banana production is 72,577 M Tons cultivated in an area of 16,720 acres in all CHT areas. Out of the total quantity of bananas in CHT, 60% is produced in Rangamati District. Pineapples have steadily been growing with importance in the CHT: production is almost 37,334 M Tons and covered an area of 6,420 acres. The CHT supplies 11% of all of Bangladesh fruits.

Table 6.5: Fruit Statistics 2010-2011

Crop	CHT Area (Acres)	CHT Production (M Tons)
Banana	16720	72577
Pineapple	6420	37334
Jackfruit	4847	82237
Mango	1722	11408
Guava	815	5245
Ripe Papaya	366	8756
Orange	578	1701
Watermelon	1080	10987
Litchi	433	3192

Source: BBS, 2014

Arum is the most popular vegetable in the CHT, and grows generously; 28,281 M Tons in an area of 3,208 ha. Rabi brinjal is the most common vegetable in the CHT, grown in over 950 ha with a production of 5,439 M Tons. Other important vegetables grown in the CHT include the following: kharif brinjal, pumpkin (both rabi and kharif), chal-kumra, radish, cabbage, cauliflower, etc.

Among spices, chilli is the fourth most commonly grown crop in the CHT, 2257 MT is grown on 1,670 ha of all the crops; turmeric 18,369 MT in 15,022 ha and Ginger 25539 MT in 2,950 ha (BBS 2011).

Motor is the most important pulse grown in the CHT, grown on over 72 ha. In fact, the CHT produces 50 M Tons motor. *Masur* is another most important pulse grown in the CHT, on a total of 215 ha with a yield of 100 M Tons.

Til (sesame) is the fifth most important crop in the CHT, covering almost 1,900 ha where as a total production 1392 M Tons (2010-2011). Ripe coconut is another source of oil. While the CHT produces 5694 M Tons coconut, it covers 79 ha area

6.2.4. Fibre-producing crops

The total area used for growing cotton in the CHT decreased significantly in the last 30 years, and cotton – both rabi and kharif – remains the eighth most commonly grown crop in the CHT. In the 1970s, there was an average annual area of over 6,500 ha, while in 2003 only 4,500 ha of cotton were cropped. In 1980, the CHT was producing 45% of the country's cotton, while in 2003 it produced only 10%. While Bandarban District grows cotton on the largest area, 2,906 ha of all the cotton growing area in the CHT, the yield is significantly similar among the other districts, 1,364 M Tons, as opposed to 402 M Tons for Khagrachhari (area = 855 ha) and 946 M Tons for Rangamati (Area = 1500 ha).

6.2.5. Rice

As in the rest of Bangladesh, rice remains the staple agricultural product of the CHT. In particular, HYV Amanhas become the most important crop in the CHT, 126,958 M Tons cultivated in an area of 46,297 ha. Besides, HYV Boro (54,646 M Tons) and local AUS (18,549 M Tons) are both popular in CHT area.

Table 6.6: Rice Statistics 2010-11

Crop	Crop CHT Area (Ha)	CHT Production (M Ton)
HYV Aman	46297	126958
HYV Boro	17081	54646
Local Aus	10885	18549
HYV Aus	4974	10943
Local T Aman	2049	3877

Source: BBS 2011

6.2.6. Jum Cultivation

The shifting cultivation, known as *Jum*, is a traditional agricultural practice of the CHT population. *Jum* used to be practiced in the CHT with fallow periods of 15 to 20 years, however, with increased population pressure and decreased suitable land in recent decades, the cycle has been reduced to 3 to 5 years. Only 2.5% of the hill area in the CHT is used annually for *Jum* cultivation. The fallow periods are meant to allow the land to naturally regenerate, but the nutritional status of the soil is not replenished or improved, and the overall productivity of *Jum* land is decreasing (Borggaard, Garfur*et al.* 2003). However, it remains the common form of agriculture in the CHT, and thus efforts must be made to help the system become more sustainable through implementing sustainable agricultural management practices.

The traditional *Jum* system is a community form of livelihood. Every year, a group of younger hill families are assigned a *Jum* plot by their elders, or by the local headman or *Karbari*managing land distribution (ADB, Agriculture Report #3, 2001). In January and February, preparation for the "slash and burn" process begins. The area is cleared of shrubs and undergrowth, often only using a type of cutlass, or long knife, known as a *dao*. The most useful trees, especially bamboo, are saved for later use. The rest of the vegetation is dried and set ablaze by March and April. However, negligence during burning damages horticultural gardens, rubber plantations, and village infrastructure at times.

The burning process makes the soil particles broken up and the land is cleared of weeds; thus little or no tillage is required. The layer of ash from the burned vegetation returns nutrients to the soil and kills off microbes. Various kinds of cereals, fruits, vegetables, spices and oil seeds are planted in *Jum* fields in April and May. Mixtures of 5 to 20 different kinds of crops are grown on the same plot. Smaller seeds such as sesame, chilli and sour leaf are tossed on

the *Jum plots*. The *dao*, or other wooden hand tool, is used to make a hole in the ground for planting larger and mixed seeds such as rice, maize, beans, and cotton. After the lands are cleared, a temporary hut, known as a *tang-ghar* is set up on the *Jum* field. Guarding the lands often requires day and night attention, especially from July to September, when animals such as deer, monkey, wild boar, porcupine, and elephants can potentially destroy the crops.

The burning is completed when the rains arrive in mid-May; and weeds begin to germinate on the commencement of the rains. Weeds can grow quickly and cover seedling crops within 2 to 3 weeks after planting. Clearing weeds becomes an important job in the *Jum* process. Because weeds are most commonly pulled up by hand (and sometimes with hoe and spade), the topsoil is not loosened very much, which keeps soil erosion to a minimum. Also, the weeds that are pulled up are left on the ground that eventually turns into organic matter; this helps reduce erosion and protect the soil from direct impact from the rain (Gafur *et al.*, 2003).

The beauty of the *Jum* cycle is that because crops with growing cycles of different lengths are all planted on the same plot, various crops are harvested from the end of the growing season throughout the winter. Cereals, including upland rice and maize, and oil seeds, such as sesame (*til*), have short growing cycle crops and are harvested in October. Cotton, spices (such as turmeric and ginger), and root and tuber crops (such as cocoyam, cassava and yams) are harvested throughout the winter or "rabi" dry season. Bananas have long growing cycles up to two years and are harvested twice or thrice over three years (Rafi and Chowdhury, 2002). To determine the economic and environmental sustainability of *Jum* cultivation in the CHT, a study was conducted in 1998 and 1999 (Borggaard *et al.*, 2003), by comparing a *Jumed* land and a fallow land in Bandarban, and measuring the run-off in both catchments downhill by gauges. Calculations of soil and nutrient loss were determined for both catchments. The difference in loss was the excess loss from *Jum*. The loss for the whole CHT was calculated assuming the total area of *Jum* as 2.5% of the CHT or 33,237 ha. It was determined that over 980,000 tonnes of soil and over 62,500 tonnes of organic matter are lost due to *Jum* each year. Also, in order to make up for the lost nutrients, it would require US$ 2 million in the purchase of fertilizers.

In addition to *Jum* cultivation and major impacts from the felling of trees for the timber industry, erosion related problems in the CHT have increased due to unsuitable tillage techniques like deep ploughing on hill slopes to grow tuber crops such as arum potato, ginger, and turmeric. Non-local migrants from the plain areas mainly practice these techniques, often without awareness of proper agricultural management methodologies.

6.2.7. Crop Damage

Due to excessive rainfall and other natural calamities, damages to crops are commonplace in the CHT. During the summer monsoon rains of 2003, the extent of damage was particularly severe. In the Rangamati region, over 60 ha of summer vegetables were damaged, a loss of 300 M ton. In 2003, damage to crops was also notable. In particular, over 600 M ton of total *Aus* paddy (over 350 ha) was damaged to due excessive rainfall, and over 650 M ton (170 ha) of summer vegetables were destroyed (**Table 6.7**).

Table 6.7: Crop Damages by Excessive Rainfall/Flood, Rangamati Region, May-July, 2003

Crop	Loss in production (M tons)	Total area damaged (ha)
Aus Local	110.0	89.0
Aus HYV	500.0	267.1
Summer Vegetables	656.0	170.8
Banana	44.0	3.0

Source: BBS 2005

In some of the more remote parts of the CHT crop damage by wild animals poses a serious problem. Wild boar is the main problem, while reports of deer, monkey, and porcupine are also common. In Khagrachhari elephants have been reported to be a nuisance. Experts recommend live fencing of a thorny species of shrub or small tree, to protect

against this type of crop damage. Coordination between locals, along with use of drumming or flares, could be used to protect against elephants by scaring them away (Hassan and Van Lavieren, 2000).

6.2.8. Fertilizer/Pesticide Use

The use of agro-chemicals remains limited in the CHT. This is mainly because of financial constraints, lack of market access, and low requirement of chemicals for traditional *Jum* cultivation. A common trend in the CHT is the use of "biological insect control" for irrigated rice, by setting up roosts for insect-eating birds in crop fields. However, the use of agro-chemicals is increasing with the increasing production of HYV rice, in particular HYV *Aman*, which needs high fertilizer and pesticide inputs because of its narrow gene base and general susceptibility to pests and diseases. Due to elimination of natural predators like birds of prey, snakes, jungle cats, rat infestation on *Jum* lands pose a big problem. During the new flowering of a special type of bamboo, the number of rats increase manifold, as the rats swoop upon the dying bamboo flowers. Department of Agricultural Extension should take preventive measures with appropriate rodenticides to protect the crop field from the rats.

6.3. Livestock

In the CHT the breeding and raising of livestock, also known as animal husbandry, which is not very organised and prosperous right now, may be developed more to make it an important part of local people's livelihoods. It contributes approximately 5% of the region's annual products. During the many religious festivals throughout the year, livestock serve as a source of additional income. The raising of pigs is particularly important for *Pahari* festivals, while goats and other livestock are used by both *Paharis* and Bengalis. There has been some introduction of buffaloes into the region, but buffaloes are not fit for the hilly terrain. Often it is cattle that are used instead of buffaloes for transport, pulling carts, hauling timber, and ploughing fields (ADB final report, 2001).

Table 6.8 reveals that about 8,986 cattle and buffaloes belong to 489 of households in all CHT. On the other hand, 28,676 goats and sheep belong to 1,094 households, and 192,152 Fowls and ducks to 372 households. Only a small number of pigeons (1287) were found in CHT area.

Table 6.8: Livestock and Poultry Birds in the CHT ('000s)

Location	Cattle & buffaloes		Goats & sheep		Fowls & ducks		Pigeons	
	Holding Reporting	Number	Holding Reporting	Number	Holding Reporting	Number	Holding Reporting	Number
Bandarban	85	642	179	4863	66	10859	9	472
Khagrachhari	71	2241	465	12587	179	147003	8	815
Rangamati	333	6103	450	11226	127	34290	0	0
Total CHT	489	8986	1094	28676	372	192152	17	1287
Bangladesh	15475	194154	28891	881507	31612	21809649	1200	115410

Source: The Bangladesh Census of Agriculture (Rural), 2005, BBS

6.4. Fisheries

Fishing provides supplemental income and nourishment for many of the people in the Chittagong Hill Tracts. Numerous rivers flow through the hills, bringing fish along with them. Floodplains and *beels*, a local name for fresh water lagoons, also provide habitat for fish. However at present, an increase in production is unlikely because moderate fishing methods in the short term are required to sustain and nurture a larger fish population; while the fish population has been hurt by continuous overfishing, environmental degradation, lack of proper management, and poor enforcement of fishing regulations. The annual fish catch from the inland waters of the CHT (district-wise) is shown in **Table 6.9**.

Table 6.9: Annual Fish Catch from Inland Waters in the CHT

CHT District	All Rivers	Beel	Flood Plain Area	Pond	Seasonal cultured
	Annual Fish Catch Scenario in water resources (Unit: **Metric Ton**)				
Bandarban	46	0	127	1413	8
Khagrachari	92	39	9	1921	52
Rangamati	84	55	0	1858	12
All CHT	222	94	136	5192	72

Source: DoF (2013-2014)

This sharp fall in fish catch may be the result of the destruction of natural fish habitats, and the reasons mentioned above. The rivers and floodplains natural fish supplies are fragile and sensitive to changes in environment and habitat. The table shows that in the CHT about 222 M tons fish are produced from all rivers whereas 5192 M tons from pond in 2013-14. Likewise, almost 94,136 and 72 M tons are produced from the *beels*, floodplains and seasonal cultured of water bodies in CHT region. The natural fish in the rivers and floodplains are fragile and sensitive to changes in environment and habitat.

7. Water Resources

Water, like any part of the country, or for that matter, any part of the world, is indispensable to life and livelihood for the people of the CHT. The people depend on different sources of water for drinking, bathing, washing, sanitation and other domestic needs. The main sources of water in the CHT are the surface water from rivers, lakes, canals and springs, and groundwater from both shallow and deep aquifers. The rivers in CHT are mostly secluded and confined in the hilly areas, and not connected to the main river system of the country. Rainwater is another source of water in most of the CHT areas. Water is an essential item in life, but it sometimes creates problems also. Safe water is not always available in the CHT, and as a result, the people suffer from various water-related diseases. Sometimes the diseases are caused by the ignorance of the hill people about proper hygiene.

The demand and availability of water in the CHT are not easy to estimate as there are not much data available and also, the data collection is difficult and expensive. Primary information, as well as different studies and projects carried out by other agencies, were considered to assess the demand, availability, and degree of impact of water scarcity on other natural resources in the region. However, unlike most parts of Bangladesh which have complicated river networks, the rivers in the CHT are either mostly independent or have one or two tributaries or distributaries.

7.1. Surface Water

Rainfall is the main source of surface water in the CHT. Surface and groundwater resources are reliant on each other. Depending upon climatic conditions and the connection between surface and groundwater, many streams receive a major portion of their flow from groundwater. On the other hand, surface streams can also be the key sources of groundwater recharge. In general, groundwater flows into the surface water bodies in the dry season and surface water enters into the ground during the monsoon. Therefore, use of one source usually affects water availability from other sources. In the overall CHT region, surface water mostly comes from springs, streams, canals, rivers and lakes.

7.1.1. River System

The CHT region typically consists of hill slopes for a long reach of the river before it enters into the plain through valleys. Most of the rivers in the CHT area flow in a north-south direction. The northern catchments of the CHT area are drained by the Karnaphuli River and its tributaries (Chengri, Myani and Kasalong), while in the south the Sangu River carries most of the drainage system. These rivers have cut deep gorges in a southwest direction before entering

the coastal plain and ultimately draining into the Bay of Bengal. In the Chittagong coastal plain, these rivers meander as a result of reduced flow and large quantities of sediment.

Five rivers mainly flow through the region, namely Chengri, Myani, Karnaphuli, Matamuhuri and Sangu, which together, add up to a length of 1400km. These rivers originate outside the country; the three major rivers in the north originate in Tripura and flow south towards Bangladesh into the Kaptai reservoir, while Matamuhuri and Sangu Rivers originate in the mountains of Myanmar. Before the creation of the Kaptai reservoir, the Chengri the Myani Rivers flowed into the Karnaphuli River.
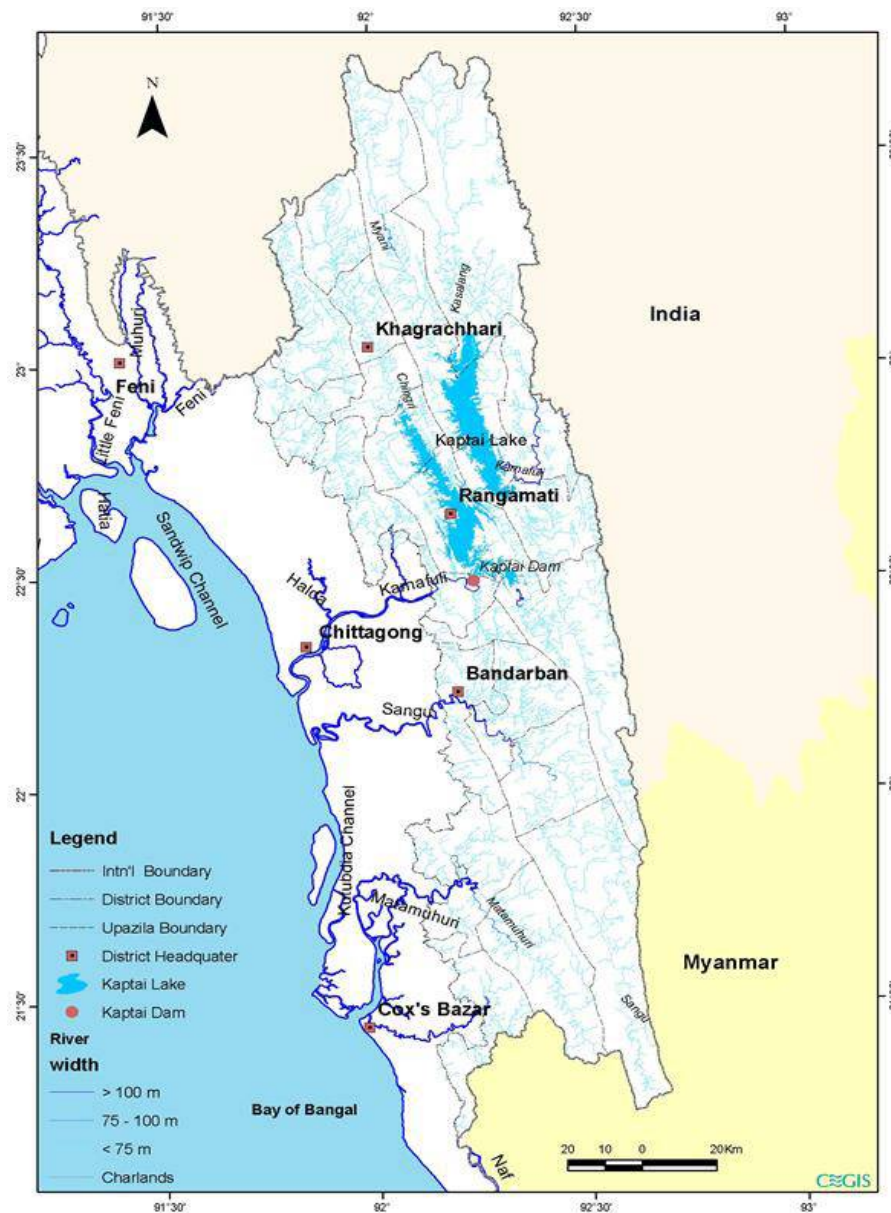

Figure 7.1: River System with Charas (small rivulets) of CHT

Source: Charm project CEGIS

The Kaptai hydroelectric dam was constructed on the Karnaphuli River in early 1960s, and as a result, an artificial lake – the Kaptai reservoir – was created. Because of seasonal variations, the reservoir area varies between 55,000 and

68,000 hectares (ADB Report on CHT Region Development). Usually, the highest water coverage occurs in June and the lowest in November. The Kasalong and Myani tributaries of the Karnaphuli River drain into the lake. The KaptaiLake is the largest (permanent) lake in the country, covering an area of around 777 km2. The average annual flow in the reservoir is approximately 15,646 million m^3. The flood absorption capacity is 1024 million m^3.

Another prominent lake is Bogakine Lake, which is a natural lake situated in the Bandarban district in the Chittagong Hill Tracts. Other lakes include Rinkhyongkine and Foys, all situated in the CHT region.

The length of the Sangu, Karnaphuli and Matamuhuri in Chittagong Region are 287 km, 180 km and 161 km respectively. About 58% of the Sangu River and 40% of the Karnaphuli River flow through the CHT. In Bandarban, the Sangu is the longest river with a length of 176 km. During the wet season, the width of any of the rivers Matamuhuri, Karnaphuli and Rangkhaing can be as wide as 100 m or more. The Bagabili, Halda, Dighalchari and Chatrachara rivers also spring back to life in the wet season. The CHT Rivers and their estimated length, width, place of origin, and the locations through which they flow are given in **Table 7.1**.

Table 7.1: Major rivers in the CHT

Sl. No.	River Name	Length (km)	Width (m)	Passing District	Originate From
1	Matamuhuri R	97	Above 100	Bandarban	Myanmar
2	Karnafuli R	90	Above 100	Rangamati	Mijoram
3	Rangkhaing R	47	Above 100	Rangamati	Bangladesh
4	Sangu R	177	50-100	Bandarban	Myanmar
5	Myani R	65	50-100	Khagrachari	Tripura
6	Chingri R	86	25-50	Khagrachari	Tripura
7	Feni R	56	25-50	Khagrachari	Tripura
8	Baghkhali R	14	25-50	Bandarban	Bangladesh

Source: CHARM Project, CEGIS/ ISRIC, 2007

There are innumerable rivulets and hill streams known as *chharas* in the CHT. When added, the total length of *chharas* meaning rivulets) spreading over the CHT region is more than 7,200 km. Among them, 40% flows over Rangamati and 30% in Bandarban and Khagrachari. These hill streams have steep slope and so they cannot hold water for long. When they reach the rivers, water is flushed out quickly. During the rainy season, about 862 km of *khals* connected to *chharas* and rivers, are also functional.

The maximum average discharge in Sangu and Matamuhuri River varies between 291 m^3/s in summer (July) and 20 m^3/s during dry period (based on period 1965-2006, NWRD), **Figure 6.2** and **Figure 6.3**. The maximum discharge of the Matamuhuri was observed to be 4,980 m^3/s at the Bandarban station in 1984 and of the Sangu 3,530 m^3/s at the Lama Station in 1990. The maximum discharge occurs from June to August and the minimum flow is usually observed from January to April. The annual average discharge of the Matamuhuri River is 938 m3/s and that of the Sangu River is about 1106 m3/s. About 15% of average discharge is observed in the dry season in both rivers.
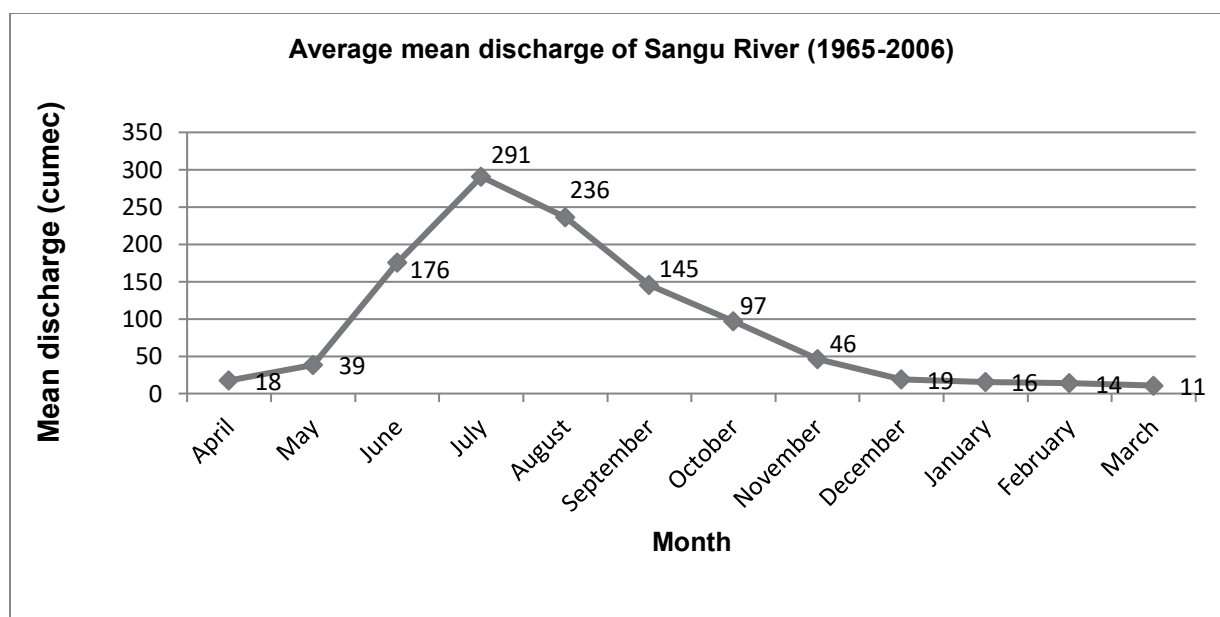
Figure 7.2: Average mean discharge of Sangu River
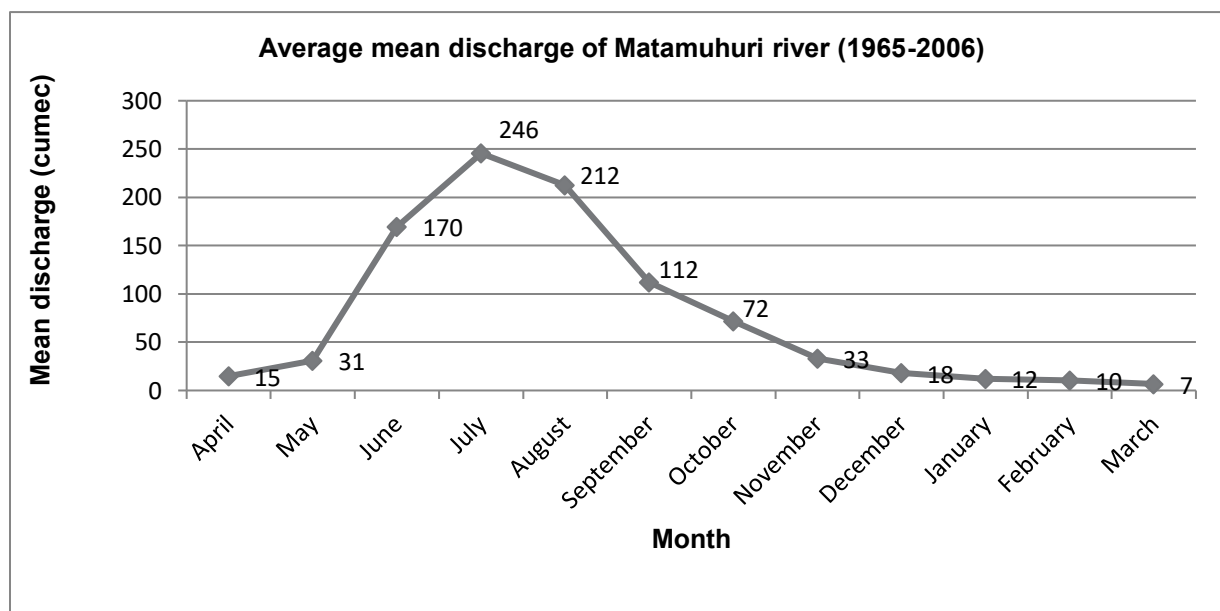
Source: NWRD

Figure 7.3: Average mean discharge of Matamuhuri River

Source: NWRD

Water level variations of the major rivers of the CHT area are shown in **Table 6.2**. Daily time series water level data of BWDB are analyzed for a period of 1962 to 2009. Highest water level is observed during the month of July and the lowest in March.

Table 7.2: Water level of major rivers in the CHT region (PWD, m)

River	Station	2008		2009		Historical	
		Highest	Lowest	Highest	Lowest	Highest	Lowest
Matamuhuri	Lama	13.26	6.28	13.87	6.41	15.06	5.23
Sangu	Bandarban	13.13	4.77	13.00	4.7	20.64	3.74

Source: NWRD

7.1.2. Perennial Waterbodies:

The total area occupied by the perennial waterbodies within the CHT region is about 54,759 hectares of which Kaptai Lake covers about 48,000 hectares. The lake spreads over Rangamati, Langadu, Barkal, Nanear Chhari, Jaraichhari, Kaptai and Belaichhari upazilas. The lake water area varies between 26,800 hectares in May and a maximum of 74,200 hectares in October (BBS, 2004). On an average it stores about 43% of water of all perennial waterbodies in the CHT.

When the Kaptai dam was commissioned in 1962, nearly 22,000 hectares of flat, alluvial land were submerged. In addition, 24,000 hectares of sloping foot hills were also submerged. The Kaptai dam was built for generating cheap hydroelectric power to mitigate the power crisis of Dhaka and other cities. The initial environmental and social costs of the project were tremendous and have multiplied with the passage of time. The creation of Kaptai Lake has greatly affected agricultural production in Rangamati District by submerging its fertile land. According to the rule curve for water levels, the water level at the dam site should remain below 27.5m from April to August so that the farmers can grow one crop (Aus or Boro) in the fringe valleys. Apparently, this rule has not been respected lately, resulting in the loss of paddy crop in the valleys. Moreover, the maximum water level in the rainy season also seems to have increased significantly (33.5 m in September), leading to huge loss of land that used to be available for monsoon vegetable production.

The fringe valley area was estimated to be about 9,000 hectares. It is not known how much of this was affected by the change in water level regulation. According to DAE-Rangamati estimates, it may be as high as 5,000 hectares. Several communities were consulted at different locations along the borders of the lake and in the upstream, in order to obtain an idea about how they were affected from the increased water level. It was realised that paddy cultivation and summer vegetable production were severely affected. The total area damaged may reach well over 9,000 hectares including thousands of small plots, which were important for subsistence.

It was also observed that hilly rivers passing through V-shaped gorges could inundate the banks. The Thanchi and Lama *Bazars* are regularly flooded by flash floods from the Sangu and Matamuhuri rivers, while Panchhari area is flooded by Chengri River. The affected areas usually remain waterlogged for a few days after every flood and causes severe damage. Moreover, the areas are often lashed by cyclones. Landslides are common during the monsoon. Reportedly, the landslides occur from soil erosion, deforestation, and faulty agricultural practices. Landslides also cause increased siltation in the rivers. In Lama, local people suggested digging a river loop to prevent regular flooding (Source: Quamrul Islam Chowdhury, Sustainable Development Networking Program).

7.1.3. Water Management practices (reference FAO Report 2013)

Irrigation: In the CHT, only 156,936 ha (3.1%) of the total land area are valley and suitable for intensive cropping. Only 19.2 percent of the valley land is brought under irrigation and over 80 percent area is under rain-fed agriculture (source: DAE). Extent of irrigation is relatively higher in Khagrachhari district (32%) and the lowest in Rangamati (12%). Most of the farmers are using low lift pumps (LLP) for irrigation and utilizing surface water. Only two deep tube wells (DTW) are operating, one in Dighinala upazila (Khagrachhari) and another in Baghaichhari upazila (Rangamati). Besides, two rubber dams were scheduled to be constructed, one in Panchhari (Khagrachhari) and the other in Rajvila (Bandarban).

Indigenous water retention practices: Commonly used methods for water retention for irrigation purposes are (a) indigenous cross-dam, (b) retention pond, (c) *Godha*, d) *Thelya-Thok*, and (e) LLP near the riverside. Indigenous earthen cross-dam, 4-6m wide and 2.5-5m high, is constructed across a perennial creek between two hills. The catchment area for the creek is 80-100 ha. People use stored water for fish culture and raising ducklings. A bamboo pipe of 5cm diameter that passes through the dam is used to maintain the water level. The pipe is kept closed with a wooden plug that can be removed to lower the water level in the pond or provide water for irrigation in downstream areas. Natural vegetation in the upstream hill slopes and along the banks of the creek is maintained to minimize soil erosion and siltation of the creek.

7.2. Groundwater

The availability and the quality of groundwater in Bangladesh is significantly related to the main physiographic elements of the country. The entire country is divided into three major physiographic units: the Holocene Plains, the Pleistocene Highlands, and the Tertiary Hills. Physiographically, CHT belongs to the Tertiary Hills unit. According to the simplified hydrogeological classification (Ahmed, 2003), this area belongs to the hydrogeological province called 'Tertiary Hills'.

In the context of groundwater availability and the suitability of groundwater improvement, the CHT is less proper than most parts of the country. The folds of the sedimentary strata developed from tectonics have made the geology of the area complex and consequently its hydrogeology as well. A thick bed of consolidated shale limits the vertical recharge of groundwater into the aquifer below. However, along the valley areas (synclines) deep groundwater is available within a depth range of 100-300 metre. Except some areas in the Khagrachhari district, the groundwater table occurs at a greater depth below the ground surface. The primary source of natural groundwater recharge is direct rainfall.

7.2.1. Aquifer system

In areas with folded rocks such as CHT, regional aquifers often lack continuity. Tertiary sediments/rocks comprising alternating clay and sand dominating formations form aquitards and aquifers of the area. According to the aquifer potential related to the stratigraphy (modified from MPO, 1987), the DupiTila Formation of the Middle Pliocene to the Late Miocene age has good aquifer potential in the CHT. This formation is mainly composed of coarse sandstone. Another sand dominating formation called the 'Tipam Sandstone' is considered as a moderate potential aquifer. These two aquifers are separated by a clay dominating aquitard called the 'Girujan Clay'. The other older geological formations are not well described yet. Free flowing aquifers are common in the hilly areas.

7.2.2. Groundwater level

The groundwater level fluctuates with seasons and the abstraction from the system. Like many other places of the country, the aquifer of the study area is not fully recharged during the wet season and in most places the groundwater level stands below the ground surface. No declining trend of groundwater level has been observed. Except for some areas of Khagrachari District, the whole of the CHT has a very low groundwater table. The installation and maintenance of groundwater abstraction technologies are costly in these areas.

7.2.3. Groundwater use

The use of groundwater in the CHT area is comparatively low. The hard bedrock underlying much of the region makes tubewell installation difficult. As a result, wells are not drilled deep enough and as a result, dry up quickly. Moreover, it is quite expensive to drill a hole and thereby to install a well.

7.2.4. Per capita water consumption

Per capita water consumption is mostly dependent on the distribution of population of a community in age groups, religion, sex, socio-economic condition, profession, etc. The average water requirements of all age groups and population living under different socio-economic conditions are not equal. Water is used for various domestic purposes such as drinking, cooking, bathing, washing, vegetable gardening, livestock feeding, sanitation, and personal hygiene. Professional and religious practices also influence the use of water. The variation in the source, supply and quality of water as well as availability of alternative water sources influence per capita water consumption of an area. Considering all these factors, the people of the CHT areas are found to consume less water than people living in the other plain areas of Bangladesh.

7.2.5. Other possibilities and uses

The Hill Tracts Region has been categorized into two parts: the hills, where irrigation returns feed the plains, and the coastal plain, where they contribute to salinity control. The region as a whole is in deficit of water, but there are still many possibilities for improvement of water uses. Irrigation, supported by natural flows, should be developed, while monsoon storage capacity should also be improved. In the hills there are obvious opportunities for drip irrigation of high value tree crops, which need less water. The main concern is that excessive irrigation on the coastal plain using groundwater might cause saline water to be drawn in, and close monitoring is needed to prevent such intrusion.

8. Water Supply and Sanitation

8.1. Drinking water

8.1.1. Introduction

Water supply is one of the most important issues in the Chittagong Hill Tracts, as water is always scarce in the region, especially during the dry months. Any substantial development in the life of the hill people will certainly require the availability and supply of water for drinking and other domestic purposes. Water supply is mainly dependent on demand, availability of the source, feasibility in the context of cost-effective technology, and physical features of an area. The availability of low cost options for the water supply system depends on hydrogeological conditions, availability of water source and quality of water in a particular area. No particular option is suitable or feasible for all areas. Like water itself, good water management is not generally seen or observed in the area. Drinking water largely comes from perennial water sources such as streams, springs, and rock channels (locally known as *chharas*). Water rights are rather undefined compared to land and forest rights. Sustainability of technologies installed for producing water in the area is questionable due to many challenges, such as geographical context, land type, depth to groundwater, hard rocky layer below the ground surface, lack of proper maintenance, replacement of instruments, seasonal disorder, high iron content, bad odour and taste. Often within a few months or years after installation, the system goes out of order.

As a result, people return to the surface water sources where they face difficulties for water collection. Water sources are not protected, and due to lack of conservation practices, the prime water sources are gradually degraded and dried up. In near future, it will be a big challenge to mitigate the demand of safe water in this region. An unsafe water practice is a common phenomenon in the remote villages of CHT. Around 55% of the households in Khagrachari have access to safe water from tubewell; for households in Rangamati and Bandarban, this figure is 39% and 15% respectively (CHARM Report, CEGIS, 2007). It is difficult to install tube wells in the CHT in the hard bedrock. Semi-operational wells become dry during the months from February to May. Villagers who rely on rivers or streams also face problems during this period. An alternative technology like rainwater harvesting (on the roofs) may be explored. Deep-set tube wells also offer advantages in the CHT. With community participation, the maintenance of existing tube wells may be improved for the availability of drinking water.

8.1.2. Water wells

In recent programmes, much attention is given to simple dug wells, which are around 20 metres deep. Free flowing artesian wells are a possibility around the lakeside. In the hilly areas, where water is a particularly scarce resource for households, more local studies need to be done on the feasibility of wells. It is of particular importance to use geological data to the fullest extent possible, in order to develop a set of models which can be used for the local situation.

The distribution of different types of tube wells is shown in **Table 8.1**. Bandarban has a significant number of Tara pumps, which probably reflects the deeper water table compared to the other two districts.

Table 8.1: Well details in the CHT region (1998-99)

District	Shallow tube well	Deep tube well	Tara pump	Ring well	Pond Sand Filter	Iron remove Plant	Deep set pumps	Total no of wells
Rangamati	931	-	-	1,268	-	-	1,530	4,943
Bandarban	781	-	1,394	887	-	-	461	3,523
Khagrachari	1,544	-	-	956	-	-	1,405	5,160

Source: NWMP 2001

The household survey conducted by Bangladesh Centre for Advanced Studies (BCAS, 2006, Survey of Households: Natural Resources Users, Draft Report) emphasized upon drinking water quality and availability related problems. Households in the CHT use a variety of different water sources to get drinking water, but are often unsatisfied with the quality, quantity, and availability of water (**Table 8.2**).

Table 8.2: Distribution of Households Surveyed by Source of Drinking Water and by District

Source	District			
	Bandarban	**Rangamati**	**Khagrachari**	**All**
Hand tube-well	24 (14.7)	38 (25.3)	115 (76.6)	177 (38.2)
Ring well	18 (11.0)	40 (26.7)	3 (2.0)	61 (13.2)
Dug well	5 (3.1)	26 (17.3)	16 (10.7)	47 (10.2)
Pond	-	-	-	-
Canal/River	56 (34.4)	6 (4.0)	3 (2.0)	65 (14.0)
Deep set tube-well	1 (0.6)	2 (1.3)	3 (2.0)	6 (1.3)
GFS	15 (9.2)	-	-	15 (3.2)
Piped water supply	2 (1.2)	3 (2.0)	-	5 (1.1)
Lakes	-	5 (3.3)	-	5 (1.1)
Spring	5 (3.1)	26 (17.3)	2 (1.3)	33 (7.3)
Jhiri(small waterfalls)	9 (5.5)	-	-	9 (1.9)
Tube well +Ring well	3 (1.8)	-	-	3 (0.6)
Tube well +Khal/River	5 (3.1)	-	5 (3.3)	10 (2.2)
Ring well +Khal/River	6 (3.7)	-	-	6 (1.3)
Tube well +Others	2 (1.2)	-	1 (0.7)	3 (0.6)
CFS+ Khal/River	2 (1.2)	-	-	2 (0.4)
Dug well +Khal/River	1 (0.6)	-	1 (0.7)	2 (0.4)
Jhiri +Khal/River	2 (1.2)	-	-	2 (0.4)
Others	7 (4.4)	4 (2.8)	1 (0.7)	12 (2.6)
Total	**163 (100.0)**	**150 (100.0)**	**150 (100.0)**	**463 (100.0)**

Note: Figures within parentheses represent percentages

Source: CHARM Project, CEGIS / ISRIC 2007

While these households have access to the sources of drinking water, the supply of water is often considered inadequate. During the dry season, 34% of households that depend on tube wells suffer from water shortage, while 48% of ring-well users, 54% of dug-well users, and 62% of canal/river users find their access to water during the dry season inadequate. Of all the households, only 65% perceive their drinking water to be safe. Additionally, 19% of households have to spend more than two hours a day collecting and storing water; 32% spend between one and two hours, while 49% use less than one hour of the day for this purpose. The responsibility of collecting and storing drinking water falls most frequently on women's shoulders – 65% of the time this task is conducted by females, while adult males only are responsible for this task in 17% of the households (BCAS, 2006).

Only 17% of households own their drinking water sources and 24% depend on their neighbours' sources. NGOs own 13% of these sources, and the government owns 9%. Community properties account for another 12% of the sources, and the remaining 25% are owned by other parties (BCAS, 2006).

8.1.3. DPHE Projects

In order to improve water supply in rural areas of CHT districts and to improve water supply and drainage system of seven Pourashavas of CHT, the Department of Public Health Engineering (DPHE) carried out a study in the CHT in 2012 through a consulting group, which included baseline survey, feasibility study, preparation of Master Plan and investment project (Master Plan for water supply in the CHT, DPHE 2012). The objectives of the project were: provision of adequate water supply in urban and rural areas, improvement of drainage for urban areas, and reducing environmental hazards. Three Hill Tracts Districts are Bandarban, Khagrachhari and Rangamati were selected for the project. The project was to use a demand driven approach to enhance water supply and environmental sanitation facilities to the in-habitants of the CHT districts. The project was divided into two parts; part-A containing water supply improvements the in Rural Areas, and part-B containing water supply and drainage improvement in *Pourashavas* (municipalities).

Data were collected from BWDB groundwater monitoring wells database; it was observed that present groundwater level of Ramgarh area was within 1 meter depth from ground surface. That of Betbunia in Rangamati was within 1.5 to 2.5 meter depth from ground surface, whwreas the GW level of Bandarban town was deeper, and varied from 3 to 6 meters.

Water supply technologies in CHT: The existing water supply technologies in rural areas of CHT are as follows: shallow tube well, deep tube well, ring well, dug well, rainwater harvesting, infiltration gallery, and gravity flow system. Shallow tube wells are widely used in Bangladesh and also in the CHT for the supply of drinking water. The diameter of this tube well is generally 38 mm and the depth is within 75 meter. The notable disadvantages of STW are that shallow layer may contain excessive concentration of iron, arsenic and salinity, if installed within 15 meter distance from pit latrine or garbage stack, water may be contaminated, and the STW may be out of operation during the dry period due to the GW table going down.

Usually a deep tube well penetrates more than one aquifer, but generally a tube well deeper than 75 meter is considered as deep tube well. The purpose of deep tube well is to go for a deep aquifer to avoid salinity, iron, and arsenic concentration (not found in the CHT so far) in shallow layers. The installation of a deep tube well is difficult particularly in the hilly/rocky region and construction methods are also different from those of shallow tube wells. However, the advantages of DTW are: water is available throughout the year, easy maintenance, spare parts readily available, and chances of contamination by pit latrines do not exist. But the disadvantages are the high installation cost and difficulty in installing in the rocky/hilly areas.

The traditional method of obtaining groundwater in rural areas in most of the CHT region is by means of dug/ring well. However their use is restricted to suitable types of ground such as clays, sands, gravels and mixed soils, where only small boulders are encountered. The volume of water in the well below the standing water table acts as a reservoir, which can meet the demands during the day and replenish itself during the periods when there is no

abstraction. Depth of hand-dug wells range from shallow well, about 5 meters, to deep wells, over 20 meters deep. Diameter is generally one meter. The yield from the dug/ring well depends upon types of aquifer and size and depth of the well. Dug well has no lining and platform; the water is collected by bucket, whereas ring well is lined with R.C. ring and has an R.C. slab, and fitted with a hand pump. The hand pump may be No 6 pump or deep set pump or Tara pump, depending upon the static level of water.

Where there is no surface water, or where groundwater is deep or inaccessible due to hard ground conditions or where it is too salty, the most appropriate alternative is the collection of rain water, called rainwater harvesting, provided the area has sufficient rainfall. The rain can be collected from most forms of roof. Tiled roofs or roofs sheeted with corrugated mild steel are preferable. The rain water is generally collected from roof by gutters. The guttering drains to a down pipe which discharges into a storage tank. For every 1 mm of rain on a square metre of roof area will yield 1 litre of water, less evaporation, spillage looses and wind effects. The capacity of the storage tank is based upon rainfall pattern and volume, the duration of the dry period and the estimate of demand. Storage can range from small containers made for other purposes upto a large tank of 150 cubic metre or more at ground level.
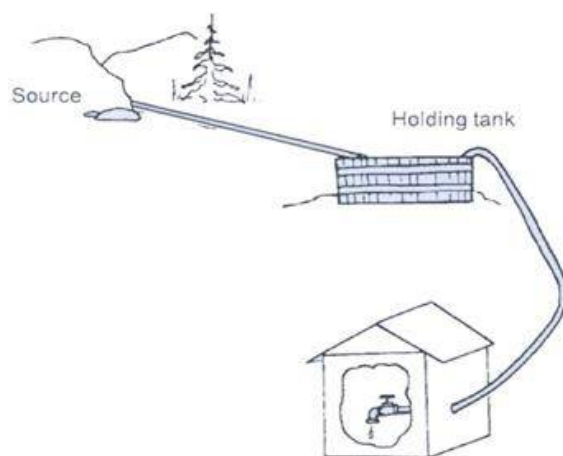

Figure 8.1: Gravity flow system

Gravity flow systems include all systems where water pressure is primarily provided by gravity. Water from streams, ponds, springs and artesian wells can be used directly or can be stored in a settling basin before entering the system. In the CHT, generally water is gravitated from the upstream of springs by construction of filter chamber, intake wall and pipeline to holding or sedimentation tanks, from where water is supplied to the consumers by pipeline (**Figure 8.1**).

The majority of people in the developing world gain access to groundwater either by means of a bucket and rope, or by using a hand pump. The disadvantages of a bucket and rope system are: it does not allow the well to have cover. Slab which can be sealed to prevent ingress of polluted water or other contaminants, and the bucket and rope are continuously being polluted by mud and dirty hands. Therefore if the water to be abstracted from a well or borehole for safe drinking, it is preferable to install a hand pump.

Present Situation of Water availability: As Bandarban is a deep hilly area, ring wells are mostly used in Bandarban, 55.17%, whereas tube wells are 25.86%. Tube wells are habitually used in Khagrachari (85.07%). In addition, Rangamati is a deep hilly area, ring wells are commonly used in Rangamati 77% whereas Tube wells are only 7.14%. From the survey it is revealed that deep hilly areas and less hills area use tube wells among the three districts of CHT.

Table 8.3: Present Situation of Water availability

District	Upazila	Union	Water availability (present situation)		
			Satisfactory	Unsatisfactory	Total
Bandarban	Bandarban Sadar	Swalak	09	06	15
		Rumasadar	04	09	13
	Alikadam	Alikadam.sadar	04	10	14
		Chykong	04	12	16
	Total	04	21	37	58
	Percentage %		36.21	63.79	100%
Khagrachhari	Panchari	Pancharisadoar	03	14	17
		Latiban	05	15	20
	Manikchari	Batanatotli	11	02	13
		Manikchari	07	10	17
	Total	04	26	41	67
	Percentage %		38.81	61.19	100%
Rangamati	Belichari	Belicharisadoar	00	13	13
		Kangrachari	00	15	15
	Langadhu	Langadhu	10	04	14
		Attrakchara	07	07	14
	Total	04	17	39	56
	Percentage %		30.36	69.64	100%

Source: *DPHE, Report on FGD of Bandarban, Khagrachari and Rangamati District, March, 2012*

From the above statistics it is observed about 64%, 61% and 70% of the total population of Bandarban, Khagrachhari and Rangamati are not satisfied with the present system of water supply.

During the dry season water demands has been increased largely due to all natural water sources have dried up. It is a common scene in the CHT, that women fetch water from a fairly long distance from their residence by earthen or aluminium pots (see picture).

8.2. Sanitation

8.2.1. Rural Sanitation in CHT

A long-term objective of Rural Sanitation project was aimed to reduce incidence of waterborne diseases through installation of sanitary latrines. The sanitation program under the name of "Village Sanitation Project" commenced under DPHE in 1974 and continued up to June 1996. Due to widespread demonstration, production and sale of latrines from DPHE and private enterprise production centres over the years and promotion of sanitation through hygiene education, social mobilization; a favourable situation has been created for the accelerated sanitation program. There are roughly 3000 private NGO production-cum-selling centres producing latrines. Social leaders are now gradually becoming aware about the importance of sanitation and are urging people to improve the sanitation and personnel hygiene practices in the CHT. During the 4th FY plan, mass scale mobilization for sanitation was launched in order to bring about a dramatic improvement in the coverage. The introduction of revolving fund in the 3rd phase of the village sanitation program (VSP) provided a unique opportunity to maintain the continuity of the production of latrine sets with reduced subsidy. GoB National operation of sanitation facilities is to bear its total cost. Measures are to be taken so that users bear increased cost of sanitation services.

Sanitation technology options in CHT areas: Existing sanitation technology in CHT rural areas are: Pit latrine technology, and Pour flash technology. Pit latrines are the simplest of all on site disposal systems; these latrines consist of a pit with a platform having a defection hole, and the excreta fall into the pit through squat hole. In rural areas traditionally, people defecate into a squat hole on a bamboo/wooden platform placed over a pit. This type of latrine is called home made latrine. Pour-flush Technology is an improvement over pit latrine, which is a pour flash latrine with a water seal. Water seal is a U-pipe filled with water, attached below the squatting pan that completely prevents passage of flies and odours. The water seal is only 15-25 mm deep and the latrine can be flushed by hand using 1.5 to 2.00 litres of water. Pour flash latrines have been developed by DPHE and is popular in Rural Sanitation in all over the country. NGOs and several private organizations manufacture these types of latrines.

Hanging Latrines: A hanging latrine consists of a small fenced room or shed with a hole in the bottom, through which faeces fall onto the ground or into the water. The latrine consists of a platform with squat hole built over a body of water and a superstructure that provides privacy. Major health problem results from the hanging latrine system. Hence it is not recommended.

8.2.2. Status of Drinking water and Sanitation

The status of safe drinking water is not good in CHT districts; overall about 49.16% of households drink tube well water in CHT, whereas the national average is about 89.1%. In Khagrachhari district tube well is the main source of drinking water, though in inadequate numbers, and 67% of the people can collect drinking water from tube well. Collection of drinking water from other sources is important in Bandarban and Rangamati, which are 48.30% and 53.50% respectively. The collection of water is very difficult during dry season and natural calamities. The status of drinking water in the CHT is shown in **Figure 8.2**.

Sanitation facility is not satisfactory in CHT; only 9% of households get water-sealed sanitary latrines whereas 48% households still use non-sanitary latrine in all CHT region. Overall 27.8% of households avail sanitation facilities (non-water sealed) in Rangamati. The alarming issue is that 18% households meet their need by using open toilets in all CHT districts. About 8.9% of the households have sanitation facilities i.e. water-sealed latrines in Khagrachhari; while 37.5% do not use toilet in Bandarban (**Figure 8.3**).
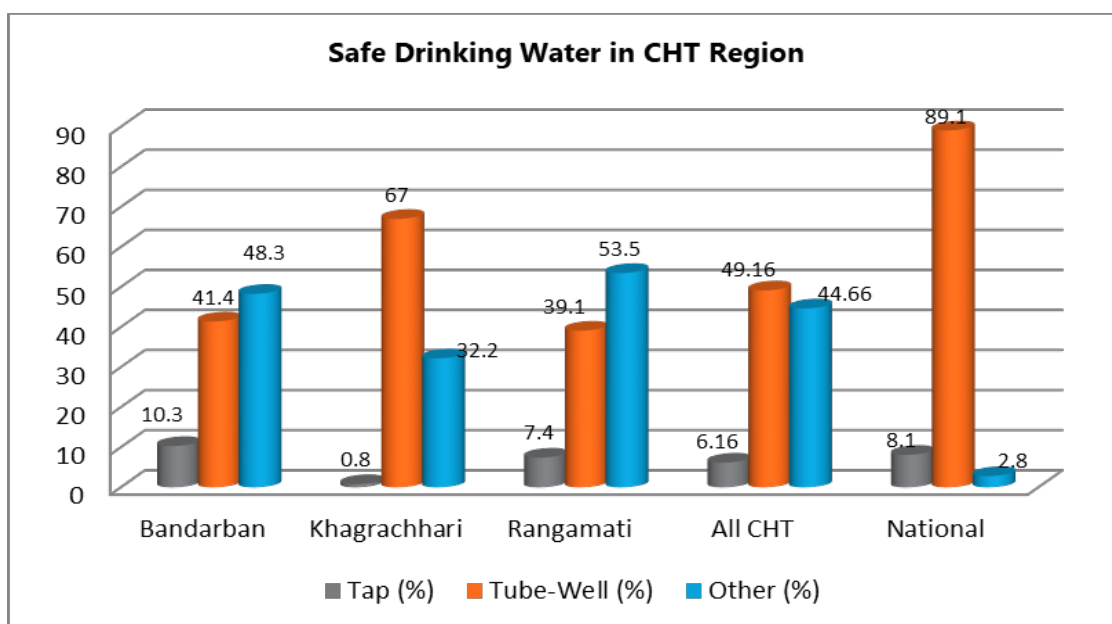
Figure 8.2: Status of safe drinking water in CHT
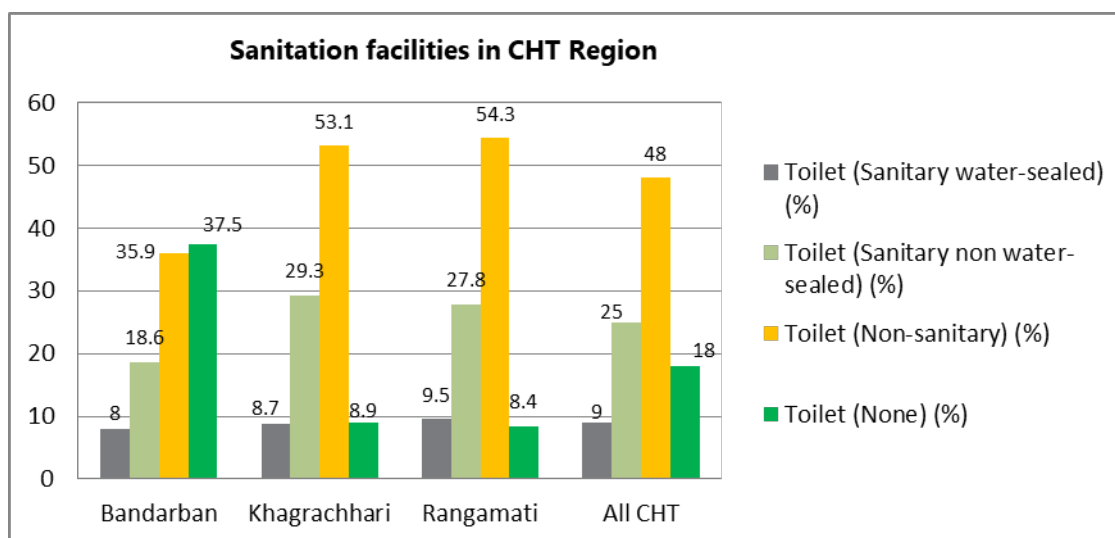
Source: Population Census 2011, BBS

Figure 8.3: Sanitation facilities in CHT

Source: Population Census 2011, BBS

8.2.3. Access to sanitation facilities in urban areas

The status of sanitation facilities used in the Pourashava area (as per Pourashava statistics): there are 2,085 sanitary and 3,447 others latrines in the Bandarban Pourashava areas. Apart from that, 245 household people use open space for this purpose. The status of sanitation facilities used in the Khagrachari Pourashava area: there are 3532 sanitary and 3279 others toilet in the Pourashava areas. Likewise, 436 household people use open space for this purpose shows. The status of sanitation facilities used in the Rangamati Pourashava area: there are 6,683 sanitary and 5,222 others latrines in the Pourashava areas. Apart from that, 406 household people use open space for this purpose.

Table 8.4: Water supply and sanitation facilities in Bandarban, Khagrachari and Rangamati Pourashava

Locality (name)	Source of Drinking Water				Sanitary facility		
	Population 2001	Tap	Tube well	Others		Sanitary	Others	No
Bandarban Pourashava	30,791	2996	1931	821		2085	3447	245
Khagrachari Pourashava	38,879	675	15588	214		3532	3279	436
Rangamati Pourashava	66,836	5,301	5,856	1,154		6,683	5,222	406

Source: Master Plan for Water Supply for Bandarban, Khagrachari & Rangamati, DPHE,June 2012

8.2.4.   Hygiene Knowledge and Behaviour

Analysis of knowledge on eight selected essential issues of personal hygiene as well as its practice in the real life situation among the residents of CHT shows that, by and large, in most of the cases, a comparatively higher proportion (67%- 92%) of Bangalees are aware of the issues than that of the Indigenous people (46%-90%) in the CHT. The overall knowledge co-efficient of the Bangalee people on personal hygiene are 0.76, which for the indigenous people is estimated to be 0.68. On the other hand, knowledge co-efficient of overall surveyed CHT population is 0.72 (**Table: 8.5**). In other words, 55% to 90% of CHT population in general has some knowledge on different issues of personal hygiene.

Table 8.5: Co-efficient of knowledge about essential personal hygiene issues and its practice at real life situation among the residents of CHT

Personal Hygiene Issues	CHT All		Indigenous People		Bangalee People	
	Knowledge Co-efficient	Practice Co-efficient	Knowledge Co-efficient	Practice Co-efficient	Knowledge Co-efficient	Practice Co-efficient
Hand wash with soap/ash before eating	0.65	0.31	0.58	0.33	0.74	0.30
Hand wash with soap/ash after defecation	0.65	0.39	0.54	0.32	0.79	0.48
Hand wash with soap/ash after cleaning baby's bottom	0.55	0.28	0.46	0.25	0.67	0.32
Hand wash with soap/ash before serving food	0.75	0.63	0.77	0.66	0.74	0.59
Hand wash with soap/ash before food preparation	0.72	0.57	0.76	0.66	0.67	0.46
Keeping food under cover	0.94	0.83	0.89	0.84	0.92	0.81
Cutting nail regularly	0.80	0.57	0.76	0.57	0.84	0.56
Go to latrine with shoes/sandals	0.70	0.56	0.69	0.52	0.72	0.59
All issue: (Overall)	0.72	0.52	0.68	0.52	0.76	0.51

Source: HDRC, 2009

However, with the exception regarding keeping food under cover and to some extent washing hand before preparing and serving of food, cutting nails regularly, and going to latrine with shoes - a noteworthy gap is evident between

their knowledge and practice (above table). In other words, the population of CHT as a whole is not practicing personal hygiene effectively. The coefficient of hygiene knowledge among the broad categories of CHT population varies between 0.68 and 0.76 with the lowest among indigenous people and highest among Bangalees. it is quite interesting to note that as regard to 'keeping food under cover' almost all (90%) are quite aware of this particular issue of personal hygiene and reported to practice it at an appreciable level (83%).

8.2.5. Problems/Constraints:

Regarding the total safe water and sanitation issues CHT-peoples faced various problems. These are summarized below:

- About 80% of families are facing difficulties for safe water collection
- About 65% of families in remote rural areas (deep hills area) use open pit as latrines
- A considerable numbers of water points in each district are non-functioning
- Most of the water points have been installed in houses of rich and influential people. As a result poor people have no access to these well points and they are deprived of safe drinking water
- As the transportation cost of concrete ring slabs of pit latrines is high in hill areas, the community people are reluctant to install pit latrines in these areas
- Rural people are suffering from water borne diseases particularly diarrhoea for lack of safe drinking water, especially from February to May
- The condition of sanitation is very poor in some tribal social class like Bom, Murong, Tripura and Maram families
- A considerable number of pit latrines are damaged through soil erosion and rain water pressure during rainy and flash food
- Water bodies such as lakes, canals, and springs are polluted by poor management of sanitation
- People have to travel long distances to fetch drinking water and spend substantial amount of time for the same. The distance and travelling time varies by season. A widespread practice of gender discrimination in collection of water is found, it is the female members who suffer most due to water scarcity and inadequate hygiene situation

8.2.6. Recommendations

- Develop reservoir at appropriate altitude
- Infiltration galleries, protected dug wells, and tube wells where feasible, should be developed as community water points
- Eco-toilet facilities or twin or multiple offset pit pour flush latrines are to be promoted, through motivational campaign and demonstration
- Rigorous campaign are needed
- The main areas of potential development can be rainwater harvesting (from roofs) and the development of surface water systems using various types of collection devices. Household water storage jars of fero-cement could be an option yet to be developed for the area.
- Deep-set tube wells also offer advantages in the CHT. With community participation, the maintenance of existing tube wells may be improved for the availability of drinking water.
- It is also recommended that training and capacity building of water user groups and LGIS to ensure active participation of local people
- Urgent need of rehabilitation of existing old and non-functional water points
- Installation of deep tube well by appropriate technology for overcoming stone cutting
- Encourage use of natural water by constructing water reservoir at the bank of rivers, lakes and to supply water through pipelines
- Use plastic pan and rings in lieu of concrete pan and rings

- Capacity building of the members of upazila, union parishad, religious leaders, social leaders, member of Bazar Committee, *Para* (village) head man, school teachers, water users in respect of use of safe water and sanitary latrines and maintenance
- Establish selling centers of spare parts of hand pumps and other water technology preferably at union level
- Encourage setting up of selling centres for the production of plastic pans and rings for sanitary water-seal latrine at union and upazila level
- Motivation of the water users for overall improvement of water supply and sanitation in the CHT area

9.   Environment, Biodiversity and Forest

9.1.   Environmental threats in the CHT

Lands in the Chittagong Hill Tracts are degrading due to deforestation. It also shortens the shifting cultivation cycle, and consequent soil erosion, floods and water pollution. The slash and burn system in *jum* cultivation as practiced in the CHT, is sustainable if practiced with long enough periods. But due to an increased population and scarcity of suitable land, the fallow periods have shortened from 15-20 to 3-5 years. Inappropriate forest and plantation management also contribute to severe land degradation. Soil erosion and forest degradation, resulting in declining crop production and loss of biodiversity, also have off-site effects on downstream and urban areas, such as flash floods, landslides, dam-siltation (Kaptai),and declining water quality. Extensive erosion is a serious threat to soils in the CHT and is one of the major degradation issues. The impact on production of the loss of topsoil is noticed by farmers in a production decline of 50% during the past 10-12 years, even though 70% of the *jum* farmers use synthetic fertilizer (Olarieta JR et al. 2007). Making sound policies and decisions on sustainable land management requires adequate information on natural resources. The potential areas may be identified according to their potential and constraints for various uses and management types through proper planning of land use. Alternative management practices may be adopted in place of present practices wherever applicable.

The sedimentation of Kaptai Lake, located on downstream of the Karnaphuli River, is an economic and environmental hazard. As such the watersheds draining into Kaptai Lake should be identified, so that any part of a watershed that drains into Kaptai Lake may be used as a criterion as it is an indicator for the downstream impact of potential degradation and soil erosion. Land areas that drain into Kaptai Lake are given higher priorities for conservation, rehabilitation and reforestation. Very steep slopes (>45%) are indicative of the sensitivity of areas for degradation upon disturbance. Private Forest land and Unclassed State Forest land with extreme slopes, under low vegetation cover, and draining into Kaptai Lake are classified with priorities for reforestation and conservation of watersheds and critical ecosystems.

Soil erosion can lead to increased landslides and flash floods. Also, animal habitats are destroyed, decreasing biodiversity. As sediment and other pollutants enter water bodies, there is a decline in water quality. Decreased dissolved oxygen levels and settling of sediment on fish breeding grounds can disrupt aquatic habitats. Sedimentation can also cause the river bottom rising, which may lead to faster flood times and disrupt navigation of water bodies. Therefore, the need for an integrated approach to natural resource management is evident.

9.2.   Biodiversity

Chittagong Hill Tracts is very rich in biodiversity, though the situation is worsening with increasing human interventions and encroachments. It is a hub of numerous medicinal plants. There is lack of information on the floral diversity of the CHT, which is threatened by increase in population combined with forest degradation, unsustainable land use patterns and soil erosion.

The CHT is considered as a centre of bio-cultural diversity because of its richness in natural resources and its cultural diversity (Halim *et al*, 2007). The negligence of the customary use and management rights of the forests has

accelerated the deforestation (Thapa and Rasul, 2006). Deforestation is caused by both natural and manmade factors. The forests, including high forest areas, have been disappearing. The timber type natural forest area of the *Kassalong Reserve* decreased, while plantation areas increased. Both mixed forest areas (timber-bamboo and bamboo-timber) and areas with bamboo trees have decreased. The *Sangu* and *Matamuhuri* reserve forest areas also underwent similar changes. About 2,200 ha of reserved forest area of Rangamati have been encroached (ADB, 2001c). Encroachment occurs as there is no clear boundary demarcation supported by cadastral maps (showing records of extent, value and ownership of lands). No data is available on the encroachment of the forest areas of the CHT.

As a habitat, the CHT supports many different kinds of animals and plants, but the fragile biodiversity has been affected by the increased human presence in the region. Cataloguing and maintaining information on the animals and plants of the region is necessary to strike a balance between the natural life of the CHT and increased human presence. The country supports a wealth of biodiversity, including 113 species of mammals, 628 species of birds, 126 species of reptiles, 22 species of amphibians, 708 species of freshwater and marine fish, 400 species of molluscs and over 5,000 species of vascular plants (IUCN, 2000). The CHT, as a large portion of Bangladesh's natural environment, contains many of these important species.

The decline in the biodiversity of the CHT has been caused by two important factors. The construction of the Kaptai hydroelectric power project inundated a large portion of the CHT with standing water, destroying a large forest area and along with it the habitat of many animal species, as well displacing local people. The increase of population density and arrival of (non-indigenous) outsiders in the CHT have also impacted the sustainability of the region's biodiversity.

The government declared the natural forests of the hilly areas as protected areas, game sanctuaries and national parks in order to preserve biodiversity. The National Environment Policy, declared in 1992, has a clear mandate for the enhancement of biodiversity, but it is yet to be implemented fully. Measures should be taken to preserve local knowledge and to implement techniques of natural resource management. A joint effort of the government agencies and involvement from the local people is essential to improve the situation and protect biodiversity.

9.2.1. Floral Diversity

The flora of the CHT resembles the flora of Arakan. The major floral species include *Garjan*, *Civit*, *Chandul* and *Champa*. But there is a lack of information on the floral diversity of the CHT. The senior groups/citizens of the ethnic communities have a vast knowledge about traditional agricultural practices and the use of medicinal plants for curing different types of diseases. They pass on their knowledge from generation to generation but do not disseminate their wisdom outside their own tribe or territory. Because the knowledge of traditional uses is limited to tribes, both this knowledge and biodiversity itself are at risk of disappearing. As mentioned earlier, population increase combined with forest degradation, unsustainable land use patterns, and soil erosion, threatens floral diversity. The threatened plants in the CHT are: *Ban supari, kadam bet, Chhoto bet mara, Modonmosta, Dholigarjan, Bon jalpai, Dephal, Kurudpata, Jangliaam, mon kata, ram supari, Jigra, Joyggagola, Chalmogra, Chandul, Lasuagarjan, Lotaaam, Han shak*, etc (ADB 2001c).

The status of trees of the CHT area was determined through a qualitative survey conducted by BRAC in 150 villages in the CHT. The findings are not quantitative, but give a general sense of the state of tree diversity. The trees have been categorised into four types such as timber, fuel, fruits and others. Gamari, teak, koroi, and gorjon are the trees that are most common in the CHT, followed by mango, jackfruit, and jarul trees. Timber trees, such as gamari, teak, koroi, chapalis, gutgute, badi, chakku, and guda species were cut down more frequently in the region. On the other hand, fruit trees like mango, jackfruit, coconut, and also betel nut trees were not usually cut down. Gorjon and chapalis were the major trees that have been eliminated from many areas. Households have planted trees, but these are mainly fruit trees. Unfortunately, some valuable trees, such as koroi and chapalis, were cut down and never replanted (Rafi and Chowdhury 2001).

Since a full quantitative survey of the area has not been conducted, the information are normally gathered from the locals to understand the environmental diversity of the region. The number of fruit trees, such as jackfruit, coconut, guava, pineapple, betel nut, and banana trees, has declined considerably according to a study conducted in the Khagrachari district (CHARM Report 2007). Most people (70%) reported that there has been a 5-15% decrease in the number of fruit trees over the last ten years. They also identified some important reasons for the decline of the fruit trees (Mahfuzullah, 2003), such as natural process of extinction, lack of land, cutting down trees for use as fuel wood or for making furniture, no trees are planted any more, lack of maintenance, etc.

9.2.2. Faunal Diversity

In the CHT, elephants are the dominating animals among wildlife. The other animals in the area are Bison's, the Sambur, the Barking Deer, leopards, and panthers. The CHT also has several different bird species such as the Imperial Pigeon, the Green Pigeon, the White Winged Wood Duck, the Maina, and the Bhimraj. The number of wildlife species has decreased because of indiscriminate hunting, and habitat conversion and destruction over the years. A depressing example of the degradation is the gradual extinction of tigers from the area (Gain, 1998).

Bangladesh is a signatory of CITES (Convention on International Trade in Endangered Species of wild flora and fauna), of the **RAMSAR Convention** (Convention on Wetlands of International Significance) of the World Heritage Convention, and of the Convention on Biodiversity Conservation. Bangladesh joined CITES on 18 February 1982. Wildlife protection is provided for in the Bangladesh Wildlife (Preservation) Act of 1973, with Amendment in 1974. This Act ensures that one needs to have special licence for hunting certain types of animals. At present there are only provisions for nominal fines and imprisonment for illegal hunting. Bangladesh has the lightest penal measures (imprisonment two years, and fine Taka 2,000) in Southeast Asia for illegal trade of elephants. The government needs to make the punishment more severe. Taking advantage of the loopholes in the Act and its enforcement, poachers have been hunting down the endangered animals and selling their skins (tusks in case of elephant) abroad at high prices.

The present available data gives evidence of the on-going depletion of wildlife. However, there is little information on the actual status of wildlife in the CHT such as inventory, recruitment, or habitat ranges. Deer, wild pigs, wild cocks, monkeys, and porcupines are found in major parts of the CHT area. The presence of tigers, rabbits, foxes, wildcats, snakes and *guishaps* are also reported. Elephants are found mainly in Alikadam, Lama, and Naikhongchari upazilas(Region II) except in the Khagrachari district (Region III). Pythons exist mostly in regions I and II, which are the most inaccessible areas at higher altitudes in the CHT. Bears have been eliminated in some parts of these regions and also in Region IV. Monkeys and wild goats have been spotted in some villages in regions I and II. Villagers in all areas of the CHT hunt various animals, mainly wild pigs, deer, and wild cocks. Monkey and porcupine are also frequently hunted. Both villagers and visitors hunt tigers. Visitors in Region II hunt elephants. Most animal species seem to have disappeared from Region IV. Many villages report that elephants and tigers no longer exist in their areas. Six villages of Region IV reported the disappearance of pythons from their areas. Despite common knowledge that many of the animals were on the verge of disappearing, the villagers did not take any measures to preserve them (Rafi and Chowdhury 2001). Deteriorating biodiversity is a problem for the animal and plant species as well as for the humans who depend on these resources for their basic needs. The animals are useful to people in various ways such as for food and hunting. The body parts of some animals are used for medicine and decoration. Thus, it is imperative that people are educated about the importance of maintaining a sustainable relationship with the flora and fauna of their environment, so that they can work to preserve those resources.

9.3. Forest

Forest is a very important feature in a country's landscape. Unfortunately, Bangladesh is highly lacking in that respect, and whatever forest resources the country has, is depleting fast, some due to natural causes, but mostly by human intervention. The reserved forests have potential for sustainable cultivation, but are still being rapidly degraded due to

monoculture plantation, illegal logging, shifting cultivation, and poor management. If the present trend continues, these reserved forests will be destroyed and converted into unproductive forestland. The policy followed by the Forest Department to convert the natural forests into more commercially productive plantations, has had a serious impact on the natural environment, and has resulted in increased soil erosion and silting in rivers and reservoirs. There is an urgent need for bringing these areas under intensive multiple use forest management and planning. As such, the forestry sector needs to be addressed on a priority basis through proper natural resources planning and management before it is too late.

At present about 14% of the area of Bangladesh is under forest cover; 43% of which belongs to the CHT (Abdus et al., 1999). The per capita forest cover of the CHT is 0.81 hectare compared to 0.016 ha for the entire country. The major forest products are timber, bamboo and fuel wood. Bamboo grows almost everywhere. About 44% of the total area of the CHT is under middle dense forest cover, while only 16% of the CHT is under dense forest cover.

9.3.1. Forest areas and boundaries

Table 8.1 indicates areas of 401,639 ha of the CHT Reserved and Protected Forest, and 692,973 ha of CHT Unclassified State Forest. The total forest area by district, as shown in the table below, only includes the forest area under the control of the Forest Department. There is a total of 418,980 ha of forest area in the CHT with 255,116 ha in Rangamati, 123,380 ha in Bandarban and 40,484 ha in Khagrachhari District.

Reserved and Protected forests (RF & PF) are owned and administered by Forest Department (FD). Some Unclassified Forests have been handed over to FD for management, while the Unclassified State Forests (USF) is a residual category of partly forested lands under the control of district administration (ADC, Land). The indigenous people consider the USF as their own forests, which is under the Ministry of Land. *Khas* Forest Areas are public lands registered in the name of any individual or corporate body, regarded by the land officials as the property of state.

Table 9.1: Classification of forest area (ha), 2008-2009

Sl.	District Classification	Bandarban (Area in ha)	Khagrachhari (Area in ha)	Rangamati (Area in ha)	Total in CHT (Area in ha)
1	Reserved & Protected Forest (RF & PF)	107740	38783	255116	401639
2	Acquired Forest	0	0	0.60	0.60
3	Unclassed Forest	15639	1700	0	17339
4	Total Forest Area (under control of FD)	123380	40484	255116	418980
5	Unclassified State Forest (USF)	200069	183762	309142	692973
6	Khas F. Area	0	0	8	8

Source: BBS 2009

The government has declared seven wildlife sanctuaries, four national parks and one game reserve in the forest areas through notification in the official Gazette. In addition, there are two wildlife sanctuaries in the forest areas, which have not been notified under the Wildlife Order. These 14 protected areas cover about 225,000 ha, which is 1.56% of the total land area. All the Protected Areas are part of the Reserved Forest. Public entry into the Reserved Forests, without the permission of the Forest Department, is prohibited. There is no commercial harvesting in the Protected Areas. Reserved Forests that are not declared as a Protected Area may be managed for regular forest products but require an approved forest management plan. The Pablakhali Wildlife Sanctuary in Rangamati with an area of 42,087 ha was established in 1962-63. The Rampahar Shitapahar Wildlife Sanctuary (3026 ha) established in 1974 in Rangamati has not yet been notified under the Wildlife Order (Reza et al. 1992)

According to the analysis table, Reserved and Protected forest area are 255,116 ha at all Upazilas of Rangamati whereas 309,134 ha Unclassified State Forest (USF). On the contrary, *Khas* Forest area is only 8.28 ha.

9.3.2. Forest types

Natural Forests

The CHT is situated in the humid tropical forest zone. The natural forests of the CHT are mainly characterised as mixed evergreen and deciduous forests. The forest trees can be ecologically classified into the following types, which intermingle with each other (Ishaq, 1971).

a) Evergreen

Tropical wet evergreen forests occur in deep valleys or shaded cold places with plentiful water available for plants. The largest trees grow up to 100 ft (30 m). The dominant tree species are *Garjan, Dhakijam, Civit, Chundul, Telsur,* and*Narikeli*.

Tropical mixed or semi-evergreen forests: This species covers vast areas of undulating hilly ground and alluvial flats. The tallest trees range from 150 to 200 ft. This forest overlaps with evergreen or deciduous type of forests depending on local influence. The *Garjan*, a dominant upper story species is found in groups and patches. The other species found in this region are *Tali, Chapalish, Pitraj, Raktan, Khairjam, Simul,* and *Bandorhola*.

b) Deciduous

Tropical moist deciduous forests: This forest type is found in valleys and channel banks. The dominant species occurring in the top canopy are *Kadam, Patali, Jarul,* and *Shimul*.

Tropical open deciduous forest: This type of forest occurs on the exposed southern slopes with a south to westerly aspect. The principal species are *Champa, Koroi,* and *Toon*.

c) Savannah

A savannah is a grassland ecosystem characterised by the trees being sufficiently widely spaced so that the canopy does not close. The open canopy allows sufficient light to reach the ground to support unbroken sungrass. Savannah occurs in a major part of the unclassified state forest (USF). It is found in areas which have been slashed and burnt for shifting cultivation.

d) Bamboo

Bamboo is a very prominent species that are available plentiful in the CHT. It is usually found as a single or mixed species. Bamboo species are found throughout the forests either in pure patches or as undergrowth. There are eight species of bamboo within the ecologically different land types of the CHT extending from the channel banks to the hilltops.

Bamboo thickets, bushes, and low forests of non-commercial shrubs and planted forests are found in most of RF and USF areas. The maximum yield from bamboo stands is 2.8 tons/hectare under ideal conditions. The cutting cycle of bamboo is three years. Frequently cut and burned bamboo thickets on drier slopes could eventually be replaced by pioneering grass and herb species. Removal of natural forest stands and agricultural burning practices cause the expansion of bamboo trees. The distribution of bamboo areas in the CHT is approximately 17,000 ha in Kassalong, 34,000 in Rangkhyong, 25,000 in Sangu-Matamuhuri region, 65,000 ha as USF, and 120,000 as RF undergrowth (Source: FD as cited in (ADB, 2001a).

Muli is the most important bamboo species that occurs as undergrowth and as pure bamboo thickets on well-drained slopes. Reaching a height of 10-15 meters and a diameter of eight cm, the new shoots are formed every year and are harvested in 2-3 years. *Muli* stands propagate over huge areas as they are fire-induced sub-climax vegetation.

Mitenga, daloo and *orah*, the remaining three commercially important species, grow in association with *muli* in mixed bamboo thickets and sometimes as the under storey of high forests. These species exhibit reduced pioneering characteristics under pre-existing shade and reasonably moist sites. They grow in a cluster of 40-100 shoots with a height of 12–25 metres and 512.5 cm cluster diameter (ADB 2001c).

Bamboo species "flower" gregariously and die immediately after flowering. This phenomenon occurs in the CHT every 40 to 60 years. In 1959/1960 the dying of bamboo clumps in the CHT occurred on a large scale, which suggests that the next event may happen soon.

9.3.3. Plantation Forestry

The Bangladesh government in its "Revised Working Plan for the Forests of Chittagong Division for the years 1978-1988" adopted monoculture, "to replace the existing irregular, depleted and less productive forests by a manmade plantation forest with more valuable and productive species suited to the soil and country's requirements." Accordingly, commercial plantations have replaced the natural forest containing tree species such as *Garjan, Gamari, Chapalish, Toon, Koroi, Shimul, Civit, Chandul* and *Champa*. Monoculture has been carried out under the names of "social forestry", "participatory" or "community forestry". Plantations of teak, rubber, eucalyptus, acacia and other exotic species are termed as "simple plantation forestry". Hill forest plantations established between 1974 and 1990 totalled 80,407 hectares, out of a total of 247,830 hectares country-wide (BBS Statistical Yearbook, various years). Within a period of 15 years (1975 to 1990) the plantation area under the USF of the CHT increased from 8,281 ha to 22,393 ha.

However, monoculture plantations in the hilly areas have some negative impacts, like many native species were destroyed, and the indigenous people living in the hill slopes for years have lost their habitat and land for *jum* cultivation. The planted *Segun* (teak) trees known for their beauty and strength and used for furniture had also some negative impacts. *Segun* is foreign species first imported during the British era. Segun was first brought from Burma in 1872 and was sowed in Sitapahar in Chittagong. *Segun* has many negative impacts on the local environment and soil, such as soil erosion, and no trees grow beneath the *Segun*tree, which is susceptible to diseases and insects, etc. Rubber plantation, a new venture undertaken by the Bangladesh Forest Industry Development Corporation (BFIDC), has proved to be environmentally and economically unsuccessful. This has also hastened the deforestation of the CHT area.

9.3.4. Agro-forestry

Agro-forestry is a tree based farming system, which provides both forest and agriculture crops through land use practices. Agro-forestry can be promoted through a combination of perennial species, including utility and firewood and somewhat shade tolerant annual species such as tubers, spices (turmeric, cardamom), and pineapples. Improved agro-forestry practices were introduced through the 'Upland Settlement Project' by the CHTDB with the goal of rehabilitating landless and marginal *Jummias* in the CHT, a total of 60 project villages have been established, 40 in Khagrachari and 20 in Bandarban District. Based on a study conducted in 15 of these villages some benefits and drawbacks of agro-forestry have been identified, the principal ones are: environment-friendly, market demand, conservation of biodiversity, sustainable production system, etc; and the drawbacks are: small plot or land, insecurity of land, new technology, etc.

9.4. Forest Industries

The CHT is the largest wood producing area in Bangladesh. From a socio-economic standpoint, bamboo is perhaps the most important non-food plant for Bangladeshis, as it is used for housing, construction, and furniture. The three major forest-related industries in the CHT are the Karnaphuli Pulp Mill, Sattar Match Factory, and BFIDS Lumber Processing and Sawmill Complex. The Eastern Traders and Red Veneer Limited (Betbunia) are the two main trade and

processing companies. The harvesting has generally been decreasing since the mid-1980s, with timber harvesting decreasing by over 90% from 395 m^3 in 1985 to 30 m^3 in 1999 (ADB 2001a).

9.4.1. Pulp and Paper Mill

While paper is not produced in the CHT, pulp, an intermediary product, is primarily developed at the Karnaphuli Pulp Mill (KPM), located in Chandragona near Kaptai. KPM is the single industry employing the most number of people, a total 3,000 (less than 10% *Parhari*), and many more indirectly for work related to forest extraction (most of whom who are *Parhari*). Currently, the KPM does not perform extraction of wood; they buy wood from private contractors. As millions of tons of bamboo and softwood have been cut down for paper production, environmental impacts from this deforestation increased soil erosion, nutrient loss, landslides, and eventual sedimentation, increased flooding, decrease in water quality, and destruction of aquatic ecosystems. In addition, the Mill along with other industries is polluting the waterways of the CHT through effluent discharge. Based on the data collected by DoE (for 1985 and 1993), water quality parameters have consistently exceeded the limits set for the Mill.

Biological oxygen demand (BOD) is a measure of the amount of oxygen used when organic matter undergoes decomposition by microorganisms, and is an indicator of the amount of biological "pollution" in the water. High BOD levels correlate with low dissolved oxygen levels, which in turn places stress on fish habitats. Aquatic organisms are also very sensitive to PH and suspended solid levels. Also, water bodies with high levels of these pollutants are unsafe for human contact.

9.4.2. Sawmills and Timber Processing

Most of the wood leaving the CHT is unprocessed; meaning that there is little "added-value" to the forest products. While in 2001 there was an estimated 29 sawmills in Bandarban, 29 in Rangamati, and 39 in Khagrachhari, many of which were not reaching maximum capacity, there were over 1,300 sawmills in the Chittagong city area. However, it is generally accepted that the sawmill industry is declining in the CHT. The return on investment for the whole region is 12.6%, with a total turnover of almost Tk49.0 million, which is encouraging. Ultimately, however, the industry is suffering from the decrease in available wood.

BFIDC has been carrying out timber extraction for over 40 years. They own a Lumber Processing and Sawmill Complex near Kaptai. BFIDC is the only organization in Bangladesh that is authorized to perform mechanized timber extraction from the CHT, mainly from the Kassalong and Ranigkhong Reserve Forests. It is reported that they are losing money every year. There are recommendations for BFIDC to slow down or perhaps halt their extraction processes due to the rapidly decreasing virgin forests. In addition, there are environmental and managerial concerns with the processing plant. An environmental assessment should be carried out with consideration of privatization of the plant.

9.4.3. Furniture

Furniture shops are the most thriving small-scale industry in the CHT, in part due to their temporary nature and use of rented space, which eliminates the need to actually purchase land. The total turnover is Tk71.6 million (Tk17.8 million in Bandarban, Tk23.5 million in Khagrachhari, and Tk30.3 million in Rangamati). The total return on investment for the CHT is 125%, with Khagrachhari having a return on investment greater than 75% and Bandarban and Rangamati with a return on investment of 150%.

The furniture industry primarily produces household items such as beds, dining tables, chairs and benches, though some argue that the quality and craftsmanship are questionable. The vast majority of these are shipped out of the CHT, mainly to Dhaka. If there were more direct links with the larger retail markets, the future of this industry could be bright.

9.5. Deforestation

The annual rate of deforestation in Bangladesh is 8,800ha (CHARM Report 2007). Deforestation is caused by both natural and manmade factors. Natural factors include fire, disease, and weather induced stress. But often human activities such as land clearing for agriculture, over grazing, over extraction of timber, harmful and illegal logging practices worsen the situation, not to mention the underlying indirect causes of poverty, inequitable resource tenure, population pressure, corruption, misguided policies and institutional pressures.

The consequences of depletion of dry tropical forests for fuel wood may be serious since it affects the local populations directly and immediately. The trends are (Forestry Master Plan GoB 1993):

- In the closed canopy moist forests, large areas of forest have been modified in structure and floristic composition by logging and deforestation;
- All virgin forests suitable for production will either be deforested or logged within a century at present rates;
- Where species diversity is often the highest (more accessible lowland forest), the impact in terms of direct resource depletion and species loss is also the highest;
- In very remote areas where resource values for timber production are lower, there is accelerated soil erosion;
- The most densely populated and accessible forests are the most endangered;
- Loss in resource values, implicit at present rates, will result in permanent damage to species and genetic resources.

The forests of the CHT area, including high forest areas, have been disappearing with time. The timber type natural forest area of the Kassalong reserve in the CHT decreased from 52,700 ha in 1963 to 41,400 ha in 1990. The 1963 and 1990 inventory revealed that plantation areas increased drastically from 2.91 % to 17.5%. The area under the category 'others' including non-forested, non-productive, water and swamp areas, has experienced a sharp rise within a span of 27 years. Both mixed forest areas (timber-bamboo and bamboo-timber) and areas with bamboo trees only have decreased.

Encroachment of Forest Area

About 2200 ha (ADB, 2001) of reserved forest area of Rangamati have been encroached by some vested quarters living around the tropical forest. Encroachment problems occur in the Reserved Forests area as there is no clear boundary demarcation supported by cadastral maps. There is also no data available regarding the encroachment of the forest areas of Khagrachhari and Bandarban.

9.6. Towards Sustainability

Some prospective sectors in the field of biodiversity conservation in CHT are mentioned below; eco-tourism, non-timber forest products, home gardens, etc; this can contribute both in development and conservation of biodiversity in the country.

9.6.1. Eco-tourism

Nature or forest-based tourism is a key category of eco-tourism, one of the fastest growing sectors in the world (Landell-Mills and Porras, 2002). However in Bangladesh this promising sector is poorly utilized. From a source it has been found that less than 10,000 foreign visitors entered the country in 1992, whereas the domestic tourism appear to be a strongly flourishing sector of the market (Vantomme et. al. 2002). Government should develop infrastructural and other facilities to attract national and international tourists in various attractive sites of CHTs.

9.6.2. Non-timber forest products and conservation

Non-timber forest products (NTFP) include fruits, firewood, bamboo, rattans, medicinal plants, spices etc. other than commercial timber. It is now widely believed that, the collection and use of NTFPs is ecologically less destructive than

timber harvesting and have encouraged the belief that more intensive management of forests for such products could contribute to both development and conservation objectives (Arnold and Ruiz Pérez, 2001). In CHT many people living in and adjacent to forest are customarily depends on various forest practices which are sometimes found harmful to forests; so commercialization and development of NTFP-based small scale industries in these regions may act as an incentive to forest conservation.

9.6.3. Home gardens and biodiversity conservation

The home gardens of CHT are a diversified agro-forestry productive system. They are very rich in floral diversity and still fulfil the majority of country's domestic fuel, bamboo and timber needs. These forests are a major habitat of various birds; reptiles; even few mammals in the country and can contribute to biodiversity conservation.

A project funded by GEF (CHARM Report 2007) on the conservation and management of biodiversity of medicinal plants for their sustainable utilization was planned to be executed in Rangamati district. The specific objectives of the project were development of an inventory of medicinal plants in the project area; documentation of traditional uses by the local people; conservation of medicinal plants and their ecosystem; and capacity building of concerned agencies in the sustainable use of the medicinal plants. It is not known whether the project was undertaken by the hill authority or the government.

10. Delta Ateliers – Results and Suggested Solutions

10.1. Introduction

Delta Ateliers are design workshops where experts and stakeholders share knowledge and jointly develop ideas. These ideas, comments and other forms of contributions are gathered and put forward to face the challenges and ultimately strengthen the output of the Delta Plan. Series of these delta ateliers were organised at various locations and in support of the baseline studies, problem statements, delta vision, scenarios and strategies. On completion of the baseline studies, integrated analyses and planning exercises were/ being carried out for specific areas or locations, called the Hotspots. The hotspots may include flood vulnerabilities, water logging, water shortages, siltation, land use patterns, etc, which may be considered to be exemplary for delta planning.

For Chittagong Hill Tracts (CHT), a series of Delta Ateliers were organised in five locations in greater Chittagong area between 3 and 8 September 2015: at Chittagong, Chokoria (Cox's Bazar), Bandarban, Rangamati and Khagrachari. The BDP 2100 team included the Project Director, Deputy Team Leader, and 7 experts (2 international and 4 national experts from BDP, and 1 national expert from GED), and 4 support staff.

The ateliers (workshops) were attended by over 200 participants/representatives of the region. The program also included field visits, allowing the BDP team to meet a large number local people. During the workshops, the people from the region were invited to share their knowledge on key issues and the potential solutions. BDP 2100 intends to identify the strategies as part of a 50 to 100 year plan for the country. Accordingly, strategies in the different 'hot spot' areas are identified, and discussions were held for arriving at a strategy. This chapter compiled the discussions and the outcome of the ateliers held at those locations in the CHT. As the BDP team was visiting the greater Chittagong area, the workshops at Chittagong and Chokoria (Cox's Bazar) also included the problems on coastal zone, Cox's Bazar and Chittagong city areas. As the coastal zone, Chittagong city and Cox's Bazar areas are expected to be covered by other baseline reports, the ateliers' outcomes on those topics have been omitted from this report, and only the CHT issues have been included.

10.2. Atelier Approach

In total, 5 (five) atelier sessions were organized at locations mentioned earlier. The duration and numbers of participants varied over the ateliers. The program however, was similar for all ateliers. The general pattern of the

program was as follows: After welcoming the participants, the objectives of the Ateliers were explained by the BDP team. The Project Director, Deputy Team Leader and expatriate staff contributed to the discussion. The introduction and the CHT problem statement was briefed by one expatriate expert. The problem statement included identifying the hotspots in the CHT region. During the two break sessions, refining the problem statement and identifying and prioritizing measures were discussed. Finally the drawing and sketching of a potential regional strategy was drafted using the touch table.

As the objective of the ateliers was to discuss the problems and arrive at possible solutions, and in some cases, to identify future problems and solutions also, the interactive group sessions focused on the *problem statements* and the potential solutions. This approach was adjusted as per the requirements of the situation. Out of the 5 meetings, 2 were at district level, 1 at Upazila level and 2 at Union Parishad level (**Table 10.1** for details).

In case of a larger group, like in the district level meetings, group work was carried out, while in smaller groups, the focus was on the plenary discussion. When doing group work, groups were divided along the primary topics of the problem statement which were derived from expert knowledge and the various baseline studies. Prior to the meetings, the key issues were identified, taking an integrated approach to the hotspots, i.e. the issues as identified by the CHT hotspots.

At the district level, where the group size varied between 4 and 10 persons, group work was done noting the problems and solutions/measures. After that, the measures were presented in the plenary session and identified on the map, using the touch table. In the meetings at Chokoria and Bandarban, the touch table session was organized parallel to the plenary session of listing the various problems and solutions. One or a few people with insight in the overall situation in the area were asked to indicate on the map the various locations where the mentioned problems occurred.

The BDP formulation team prepared the meetings well ahead, involving local expertise (e.g. from DC office or from NGOs) targeting an inclusive meeting with a wide representation of various people, which, in general, worked out well. The meetings were actually attended by a wide range of people, from Government departments (Forest Department, BWDB, DAE, PDB, etc) plus government administration (DC, SP), Upazila and local level administration (Union Parishad Chairmen (comparable to Headmen in the CHT), UP members (comparable to *karbari* in CHT), NGOs, media and (Senior) citizens.

10.3. Results from the Ateliers

The first part of the session focused on the key issues. An overview of the problem statement was presented by the BDP team, based on the baseline studies. **Table 10.1** summarized the issues/ problems and possible solutions (the problems and the possible solutions given in the table follow the chronology of this report).

Table 10.1: Issues/ Problems and Possible solutions discussed in the various thematic groups

Issues/Problems	Possible Solutions
Food Security & Agriculture	
o Large quantity of fruits and vegetables produced in CHT every year, but a substantial portion of is wasted due to lack of proper maintenance and storage	o Fruits and vegetable processing industries should be encouraged to be built up including storage facilities
o Culturally most ethnic communities are used to pig farming	o Cow farming may be a lucrative alternative source of income for the community, as the hills are full of grasses and weeds
o More attention on *Jum* cultivation (how to improve, research institute)	o Few Jum research institutions should be established
o Value added to products from the hills, to ensure income	o Food processing/preservation (value addition and

	jobs)
Floods, Droughts & Natural Disasters	
o Houses, infrastructure and croplands damaged due to flood	o Flood Shelter needed for vulnerable people o Relief facilities should be available during flood o Proper drainage system should be developed
o Sometimes water logging remains stagnant for few days and various diseases break out in affected area o During flash flood, about 80% crops, vegetables and Aman bed seeds are damaged due to hilly land erosion and landslide	o Drainages system should be developed and made effective to rid of water logging o Embankments have to be built in vulnerable areas
Water Resources, Water Supply, Sanitation & Health	
o **Kaptai Lake** is up to brim during rainy season, sometimes overflowing, resulting in inundation of the neighbouring local areas	o Integrated planning for development needed for the lake from upstream to downstream including consideration of high and low tides during planning o Periodic dredging of lake
o In many upazilas in **Rangamati** water is not available in dry season; on the other hand, there is too much water during the rainy season	o Sluice gates and embankments have to be built for preservation of water, so that this water can be used in dry season.
o Water hyacinth is a nuisance common problem in Kaptai Lake and in many canals; problems created by the hyacinths are: - Water transports cannot move due to hyacinth - Hindrance to movements of local people, especially during emergency medical problems	o Water hyacinths should be removed from Kaptai Lake and other canals, and the navigational pathways should be cleared of all such obstructions o Better alternative use of water hyacinth such as compost fertilizer may be produced o Need for water ambulance
o Among two other districts of CHT, **Bandarban** faces acute shortage of safe drinking water, especially in four upazilas (water shortage round the year), namely Bandarban Sadar, Ruma, Thanchi and Roangchhari, out of a total seven upazilas in the district, although it has numerous small springs plus the Sangu River; also shallow or deep tubewells or ring well technology do not work here due to hard solid underground rocks (geologically speaking) o Most villages are located on hilltops while the sources of (small) spring water are downhill, so the people have to stride up and down and waste a considerable time to fetch water from there	o Gravity Flow System (GFS) water technology may be adopted for such situation; also Solar pump technology may also be used to solve the acute water crisis in Bandarban o Watershed management o O&M from local community o Awareness (traditional leaders/ school children, mothers in curriculum)
o In terms of sanitation, Bandarban district has achieved only 49% sanitation coverage in the year 2014 (DPHE Report). Since the district has most groups of ethnic population normally they have separate customs, heritage, costume, life style, food habits and in particular the beliefs. For this reason, achieving 100% sanitation	o Since most houses are hanging type (*Machang Ghar*), the age-old conventional latrines should be improved by constructed additional 4/5 rings around the pit plus one concrete slab. In case of pit latrines, the pits should be fully covered by a slab to maintain hygienic environment

coverage in the district still remains a great challenge.	
o Water scarcity is increasing due to drying up of springs, *chharas*(rivulets), canals and beels during dry season	Sluice gates have to be built on *chharas*, canals and vulnerable catchment areas for better water management during both rainy and dry seasons
o There are many health care centers, but doctors are reluctant to attend there due to lack of infrastructure like roads; also the doctors do not stay in these centers due to lack of basic amenities; as a consequence, general people do not get proper medical treatment	o Public health care centers and clinics must be improved and the number of these facilities should be increased to cater for better treatment of the hill people; also doctors' presence in the health centers must be ensured by providing the basic amenities to them
o Limited hospital care for women and children	o Hospitals needed for women and children (mother and child care)
Environment, Biodiversity & Forest	
o Deforestation is increasing due to intervention by the local people	o All stakeholders must give combined efforts to prevent deforestation
o All markets of Rangamati are adjacent to the Kaptai Lake; so the market and domestic waste and other waste regularly fall into the Lake; as a result, environment pollution is increasing in the Lake; besides, biodiversity is also under threat	o Waste dumping area has to be created for the dumping of daily waste, which, may, alternatively can be used for production of biogas for generating electricity in Rangamati o Water treatment plants needed
o Teakwood trees are not good for the environment in CHT region, because these cause hilly land erosion and landslides; besides, Teak wood tree leaf is grass protected, resulting in easy land erosion	o So, forest department has to find out alternative plan in lieu of planting Teak wood tree in hilly reason.
o Due to flash food and soil erosion, a certain reach of the Sangu River has already been silted up o Collection of bed stones also from rivers including the Sangu River causing severe soil erosion o One of the reasons for drying up of springs is the collection of hilly stones from small spring sources	o The stone collection from the spring sources and rivers should be banned for the sake of saving water sources and soil erosion o Initiate dredging of the Sangu River to maintain the depth
o Natural forest resources are depleting due to legal/illegal forest cutting and collection for business purpose o For monetary gain, people are planting Teak wood and rubber trees rather than planting mixed fruit crops; as a result, biodiversity in the area is facing a challenging situation o Unscrupulous hunting of forest animals like pig and deer by the local people for business purpose is destroying the environmental biodiversity in the area o Hills are being burnt every year for *jum* cultivation, which depletes the forest resources and endangers the biodiversity	o Forest depletion must be stopped o Alternative source of livelihood should be found rather than plantation of Teak and rubber trees and *jum* cultivation o Forest animal hunting should be stopped for the sake of ecological balance and conservation of biodiversity
o Due to deforestation in the CHT, hill erosion and	o Forestation have to be done on the hills and the river

landslides are occurring frequently; many *chharas*and rivers are filling up due to the hill erosion, thus causing occasional flash flood during rainy season	banks
o Forest conservation and forest use (livelihoods)	o Social forestry by mixed species
o Habitation and settlement in designated forest areas	o No settlement in forests, especially in the reserved forests
o Human- wildlife conflict	o Zoning habitat improvement inside forests and adjacent forest boundary
o Both banks of Chengri River (in the north) are eroding due to flash flood; the river is also filling up due to bank erosion	o Construction of embankment and dredging of the river needed immediately
Infrastructure & Tourism	
o Despite lot of potentials, there is no Eco-friendly tourism in the CHT region o Tourism must not ruin the environment	o Eco-friendly tourism should be developed in Khagrachhari and other districts of CHT o Creation of jobs for the local people
o Scope for Family tourism	o Family tourism is a new theme of tourism in the hilly areas for diversity of tourism world; the hill families should be encouraged to develop such tourism, where outside tourists would come and live in their households; publicity and ensured security are needed for such tourism

10.4. Possible Solutions for the CHT region

Many issues/problems were identified during the Delta Ateliers workshops, and some solutions were also discussed/ suggested. The key is to restore a balance between the people and the nature. This balance is needed within the CHT, and also between the CHT and the floodplains downstream. An important issue is the establishment of the land rights issue. Resettlement is difficult but it may be part of a solution towards sustainable use of the area. It should be explored, based on local government involvement, whether people can be moved to newly planned locations; a process that may take many years.

Avoiding/Removing exotic species and returning to traditional agricultural practices; restoring wetlands, floodplain vegetation will increase the capacity to absorb rainfall and delay peak discharge, reducing flood risk downstream. At the same time reduction of erosion and landslide will decrease sediment loads. Wetlands and pits restoration creates natural buffer and extra resource of water during dry period. Gravity Flow Systems (GFS) may be explored to solve drinking water shortages, especially in the dry seasons. Sometimes the rocks are removed from the hill walls for road construction, causing many landslides to occur. An alternative resource should be explored to replace this damaging act. River beds should also be restored by dredging or other means.

Kaptai Lake is surrounded by protected and unprotected forests. Local people indicated that there could be more optimal use combined with better protection of the forest, which needs to be explored. The idea of lowering the water level in Kaptai Lake creating more land and a larger number of smaller lakes was welcomed as a potentially good idea as it creates more land for agriculture (income) and various options for sustainable tourism development (income). Alternatively energy production from wastewater and biomass energy from water hyacinth was proposed. This would have very positive impacts on fish and aquatic biodiversity.

Looking at all the issues/problems in the CHT, it is imperative that solving the problems requires an integrated approach at basin level. While catchments of most of the large rivers in Bangladesh lie outside the country, the CHT rivers catchments are within the country's boundaries. Solving issues downstream requires that erosion issues have to be solved upstream. Currently the 'business as usual' approach is to solve issues locally and in isolation. Through dredging projects and reinforcement of embankments and drainage systems, the problems are being partly or temporarily solved; but the processes that are causing the problems are not being addressed.

The core issue is that the land and water management system as a whole is not functioning in a sustainable way. Too many people, uncertain land rights issues, unsustainable tree plantation, under the current climate variable regime (more extremes are expected under climate change), low operation and maintenance budgets, poor coordination between local, district and national government result in landslides, sedimentation, breaching embankments and the like. Coordination between these branches of the government (local, district and national govt) should be ensured for all possible solutions in the area.

11. Challenges and Opportunities

11.1. Challenges

Chittagong Hill Tracts faces some unique challenges which are different to those in the rest of the country because of its special socio-cultural and geographic situation. The livelihoods of the people in the CHT are more dependent on economic and environmental changes than those in the plain lands. Remoteness and poor accessibility, poor infrastructure and social and economic services, and rapid socioeconomic changes are big challenges for sustainable development in the CHT. On top of this, the impacts of climate change without adequate measures to support adaptation only augment the existing problems. Over last few decades, some progress has been made, but the expected benefits in terms of socioeconomic development and environmental protection are yet to take shape. The problems and challenges standing in the way of a meaningful development are explained below.

Political and social instability: The CHT peace accord was signed in 1997, but it has failed to ensure the social harmony crucially needed for social and economic development in the area. The discord created by the settlers (Bengali) in the hill region decades ago is yet to be improved substantially; the frequent conflicts between the settlers and the indigenous community only remind the fragile state of affairs in the area. Until the peace agreement is fully implemented, the grievances would persist and the conflicts between the Bengalis and the *paharis* and also between various ethnic communities would continue to disturb the social stability.

Poverty: The Hill Tracts is one of the poorest regions in the country. National statistics indicate that 52% of the CHT population is below the poverty line, and 21% are hardcore poor, compared to 32% and 18%, respectively, in national scale (**Figure 11.1**). A socioeconomic survey carried out in the CHT (UNDP, 2009) showed around 62% of households in the region, irrespective of ethnicity, to be below the absolute poverty line in terms of daily calorie intake per capita (below 2,122 kcal), and 36% to be hardcore poor (below 1,805 kcal). The annual household income in CHT is around BDT 66,000 (approximately USD 850), considerably lower than the national average for rural areas of BDT 84,000 (approx. USD 1,080) (CHTDF, UNDP 2014; FAO 2013).

15 districts of the country out of a total of 64 have been identified as the least developed and most deprived in terms of roads, electricity, education, health, water supply, and overseas employment. The list includes all three hill districts of CHT; with the highest level of poverty found in the hill district of Bandarban. Non-income poverty is also higher in the CHT than in other areas of the country and most of the rural people in the CHT are food insecure during the summer months.

Hill people are deprived of basic amenity like drinking water. Only 65% of people have access to safe drinking water in the CHT, compared to 75% of rural people in the country as a whole. This is due to inadequate access to safe

drinking water in the hilly area because of its difficult terrain. Providing access to safe drinking water is costly and often beyond the capacity of the local people. Moreover, open defecation is still a normal practice in many rural areas in CHT, which causes health and nutritional problems (MOHAFW 2011; UNICEF 2012; World Bank 2014). Local people are also deprived of basic health services at many places in the CHT. The children suffer from stunting and underweight, and various diseases including diarrhoea.
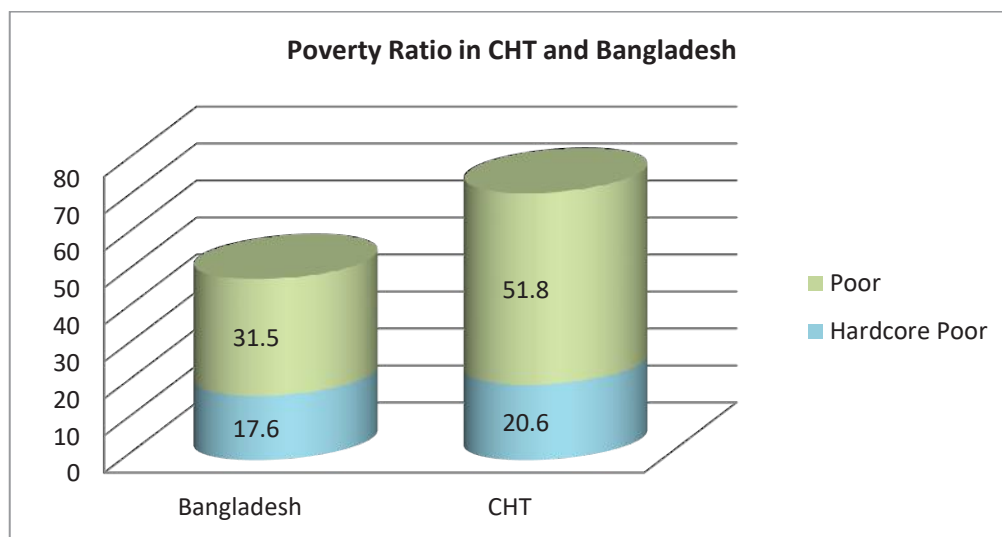

Figure 11.1: Poverty in CHT and Bangladesh (% of total population in terms of income)

Source: CHTDF, UNDP 2014, FAO 2013

Population pressure: The population of CHT in 1974 was about 500,000, which increased sharply to 1.6million in 2011 (BBS 2012), an increase of 327%, compared to 96% in the country. While the population growth rate has been declining in the plains districts, it is still increasing in CHT, which is putting immense pressure on the natural resource base in the region. During 2001-2011, population of the CHT increased by 19.5 percent. Assuming a simplistic growth pattern and urban-rural divide in the CHT and zero net in-migration, population of the CHT would increase to 1.91 million by 2021 (at the end of 7th FYP period) and to 2.43 million by 2051. Urban population would surpass rural population in the mid-2030s and would be as high as 64 percent of the total population, compared to 29 percent in 2011, **Figure 10.2**.[6] This would exert tremendous pressure on the natural resources and infrastructure in CHT.

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[6] Actual population figure for CHT in 2011 has been used. Other estimates are based on BBS projections on the basis of 2001 census data assuming TFR=1 in 2011.
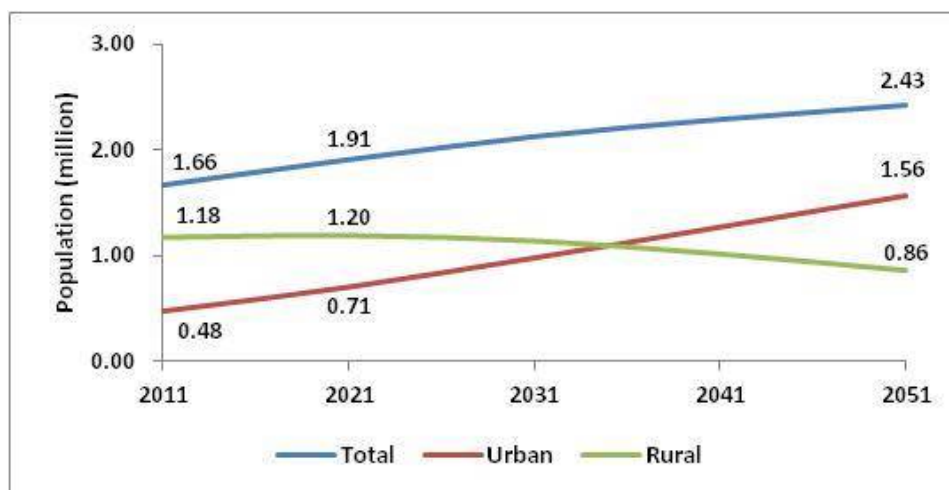
Figure 11.2: CHT population trend (estimated by Consultants)

Poor accessibility: The areas under CHT are very remote, and the accessibility to the region is poor. Most localities are more than half-day's walk from an all-weather road. Moreover, the road conditions are bad and the transportation cost is high. Also most of the rural areas of the CHT have steep and uneven slope. As a result, communication between places and the marketing of agricultural products is very difficult.

Unemployment and Dependence on agriculture: Agriculture is still the main source of livelihood for the majority of rural people in the CHT; about 70% rural people depend on agriculture, forestry, fisheries, and horticulture. The rural agriculture can only offer limited jobs to the local population. The private investment in industry and commercial enterprises is also limited and as such, the employment opportunities are also low. About one-quarter of households depend on wage labour for their livelihoods, but the demand for wage labour is low. The unemployment rate is high. Only few thousand people get jobs in Dhaka, Chittagong and other big cities. A large portion of the youth remains unemployed; as a result, the youth suffer from frustration, which also create social conflicts and economic hardship. The scope for going abroad for jobs for the CHT youths is also bleak, unlike from other parts of the country. This is due to lack of education and poor vocational skills among the CHT youths. The challenge is how to prepare these people to grab the job opportunities at home and abroad.

The occupational challenges are also due to age-old cultivation pattern in the hilly land. But the scenario is changing, and the *jum*-dependent hill people called the *Jumiyas*, are encouraged more and more to cultivate high value cash crops instead of the conventional varieties. In recent years, this market-oriented culture and unreliable *jum* cultivation for the food security and subsistence are under change. People are also engaged in other occupation, such as fishing, daily wage labour, rubber collection, horticulture gardening, small trading, timber business, poultry farm, selling/collecting forest resources etc. These occupations are new to the indigenous people and they do not have the required skill and knowledge. As a result, they face many problems and need assistance from the concerned authority.

Landlessness: The agricultural area of CHT is shrinking for *jum* cultivation due to high growth of population. As a result, more and more ethnic people are becoming landless, which now stands at 36%. The investment is discouraged due to land disputes, land grabbing, unclear property rights, etc. The over-cultivation led the *jum* cycle reduced from 25-30 years to 3 -4 years, which is not good enough to regenerate soil fertility. But *jum* is outdated and can no longer able to ensure food security and improve the living conditions of the people. Changing *jum* lands into more productive systems by educating and motivating the people and improving the productivity is one of the main challenges in the CHT.

Deforestation: The CHT consisting of hill forests are facing severe degradation due to overpopulation, deforestation and extension of unplanned agriculture. Due to deforestation, many plants and animals have become extinct or

endangered in CHT region. Livelihoods of the communities and their cultural integrity are also affected by the degradation. Deforestation combined with unsustainable agricultural practices, including mono-cropping of ginger, and root and other crops, has increased runoff, soil erosion, and loss of nutrients and biodiversity. Rapid expansion of tobacco cultivation is also causing environmental problems.

Climate change impact: In addition to all existing problems and challenges, the impact of climate change is imminent in foreseeable future. The impacts of rising temperatures, increased rainfall variability with more intensive rainfall events, and possible high runoff and floods, all are likely to happen in the coming decades. There is high risk to the vulnerable agriculture-based livelihood systems and also immediate risk of increased crop failure, and the new patterns of pests and diseases (BCAS 2007).

Lack of safe water supply and poor sanitation: Most of the people in the CHT use stream or lake water for their domestic use including drinking water. But these natural water bodies like springs and lakes are drying up causing shortage of water for the community. Also the water availability in rivers, lake and *chharas* in different seasons is reducing because of siltation, stone collection and deforestation. Eroded soils silt up adjacent water bodies and reduce water storage capacity. The shortage of water has become a problem for most part of the year. Unlike other parts of the country, the tube well technology does not seem to work in the CHT, due to underground rocky formation of the earth layer. The supply of safe drinking water has become a major challenge now.

The lack of sanitation is also prevalent in the CHT. For example, Bandarban district has achieved only 49% sanitation coverage in the year 2014, according to DPHE sanitation coverage report for 2014. Since the district has the highest groups of ethnic population normally they have varying degrees of customs, heritage, life style, food habits and the worst of all – the superstitions. For this reason, achieving 100% sanitation coverage in the CHT still remains a great challenge.

Cultural Challenge: Though efforts are underway to replace the traditional *jum* by more modern methods of cultivation, it is not an easy job to erase the culture of the ethnic communities which lasted for centuries. Most of these ethnic people have the culture which is integrated with the jum preparation, cultivation, harvesting, and the celebrations that follow. The songs, dance, and many other festivities are themed on *jum*. The various ethnic groups with multi-cultural picture in the CHT co-exist with tolerance, which gives an essence of the democratic practices, and which must be encouraged to continue.

11.2. Opportunities

It is imperative to give immediate attention to the already deteriorating and degrading situation of the CHT for its rehabilitation and sustainability. Problems were not created overnight, but due to long negligence and lack of implementation of many projects has only added up to the problems. However, during the past few decades, there was substantial overall rural development that have changed significantly due to globalization, and increased the connectivity of the rural population. The mobile and internet technologies and the building of new roads only helped to improve the potential of progress in CHT. Remote villages are now connected to national, regional, and global markets. Subsistence farming like *jum* is being replaced by more modern methods to cultivate cash crops. Diversification of livelihood and value chains for rural products would reduce dependence on agriculture.

Horticulture practice: The hill slopes of the CHT are suitable for growing high value fruits like banana, pineapple, papaya, jackfruit, guava, and lemons. Large scale commercial plantation of banana, papaya, lemons, and some other fruits is already being practiced in the region, but with limited technical knowledge. Moreover, there are plenty of scopes for growing vegetables and medicinal and aromatic plants, and agro-forestry in the hill slopes. At present the farmers rely on ancient plantation methods, and they should be taught proper plantation methods or correct application of fertilizers and pesticides. That way, the production of the high value crops and fruits may be increased to a great extent. Now most of the farmers grow vegetables for household consumption, but there is immense

potential for growing higher value produce such as off-season vegetables. The fallow lands might be used for cultivation of off-season vegetables during the summer months. But the farmers do not have easy access to quality seed, modern agricultural tools, fertilizers, or pesticides, which are essential to increase productivity. There are also problems regarding collection and storage of food grains, packaging and transportation, which are mostly done by middle-men. If the farmers directly handle the value chain development, i.e., storing, packaging, transportation, etc, they would have the opportunity to get the real price of their produce.

Potential for Agro-based products: The potential for increased agro-based products like fruits and vegetables is quite high in the CHT, if the private investors are encouraged to invest, and appropriate mechanisms are developed for it. The inclusion of agro-based products may be promoted as an alternative livelihood for the hill people. In addition to producing perishable fruits, fruit processing activities, for example, making pickles and sauce, should be encouraged and initiated. Interested individuals or groups of farmers should be trained in agro processing. This would only improve the condition of the rural livelihoods. The farmers could get better prices if the region had agro-processing facilities. As the very limited processing facilities that do exist are located in major urban centres, the other agro-processing industries may be diverted to the CHT region. Necessary support services should also be provided like technology, finance and marketing.

Development of tourism: The Chittagong Hill Tracts can be developed as a tourist region. The hill districts are rich in scenic beauties and varying degree of landscapes that create huge opportunities for tourism development. The sloping hills with trekking opportunities, vast lakes, and rich ethnic and cultural diversity offers a unique attraction to both home and foreign tourists. However, the much needed infrastructure, such as road communication, must be developed to connect the remote and unspoilt rural areas with the main areas of the country. For example, Bandarban, 'the roof of Bangladesh', has been referred to as a hidden paradise by the National Tourism Organization of Bangladesh (ICIMOD 2013). The Bandarban sub-district of Ruma, in particular, holds immense potential for tourism with huge number of natural lakes. But the basic amenities necessary for tourism are lacking, such as hotel facilities and other places are inadequate. If the tourism sector is to be developed to its full potential, then the present accommodation facilities along with infrastructure must be developed to meet the high quality standards.

Kaptai Lake is a unique feature of the hill tracts, the potential of which should be harnessed. It covers an area of more than 1,000 square kilometres and is the largest man-made lake in East Asia. When the Kaptai dam was built, it submerged a huge agricultural area, displacing a large number of people making them destitute almost overnight. But it has also created vast resources like in terms of tourism, freshwater fish, and navigation. If an integrated management of the lake is developed, it could transform the economy of the CHT.

It is obvious that the CHT has a huge potential for a tourist destination. So a tourist industry may be developed by educating and training all concerned, like the tour operators, the local community and the tourists themselves. This would be a part of the overall plan for development of the area. The idea may be demonstrated with the help of the following diagram (**Figure 11.3**).

Figure 11.3: Various sectors of tourism and agriculture

Source: A book titled '*Regaykheyong*' (in Bangla) published by the MoCHTA, September 2015

Migration: The hill people are reluctant to find jobs out of their comfort zone, wither home or abroad. The main reason behind this is the lack of education and vocational skills required for the jobs, and also because of poor social networks, low human skills, and limited access to finance. In recent time, a small number of people from the CHT have migrated outside CHT, both within the country and abroad. Overall, Chittagong accounted for 10% of the total migration flow from Bangladesh between 2005 and 2014, but hardly any migration took place from the CHT districts during this time. Only a handful percentage (0.06%) of CHT population is employed overseas (BMET Database 2015). If the hill youths are provided with the skills needed for foreign employment and access to finance, then these youths can get better job opportunities abroad, enhancing the economy of their own region (CHT). Simultaneously, the CHT region may be developed as an economic corridor between Myanmar, Thailand, and China for trade.

Policy formulation and prioritization of strategies: The most important factor remains the policy formulation and implementation of strategies. The peace accord must be made effective fully and the loopholes must be clogged, to make room for harmony among various inhabitants including the settler Bangali population. The discord created and nurtured since a long time, must be solved peacefully, and the indigenous hill people should be integrated with the mainstream of the country. This would only increase the sense of belonging of the hill people which is possibly absent at the moment. The trust must be regained and a sense of self-esteem should be installed in the hill people. Without making the hill people as part of the country's citizenry, the overall objective may turn into futile.

The Government should include in the 7th Five Year Plan some important recommendations, submitted to the Planning Commission by the Ministry of Chittagong Hill Tracts Affairs (section 2.1.3). The important issues should include land rights of the hill people, the disputes of whom should be resolved by the Land Commission. The Government will ensure participation of local people in development activities and management of natural resources and will recognize the traditional customs and knowledge of the various ethnic peoples. A national language policy will be formulated to safeguard the languages of ethnic people.   The Government will ensure establishment of

cluster-based residential primary and secondary schools for children of extremely poor parents in remote and inaccessible areas of the CHT. The Government will formulate a Perspective Plan for the development of CHT through consultation process with key stakeholders. The basis of development planning and programs in the CHT will be the CHT Peace Accord. Income generating activities through small and cottage industries, trading, poultry and livestock rearing, beekeeping, mushroom cultivation, and others will be expanded.

Special programmes/ projects will be undertaken to promote alternative livelihoods options and reduce dependency on traditional livelihoods like Jum cultivation, which is sustainable and socially acceptable. Proper market infrastructure and rural road and market facilities will be developed so that farmers/producers can achieve a better price from selling their products. Private investment in processing, packaging, and marketing CHT products and services will be encouraged. Existing human resource development programs will be augmented to address the special needs of ethnic people and strengthen their vocational and social skills. The Government will provide effective Internet facilities throughout the CHT region and will arrange ICT training for the youth to prepare them for better education and employment. The national power grid and distribution system for electricity supply in the different upazilas of the hill districts will be expanded. The Government will expand electrification in rural and remote areas of CHT and will set up solar-based electric power stations in remote and inaccessible areas. Micro-finance activities for poor people and farmers will be expanded (in place of micro-credit) and vocational training provided to the poor. Innovative and sustainable adaptation strategies and methods will be ensured to protect people and the environment from hazards caused by climate change and disaster mitigation. A massive effort will be undertaken involving the local communities for afforestation over the region. Measures will be taken to protect wildlife and biodiversity. Special initiatives will be undertaken to ensure the flow of water in creeks, water bodies and waterfalls by preserving the natural sources and integrated watershed.

12. References

Abdus, S., Md., Toshikuni, N., Masao, K., 1999. The causes of forest cover loss in the hill forests in Bangladesh. GeoJournal 47-4, 539-549.

ADB, 1986. Chittagong Hill Tracts Development Project Upland & Afforestation Settlement Component Final Field Report of the Rehabilitation (Settlement) Expert and the Horticulture Specialists.

ADB, 1999. Technical Assistance to the People's Republic of Bangladesh for the Chittagong Hill Tracts Region Development Plan (ADB TAR #32467 - BAN), Asian Development Bank.

ADB, 2000. Report and Recommendation of the President to the Board of Directors on a Proposed Loan to the People's Republic of Bangladesh for the Chitttagong Hill Tracts Rural Development Project, Asian Development Bank.

ADB, 2001. Chittagong Hill Tracts Region Development Plan

ADB, 2002. Chittagong Hill Tracts Region Development Plan (ADB TA #3328 - BAN) Final Report Rangamati,, Asian Development Bank.

Adnan, Shapan (2004). Migration, Land Alienation and Ethnic Conflict – Causes of Poverty in the Chittagong Hill Tracts of Bangladesh. Research & Advisory Services, Dhaka.

Ahmad, Mohiuddin et al, ed. (2008). Jum Pharr Jibon (Life in the Hills), Community Development Library, Dhaka.

Alam, Quazi Mesbahul, Miah, M. A. Monayem & Mohabbatullah, Md. (2010). Land Use Pattern, Nutritional Status and Food Security of Indigenous People in Hill Areas of Bangladesh. National Food Policy Capacity Strengthening Programme. FAO and the Food Planning and Monitoring Unit (FPMU), Ministry of Food and Disaster Management.

ANZDEC Ltd (2011). Indigenous Peoples Plan–Second Chittagong Hill Tracts Rural Development Project. Ministry of Chittagong Hill Tracts Affairs and Asian Development Bank.

Aziz, M.A. and Hossain, M.A 2002. Fisheries in Trans-Himalayan Region: prospects for fish culture in Hill Districts of Bangladesh, in: Petr, T. and Swar, D.B. (eds), Cold Water Fisheries in the Trans-Himalayan Countries, FAO Fisheries Technical Paper 431, FAO, Rome.

Bai, ZG 2006. Assessing land degradation in the Chittagong Hill Tract, Bangladesh, using NASA GIMMS, CHARM Project Report. ISRIC, BCAS, CEGIS, UdL, Wageningen.

Banglapedia: Land Capability, National Encyclopedia of Bangladesh; www.banglapedia.ogr.

BBS & UNICEF (2010). Monitoring Situation of children and Women, Multiple Indicator Cluster Survey 2009. Progotir Pathey 2009, Volume 1.

BBS (2012). Population & Housing Census 2011, Community Report, Bandarban, Khagrachhari and Rangamati. Government of the People's Republic of Bangladesh.

BBS, 1991. Bangladesh Population Census 1991.

BBS, WFP and World Bank (2009). Updating poverty maps of Bangladesh.

BCAS, 2006. Survey of Households: Natural Resource Users, (Draft Report). Chittagong Hill Tracts Improved Natural Resource Management (CHARM) Project. p.55. Dhaka: Bangladesh Centre for Advanced Studies (BCAS).

Borggaard, O.K., Gafur, A. and Petersen, L. 2003. Sustainability Appraisal of Shifting Cultivation in the Chittagong Hill Tracts of Bangladesh. Ambio 32(2): 118-123.

Brammer H., Antoine J., Kassam A.H and van Velthuizen H.T. 1988. Land Resources Appraisal of Bangladesh for Agricultural Development. Technical Report 5, Land Resource, Volume II-16 Land Resources Man and Legend, Parts of Rangamati, Chittagong, Bandarban. FAO/UNDP: BGD/81/035 Agricultural Development Advisor Project, Dhaka, Bangladesh.

Brammer, H. 1986. Reconnaissance Soil and Land use survey, Chittagong Hill Tracts, 1964-65, Soil Resources Development Institute (SRDI), Ministry of Agriculture, and Government of Bangladesh, Dhaka.

Burgers, P., Q. M. Ketterings & Garrity, D.P. 2005. Fallow management strategies and issues in Southeast Asia. Agriculture, Ecosystems and Environment 110: 1-13.

BWDB, 1998. Ground Water Quality Report. Dhaka, Bangladesh Water Development Board, Ground Water Division-1, Ground Water Circle.

CEGIS & ISRIC (2007). State of the Environment of the Chittagong Hill Tracts. CHARM Project.

Chakma, Sugata (2000). Chakma O Chak Itihash Alochona. Tribal Cultural Institute, Rangamati.

Chowdhury, Q. I. (ed.) 2001. Chittagong Hill Tracts: State of Environment. Dhaka. Forum of Environmental Journalists of Bangladesh (FEJB), Ministry of Environment and Forest (MoEF), and United Nations Development Programme (UNDP), Dhaka.

CHT Development News, Issue No. 2, November 2011. Gender and poverty Eradication. MoCHTA & CHTDF.

CHTDB (2008). The Integrated Community Development Project for Chittagong Hill Tracts Area – ICDP. Rangamati.

CHTDF (2012). Annual Report 2011. Chittagong Hill Tracts Development Facility, UNDP, Dhaka.

DAE (2012). Report from Additional Director. DAE, Rangamati.

DANIDA 1999. Final Report, Transport Sector Programme Support Component Identification Report, Infrastructure Development Project to Develop Economic Activities in the Chittagong Hill Tracts, Bangladesh: Rural Infrastructure Component, Danish International Development Agency, Dhaka.

DOE, 1993. Water quality limits based upon effluent discharge standards of large Indian pulp and paper mills, Department of Environment, Dhaka, (Source: www.waterandagroindustry.org).

DOF (2003-04). Fishery Statistical Yearbook of Bangladesh, 2003-2004. Department of Fisheries, Dhaka.

Establishment Division (1971). Bangladesh District Gazetteers – Chittagong Hill Tracts. Government of the People's Republic of Bangladesh.

FAO 1988. Land resources map and legend - Cox's Bazar and part of Bandarban, FAO, Rome

FAO 1988. Computerized land resources inventory, FAO, Rome

FAO 2005. Livestock, Environment and Development (LEAD) Initiative. 1999. Livestock and Environment Toolbox. http://www.virtualcentre.org/en/dec/toolbox/Index.htm. Food and Agriculture Organisation of the United Nations (Date of Access: 2005).

Farid, A.T.M and Hossain S.M.S (1988). Diagnosis of farming practices and their impact on soil resource loss and economic loss in the hill tract areas of Bangladesh, BARI Report. Joydevpur.

Forestal Forestry and Engineering International Limited (1966). Chittagong Hill Tracts Soil and Land Use Survey Report.

Gafur, A., Jensen, J.R., Borggaard, O.K., Petersen, L., 2003. Runoff and losses of soil and nutrients from small watersheds under shifting cultivation (jhum) in the Chittagong Hill Tracts of Bangladesh. Journal of Hydrology 274 (1): 30-46.

GED (2008). A Strategy for Poverty Reduction in the Lagging Regions of Bangladesh. Planning Commission, Government of the People's Republic of Bangladesh.

GED (2010). Outline Perspective Plan of Bangladesh 2010-2021-Making Vision 2021 a Reality, Draft Final. Planning Commission, Government of the People's Republic of Bangladesh.

Halim, S (2002). Human Rights and Indigenous Women: A Case Study from the CHT, in State of Human Rights: Women's Perspective. Women for Women, Dhaka

Hassan, D.M.M. and Van Lavieren, B. 2000. Chittagong Hill Tracts Region Development Plan (ADB TA #3328 - BAN) Interim Report No. 3: Environment and Forestry. Rangamati, Asian Development Bank.

HDRC (2009). Socio-Economic Baseline Survey of Chittagong Hill Tracts. Chittagong, Hill Tracts Development Facility, UNDP, Dhaka.

Helen Keller International Bangladesh (2008). Recommended Responses to the Rodent Crisis in the Chittagong Hill Tracts: Evidence from the Food and Nutrition Survey.

Holmes, D.A., 2002. Where Have All the Forests Gone? Environment and Social Development Development Unit (EASES), East Asia and Pacific Region Discussion Paper, World Bank, Washington, DC.

Ishaq, M., Ed.1971. Bangladesh District Gazetteers - Chittagong Hill Tracts. Dacca, December, 1971, Ministry of Cabinet Affaires, Establishment Division, Bangladesh Government Press.

IUCN, 2007. http://www.iucnbd.org/overview.html (access date: 20 February 2007).

IUCN. 2000 Red list of threatened animals of Bangladesh. Dhaka, International Union for Conservation of Nature (IUCN).

JAC (2000). Lampra. Jum Aesthetics Council, Rangamati.

Khan NA, Alam MK, Khisa SK, Millat-e-Mustafa M, (eds), 2006. Farming practices and sustainable development in the Chittagong Hill Tracts. CHTDB and VEFP-IC, 272 pp.

Khan, N. A. and S. K. Khisa 2000. "Sustainable Land Management with Rubber-based Agroforestry: A Bangladeshi Example of Uplands Community Development." Sustainable Development 8: 1-10.

Khisha, Amarendra Lal (1995): Parbotto Chattagramer Jum Chash: Otit, Bortoman o Bhobishyat (Jum cultivation in Chittagong Hill Tracts: Past, Present and Future), in Upajatiya Gobeshona Potrika (Tribal Research Journal), Tribal Cultural Institute, Rangamati, Issue 1 & 2.

Khisha, Prodipta (1996). Parbatya Chattagramer Shamasya (Problems of Chittagong Hill Tracts). Shahitya Prakash, Dhaka.

Larma, Jyotirindra Bodhipriya (2008). The CHT Issue and Its Solution, in Breaking the Barrier – inter-Asia reader on democratization and social movements, ed. Mohiuddin Ahmad and Cho Hee Yeon. Democracy and Social Movement Institute, Seoul.

Layzell, D. 1982. FAO/UNDP Land Use Policy Project (BGD/78/014): Soil Conservation Needs in Bangladesh. Dhaka, Food and Agriculture Organization of the United Nations (FAO), United Nations Development Program (UNDP).

Lewin, T H (1869). The Hill Tracts of Chittagong and the Dwellers Therein. Translated by Hirohita Chakma. Tribal Cultural Institute, Rangamati, 1996.

LGED, April 2006. Mapping Chittagong Hill Tracts Census Indicators 2001 & Trends (1981-2001). Bangladesh. Prepared under joint collaboration with GIS Unit, LGED, ICIMOD, Nepal and MENRIS.

Mahfuzullah, 2003. Traditional Knowledge and State of Bio-diversity in CHT: Case Study of Khagrachhari. In: Bangladesh Environmental Lawyers Association (BELA), South Asian Watch on Trade, Environment and Economics (SAWTEE), Dhaka, Bangladesh, pp. 21.

Mantel, S., Mohiuddin, M., Alam, M.K., Olarieta, J.R., Alam, M., Khan, F.M.A., 2006. Improving the jhum system in Bangladesh. Leisa - Magazine on low external input and sustainable agriculture 22.4, 20-21.

Mitchell, T.D. and Jones, P.D. 2005. An improved method of constructing a database of monthly climate observations and associated high resolution grids. International Journal of Climate 25, 693-712.

Nath, T.K. Makoto, I. & Hla, M. 2005. Small-scale agroforestry for upland community development: a case study from Chittagong Hill Tracts, Bangladesh. Journal of Forest Research V10(6), 443-452.

Nath, T.K., Inoue, M. and Chakma, S. 2006. Shifting Cultivation (jhum) in the Chittagong Hill Tracts, Bangladesh: Examining its Sustainability, Rural Livelihood and Policy Implications. International Journal of Agricultural Sustainability 3 (2006) 130–142

NIPORT (2012). Bangladesh Demographic and Health Survey 2011, preliminary report. Ministry of Health and family Welfare, Government of the People's Republic of Bangladesh

NMFP 1994. Environmental Capability Guidelines. NMFP Report. Report F/4, DGRRL Ministry of Forestry, Indonesia, Jakarta.

Olarieta, J. R. Rodríguez-ochoa, R. & Ascaso, E. (2007). Land Management Practices in the Chittagong Hill Tracts and Sustainable Alternatives. CHARM project report 4, Dept. Medi Ambient i Ciències del Sòl, Universitat de Lleida.

Planning Commission (2011). Sixth Five Year Plan FY2011-FY2015, Part-2, Sectoral Strategies, Programs and Policies. Government of the People's Republic of Bangladesh.

Rafi, M. and Chowdhury, A.M.R. 2002, Counting the Hills: Assessing Development in Chittagong Hill Tracts. Dhaka, University Press Limited, 2001, 261 p.

Rahman, K. M. (2000). Chittagong Hill Tracts Region Development Plan (ADB TA No-3328-BAN) Interim Report No.11: Institutional Issues. Rangamati, Asian Development Bank.

Rasul, G. Thapa, G. B. & Zoebisch, M. A. 2004. Determinants of land-use changes in the Chittagong Hill Tracts of Bangladesh. Applied Geography 24, 217–240.

Riessen, A. v., N. Chakma, N. Chakma, D. Khisa and S. Chakma. 2000. Chittagong Hill Tracts Region Development Plan (ADB TA #3328 - BAN) Interim Report No. 7: Sociology and Indigenous People. Rangamati, Asian Development Bank.

Roy, Raja Debashish (2008). Sangbidhan O Bangladesher Adibashi Janagoshthi (Constitution and the indigenous peoples of Bangladesh), in Jum Paharer Jiban (Life in the hills), ed. Mohiuddin Ahmad, Community Development Library, Dhaka, 2008.

Salam M.A., Noguchi T., Koike M, 1999. The causes of forest cover loss in the hill forests in Bangladesh. GeoJournal, 47 (4): 539-549.

Schendel, W. V. 1992. The Invention of the 'Jummas': State Formation and Ethnicity in Southeastern Bangladesh. Modern Asian Studies 26(1): 95-128.

Shaheed, S M, (1995). Status of Human-Induced Soil Degradation in Bangladesh. Country Report Consultation of the Asian Network on Problem soils, (23-27 October) FAO, Manila, Philippines (Unpublished).

Shahu, Z. K. and S. L. Pardo 1998. The Bawms: Forest Wandering Tribe of Chittagong Hill Tracts. Chittagong, Zir Kung Shahu.

SMEC International Pty Ltd (2008). Rural Social Survey in CHT, Main Report. Chittagong Hill Tracts Rural Development Project (CHT-RDP), Government of the People's republic of Bangladesh, Dhaka.

SRDI, 1996-2002. Land and Soil Resource User Guide, Thana (Upazilla) Serie. Soil Resources Development Institute, Dhaka.

Support to Preparation of an Integrated Project for Environment Friendly Agriculture in the Chittagong Hill Tracts Ministry of Agriculture, Ministry of Chittagong Hill Tract Affairs, Government of the People's Republic of Bangladesh & Food and Agriculture Organization of the United Nations, 24 March 2013.

Staff of Soil Resources Development Institute 1988-2001. Land and Soil Resource Utilization Guide (Upazil Nirdeshika), 25 Vols. , SRDI, Dhaka

Talukder, Shyamal (2006). Jum, compiled in Ranya Phul - The Chakma Best Poems, ed. Hemal Dewan at el, published by Moniswapan Dewan, Rangamati.

Thapa, G. B. and G. Rasul 2005. Patterns and determinants of agricultural systems in the Chittagong Hill Tracts of Bangladesh. Agricultural Systems 85: 255-277.

Tripura, Prasanta & Harun, Abanti (2003). Parbotto Chattagrame Jumchash (Swidden Agriculture in the Chittagong Hill Tracts). Society for Environment & Development, Dhaka.

Tripura, Shaktipada (2012). Regional workshop on laws, conventions and regulations related to land of the indigenous hill people of the Chittagong Hill Tracts, 18 July 2012. CHT Regional Council, Rangamati.

Uddin, M. S. and Nazrul, M.I. (2002). Research Highlight. Hill Agricultural Research Station, BARI, Khagrachhari.

Ullah, M. 2002. Mountain Issues and Communities in Chittgagong Hill Tracts of Bangladesh. Policy Brief: South Asia Watch on Trade, Economics, & Environment (SAWTEE), 3.

UNDP (2012). Annual Progress report on Agriculture and Food Security Project in the Chittagong Hill Tracts.

UNDP 2003. Promotion of Development and Confidence-Building in the Chittagong Hill Tracts: Programme Document, Economic Relations Division, Ministry of Finance, GoB, Ministry of Chittagong Hill Tracts Affairs, United Nations Development Progrogramme Country Office/Bangladesh, Dhaka.

UNICEF 2003. PROGOTIR PATHEY 2003. Monitoring the Situation of Children and Women Project, Bangladesh Bureau of Statistics, Dhaka.

USGS 2003. Shuttle Radar Topographic Mission Digital Elevation Model (http://srtm.usgs.gov/).

Van Schendel, Willem; Mey, Wolfgang; & Dewan, Aditya Kumar (2001). The Chittagong Hill Tracts – Living in a Borderland. UPL, Dhaka.

WARPO (2001). National Water Management Plan. Ministry of Water Resources, Government of the People's Republic of Bangladesh.

WFP, 2004. Local Estimation of Poverty and Malnutrition in Bangladesh. Bangladesh Bureau of Statistics in collaboration with the United Nations World Food Programme.

White, R. and S. K. Bhuchar, eds, 2003. Proceedings of a Regional Workshop held 8-9 December, 2003: Resource Constraints and Management Options in Mountain Watersheds of the Himalays, International Centre for Integrated Mountain Development, Kathmandu, Nepal.

www.mochta.gov.bd, official website of the Ministry of Chittagong Hill Tracts Affairs (MoCHTA)

List of Notable Publications By General Economics Division (GED) Bangladesh Planning Commission since 2009

1. Policy Study on Financing Growth and Poverty Reduction: Policy Challenges and Options in Bangladesh (May 2009)
2. Policy Study on Responding to the Millennium Development Challenge Through Private Sectors Involvement in Bangladesh (May 2009)
3. Policy Study on The Probable Impacts of Climate Change on Poverty and Economic Growth and the Options of Coping with Adverse Effect of Climate Change in Bangladesh (May 2009)
4. Steps Towards Change: National Strategy for Accelerated Poverty Reduction II (Revised) FY 2009-11 (December 2009)
5. Millennium Development Goals: Bangladesh Progress Report 2009 (2009)
6. Millennium Development Goals: Needs Assessment and Costing 2009-2015 Bangladesh (July 2009)
7. এমডিজি কর্ম-পরিকল্পনা (৫১টি উপজেলা) (জানুয়ারি-জুন-২০১০)
8. MDG Action Plan (51 Upazillas) (January 2011)
9. MDG Financing Strategy for Bangladesh (April 2011)
10. SAARC Development Goals: Bangladesh Progress Report 2011 (August 2011)
11. Background Papers of the Sixth Five Year Plan (Volume 1-4) (September 2011)
12. 6th Five Year Plan (FY 2011-FY 2015) (December 2011)
13. Millennium Development Goals: Bangladesh Progress Report-2011 (February 2012)
14. Perspective Plan of Bangladesh 2010-2021: Making Vision 2021 a Reality (April 2012)
15. Public Expenditure for Climate Change: Bangladesh Climate Public Expenditure and Institutional Review (October 2012)
16. Development of Results Framework for Private Sectors Development in Bangladesh (2012)
17. ষষ্ঠ পঞ্চবার্ষিক পরিকল্পনা (২০১১-১৫) [মূল ইংরেজি থেকে বাংলায় অনুদিত] (অক্টোবর ২০১২)
18. Climate Fiscal Framework (October 2012)
19. Public Expenditure for Climate Change: Bangladesh CPEIR 2012
20. First Implementation Review of the Sixth Five year Plan -2012 (January 2013)
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22. National Sustainable Development Strategy (2010-2021) (May 2013)
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39. 7th Five Year Plan (2015/16-2019/20) (December 2015)

40. সপ্তম পঞ্চবার্ষিক পরিকল্পনা ২০১৫/১৬-২০১৯/২০ [মূল ইংরেজি থেকে বাংলা অনূদিত] (অক্টোবর ২০১৬)

41. জাতীয় সামাজিক নিরাপত্তা কৌশলপত্র [মূল ইংরেজি থেকে বাংলা অনূদিত] (অক্টোবর ২০১৬)

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