Background Studies for the Second Perspective Plan of Bangladesh (2021-2041)

Volume-6

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M.A. Mannan, MP
Minister
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Message

It gives me immense pleasure to learn that the General Economics Division (GED) of Bangladesh Planning Commission is going to publish 16 background papers in six volumes which have been used as the inputs for preparing the country's Second Perspective Plan (2021-2041). The background papers of the Second Perspective Plan is the culmination of macroeconomic and sectoral issues of Bangladesh for future intervention that GED has pursued with various eminent economists, social scientists, researchers, and academicians at the national level.

My thanks are done to the Member (Senior Secretary) and the officials in the General Economics Division (GED) for their perseverance in shaping this document. I believe background papers will be helpful for policy-planners, development practitioners, researchers, academicians and students as well. I believe that officials working in government ministries and agencies will be immensely benefited from these background papers for upgrading and updating their knowledge and professional competences. Finally, I appriciate GED leadership for undertaking this endeavour for printing background papers of the Second Perspective Plan in book volumes for much wider use. I earnestly wish their success.

(M. A. Mannan, MP)

Dr. Shamsul Alam
Member (Senior Secretary)
General Economics Division (GED)
Bangladesh Planning Commission

Foreword

Following the 2009 National Election that reinstated democracy in Bangladesh, two major changes ensued in the planning landscape of the country. First, Bangladesh returned to its five-year planning system discontinuing the PRSPs. The country, then, decided to synergize its short- and medium-term planning intervention introducing a long-term perspective plan. The efforts culminated into the preparation of first ever Perspective Plan of Bangladesh (2010-2021). The Plan, in fact, was an elaboration of the Vision 2021 announced by the Hon'ble Prime Minister Sheikh Hasina. It provided a roadmap for accelerated growth and laid down broad approaches for the eradication of poverty, inequality, and human deprivation. Most importantly, it provided the broader context in which the Sixth and the Seventh Five Year Plan would be implemented.

Embracing the Perspective Plan's creed, the 6th Five Year Plan (2011-2015) has completed its tenure and the 7th Five Year Plan (2016-2020) has crossed the halfway of its intended period of implementation approaching the end. The preparatory activities of the 8th Five Year Plan are expected to begin in 2019. However, like the two preceding plans, it needs a longer-term perspective plan to set the context and create the policy pathway. Moreover, in the meantime, Bangladesh has gone through some major socioeconomic transformation—it crossed the lower-middle income threshold of World Bank country classification in 2015 and qualified for the first time to graduate into a developing country in 2018. Based on her presentiment that such changes are imminent, the Hon'ble Prime Minister directed GED to initiate Second Perspective Plan (2021-2041) formulation process in the National Economic Council (NEC) meeting held on 20 October 2015.

And following that instruction the process of preparing the Second Perspective Plan has been initiated by General Economics Division at the end of 2016. The process formally started with preparation of a 'Concept Paper'. In addition, Planning Commission constituted a high level "Panel of Experts" for guiding the process of formulating the Plan within a participatory framework. For developing the Plan strategies and indicating the desirable development path that would lead to fulfilling its objectives, sixteen different

background studies covering different socio-economic sectors and sub-sectors, and a technical framework for macroeconomic projection for 2021-2041 were prepared. These background papers were undertaken for generating quantitative/qualitative benchmark values and targets for relevant indicators of the Plan and fill in critical knowledge gaps. Renowned economists, academicians, researchers and development practitioners in the relevant fields with a long-standing flair were assigned to conduct the studies within the stipulated timeframe. Later, the final drafts of the background papers were reviewed by relevant experts in the government as well as from professional and academic community. Based on such elaborate feedback, the drafts were modified and finalised by the author(s) under the overall supervision and guidance of General Economics Division (GED).

These background studies provided valuable information/inputs which significantly contributed towards drafting the Second Perspective Plan. These studies are rich in contents and, if made available, will enrich the knowledge base relating to development challenges and development options facing Bangladesh. In view of the importance of these studies, it has been decided that GED will publish these studies for making these available to interested readers, researchers and academia.

The background papers have been published in six separate volumes. It is expected that these volumes will help the readers to understand the rational for the choice of the specific domain underlying the Plan and the design of the policy package adapted for the Plan for reconciling the goals of efficiency with those of equity. The studies attempted to spell out a reform strategy and agenda for agriculture, food security, industrialisation, poverty reduction, social inclusion, transportation, quality infrastructure, sustainable management of natural resources, and other development issues like governance, gender, urban development, service sector development, health and population management, human development, ICT and information highway, employment and labour market in the light of current conditions as well as past experience trends.

Now, I would like to take the opportunity to convey my gratitude to the people behind this splendid task. First and foremost, I will recall the diligent contribution from the relevant officials of GED for their untiring support and cooperation in managing all the studies. Finally, the publication will be a success only when it served the purpose of the readers that intended to.

I believe, this book of background papers prepared to help formulate the Second Perspective Plan of Bangladesh would be considered as one of the valuable knowledge products of GED.

(Professor Shamsul Alam, M.A. Econs., PhD)

Acknowledgements

As the General Economics Division (GED) is going to publish the background studies as a collection of 16 papers in 6 volumes, it likes to exert its gratitude to all the actors involved.

First and foremost, GED likes to express its humble gratefulness to the Hon'ble Prime Minister Sheikh Hasina for her visionary leadership. Perceiving in advance the changing socioeconomic landscape of the country, she first felt the need of a second perspective plan to be formulated. In the National Economic Council (NEC) meeting of the 20th October 2015, she provided a clear guidance in this regard. Hence began the ensuing activities.

GED acknowledges the guidance and timely direction provided by the Hon'ble Minister for Planning Mr. Abdul Mannan, MP, gave valuable time and precious guidance. GED is indebted to him.

GED, gratefully recalls the valuable contribution of the Panel of Experts headed by Dr. Wahiduddin Mahmud for his suggestions and advices all through. The reviewers' (members of technical committee) contribution to the background papers are also acknowledged herewith.

GED is indebted to the outstanding leadership of Dr. Shamsul Alam for this endeavor. In his eleven years tenure, he has raised GED, the policy-planning hub of the country, into the highest level of excellence. He is the person who reviewed and edited the background papers and transformed them into one interlinked document that ultimately culminated into the Second Perspective Plan (2021-2041).

Md. Mafidul Islam, not only as the Chief, GED also as the Project Director of Mid-Term Review of the Perspective Plan and Formulation of Bangladesh Vision 2041 coordinated all the administrative and financial procedures. Mr. Md. Forhad Siddique, Deputy Chief and Deputy Project Director seconded his with his ubiquitous involvement in all the activities. Ms. Josefa Yesmin, Assistant Chief, as the Assistant Project Director exerted her best to make the initiative a success story. Preparing the project proposal, concept paper and other relevant documents as well as providing data support, Mr. Sheikh Moinul Islam Moin, Senior Assistant Chief, played his role in the process. Ms. Shifat Anwar Tumpa, Assistant Chief also provided constant support in the process of preparation of these background papers.

Last but not the least, many officials from the General Economics Division (GED), Bangladesh Planning Commission, Ministry of Planning and other Ministries of the government graced with their presence to project-related meetings and discussions.

We gratefully acknowledge the efforts by all concerned in the Bangladesh Planning Commission.

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List of Abbreviations (Part-2)

A2I	Access to Information
ANIS	Augmented National Innovation System
BANIS	Bangladesh Augmented National Innovation System
BBS	Bangladesh Bureau of Statistics
ccTLDs	Country-code top-level domains
CGE Model	Computable General Equilibrium Model
CRS	Customer Relationship Management
CSR	Corporate Social Responsibility
DRM	Digital Rights Management
gTLD	Generic top-level domains
ECNCST	Executive Committee of National Council on Science and Technology
EPB	Export Promotion Bureau
GoB	Government of Bangladesh
GPRS	General Packet Radio Service
HDMI	High Definition Multimedia Interface
HDTV	High Definition TV
ICT	Information and Communications Technology
ICTMB	ICT Monitoring Board
INSEAD	Institut Européen d'Administration des Affaires
IOS/iOS	Input/Output Supervisor iPhone operating system Internetworking operating system
IT	Information Technology
ITES	IT enabled services
KEI	Knowledge Economy Index
LCD	Liquid Crystal Display
LED	Light Emitting Diode
MoE	Ministry of Education
MoP	Ministry of Planning
MOST	Ministry of Science and Technology
NCST	National Council on Science and Technology
NSTP	National Science and Technology Policy
NIS	National Innovation System
OECD	Organization for Economic Cooperation and Development
PPP	Public Private Partnership
SAM	Social Accounting Matrix
SAM-Tech	Technology-based Social Accounting Matrices
SCENIS	Sustainable Capabilities Enhancing National Innovation System
SISS	Sectoral Innovation Sub-System
SoC/SOC	System on a Chip
TFP	Total Factor Productivity
UNIDO	United Nations Industrial Development Organization
USB	Universal Serial Bus
VDI	Virtual Desktop Infrastructure
VECM	Vector Error Correction Model
VGA	Video Graphics Array
WIPO	World Intellectual Property Organization

ACRONYMS (Part-3)

7FYP	Seventh Five Year Plan
ANC	Antenatal Care
BBS	Bangladesh Bureau of Statistics
BMI	Body Mass Index
CEmOC	Comprehensive Emergency Obstetric Care
CPR	Contraceptive Prevalence Rate
DGFP	Directorate General of Family Planning
DGHS	Directorate General of Health Services
ESD	Essential Service Delivery
ESP	Essential Service Packages
GDP	Gross Domestic Product
HIES	Household Income and Expenditure Survey
HNP	Health Nutrition and Population
HPNSDP	Health Population & Nutrition Sector Development Plan
IPCC	Intergovernmental Panel on Climate Change
LDC	Less Developed Countries
LFP	Labour Force Participation
MCH-FP	Maternal, Child Health and Family Planning
MDGs	Millennium Development Goals
MIS	Management Information System
MOHFW	Ministry of Health and Family Welfare
NCD	Non-communicable Diseases
NIPORT	National Institute of Population Research and Training
PHC	Primary Health Care
PNC	Postnatal Care
SACMO	Sub-assistant Community Medical Officer
SDGs	Sustainable Development Goals
TFR	Total Fertility Rate
UHFWC	Union Health and Family Welfare Centers
WASH	Water Sanitation and Hygiene
WDP	Women's Development Policy, 2011
WHO	World Health Organization

Part-1

Education, Skills and Human Development for 2041

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Education, Skills and Human Development for 2041

Abstract

Bangladesh has witnessed structural transformation in terms of sectoral shares of GDP implying that structural changes in employment should follow. Thus equipping the labour force with the kind of education and skills in line with structural transformation in the economy will be crucial for achieving further advancement of the economy. The perspective plan 2021-2041 envisions Bangladesh to enter into knowledge based societies, requiring greater emphasis on education and skill through research and development. It is argued that a knowledge based society would be crucial for the level of economic development to the status of an upper middle income country. This chapter is an attempt to inform policies on education, skill development and overall human development strategies for addressing the human development challenges for 2041. Importantly, globalization and the advancement of technology will require human entered development paradigm implying that knowledge and expertise will be crucial for competitiveness of individuals and the country. Thus the efficient development and use of human resources will be crucial for adapting to changing global economic environments necessitating a workforce with transferable skills and competencies in order to propel the engine of growth.

1. Introduction

Bangladesh government has embarked on a twenty years perspective plan 2021-2041 with the aim of achieving upper-middle income status by the year 2031 and higher middle income status country by the year 2046. The perspective plan sets its developmental goals with the view to eradicate extreme poverty, while attaining the status of upper middle status by 2031. It is assumed that past development achievements and favourable future growth prospects would make such goals towards realisation. However, the country faces many inherent development challenges that are documented in the national policy documents such as the 7th five year plan 2016-2020(SFYP 2015). As human development remains a strategic input to achieving the goal of poverty reduction and inclusive growth, successive plans of the government of Bangladesh have put considerable emphasis on this. There has been considerable progress in expanding education at primary, secondary and tertiary levels both for male and female in Bangladesh. Indeed Bangladesh is one of the countries to achieve tremendous success on achieving millennium development goals (MDGs) including the progress on universal primary schooling and gender parity in education. However, quality of education in particular learning outcome and low levels of skills remains a serious concern Bangladesh, like other developing countries. The former also got into critical attention in the sustainable development goals (SDG) that sets out the global objectives to end poverty and hunger. As education importantly links all the sustainable development goals and the need for improving the quality of education and addressing the learning crisis can hardly be over emphasized for the country's long run economic development. For example, Hanushek and Woessmann (2009) suggest that quantitative expansion of schooling without emphasis on quality might be counterproductive for developing countries. In Bangladesh, as shown in Islam(2015), the relationship between the level education (schooling) and unemployment has been shown positive implying also that mere quantitative expansion of education and training cannot address the future human development challenges. The challenges that the education sector faces include low quality of learning, inadequate technical and vocational education and training, and limited tertiary education facilities as well as lack of inclusion in access to quality education. While this might be reflective of the low public expenditure in education compared both low and high performing countries in terms of education achievements, there is also lack of holistic approach towards education and training policies of the country. Bangladesh's public expenditure on education (2.1 percent) is considered very low even compared with in south Asia (India 3.7%) and South East Asia (Malaysia 4.3%, Vietnam 5.3%). While high performing systems appear to spend more on education as a percentage of GNP, they also accompany with sound policies determining the success.

One of the six goals enunciated under the perspective plan is to "establish the country as a knowledge hub country for promoting a new skilled based society." The framework of perspective plan focuses on several policy variables, to influence growth, employment and poverty reduction targets, that includes total factor productivity improvement by emphasising on average schooling of 11 years, quality education, skill development and investing in education around 5 percent of GDP. Importantly, as the country reaches to higher growth trajectory there will be expected commensurate rise in the demand for workers with higher education and skills. In the backdrop of increasingly globalized and highly competitive markets as well as rapidly changing technologies, it will become crucial

that education systems aim to produce well-balanced human resources with appropriate skills. The important question is then how the country's education system can be geared towards innovation and economic growth. While greater attention needs to be devoted to secondary and tertiary level education as well as vocational and technical education and training, reform of higher education to embrace global transformation as well as putting greater emphasis on research universities would be immensely important. When it comes to higher education, the link between education and human capital creation, labour market outcomes as well as the overall development strategy assumes greater emphasis than merely producing graduates. This will require the education policies to be aligned with and be an integral part of the development strategy.

The chapter is organized as follows. In Section 2 we discuss the linkage between education, productivity and growth, in order to provide an understanding of the importance of human development for growth. The following Section briefly reviews the achievements, challenges of overall education sector. In doing so it also highlights some on-going policies as well as structural reform challenges existing in the sector. The Section 4 discuss the linkage between education and labour market outcome, keeping in view of structural changes in eth economy and the future demand for skilled human resources and essentially shed light on some indicative scenario for human capital need in the long run. The Section 5 and Section 6, respectively, review the international evidences with respect to education and skill development as well as higher education reform. Section 7 discusses some policy options, in line with international evidences, with regards to future human development of the country and the Section 8 concludes the chapter.

2. Education and Economic Growth

The contribution of education to economic growth is seen both from micro and macro perspective respectively from the view of raising the productivity of individuals as well as labour productivity growth. According to the endogenous growth theory literature, higher investment in education drives growth of national income through human capital improvement (e.g. Barro 2000). Schulz (1991) suggested strong correlation between educational attainment and productivity of labour force implying that education is growth enhancing. Some studies also suggest that investment in education does not necessarily promote economic growth. Additionally education has positive impact on investment (both domestic and foreign investment) as well as innovation (Hawkes and Uger 2012). Importantly education contributes to the economy facilitating shift of labour from low productive sectors to high productive sectors.

The link between education and productivity is usually investigated by looking at the rate of return to education, which is estimated by assuming that wage (or earning) is a function of years of schooling, controlling for other characteristics of an individual such as age, gender, experience and ability (see Mincer 1974). The hypothesized relationship, in such earning equation, between income and education level is positive implying that educated workers have higher marginal revenue of product of labour as they are more productive. Private rate of return to education can be estimated by regressing an individual's income on the level of education. The same hypothesis is postulated at the macro level, whereby growth accounting framework is applied to discern the contribution of education (quality of labour) as an input on growth of output as well as use of cross country growth regressions

are made to estimate the relationship between education and growth (see Stevens and Weale 2003). Early literatures suggest that low income countries could harness more return from education. Interestingly, the rate of return on education is shown higher for primary education compared to other schooling levels in case of developing countries (Islam 2015). For example, the republic of Korea achieved the goal of universal primary education in 1960 and the country benefited from the workers having basic education in its early phase of industrialization (Tzannatos and Geraint, 1997). However, later studies shown that private rate of return on higher education as well as that of secondary education was higher compared to rate of return on investment in higher education primary education in many developing countries including India and South Africa. Barro and Lee (1994) show that rate of secondary school enrolment is positively related with rate of growth. Importantly, education and skill development played crucial role in case of high economic growth achieved by the East Asian countries. For example, education has been behind Vietnam's development success. The country's committed effort to enhance access to primary education as well as enhancing quality made it to have well-educated workforce. Recent studies show that the literacy and numeracy of its adult workforce is comparable to developed countries (VDR 2014). Also, Korea drew global attention for its high growth over many decades making its transformation from a poor country to a developed one, a success story that is widely attributed to its focus on education from the early years. Korea gradually improved its education system making it responsive to economic development and the average years of schooling in Korea increased from 5.7 years in 1970 to 9.5 years in 1991 and 10.6 years in 2001, commensurate with its economic progress during which time high school graduates entering higher education has increased from 26.9 percent in 1970to 33.2 percent in 1991 and 70.5 percent in 2001(Song 2003). Recent evidence have shown higher returns, in terms of increasing trend of wage, from tertiary education (Colclough, Kingdon, and Patrinos 2010; Montenegro and Patrinos 2014).

In case of Bangladesh, Sen and Rahman (2017) observed that the past growth in was largely driven by relatively unskilled labour in the sense that "the earnings of relatively unskilled labour (having no or little education) have surpassed the growth in skilled labour." Based on the analysis of labour force surveys, they also suggest that relative gains to secondary and tertiary education as opposed to "no education" have diminished between the period 2000 and 2010. As an unintended consequence of higher gains for unskilled workers, the demand for secondary and higher education did not commensurately rise, as the authors also argue (Sen and Rahman 2017). Indeed, despite success made in enrolments, average years of schooling in Bangladesh still remains low compared to its neighbouring counties and countries in South East Asia. While average years of schooling in Bangladesh is 5.1, this is 5.8 in India, 10.9 in Sri Lanka and 10.1 in Malaysia and 7.8 in Vietnam.

These evidences has important implications for formulating long-term policies for human development for a developing country like Bangladesh, which also suggest that shortage of human capital may also appear as constraints to further growth. Importantly, globalization and the advancement of technology will require human entered development paradigm implying that knowledge and expertise will be crucial for competitiveness of individuals and societies. Thus the efficient development and use of human resources will be crucial for adapting to changing global economic environments necessitating a technically skilled workforce driving the engine of growth.

3. Education Sectors in Bangladesh: Achievements, Challenges and Policies

In this section we briefly review the current achievements in primary, secondary and higher education, while also highlighting the remaining challenges and on-going policies for improvement. The section highlights that quality of education and the education system still faces many challenges, despite success in terms of access and equity mostly at the primary level. We also review the management and logistic issues in ensuring quality of education. The following discussion to some extent draws on the review provided in the Seventh Five Year Plan (SYFP, 2015).

3.1 Primary education

Bangladesh has made tremendous progress in terms of primary school enrolment, while almost achieving the target of universal primary education under the MDG target. The net primary education enrolment rate (NER) of Bangladesh increased from 62.9% in 2000 to 97.7% in 2014, while gross primary enrolment rate was 108.4% in 2014. There has been improvement in primary cycle completion rate as well as reduction in drop-out rates as well as a significant reduction of the gender disparity in access (Kono et. al 2018). Further to government policies and engagement in improving education (Ravallion and Wodon, 2000; Ahmed and Ninno, 2002), schooling has been provided by NGOs in Bangladesh, with the continued donor support for targeted programs and interventions resulting improving school enrolment.

The Primary education development program (PDEP) initiated during the period of the Sixth Five Year Plan aimed at further improving the standard of primary education. This has been supported by the Asian Development Bank (ADB) Program known as primary education development program (PEDPII). It highlighted six areas where progress was needed: learning outcomes, participation, reducing disparities, decentralization, and effective use of budget allocations as well as program planning and management. It also put emphasis on effective resource use to improve completion and quality of teaching.

The government sets the target for the 7th FYP, in line with the national education policy (NEP 2010), that includes introduction of pre-primary and mandatory primary education for all. For the development of primary education, the main targets include 1) improving teaching and learning process in schools, 2) decentralization of management and enhance effectiveness, 3) effective planning and management. Also greater emphasis is to be given on non-formal primary education. The PEDPIII was undertaken to further improve primary education quality in addition to widen its access. Under the PDEPIII notable progress was made in terms of enrollment (98 percent net enrollment achieved), teacher recruitment, organizational development and capacity development, enhancement of educational management and information system (EMIS), progress in universal coverage of school level improvement plan (SLIP), progress in plan for decentralization, progress in quantitative training for teachers, progress in school infrastructure development(See SYFP 2015). It has been also noted that some targets within the primary education development plan did not see much progress and needed further attention. These included: firstly, allocation on primary education as a proportion to total education expenditure resulting from lack of allocation on education as a percentage of GDP; secondly, completion rate in primary education below target, repetition rates not decreasing at desired level, teachers

training and designing incentive for teachers, capacity development of quality enhancing institutions NAPE and NCTB still remains a big concern. More importantly, the lack of adequate student learning remain a serious concern in Bangladesh, as in other developing countries; it is found that five full years of primary schooling taught less than 1 in 10 children how to do simple mathematics (Asadullah and Chowdhury 2013).[1] On improving the quality of primary education, the policy focus would remain on learning outcomes and skills for life and work (see Bangladesh Education Watch Report 2016).

3.1.1 Early childhood development

The early childhood education or preschool program with organized learning component is gaining importance to prepare children for primary school enrollment as well as to facilitate their psycho-social development. Although the government's education policy specifies two years of early education, as reported in Micro Indicator Cluster Survey 2015(MICS 2015), only 13.4 percent of children of age 36-59 months are receiving early childhood education. Another study reports that the net enrolment at the pre-primary level of education is still lagging behind (40.4 percent) the world average of about 54 percent (or a median of about 59 percent) (Bangladesh Education Watch 2016).

3.1.2 Non-formal education

The successive governments in Bangladesh have been implementing non-formal education programs to empower its people. In the 1990s the government launched major non-formal education program focusing basic literacy. Later in 2006, a non-formal education policy was adopted that envisages increasing the number of literates, providing need based continuing education, pre-voc1 and pre-voc2 level of education, promotion and equivalency between formal and non-formal education and ensuring the sustainability of non-formal education. The policy also emphasized remedial education program, such a second chance schooling, for dropouts to enhance skill for people entering labour market. The governments goals, in the area of non-formal education, include establishing community based network of learning centers in each union, extending opportunities for effective skill training and establishing non-formal education board to facilitate opportunities for attaining higher education and skill through establishment of equivalence between formal and non-formal education(SFYP 2015).

3.2 Secondary education

In the case of secondary education, the enrollment as well as completion rates suggest that large proportion of primary completers do not continue to secondary and that a large proportion of students do not pass the secondary school certificate (SSC) examination. The issues of learning and drop-out (both physical as well as virtual drop-outs) still remain a serious concern at the policy level. Comparing with international trend, the secondary continuation rate of Bangladesh is almost at the average level predicted by country's GDP per capita, while the repetition rate is slightly lower than the international average (see Kono et al 2018). They also suggest that in terms of female-to-male gender gap, Bangladesh recorded a slightly better continuation rate, but worse in the repetition rate when compared with the international trend. These findings have implications for quality and/or learning outcomes in schools.

1 These authors evaluated the ability of school students to answer simple arithmetic problems, finding significant discrepancies between years of schooling and cognitive outcomes.

According to the government's documents, some of the programs to enhance the secondary education currently underway include: 1) the secondary education sector investment program (SESIP 2014-17) under which support for teaching materials and teachers training and stipend are given; 2) Teaching quality Improvement II (TQI-II 2012-17) under which on-the-job, continuous training and professional development and access to office equipment and ICT materials are provided. Enrolment in vocational and technical education as a percentage of secondary enrolment has been slowly increasing over the last decades, while less progress is done in terms of enrolment in upper levels. The government under the Sixth Five Year Plan took the initiate to strengthen the system of vocational education and training (TVET). Formal TVET consist of SSC, HSC, and diploma courses. The TVET program includes a range of courses: time bound, institution based and graded training with formal certification, which are offered by vocational training institutes, polytechnic, commercial institutes, technical training centre and specialized institutes and their governance are overseen by the directorate of technical education and Bangladesh technical education board. However, there remain important challenges resulting from unsatisfactory performance of TVET sector in terms of quality. The relevance of training, circumstanced by the lack of infrastructures, lab/equipment and technical facilities in non-governmental technical institutes as well as lack of adequate resources with the technical education board limits the implementation of goals under the aforementioned policies. While analysing the challenges of human capital development in Bangladesh Islam (2015) concludes that mere expansion of capacity with regards to formal technical and vocational training may not solve the skill gap that exist at the moment, particularly given the fact that degree of capacity utilization in vocational education and training institutions is found to be low (Alamgir 2013, cited in Islam (2015)).

3.2.1 Madrasa Education

It has been observed that the enrollment in Madrasa's at the secondary level has been increasing in the 1990s, particularly female enrollment, with the introduction of female stipend program. Many argue that Madrasa graduates often find it difficult to compete and integrate with the mainstream education affecting their labour market outcomes. The government's policy focus with regards to Madrasa education in the recent years have been to make the system productive and job-oriented through introducing vocational courses at secondary level in selected Madrasas. The government under the 7th FYP has taken initiatives to invest on infrastructural improvements for non-governmental Madrasas to facilitate learning environment and plans are underway in revising the curriculums at all levels of Madrasa education. The government's reform agenda also includes capacity building of teachers in the use of ICT and facilitate ICT education for Madrasa students.

3.3 Higher Education

Here we briefly review the progress including enrolment and challenges in the higher education sector. While recent evidence have shown that higher return (in terms of increasing trend of wage) from tertiary education (Colclough, Kingdon, and Patrinos 2010; Montenegro and Patrinos 2014), the enrolment rate at tertiary level education is only 14% in Bangladesh (World Bank 2012). At present around 20 percent of government expenditure is devoted on tertiary education (World Bank 2016). The gross enrollment in

tertiary education has more than doubled in the recent decade. The female enrollment has also considerably increased in the recent years. It has been observed that compared to the most developed countries the percentage of population having access to higher education is much less in Bangladesh; according to an estimate presently only 4.7% the population aged 18 years and above in Bangladesh has ever accessed any education above grade 12.

Until recently, higher education sector was dominated by the public sector. Last twenty years have seen tremendous growth of private higher education. In response to both social and market demand for higher education, government has allowed private sector to come forward to provide university education. According to BANBEIS (2016), there are now 38 public universities and 92 private universities in Bangladesh providing tertiary education. It is shown in one study that, among those accessing higher education 79% students attend affiliated colleges under the national university. Private universities in the recent years have been absorbing the demand for higher education, which however are the most expensive and have not have not encouraged better access or equity. Recent study (World Bank 2014) projects that by 2030, 65% more students will try to gain admission to tertiary level institutions and suggest the importance of the private sector investment in higher education has to be increased vis a vis public sector.

Available studies and policy documents suggest that the key challenges facing higher education in Bangladesh includes access and equity, quality and relevance, financing as well as governance related issues. The rapid increase of private universities, which arguably face rather loose regulation, has become a concern for quality of the degrees they were offering except for a few. Importantly, the recent UGC private university act 2010 requires stronger self- regulation and specifies responsibility of all stakeholders and establishment of accreditation council for academic and instructional standards. The rapid increase of private universities, which arguably face rather loose regulation, has become a concern for quality of the degrees they were offering except for a few. Importantly, the recent UGC private university act 2010 requires stronger self- regulation and specifies responsibility of all stakeholders and establishment of accreditation council for academic and instructional standards.

In Bangladeshi universities, research culture, scholarly atmosphere is somewhat at frustrating level and do not assume any good place in ranking even in South Asian Context. The National Education Policy 2010 of Bangladesh envisions "expanding the horizons of knowledge through creative, multidimensional, original and practical research." This emphasis on research is a new policy focus and seen crucial to allocate and ensure long-term availability of funds for academia to engage with research and contribute to the global knowledge. Importantly, to facilitate such mechanism focus on research universities is crucial. It is also observed that teachers in higher education institutions do not possess required research or pedagogical training, or qualifications beyond a master's degree and only a small percentage (4%) possess doctoral level or M.Phil. degrees.

3.4 Structural reform challenges

Bangladesh education sector comprises heterogeneous providers that include governmental, non-governmental (non-profit as well as for-profit) institutions. There is diverse curriculum and instructions offered at primary, secondary as well as tertiary levels. In the case of primary,

about 54% of total enrolment is in government schools, followed by newly nationalized primary schools (22 percent) and religious schools (6%) and other non-formal schools comprising the rest (APSC 2013). Among the secondary schooling providers roughly two third comprise of secular/no-religious stream, 21 percent religious stream and 5% technical and vocational l education and training (BANBEIS 2011). The higher secondary education comprises the similar streams as the junior and secondary level, in terms of providers. The tertiary level of education in Bangladesh has two broad streams offering Bachelor and Masters level education offered by public sector and private universities and colleges.

The education sector in Bangladesh has a complex governance structure consisting of various overseeing bodies including the Ministry of Primary and Mass Education, Ministry of Education, Ministry of Commerce, Department of Primary Education, Ministry of Social Welfare, Bureau of Non-formal Education, Directorate of Secondary and Higher Education and the University Grants Commission (see SFYP 2015). As of 2005 new ministry was created to give distinct attention to primary education (up-to grade 5). This became a barrier to achieve the goal of universal access to education as well as quality enhancement in schools as such goals rather required an integrated approach focusing on sequencing curriculum, teaching and learning. This resulted in apparent failure of extending universal and compulsory primary education up to grade 8, which was the goal under NEP 2010. The challenges to teaching-learning solution also result from a much centralised system of education in the country, whereby central agencies are involved in each aspect of technical and financial issues related to teaching and learning in hundreds of institutions at the Upazilla level in the country. The regulation and assessment of non-governmental educational institutions are also managed by few central agencies.

The four types of higher education institutions in Bangladesh : a) public and private universities, b) public and private colleges affiliated with the National University, c) colleges affiliated with the Islamic University, and d) various types of professional colleges, institutions and madrasas. The overall responsibility of higher education sector from preparing budget to formulating policies and providing strategic leadership falls on the Ministry of Education (MOE), while the University Grants Commission (UGC) works as the regulating body of both public and private universities. On higher education management issues, a recent world Bank study (World Bank 2014) suggests that the national university under which about 1500 public and private colleges offering higher education require strategic coordination among key stakeholders (such as the ministry of education, national universities, university grants commission, department of secondary and higher education as well as public and private colleges' representatives) in order to follow multidimensional policy framework. The suggested policy options include; strengthening the system and service delivery, expanding in response to market and future demands, improving governance and management of the college subsector, reforming financing matters, and improving the quality of affiliated colleges.

The Private University Act 2010 under which the private universities are governed, does not provide a common framework for all and there is lack of clarification regarding the role and responsibilities of various officers/bodies within the university governance structure such as that of the university board of trustees, board of governors, syndicate, academic council, chief executive officer, vice chancellor, and of the university administration in

general. Under a common framework and rules, both types of universities could effectively function having their own governance structure and management, also emphasized in the 7th Five Year Plan. There is lack of oversight mechanism for universities in Bangladesh such as that of national accreditation council in other countries resulting in huge difficulties in assessing the quality of services rendered by the higher education institutions. For example, India's UGC established the National Assessment and Accreditation Council in 1994 as an autonomous organization.

3.5 Ongoing Education Sector Policies[2]

With the aim to improve quality and capacity several measures initiatives were underway. These include: developing competency based curriculum, revision of text books and introducing creative question paper to assess learning in the terminal exam for grade-five students. On the management side, school based sub-cluster training and subject-based in service training for teachers, Diploma in Education (Dip-Ed) training for primary school teachers, leadership and school management training for head teachers and ICT training for all teachers have been introduced.

Under the government's National Education Policy (NEP 2010), the government has re-emphasized further improvement in teaching learning process in schools. The latter will be evaluated through national assessments as well as continuous evaluation by teachers, whereby cognitive, effective and skill domains are planned to be evaluated and enhanced. In this context teachers' incentive including training and development is also re-emphasized. The use of ICT in all schools including audio visual aids, adoption of quality improvement measures in curriculum and pedagogy, common curriculum in government, non-government/private schools and Madrasas, class room based as well as school based assessments, on- the –job training for teachers are emphasized as goals. Early childhood development and pre-primary education to prepare child for primary school as well inclusion based approaches are to be continued through nutrition program, stipend program, school feeding and health check-up programs among other efforts. A third specific goal to improve primary education within the framework of NEP 2010 and under the 7th Five Year Plan is to ensure decentralization of management and enhance effectiveness, giving more autonomy to school movement committees that will increase involvement of local community. The goal also includes bringing greater transparency in governance and financial management.

With the national education policy and national skill development policy, further expansion, diversification and development of technical and vocational education has been planned. This focuses on greater secondary school enrolment in the field of technical and vocational education and training. The government has deigned National Technical and Vocational Qualifications Framework (NTVQF) has been designed to improve the quality and consistency of nationally recognized qualifications. The latter also aim to ensure international recognition of the skills and knowledge of workers. Further, the skills and training enhancement project (STEP) has been implemented to improve the quality of training as well as enhance the employability of trainees. The Seventh Five Year Plan has re-emphasized the implementation of policies under the National Skill Development Plan (NSDP 2011), as a shared vision of government, industry and workers in that the skill development in Bangladesh will be recognized and supported by the government and

2 This discussion is based on particularly summarizing the Chapter 11 of the 7th Five Year Plan (SYFP 2015).

industry for national and enterprise development, which will empower all to access decent employment and enhance global competitiveness workers through improved knowledge, qualifications and skills. Overall mission is stated as to support rapid and inclusive economic growth (See chapter 11 of SFYP 2015 for detail).

The Skills for Employment Investment Program (SEIP) funded by the Asian Development Bank(ADB 2015), aim to support the government's reforms in skills development outlined in the National Skills Development Policy (NSDP). The SEIP aims to provide market responsive skills training for both private and public sector at the same time improving job placement and/or self-employment rate substantially. The four stages of training cycle include achieving of targeted enrolment, improving quality training completion, job placement placed of trainee within 6 months of completing training, and ensuring that the trainees stay in the jobs for at least 6 months. It is observed that the current TVET teacher/instructor training programs produce small numbers of graduates with inadequate pedagogical and technical skills. The SEIP will implement a vocational trainer development program for trainers and assessors and a management leadership program for training provider management personnel reflecting NSDP requirements. The NSDP suggest the required changes in TVET system management, pedagogy, and certification and accordingly the SEIP aims to support the engagement of industry and external contractors to manage the delivery of training and develop a network of certified trainers and assessors, including work-based trainers and assessors. The SEIP focuses on ensuring that key staff has the required skills, knowledge, and attitude to deliver quality training and other priorities of the NSDP (see ADB 2015 for detail).

Recognizing the critical importance of tertiary education, the government has developed a long term strategic plan for higher education: 2006-2026 also IDA supported Higher Education Quality Enhancement Project (HEQEP) (2009-2015) is underway, which aimed at improvement of quality of education in universities and strengthening their institutional capacity including the University Grants Commission of Bangladesh. Some of the key recommendations are of the strategic plan include: University sector should be expanded to accommodate the increased demands of high school graduates and emphasis should be given on production of skilled manpower in the selected fields such as agriculture, bio-technology, livestock and fisheries, textile engineering; Public funds should be increased in order to increase access and improve quality while exploring other sources of funds; Accountability and institutional autonomy should be redefined; and Accreditation Council for public and private universities (Source: Strategic Plan for Higher education in Bangladesh 2006-2026, University Grants Commission, Dhaka).

The UGC envisions a gross enrolment rate of 15% in higher education, to be achieved by the year 2026. At an annual growth rate of 7.93%, the total number of projected tertiary students would be 3,496,135 in 2026, which implies tremendous pressure on tertiary institutions in terms of access, which will necessitate the expansion of physical facilities and human resources in the existing higher education institutions and/or the creation of new public and private universities. In order to accommodate tertiary enrolment as per the UGC's projected rate of 15%, there will be need to expand the number of private as well as public universities; the UGC estimates about 28 universities will be needed by the 2025 requiring huge public investment. Alternatively resources need to be employed on improving and expanding existing higher education institutions, create independent

centres of excellence within the existing higher education institutes. Some of the strategies to accommodate wider access to higher education that are suggested : expanding open university (BOU) to provide greater access, allowing private universities to operate distance education programs; granting permission to international universities to open campuses in Bangladesh; and providing facilities for e-learning in higher education, especially through the creation of virtual universities(SFYP 2015).

4. Challenges of Human Development for 2041

In Bangladesh, with its journey towards industrialization, it is observed that workers skill are not aligned with the stage of growth and that low level of skills remains a fundamental constraint to future growth prospects. As low skill implies lower productivity, the labour potential is not harnessed to the extent needed to realise the growth potential of economy. For example, shortage of skilled worker and management personnel appears limiting factor harnessing the growth potential of RMG industry. Also inadequate human capital can be constraining to the absorption of 2 million plus labour each year, according to the Seventh Five Year Plan (SFYP 2015). The education profile of labour force (see Table 1) also depicts the inadequacy of needed human capital for further economic transformation.

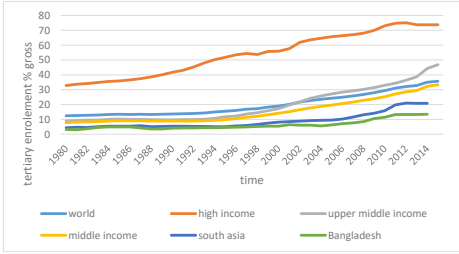
Table 1. Distribution of Employment by levels of Education in Bangladesh: 2015-2016

Levels of education	Percent of Employment
No Education	32.5
Primary	25.9
Secondary	30.1
Higher Secondary	6.0
Tertiary	5.3
Others	0.2

Source: Bangladesh Bureau of Statistics, Labour Force Survey 2015

While at the early stages of development basic education may be adequate for many jobs in the economy, however, with the advancement of technology, it is more likely that new set of skills would be necessary for jobs particularly in the manufacturing as well as service sector. Even with changes in demand for skills, the necessity of basic skills and knowledge would not disappear. Importantly returns to learning are expected to increase – both in case of cognitive and non-cognitive skills. It is envisaged, under the perspective plan policy framework, for achieving high and sustained growth to be an upper middle income country by 2031 and high income country by 2046, the total factor productivity would have to grow from the current average of 0.3 to 2.3 during 2021-2031 and 3.6 during 2032-2046(Alamgir 2015). This will require, inter alia, higher investment in human capital. For example, South Korea moved from low-income in 1974 to high income country in early 2000. Korea's transition to upper middle income country experiences an average labour productivity growth of 4.2 percent which is attributed to the country's historically high literacy rate(Alamgir 2015). In the next phase of Korea's transition to higher income country, it was able to maintain stable 2.7 percent total factor productivity through its emphasis on skill development programs, higher allocation in research and development and expansion of tertiary education. In Korea labour productivity increased substantially over the period- its transition to higher income country (Alamgir 2015).

Figure 1. Enrolment in Tertiary Education for Different Groups of Countries



Source: World Development Indicators (2016)

One important focus thus would be the tertiary education both in terms of quality and quality. The enrolment in tertiary education has not been increasing or at the level of global proportion, particularly if we look at the level of higher and middle income countries. Indeed it has been lower to South Asian average in the recent decades (See Figure 1). The relevance of higher education in Bangladesh suffers from the limited options of studying science and engineering and subjects that have market demand. This is substantiated by the fact that the highest level of unemployment (9%) is among the higher (tertiary) educated people (Bangladesh Labour Force Survey 2015-16). This also creates supply-demand mismatch or skill gap. There is also lack of systematic studies that will inform education policy makers about the job market relevance of the higher education in Bangladesh.

Thus the important question would then is what kind of targets in the area of human capital would commensurate with future growth prospect of the country? Following the approach taken in Islam (2015), we attempt to provide some indicative scenario based on international experiences. The basis of the exercise is to address whether Bangladesh can aim to achieve certain level of human capital that that other middle/higher income countries experienced at the similar stage of development. We particularly compare the situation with Malaysia and Thailand when providing such scenario.

Table 2. Some Indicative Targets for Education and Skill development for Bangladesh[3]

	2015-16	Possible Target for 2030**	Possible Target for 2040***
% of labour force with			
Basic education	34.90	46.70	61.30
Intermediate education	28.40	53.90	63.70
Advanced education	52.90	65.40	83.70
Enrolment in education at			
Primary level	120.43	101.79	102.73
Secondary level	63.52	77.57	129.00
Tertiary level	13.44*	26.07	48.86
Vocational education as percentage of secondary	4.13	11.16	10.14

Source: World Development Indicators (2016)
Notes: * 2014 data; ** indicates that these levels prevailing in Malaysia in 2015;
*** indicates that these levels prevailing in Thailand in 2015.

3 Advanced education comprises short-cycle tertiary education such as a bachelor's degree or equivalent education level, a master's degree or equivalent education level, or doctoral degree or equivalent education level; Intermediate education comprises upper secondary or post-secondary non tertiary education; Basic education comprises primary education or lower secondary education(according to International Standard Classification of Education 2011).

Bangladesh has witnessed structural transformation in terms of sectoral shares of GDP implying structural changes in employment should follow. Thus equipping the labour force with the kind of education and skills commensurate with structural transformation in the economy will be crucial for achieving further advancement of the economy. The transformation that the now- industrialized countries experienced has been accompanied by a shift to more skill intensive jobs. Countries which were at the same level of development had also undergone shift in labour force from manual jobs to skill intensive non-manual jobs and from traditional type to modern jobs that would require basic to improved skills in order to perform non-routine tasks than routine tasks, whereby workers will be doing day to day problem solving tasks than routine tasks. For example, Korea, Malaysia and Thailand saw the share of white collar workers rising over time; the fraction of professional and technical workers in the labour force has been on the rise during the period 1971-2008 in these countries (VDR 2014). These occupations include mechanical, civil and other engineers, chemists, doctors, technicians in IT and science and accountants. Similar increases were also seen in the fraction of clerical workers such as receptionists and librarians. In the manufacturing sector of these countries major dominance are of white and blue collar workers in the East Asian countries. The skill-biased occupational transition that has taken place in south-east Asian and East Asian advanced countries suggest the demand for analytical and interpersonal skills has been growing with demand for manual skills declining. It is observed that analytical and interpersonal skills are highly valued. Jobs that are likely to grow in the future in the technical and professional occupations will require workers to have more advanced skills. Jobs in agriculture sector or technical occupations require more routine and manual work for which basic education and skill may be sufficient. But the jobs in the future will involve performing complex problem solving tasks requiring workers to possess problem solving and analytical skills. Furthermore, there will be need for strong interpersonal and behavioral skills as the workers will be in need of working in team and in supervising role.

The important challenges then is to what extent the education system could equip the workforce with such skills those will be in high demand or highly valued in the longer term. The skill development strategy commensurate with the economy's structural transformation should then be holistic and should be focused from early years through early child hood development to job-related skills development with a connected education system. The formation of cognitive skills starts from the early years of life that continues through adolescence. Behavioral skills are formed in childhood first and then continue to evolve through adult life. Importantly, the cognitive and behavioral skills help workers to update their technical skills continuously. With the advancement in production technology and use vis a vis modernization of the economy workers will need to catch up with their skills. The implication on education and skill development system of the country is very important in making that connection between what is demanded and supplied in terms of human resources for the economy.

5. Education and Skill Development: International evidence

Here we discuss some international experience to understand the importance of government policies towards educational reforms and skill development responding to the pattern of structural transformation of the economy. The Asian experience is noteworthy in this context.

For example, some countries in Asia grew substantially faster than Bangladesh over the last forty years or so to achieve the status of middle income (China and Malaysia) and high income (Korea) countries. One important common feature regarding the transformation of these three countries is that of higher investment in human capital, additional to their emphasis on capital accumulation; all of them focused on human capital investment in terms of generally large spending on education and emphasis on skill development and with expanding economy greater emphasis on tertiary and advanced education (Islam 2015). Bangladesh will need prioritise skill training in line with the strategies followed by these countries.

The experience Korea is pertinent as its human resource development strategies are in line with its industrialization and economic development policies.[4] Korean education and skill development reform has progressed with various stages of development, historically, which has placed it highly in OECD program for international student achievement (PISA) and high enrolment rates at all level of education. In the early years of re-building and industrialization efforts (1945-1960), Korea focused on enforcing universal primary education and reconstruction of educational infrastructure. It may be noted that more than half of the population aged 13 and above were illiterate during the proclamation of the Republic of Korea in 1948. Korea established six years of elementary education, three years of middle school, three years of high school and four years of higher education, popularly known as 6-3-3-4 school system, which introduces multiple pathways to tertiary education. During this period, importantly, primary school teachers qualification requirement were revised requiring four years teachers' college graduates in place of upper secondary school diploma. This means the major policy concern in this period was access to education with the goal of compulsory primary education. During the next decades (1961-1980), when Korea was experiencing strong economic growth with structural transformation with a shift of employment from agriculture to capital-intensive industrialization, the focus remained 'education for economic growth.' The major policy goal became universal secondary education with greater emphasis on supplying technical manpower through enhancing technical and vocational training. That is the government further expanded primary enrolment and vocational high-schools with science and technology education. Expanded primary enrolment increased competition among students for places in secondary schools, the result of which is the introduction of automatic grade promotion in 1969 and abolishment of entrance examination for secondary schools in 1974. The major policy concern in this period was thus enhancing quality-efficiency and control. The government resorted to medium and long term planning and creation of local funds and reliance in foreign loans to support TVET. In the following decade 1981-2000, the government focused on educational development through decentralization of education management facilitating local greater local autonomy with accountability. In this period the policy goal shifted to universal tertiary education, greater focus on quality and reform in vocational training and thus the major concern remain quality, autonomy and accountability. This period saw various reform measures, accordingly. The reforms focused on addressing unequal access to education resulting from widening income gap. The demand for tertiary education increased in this period. The education reform aimed to stop private tutoring while also exempting students from competitive exam for tertiary enrolments as well as

4 The following discussion draws on Understanding Korean Education Vol. 5 Education and Korea's Development, 2007, Korean Educational Development Institute

relaxed control over universities regarding enrolment in 1995. The reform provided greater emphasis on learner-centred education, diversification of educational programs, autonomy and accountability of school operations and also allowed "open access to results of school education evaluation."

In the 2000s Korean educational development focus was on restructuring the education system and policies was aimed at life-long learning, human resource development, improving quality of public schools, supporting research, regional development and human resources development particularly in the context of tertiary education. The resources are devoted to education and financial support for tertiary education with major policy concern remaining global competitiveness and a knowledge based society. The policies mainly responded to the challenges in supporting the nation's competitiveness in the global market as well as meeting the human resource development need. Thus the priority remained reforming higher education in a way that enhances its relevance and the international competitiveness of Korean universities and at the same time strengthening vocational education and training so as to reduce over reliance on tertiary education. In addition the life-long learning has been considered as the integral part of the education system. With the country's move towards heavy and –chemical industries that created demand for higher skills (as the existing vocational school that the government initiated in the 1960s were not in a position to meet the changing demand), the government respondent by focusing on strengthening technical and vocational education as well as increasing the numbers of public vocational training institutes together with a policy of allowing certain private enterprises to offer on-site training under a legal obligatory [cite] framework. Korean government restructured five-year junior technical college education (comprising three years of secondary and two years of post-secondary schooling) into two-year vocational colleges in order to produce technical skills (technicians and engineers) needed for its heavy and chemical industries. In 1908s Korea faced skill worker shortage in industries resulting from decline in vocational secondary schools enrolment due to expanded higher education opportunities. In response to this, the government took further measures to strengthen vocational education and training with the goal to increase vocational school enrolment and ratio of general education school enrolment to vocational senior secondary schools from 68:32 to 50:50 by 1995. Korean government also initiated further reforms in the vocational and training system in the 1990s, while also emphasized on-the-job skill upgradation.

Malaysia attained rapid economic growth experiencing significant structural changes since the 1980s. Like the case of Korea, Malaysian government took initiatives to expand post-secondary education and vocational education and training. If we look at the composition of labour force by educational attainment, there has been notable shift from primary to secondary and tertiary level in Malaysia (Islam 2015. About 25% (55%) of the labour force had tertiary (secondary) education in 2010 compared to roughly 6 % (36%) in 1982(data cited in Islam, 2015). Interestingly, there has been also supply –demand mismatch of graduates (or skill mismatch) in Malaysia; Fleming and Soborg 2012 report that 50% of the graduates in 2006 and 2007 found it difficult to find employment and 28 percent remained unemployed over a year of graduation, and the similar percentage needed further skill training suitable to find employment. It has been argued that such problem related to skill mismatch could act as hindrance to the country's transformation to advanced industrialized

nation – transformation from middle income to higher income status. This phenomenon is recognized as the "middle income trap" by the country's national economic advisory council (NEAC 2010), which emphasized the need for paradigm shift in education towards producing higher level skills needed for an advanced economy. The NEAC 2010 also emphasized on the importance of skill upgrading with continuing education and training and industry and government partnership for skill training of the type demanded by the former.

Another pertinent example is Taiwan, whereby education and training system seen reforms together with various stages of development that the country embarked on. While the initial phase of industrialisation benefited from a literate workforce, the government responded to the changing demand for skills resulting from industrialisation efforts by making secondary education compulsory in place of compulsory primary education. As cited in Ranis (1995), total expenditure in education as a percentage of GNP was increased from 2.1 percent to 4.6 percent from 1955 to 1970. In case of Taiwan, with the rising share of workers in manufacturing/industrial sector, vocational training increased six-fold during 1966 to 1974 and the students in vocational track increased from 40 percent in 1963 to 52 percent in 1972 and almost 70 percent in 1980(Ranis 1995), which again demonstrates clear policy focus on education commensurate with skill need of the economy.

6. Reforming Higher Education: International Evidence

In an increasingly globalised and interdependent world, higher education is crucial for achieving economic progress. This is also extremely important for building institutions that is needed to sustain the progress a nation would make. The scientific and technological advancement globally has also created opportunities to view higher education as global learning platform. Adequate number of higher educational and research institutions as well as globally competitive educated and skilled people are a prerequisite to build sustainable societies. The most advanced economies in the world are knowledge based, whereby competitive use of knowledge and innovations create comparative advantage for these countries. Therefore for countries like Bangladesh, it is imperative to raise higher level skills through creating opportunities for globally competitive education and research facilities. Bangladesh can learn from the experience of East Asian countries such as Singapore and Malaysia with regards to reform in higher education and learning. Here we discuss the experience of these countries with respect to higher education reforms and achievements. For example Singapore and Malaysia, in an effort to enhance global competitiveness of higher education have allowed joint degree programs with world renowned universities as well as granting permission to foreign universities to set up their campuses to facilitate world class educational opportunities for their students. Singapore has increased its allocation on research and development (of total education expenditure) from 34% in 2000 to 54% in 2009. With the aim to establish world class higher education system, Singapore government set up an international academic advisory panel drawing on individuals from renowned scholars, global higher education specialists, as well as corporate leaders (Ministry of Education Singapore, 2001). The universities in Singapore have been assigned to achieve defined goals: "provide top level professionals managers, planners, and researchers; raise the intellectual tune of society, acting as a bench mark in maintaining higher education, creating wealth" (UNESCO, 2006). The Singapore education reform promoting competition with publicly funded universities saw the establishment

of top class private universities such as the Singapore Management University, which was established in collaboration with the Wharton Business School at the University of Pennsylvania (Lee and Gopinathan 2001). The Singapore government had launched its Global Schoolhouse initiatives in 2002 and has taken efforts by its Economic Development Board instead of its MOE, to strategically invite world-class and reputable universities from abroad to set up their campuses in Singapore (MOK, 2011). This initiatives became very successful in that leading foreign educational such as the European' Administration des Affaires (INSEAD)(in 2000), the University of Chicago Booth School of Business (in 2000), S.P. Jain Center of Management (in 2006), the New York University's Tisch School of the Arts (2007), and DigiPen Institute of Technology (in 2008) offering tertiary education in areas such as business, management arts, media, hospitality to information technology, biomedical sciences, and engineering(MOK 2011; cited in Mohsin and Kamal 2012). Singaporean universities are collaborating with universities across the world to offer high quality diversified academic programs, whereby students are given the opportunity to study at both local and foreign campuses, as well as receive supervision and teaching of faculties from both universities. For example, the Singapore-MIT Alliance (SMA), an innovative engineering education and research enterprise jointly founded by the National University of Singapore US, the NTU, and MIT (USA), which since 1998 have developed five graduate degree programs, and has created distant/open learning environment with the use of technology(Mohsin and Kamal 2012).

Malaysian government has taken longer term vision to make its higher education institutions responding to the global challenges in international higher education which included: widening access and quality, improving the quality of teaching and learning, enhancing research and innovation, strengthening institution of higher education, and life-long learning, and finally reinforcing the higher education delivery system (Malaysian Higher Education Strategic plan, 2020). Noteworthy MyBrain15 initiative taken by the Malaysian government is a financing scheme under the Ministry of Higher Education (MOHE) aiming to expand its globally competitive human capital for enhancing research, development and innovation by 2020 (OECD, 2011; cited in Mohsin and Kamal 2012). The Malaysian government have also facilitated setting up of branch campuses of UK and Australian universities to encourage twinning program where students can study in both local and overseas campuses to complete their degrees (Goi and Goi, 2009; MOK, 2011).

6.1 Global Transformation in Higher Education

A new educational paradigm has been created with the advancement of technology and growth of internet. The latter has transformed open learning environment offering innovation in development of knowledge, its dissemination as well as utilization in case of teaching and learning as well as research. The OER originates from higher education institutes that include textbook, reading materials, any learning contents; simulations, games, other learning applications; syllabi, quizzes and assessment tools or any other materials suitable for educational purposes. The famous OER initiatives around the world are, according to Watters(2010), open education consortium, MIT open courseware, Khan Academy, PSPU, Open Study, Nitxy, OER glue, iUniv, OCWSearch, smartshistory, CK-12, Flat World Knowledge and Connexions- these platforms could cover diverse group of learners offering excellence in teaching and learning.

It is apprehended by many that traditional universities (relying on class-room based system) may become obsolete by the advancement of information technology and technology based distance education. There has been huge disconnect till date between use of ICT based education and quality enhancement. Internationally development in science and technology have had huge impact on education sector with an overall paradigm shift in higher education (Rena 2010);this implies shifts from national to global education, state sponsored to open market system, general education to market driven education , and from teachers' to learners' centred education. All these pose greater challenges for an education system that would rely on old practices to expand education without much focusing on quality without recognising the internationalisation and setting out priorities.

Higher education system worldwide has embraced MOOC to facilitate open learning achieving excellence in overall higher education system, which allows a massive amount of learners to learn on an open and on-line learning environment (Gover et al., 2013). For example, India has launched an India specific MOOC platform known as Swayam that promotes self-learning by offering top quality online courses in number of Indian languages. The national knowledge commission recommend addressing the paucity of high quality teachers, inadequate infrastructure of the universities particularly libraries, quality of educational resources offered in educational institution by facilitating more open access (OA) and Open educational resources (OER).

Malaysian government for example outlines a blue print (2013-2025) for achieving excellence in higher education system in the country (see Nordin et al 2015 for detail). These include creating 1) holistic, entrepreneurial and balance graduates, talent excellence, nation of life-long learning, quality TVET graduate, financial sustainability, empowered governance, innovation ecosystem, global prominence, globalized on-line learning and transformed higher education delivery. The Malaysian government has initiated and developed Malaysia MOOC in collaboration with selected local public universities. The government has developed national e-learning policy, which are subject to revision every three /five years, focusing on infrastructure and infostructure, governance, pedagogy online, e-content, professional development and enculturation. The internet penetration level in Malaysia (67%) supports to harness the potential of on-line learning. The global on-line learning initiative of the Malaysian government includes launching of MOOCs in distinctive subjects in partnership with to quality international MOOC consortiums such as EdX and Coursera in order to build the country's global brand (Nordin et al. 2015). Japanese traditional universities started open courseware consortium (JOCW) in 2005 and its OER movements were led by a network of private universities. Japanese top class universities started MOOC projects in collaboration with international consortium such as Coursera and edX and initiated JMOOC (Yamada 2015).

Chinese government promulgated policies towards education digitization (e.g. 10 year Education Digitization Development Plan 2011-2020, which outline that education cloud network, training information technology talents and building information management system.[5] In July 2012, MOE issued the Twelfth Five Year Plan of national education development and proposed the realisation of education modernisation and building of a learning society by the year 2020 by entering the ranks of powerful countries rich in human

5 This paragraph is based on Ying (2015).

resources- thus promoting on-line education development. In 2014 Chinese state council decided to accelerate the development of vocational education – a world class vocational education system with Chinese characteristics shall be developed for the adaptation of development needs, the deep integration of industry with teaching, the connection between secondary and tertiary vocational education and the intercommunication of vocational and regular education embodying the concept of life long education. In 2013 the state council issued the broad band China strategy and implementation scheme to strengthen strategic guidance, systematic development and the fast and sound development of broad bank infrastructure in China- the kind of policy support that is expected ultimately to enrich online education

6.2 Emphasis on Research Universities

Research universities are considered as academic institutions "committed to the creation and dissemination of knowledge, in a range of disciplines and fields, and featuring the appropriate laboratories, libraries, and other infrastructures that permit teaching and research at the highest possible level." Importantly, synergies of research and teaching are the "trademark "of research universities and hence understanding the characteristics of the research university and building the infrastructures and the intellectual environment is important. The key to research universities – "communications and networks, journals, libraries, communities of scholars, conferences and professional organizations, the internet, repositories of knowledge, etc." Research universities are crucial for "differentiated and effective academic systems", that facilitates a country's entry to "global knowledge society" and are "key to the knowledge economy." For example, the Malaysian government has given four public universities the status of Research University and emphasizes overall internationalization of these universities. These include: University of Malaya, USM, UPM, and UKM (cited in Mohsin and Kamal 2012). These countries also allowed corporatization of public higher education institutes for greater sustainability. For example the oldest university in Malaysia, University of Malay, was incorporated along with eight other public universities allowing them to generate resources through possible mechanisms (Lee 1999; cited in Mohsin and Kamal 2012).

Asian countries also bring reform in higher education sector such 'Multi-Media Super Corridor (MSC)' in Malaysia, Cyberservice corridor in Philippines (PCC) for moving towards knowledge-based societies (Symaco 2012). More recently, Korean higher education reform focused on enhancing relevance of education and international competitiveness of its universities. The research support project 'Brain Korea 21' was initiated to support research oriented graduate programs in selected universities. The 'New University for Regional Innovation' project was initiated to support universities in their efforts for HRD for regional community development.[6] In many developing countries reforms are underway to make universities research based institutions emphasizing the crucial role of research for the advancement of the economy and creating knowledge-based societies. In this context, universities in countries like Bangladesh to enhance both quantity and quality of their research output

6 See Understanding Korean Educational Policy Vol. 2 Universalization of Tertiary Education, Korean Educational Development Institute

7. Addressing the challenges of Education, Skill and Human Development for 2041

A major trend observed in the education system of ASEAN countries is that 'building on progress in basic education, strengthening of other levels of education including vocational and higher education is crucial to have a well-educated and skilled population. Also as the country in transition appropriate transferable skills and competencies are critical to the next level of development by increasing its knowledge-based sectors (VDR 2014). While Bangladesh's context may differ in many areas with regards to institutional and policy contexts, some important reforms and trends observed in these countries might still be relevant for strengthening its education system towards the vision 2041. As described in VDR(2014), these are 1) On achieving universal primary education, expansion of compulsory education to include at least lower secondary education; 2) Shift to more decentralized education management, which includes transference of some of the key education responsibilities (e.g., teacher management, curriculum development, and financing) to lower levels of administration. 3) Considerable private expenditure on education, including shadow education, 4) Financing is important, but not the only factor behind educational performance: Government expenditure on education varies significantly across countries. While high performing systems appear to spend more on education as a percentage of GNP, there appear sound policies concerning teacher quality and remuneration, the frequency of curriculum updates/reform, quality assurance systems, quantity and quality of teaching and learning time and language of instruction determining the success. 5) *Larger class size with teachers teaching less hours in high-performing countries 6)Curriculum reforms promoting non-cognitive and higher-order skills, as much as academic contents 7) Improving teacher performance through result-based evaluation for teachers;* One particular trend involves linking teacher salaries to performance vis-à-vis predetermined standards.

Bangladesh has witnessed structural transformation in terms of sectoral shares of GDP implying that structural changes in employment should follow. Thus equipping the labour force with the kind of education and skills commensurate with structural transformation in the economy will be crucial for achieving further advancement of the economy. Countries which were at the same level of development also undergone shift in labour force from manual jobs to skill intensive non-manual jobs and from traditional type to modern jobs that would require basic to improved skills in order to perform non-routine tasks than routine tasks, whereby workers will be doing day to day problem solving tasks than routine tasks.

The Korean example is pertinent here. Korea gradually improved its education system making it responsive to economic development providing an interesting example of how a growing economy could achieve national education success both in terms of quantitative expansion and qualitative improvement without any trade-off between the quantity and quality and universal access to all, while contributing to economic development (Jones, 2013). The average years of schooling in Korea gradually increased from 5.7 years in 1970 to 9.5 years in 1991 and 10.6 years in 2001, commensurate with economic progress. During the same period high school graduate entering higher education has increased from 26.9 percent in 1970 to 33.2 percent in 1991 and 70.5 percent in 2001(Song 2003). Some strong features of the Korean education system,[7] which might be relevant for policy

7 Source: Adapted from Understanding Korean Educational Policy Vol. 5 2009, Korean Educational Development Institute

making in Bangladesh, are: *(1) Well trained and well paid teachers can be driving force for improved quality of education; Korean teachers are significantly better paid, in terms of average salary to per capita GDP ratio, compared to their peers elsewhere in OECD. (2). Automatic promotion and singular track education system ensured almost universal enrolment in tertiary education, which also ensured that all secondary school graduates, whether from an academic or vocational school equally qualify for university admission. (3) Shift away from rote memorization to knowledge based education steered students critical thinking and problem solving skills resulting higher student achievements in PISA. (4) Korean education system is highly and efficiently funded.*

7.1 Cognitive and behavioural foundation in general education

To begin with addressing the future concern, one important intervention would be to focus on developing cognitive and behavioural foundation in general education system. This will require balancing literacy and numeracy skills with advanced skills such as problem solving and critical thinking. Basic cognitive skills are referred numeracy and literacy skills. Higher cognitive skills refer the ability to understand complex ideas, learn from experience and use if logical, intuitive as well as critical thinking, and problem solving using logical process by way of acquired knowledge. Social and behavioural skill, defined as soft skills include personality traits, social skills. These also include openness to experience, conscientiousness, extraversion, agreeability, emotional and self -control to decision-making skills. The contradiction between available findings on cognitive ability of primary school completers and the nation-wide examination results are indicative of the fact that primary school curriculum and or pedagogy may not equip children with cognitive skills that allows one to transfer formal knowledge into unfamiliar settings. Importantly, reform has to be built on the system's strength. General education system should focus on nurturing the above cognitive, behavioural and social skills. Technical skills that involve manual dexterity, application of methods, materials or instruments – are developed through vocational schooling and training, job or occupation specific on –the-job training (Pierre et al. 2014)

The emphasis has to be shifted so that more can acquire the cognitive and behavioural skills that would be needed for becoming successful in the labour market. The latter may require more schooling for all, expanding access to secondary education and more importantly a teaching and assessment method that will enhance the development of such skills. In this context for example, individualized self- learning approach that teaches at the right level has shown promise in many countries including Bangladesh (see Sawada et al. 2017). It is important that drop-outs from schools are substantially reduced and the progression from primary to slower secondary to higher secondary to post-secondary are increased. The latter may require extra-hour of tuition which may not be currently at the desirable level comrade to other countries. The extra-hour of tuition has shown promise in reducing drop-outs or increasing enrolments in Bangladesh (Rutbah et al. 2016). However, what is most important is to provide quality teaching and learning environment to foster cognitive ability. Schooling through general education should balance competency as well as content based learning that will stimulate creative and critical thing among primary and secondary schools goers.

In this context, we can learn from the experience of Singapore and Korea- these two countries exemplified as successful education system had adopted curriculum and student assessment system, which promote knowledge acquisition as well as active learning and critical thinking in schools (cited in VDR 2014). For example, Vietnam also undergoing modernization its school curriculum system and redesigning general education system defining students' essential competencies that will form the basis of educational objectives, standards, learning content, teaching method and assessment(VDR 2014). In an effort to reform its school curriculum modernization, beyond textbook reform only, Vietnam undertook a model replicating what was taken in Columbia, which is called Esculea Nueva that features group learning and problem solving rather than memorisation and copying that is often seen in many places; Vietnam has piloted its version of Esculea Nuvea in 1500 schools and the government intend to expand the pilot in lower secondary schools (VDR 2014).

7.2 Addressing Learning Crisis

The benefits an individual would derive from education largely depend on learning implying that schooling without learning can be wasted opportunity. Education or schooling should provide with skills needed to sustain life activities. It is extremely important that students learn how to interpret many types of written passages, understand how numbers work and be able to use higher-order reasoning and creativity that building on these foundational skills. Importantly they should be able to acquire socio-emotional skills such as perseverance for success and interpersonal communication to the ability to work on teams.

Early childhood development

Early childhood development assumes crucial importance for future human development. The family environments of young children are major predictors of cognitive and non-cognitive abilities as well as other child outcomes and that ability gaps between advantaged and disadvantaged open up early years of lives of children (Heckman 2008). Studies focusing on early childhood education conclude that such interventions can have positive impacts on cognitive skills and test outcomes during the later stages of schooling and can also have longer term later life success including labour market outcomes. Rabbani (2016) discusses some of the smarter goals for education sector in Bangladesh, those particularly focuses on early childhood development through psycho-social stimulation. Drawing from a study in Jamaica, which provided a "two-year stimulation intervention" to stunted children, who lagged behind in learning and productivity and that resulted in about 20 years almost equal labour market outcomes in terms of wage and earning level for these treated and their non-stunted (stunted control) cohorts; stunted children not covered by such program 20 years earlier, earned 25% less (Rabbani 2016). Rabbani (2016) suggests, when translated to Bangladesh, benefit of such program (one social worker for one hour per week per child) would out-weight the cost at a ratio of 18:1.

Remedial prevention approaches

Remedial programs can help young children at risk in the formal education system to prepare themselves for further academic education or training (World Bank 2018). The most promising remedial prevention approaches include: 1) supporting primary and secondary students willing to stay in school and master foundational skills: in India, offering additional

instruction for disadvantaged students have shown positive impacts on foundational skills; 2) offering students with early assessments of their academic standing, along with extra instruction to improve performance. For example, early assessment program in California for academically at-risk students shows declining needs for remediation at later stages of education and training; 3) providing secondary school students the option of registering concurrently in postsecondary courses: in USA it was found that those student are were less likely to require remediation and more likely to persist in tertiary education and improve academic outcomes.

Making teaching more effective:

For effective teaching teachers' skill and motivation is crucial. For this education system need to attract qualified people in teaching and provide a solid foundation of subject knowledge and pedagogy before they start teaching, without which teachers will find them in the class room less equipped to teach effectively with only theoretical knowledge. Education system need effective mechanism to mentor, support and motivate teachers-without motivation of teachers their skills may not translate to student learning.

All for learning approach

Focusing on improving learning outcome can bring great progress in achieving the goals of education and building skilled human resources. The case of republic Korea is a great example that achieved universal enrolment in high quality education through secondary schools in 45 years from very low level of literacy in 1945; Korean students perform at the highest level in international learning assessments (World Bank 2018). Another example is Vietnam, which as a lower-middle income country, demonstrated comparable performance in student (15 years old students) learning assessment tests to that of Germany (VDR 2014). As reported, during 2009 to 2015, Peru achieved some of the fastest growth in overall learning outcomes following policy action (VDR 2014). Recently, Malaysia and Tanzania launched promising society wide collaborative approaches to systematically improving learning (World Bank 2018). For a successful approach to addressing learning crisis and achieving the promise of education, a "clear-eyed diagnosis followed by concerned action' will be needed. The WDR 2018, drawing evidences, discusses how change might be possible with commitment to "all for learning." The three complimentary strategies to achieve "all for learning" would entail "1) Assess learning—to make it a serious goal. Measure and track learning better; use the results to guide action. 2) Act on evidence—to make schools work for all learners. Use evidence to guide innovation and practice. 3) Align actors—to make the whole system work for learning. Tackle the technical and political barriers to learning at scale."

Stakeholder Mobilization

One important strategy to improve learning is that of 'mobilizing everyone who has a stake in learning. Many countries have used wide-ranging consultations with all potential stakeholders in policy reforms and implementation. For example, Malaysia used a "lab" model to bring all stakeholders and involve them in all stages of reform, from design to implementation. Citizen mobilization though information and communication is also seen an important strategy. For example, in Peru, the government policy makers used information

on poor learning outcomes and performance of the education system to mobilize public support for reforms to strengthen teacher accountability, which also was able to buy-in business support for funding a campaign highlighting the importance of quality education for economic growth. WDR suggest modernization of vocational training will help employers and at the same time could buy their support for broader educational reform.

The participation of the private sector can help the education-labour linkage by providing more market-oriented skill training, while reducing the government's fiscal burden in education spending. In some countries, the sector has provided technical training courses along with nationally recognized licenses to trainees and has also directly placed them in employment. The Republic of Korea, for example, has established a qualifications act, which allows the national technical qualifications system set up by the Government to be supplemented by certification of qualifications issued by the private sector. In turn, private sector involvement in vocational education and training is assisted by the policy that supports industry level training through the Employment Insurance Scheme (EIS) administered by the Ministry of Labour. The EIS supports training and re-training of workers through a tax on firm level wages.

7.3 Technical and Vocational Education and Training

Globalization and the advancement of information technology will require human-centred development paradigm, whereby in knowledge –based information society, knowledge and expertise will be crucial for competitiveness of individuals, companies, and countries. In order to adapt to such rapidly changing economic environment and competition, the efficient development and use of human resources will foster country's economic development. This will necessitate the development of technically skilled workers who will propel the engine of growth. For example, Korea drew global attention for its spectacular economic growth, while many observed that it was possible since the country focused from the 1960s developing technical personnel through vocational training. Korea's vocational education and training system provided the workers needed by the industrial sector to contribute to economic growth.[8]

In this context vocational education and vocational training need to be differentiated as both can be pursued with different policy focus, as was in the case of Korea's industrialization efforts. Vocational education refers to long-term courses in which students gain basic competencies towards becoming technical personnel, whereas vocational is training provided to enhance workers' employment prospects. The vocational education is provided at vocational high schools and colleges under the Ministry of Education, while the vocational training is provided under the responsibility of the Ministry of Labour. The vocational education in Korea evolve with its focus and promotion of industrialization, with the full scale promotion of vocational education in the 1960s when a structural transformation a way from agricultural to a manufacturing economy, and an export drive was underway. The changes in vocational training policies and facilities were also in correspondence with the country's industrialization and growth stages, which are defined in four major stages , stage 1(1945-60)- post war rebuilding and founding stage, stage 2(1961-1981)- export oriented industrialization and rapid growth , stage 3(1982-97) – economic restructuring

8 The following paragraph draws on Understanding Korean Educational Policy **Vol. 5** Vocational Education and Training in the Process of Industrialization, 2009, Korean Educational Development Institute

, stage 4(1998-) – knowledge based economy and vocational training paradigm(see Appendix). While vocational education in Korea in the 1960s and 1970s focused on the training of skilled workers, education efforts in the 1980s aimed to produce technicians required for the upgradation of the economy as well as national competitiveness. The major vocational education policies in this period included the strengthening of science and technical education, the consolidation of vocational high school education, and the revitalization of vocational education within higher education.[9] More recently in order to address industry demand, the Korean government encourages innovation in VET offering customized employment-linked vocational training programs (Park 2011). The reform allowed private sector engagement and collaboration among various ministries to address skill mismatch affecting VET graduates.

7.4. ICT use in Education and Education Informatization

For a knowledge-based economy the application of information and communication technology is crucial.[10] That is ICT use in education is of central importance for building an education system for a knowledge society. ICT use in education produces education resources and information and sustains student-oriented learning and education opportunity. The informatization has essentially led to a network society – enhancing participation, cooperation, and sharing. The informatization has resulted in education models such as learner-teacher models, group models, self-guided learning, for example. The informatization has created prospects for home schooling and a new education system that "blurs the boundaries between online and offline, reality and cyber-world," and has stimulated the creation of a new education institutions such as cyber Universities.

Facilitating the computer use and computer training programs in schools is a first step for ICT use in education and thus creating information society. The use of computer not only facilitate lessons to students but also can develop and process school governing tasks including automation of grades and school schedules and time tables. Gradually computer education can become part of regular education. The challenge will be to facilitate higher order thinking skills or increasing global competitiveness in the future. In this context Korean experience is worth revisiting as Korea received international recognition of its education informatization which focused on nurturing computer literate teachers and students' basic computer knowledge.

For example, Korea followed an education informatization process in three phases namely computer introduction phase, automation phase and informatization phase (see Table 3). The government's 'Master Plan for Education Reform' emphasized introduction of computers to improve teaching methods at elementary and secondary schools, promote science and technology education, and prepare for an information society. Korean national policy on education informatization began with the 'Measures to Strengthen Computer Education in Schools' followed by and three 'Master Plans on ICT Use in Education' as well as supplementary plans were created to supplement the master plan. The measures

9 For summary of these policy changes on vocational education and training see Appendix. For detail review see Understanding Korean Educational Policy **Vol. 5** Vocational Education and Training in the Process of Industrialization, 2009

10 The following discussion draws on Understanding Korean Educational Policy Vol. 6, Informatization of Education: ICT Use in Education, Korean Development Institute.

included provision of computer education opportunities, development of computer based learning method and computerization of school operations. Eventually computer education became a part of regular education resulting from the Government's National Computer Network Project, education reforms, growth of computer industry, increased social demand and global focus on computer education.

Table3. Education Informatization in Korea

Computer introduction phase	Automation phase	Informatization phase
• *Creating specialists demanded by society* • *Focused on university and industrial training education following progress in the information industry* • *Began computer education at elementary, middle, high school level as after-school classes •Automated tasks on individual school base*	• *Began computer education as part of regular curriculum* • *Provided computer literacy training and how to use ICT in education* • *Aimed for more computers, education , schoolteachers training* • *Promoted LAN, C/S-based automation of school tasks*	• *Implemented ICT to improve education System* • *Promoted general ICT education to facilitate quality education and access to education* • *Emphasized school teachers and student participation of education resources, information sharing, joint-production* • *Emphasized on education informatization based on intranet, Internet, web*

Source: Adapted from "Understanding Korean Educational Policy Vol. 6, Informatization of Education: ICT Use in Education, Korean Development Institute.

Learning from Korea's experience, where computer education was considered an integral part of school education from the beginning of its industrialization process, following factors are important in realizing ICT use in education: Firstly, the government must have a development plan for an information industry or society informatization. This is important as growing demands for school informatization equipment or networking solutions, specialists, could not be effectively meet without such plan. Secondly, for the former, a clear objective for ICT use in education is needed. Korean example shows that the country underwent phases of computer specialist training, computer education universalization, and, finally, ICT use in education, whereby it's economic, industrial, and socio-cultural factors was at play. This means country's context is important in setting out objectives and plans for education informatization. Moreover, the necessary manpower to handle the responsibility of computer education or ICT use in education has to be ensured and education informatization needs to be consistent with education curriculum or demand driven. Government also need to ascertain funding /financing issues secure capital for education informatization as well as make prior evaluation of social and overhead capital such as electricity and communication network availability as foundation for education informatization.

7.5 Reforming higher education to embracing global transformation

The development of MOOC facilitate the universalization of university education though expansion of learning access and quality. These courses are conducted online for thousands of students worldwide without restrictions. The new global learning practice created opportunities to utilize the potential of ICT in pedagogy. MOOC initiatives provide global

platform for extending the reach of educational institutions and providing universal access to quality education. It facilitates innovation in teaching and research and international collaboration. Virtual learning contexts, transnational learning platforms, global citizenship have become priority following subject specific learning across the world. For example, the national Knowledge commission in India emphasizes the use of OER in order to enhance the availability of high quality educational resources and improve quality of education for all (Pushpanadham 2015). It is expected that these OER can potentially solve the paucity of high quality teachers, inadequate infrastructures of universities including libraries and poor quality educational resources. The developments in digital technologies such as Big data, Internets, and artificial intelligence (AI) are taking place very fast and which can be utilized by universities to upgrade learning environments. Educational institutions at the university level will need to embrace digital solutions to teaching and learning as the future excellence in education and learning will come through digital technology. Technology like "google apps for education" serves as effective tool to connect with students. Teachers assume the active role in demonstrating digital skills so that students can acquire such skills fast. Also digital skill development courses should be offered. Educational institutions will need to invest on global learning network solutions to offer online training and workshops through video conferencing facilities. Distance learning can address challenges of class room instructions by way of hybrid educational programs. For this building technology platforms that will facilitate online and digital instructions in universities will be crucial.

Both public and private universities in the country will need to play active role in embracing this transformation to offer globally competitive education to develop skilled human resources. Given the ever increasing demand for higher education digital based distance learning solution will be essential to educate the population. Universities will need to adapt and design solutions to offer globally competitive online education. This means universities will need to focus on education on digital technologies and as well as application of such technologies in teaching and learning. Digitally equipped classrooms as well as digital platforms for online education will be extremely important in the higher education sectors in the country as this will be essentially create better understanding between providers of education and learners thus improving the quality of education.

While the role of government policy is extremely important in facilitating digital education-using technology to connect teaching and learning, collaboration between private sectors, digital industries and universities remains as important. The universities in Singapore and Malaysia have been able to maintain a credible and sustainable relationship with industries for collaborating and commercializing their research and development products and ideas (cited in Mohsin and Kamal 2012). Importantly the scope of education has widened in a knowledge based society. Increasingly there have been initiatives in advanced developed countries including countries in Asia to link higher education to external world that also takes into account labour market demands domestically and internationally. There have been reforms in higher education systems in these countries to create opportunities for higher education institutes so that the latter can become more responsive to the need of the society. Many countries have allowed their top institutions to open campuses and offer educational programs in other countries. There has been increasing collaboration among universities offering academic programs. Universities will need to focus on promotion of research, capacity building of faculty, financial support for research funding and their

effective use, academic freedom, creating environment to do quality research, adequately incentivising faculty. For example, the universities can be put under an obligation to maintain and report their educational and research activities, with a detail self-monitoring and self-evaluation system.

The international dimension of quality education needs to be emphasized in view of globalization. This means countries like Bangladesh need to focus on educations that are nationally comparable as well as internationally acceptable. The learning crises need to be addressed at all level of education keeping in view of the global standard. Recent research has shown that globalisation has impacted higher education in developing countries requiring highly skilled human capital. The knowledge economy necessitate a well-developed quality education system, both based in teaching and research, particularly at the tertiary level, which will bring future prosperity of developing countries like Bangladesh to the level of developed countries.

8. Conclusions

The perspective plan 2021-2041 envisions Bangladesh to enter into knowledge based societies, requiring greater emphasis on education and skill through research and development. It is argued that a knowledge based society would be crucial for the level of economic development to the status of an upper middle income country. Globalization and the advancement of information technology will require competitiveness of individuals in order to adapt to such rapidly changing global economic environment necessitating the development of technically skilled workers who will propel the engine of growth. Future human development strategy should adopt holistic approach through education and training: begin with a greater focus on early childhood to develop cognitive skills and prepare a child for school; schooling under general education system need emphasizing cognitive and behavioural development of students by featuring more group learning and problem solving than memorization and copying; postsecondary education and training should be focused on building and updating technical skills. Improve quality of schooling can be enhanced with focused curriculum, teaching and assessment methods fostering higher order cognitive as well as behavioural skills. This will mean a general education curriculum that well balances competency based as well as content-based learning. This has to be supported by teaching method that can stimulate creating and critical thinking among primary and secondary students. The student assessment should eb tailored with the teaching and learning. The experience of Singapore and Korea is very pertinent in this context, which countries adopted curriculum and student assessment system that foster knowledge acquisition and active learning as well as creative and critical thinking in schools. Importantly, if the curriculum change can make meaningful results will depend on modernization of teacher training and their professional development.

The skill development system should be in line with the expectation of all stakeholders, students, universities, vocational institutions and not least the employers. Because disconnected skill development system that does not connect the demand and supply side will underperform toward the goal and may result in production of graduates not in line with the labour market reality. Again, students and parents may not be demanding certain types of program or training method that they would not desire to have to be successful in the

labour market. With the structural transformation in the economy, there has been concern on skill shortage in various occupations as well as skill implying that skill development system should be tailored to overcome these constraints. Korean example suggests that the governments' in developing countries need to follow an efficient system to implement vocational education and training commensurate with the industrialization process; Korea has transformed its vocational education and training systems to in line with changing industrial demands. Importantly, an economy cannot be globally competitive with simple skills alone. This implies that changes in the vocational education and training paradigm are needed to keep pace with a changing world, and that an industrial structure based on information services requires various basic, technical, and specialized abilities. Hence, "the goal of vocational education and training is not to lock students into specific jobs or skills, but to give them the ability to adapt to changing employment conditions (UNESCO, 2005)."

Building on progress achieved in basic education, strengthening of other levels of education in including vocational and higher education is important to have a well-educated and skilled population with the capacity to contribute effectively to the country's development. As the country in transition appropriate transferable skills and competencies are essential to the next level of development by increasing its knowledge-based sectors. In the context of higher education, generation of knowledge as well as availability of knowledge for national competitiveness in a globalized world becomes crucial. For realization of the country's long-run economic aspiration, skilled labour-force and hence high quality graduates are required. This means country's higher education sector needs to be revitalized with appropriate policies and strategies. Finally, based on the successful experience of ASEAN countries(cited in VDR 2014), a clear vision, that originates through broad-based consensus and is well coordinated among different sectors for successful implementation, would be crucial for addressing the future human development challenges,. While targets need to be set realistically with short, medium and long term objectives, it would be important to have consistency between goals and actions and that budget should be aligned with effective implementation and monitoring of education reform. In this context clear coordination of educational policies and coordination among relevant ministries will be crucial for achieving shared education sector goals. The role of government for successful partnerships among various stakeholders would be crucial to ensure successful implementation of educational policies and reforms.

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Appendix. Changes in Vocational Training during Industrialization in Korea

Rebuilding 1945-1960	Export led growth 1961-1981	Economic restructuring 1982-1997	Knowledge-based economy1998-200
Both vocational training and technical training were provided by industrial primary schools, vocational high schools, and six month short term industrial technology training centers. The first law to lay a foundation for vocational training was the Labour Standards Law announced in May 1953. The Labour Standards Law's regulations on "fostering technicians" did not stimulate vocational training or propose a basis for the government to directly carry out vocational training; they were merely intended to protect trainees. 15 institutions including the Korea Electric Power Corporation, the Korea Shipbuilding and Engineering Corporation, Goldstar, and the Korea Coal Corporation introduced apprenticeship training courses in the early 1960s, and fostered the personnel needed in 11 industries including the electrical, heavy chemical, machine, shipbuilding, welding, and plumbing industries. This period can be seen as the birth of the modern vocational training system.	*In the 1970s, the government pursued capital-intensive heavy-and-chemical industrialization. The government's industrial policy had a decisive effect on vocational training. During this era, the Korean economy underwent dramatic growth that brought about a shortage of trained workers. Although immense investments were being made in the heavy and chemical industries, these sectors lacked technicians and companies vigorously competed in scouting workers. To address the labour shortage, the government drafted a Special Measures Law in December 1974 which promoted vocational training within the workplace. Employers of companies larger than a certain size were required to train a certain percentage of employees every year. In December 1976, the Vocational Training Law and the Special Measures Regarding Vocational Training drafted in 1967 were combined into the "Basic Law on Vocational Training." The law introduced a training levy system, with the employer required to conduct training or pay levy. To ensure job stability, the law also decreed that employees be provided job transfer training as well as pre-employment training*	*Due to stable economic growth, restructuring, and industrial rationalization policies, the industries that led Korea's industrialization shifted to technology intensive industries in the 1970s and then to knowledge-based industries in the 1980s. As the industrial structure became more advanced, automobiles, semiconductors, computers, and telecom equipment became the leading industries, and social overhead capital and service industries underwent dramatic expansion. The economy continued its rapid growth and Korea joined the OECD. Vocation training in this period underwent expansion and several major policies were introduced. First, the Human Resources Development Service of Korea (HRD Korea) was founded to provide vocational training, employment service, skills testing, human resource registration management, and job study. Second, the Korea University of Technology and Education was founded to foster vocational training instructors. . To respond to the expected rise in demand and compensate for existing inadequacies, a vocational training development plan was created in 1990.*	*The vocational training system during this period shifted from the training of school leavers to lifelong skills development, and from a government-led and supply-oriented delivery system to a private sector-led and demand-oriented system. To respond to Korea's transformation into a knowledge economy and a lifelong learning society, systematic skills development over the working life of an individual is needed. The 2004 Labourer Skills Development Law law made the participation of labour and manage groups mandatory in the Basic Plan for Skills Development created by the Minister of Labour, and provided preferential support for job training efforts that were implemented after discussion between employers and workers. In addition, all evaluations of skills development programs supported by the Minister of Labour were systematized, providing differentiated support based on evaluation results created to shift from an input-based policy to a results-based policy.*

Source: Adapted from Understanding Korean Educational Policy Vol. 5 Vocational Education and Training in the Process of Industrialization, 2009

Part-2

ICT and Information Highway Development to Support Inclusive High Growth in a Transformational Economy

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ICT and Information Highway Development to Support Inclusive High Growth in a Transformational Economy

A. Background and Overview:

Since its liberation after a bloody war against the Pakistani military dictatorship, Bangladesh has gone through many ups and downs but particularly since the late 1990s the country has shown great promise by pushing ahead with its development agenda vigorously. Poverty has declined rapidly and economic growth is showing an upward trend reaching between 6 and 7 percent per annum in the second decade of this century. It is realistic to expect a growth rate of 8 percent. However, technological progress and innovation, especially in the ICT sector will be crucial in achieving rapid inclusive growth.

The country aspires to reach upper middle-income country status by 2030, and expects to become a developed economy in the 2040s decade. The transition---indeed transformation---can be realized through a process of rapid inclusive growth leading to elimination of poverty while increasing the productive capacity and building an innovating learning economy. The cornerstone of an inclusive development strategy is a robust strategy of job creation through employment-intensive export-oriented manufacturing growth.

The ICT sector has both manufacturing and services sector characteristics and both will be discussed in this paper. With regards to the service sector aspects, it is relevant to recall Dr. Sadiq Ahmed's broader treatment of services in the same series:

A striking aspect of the development of the services sector in Bangladesh is that it not only has responded well to the growing demand emerging from the growth of manufacturing and agriculture activities, it has also positioned itself well in the global market for low-skilled workers, especially to the oil-rich middle-eastern markets. As a result, there has been a rapid inflow of worker remittances that has fueled a huge demand for construction activities and for a range of services in both urban and rural areas. This inflow of remittances has played a major role in transforming the rural economy and contributing to poverty reduction (Ahmed 2015).

While the creation of a better skill sets endowed workers is necessary for ICT, the demand side factors mentioned above also apply to the service oriented parts of the ICT sector. Ahmed (2017) adds further:

The services sector itself is transforming. As Bangladesh transited from a low-income developing country at the time of independence in 1972 to a lower middle-income country in 2015, the services sector has been steadily transforming from a primarily low-productivity, low-income unorganized services sector dominated by trade, transport and low-end personal services towards more organized and higher-income commercial services.

What Ahmed refers to above for a broader set including ICT, applies with particular force to the latter.

There are, however, many challenges that Bangladesh government---particularly its ministry of planning--- has recognized and is taking steps to address.[11] A recent document from the ministry of planning thoughtfully states:

11 For an earlier set of prospective studies see the chapters in Ahmed, Sadiq ed. (2012). Leading Issues in Bangladesh Development. Dhaka: University Press Limited.

…Bangladesh faces many development challenges that are well summarized in the ongoing 7th Plan as well as in the Delta Plan (BDP 2100). ……As a starting point, the PP proposes 6 developmental goals including 2 higher level national goals set by National Plans:

Goal 1: Eradication of Extreme Poverty by 2030;
Goal 2: Upper middle-income country by 2030;
Goal 3: Reducing moderate poverty to less than 5 percent by 2046;
Goal 4: High income country by 2046;
Goal 5: Building a Bangladesh resilient to environmental degradation;
Goal 6: Establishing Bangladesh as a knowledge hub country for promoting a new skilled based society.

(MoP: Macroeconomic Framework for the Perspective Plan of Bangladesh (2021-2041): Growth Outlook up to 2046: pp.1-3)

In keeping with the above goals, the broad objective of this study will be to explore and determine how an optimal strategy for technological adaptation, adoption, innovation and diffusion with special emphasis on the ICT sector for meeting these goals can be formulated. In particular, the characteristics of ICT, the challenges to innovation and diffusion of ICT and its linkages with other sectors in the economy will be examined in detail. The role played by innovating entrepreneurs using the market as a discovery mechanism and the significance of effective PPP (Public Private Partnership) will be examined carefully.

Ultimately the goal of S& T---including ICT--- policies and institution building must be to improve the living standards of people. For this purpose, extending Sen's capabilities approach to human well-being to S&T systems, I have coined the term **SCENIS** or Sustainable ***Capabilities Enhancing National Innovation System.*** Building a SCENIS is what I advocate for Bangladesh. Although the technical issues cannot be discussed here further for lack of space, I have developed two versions of a computable SCENIS model that could be implemented in Bangladesh with further appropriate data gathering and building in particular, a sequence over time of SAM-Techs or disaggregated Technology-based Social Accounting Matrices as consistent economy wide databases.

B. Progress in Science and Technology[12], the Performance of the Ict Sector and Emerging Issues for BD 2041 Vision of Ict

National Science and Technology Policy (NSTP):

The need for faster technological development in general is increasingly recognized by the government of Bangladesh. Within the general goal of promoting faster technological development in general, identifying the ICT sector as strategic for long term planning in Bangladesh is the right move. Here too, a comparison with Korea and Taiwan is instructive. From very humble beginnings in the 1950s and even 1960s, these economies have moved to niches in ICT industry that are now crucial for their growth and further development. Like these economies at an earlier stage of development, development plans of Bangladesh have also emphasized science and technological research to hasten technical progress and productivity. It has been recognized that such progress can be achieved through adoption and adaptation of imported technologies as well as development of indigenous technologies.

12 Bangladesh Education and Technology Sector Action Plan

Indeed, a *National Science and Technology Policy(NSTP)* has been formulated and adopted by the Government. The NSTP has laid down the directions for S and T activities and research, institutional and manpower development, dissemination and documentation facilities. The *National Council for Science and Technology (NCST)* determines S and T policies, reviews the activities of different institutions and provides direction towards S and T research and activities. In the area of technical education, the main focus of the government has been to expand technical universities at the district level, spread the outreach of the information and communications technology (ICT) and support the adoption of agricultural technology. There is a separate ministry of Science and Technology that is dedicated to strengthening scientific progress and development of technology.

The spread of ICT revolution has received particular emphasis based on the personal attention provided by the Honorable Prime Minister under her Digital Bangladesh Initiative. Digital Bangladesh is an integral part of the government's Vision 2021. The Digital Bangladesh initiative consists so far of four key priorities:

- Developing human resources ready for the 21st century.
- Connecting citizens in ways most meaningful to them.
- Taking services to citizens' doorsteps.
- Making the private sector and market more productive and competitive through the use of digital technology.

Bangladesh made important strides during the Sixth Plan in utilizing technology to bring in tangible transformation in all four areas. Progress made in bringing government services to the doorsteps of citizen is probably the area where Bangladesh registered most significant progress. Vertical (with government ministries and agencies) and horizontal (i.e., with citizens) policy advocacy and development interventions have resulted in a number of citizen-centric e-initiatives and services such as multimedia classroom and teacher-led education content development in public schools, mobile phone based health service from Upazila Health Complex, agricultural and other livelihood information and services (*e-Tathyakosh*) online through grassroots outlets. These are at an early stage of implementation but they constitute a concerted effort to bring government closer to the people through use of technology. According to the available information, a number of acts, policies and guidelines are already in place to guide the nation towards the realization of Digital Bangladesh. The ICT Policy 2009 and the 'Strategic Priorities for Digital Bangladesh 2011' documents also contain elaborate work plans. Because of the cross-cutting nature of the vision, these work plans encompass priorities in almost all development sectors. These policies and regulations have provided a first round enabling environment for the implementation of the Digital Bangladesh enterprise. Furthermore, *the ICT Policy 2009* document has now been updated to *ICT Policy 2015.*

With regards to ICT-based education, under the 'Secondary and Higher Secondary ICT based Education Project' 20,000 multimedia corridors (MMCs) in educational institutes have been established, with each MMC having one internet connectivity, one laptop and one multimedia. Computer labs have also been set at 192 educational institutes with the provision of training to both the teachers as well as students. From this author's fieldwork experience, it can be asserted that Bangladesh is already further along this route than Malaysia was when it announced and began to implement its MMC strategy earlier.

Emerging issues and challenges:

Nevertheless, it must be admitted that progress in nurturing the knowledge economy has been slow. As a young economy Bangladesh is still has to go a long way to catch up to the standards of the global knowledge economy. The latest available ranking of the Knowledge Economy Index (KEI) prepared by the World Bank puts Bangladesh at the low end of 137 out of 146 countries (Table 1). Other South Asian countries and competitors, like Vietnam and China, are ranked higher. Bangladesh has made important strides in the area of ICT over the past few years. Even so, in the global context, the ICT performance is also considerably behind. Importantly, there is a huge gap in the area of science and technology compared to global standards that will require substantial long-term effort.

Table 1: Global Knowledge Economy Rankings

Countries	Score	Rankings
Sweden	9.43	1
Singapore	8.26	23
Korea	7.97	29
China	4.37	84
Sri Lanka	3.63	101
Vietnam	3.4	104
India	3.06	110
Pakistan	2.45	117
Nepal	1.58	135
Bangladesh	1.49	137
Myanmar	0.96	145

Source: World Bank (2012)

We see a similar pattern in other reports. For example, in the Global Innovation Report 2015, prepared by Cornell University, INSEAD and WIPO, Bangladesh was placed at 129th position among 141 countries. I discuss this in light of the most recent Global Innovation Report in more detail in the next sub-section. In a recent report to assess the country competitiveness with respect to the exploitation of Role of Technology and Innovation in Inclusive and Sustainable Industrial Development, UNIDO has placed Bangladesh at the 77th position among 141 countries. Bangladesh's relative performance in intellectually property promotion is also quite low. For example, in 2015, only 112 patents have been filed in Bangladesh. By way of contrasting, in 2015 Vietnam and India filed 679 and 23,844 patents respectively. However, China far exceeded these countries by filing 1,010,406 patents in 2015. Even the contrast with Vietnam shows a very weak position of Bangladesh in global knowledge, innovation and sustainability fields. Low values of relevant indices indicate that Bangladesh lags behind others; but more optimistically, it also has large untapped opportunity to make rapid advances in Science and Technology leading to higher as well as sustainable and inclusive economic growth through technology-driven productivity increase.

Another noteworthy project is The Access to Information (A2I) project in the Prime Minister's office which has been designed to encourage all government Ministries, agencies and local government bodies to develop and implement plans to apply ICT in their respective spheres with the aim of improving services to citizens and enhancing

accountability and transparency of governance. The broad sweep of the A2I project includes the logistics and operational aspects of connectivity, maintenance, availability of skilled people, and training of people and incentives for performance. Meeting these challenges in a timely manner and forming PPPs to enhance people's capabilities through A2I will go some distance towards meeting the six goals mentioned at the beginning.

There are infrastructural issues relevant for assessing the potential of electronic ICT-based educational aids and particularly multimedia classrooms. Multimedia classrooms very often do not function or produce the expected benefits in learning outcomes, because infrastructural supports such as electricity is lacking or erratic, teachers have not been adequately prepared, infrequent and regular internet access etc. It has also been observed that provisions for maintenance of equipment and services have often not been made, particularly in the rural areas.

Let us now turn to a closer look at Bangladesh's innovative capacities in the context of the most recently available global and country studies.

Bangladesh and the Global Innovation Scene: Focus on ICT

The encouraging ---though not too much so—fact is that recently Bangladesh has advanced by a few places to no. 114 in the GII rankings.

Table 2: Bangladesh in Global Innovation

Population	162911.00 thousand
Gross Domestic Product (GDP)	225.76 US ($) billions
GDP per capita, PPP$	3606.65 US ($) thousands
Global Innovation Index (GII) 2017 rank	114
	Strength
	Weakness

Global Innovation Index		
	Rank	Score
Overall	**114**	**23.7**
Innovation Efficiency Ratio	93	0.5
Innovation Input Sub-index	113	30.6
Innovation Output Sub-index	108	16.8

Institutions		
	Rank	Score
Overall	**122**	**40.3**
Political Environment	117	29.6
Political stability and absence of violence/terrorism	116	35.8
Government effectiveness	111	23.4
Regulatory Environment	117	36.6
Regulatory quality	118	18.4
Rule of law	102	19.0
Cost of redundancy dismissal	119	54.5
Business Environment	116	54.8
Ease of starting a business	93	81.7
Ease of resolving insolvency	121	27.0
Ease of paying taxes	104	55.6

Human Capital and Research		
	Rank	Score
Overall	**124**	**12.0**
Education	126	16.1
Expenditure on education	111	12.7
Govt. expenditure on education per pupil, secondary	100	5.1
School life expectancy	103	30.0
Assessment in reading, mathematics, and science	n/a	n/a
Pupil-teacher ratio, secondary	106	17.3
Tertiary education	106	17.0
Tertiary enrolment	99	11.2
Graduates in science and engineering	82	28.2
Tertiary level inbound mobility	106	0.4
Research and development (R&D)	88	2.8
Researchers	n/a	n/a
Gross expenditure on R&D (GRED)	n/a	n/a
Global R&D companies, average expenditure top 3	43	n/a
QS university ranking average score top 3 universities	69	5.6

Infrastructure		
	Rank	Score
Overall	**95**	**37.0**
Information and communications technologies (ICTs)	95	39.0
ICT access	109	30.6
ICT use	113	10.6
Government's online service	60	62.3
Online e-participation	82	52.5
General infrastructure	71	35.5
Electricity output	107	1.2
Logistics performance	86	27.8
Gross capital formation	25	56.6
Ecological sustainability	96	36.4
GDP per unit of energy use	18	48.6
Environmental performance	120	41.8
ISO 14001 environmental certificates	112	1.1

Infrastructure		
	Rank	Score
Overall	**95**	**37.0**
Information and communications technologies (ICTs)	95	39.0
ICT access	109	30.6
ICT use	113	10.6
Government's online service	60	62.3
Online e-participation	82	52.5
General infrastructure	71	35.5
Electricity output	107	1.2
Logistics performance	86	27.8
Gross capital formation	25	56.6
Ecological sustainability	96	36.4
GDP per unit of energy use	18	48.6
Environmental performance	120	41.8
ISO 14001 environmental certificates	112	1.1

Market Sophistication		
	Rank	Score
Overall	**103**	**38.3**
Credit	96	25.4
Ease of getting credit	119	25.0
Domestic credit to private sector	77	16.8
Microfinance institutions' gross loan portfolio	16	34.4
Investment	99	32.4
Ease of protecting minority investors	67	56.7
Market capitalization	40	15.8
Venture capital deals	91	0.3
Trade, competition, & market scale	82	57.1
Applied tariff rate, weighted mean	121	30.9
Intensity of local competition	69	68.5
Domestic market scale	32	64.5

Business Sophistication		
	Rank	Score
Overall	**99**	**25.6**
Knowledge workers	84	29.4
Employment in knowledge-intensive services	74	34.4
Firms offering formal training	72	24.4
GERD performed by business enterprise	n/a	n/a
GERD financed by business enterprise	n/a	n/a
Females employed with advanced degrees	n/a	n/a
Innovation linkages	81	23.5
University/industry research collaboration	116	25.7
State of cluster development	72	44.0
GERD financed by abroad	n/a	n/a
Joint venture/strategic alliance deals	84	3.7
Patent families filed in at least two offices	116	0.0
Knowledge absorption	105	24.0
Intellectual property payments	104	2.0
High-tech imports	48	31.3
ICT services imports	119	2.3
Foreign direct investment, net inflows	91	49.5
Research talent in business enterprise	n/a	n/a

Knowledge and Technology Outputs		
	Rank	Score
Overall	**96**	**16.0**
Knowledge creation	95	4.5
Patent applications by origin	110	0.3
PCT international applications by origin	n/a	n/a
Utility model applications by origin	n/a	n/a
Scientific and technical publications	110	3.4
Citable documents H index	63	9.8
Knowledge impact	72	29.2
Growth rate of GDP per person engaged	16	73.8
New business density	101	0.5

Total computer software spending	77	14.9
ISO 9001 quality certificates	114	1.3
High-tech and medium high-tech output	84	11.0
Knowledge diffusion	112	14.4
Intellectual property receipts	98	0.1
High-tech exports	107	0.5
ICT services exports	78	10.0
Foreign direct investment, net outflows	90	30.8

Creative Outputs		
	Rank	Score
Overall	**110**	**17.6**
Intangible assets	104	30.1
Trademark application class count by origin	92	7.8
Industrial designs by origin	42	11.8
ICTs and business model creation	103	49.5
ICTs and organizational model creation	104	42.0
Creative goods and services	125	1.1
Cultural and creative services exports	83	0.2
National feature films produced	87	0.2
Global entertainment and media market	n/a	n/a
Printing and publishing output	99	n/a
Creative goods exports	100	2.1
Online creativity	102	8.9
Generic top-level domains (gTLDs)	111	0.4
Country-code top-level domains (ccTLDs)	123	0.0
Wikipedia yearly edits	103	26.3
Video uploads on YouTube	n/a	n/a

Scrutinizing the extensive data in the table above, two facts and trends stand out. First, Bangladesh is behind the middle-income countries in both hard and soft infrastructures of research and development. Secondly, even in the soft part regarding education and training, the progress has been very slow and faltering. Thus, acceleration of the appropriate areas of hard and soft infrastructures for R & D needs to be a top priority.

It should also be noted that Bangladesh remains weak in on line creativity, especially in Country-code top-level domains (ccTLDs). It is shocking that although the publishing industry has grown as evident from Boi Melas and other cursory evidence, there is apparently no systematic data base for year to year information about this vital knowledge industry. It is likewise surprising that Bangladesh's cultural and creative services exports are so low-scoring. The H-index performance is encouraging but not overwhelmingly so. Leaving aside the critiques of the index, even moderately productive research departments in the US have average scores over 20.

However, it is heartening that Bangladesh scores well in Industrial designs by origin. It is also moderately starting to move towards ICT improvements. ICTs and business model creation shows some improvement but there is a long distance to go to catch up with India. A similar picture emerges in ICTs and organizational model creation also. Compared to

global innovation frontier in ICT briefly captured above, Bangladesh needs to focus on a strategic sector like ICT to catch up quickly and meet the goals of the perspective plan for Vision 2041.

We now turn to the specifics of assessing the ICT potential for Bangladesh and what needs to be done to build this part of the Bangladesh national innovation system(BNIS) by the 2040s.

C. 2041 Perspective Plan Vision, the Required Objectives of the ICT Sector and the Future

It is clear from the previous discussion that the ICT sector is both capable of and so far, falls short of contributing to its full potential for fulfilling the perspective plan vision mentioned in section A of this paper. We now take a closer look at the ICT sector and suggest strategic policy and institutional moves to fulfil the plan vision.

Defining and charting the ICT sub-system in Bangladesh:

WPIIS Classification:

Before discussing the relation between ICT sectors and economic growth, innovation and development, it is first necessary to have a clear definition of the ICT sectors. The most widely accepted definition so far is the one agreed to at the April 1998 meeting of the Working Party on Indicators for the Information Society (WPIIS) and subsequently endorsed at the September 1998 meeting of the Committee for Information, Computer and Communication Policy of OECD. The following principles underlie the definition.

For manufacturing industries, the products of a candidate industry:

- Must be intended to fulfill the function of information processing and communication including transmission and display.
- Must use electronic processing to detect, measure and/or record physical phenomena or to control a physical process.

For services industries, the products of a candidate industry:

- Must be intended to enable the function of information processing and communication by electronic means.

Based on these principles the ICT sectors are identified within the revised classes of the International Standard Industrial Classification (ISIC). In manufacturing and services the following four digit sectors are included:

Manufacturing

- 3000-Office, accounting and computing machinery
- 3130-Insulated wire and cable
- 3210-Electronic valves and tubes and other electronic components
- 3220-television and radio transmitters and apparatus for line telephony and line telegraphy

- 3230-Television and radio receivers, sound or video recording or reproducing apparatus, and associated goods
- 3312-Instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process equipment
- 3313-Industrial process control equipment
- Services
- 5150-Wholesaling of machinery, equipment and supplies
- 7123-Renting of office machinery and equipment (including computers)
- 6420-telecommunications
- 7200-Computer and related activities

In short, roughly there are three broad categories of the new ICTs: (1) computing, (2) communicating, (3) Internet-enabled communication and computing. Strictly speaking, not all of ICT sectors are digital, or at least not yet. Even within the digital part, the pre- and post- internet distinction is historically important and relevant for the developing economies. This applies for example for cell phones that became smart phones with the integration of telephony and microcomputer-based internet transactions. Bangladesh has made great strides in utilizing smart phones and as recent developments show, there is still much untapped potential in the service sector use of smartphones.

We can roughly dissect the digital economy's infrastructure into its pre-Internet and Internet eras. Before the Internet, a host of information technologies came into existence, which provided computing power on a platform-specific system, usually centralized (e.g. a central mainframe with terminals) or distributed within a local area. The advent of the Internet (and its precursors, the U.S. government-funded research networks like the defense research network - ARPANET) was a critical event because it set up the basic infrastructure, standards (e.g. protocols for communication) and technologies, that enabled large scale, distributed and platform-independent information exchange and manipulation. This "single" system allowed the introduction of literally unlimited sources of information, or access points to it, in a scaleable fashion, i.e., without increasing numbers of constraints or decreasing economic "returns to scale". The first computing functions consisted of basic email and file transfer capabilities like ftp and gopher, but these were soon coupled with basic "Web" technologies, like the development of the first browsers and the standards and technologies of the "World Wide Web". The "World Wide Web" further improved the remote accessing and manipulation of information, and ensured that all information could be "web-based", and therefore potentially viewable/downloadable by anyone connected to the Web. All these set the stage for electronic commerce to take place, since the connection of such large numbers of people to all the sources of information provided a potentially enormous market never possible in the history of markets.

ICT Sectors in Bangladesh – Identification and analysis of sub-sectors of ICT in Bangladesh and trends in the ICT industry. Identification of economy wide linkages between the above sectors and between these sectors and the rest of the economy:

I present below the relevant available ICT Data for Bangladesh. As mentioned earlier, it should be noted that the data for the ICT manufacturing sector is currently only available for a few years (the latest being 2012). Using the Bangladesh Survey of Manufacturing Industries, I have compiled data on establishments, gross output, total persons engaged

and salaries and wages of each component. Since the report did not provide any profit calculation, I have instead included data of Gross Value Added (Gross Output-Input Cost) and Value Added at Factor Cost (Gross Value Added- Indirect Cost). Using International Trade Centre as the primary source, I have compiled the data on export and import of the given ICT and related sectors. However, there are some data limitations.

1) Due to the difference in BSIC code, data for the year 2012 has been shown on a separate sheet. As the earlier years used BSIC Rev 2 and the latest year used BSIC Rev 4, I have resorted to the sectors that are most similar to those defined under BSIC Rev 3.1. Thus, there may be a discrepancy between the codes and descriptions used for each manufacturing product.
2) The BSIC codes given in the file are taken directly from the Manufacturing Surveys and may not necessarily match the ISIC codes for OECD classification.
3) In tables 9 and 10 below, the export and import data related to the ICT sector are defined under ISIC Rev 3.1. This dataset covers many of the ICT manufacturing products mentioned in the OECD classification scheme. However, the data are only available for four years (2012-2015).

In table below and the corresponding graph, we note that much of the earlier growth occurred between the mid 1990s and 2000. The growth under the second BNP regime was particularly slow. For sectors 3836 and 3000 (Computing & Accounting Machineries),3841(electronics) and 3839 (other general-purpose machinery), there was negative growth in number of establishments. Fortunately, gross output continued to show increases, as shown in Table 4. Table 5 shows slow growth in gross input cost implying perhaps stagnant wages and some mismeasurement of capital cost. Table 6 on Value Added at Factor Cost registers growth in several ICT sectors but shows little progress in computing machinery. We'll discuss this on the basis of extensive interview with some industry leaders.

ICT Classification Under BSIC Rev-2 and 3

Table 3: Number of Establishments

BSIC Rev-2 (as used in MIS) and Rev 3.1 for 2005-06	Year/Description	1992-93	1995-96	1997-98	1999-2000	2005-2006
3836 & 3000	Computing & Accounting Machineries		3	3	3	2
3839	Other General-Purpose Machinery	49	61	93	64	
3841	Electronics Including Machinery Appliances	14	28	14	7	
3842 & 3220	Radio and Television	23	32	38	31	36
3843	Electrical Appliances	13		18	12	
3844 & 3130	Insulated Wires & Cables	12	12	12	11	44
3845 & 3210	Electric Bulbs and Tubes	8	8	16	18	22
3847 & 3120	Electronic Components	4			1	30
3849	Electrical Apparatus	134	143	122	121	

Source: Report of Bangladesh Census/Survey of Manufacturing Industries

Figure 1: Number of Establishments

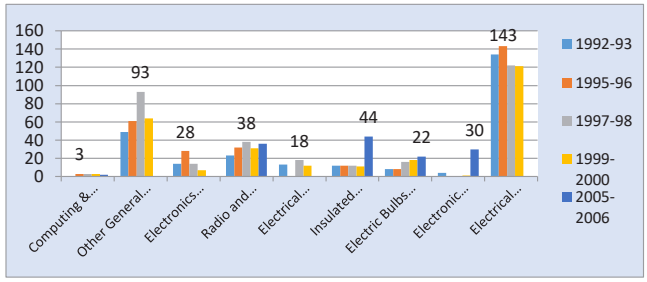


Table 4: Gross O

BSIC Rev-2 (as used in MIS) and Rev 3.1 for 2005-06	Year/Description	1992-93	1995-96	1997-98	1999-2000	2005-2006
3836 & 3000	Computing & Accounting Machineries		7800	7800	7816	49755
3839	Other General-Purpose Machinery	247389	164899	187397	1170832	
3841	Electronics Including Machinery Appliances	94910	81560	5537	498181	
3842 & 3220	Radio and Television	914578	1282061	2023611	2217112	2501656
3843	Electrical Appliances	174201		624736	398396	
3844 & 3130	Insulated Wires & Cables	724697	1669315	11062226	9090272	2089148
3845 & 3210	Electric Bulbs and Tubes	842202	1170748	2942578	4567064	1363209
3847 & 3120	Electronic Components	59351			27859	115276
3849	Electrical Apparatus	699624	6732789	4208753	3817188	

Source: Report of Bangladesh Census/Survey of Manufacturing Industries

Figure 2: Gross Output (in '000 Tk.)

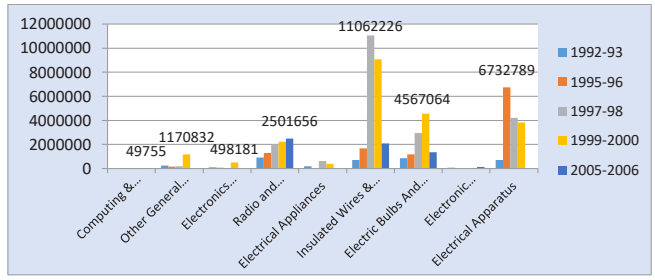


Table 4 shows moderate growth that will need to be accelerated consistent with the plan vision for 2041. Although production in most categories shows healthy growth trajectories, two basic areas --- Insulated Wires & Cables and Electric Bulbs and Tubes---show a decline. Since electrical goods sector as a whole did not shrink and electronic components part kept growing, most probably, the gap was made up for by imports. Without a sufficiently detailed imports map year by year, it was not possible to check this conjecture directly. It could in part be also accounted for by price inflation in these sectors. A comparison with VA at factor costs in table 12 suggests that this may have happened.

Table 5: Gross Value Added (Gross Input Cost) (in '000 Tk.)

BSIC Rev-2 (as used in MIS) and Rev 3.1 for 2005-06	Year/Description	1992-93	1995-96	1997-98	1999-2000	2005-2006
3836 & 3000	Computing & Accounting Machineries		4403	4403	4418	10488
3839	Other General-Purpose Machinery	89488	41742	84160	417734	
3841	Electronics Including Machinery Appliances	25963	35058	5033	208295	
3842 & 3220	Radio and Television	368725	447897	807918	1229290	1129338
3843	Electrical Appliances	54914		240107	154901	
3844 & 3130	Insulated Wires & Cables	308903	1112185	10070519	8149383	592751
3845 & 3210	Electric Bulbs and Tubes	366936	560194	1155655	2345189	1119374
3847 & 3120	Electronic Components	26483			7674	82830
3849	Electrical Apparatus	441453	2273814	2052942	1863695	

Source: Report of Bangladesh Census/Survey of Manufacturing Industries

Figure 3: Gross Value Added (in '000 Tk.)

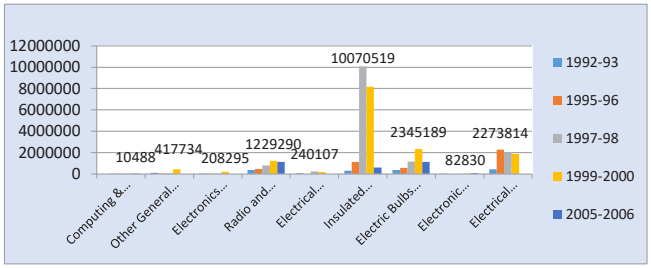


Table 6: Value Added at factor cost (in '000 Tk.)

BSIC Rev-2 (as used in MIS) and Rev 3.1 for 2005-06	Year/Description	1992-93	1995-96	1997-98	1999-2000	2005-2006
3836 & 3000	Computing & Accounting Machineries		2981	2981	2996	4887
3839	Other General-Purpose Machinery	65035	31000	76124	292088	
3841	Electronics Including Machinery Appliances	10843	28344	3328	106700	
3842 & 3220	Radio and Television	165306	245769	373777	905778	1106904
3843	Electrical Appliances	34152		128863	82838	
3844 & 3130	Insulated Wires & Cables	196292	743376	9836455	7930171	550082
3845 & 3210	Electric Bulbs and Tubes	207235	328266	363106	660490	931726
3847 & 3120	Electronic Components	18852			6187	80275
3849	Electrical Apparatus	398335	1615071	1636018	1453892	

Source: Report of Bangladesh Census/Survey of Manufacturing Industries

Figure 4: Value Added at Factor Cost (in '000 Tk.)

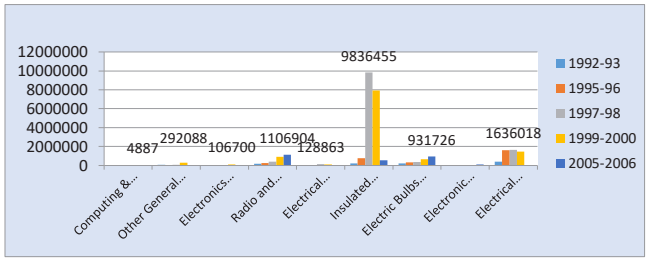


Table 7: Total Number Persons Engaged

BSIC Rev-2 (as used in MIS) and Rev 3.1 for 2005-06	Year/Description	1992-93	1995-96	1997-98	1999-2000	2005-2006
3836 & 3000	Computing & Accounting Machineries		36	36	36	58
3839	Other General-Purpose Machinery	1510	1253	2562	6099	
3841	Electronics Including Machinery Appliances	395	490	182	895	
3842 & 3220	Radio and Television	1938	1971	2669	1549	10480
3843	Electrical Appliances	929		3499	2136	
3844 & 3130	Insulated Wires & Cables	1749	2396	2316	2185	2537
3845 & 3210	Electric Bulbs and Tubes	730	764	1588	2036	1285
3847 & 3120	Electronic Components	172			795	420
3849	Electrical Apparatus	5870	27129	20654	18829	

Source: Report of Bangladesh Census/Survey of Manufacturing Industries

Figure 5: Total Persons Engaged

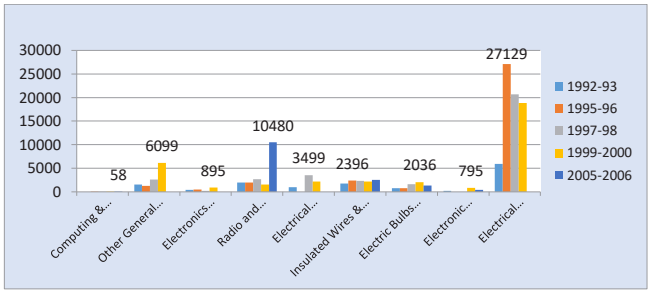


Table 7 is an important indicator of the contribution of the ICT sectors to people's well-being via employment generation. Again, the record of BSIC 3836 and 3000 is weak, and Electric Bulbs and Tubes and Electronic Components show declining employment from 2000 to 2006. More recent data for these sectors are not available; but the healthier overall growth figures for more recent years suggest a possible recovery and expansion.

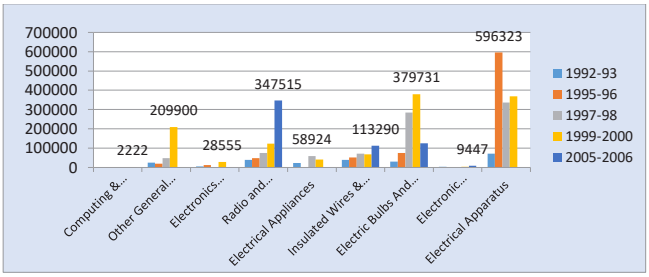
The conclusion that can be drawn provisionally is that on the whole ICT sectors generate relatively decent number of jobs at relatively decent pay and benefits; but there is much

room for increasing the scale and scope, generating more output and employment. My field work observations also indicate large variances both within and between firms. The potential for both quantitative and qualitative improvements by 2041 is enormous in this area.

Table 8: Wages & Salaries (in '000 Tk.)

BSIC Rev-2 (as used in MIS) and Rev 3.1 for 2005-06	Year/Description	1992-93	1995-96	1997-98	1999-2000	2005-2006
3836 & 3000	Computing & Accounting Machineries		1072	900	900	2222
3839	Other General-Purpose Machinery	25517	19883	49288	209900	
3841	Electronics Including Machinery Appliances	5711	13397	2598	28555	
3842 & 3220	Radio and Television	39409	48934	75887	123041	347515
3843	Electrical Appliances	23041		58924	40967	
3844 & 3130	Insulated Wires & Cables	40475	51985	72067	67831	113290
3845 & 3210	Electric Bulbs and Tubes	30461	75561	284329	379731	125358
3847 & 3120	Electronic Components	3969			3097	9447
3849	Electrical Apparatus	71086	596323	337255	369152	

Figure 6: Wages & Salaries (in '000 Tk.)



Here the average compensation within the ICT industry as a whole shows wide variation. (compute averages for each BSIC). Ahmed (2017) points out with respect to wage dispersion in services:

As expected, there are large productivity differentials within the services category. Highest productivity is found in professional services, such as Finance, Telecoms and ICT.

What we find from our closer look at ICT in particular is that the industry both in services and in manufacturing shows wage dispersion and wage growth.

Table 9: Exports (in US $ million)

BSIC Rev-3	Year/Description	2012	2013	2014	2015	2005-2006
3000	Office, accounting and computing machinery	4.7	3.5	6.9	2.3	
3130	Manufacture of insulated wire and cable	0.8	0.3	0.6	0.4	
3210	Manufacture of electronic valves and tubes and other electronic components	8.9	10	8.1	4.7	

BSIC Rev-3	Year/Description	2012	2013	2014	2015	2005-2006
3220	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	2.8	1.6	7	14.6	
3230	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods	1.6	0.4	1	0.4	
	Manufacture of electricity distribution and control apparatus	0.8	1	1.8	1.8	

Source: International Trade Centre

Figure 7: Exports (in US $ million)

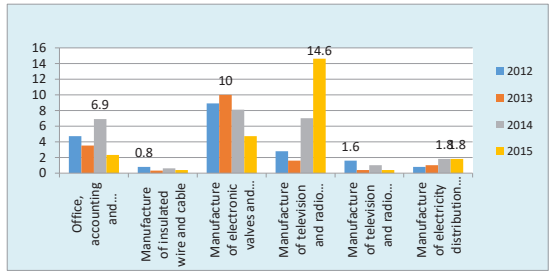
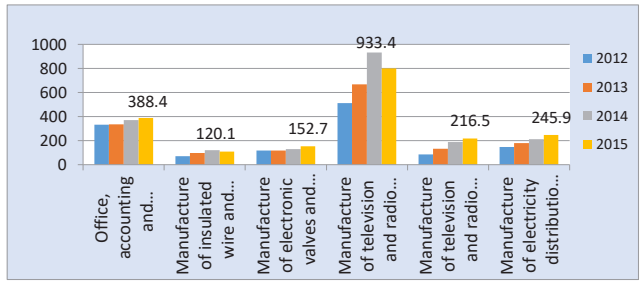


Table 10: Imports (in US $ million)

BSIC Rev-3	Year/Description	2012	2013	2014	2015
3000	Office, accounting and computing machinery	332.1	336	371.3	388.4
3130	Manufacture of insulated wire and cable	70.6	95.8	120.1	108.2
3210	Manufacture of electronic valves and tubes and other electronic components	117.4	116.3	127.8	152.7
3220	Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy	510.7	668.6	933.4	800.5
3230	Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods	84	132.3	186.9	216.5
	Manufacture of electricity distribution and control apparatus	147.1	177.3	212.1	245.9

Source: International Trade Centre

Figure 8: Imports (in US $ million)



It seems that Bangladesh has an opportunity to use the imported inputs for ICT to create an export base for ICT products and services.

ICT Classification under BSIC Rev – 3.1 and 4: Year 2012

Table 11: Manufacture of Computers and peripheral Equipment

BSIC Rev-3.1	BSIC Rev-4	Year/Description	2012
3000	2620	No. Of Establishments	13
		Gross Output	2263950
		Gross Value Added (GVA)	672051
		Total Persons Engaged	1027
		Wages and Salaries	172374

Table 12: Manufacture of communication equipment

BSIC Rev-3.1	BSIC Rev-4	Year/Description	2012
3220	2630	No. Of Establishments	46
		Gross Output	18,301,100
		Gross Value Added (GVA)	5657179
		Total Persons Engaged	10,787
		Wages and Salaries	1570348

Table 13: Manufacture of other electronic and electric wires and cables

BSIC Rev-3.1	BSIC Rev-4	Year/Description	2012
3130	2732	No. Of Establishments	183
		Gross Output	107,980,235
		Gross Value Added (GVA)	28794867
		Total Persons Engaged	11,623
		Wages and Salaries	1476801

Table 14: Manufacture of wiring devices

BSIC Rev-3.1	BSIC Rev-4	Year/Description	2012
	2733	No. Of Establishments	143
		Gross Output	3,069,530
		Gross Value Added (GVA)	1104056
		Total Persons Engaged	5,325
		Wages and Salaries	345758

Table 15: Manufacture of other electrical equipment

BSIC Rev-3.1	BSIC Rev-4	Year/Description	2012
	2790	No. Of Establishments	219
		Gross Output	18,468,887
		Gross Value Added (GVA)	5876186
		Total Persons Engaged	7,845
		Wages and Salaries	783949

Table 16: Manufacture of consumer electronics

BSIC Rev-3.1	BSIC Rev-4	Year/Description	2012
3230	2640	No. Of Establishments	90
		Gross Output	19,057,589
		Gross Value Added (GVA)	4447755
		Total Persons Engaged	4,576
		Wages and Salaries	584051

Table 17: Category of Income by BSIC 2-digit Code for the year 2012

BSIC code and description	Category of other income	Value (in '000 Tk.)
26: Manufacture of computer, electronic and optical products	Total	467,027
	Income from others' raw materials	118,122
	Investment and other income	321,630
	Income from selling of raw materials	27,274
27: Manufacture of electrical equipment	Total	1,033,683
	Income from others' raw materials	182,619
	Rental and leasing assets	85,303
	Investment and other income	39,906
	Bonus and premium	2,396
	Income from selling of raw materials	723,459

One particular issue with regards to the human component of ICT sector is noteworthy. Although the skill set in ICT in terms of education and training is better than other sectors, still there is a skills gap here too. As Ahmed (2017, pp19-20) states:

The skills situation in the formal services is better. Modern services such as ICT, telecoms, financial sector, aviation, international shipping and professional services are the largest employer of the graduates of the tertiary education system. Although there are quality differentials among supply sources of the tertiary education network, the expansion of these services is usually constrained by supply of specialized skills needed. In particular, the ICT industry is constrained by supply of skills.

Private Sector Contributions and Prospects:

Much of the manufacturing and services described are by private sector firms. In the service category, as discussed earlier, there have been several successful e-delivery of services firms. Perhaps BKash is the most prominent. As I observed, there are variations of quality in the private sector and not all firms are financially transparent or accountable corporate entities. Another problem is a kind of growth ceiling that experts in the ICT field have identified. It seems that the industry has not been able to break out from an overall size of exporting 700 million dollars annually[13] in an upward direction.[14] A close study of the most recently published industry document from BASIS SOFT EXPO 2017 confirms this assessment by Bangladeshi experts.[15] The document asserts that more than 300,000 professionals are involved; but this seems an overestimate.

BASIS SOFT EXPO 2017 document states that there are now more than 4500 enterprises with 56 per cent of the total revenue coming from software related firms and 44 per cent from ITES related firms. According to BASIS research, exports from 382 BASIS companies in 2015 was US $594.73 million. There is also an upper bound estimate of US $ 761.5 million. But this is based a generous assumption that 25 per cent of the IT and ITES sector firms are exporters.

One area of success, as mentioned before, is the extension of ITES through smart mobile telephony. In my view, more important than the success of just selling mobile phones are the creative ways firms like bKash are starting to provide important services to the people.

13 This is the figure given by Hon. Sajib Wajed Joy. "…In fact, Honorable ICT adviser to PM Mr. Sajeeb Wajed Joy, declared that present IT & ITES sector export is US $ 700 million."(BASIS SOFT EXPO 2017, p. 41)
14 Interview with Mr. Munir Hasan and other experts in February, 2017.
15 BASIS SOFT EXPO 2017,p. 41

Export Promotion Bureau Program:

In the 1990's there was much hype about IT everywhere and outsourcing was beginning to draw attention as a new business. India had just started to use outsourcing on a small scale. Through the Export Promotion Bureau (EPB) of Bangladesh program in Malaysia, Mahboob Zaman and others attended this program and found that all the participating countries were concerned about the possible digital catastrophe known as the Millennium bug or Y2K bug. They also learned that India was already prepared with to solve the crisis. This proactive stance gave an advantage to India and it drew increasing amount of investments and strategic corporate alliances in this sector.

Leading Bangladeshi ICT entrepreneurs met N. R. Narayana Murthy, the co-founder of Infosys. Narayana Murthy made some suggestions regarding start-ups and new ventures. He also explained the whole system of Infosys to them. According to a later publication, the Bangladeshis reported:

It was evident that Infosys concentrated on its key activities – software development. The rest of the activities inside their campus were outsourced. It helped them to remain focused and to put 100% of the effort in one basket.

After successful projects like Chittagong Custom House Automation (CCHA), companies like Datsoft are going into mobile applications as new lines of business. Given the increase in the number of mobile phone users and the use of different mobile applications it was possible to form a company solely dedicated for developing mobile software. In September 2013, DataSoft founded a small spinoff mobile applications company. This company, called MobioApp is the first software company in Bangladesh that was employee owned. MobioApp Limited distributed its share capital not just to the key managers and the board of directors, but also among the employees of the company.

It is impressive that MobioApp has already developed mobile application software for Android, iOS, Windows phone and Blackberry and is carrying out continuous innovation. For the implementation of such an innovation strategy, MobioApp has recruited employees from different backgrounds including Software Development, Communications, and Creative Arts & Crafts. Notably, MobioApp not only has experienced business developers, but also has recruited students who work as interns or on part time basis. The employees are given in-house training in different areas of software development to maintain the continuous innovation in mobile applications. It is then not surprising that MobioApp has developed a number of mobile applications for the local market like 71, Ekusher Boi, Kid's Starter, Balanced Diet, Salat-Ramadan-Masjid etc. Being a booklover, I am pleasantly surprised that an application called Boipoka (Bookworm) is the "…flagship product of the company".

People connected with the company proudly pointed out:

It has been nominated for 'mBillionth Award South Asia 2014'. Among 300+ Mobile Apps from all over South Asia, Boipoka is in top nine. For better publicity in the local market, MobioApp had a stall for Boipoka in the 2014 Ekushey book fair. The increasing popularity of eBooks among the book readers around the world inspired MobioApp to

develop Boipoka with which readers can get eBooks on their smartphones or tablets. By downloading and installing Boipoka, a reader has access to Boipoka's online bookshelves. In those bookshelves, the reader can find his/her desired books and purchase them. Customers outside the country can also purchase books from the app by using their credit cards. All the books are protected by Digital Rights Management (DRM) to impose technological restrictions for controlling what users can do with material on digital media platforms like eBooks. (DS Biz pp6-7)

It may not be impossible to brand Bangladesh as the land of mobile applications if the young learners take the lead and train in this area to make important contributions in the near future. In addition to the above area, ICT companies in Bangladesh are assisting microfinance organizations and formal Banking sector.

As a partner of Temenos (the world leading banking software provider), one company has successfully implemented Temenos T24 in 5 commercial banks in Bangladesh which includes Prime Bank Limited, EXIM Bank Limited, Janata Bank limited, Agrani Bank and Mercantile Bank. Temenos T24 (T24) is a complete front- to back-office, Customer Relationship Management (CRM) and product lifecycle management software platform that powers core banking operations. It is a 24-hour real-time banking application that provides multiple application server support to a huge number of users. The system also eliminates the need to run End of Day processing. It ties together multiple channels, and provides CRM functionality and true non-stop processing in a single system (DS Biz, p.9).

In other areas, the application of sophisticated software with advanced computers are proceeding from infrastructure projects to e-governance. Many firms in this sector are also progressive in terms of their recognition of corporate social responsibility (CSR). My conversations with some of the leaders showed that consistent with their level of education and at least for some, a background of their involvement in our war of liberation in 1971 and with progressive student activism prior to 1971, these corporate leaders are cognizant of CSR.

Since I wish to focus on the future, it is pertinent to pick one solidly performing manufacturing firm. With this purpose in mind I now turn to a Case Study of an actual IT company in Bangladesh. For reasons of confidentiality, I will not name the company. But it is a leading, progressive IT company with a lot of promise. I will discuss one particular product development idea and the problems that arise in this particular context to give the reader a concrete picture of innovation prospects and problems in this area.

One of the computer products that this company is interested in is aptly called A1- All-In-One computer (A1), which includes a LED Monitor, Keyboard and Mouse with low-powered consumption SoC; which can be manufactured and assembled in Bangladesh. The leaders interviewed also provided an overview of the spare parts required for the product along with guidelines on the vast array of applicable devices and assembling solutions for modern day computing need.

The goal is to develop, hardware, software and provide IT enable services, which includes Hardware Design/Development, manufacturing and assembly of different devices to build the IT infrastructure for Bangladesh progressing towards the broad goal of building an

innovation system. Even where the country is dependent of import items, the goal is to build and train and skilled labor forces for meeting Bangladesh's needs in software development, management and administration. The company seems to be committed to capturing its niche in the world market in providing state of art technology and services at a fraction of global average cost. The company's goal---stated concretely--- is to manufacture the computer hardware and provide IT enable services. It is planning to build on its existing expertise in Software/Hardware, and IOT Design and Development. It already provides enterprise level software and hardware, along with IT services across the global market. The concrete objectives are to eventually capture the niche in the world market in providing state of art technology in IOT, VDI, Virtual Reality, Drone and other related items in a cost-effective manner--- manufactured and assembled in Bangladesh at the Hi-Tech Park in KaliaKhor.

Bangladesh requires desktop level computing power on each person's desktop, which can be a laptop and/or a desktop and/or Virtual Desktop Infrastructure (VDI) product uses a Private cloud technology in such a way that each person will be using a small device called A1 with a Keyboard, and a Mouse to experience a full desktop computing environment without having to have a traditional laptop or a desktop. A1 is a platform independent software that will run on Windows7, Windows10, Androids and Linux desktop environment, where a person can use Microsoft Office product, Adobe Illustrator/Photoshop for Graphic Design and any applications, able to surf the Internet. This technology has already reduced the cost of owning desktop exponentially and is closing the gap of Digital Divide for Bangladesh market. Therefore, it promises to be a cost-effective way to promote the Honorable Prime Minister's campaign for "Digital Bangladesh".

A1 can coexist with existing environment or can function independently. With the rise of cloud computing in the world and the IT changes that are taking place in Bangladesh for digitization, within offices and institutes, by having A1 produced in Bangladesh, the local firms can provide an inexpensive desktop to address the IT challenges.

The author found that A1 technology could be deployed in any enterprises, institutions and schools in Bangladesh to cut down 50% of the desktop/laptop cost to build an IT infrastructure. This technology will be applicable for small, mid and large size IT infrastructures and will provide a low-cost solution to access the full functionality of a desktop with merely a fragment of IT budget. Among the concrete needs are the factory build-up materials such as:

1) Conveyor Belt Table 50/100/200 ft. long
2) Plastic imprint 2-color machine to print our name and logo on the frame
3) Molding and other metal based manufacturing tooling machines
4) Tools & electronics devices required to build an assembly and manufacturing plants

It is important for our economic planners to understand the need for removing/reducing tariffs and/or providing subsidies as part of a coherent industrial policy for Vision 2041. Here is a concrete partial list:

Table 18: Needed Waiver/Reduction of Duties/Taxes/VATs

No.	Category Name Specification
1	Electronic monitor mother board
2	Invertor
3	Panel wire FI-X30H/DP2X15P/250mm
4	Power cable 1.5m UK standard plug
5	Power board
6	Keyboard & receive board with line14P2.0/8P2.0-5P2.0/400mm
7	Receive board CL-24LED-B
8	Keyboard CL-24LED-A
9	HDMI cable
10	Cabinet size 18.5/19 inch
11	Back cabinet
12	Front cabinet
13	Base plate
14	Metal Plant inner
15	Panel metal(down/side) metal
16	Screw PA3*8 mainboard*4/invertor*2/keyboard*2/received*1/panel metal*2
17	Package carton with foam color gift box
18	PE plastic bag 39*55cm
19	Instruction manual
20	LED and LCD Panel 16:9, 18.5 or 19 inch A+ grade
21	Glass protection of the 16:9 18.5/19 inch LED panel Apple or other model
22	SOC based mother board with 2/4/8GB RAM, 32/64/128GB SSD, Low Power Consumption CPUs, 4*USB2.0, 1*Rj45, 1*Headphone port, 1* Audio, 1*TF card slot, 1*standard HDMI, WIFI/BT, 2.4G wifi and Power Adapter 20VDC/3 Amps
23	Memories
24	Hard Drives
25	DC Power Supplies
26	Rechargable batteries
27	HDTV or TV controller boards
28	VGA Cable, connectors
29	HDMI to VGA Convertors
30	GPRS Modules or circuits board
31	Micro-controllers - 8bit, 16bits, 32 bits and 64 bits
32	MiniUSB Cables
33	RS232 Connectors and cables
34	Capacitors and registors
35	Optical Mouse
36	Computer mother board and accessories
37	AC to DC power convertors
38	Windows10 Pro or other OS
39	Wifi circuit board
40	On/off switches, cables, connectors
41	USB COM port board and cables
42	Special electronics and circuits
43	Special electronics components

It is my hope that this brief but detailed concrete case study illustrates the practical problems faced by some of our truly patriotic entrepreneurs. In the final section, I will list many other possible strategic policy orientations and steps.

I now turn to a brief discussion of my extensions of the idea of National Innovation System(NIS) in order to pose the problems of and prospects for an appropriate NIS for Bangladesh or BNIS y 2041.

National Innovation System (NIS), Sectoral Innovation Sub-System (SISS), Augmented National Innovation System (ANIS), Social Learning and Complexity:

The National Innovation System or NIS--- also abbreviated as NSI or National System of Innovation---- can be broadly defined as the intersectoral flow of technology and information in the economy including households and individuals, productive enterprises and various institutions including both public and private educational and R& D institutions. All these can form a network which under appropriate circumstances can generate a self-sustaining innovative process on the national level.(Freeman 1987,1995; Nelson 1992,1993a,b, 1994, 1995; Lundvall 1992; Edquist 1997; Kim 2000; Kim and Nelson 2000; Lee 2006,2008; Lee and Lim 2001; Lee and Kim 2009; Khan1998, 2002, 2004a,b,2011, 2012,2013, 2017;Khan and Matin 2011) . According to this approach, which I generally follow with some modifications described later, technological development requires a system of well-functioning institutional networks and such development when it occurs results from this complex system of relationships among different groups of actors who respond to appropriate policies in the socio-economic system. Most advanced countries are already societies with highly evolved NIS and SISS. Some NIEs in the Asia-Pacific region like China, India, Korea and Taiwan are developing such NIS and SISS with various degrees of success. Many poor countries are far behind. This is an example of what I mean by the unevenness of the global economy and globalization as a process.

My previous work on NIS and RIS (Khan 2002 and 2004a,b in particular) of the requirements of technical progress shows that we need both a deeper understanding of the disequilibrium processes at work leading towards multiple equilibria, and the economic implications of the complexities of the production and distribution aspects of new technologies. It is with a view towards capturing these complexities leading towards multiple equilibria that an alternative conceptualization of technology systems transition in terms of an Augmented NIS (ANIS) has been formulated by some economists (Khan 1993; James and Khan 1997; Khan 1998, 2001a,b;2002,2004a,b; Gabriele and Khan 2010). In addition to capturing both equilibrium and disequilibrium features of technological transitions, this broad approach can illuminate distributional issues as well. Since poverty alleviation remains on the agenda of the national governments of Bangladesh as one the six goals discussed at the beginning, it can be argued that from this perspective at least the new approach has obvious relevance for Bangladesh. The key analytical results for policy purposes will be described shortly; but first let us take a closer look at the concept itself and see how it can be applied to specific technologies and NIS in a particular Asian country where the NIS is comparatively recent in origin and development. From here on, I wish to highlight the fact that my framework can be viewed as simply a variety of Augmented NIS (ANIS) and its various subsystems and therefore, I will be using the more general term from now on which

also has the virtue of maintaining intellectual continuity with NIS and at the same time augment the range of the concept. One important extension captured in my formulation is the explicit consideration of both factorial and household income distributions which interact in a causally reciprocal way with the technology systems including the ICT- SISS.

An Augmented NIS for Bangladesh and the linkages between ICT industry and science: the Chinese example and prospects for BNIS by 2041:

As an example of a recent and successful example of the process of creating an Augmented NIS we can look at China. The argument here is not that Bangladesh is like China but rather that China's rapid state-led public private partnership (SL-PPP) presents a somewhat novel model for other Asian countries to follow with local modifications and variations. The claim is not that China has adopted an innovation system that is totally different, but rather that in addition to the SL-PPP model, there is finally some official recognition in China that issues related to distribution and the maintenance of reasonably harmonious social relations cannot be completely neglected in overall development strategy including the strategy for innovation.

China's Augmented NIS has witnessed remarkable advances since the early 1980s, as a result of a series of reforms aimed mainly at improving its effectiveness and closing the excessive gap which traditionally separated university-based research activities from the technology absorption and innovation needs of the enterprises system. The main thrust of reforms has been to diversify the country's Augmented NIS and to strengthen its market-orientation (or market-compatibility), but the role of centrally-managed large, long-term research programs has also been enhanced. These reforms, along with the ever-expanding availability of financial resources made possible by economic growth and by the strong role of the national state, have allowed China to achieve remarkable advances. This has also led to the prospects for deeper integration with other Asia-Pacific economies through both international trade, investment and joint technological and infrastructural projects.

Several organizational and institutional structures which proved their validity in the context of developed market economies are also being studied, experimented with, and in some cases adopted in China, but such a pragmatic approach does not amount to an attempt to ape Western examples. The most visible change in China's Augmented NIS is probably the progressive shift of the bulk of R&D activities away from universities and specialized research centres and towards industrial enterprises. However, universities participate in many of the most ambitious basic research endeavours, and often play a crucial role in their implementation. For instance, universities carry out about 1/3 of the "863 projects" and 2/3 of the projects funded by National Natural Science Foundation (NNSF) (Wu (2007), Hu and Jefferson 2004). In order to re-balance the roles of the different actors in the R&D scene in favour of the academia, the Chinese government is earmarking an increasing volume of funds to elite universities, mainly through the Ministry of Education (MOE). Elite universities are expected to lead in national R&D programs and projects, facilitate technology diffusion and pullovers, promote spin-off companies, incubation centres, and open laboratories for R&D sharing, to bridge-in foreign technology and partners. This emphasis on the role of universities in engaging directly in the development, production, and commercialization stages of their research results has been dubbed "forward engineering

" by Lee. According to him, forward engineering is a peculiarly Chinese component of the "Beijing Consensus", a comprehensive and proactive catch-up strategy very different from the "Washington Consensus" and partly, but not fully similar to that followed before by other successful Asian latecomers such as Korea and Taiwan (see Lee 2006a, b). Among other initiatives, a very important one was project 211, aimed at funding the construction of campuses and developing new academic programs in key scientific areas all over the country during the 1996-2000 Five-year plan period.

In China, as elsewhere in the Asia-Pacific, R&D expenditure is positive and significantly correlated with firm productivity. The contribution of government R&D to firm productivity works mainly through an indirect channel, via the promotion of firms' own R&D, which appears to be a more effective policy tool than direct R&D grants. Other key sources of production improvement and innovation growth are each firm's absorptive capacity, the production network, openness, and managers' education. Market-oriented, competition-enhancing innovation system reforms are improving the effectiveness of the incentive structure and fostering S&T linkage activities. With respect to the impact of ownership type, SOEs perform worse than collective and private firms in terms of production performance, but not in terms of innovation capabilities grants. The choice of innovation types among Chinese SOEs depends on the turbulence in the environment, and on the organizational resources, with market forces and internal governance simultaneously influencing SOEs' innovation patterns. In many SOEs, managers apply the technical innovation audit tool for benchmarking, thereby improving their ability to choose among different types of innovation mechanisms.

Due to the influence of the two main stakeholders (government and end-users), firms with a higher degree of government involvement and a correspondently lower degree of openness to the market exhibit a more widespread use of innovation mechanisms, thereby apparently contradicting the positive relationship between market focus and innovativeness traditionally posited by "Western" innovation management theories. This phenomenon is due largely to strong government interference in SOEs' behavior, in a context of relatively weak IPR protection. The government puts a paramount emphasis on long-term investments and makes a great effort to promote technological innovations, targeting them as important indicators of SOE performance and awarding resources to SOEs accordingly). SOEs rely more on government-allocated resources, and therefore tend to perform better in areas that are encouraged by the government, such as new product development. As new product output is an important indicator of SOE performance, SOEs are incentivized to operate at the frontier of new product development. In our view, in spite of the relevance of static inefficiencies and distortions, SOEs' "distorted" behavior in the static sense can be associated with dynamic advantages in terms of innovative capacity and technological progress, with major spillovers benefiting the national economy as a whole. One also needs to take into account the existence of virtuous synergies with the non-state-owned sector.

Notwithstanding China's Augmented NIS's remarkable strengths, remaining challenges are formidable. For instance, Wang (2006) identifies a dualistic pattern in China's of technological development, with the export-oriented segments of the economy being relatively isolated from those producing mainly for the domestic market. Zeng and Wang (2007) and Gabriele and Khan (2010) stress the weight of constraints such as an insufficiently

developed institutional framework, relatively low overall educational attainments, the lack of a large pool of world-class talents, the embryonic stage of indigenous innovation capacity, and insufficiently developed linkages between R&D and industrial enterprises. Other researchers point towards China's persistent weaknesses in technological cooperation between universities and industry, the inadequate integration of the country's Augmented NIS into the global innovation networks, and the need to develop a comprehensive , more refined technological strategy in order to achieve effective technology transfer from foreign technological leaders, while at the same time maintaining an appropriate balance between indigenous innovations and technology imports.

Without being exhaustive, one last feature of the still evolving Chinese Augmented NIS can be mentioned. Since the beginning of the new regime in the 21st century the increasing social and political tensions which inevitably accompany worsening income distribution have been noted carefully. The worsening distributional situation sets China apart from the other East Asian latecomer innovators. The new regime seems committed to changing the distributional picture and managing social and political tensions effectively. The overall macroeconomic and innovation policies are influenced by these goals.

While Bangladesh is far from the technological frontier in 2017, an optimal strategy for catching up through Original Design and finally original equipment manufacturing in various areas including ICT software and hardware can be formulated and thus a BANIS or Bangladesh Augmented National Innovation System can be launched to yield some fruits by 2030s.

D. Projections and Strategy Policy Space: Optimal ICT Sectoral Policies for Investment and Institutional Development, Given the Perspective Plan's National Economic Objectives to be Reached by 2041

There are some crucial problems in the ICT sector in particular if Bangladesh is to meet its ambitious targets for the Perspective Plan by 2041. As identified by Ahmed (2017, pp.23-24):

Bangladesh is a relative new comer to the ICT sector. The emphasis gained momentum in the wake of the leadership role provided by Prime Minister Sheikh Hasina through the Digital Bangladesh initiative developed in the context of Vision 2021 (Government of Bangladesh 2009). The 6th Five Year Plan (Government of Bangladesh 2011) put considerable emphasis to the implementation of the Digital Bangladesh Initiative. Considerable progress has been achieved (Government of Bangladesh, 2015). However, much of the ICT focus has been in improving the connectivity and service delivery inland within the country. The impact on export of ICT services has been relatively modest when compared with the global market prospect. …[E]arnings from ICT exports have grown from $247 million in FY 2010 to $595 million in FY2014. This is a welcome increase but pales into insignificance when compared with ICT earnings of $105 billion in India in FY2015 (World Bank 2016). Even after allowing for size effects, India's exports of ICT services amounts to 5 percent of GDP whereas it is less than 0.3 percent of GDP in Bangladesh. The global market for ICT services is large and India has successfully tapped this market even while expanding ICT services domestically. An important target for the services exports for the Seventh Plan will be to boost the penetration of Bangladesh into the global ICT market through a well

thought out ICT strategy that looks at both domestic market and also the global market. This progress will then lay the basis for longer-term growth of ICT exports.

The past experience suggests a number of factors that constrain the growth of ICT exports. First, although a significant number of educated and qualified entrepreneurs have started ICT ventures during the last couple of decades, most are trapped in the 'small size-low growth' situation because of funding constraints. Second, there are severe gaps in both quantity and quality of human resources for the software industry. This is due to institutional deficiency of the tertiary ICT-related educational institutions (lack of industry orientation of teaching resources, slowness of curriculum modernization etc.) as well as inadequate quality input from the higher secondary education system to the tertiary level. Third, high cost of bandwidth deters growth of domestic market for ICT. Fourth, the absence of IT park/software Technology Park, high internet cost, no redundant submarine cable, and power shortages are some of the common infrastructural problems for most of the IT enterprises. …Finally, the growth of export of ICT industry is below the expected level due to inadequacy in entrepreneurial dynamism, limited overseas marketing budget and absence of government level initiatives in promoting country brand. Policies and facilities are not friendly for value added service providers in the mobile phone industry.

One of the most important operational questions for planning adequately for S and T in Bangladesh---ICT in particular---is regarding the impact of technical progress including ICT on output, employment, incomes of households and their wellbeing. Although a Social Accounting Matrix based formal CGE model is necessary for answering this question technically and carrying out a number of relevant counterfactual policy experiments[16], it can be inferred from the existing models and data that on the whole there are great gains in these areas to be made from investments in R and D and production in innovative technologies.

Policy priorities from a strategic Perspective and investment requirement---future developments in internet architecture, big data and AI and the tasks for Bangladesh:

In the broadest terms---consistent with initiatives such as A2i--- there are two complementary sets of strategic S&T package of policies for the ICT sector, both of which can be advocated in various degrees of mixtures:

1. Supporting (via preferential fiscal, financial and other policies, subsidies, investment and capital goods support) existing S&T private firms and promote startups etc. This would be a directly market-oriented, private sector centered strategy based on a sector-specific industrial policy aimed primarily at medium-term goals such

16 This looms as a necessary future technical project. A necessary component is to create a SAM that uses clearly distinguished technological classifications for ICTs. Following and extending the term introduced by Khan and Thorbecke(1988, 1989), we can call this kind of a SAM an ICT-SAMTech. Such a multistep project---creation of SAM, Formulation of model and implementation, training Bangladeshi technical personnel and carrying out policy experiments can be done in 2 to 3 years with provisions for updating every 3 years or so. Though costly in terms of time and money, the payoff will be substantial with future self-sufficiency and learning mechanisms and facilities for Bangladeshi professionals in Bangladesh as part of the value added. The other alternative is to have modern time-series based models such as VECM that are informed by the advances in time-series analysis of nonstationarities and spurious regression problems among other pertinent econometric issues. It should be emphasized that the two technical approaches are not mutually exclusive. Actually, my recommendation is to build and make operational both types of models if time and resources allow.

as growth and technological upgrading of manufacturing output and exports and GDP growth. Yet, it would only indirectly be conducive to the establishment of an (augmented) National Innovation System.

2. Supporting primarily public S&T centers, institutions and infrastructure. This would be a public sector-centered strategy with a more long-term horizon, that might imply a lower GDP growth in the short and medium term. Yet, it would be the most clearly focused on the goal of creating an (augmented) National Innovation System.

Quantitatively, from the strategic planning perspective, policy makers must find targets for each year starting in 2018 to increase R&D expenditures so that by 2041 it reaches 2 per cent or more of GDP. Tables 19 and 20 below give the available R&D /GDP ratio for recent years, and the R&D-intensive export sectors. Bangladesh needs to increase the R&D /GDP ratio to at least 1% by 2025 and then gradually to 2% by the 2040s. Exports from R&D-intensive sectors should also be increased by 10% a year and by a higher percentage than that from the 2030s onwards perhaps by 2 per cent a year reaching the 25 to 30 per cent range eventually. This will be crucial for increasing productivity in the ICT sector and total factor productivity (TFP) overall. As the planning document correctly notes on p. 13:

In order to achieve the high and sustained economic growth to be an UMIC country by FY31 and a HIC by FY41 TFP must grow at an average rate of 2.7 during 2021-2031 and 3.6 during 2032-2041 periods respectively. Increasing the average TPF from 0.3 observed in the last decade to 2.3 to 4.5 range will be a massive undertaking….

For high technology sectors---particularly the ICT sector---optimal use of R&D that can facilitate increase in human capital investment and institutional efficiency, removing infrastructure gaps, higher enrolment ratio, and good governance is the goal recommended in this paper. Specific studies using the input-output structure and social accounting matrices can be undertaken for this purpose in order to come up with specific targeted R&D program within the ICT sector and other high technology sectors.

Table 19: Forecast Gross Expenditures on R&D

	R&D as % GDP	GERD PPP bil. USD
2014	0.70%	3.75
2015	0.70%	4.04
2016 Estimated	0.70%	4.32
2017 Forecast	0.70%	4.62

Source: Battelle, R&D Magazine, International Monetary Fund, World Bank, CIA Fact Book

*GERD= Gross Expenditures on Research and Development
*PPP= Purchasing Power Parity (issued to normalize R&D investments)

Table 20: Bangladesh - High-technology exports in current prices

Date	Value	Change, %
2011	39,378,724	24.89%
2010	31,530,160	-16.92%
2009	37,952,009	-35.58%
2008	58,908,946	-55.94%
2007	133,700,302	469.40%
2006	23,480,859	-15.00%
2005	27,624,176	73.00%
2004	15,967,424	6.74%
2003	14,958,984	127.65%
2002	6,571,088	-28.00%
2001	9,126,275	-13.83%
2000	10,591,240	

Source: World Bank

* High-technology exports are products with high R&D intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery. Data are in current U.S. dollars.

What seems best for a country like Bangladesh is to find a strategy that uses the stronger elements of both public and private sectors as well as continue to strengthen these elements through policy and institutional reforms. This is one reason why in addition to analyzing available macro and sectoral data, I have also included observations from field work up to and including individual firm level observations and analyses.

The investment through PPP in the ICT sector should specifically do the following:

- Plan to install the second submarine cable connection for expanding high speed internet facilities as soon as feasible.
- Plan to finish Phase II of implementation of broadband internet connectivity under the South Asia Sub-Regional Cooperation (SASEC) initiative.
- Within the Research and Development budget earmark 25% for ICT from 2020 to 2030, and as the absorptive capacity of the ICT sector increases, then in keeping with the goal of increasing TFP further between 30 and 40 per cent from 2031 to 2041.
- Study the examples of Korea and Taiwan carefully and build ICT parks through PPP initiative for developing capacity, attracting expatriate scientists and technicians and train the future ICT-capable workforce.

Incentive Policies for ICT Facilitation:

Within the basic framework of public, private and NGO partnership, removing barriers to private investment including FDI in ICT loom as an important task. As the planning document acknowledges, learning from the positive results of others Bangladesh can improve its scores on doing business by deregulating procedural aspects. It can improve

the drive to motivate greater private provision of ICT services by appropriate substantive deregulation of ICT sector activities promoting ease of entry and expansion of capacity. The government should ensure that the line Ministries related to ICT engage in constructive dialogue with ICT manufacturers and service providers. Inter alia, these can be facilitated through public meetings with business chambers and conducting special purpose surveys as necessary to obtain specific feedback on regulatory burden or other constraints faced by the producers and suppliers. Such practices will undoubtedly help attract foreign investment in export-oriented ICT manufacturing and services and enhance technological progress, service quality and export competitiveness. Joint venture with foreign partners in ICT should be encouraged along with import of technical skills in this sector.

In addition, domestically the Government should invite private sector and non-profit sector for increasing broadband connectivity in rural area. The local entrepreneurs should be incentivized to cooperate in extending internet service to every local community. Tax incentives may be necessary for this. The Government should act on tax policy changes---including import duties on ICT components, as discussed in the previous section--- swiftly so that incentives for private investment increase. At the same time, careful monitoring of performance so that the private ICT sector is competitive internationally will need to be in place. This is discussed further in the sub-section on institutional innovation.

The strategy advocated here is consistent with the broad goals of Bangladesh government.

Indeed, a number of policy moves supported in principle by GoB and consistent with A2i and similar initiatives can be adopted for the ICT sector. Without being exhaustive or definitive, the following are perhaps the most critical from an ICT development policy administration:

Introduction of appropriate legal and policy instruments for the implementation of science, technology and innovation (ST&I) in ICT.

- Introduction of appropriate legal and policy instruments for the implementation of science, technology and innovation (ST&I) in ICT.
- Strengthening of intellectual property rights regime (e.g. enactment and enforcement of laws, strengthening of administrative and judiciary institutions) in a step-by-step process with careful review of specific ICT contexts in Bangladesh.
- Promotion of evidence-based awareness concretely about the importance of ICT among politicians, bureaucrats, researchers, managers, administrators, academics, professionals, members of the public and other stake holders
- Mobilization of sufficient research and training funds, venture and investment capitals from government, public, private and external sources for the promotion and application of ICT
- Strengthening and development of infrastructure to support ICT development
- Strengthening and development of ICT production facilities
- Strengthening and development of research facilities and capabilities for the ICT sector under public and private sector managements on acquisition, transfer, adaptation, development, diffusion and management of local and imported technologies and research on applied and basic sciences

- Promotion of co-ordinated (multi-institutional & multi-disciplinary) ICT national research programmes on cross-sectoral issues
- Creation of R&D facilities for physically and otherwise disadvantaged groups
- Strengthening and development of capable ICT human resources at different levels-vocational (nonformal and formal), school, pre-university, university, formal post-graduate and non-formal postgraduate (continuing education and training) to meet the needs of research and production systems of different sectors
- Promotion of innovative production and marketing systems in public and private sectors involving innovative technologies, products, processes, services and institutions
- Establishment and strengthening of regulatory regimes (e.g. regulatory and enforcement authorities) for effective promotion of ST&I in public and private sectors
- Strengthening and establishment of institutions for standardization of S&T based products and services
- Strengthening and development of S&T capacities and capabilities for effective management of natural disasters (e.g. floods, cyclones, droughts, earthquakes, tsunamis, SLR and landslides)
- Promotion of pro-active collaborative relations among government organizations, public & private production systems, research organizations, universities and professional bodies for effective use of trained manpower, natural and physical resources for sustainable development
- Promotion of international cooperation in S&T education and research in achieving national development objectives
- Formation of technical advisory committees in all relevant ministries (including MOSICT) for dealing with S&T matters with relevant scientists and technologists to assist them
- Dissemination of information on sectoral policies, policy instruments, natural resources, production facilities, research facilities, development of S&T manpower and relevant institutions to all concerned through print and electronic media for undertaking S&T based development programme
- Development of concrete guidelines for proper utilization of the findings- Policy formulae, Strategies, Methods, Committees, Secretariat, Financial rules and regulations, Implementation procedures, Monitoring and Evaluation, Refreshing etc.
- Creation of database of R&D organization and professionals with provisions of regular updating

It should be noted that the ministry of Science and Technology has been proactive in setting up a centrally institutionalized mechanism under the title, National Council on Science and Technology (NCST) and an Executive Committee of NCST called ECNCST. Thus, the government already has an institutional mechanism in place. The urgent task is to ensure

that it is functioning adequately with sufficient funding and competent professionals in way that is transparent and accountable to the public.

Given the institutional structure in place, Bangladesh in its attempt to create a BNIS by 2041, can try to strategically shift the bulk of R&D activities away from universities and specialized research centres and towards industrial enterprises. As we can see from the most visible change in China's Augmented NIS is probably this progressive shift of the bulk of R&D activities away from universities and specialized research centres and towards industrial enterprises is a cornerstone for the transition to a high middle-income country and eventually to a high-income country. However, just as in China, our universities must participate in many of the most ambitious basic research endeavours, and often play a crucial role in their implementation. The government needs to set up more specialized S&T universities in different regions and invite experts within the country and outside to develop curricula that train students in R&D work for up and coming sub-sectors of ICT industries in particular.

In order to encourage the different actors in the R&D scene in and out of the academia, the government needs to earmark an increasing volume of funds to elite universities, mainly through the Ministry of Education (MOE). Elite universities should be expected to lead in national R&D programs and projects, facilitate technology diffusion and pullovers, promote spin-off companies, incubation centres, and open laboratories for R&D sharing, to bridge-in foreign technology and partners. But this must occur in partnership with the most advanced companies in technologically sophisticated fields, particularly in advanced ICT sub-sectors. This should be part of all 5-year plans with as much concrete details regarding objectives, targets and the means to achieve them within a fixed time horizon.

A short run action program can be launched within the next 3 years to promote specifically university-industry links for R&D. A policy action group with scientists, engineers, economists and entrepreneurs can be set up for this purpose. The goal of this group should be to set up state technology transfer centres in four to six leading universities, with adequate funding and the most competent leadership that can be recruited nationally and internationally. It is vital strategically, to promote the commercialization of viable technological achievements. Bangladesh should also undertake tax write offs and incentivized subsidies policies for university-based start-up companies. As in China, these start-ups should be seen as crucial channels through which universities can contribute to national and local economies. For a country like Bangladesh emphasis on distributed computing such as the cloud computing mentioned before in the context of A-1 concept developed in Bangladesh will be strategically rewarding.

As in China and elsewhere in the Asia-Pacific, in Bangladesh too, R&D expenditure can be linked to performance so that such expenditure leads to a positive and significant correlation with firm productivity. The contribution of government R&D to firm productivity can work mainly through an indirect channel, via the promotion of firms' own R&D, which will be a more effective policy tool than direct R&D grants. However, careful and competent monitoring and a transparent system of rewards and punishment must be developed as in East Asia, for these to work.

Policy makers also need to keep in mind some other key sources of production improvement and innovation growth such as each firm's absorptive capacity, the production network, openness, and managers' education. Market-oriented, competition-enhancing innovation system reforms can indeed improve the effectiveness of the incentive structure and foster the right set of S&T linkage activities, in the ICT sector specifically.

The influence of the two main stakeholders (government and end-users) can lead to a creative synergy when the incentives are transparent and impartially imposed by the government. Hence specific areas of good governance are relevant to S&T and R&D intensive firms. Business laws and corporate governance should be transparent and enforced. While facilitating business and reducing bottlenecks, the state should not be captured by special interests. A responsive and responsible bureaucracy is part of this picture. Therefore, administrative reforms in the government and within the larger private sector firms need to be at the top of good governance priority list.

As new product output is an important indicator of R&D intensive firm performance, high technology firms in Bangladesh should be incentivized to operate at the frontier of new product development ---at first slowly but in an accelerated pace from the 2030s. There are sometimes static inefficiencies in R&D and these should be minimized as soon as possible without losing much time; but the main focus should be on dynamic advantages in terms of innovative capacity and technological progress, with major spillovers benefiting the national economy as a whole.

A dualistic pattern in Bangladesh's technological development, with the export-oriented segments of the economy being relatively isolated from those producing mainly for the domestic market can also develop. While some of these are inevitable and beneficial with proper reinvestment and distribution of benefits, care must be taken not to become exclusively export dependence for the innovative sectors to be innovative. This is where ANIS in Bangladesh can come into its own in the 2040s.The weight of constraints such as an insufficiently developed institutional framework, relatively low overall educational attainments, the lack of a large pool of world-class talents, the embryonic stage of indigenous innovation capacity, and insufficiently developed linkages between R&D and industrial enterprises can and should be overcome to a large extent by the 2040s and 2050s.

An Institutional Recommendation: Setting up an ICT Monitoring Board (ICTMB) with Regulatory Power and State of the Art International Advisors

It is clear from both the empirical evidence and the institutional analysis above that the governmental bodies set up to administer the R&D can pursue the goal of building a BANIS with emphasis on ICT more vigorously in the coming years. But given the ambitious goals for Bangladesh 2041, there is no time to lose. A well-funded PPP institutional mechanism will also need competent technical and managerial talent for functioning properly. A better mechanism for monitoring and timely action and agenda formulation is needed. Instead of relying on multiple, overlapping and sometimes dysfunctional bureaucratic formations, it may be possible to set up a relatively autonomous functional body of experts by careful selection from within the government and from the civil society.

For the ICT sector, this could be an ICT Monitoring Board (ICTMB) of experts by drawing upon both local and international pool of competent scientists and managers. The ICTMB should have the authority to get information from all the divisions and districts. It should also have the authority to design a flexible and pragmatic ICT inputs pricing policy where such a policy is needed. Through its professional cadres it could monitor more effectively the supply and demand conditions in a rapidly changing market by developing a Geographically Decentralized ICT Monitoring System (GDICTMB). The GDICTMB will also keep track of import levels and future import needs.

The GDICTMB should have the authority to take steps to promote both market competition and good corporate governance (Khan, 1999, 2004). It should also have the authority to set up laboratories and mechanisms for detecting the quality of ICT products manufactured and services delivered, and supply public prosecutors with the needed information so that the guilty parties who abuse government support can be brought to justice swiftly. Needless to say, there are many organizational and other details that will need to be worked out. But such institutional reforms if carried out competently, will enhance the prospect for stabilizing the ICT markets and lead to further innovation. If and when institutional reforms in ICT sector take hold, producing desirable results, then such boards could be set up for other R&D intensive markets. Further coordination problems will doubtless emerge and have to be tackled. Indeed, the capacity to coordinate effectively is the hallmark of good governance.

Finally, without being exhaustive, some operationally relevant areas of future research should also be mentioned before giving estimates of investment requirements for the ICT sector in the following ultimate section.

First, is an integrated survey of ICT needs and ICT resources and the shortfalls in the latter. This in itself could be a PPP project.

Second, an ICT oriented SAM should be built for both creating a consistent economy wide technical data base and for future modeling for counterfactual policy experiments. Relevant CGE models by technically competent teams of researchers will be a necessary tool for rigorous policy analysis. Such a multistep project---creation of SAM, formulation of model and implementation, training Bangladeshi technical personnel and carrying out policy experiments can be done in 2 to 3 years with provisions for updating every 3 years or so. Though costly in terms of time and money, the payoff will be substantial with future self-sufficiency and learning mechanisms and facilities for Bangladeshi professionals in Bangladesh as part of the value added.

Third, the other alternative is to have modern time-series based models such as VECM that are informed by the advances in time-series analysis of non-stationarities and spurious regression problems among other pertinent econometric issues. These models should allow us to identify clearly the causal links if any, between variables in the long run. Since we are looking up to and beyond 2041, this is an important consideration.

It should be emphasized that the two technical approaches are not mutually exclusive. Actually, my recommendation is to build and make operational both types of models if time and resources allow.

Fourth, some intellectual resources can be devoted to political and social economic analyses. An economic system has complex connections with political and social systems. A complex system of political and social economic analyses will uncover many hitherto unseen linkages revealing both future problems and possibilities for progress.

Fifth, with the help of the above data collection, data integration and rigorous modeling focused studies regarding ICT sector industrial policies including the role of credit and subsidies will need to be carried out.

As mentioned before, these five items do not exhaust the list of future policy-relevant research tasks, but these can provide the knowledge base on which a quantitative target oriented policy platform can be built. There are many challenges for Bangladesh in its bid to meet the six goals identified clearly by the MoP. With proper planning tools, PPP institutions, R&D policies and institutions like the proposed ICTMB the ICT sector can be developed by 2041 to meet these challenges with a high degree of probability of success. The last section that follows presents some preliminary investment requirements estimates projections until 2041 for the ICT sector.

E. Investment Requirements for the ICT Sector Export and Employment Targets and the Future Technological Developments for Bangladesh

With proper incentives, as discussed before, much of the investment in ICT sector, esp. from 2030s onwards will come from the private sector. The projected reforms in regulatory and incentive policies along with improved prudential regulations will result in an expansion of private domestic and foreign investment. However, as discussed above, complementary public investments in infrastructure including that in the ICT sector will be a crucial for an effective expansion of private investment leading to an increase in ICT productivity and TFP .

Therefore, in the ICT sector both public and private investment will need to go up as a share of GDP. Since the ICT sector is a mix of manufacturing and services, it is difficult to estimate the exact ICOR and align the investment requirements with the macroeconomic projections of MoP. However, since the sectoral output and exports now are both small, the margin of error even without a detailed input-output and capital coefficients matrix is likely to be small. Furthermore, it is crucial to increase both public and private investments quickly so that an enduring foundation for an innovation sub-system in the ICT sector can be created by 2031. Keeping all these in mind, I use estimates for the ICT sector investments that are roughly in line with the overall ICOR, TFP and other indicative macroeconomic projections of MoP.

Given the growth targets, the total investment target for ICT sector should be at least 3 percent of GDP in FY2031 and can go up by a further 3 per cent by 2041. Public investment should rise to be 25 percent of total ICT investment in FY2021 and remain so throughout the two following decades with upward adjustments if necessary until FY2041, whereas private investment should cover the rest. Most of the public investment will be in infrastructure and facilities discussed before. Private investment will focus on direct productive activities in manufacturing and providing direct services with ICT. The complementarity of the public and private sector investments will result in a crowding in rather than a crowding out.

Table 21: Investment Requirements of the ICT Sector (taka billion 2017 prices), FY 2031 and 2041

	Base FY 2017	FY2031	FY2041
Public		519.56	2900
Private		1558.69	8698
Total	156.64 to 234.96	2078.25	11598
Public (% of GDP)		.75	.75
Private (% of GDP)		2.25	2.25
Total (% of GDP)	.8 to 1.2	3.0	6.0

Source: Author's calculations consistent with GED Macroeconomic Projections and Ahmed (2017)

In the above table, for Base FY, the ICT sector size is known to be less than .3% of GDP but we do not seem to have a precise estimate. Hence, I give the range estimate from .2% to .3% of GDP and I assume for simplicity an average ICOR of 4 which should be close to the actual but unknown value. I then make the calculations consistent with Ahmed (2017). The distribution between public and private investment in 2017 is unknown---at least to this author--- but is probably heavily private for manufacturing with slightly more public investment in services and infrastructure.

For exports, the best 2017 estimate is 611 million US dollars. Given the targets discussed earlier consistent with the perspective plan, by 2031 this figure in constant 2017 dollars will need to be 2320.27 million. After achieving UMIC status in 2031, the exports will accelerate and the target for 2041 when Bangladesh achieves HIC status, the figure can reach 9386.79 million in constant 2017 dollars.

For employment, the 2015-16 figure from BBS is only .2 million. This can be raised to 1.63 million workers by 2031 and eventually to 6.59 million workers by 2041. These are direct sectoral employment figures. More jobs will be created through forward and backward intersectoral linkages and income effects.

Preliminary and approximations as these estimates are, nevertheless the investment requirements here should be treated as the minimum necessary from 2017 to 2041 in order to reach the overall plan targets within this period.

Since ICT globally is a dynamic sector, what does Bangladesh need to do to follow the trajectories of likely future developments in ICT and realize the above targets consistent with the visions such as A2i and the perspective plan ? It is impossible to be definitive or exhaustive in the field of innovation in ICT; but to the best of our technical knowledge---without being exhaustive, the following areas will be important to catch up with in the next ten years:

1. The Internet of Things;
2. Cloud Orchestration;
3. Distributed Storage;
4. Alternatives to Java;
5. Big Data Processing;
6. Deep Learning in AI(Artificial Intelligence) .

All these areas involve learning from frontier technological practices of today and tomorrow. While consistent with A2i, we should be improving access to internet and the various areas such as e-governance, e-health, e-education etc , we need to develop the human resources and institutions of learning for this. In the next 5 years, internet of things(IoT) will become widespread. The growing adoption of intelligent agents like Amazon Alexa or Google Assistant in more and more devices will lead to new ways of interacting for both businesses and government. There will be edge IoT devices that can act locally based on data they generate, as well as utilize the cloud computing networks for security, scalability, configuration, deployment, and management. IoT will evolve rapidly to cut data ingestion costs and reduce network latency.

We need to move now in order not to be left behind the trends in IoT. Likewise, adopting cloud orchestration and distributed storage will need to be top priorities for the next 10 years. Training our software developers in adopting big data programs such as Apache Hadoop and its future developments should also be a top priority.

From 2031 onwards, in addition to the above, the focus should be even more on Big Data. Bangladesh will need to develop technical capabilities in utilizing Deep Learning algorithms and all other areas of AI. By that time, the world will most likely move towards advanced nanotechnology, robotics and ICT-linked AI. We need to have top quality learning institutions to keep pace. Utilizing the skills of highly trained expatriates in specific technical fields should be high on our agenda by 2031.

By 2041, if the above strategy is followed, we should be near the frontiers in AI and ICT . However as Khan(2017b) and others have pointed out, by 2050 there will most likely be a "superconvergence" of ICT, Biotechnology and Nanotechnology with enormous increase in total factor productivity. Bangladesh must not be left behind in this process. The time is now to begin thinking about this prospect in connection with ICT . It is reccommended that an experts group comprised of a majority of scientists in this field in Bangladesh together with a few expatriates of international standing in their respective research communities should be set up to study the prospects of "superconvergence" of technologies in Bangladesh for 2050 and recommend specific policies for all three sectors. For the ICT, the strategy recommended here should take Bangladesh a great distance towards this. However, it will need to be coordinated with the other two sectoral policies.

A last important point is to be alert to the prospects of developing markets in Asia and beyond for ICT exports through strategic alliances with regional partners. This could be pursued in a synergistic manner by participating in a regional innovation system.

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Part-3

Health and Population Management for Sustained Human Development

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Health and Population Management for Sustained Human Development

1.0 Background

Quality health care and effective population management are very essential for ensuring sustained human development because of their huge positive impact on the overall wellbeing of human in general and on their labour productivity and rapid economic growth in particular. For this reason, the World Health Organization recognized human health as one of the fundamental human rights and defined 'health as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (WHO, 1946). Consistently in 1992, the United Nations endures that 'human beings are at the center of concerns for sustainable development and they are entitled to a healthy and productive life in harmony with nature' (UN 1992). Both the Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) uphold the importance of universal health care for sustained health and human development. Good human health plays pivotal roles in the attainment of prosperous and happy livelihood by affecting human capitals such as educational attainment and income-generating capacity.

The Government of Bangladesh has placed utmost focus to integrate population management issues with healthcare system to ensure healthcare services for all. Initiatives have been taken to ensure availability, accessibility, affordability, and acceptability (4-As) of the health care system in Bangladesh. Consequently, Bangladesh has made remarkable progress in managing healthcare needs of its large population despite several resource constraints. However, there are several areas where greater attention is needed to ensure sustained human development in Bangladesh such as further improvement of maternal and child health, ensuring nutrition of mother and children, addressing youth and adolescent needs, and managing aging population. In this context, it is worthwhile to develop a long-term plan for ensuring quality health care and effective management of population along with identifying their challenges and generating implementation strategies.

2.0 Objectives of the Study

Bangladesh has made outstanding progress in socioeconomic development particularly in the last decade. For example, Bangladesh's gross domestic product (GDP) growth reached 7.24 percent in the fiscal year of 2016-2017 beating all the previous records in the history of the country's economy. Meanwhile per capita income has increased to $1602 (BBS, 2017). Thus Bangladesh will graduate out of LDC status by 2021, aspires to reach upper middle income country status by 2030, and expects to become a developed economy in the 2040s decade, through a process of rapid inclusive growth leading to elimination of poverty. In this context, the broader objective of this study is to outline future approach to health and population management for sustained human development. More specifically, this study aims to focus on the following sectors to describe currents status, identify challenges, set targets, and generate strategies for the second Perspective Plan of Bangladesh.

- Health and family welfare: Maternal, child and adolescent health
- Essential Health Services Delivery/ESP

- Health care delivery system
- Issues in nutrition
- Gender issues in health and nutrition
- Human resources for health
- Health sector management and administration
- Planning for population management
- Climate change, displacement and health

3.0 Methodology

In this study, mostly secondary data were used to describe current situation of health status and population management, and to identify challenges and to develop strategies for achieving the targets in areas of health and population management for sustained human development. Secondary data were collected from scholarly journals, census reports, surveys reports, and annual reports of the Government and international organizations. Updated projection of Bangladesh population was provided for long-term planning in areas of health and human resource development. Greater emphasis was given on critical review of policy documents of the Government of Bangladesh such as 7th Five Year Plan, Vision 2021, Health Policy, Education Policy, Population Policy, Climate Change Strategy Action Plan and MDGs Progress Reports. In addition, consultations were carried out with population experts, policy makers and other stakeholders who had long experience of working in this sector to generate appropriate strategies for health and population management.

4.0 Role of Health and Population Management in Sustained Human Development

Health status has wide range of effects on human development and economic growth. Ensuring better health begins with ensuring nutrition for children in their early stage of life due to its greater impact on productivity during working ages and well-being in later life. For example, Hoddinott and colleagues (2013) revealed that prevention of malnutrition in early childhood led to 20.0 percent higher hourly earnings and 48 percent higher wage rates, and 33.0% more likely to escape poverty. In connection with this Horton and Steckel (2011) reported that Asia and Africa lose 11.0 percent of GNP every year owing to poor nutrition. Thus, it is well established in the literature that quality health care leads to human development through which sustained human development can be ensured. There are four prerequisite of quality health care: availability, accessibility, affordability and acceptability (4-As).

Population management is an important dimension of ensuring sustained human development. It is the process of managing population through ensuring their basic human rights in one hand and ensuring quality services for their overall wellbeing on the other. In the context of Bangladesh, effective population management indicates control of population growth considering land and resources, and providing efficient services in areas of education, health, food and nutrition, labour market, income distribution and human resource development. Thus ensuring effective management of population will have substantial implications on establishing peace and security, reducing crime and conflict, good governance and sustainable development.

5.0 Review of Policy Documents on Health and Population Management

The Government of Bangladesh has given topmost priority to ensure complete physical, social and mental well being of people recognizing that every citizen has the right to adequate health care. Hence, the vision of the *2011 National Health Policy* of Bangladesh was to ensure equality health care services for all while emphasizing more on marginal and vulnerable populations. The major objectives of the National Health Policy of Bangladesh were to make necessary basic medical utilities reach people of all strata and develop the health and nutrition status; to ensure optimum quality, acceptance and availability of primary health care, and governmental medical services at the Upazila and Union levels; to undertake programmes for reducing the rates of child and maternal mortality; and to explore ways to make the family planning programme more acceptable, easily available and effective among the extremely poor and low-income communities.

Health and population management also received utmost priority in the *2012 Population Policy* of Bangladesh. The Population Policy of Bangladesh sets the vision to develop a healthier, happier, and wealthier Bangladesh through planned development and control of national population. Thus the objectives of the population policy were to reduce the total fertility rate (TFR) to 2.1 (replacement level), ensure the availability of family planning methods to eligible couples by providing easy access to reproductive health services including family planning methods; reduce maternal and infant mortality, and strengthen activities to eliminate gender discrimination in family planning and maternal and child health care programs; and undertake plans for developing the population into human resources.

Consistently, the goal of the *National Nutrition Policy 2015* of Bangladesh was to improve the status of the people especially disadvantaged groups including mothers, adolescent girls, and children to prevent and control malnutrition, and to accelerate national development through raising standard of living. To achieve this goal, five objectives were set in the National Nutrition Policy of Bangladesh: (1) improve the nutritional status of all citizens including children, adolescent girls, pregnant women and lactating mothers, (2) ensure availability of adequate, diversified, and quality safe food and promote healthy feeding practices, (3) strengthen nutrition specific interventions, (4) strengthen nutrition sensitive interventions, and (5) strengthen multisectoral programmes and increase coordination among sectors to improve nutrition.

Considering the importance of health, population and nutrition, the *Seventh Five Year Plan* (2016-2020) of Bangladesh was designed to ensure access and utilization of health population and nutrition (HNP) services for every citizen of the country, with particular emphasis on elderly, women, children, poor, disadvantaged and those living in difficult areas; to reduce total fertility rate; to ensure adolescent and reproductive health care; to improve nutritional status of children and women; to meet challenges of non-communicable diseases, health hazards due to climate change and emergency response to catastrophe; provide in-service training and better management of human resources; and to improve the quality of hospitals and maternity services.

In the first *Perspective Plan of Bangladesh (2010-2021),* the Government of Bangladesh focused on three broader areas to promote human development: (i) ensuring education

for all; (ii) promoting and sustaining health and nutrition; and (iii) planning population (both containment and management) and converting them into human resources. In the light of the Government's Vision 2021, the country aims to remove deficiency in food and ensure nutritional requirement for 80% of the population, ensure a minimum daily intake of 2,122 kilo calories of food, eliminate contagious diseases and ensure primary health care and sanitation, increase average life expectancy to 70 years, reduce maternal and child mortality, and ensure significant improvement in the quality of education.

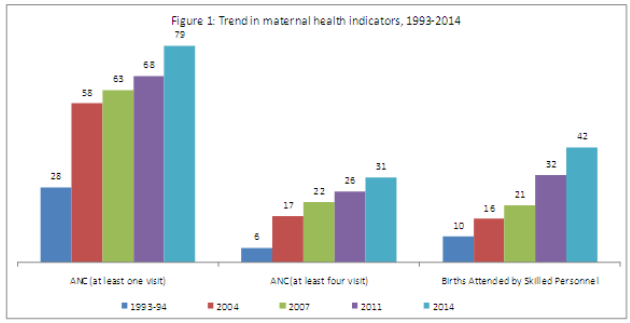
Bangladesh has been following a Sector-Wide Approach (SWAp) in the HNP sector since 1998. The first SWAp – the Health and Population Sector Programme (HPSP) - was implemented during 1998-2003. It was followed by a second SWAp, the Health, Nutrition and Population Sector Programme (HNPSP), that began in 2003 and concluded in June 2011. The third SWAp titled the *Health, Population and Nutrition Sector Development Programme (HPNSDP) (2011-2016),* rightly sets out several drivers for achieving the goal of improved health status for the poor, women and marginalized. These include scaling up services for poverty eradication, reducing child mortality, improving maternal health, and combating malaria, HIV and other diseases; addressing population growth through fully integrated family planning services, and mainstreaming nutrition in all service delivery points through the channels of DGHS and DGFP; expanding access to health services for priority communicable and non-communicable diseases; revitalizing the Community Clinic based services as part of functional Upazila Health System (UHS); and improving health equity for poor and geographically marginalized population.

The subsequent sections describe the extent to which these goals and targets have been achieved so far, identify the challenges, set targets and generate strategies for achieving the targets of the second perspective plan of Bangladesh (2021-2041).

6.0 Health and Family Welfare: The Broad Picture

6.1 Maternal healthcare: trends and patterns

Bangladesh has made substantial progress over the last decade in improving maternal and child health status. For example, the percentage of women having ANC care visit increased from 28% in 1993-94 to 79% in 2014. The proportion of women receiving at least four ANC visit also increased from merely 6.0% in 1993-94 to 31% in 2014 (Figure 1). However, it is important to note that only 31% women had received four or more than four ANC visits during their pregnancy while the target of HPNSDP was to achieve it for 50% women by 2016 (MOHFW 2011). The highest proportion of women received ANC care from private sector providers (52%) followed by public sector providers (36%), home-based provider (16%) and NGO sector providers (11%) (NIPORT, Mitra and Associates, and ICF International, 2016).



Source: Bangladesh Demographic and Health Surveys, 2004-2014

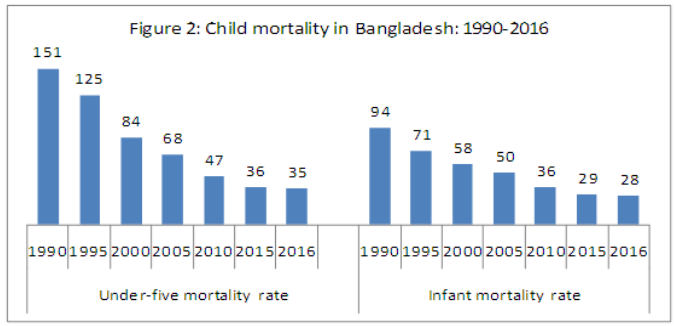
Care during delivery is another important indicator of maternal health. In 2014, around 37% births were delivered at health facility which is almost three times higher than that of 2004. Overall, 22% of the facility-based delivery were took place in a private facility followed by 13% in a public facility and 2% in an NGO facility. Among facility-based delivery, the prevalence of C-section delivery has increased from 4% in 2004 to 23% in 2014 mainly among urban women in the highest wealth quintile with secondary or higher level education (NIPORT, Mitra and Associates, and ICF International, 2016). The proportion of births attended by skilled personnel has increased from 10% in 1993-94 to 42% in 2014 (Figure 1).

Utilization of postnatal care (PNC) is vital for safe motherhood and neonatal health. In 2014, 39% of the mothers and 36% of the neonates had postnatal checkup within 42 days of delivery indicating that Bangladesh has already achieved the target of HPNSDP 35% by 2016. In addition, the proportion of mothers who received PNC care within two days of delivery has increased from 16% in 2004 to 36.0% in 2014. The proportion of newborn infants receiving checkup from medically trained provider within two days of delivery has also increased from 13.0% in 2004 to 32.0% in 2014 (NIPORT, Mitra and Associates, and ICF International, 2016). Maternal mortality ratio in Bangladesh has declined from 574 (per 100,000 live births) in 1990 to 181 in 2015, and 178 in 2016 (BBS, 2017). The MDG target of MMR was 143 (per 100,000 live births) by 2015 indicating that Bangladesh is lagging behind in this case.

6.2 Status of Child Health

Trends and patterns of infant and under-five mortality

Bangladesh has made significant progress in reducing child mortality and coverage of childhood illness treatment. Under-five mortality rate of children (per 1000 live births) has declined from 151 in 1990 to 35 in 2016. The MDG target for under-five mortality was 48 by 2015. Infant mortality rate (below one year) per 1000 live births has also decline from 94 in 1990 to 28 in 2016 (Figure 2). In the case of infant mortality, MDG target was 31 per 1000 live births by 2015. Thus Bangladesh has successfully achieved the MDG targets of under-five mortality and infant mortality. In addition, neo-natal mortality rate (deaths under 4 weeks of life) has declined from 21 (per 1000 live births) in 2012 to 19 in 2016; and post-neonatal mortality rate (deaths between 4 weeks and under one year of life) has declined from 12 (per 1000 live births) in 2012 to 9 in 2016.



Source: BBS, 2017

The rate of vaccination coverage has increased from 68% in 2004 to 78% between in 2014. The coverage of vitamin A supplementation for children age 6-59 months has increased from 60% in 2011 to 62% in 2014. The prevalence of diarrhea was around 6% among children age 6-23 months in 2014. The coverage of treatment for diarrhea with ORT/ORS is around 84% in 2014. However, diarrhea treatment with ORT and zinc has increased from 20% to 38% between 2011 and 2014. The prevalence of Acute Respiratory Infection (ARI) among children under age five was 5% in 2014. The prevalence of receiving treatment for children with ARI from a medically trained provider has increased slightly, from 35% to 42% from 2011 to 2014.

6.3 Status of adolescent health

There were 30.7 million adolescents in Bangladesh in 2011 Census. The total number of adolescents will increase to 33.7 million by 2021, and thereafter, will decline to 30.2 million by 2031 and 28.9 million by 2041. Female adolescents comprised of about half of the total adolescent population (BBS, 2015). Adolescents in Bangladesh face a number of issues, including high rates of early marriage, high fertility rates, limited negotiation skills, and insufficient awareness of and information about reproductive health (Ainul et al. 2017; Barkat and Majid, 2003). In 2014, the median age of marriage for women was 15.5 years compared to 26 years for men. More importantly, the rate of child marriage in Bangladesh was 59% in 2014---one of the highest in the world (NIPORT, Mitra and Associates, and ICF International 2016). Thus adolescent girls enter married life with limited ability to exercise their reproductive rights, including decisions related to family planning, childbearing and maternal and child health services, and usually begin childbearing soon after marriage (Ainul et al. 2017; Khan, Townsend, and D'Costa, 2002).

6.4 Status of Morbidity

The top ten prevalence of morbidity in Bangladesh (per 1000 population) include fever (52.5), arthritis (14), peptic-ulcer (13.4), high blood pressure (12.4), dysentery (8.3), diabetes (7.7), diarrhea (6.6), acute respiratory infection (4.9), skin disease (4.3) and conjunctivitis (4.2). However, the prevalence of co-morbidity is 52 per 1000 population and 6 in 10 people with co-morbidity lives in urban areas (BBS 2013). Among the morbid people, 72% received treatment. Among morbid people, 70% depends on private health facilities, followed by government health facilities and NGO health facilities (BBS, 2013).

6.5 Utilization of healthcare services

The utilization of healthcare services is determined by a wide range of factors including demographic (age, sex and residence), socioeconomic (education and wealth) and cultural (religion and ethnic) factors. There are clear evidences in the context of Bangladesh that utilization of maternal and child healthcare services vary by age, gender, residence, education, economic status, place of residence and region. Utilization of healthcare services and level of nutrition is further affected by natural disasters such as floods and cyclones.

Recent data from the DGHS (2016) showed that health care seeking from the public facilities has been continuing to rise over the past few years, indicating improvements in the management of patients and their increasing satisfaction. In 2015, a total of 178,697,958 patient-visits took place at the outpatient departments (OPD) of 16,167 public health facilities. Most patient-attendance (89%) occurred in the primary-level facilities, and the community clinics alone handled more than 100 million visits. Only 5% of the OPD visits took place at the tertiary-level-facilities. About 60.0% of the attendees at the outpatient departments of all facilities were female. At the lower-level facilities, there is predominance of female attendees but, as the level goes up, the female predominance reduces in a linear fashion. At the medical college hospitals, the male-female ratio is almost identical (49% and 51%). However, in the super specialized institute hospitals, the scenario is reversed, having a male predominance. This pattern of utilization of health care facilities clearly revealed that socioeconomic factors play an important role in determining the utilization of health care services. More specifically, women, lower educated people, poor people, and marginal and vulnerable people are less likely to utilize health care services from higher level institute-hospitals (MIS-DGHS, 2016).

7.0 Essential Health Services Delivery/ESP

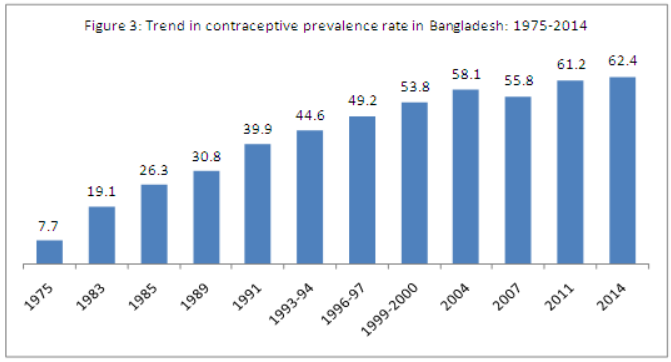
7.1 Importance and Composition of ESP/ESD

The essential health package (ESP) is the foundation program of Bangladesh to ensure access to the universal health coverage as well as the cornerstone of the primary health care (PHC) strategy. The composition of ESP covers five core, one complementary and three support services. The five core services of ESP are: maternal, neonatal, child and adolescent health care; family planning; nutrition; communicable and non-communicable diseases. The issue of non-communicable diseases is included in the newest package of ESP in Bangladesh, acknowledging the demographic and epidemiological transition. The essential service package also deal with the management of other common conditions such as skin, geriatric and emergency care. Social and behavioral change communication activities are integrated in each of the services. The three non-clinical support services of ESP include laboratory, radiology and other image tools and pharmacy.

The ESP services are provided mainly from nine deliver sites, from community to district hospital including urban facilities, which are: domiciliary; satellite clinics and outreach; community clinics (CC); union-level facilities (combination of union health and family welfare centers (UHFWC); union health sub-centers (USC); Upazila health complexes (UHC); district hospitals (DH), maternal and child welfare center (MCWC); comprehensive reproductive health care center (CRHCC) and primary health care center (PHCC). In addition, higher level and specialized public hospitals, as well as NGO facilities are providing some of the ESP components.

7.2 Current status of Essential Health Services

Concerning family planning, Bangladesh has made remarkable progress in increasing contraceptive prevalence rate (CPR) from only 7.7 percent in 1975 to 62.4 percent in 2014 (Figure 3). However, in recent years the increase in CPR has been slower than expected. In 2014, the use of any modern method was 54.1 percent. In 2014, CPR in rural area was lower than that of urban area (61.1% and 65.9% respectively). Rajshahi and Rangpur had higher CPRs (about 70%) and Sylhet and Chittagong had lower CPRs compared to other divisions (47.8% and 55.0% respectively). Unmet need for family planning (i.e., those who want to use contraceptive but cannot use for any reason) was 12.0% in 2014. Contraception discontinuation rate was 48% in 1993-94 which has declined to 30.0% in 2014 (NIPORT, Mitra and Associates, and ICF International, 2016).



Source: NIPORT, Mitra and Associates, and ICF International, 2016

In 2015, vaccination coverage among less than 12 months old children was 82.5%. Tetanus toxoid coverage among women of childbearing age was 96.0% for TT1, 94.0% for TT2, 83.6% for TT3, 66.7% for TT4, 46.1% for TT5. Among communicable diseases, there were 3.0 positive cases of malaria per 1000 population in endemic areas, and death from malaria per 10,000 populations in 2015 in endemic areas was 0.0068. Incidence rate of Tuberculosis (all forms) per 100,000 population was 227 (in 2014, NTP 2016). In 2015, a total of 2,560,598 diarrhea cases and 24 related deaths were reported showing 0.001% of death rate from diarrhea in Bangladesh. Chikungunya fever is emerging alarmingly in the country in recent years. It is estimated that less than 0.1% of the total population in Bangladesh is infected by HIV. A large number of populations are also in the risk of non-communicable diseases such as cardiovascular diseases, stroke, cancer, diabetes, COPD, and arsenicosis.

8.0 Healthcare facilities and health delivery system

8.1 Healthcare Delivery System

Bangladesh has an extensive network of public, private and NGO facilities for providing primary healthcare services. There are 16,968 public health facilities at the Upazila level and below of which 3,134 primary healthcare facilities, including Upazila health complex, hospital outside health complexes, and union outpatient centers, functions from Upazila

to union levels and 13,336 community clinics at ward level (MIS-DGHS 2016). These public health outlets provide free medical services to people at the community level. The community clinics (ideally, one community clinic for every 6000 population) are critically important to bring health facilities closer the doorstep of the population. In the PHC system, the CC is the lowest tier, is a unique example of public-private partnership in health the system, to make health services available for rural and urban hard to reach people (MOHFW, 2016).

At district level, there are 53 district hospitals, 9 general hospitals, 3 leprosy hospitals, 3 communicable disease hospitals, 13 chest disease/TB hospitals, 43 chest/TB clinics and 23 school health clinics. Additionally, 60 MCWCs operates at district levels. At the national level, there are 17 medical college hospitals and eight super-specialized teaching hospitals (MIS-DGHS, 2012). On the other hand, there are 2983 registered private hospitals and clinics in the country and only a few of these have free beds for the poor and disadvantaged (MIS-DGHS, 2013). Besides the registered ones, there are a substantial number of clinics and hospitals which are not registered with the regulatory bodies, and do not fulfill the minimum standards of operation (Ahmed et al., 2015).

8.2 Water, Sanitation and Hygiene Situation in Bangladesh

Improved water, sanitation and hygienic practices can significantly reduce the burden of different diseases. Regarding water, 98% of the Bangladeshi population has access to improved water supply- with the vast majority (91%) through other than non-piped sources of improved water (MICS, 2015). Regarding sanitation, 97% populations have access to the latrine facilities (irrespective of their quality) and only 3% population practiced open defecation (MICS 2015).

Concerning hygiene, post-defection hand wash facilities near toilet are available for two-third of the households and 40% of the households have post-defection hand wash facilities with water and soap Menstrual hygiene practices remained a challenge, especially in schools. Old cloth is the main menstruation management material for 82-86% menstruating girls and women, while only 12% of school girls, 23% of girls at home and 27% of women washes their menstruation cloth properly. Additionally, 40% of schools girls reported that they miss school during menstruation for a median of 3 days a month (ICDDR'B et al. 2014).

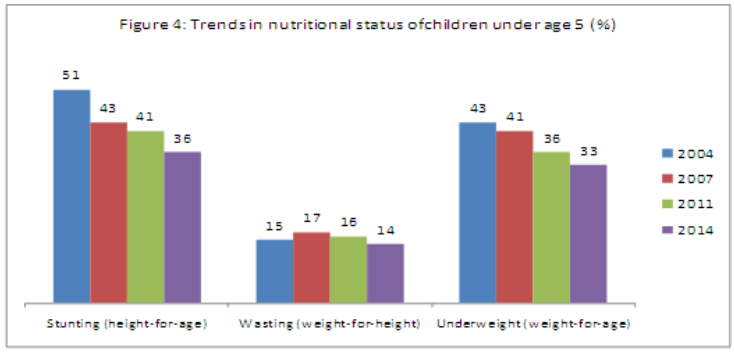
9.0 Issues in Nutrition

Intake of adequate nutrition among children prevents lifelong risk of lowering productivity and risk of child mortality. Ensuring balanced nutrition among mothers and children eventually promotes sustained human development through increased productivity and life-long reduced risk of poor health status.

9.1 Nutritional status of children

Reduction of child malnutrition is an important indicator in achieving the targets of sustainable development goals. The prevalence of stunting (height-for-age) among children under age 5 has declined substantially in Bangladesh from 51% in 2004 to 36% in 2014. Similarly, the prevalence of underweight (weight-for-age) among children under age 5 has

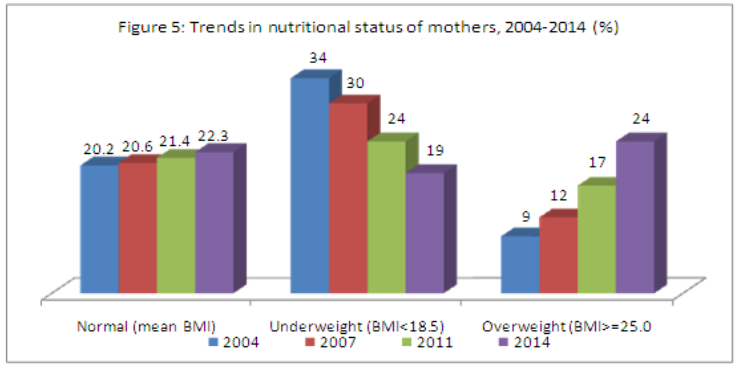
declined considerably from 43.0 percent in 2004 to 33.0 percent in 2014 (Figure 4). Thus Bangladesh has achieved the MDG target of 33.0 percent prevalence rate of underweight by 2015. The findings from the 2012-2013 Multiple Indicator Cluster Survey also confirmed achieving the target of underweight prevalence rate where the underweight rate for under-five years of children was found to be 31.9. However, declining trend in the prevalence of wasting among children under age 5 has been slower than expected (15% in 2004 to 14% in 2014).



Source: NIPORT, Mitra and Associates, and ICF International, 2016.

9.2 Nutritional Status of mothers

There are multiple effects of underweight (low BMI) among mothers such as suffering more from illness, having impaired work capacity, having lower income and suboptimal childcare. In Bangladesh, the prevalence of underweight among mothers (BMI<18.5) have declined considerably from 34.0 percent in 2004 to 19.0 percent in 2014. However, during this period the prevalence of overweight has increased among mothers from 9.0 percent in 2004 to 24.0 percent in 2014. Overall, about one-fourth mothers had normal BMI during the period of 2004 to 2014 (Figure 5). Nevertheless, the rate of Vitamin A supplement among mothers had increased more than three times from 2004 to 2014 (15.0% to 46.0%).



Source: NIPORT, Mitra and Associates, and ICF International, 2016.

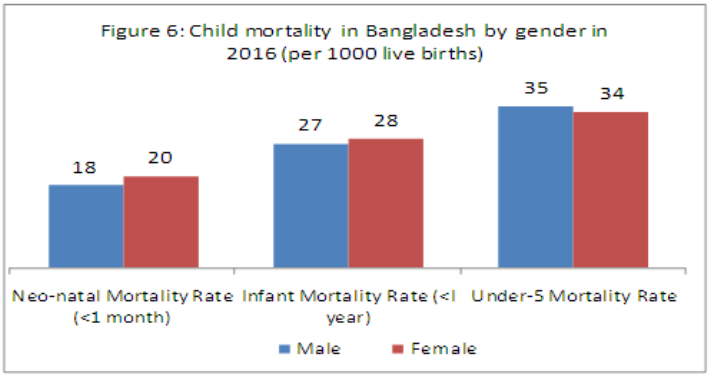
9.3 Prevalence of micronutrient deficiencies by age

Micro-nutrients are essential for the proper functioning of every system in the body and are vital for good health. Findings from the National Micronutrient Survey 2011-2012 showed that one-fifth of the children in preschool and school age had Vitamin A deficiency, and 5.4% non-pregnant non-lactating mothers (NPNL) also had the Vitamin A deficiency. About one-third children in preschool age and one-fifth children in school age had Anaemia. The prevalence of anaemia among NPNL women was 26.0%. There were also evidence of iron deficiency among children and NPNL women though to a lesser extent. The deficiency of iodine among children and NPNL women were more than 40.0 percent in both cases. Similarly Zinc deficiency was also highly prevalent among preschool age children (44.6%) and NPNL women (57.3%). Among NPNL women there were also evidence of Folate deficiency (9.1%) and B12 deficiency (ICDDR'B et al., 2013). Breastfeed among children has increased from 42.0% in 2004 to 55.0% in 2014 (NIPORT, Mitra and Associates, and ICF International, 2016).

10.0 Gender Issues in Health and Nutrition

10.1 Status of child mortality by gender

Bangladesh has done exceptionally well in reducing gender disparity in child mortality rates. Neonatal mortality rate (<1 month) among male children was 18 per 1000 live births which was 20 deaths per 1000 live births in the case of female children. However, there was not much difference in the case of infant mortality rate (<1 year) between male children and female children (27 and 28 deaths per 1000 live births respectively). In addition, under-five mortality rate is even lower for female children than male children (Figure 6). Though there is no substantial difference in child mortality rates by gender, key point here is that the death rates in both cases still need to reduce to a large extent.

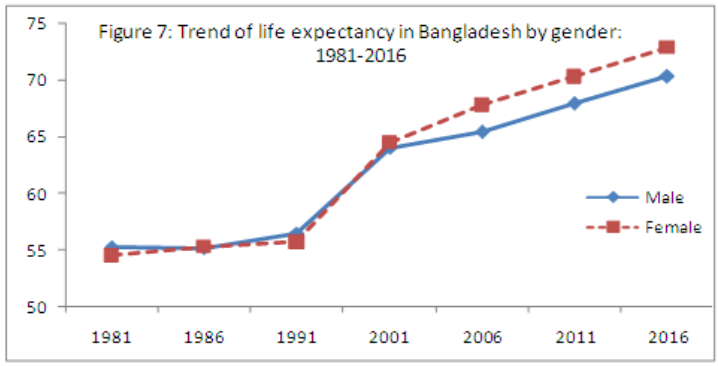


Source: BBS, 2017

10.2 Status of life expectancy by gender

Bangladesh has made considerable progress in increasing life expectancy for females compared to males. In 1981 females had lower life expectancy in Bangladesh compared to male life expectancy. In 2016, female life expectancy has increased to 72.9 years from

that of 64.5 years in 2001. During the same period, male life expectancy has increased to 70.3 years from 64.0 years in 2001 (Figure 7). Thus, overall, females have higher life expectancy than males in Bangladesh. From a policy perspective, the key point here is to achieve sustained increase in healthy life expectancy both for males and females.



Source: SVRS, 2016

10.3 Women's participation in family decision making process

Women's participation in family decision making process is an important component of women empowerment. Findings from the 2014 BDHS show that both husband and wife jointly take decisions in using contraception (75.3%), wife's health care (48.2%), and spending wife's earning (51.3%). However, women's role in decision making for her own health care is limited (15.0%) compared to their male counterparts (30.8%) suggesting that increased role of women in family decision making process should be ensured.

11.0 Human Resources for Health

Adequate skilled human resources are essential for delivering quality health care. For this reason, adequate number of educational institutions and training facilities are needed to produce adequate human resources for health. Thereafter, ensuring proper distribution of available human resources is pivotal to ensure equal access to health care for all.

11.1 Human resource building facilities for health

There are 23 Government institutions and 10 private institutions offering post graduate medical courses with a capability of 2237 seats. In addition, 36 Government institutions and 68 private institutions are offering MBBS degree having a total of 13,769 seats. There are 34 government and private institutions offering undergraduate dental degree to 1917 students. There are 131 nursing institutions (Government: 57, and Private: 74) in Bangladesh as of June 2016 with a seat capacity of 6,680. There are 12 junior midwifery institutions with a seat capacity of 320. As of June 2016, 52 institutions (both Government and Private) are producing community based skilled birth attendants, 189 Medical Assistant Training Schools (MATS) (Government: 8, Private: 181) are 12610 skilled human resources. In addition, there are 133 institutions of health technology (Government: 11 and Private: 122) (MIS-DGHS, 2016).

11.2 Distribution of available human resources

There are 127,841 sanctioned posts under the DGHS of which physicians comprised of 18.8%; class II 16.7%, class III 41.3% and class IV employees comprise the rest 22.7%. Of the available 106,104 health personnel 21.1% are doctors (Class I), 16.8% are of class II, 41.4% are of class III and the remaining 20.6% are class IV. The lass I non-doctors comprise 0.42% of the sanctioned posts and 0.22% of the available staff. As of June 2016, 21,717 sanctioned posts remained vacant which constituted 17% of the total sanctioned posts. Vacancy rate was 6.9% for doctors (1,654 posts), 56.5% (306 posts) for class I non-doctors, 16.4% (3.486 posts) for class II staff, 17.1% for (9,062 posts) for class III staff, and 24.9% for class IV staff (DGHS, 2016). The above mentioned distribution of human resources produces number of registered physician per 10,000 populations 4.90, number of registered nurses per 10,000 population 2.90, number of medical technologists working under GFHS per 10,000 populations 0.37, and number of community and domiciliary health workers working under MOHFW per 10,000 populations 4.04 (MIS-DGHS, 2016).

Moreover, there is a bulk portion of healthcare providers in the informal sector comprising semi-qualified allopathic providers (e.g., community health workers, medical assistants and trained midwives), unqualified allopathic providers (e.g., pharmacists, quack doctors), traditional healers (ayurvedic, unani and homeopathic medicine practitioners) and faith healers. They are the major healthcare providers for large number of rural people, especially in remote and hard-to-reach areas, though they are not part of the mainstream health system.

11.3 Management Information Systems (MIS)

Bangladesh has made remarkable progress in developing and deploying a country-wide health information system (HIS) which includes a robust routine health information system (RHIS). Several of its HIS and eHealth initiatives, coming mainly from the Government, are being appreciated and recognized both at home and abroad. International recognitions in the form of prestigious awards received during the past few years hallmark Bangladesh's glorious efforts for digitalization of the health.

As part of the digitalization of the health, Bangladesh has organized the Inter-Country Conference on Measurement and Accountability for Results in health (MA4Health) in April 2016. Bangladesh has also taken NCD interventions through the Commission on Information and Accountability for Women's and Children's Health (COIA). With an aim to ensure quality of data, completeness of reporting, and timeliness of data, the COIA Secretariat conducts regular monitoring visits to the community clinics and provides hands-on training to the service providers and respective Upazila statisticians. A platform of Shared Health Records (SHRs) has been developed as the initial step toward introducing universal electronic health records in the country.

A Memorandum of Understanding (MoU) was signed on 12 July 2015 between the Ministry of Health and Family Welfare and the Access to Information (A2I) project of the Prime Minister's Office to expand effective collaboration between the two parties with respect to promotion of digital health information in the country. The MIS-DGHS has recently created user friendly dashboards for advocacy programs to visualize and increase in the

use of geospatial data. MIS-DGHS has also initiated eMIS solutions for the use by rural community health workers in the public sector. In addition to mobile phone based health service and advanced telemedicine, Skype-based teleconsultation is also pursued.

12.0 Health Sector Management/Administration

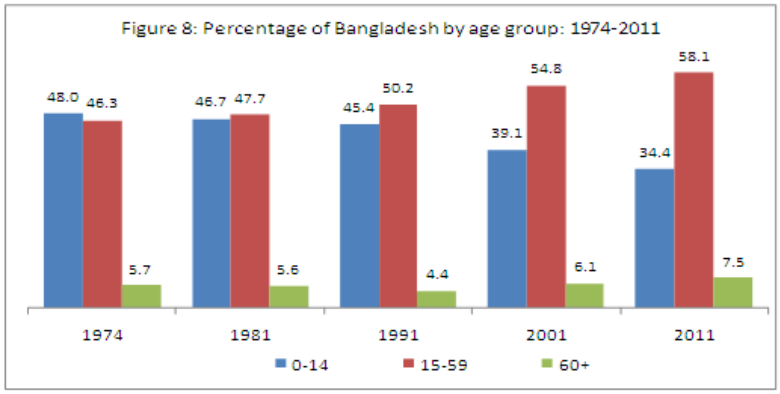
Bangladesh has made remarkable progress in health sector surpassing its neighbours in raising life expectancy, and reducing fertility and mortality of mothers and infants. The health system of Bangladesh is organized by multiple actors performing diverse roles and functions through a mixed system of medical practices. There are four key actors: Government, private sector, NGOs and donor agencies. Ministry of Health and Family Welfare provides services through different executing and regulatory authorities primarily in rural areas, and health services in urban areas are delivered by Ministry of Local Government, Rural Development and Cooperatives in partnership with NGOs and the private sector. Thus the Ministry has been empowered to act as central body for regulating a wide range of health agencies, including medical professions and institutions (Naheed and Hort, 2015).

The existing structure and management of health organizations require further improvement to make the health system accountable to its stakeholders, preventing absenteeism among doctors, improving service quality and performance of service providers, and other challenges for the health sector. Bangladesh has achieved MDG 4 by reducing child death ahead of the 2015 target, and rapidly improving in other indicators including maternal death, immunization coverage, and survival from infectious diseases including malaria and tuberculosis, and diarrhea. Now the Ministry of Health and Family Welfare would need to improve its coordination with other ministries and NGOs that are directly and indirectly involved with health services to maintain these successes.

13.0 Issues in Population Planning

13.1 Trend of population growth

Bangladesh is one of the most densely populated countries in the world. In 1981 Census, the total population of Bangladesh was 89.9 million which has increased to 130.5 million in 2001 and 149.8 million in 2011 Census. During the period of 1974-2011, the share of young population (0-14 years) to the total population has declined to 34.4 percent in 2011 from 48.0 percent in 1974 mostly due to declining trend in fertility. On the other hand, the share of working population (15-59 years) to the total population has increased to 58.1 percent in 2011 from 46.3 percent in 1974 and the proportion of older people (aged 60+) has increased gradually over time reaching 7.5 percent in 2011 (Figure 8).



Source: Bangladesh Bureau of Statistics (BBS), Censuses of Bangladesh, 1974-2011

13.2 Projection of Bangladesh population 2011-2041

Projection of population by age, sex, and place of residence (rural-urban) is essential for long-term planning. A recent projection by Bangladesh Bureau of Statistics shows that the total population of Bangladesh will increase to 171.68 million in 2021, 190.74 million in 2031, and 205.64 million in 2041. Due to balanced sex ratio, there will be almost equal number of males and females in the projected population with some exceptions. The percentage of population living in urban areas is projected to increase to 29.7 percent in 2021, 33.8 percent in 2031 and 38.5 percent in 2041 (Table 1).

Table 1: Projected population in Bangladesh under medium scenario: 2011-2041

Year	National (millions)	Male (millions)	Female (millions)	Percentage of Urban Population		
				Low variant	Medium Variant	High Variant
2011	149.76	74.98	74.78	23.4	23.4	23.4
2016	160.22	80.03	80.19	26.5	27.9	29.3
2021	171.68	85.80	85.88	28.2	29.7	31.2
2026	182.09	91.05	91.04	30.1	31.7	33.3
2031	190.74	95.52	95.21	32.1	33.8	35.5
2036	198.50	99.54	98.96	34.3	36.1	37.9
2041	205.64	103.12	102.52	36.6	38.5	40.4

Source: Bangladesh Bureau of Statistics, 2015

During the period of 2011-2041, the number of young population (0-14 years) is projected to decline to 41.17 million in 2041 from 51.87 million due to declining trend in fertility. The size of the working population aged 15-59 years will be 111.71 million in 2021, 124.93 million in 2031 and 134.53 million in 2041. The number of elderly population aged 60 and above is projected to increase to 14.16 million in 2021, 20.70 million in 2031 and 29.94 million in 2041. Thus the total older population (60+) is projected to reach 14.6% of the total population in 2041 (Table 2). A separate projection of older population aged 60-64 years and 65+ years are shown in Table 2 for policy purposes and social safety programs.

Table 2: Age-Specific Projected Population in Bangladesh in millions (medium scenario)

Year	National	0-14 years	15-59 years	60-64 years	65+ years
2011	149.76	51.87	86.71	4.09	7.10
2016	160.22	48.99	99.42	3.37	8.44
2021	171.68	45.82	111.71	5.13	9.03
2026	182.09	45.96	119.38	5.78	10.99
2031	190.74	45.11	124.93	7.44	13.26
2036	198.50	42.94	130.41	8.62	16.53
2041	205.64	41.17	134.53	9.52	20.42

Source: Bangladesh Bureau of Statistics, 2015

13.3 Projection of labour force and youth population

The share of labour force (15-59 years) to the total population is projected to reach 65.4 percent in 2041 from 57.9 percent in 2011. During this period the dependency ratio will continue to decline raising opportunities for rapid economic growth. The total number of women in the reproductive age (15-49 years) increase to 49.73 million in 2021, 53.24 million in 2031, and 52.98 million in 2041 suggesting there should be adequate planning for their reproductive health needs. Finally, the number of youth population (15-29 years) will increase to 49.28 million in 2021, 48.05 million in 2031, and 45.23 million in 2041. These large number of youth population will require quality education, training, and other support services for translating them into human resources (Table 3).

Year	National (millions)	Labour Force (%) (15-59)	Dependency Ratio (0-14 and 65+)	Female Population Aged 15-49 (millions)	Projected Youth Population (15-29 Years) (in millions)
2011	149.76	57.9	0.694	39.94	41.22
2016	160.22	62.1	0.559	44.90	44.37
2021	171.68	65.1	0.469	49.73	49.28
2026	182.09	65.6	0.455	51.87	50.79
2031	190.74	65.5	0.441	53.24	48.05
2036	198.50	65.7	0.428	53.35	44.96
2041	205.64	65.4	0.425	52.98	45.23

Source: Bangladesh Bureau of Statistics, 2015

13.4 Trend of Total Fertility Rate (TFR) and Contraceptive Prevalence Rate

Bangladesh has made outstanding success in declining the total fertility rate (TFR)—average number of children born per woman during their reproductive age of 15-49 years. For instance, TFR in Bangladesh has decline from 6.3 children per woman in 1975 to 4.3 children in 1991, 3.0 children in 2004, and 2.3 children in 2014. It is worthwhile to mention that during the same period contraceptive prevalence rate (CPR) has increased from 7.7% in 1975 to 39.9% in 1991, 58.1% in 2004 and 62.4% in 2014 (NIPORT, Mitra and Associates, and ICF International, 2016). From a policy perspective, the key point here is to achieve the replacement level of fertility (i.e., 2.1 children per women on average) through increasing CPR, and thereafter continue declining TFR to control population growth in one hand and minimize the impact of population momentum on the other.

13.4 Trends of socioeconomic development

Bangladesh has been very successful in reducing national poverty rate from 56.7% in 1991-92 to 48.9% in 2000, 31.5% in 2010 and 24.8% in 2015 with a relatively faster decline in the last decade (GED, 2016). The prevalence of child marriage among girls (marriage before age 18) in Bangladesh has declined to a slower extent from 73% in 1993-94 to 59% in 2014. Bangladesh has achieved remarkable success in universalisation of primary education through increasing equitable access to education, reducing dropouts, improving completion of the cycle, and implementing a number of quality enhancement measures in primary education. Adult literacy rate (15+ years old population) has increased from 37.2% in 1990-91 to 52.8% in 2000 and 64.6 in 2015 (SVRS, 2015). Labour force participation rate has increased from 51.2% in 1990-1991 to 58.7% in 2015. However, there are substantial differences in labour force participation rate between males and females (e.g., in 2013, males: 81.2% and females: 33.5%).

14.0 Climate Change, Displacement and Health

Globally, Bangladesh is widely considered as one of the most climate vulnerable countries. In the 2017 Global Climate Risk Index, Bangladesh was identified as the sixth most affected country during 1996-2015. In recognition of Bangladesh's far-reaching initiatives to address climate change, the United Nations Environmental Program (UNEP) awarded its highest environmental award – Champions of the Earth – to the Honorable Prime Minister Sheikh Hasina in 2015. Through the award UNEP recognizes Bangladesh's first-off-the-block initiatives under the current government to prepare the ecologically fragile country for the challenges it faces from climate change.

14.1 Effects of climate change on displacement

The frequent occurrence of natural hazards in Bangladesh leads to loss of life, land, homes, livelihoods, and to the forced displacement of individuals across the country. Importantly all natural hazards are expected to increase in both frequency and intensity as a result of climate change – almost inevitably leading to the displacement of many millions more across Bangladesh (IOM, 2009). Islam and Shamsuddhoa (2017) showed that the rapid onset disasters usually caused mass displacement, while the slow onset disasters affected the environment, local ecosystem services and employment opportunities that forced people to undergo routine economic migration at first, followed later by permanent migration. Thus, it is estimated that six million people have already been displaced by the effects of climate hazards in Bangladesh (ACR, 2012). In addition, a recent Intergovernmental Panel on Climate Change (IPCC) report claims that a one meter rise in sea level will inundate some 13 per cent of land mass in the southern belt, displacing some 15-20 million people by 2050.

14.2 Effects of climate change on health

Climate change has wide range of effects on human health. For example, WHO (2003) found that in 2000, climate change has caused loss of over 160,000 lives annually. The health outcomes due to the effects of climate change included: episodes of diarrheal disease; cases of Plasmodium falciparum malaria, fatal accidental injuries due to floods and landslides;

and malnutrition. Millions of people in also Bangladesh suffer directly or indirectly from water and vector-borne diseases. The actual health impacts of climate change are likely to be influenced by local environmental conditions, socioeconomic circumstances, and behavioural adaptations taken to reduce the full range of threats to health. Due to climate change induced differences in temperature and precipitation, the dynamics of vector-borne diseases such as dengue and malaria will increase. Dengue was not prevalent in Bangladesh until 2000. Since then, the disease became predominantly endemic in urban areas. The incidence of dengue occurs every year in Bangladesh, especially Dhaka causes a constant threat to the population and is a recurring problem for the health authorities.

14.3 Issues of Elderly People

The proportion of elderly population will continue to increase over time in Bangladesh due to increasing trend in life expectancy and declining trend in fertility. Previous research on elderly people in Bangladesh suggest that older people suffer from multiple health problems including higher prevalence of heart disease, diabetes, high blood pressure, weakness, dementia, tooth problem, hearing problem, vision problem, rheumatic pain and stiffness in joint, prolonged cough, breathlessness, bronchial, asthma, and shortness of breath and chest pain. Financial insecurity is an influencing factor that makes elderly people more vulnerable in a society. The more people get older, the more they become dependent on others in terms of financial security as they lose the capacity of earning. Though pension scheme for the public servants is availed by the government, it covers only a small portion of the elderly population.

15.0 Challenges in Health and Population Management

Challenges in maternal healthcare

Although ANC coverage has increased substantially over time, still 21.0% women do not receive any ANC checkup and 69.0% women do not get the required four ANC visits suggesting that a large number of women are yet to realize the full risk of not doing checkup during pregnancy. Rural women, women with no education or lower education, and poor women are more likely not to receive ANC checkup. The key challenge is to ensure that all women become conscious about ANC checkup and receive at least four visits to avoid any risk of loss of pregnancy.

Another challenge of maternal health care is increasing the rate of facility delivery. Still 63.0 percent women give births at home instead of going to health facility indicating a daunting challenge in ahead in increasing facility delivery rapidly. The reasons for higher number of home delivery include lack of awareness among women in giving births at home, lack of money to give birth in facility, religious reasons, poor quality services in some health facilities, and expensive facility delivery in private sector, and higher chance of taking to C-section for delivery. Caesarean sections have increased five-fold over a ten-year period particularly in the private sector and are a cause for concern. Similarly, about two third women are not getting PNC care indicating that greater efforts are needed to ensure higher rate of PNC across the country. Improving access and utilization of preventive and curative services of maternal morbidities like fistula is another area that demands attention.

Challenges in child health care

The major challenge in child health care is to eliminate the differences in child health status across socioeconomic and spatial characteristics. For example, currently child mortality is 24% higher in rural areas than in urban areas. Under-five mortality is higher among mothers with lower education. Similarly, among the poorest women under-five mortality is higher. In addition, under-five mortality rate is 9% higher among female children than male children. In addition, coverage of vaccination is lower among higher birth order, lower educated mothers, and poorer women. The prevalence of diarrhea is higher among children living in households with non-improved toilet facilities. The use ORT and zinc for diarrheal treatment is profoundly observed for male children and children living in urban areas. The children living in rural areas and in Rajshahi and Sylhet regions are more likely to suffer from ARI than children living in urban and other regions.

Despite the progress in reducing child mortality neonatal deaths still remain high primarily because most deliveries take place at home without access to proper medical care. This has been further compounded by lack qualified staff and shortages of supplies in many health facilities. As a result, those who go to health facilities do not get quality services in most cases. Improving the provision of early essential newborn care practices and interventions (immediate drying and wrapping, skin-to-skin contact with the mother, delayed cord clamping and clean cord care, delayed bathing and immediate breastfeeding) is of high priority and will require greater coverage of skilled delivery care and an emphasis on improving quality of delivery and immediate newborn care. Drowning and injury is the leading cause of death among children older than one year which has become another major challenge in preventing child mortality in Bangladesh.

Challenges in adolescent reproductive health

Adolescent reproductive health issues include level of awareness among adolescents about their reproductive health, early pregnancy, extent of unwanted pregnancy, septic abortion, STI and HIV/AIDS. In the traditional Bangladesh society, many adolescents do not get clear information from parents, peers and teachers about their reproductive health issues. As a result, many adolescents are not aware about their reproductive health problems. The prevalence of adolescent pregnancy is still high in Bangladesh despite substantial decline in fertility rates. Findings from the 2014 Demographic and Health Survey showed that 31.0% of adolescents age 15-19 in Bangladesh were already mothers or pregnant with their first child. The total fertility rate would be 30% lower in Bangladesh if unwanted births were avoided. The prevalence of unwanted births is even higher among adolescents due to their limited role in family decision making process including taking decision to use contraceptives.

There are three types of challenges in ensuring adolescent reproductive health. First, there are some physical access challenges which include inadequate reproductive health service points and absence of peer group approach in the service point. Second, there are psychological and social challenges such as shyness of adolescents to discuss the reproductive health issues; keeping reproductive health problems secret; ignorance about sexuality; and parents/guardians who are uninformed about adolescent reproductive health. Third, there are quality barriers which include the service environment, which does not

ensure privacy and confidentiality of adolescent service seekers; lack of professional staff; inadequate supervision and monitoring of ARH services; and relatively high service charges.

Challenges in utilization of health care services

The major challenge in utilization of health care services is to eliminate disparities between rich and poor and for girls and women regarding health outcomes and health care utilization. Islam and Biswas (2014) revealed that poor and the disadvantaged groups still have significantly less access to health care services than the rich and the privileged. For example, only 8% of pregnant women from the poorest income quintile deliver their babies at any health centre or clinic compared to 53% pregnant women from the richest income quintile. There is serious disparity in terms of antenatal and post-natal care too. In addition, a large number of rural people mostly depend on unqualified informal health providers for their health needs. However, in the absence of a prescription policy, households end up spending much more at drug outlets due to overprescribing, multidrug prescribing and prescribing of expensive drugs by these unregulated and untrained informal providers mostly in the rural areas due to limited options and availability. Such disparity in the distribution of health service facilities and access to qualified providers has created geographic inequity in access to quality care and prevents the majority of the population from the benefits of health services (Islam and Biswas, 2014).

Another challenge is to ensure equity in universal health coverage. A health system consists of six interrelated and interdependent building blocks – efficient and effective health service delivery; appropriately skilled, adequate number and properly distributed health workforce; a well functioning health information system; equitable access to essential medical products and technologies; adequate financing; and leadership and good governance. These building blocks are interrelated and need to address them simultaneously in order to overcome the drawbacks of the overall health system.

Challenges in Essential Service Package/Essential Service Delivery (ESD)

National survey and program implementation reports highlighted some key indicators of low performing areas such as place of delivery, use of skilled birth attendance, infant mortality, poor utilization of service facilities and scaling up infant and child nutrition. Additionally, there has been more limited progress in service provision for hard to reach populations and various disadvantaged and marginalized groups. Lack of adequate health work force has plagued service delivery in hard to reach areas. Greater efforts are needed in strengthening the ESP, secondary and tertiary healthcare and in underpinning the public-private relationship in providing health services. Availability of services to all sections of society, addressing the current inadequate services to rural and urban hard to reach areas, and an effective referral system between different tiers of health system, building public-private partnership and integration of other services are the major challenges of the ESP..

Family planning is one of the major components of ESD. Although Bangladesh has achieved remarkable progress in improving contraceptive prevalence rate (CPR) from 7.7% in 1975 to 62.4% in 2014, there are numerous challenges ahead for Bangladesh in further increase of CPR including addressing the need for increasing number of population,

reducing regional differences in contraceptive prevalence rates, eliminating rich-poor differentials in contraceptive use rate, and increasing use of long-acting and permanent methods of contraception (LAPM). Another challenge of increasing contraceptive prevalence rate is distribution of new generation of contraceptives. Currently, second generation contraceptive methods are distributed by the Government through its large scale family planning programmes. Third generation contraceptives are already available in the market which are more effective and have lower side effects compared to second generation contraceptives. To achieve the desired target of CPR in the long-term planning it will require to provide new generation contraceptive methods to clients.

Changes in disease pattern from communicable diseases to non-communicable diseases will pose another challenge. The health service delivery system will need to ensure adequate response to the changing pattern of disease but at the same time it is important to ensure that it does not reduce its efforts to tackle important communicable disease prevention and treatment interventions. Another challenge in ESD is the existence of co-morbidity among people. Acute respiratory infection, diarrhea and measles are three common causes morbidity for children, while the major cause of morbidity for people aged 64 and above are arthritis, blood pressure and diabetes. The proportion of most of the diseases is higher for people of the lowest wealth quintile. However, non-communicable diseases such as diabetes, high blood pressure and cancer are predominantly observed among people in the highest wealth quintile and in urban areas. Tackling the burden of non-communicable diseases will be another major challenge for ESD due to the increasing number of ageing population.

Challenges in healthcare system

The extent of service outlets in public and private sectors, and the coverage of primary healthcare (PHC) have substantially increased over time but these are not adequately provisioned for human and other resources including drugs, instruments and supplies. Counting both public and private hospitals and clinics, there is 1528 population per hospital bed in 2016 (DGHS, 2016). Moreover, there is large variation in terms of hospitals' bed and population ratio by division. The health facilities, particularly public sectors facilities, in Bangladesh are poorly equipped with medical equipment and instruments. Lack basic instruments and the supply of drugs are also inadequate and infrequent in many of the lower-level facilities. However, the private sector, especially the emerging high-cost hospitals and clinics in the urban areas, have all the major diagnostic equipment and facilities.

With regards to workforce, the health system in Bangladesh is characterized by shortage, inappropriate skill mix and inequitable distribution. Doctor-population ratio is very high in Bangladesh. The nurse-patient ratio is also much lower than international standard. In addition, there is a large variation in terms of sanctioned post and posts filled. For example, the percentage of sanctioned physician posts filled is the lowest in union level public facilities (22%). In contrast, sanctioned physician posts are filled in 62% of district and Upazila facilities and in over 80% of NGO facilities and private hospitals (NIPORT, Mitra and Associates, and ICF International, 2016). The engagement of the health workforce in the private sector is increasing. The formal health workforce (doctors, dentists, nurses) is mostly concentrated in the urban areas, with variation among the different regions. Retention and absenteeism of health workers are two major problems facing rural areas (Ahmed et al 2015).

The findings of Health Facility Survey reveals that on average only 8% of all service facilities including community clinics (CCs) provides all (child curative care, child growth monitoring, child vaccination, FP, ANC and delivery care) the basic healthcare services. Additionally, only 4% of all the health facilities have all six basic amenities (communication equipment, computer with internet, client toilet facilities, consultation privacy, improved water source and regular electricity). Only 3% of all the facilities have all basic nine items to control infections while 7% of the health facilities have capacity to conduct basic laboratory test (hemoglobin, blood glucose, urine protein, urine glucose and urine pregnancy). More than three quarters of health facilities have at least six of eight essential medicines included in the drug and dietary supply kit (NIPORT, Mitra and Associates, and ICF International, 2016). Thus ensuring all the basic health care services in all health facilities with all basic amenities is one of the major challenges of the health care system in Bangladesh.

Challenges in water, sanitation and hygiene practices

Although water and sanitation coverage of Bangladesh increased substantially, still the quality of water and sanitation facilities needs further improvement. The share of GOB financing needs to increase for ensuring sustainability and close monitoring of water, sanitation and hygiene sectors. For instance, the quality of sanitation coverage is an emerging area of concern as still substantial number of population does not have improved latrine facilities or access to hygienic sanitation facilities (MICS 2015). For water supply, drinking water is undermined by severe quality issues. For example, 26% of the households' drinking water is contaminated with 10 ppb arsenic concentration and another 13% of the households' using water with over 50 ppb arsenic concentration. The rapid growing of low income community including the slum dwellers, fecal contamination with drinking water, presence of other health significant chemical constituents in ground water and extreme climate events have continuously been adding new challenges in these sectors.

Lack of hygienic practices is one of the major challenges of the water and sanitation sector. Still a significant proportion of all population is not practicing proper hygiene due to scarcity of opportunities, poor knowledge and previous practices. To address this challenge, the GOB has formulated a Hygiene Promotion Strategy-2012 and has emphasized improving hygiene practices in the National Strategy for Water Supply and Sanitation 2014 aiming to promote sustainable use of improved water supply and sanitation infrastructures and to create an enabling environment ensuring comprehensive hygiene promotion and practices to reduce water and sanitation related diseases. Now the key challenge here is proper implementation of the strategies across the country.

Challenges in ensuring nutrition among children and mothers

Although Bangladesh has achieved remarkable success in ensuring nutrition among children and mothers still there are numerous challenges ahead for Bangladesh in achieving the desired success in nutrition sector due to large number of population in one hand and frequent onset of disasters on the other. Findings from the Bangladesh Demographic and Health Surveys show that the pattern of stunting varies by the background characteristics of the children such age and gender and their parental status. The prevalence of stunting increases with age. Male and rural children are more likely to be stunted than their

counterparts. Additionally, the prevalence of stunting differs by birth interval, region and parental wealth status. Almost similar variations were found regarding wasting of the children. The prevalence of underweight is higher among rural and female children than their counterparts. It continues to increase with increasing age. The lowest prevalence of underweight was found among the richest and educated mothers. Childhood underweight also differs by region, such as Sylhet has the highest rate of stunting and underweight compared to other regions. The prevalence of stunting, wasting and underweight correspondingly varied within urban populations. Urban people live in slum areas are more prevalent to be stunted, wasted and underweighted than their counterpart.

Other challenges in nutrition sector include inadequate human resources, poor accountability both in public sector and NGOs, poor monitoring and evaluation, and lack of coordination among different ministries and organization. Therefore, the key challenges for promoting programmes to prevent undernutrition at the national level in Bangladesh include: placing nutrition high up on the list of priorities, implementing cost-effective and sustainable interventions at scale following appropriate strategies, improving access to the services for those in real need, and evidence-based decision-making and building up operational capacity.

Challenges of addressing gender issues in health and nutrition

Addressing gender issues in health and nutrition is of crucial importance in achieving the SDGs related to maternal and child health. There are three major challenges in Bangladesh in addressing gender issues in health and nutrition. First challenge is to improve women's status and intra-household bargaining capacity in relation to child survival, health and nutrition. Improved women's status contributes to influence decision-making within the household in allocating resources for children's health and nutrition (i.e. feeding practices, prenatal and birthing care, treatment-seeking for child illness and immunisation). Second challenge is to reduce the double burden of women in household maintenance and rearing children. Women's multiple responsibilities (e.g., domestic tasks, child care and paid labour) present a heavy burden on women which has potentially negative impacts for child health and nutrition outcomes. Third challenge is to reduce the influence of gender norms, values and identities in relation to child survival, health and nutrition. Socio-cultural values which perpetuate certain expectations about women's and men's capacities, characteristics and social behaviour underpin many of the imbalances in between women and men. These have serious consequences for child survival, health and nutrition, especially in contexts where gender bias against girls exists.

Challenges in health sector Management and administration

As mentioned earlier, there are four key actors in the health system in Bangladesh: Government, private sector, NGOs and donor agencies. Ensuring effective coordination of the Ministry of Health and Family Welfare with other ministries, private sectors, NGOs and donor agencies is one of the major challenges in health sector management and administration. The government adopted the National Health Policy 2011 with an aim to ensure healthcare services to all. However, ensuring accountability of health personnel and taking effective legal action against doctors for negligence or remaining absent from work are yet challenges in health sector management and administration. In some cases, medical

practitioners, private clinics, and private laboratories take arbitrary changes from patients and there are huge differences in fees among institutions. There are lack of clear regulatory frameworks for provision of mandatory display of consultation fees and investigation charges across the private sector health delivery system. Addressing these imitations is obviously among the challenges in health care management and administration. Finally there are three major challenges of health financing in Bangladesh: inadequate health financing; inequity in health financing and utilization; and inefficient use of existing resources.

Challenges in population management

Despite substantial progress in declining population growth rate from 2.35% in 1981 census to 1.37% in 2011 census the total population of Bangladesh has increased gradually from 89.9 million in 1981 census to 149.8 million in 2011 census. Estimates from Bangladesh Bureau of Statistics (BBS) showed that the total population of Bangladesh has increased to 16.8 million in 2017. In this context, the biggest challenge for Bangladesh is the containment of population growth through reduction of total fertility rate (TFR) while maintaining rapid economic growth. Although the TFR has decline from 6.3 children in 1975 to 2.3 children in 2014, declining TFR much below the replacement level of 2.1 children per woman will be challenging due to desire for son, future insecurity for poor parents, engagement of large number of people in informal section with no pension benefits, and religious reasons. Second, children in Bangladesh face a range of difficult issues that hamper their survival and development, and prevent the full realisation of their rights and potential. Creating enable environment for child development through preventing violence and abuse against children, eliminating child labour from informal sector as well, and preventing child marriage, and preventing child trafficking is a huge challenge.

Third, due to sustained high fertility in last few decades Bangladesh has a large number of youth population (aged 15-29) which is also an opportunity of rapid economic development—also known as demographic dividend. However, the biggest challenge in achieving the demographic dividend in Bangladesh is to translate the large number of youth population into human resources through providing quality education, skill building training professional development, and employment opportunities. Fourth, international migration is often considered as a possible solution in managing large number of population. International migration reduces the pressure employment creation in domestic labour market while providing crucial contribution to economic growth through the flow of remittance. However, with large number of working population having lower education, lack of skilled training, and lack of proficiency in foreign languages, maintaining the continuous flow of sending workers in abroad might be very challenging in the future. Finally, the share of ageing population (aged 60 and above) is increasing gradually and it is projected to become double by 2041 (from 7.5% in 2011 to 15.0% in 2041). Managing the increasing ageing population through delivering quality services to fulfill their basic needs including health care will require large scale investment and efforts.

Challenges in climate change, displacement and health

There are two types of climate induced displacement: short-term displacement and long term displacement. Short-term climate-displaced people take shelter in various places including embankments, schools and shelter centers. People in general and women and children in particular experience various insecurity in these places. They also undergo insecurity related to their basic needs which needs to be addressed properly. The long term displaced people usually migrate to cities for better livelihood which eventually promote unplanned urbanization and generate various consequences related to their food, health and livelihood opportunities. Most of them live in slums and experience lack of employment opportunities and failure to fulfill basic needs in their daily life. Thus, providing all kinds of services to them including better employment opportunities are among the major challenges in address vulnerabilities of climate displaced people. There are also concerns that due to increasing pattern of occurrence of disaster millions of people will become displaced which would cause social disorders, political instability, and cross-borders conflicts and upheavals.

Findings from previous studies showed that climate change would increase risks to human health, especially in light of the poor state of the country's public health infrastructure. It is very challenging to ensure access to adequate health care for the poorest and most vulnerable who are also likely to be the group most adversely impacted by any adverse change in human health. Furthermore, warmer and more humid weather may lead to an increased prevalence of disease and disease vectors, to which the poor will be the most susceptible. In addition, climate displaced people are often forced to relocate to any land available, in practice this often leads to illegal squatting on Government land in vulnerable and isolated locations, far removed from adequate and accessible healthcare. This process exposes climate displaced persons to further health risks.

Other challenges in health and population management

In addition to the above mentioned challenges, there are some other issues that need urgent attention to deliver quality health care services in Bangladesh. For example, a large number of people in Bangladesh turn to private sector health providers and informal service providers are frequent (village doctors, unqualified/semi-qualified providers) first resort often for poor and remote villagers. A strong and effective regulatory structure is needed to ensure that private sector is delivering quality health care services to people at a reasonable cost. Another important issue is the state of mental health care services. Though health implies both physical and mental health, psychological aspect of health is yet to receive proper attention. People are less aware, services are limited, and social stigma is attached with it. However, due to various socioeconomic reasons increasing number of people are in desperate need of such essential services. Developing and delivering a comprehensive mental health service is an important issue to address. Moreover, there are challenges in ensuring adequate health care services for disables, providing opportunities for quality alternate medical care, and delivering health promotion services through behavioral change and communication.

16.0 Targets in Health and Population Management for the Perspective Plan II

Targets for improving maternal health

- Increase ANC-4 visits coverage from 31% in 2014 to 50.0% in 2021, 75.0% in 2025 and 100.0% by 2030 by skilled health professionals.
- Increase facility-base delivery from 37% in 2014 to 50% by 2030 and 75% by 2041.
- Increase births attended by skilled health professionals from 42% in 2014 to 65% by 2021 and 85% by 2030 and 100% by 2041.
- Increase PNC coverage for mothers and children by skilled health providers from 39% in 2014 to 45% by 2021, 50% by 2030 and 75% by 2041.
- Reduce maternal mortality ratio (per 100,000) from 178 in 2016 to 100 by 2021, 80 by 2025, 60 by 2030, 40 by 2035, and less than 10 by 2041.

Targets for Improving Essential Health Services

- Increase contraceptive prevalence rate from 62.4 in 2014 to 75.0% by 2021, 80.0% by 2030, and 85.0% by 2041
- Reduce discontinuation of contraception use from 29.7% in 2014 to 20.0% by 2021, 10.0% by 2030, and 5% by 2041.
- Reduce unmet need for family planning from 12.0% in 2014 to 7.0% by 2021, 4.0% by 2030, and less than 2.0% in 2041.
- Increase all vaccination coverage to 100% by 2041
- Increase diarrheal treatment with ORT and zinc to 75% by 2041
- Ensure universal coverage of vitamin-A supplementation by 2030.
- Increase ARI treatment from a medically trained provider to 85% by 2041
- Reduce incidence of communicable diseases to half by 2021 and end the epidemics of tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases including AIDS by 2030.
- Reduce one-forth pre-mature mortality from non-communicable diseases by 2021, one-third non-communicable diseases by 2030, and two-third non-communicable diseases by 2041 through prevention and treatment and promote mental health and wellbeing.
- Reduce number of deaths and injuries from road traffic accidents to 50% by 2020, to 75% by 2030, and 100% by 2041.

Targets for improving health care delivery system

- Increase the ratio of doctors to nurses to technologists of 1:3:1 by 2030 and 1:4:2 by 2041
- Filled all sanctioned post union and sub-district levels by 2030 and create enabling infrastructure and environment for trained nurse and MBBS doctor at union level health facilities by 2041.

- Ensure availability of six basic amenities at union level health facilities and ensure online referral system to UHC to 25% by 2021, 50% by 2030 and 100% by 2041.
- Ensure availability of all basic nine items to control infections of the facilities to 25% by 2021, 50% by 2030 and 100% by 2041.
- Establish basic laboratory test facilities at union level health center to 25% by 2021, 50% by 2030 and 100% by 2041.

Targets for improving in water, sanitation and hygiene practices

- Ensure universal access to improved arsenic-free water for drinking and households' use by 2041 by given priority to arsenic mitigation and specific approaches for hard-to-reach areas and vulnerable people
- Achieving fecal load free environment, and ensure universal access and utilization to quality sanitation facilities and reducing rich-poor differentiation at zero level by 2041.
- Ensure improved and functional sanitation facilities at all schools by 2041 maintaining both the student-latrine ratio and gender ratio.

Targets for improving nutrition among children and mothers

- Remove nutrition deficiency among 85.0% people by 2021, and end all forms of malnutrition by 2030
- End all forms of stunting and wasting among children under 5 years of age by 2030
- Adequately address the nutritional needs of adolescent girls, pregnant and lactating women by 2041.
- Increase the rate of Vitamin A supplement among mothers to 75% by 2021 and 100% by 2030.
- End all forms of micronutrient deficiencies among children and women by 2030

Targets of gender issues in health and nutrition

- End all forms of discrimination against all women and girls everywhere by 2030
- Ensure universal access to sexual and reproductive health and reproductive rights by 2030
- Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels by 2030

Targets on population issues

- Reduce total fertility rate (TFR) from 2.3 in 2014 to 2.0 by 2021, 1.90 by 2025, 1.80 by 2030, 1.75 by 2035, and 1.70 by 2041.
- Limit total population from 149.8 million in 2011 to 169 million by 2021, 175 million by 2025, 183 million by 2030 and 195 million by 2041.

- End child marriage under the age of 15 by 2021 and end all child marriage under age 18 by 2041.
- Reduce national poverty rate from 24.8% in 2015 to 18.0% by 2021, 10.0% by 2025 and eradicate poverty by 2030.
- Reduce extreme poverty from 12.9% in 2015 to 8.5% by 2021, 4.5% by 2025 and no extreme poverty by 2030.
- •Achieve 100% net enrolment rate for primary and secondary education by 2020, increase percentage of cohorts reaching grade 8 to 100% by 2020, and increase adult literacy rate (15+ years old population) from 64.6% in 2015 to 75.0% by 2020, 85.0% by 2030, and 100% by 2041.
- Create adequate employment opportunities to absorb the projected number of labor force over time.

Targets on climate change, displacement and health

- Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters across the country irrespective of race, gender and ethnicity.
- Ensure quality education, adequate awareness and human and institutional capacity on climate change mitigation, adaptation and impact reduction.
- Elimination of gender based vulnerability during, pre- and after disaster.
- Introduce disaster insurance to reduce people's vulnerability to natural disasters and increasing capacity to cope with health care burden during disaster.
- Ensure overall well-being of climate displaced people

17.0 Strategies for Achieving the Targets in Health and Population Management

Strategies to achieve targets related to maternal health

Reduction in maternal mortality and child mortality in Bangladesh has been achieved through strong Government commitment in HPSP, HPNSP, HPNSDP and other national policies and program implementation. However, greater emphasis should be given on the following strategies to achieve the targets related to maternal and child health in the second perspective plan of Bangladesh:

- Ensure effective utilization of maternal health care services during pregnancy, delivery and post-delivery period, particularly for the poor, marginalized and climate displaced people live remote settings. Improve the availability and quality services on maternal and child health provided by skilled personnel, and ensure prompt and appropriate management of complications in EOC facilities to provide 24 hour services, 7 days a week.
- Address the four main reasons of poor use of maternal and newborn health services: shortage of health care personnel; scarcity of functioning emergency obstetric care at the Upazila level; absence of advice from family regarding when and where to seek medical care; and lack of decision making authority of women.

- Explore the possibility of utilizing vast informal sector of health service delivery particularly for hard to reach areas ensuring proper quality of care and health promotion.
- Ensure quality services in the public delivery care facilities and set-up more delivery care facilities at union level healthcare centers. Increase the number of Community-based Skilled Birth Attendant (CSBAs) through close collaboration with NGOs and private sector, and monitor and supervision the performance of skilled birth attendants (both at facility and at home).
- Promote community clinic-based preconception and pregnancy services by trained providers with a view to replace home-based services. Provide women friendly preconception and pregnancy care, MR and post-abortion services, and 24/7 services for childbirth, newborn and immediate postpartum care.
- Strengthen community support system to identify and remove barriers that lies between poor women and safe delivery including EmOC facilities.
- Adopt specific measures to reduce long-term maternal morbidities, due to complications of pregnancy and child birth among the women of reproductive age. Long-term illness includes fistula, uterine prolapsed, perineal tear, vaginal stenosis, urinary incontinence etc.
- A strong and functional referral system, and public-private partnership with registering and tracking system from union to Upazila and district healthcare facilities needs to strengthen for monitoring progress and client's needs and dissatisfactions.
- Provide nutritional counselling to adolescent girls, pregnant and lactating mothers, together with Vitamin-A supplementation of mothers at their postnatal period.
- Conduct research to combat the fatal diseases of HIV and health of women during their pregnancy in particular and publicize health information and raise awareness.

Strategies to achieve targets related to child health

- Strengthen new born care and expand through building strategic partnerships with NGOs and private sector to leverage the resources and collective efforts to align, harmonize actions and improve public sector efforts including intensification of newborn care promotion.
- Promote essential newborn care through trained providers. To accomplish this provide extensive training to new workers and existing community based workers (FWA, FHA, NGO workers) and support them through operational guidelines and incentives, monitoring and supervision.
- Ensure at least two home visits by trained community health workers within first week of child birth.
- A large number of childhood morbidity and mortality in Bangladesh is caused by five conditions: acute respiratory infections (mostly pneumonia), diarrhea, measles, malaria, or malnutrition. Expand the Integrated Management of Childhood Illness (IMCI) strategy that encompasses a range of interventions to prevent and manage this major childhood illness, both in health facilities and in the home.

- The Government has ensured maternity leave of six months for working mothers in the public sector. However, as per the labour law working mothers in private sector are getting four months maternity leave. Legislate and implement law for the private sector as well to allow mothers to enjoy a leave of six months after the delivery of the child to ensure that the newborn has the right to mother's breast milk and promote exclusive breast feeding.

Strategies to achieve targets related to adolescent health

- Create awareness about the negative consequences of early marriage, early childbearing and having more children.
- Provide quality reproductive health care and other health services to those married as children. Additional support should be provided to catalyze increased knowledge, and attitudinal and behavioral change among service providers with regard to adolescent health.
- Address unmet need of family planning among adolescent married women through giving proper attention to causes of unmet need for family planning such as lack of access, poverty, wrong perceptions, fear of side effects.
- Gatekeepers, formal and informal community leaders, and religious leaders at all levels need to be motivated and trained on adolescent health and gender issues and gender issues.
- Special training should be conducted for adolescent boys and girls at community clinics, satellite clinics, family welfare centers, and Upazila health complexes.
- Increased networking between all relevant government organizations and NGOs working with adolescents should be encouraged to ensure the proper implementation of projects.
- Hard-to-reach, out-of-school adolescents should be encouraged to form groups through which formal and informal leaders provide information and guidance.
- Include adolescent sexual and reproductive health (ASRH) in all national planning frameworks related to human development, allocate adequate resources for proper implementation of ASRH goals and thereafter assess the impact of the interventions in ensuring quality services in areas of ASRH.

Strategies to achieve targets related to health care delivery system

- Provide high quality integrated primary health care delivered through domiciliary services, community clinic (CC) and comprehensive static health facilities at union, Upazila and district levels. Establish strong links between the levels providing ESP services through a functioning referral system, ensuring equity, efficiency, universal access and improve quality of services.
- Develop strong and effective public-private partnership in local level health system. Introduce special care and policies targeting poor, marginalized and out-reach people, particularly in disaster and displacement affected areas.

- Increase GOB financing substantially ensure universal access to quality healthcare services by 204. Meeting the targets of vision 2041 will require registering, tracking and responding to each person's needs and dissatisfactions.
- Establish strong coordination for developing long-term self-sustaining health plans with increasing focus on primary health care and prevention strategies for both acute and long-term care.
- Establish linkages between urban health services and the health ministry, referral systems, deployment of adequately-qualified providers, and a unified and affordable financing for health services in order to reduce high out-of-pocket payments.
- To strengthen the health system, evaluate some of the current vertical programs that show few positive health outcomes such as HIV/AIDS, mental health and urban primary care. Take initiatives for rapid capacity building to prevent the epidemic of non-communicable diseases due to increasing older population.
- To cope with the challenges and increase financial protection for the entire population and decrease out-of-pocket payments at point of service, strictly implement the three strategic objectives: generate more resources for effective health services, improve equity and increase health care access especially for the poor and vulnerable, and enhance efficiency in resource allocation and utilization.

Strategies to achieve targets related to water, sanitation and hygiene practices

- • Improve quality of water (at the source, in storage, and at the point of consumption) and sanitation to limit transmission of infection. Awareness campaigns along with emotional/social drivers can be effective in meeting these needs.
- Strengthen implementation of hygiene-related activities. Particular emphasis should be placed on increasing the availability of hand-washing stations and ensuring that these are used.
- Give preference to arsenic mitigation technology using surface water sources when other types of arsenic mitigation technologies appear to be equally technically feasible, while also considering factors like chemical and microbial safety of the water, social acceptability and cost. Also promote piped water supply in arsenic affected areas wherever feasible.
- Undertake collaborative initiatives with private sector for promoting hygiene related consumer products like soaps, sanitary napkins, oral rehydration salts (ORS), water storage tanks and hand washing devices. Also undertake national hygiene and sanitation campaign in partnership with media.
- For sustainability and life-long hygienic practices, behavioral change, communication and standard hygienic practices should be the integrated part at school levels. Factors related to unsustainable use of quality water, sanitation and hygienic practice are: poverty, frequent natural disasters and displacement, unplanned urban squatters, lack of coordination among different service sectors and monitoring.

Strategies to achieve targets related to Nutrition among children and mothers

- Introduce multiple evidence-based interventions to ensure adequate for children, adolescent girls and women. Interventions that would tackle the direct and immediate factors of undernutrition should target not only the 'window of opportunity' or the first 1,000 days (the period between conception and up to two years of age) but also the period before that—the adolescent period as part of the life-cycle approach. The interventions targeting undernutrition should be scaled up to cover at least 70% of the total population to show tangible outcomes.
- Provide supplementation of iron-folic acid tablets to mothers to combat anaemia during pregnancy and lactation and effective counselling for increased rest and food intake during pregnancy and counselling on appropriate infant-feeding practices during the second half of pregnancy.
- Creating an awareness of the importance of breastfeeding through multiple channels, such as classroom discussions for adolescent girls, counselling during pregnancy, feeding support, and trouble-shooting during the first few hours and days after child birth, and media coverage.
- Counselling of mothers on complementary feeding using energy-dense local foods made of cereals, vegetables, oil, lentils, and, whenever possible, animal protein (fish/egg/meat). Providing six-monthly supplementation of vitamin A, zinc treatment and ORT during diarrhea, hygiene interventions, and providing supplementation of iron-folic acid tablets, and nutrition and health education to adolescent girls and newly-married women.

Strategies to achieve targets related to gender issues in health and nutrition

Addressing gender issues in health and nutrition is one of the essential conditions for ensuring sustained human development. Given that there are many other socio-cultural factors are related with the gender inequality in health and nutrition, emphasizing only on supplying adequate food and nutrition will not solve the problem. Therefore, following strategies should be taken to address gender issues in food and nutrition.

- Incorporate a gender analysis as part of the regular, nutrition situation analysis, analyzing the needs, priorities and roles of men and women. These analyses should collectively inform project design, formulation, planning and implementation.
- Incorporate gender considerations at all levels, framing such efforts as an opportunity to improve effectiveness and nutritional impact. Including gender considerations enhances impact on both women and men, thereby improving the impact of the project as a whole.
- Women may be targeted as part of the vulnerable group in view of their special vulnerabilities, but men should also be reached to help address their needs as well as those of women. In some cases, this may be achieved by targeting food security and nutrition support to households to emphasize common goals and partnership.

- Targeting youth is also recommended for a number of reasons. First, good nutrition early in life is a basis for good health at later phases as well as for the health of the next generation. Secondly, gender equality is often more accepted among youth. Thirdly, young people may transfer their knowledge, habits and benefits related to gender and nutrition to their parents and/or other adult members of the community.
- Promote gender-sensitive elements in integrated/multi-sectoral nutrition policies, programs and actions. In addition, regularly monitor and evaluate the impact of the gender sensitive elements on reducing gender disparity in health and nutrition. Moreover, explore and successively use the way these components influence each other.
- Support equal rights and access to employment, land and other resources/services such as: Right to Food and other human rights; equal access to education; reproductive health and family planning; women's access to land, financial services, extension, technology and markets among other areas.

Strategies to achieve targets related to Health Sector Management/Administration

- The Bangladesh health workforce strategy 2015 was designed in line with the Government's commitment to Universal Health Coverage. The strategy includes four cross-cutting guiding principles: gender balance, motivation, partnership and transparency and accountability. Ensure proper implementation of the health workforce strategy to achieve the desired goal of providing quality health care services to all.
- Ensure availability of competent and adequate number of workforces equitably; develop and maintain quality health workforce at all level; recruit, deploy and retain health workforce equitably; promote and maintain high standards in health workforce performance; and use health workforce information system (HWIS) to support health workforce planning and management.
- Ensure maximum utilization of resources allocated for health care delivery.
- Another important area is effective management of manpower so that we can avoid misuse and duplication of human resources for health. In addition, priority should be given to functioning the existing government health facilities.
- Improve management information system with information and communication technology and strictly implement the monitoring and evaluation system.
- Excessive out-of-pocket (OOP) payments for health care (64% of the total health expenditure) have become a burden for millions of population. Bangladesh spends 3.4 % of GDP on health and less than 1% of the populations are covered by an insurance scheme. To cope with the challenges and increase financial protection for the entire population and decrease out-of-pocket payments at point of service strictly implement the three strategic objectives proposed in the Health Care Financing Strategy 2012-2032: (i) generate more resources for effective health services, (ii) improve equity and increase health care access especially for the poor and vulnerable, and (iii) enhance efficiency in resource allocation and utilization.

Strategies to achieve targets related to population management

Strategies for family planning

- There has been slower increase in contraceptive prevalence rate in recent years. To achieve the desired targets in increasing contraceptive prevalence rate greater emphasis should be given on increasing long acting and permanent methods of contraception (i.e., IUD, Implant, female sterilization, and vasectomy). There are social stigma about using long acting and permanent method in Bangladesh. Adequate awareness program should be taken to eliminate misconceptions about contraceptive methods and making those more acceptable to couples.
- National Broadcast Policy should be reformed for using TV as an electronic media to disseminate health and family planning related Information Education and Communication (IEC)/Social and Behavioural Change Communication (SBCC) activities. DGFP should use TV as media more to communicate health and family planning related messages.
- Area-specific strategy should be adopted in broadcasting IEC/SBCC activities for bringing desired change in health and family planning sectors. In addition, IEC/SBCC activities should disseminate adequate information and counselling to address side effects of using family planning methods.
- Capacity building of the front-line workers regarding interpersonal communication should be strengthened to provide FP-MCH information so that it motivates clients in using service centers.
- Providing new generation of contraceptives (e.g., third generation oral contraceptive) to couples in order to ensure higher efficiency and lower side effects of using contraception.
- Greater investment in female education, creating awareness about the negative consequences of having more children, promoting delay in marriage and child bearing, compensating for lost wages for LAPM are needed to reduce total fertility rate to the target level.
- Using different service delivery approaches for different geographic regions and segments of population. Reducing discontinuation of contraception and unmet need for family planning through quality services, improved communication, and awareness building.

Poverty eradication

- Creating adequate employment opportunities, increasing labour productivity and real wages are the most important factor for sustainable reduction in poverty. There are substantial variations in the wages between males and females. Eliminating the wage differential by sex would have substantial impact on poverty reduction in Bangladesh.
- Remittances have wide range of impact on poverty reduction in Bangladesh. Ensure increasing flow of remittance through exploring new labour markets in abroad, sending more skilled and professional workers in abroad and eliminating barriers to sending people in abroad.

- Access to microcredit contributes to poverty reductions to a large extent through increasing consumption and facilitating income generation. Ensure higher access to microcredit among millions of people by providing increasing financial support through partner organizations.
- Tackle income inequality through increase in employment, labour productivity and wages, development of human capital, expansion in microcredit and increased social safety net programs.
- The Government has approved the National Social Security Strategy (NSSS) of Bangladesh in 2015. The NSSS is an inclusive, focused and coordinated approach to poverty reduction in Bangladesh because it recognises the differences in risks at different stages of the life cycle and provides support to various demographic groups. Ensure a successful implementation of the NSSS to eradicate poverty along with extending proper social security to marginal and vulnerable populations.

Child marriage prevention

- Create social awareness about the negative consequences of child marriage among boys, girls, parents, teachers, local representatives, and other community people.
- Ensure security of adolescent females through a combination of awareness program and strict implementation of laws related to violence against women.
- Ensure transparent birth registration for all and implement laws against child marriage very strictly.

Providing quality education

- Ensure higher than secondary education for all by eliminating dropouts both at primary and secondary levels. Ensure Quality and inclusive education at all levels.
- Ensure teacher competence and school efficiency through ongoing professional development. Provide Continuous support for student-centered learning, establish teacher feedback mechanisms, provide administrative support and leadership.
- More investment should be given on education and skill building which will eventually contribute to enhance competitiveness of Bangladeshi workers.
- Ensure full implementation of National Skill Development Policy (NSDP 2011)

Creating employment opportunities

- Ensure smooth transition to labour force participation and self-employment after completing education through creating more employment opportunities for youths by providing diversified technical and vocational education in areas of fish Production, leather, textile, mechatronics, mining & mine survey, Construction, Environmental, Garments Design & Pattern Making, Electro-Medical and the ICT sector.
- Explore new sectors for creating employment opportunities within country and in abroad including greater focus on ICT, agro processing industry, tourism.

- Address the problem of underemployment among youths population both in rural and urban areas and develop a database of graduates with their skills and capabilities. Provide skilled training for becoming an entrepreneur/small business among youth population.

Promote international migration

- Explore new job markets abroad where there are decent work opportunities. In addition, adequate initiatives should be taken to ensure regular circular migration indicating that one batch/group will be trained for going abroad by the time other batch/group returns.
- More investment should be given on education and skill building which will eventually contribute to enhance competitiveness of Bangladeshi workers. Provide skill training based on skill demand of local industries and overseas job market.
- Provide legal support services for migration in a transparent and affordable manner by eliminating corruption, harassment and mismanagement in the process of migration.
- National Youth Policy (NYP) needs to be demand driven along with a well-crafted strategy and time bound action plan with adequate resource allocation. It should be more clearly connected to broader national policy frame work including Five Year Plan, PRSP, National education policy, industrial policy, SME policy so that mainstreaming youth issues in all policies of public and private sector initiatives can be ensured.

Addressing problems of elderly people

- Elderly people suffer from multiple health problems. Access to adequate information about health care facilities and treatment should be ensured for elderly people. Most importantly, ensure quality health care services for elderly people at free of cost.
- Motivational and awareness programs should be taken to ensure that elderly people are getting adequate care and support from family and society.
- Access to food is the basic human rights. Ensure adequate supply of food for elderly based on their needs. Rationing food should be given to elderly people.
- Initiatives should be taken to ensure adequate financial support for elderly people in Bangladesh. The coverage of old age allowance should be expanded and amount of the allowance should be increased as well to ensure that elderly people can meet their basic needs with the allowance.
- Prevent abuse and exploitation against elderly people through creating awareness program on one hand and taking stern action against those who abuse and exploit elderly people. To achieve this, develop communication system with the elderly people so that they can report complains faster to the legal authority.
- During disaster elderly people have different need compared to other people such as medication and suitable food. To address these problems of elderly people, include particular provisions for elderly people in disaster risk reduction manuals and training activities.

- Ensure proper implementation of initiatives mentioned in the National Social Security Strategy (NSSS) including the Old Age Allowance for senior citizens who are aged 60 years and above and belong to the poor and vulnerable population, explore possibilities to establish a National Social Insurance Scheme (NSIS), to be managed under the Insurance Development & Regulatory Authority (IDRA) under the provision of the Insurance Act-2010, based on the principle of employers and employees jointly paying contribution, provide pensions as well as address other contingencies (such as disability, sickness, unemployment and maternity).

Strategies to achieve targets related to climate change, displacement and health

MOHFW has formed a Climate Change and Health Promotion Unit (CCHPU) to ensure coordination of health promotional activities; capacity building for minimizing the consequences of climate change on health. This is an excellent initiative to address health consequences of climate change. Therefore, the key point here is to ensure that the goals are achieved with greater efficiency. In addition, following strategies should be taken to achieve targets related to climate change, displacement and health.

- Enhance understanding, knowledge and capacity at different levels of educational system, invest in leadership and management capacity development of service providers and stakeholders, and promote mechanisms for raising capacity for climate change related effective planning.
- Strengthen integration of climate change adaptation with development efforts through building institutional capacity to integrate CCA in Development programming, prioritizing development projects which have proven adaptation co-benefit potential, and allocating greater investment in the environmental and natural resource management.
- Increase climate change adaptation funding ensure that all components of disaster risk reduction and climate change adaptation are implemented properly and ensure proper utilization of Green Climate Fund.
- Ensure decentralization and local level mainstreaming of disaster risk reduction through incorporating DRR and CCA into district level development plans, strengthening coordination between GOB and civil society at the district level, and providing incentives for design, implementation and maintenance of disaster risk reduction investments in local level.
- Other strategies for addressing problems related to climate change, displacement and health include developing Strong Public Private Partnership along with Global Partnership, introducing disaster insurance for sustained development, strengthening institutional capacity for greater and effective coordination, developing a right based national plan to resolve climate displacement, undertaking advanced research to assess impact of climate change on health, initiating surveillance measures for climate sensitive diseases, and strengthening policy and regulatory framework.

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Part-4

Background Paper of Vision 2041: "Empowerment of Children, Women and Youth to Strengthen Social Inclusion and support Shared Prosperity"

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Section 1: Introduction & Background

For the last few decades or so, Bangladesh has attained moderately high GDP growth with impressive progress in a number of socio-economic indicators. The country expects to graduate out of the LDC status by 2021 and aspires to reach the upper middle income status by 2030. After successful experiences of accomplishing a number of Millennium Development Goals, the country now aims at progressing towards attaining the Sustainable Development Goals, targeting towards elimination of poverty, reducing inequality and empowering the less privileged groups of people. The cornerstone of such an inclusive development strategy is a robust one of job creation through employment intensive growth which will absorb the army of additional workers that will enter the labour force due to the demographic transition of the country.

In this context, utilizing the potential of different demographic groups can be the key towards moving into higher growth trajectory and for social inclusion of different segments of population. In this regard, the composition, trend and characteristics of youth population is of further importance due to their direct contribution to the labour market. It is also important to incorporate child welfare at every stage of development planning to ensure a steady flow of healthy workforce in the future. Moreover, the patriarchal social structure of Bangladesh often puts women in a disadvantaged state in terms of many socio-economic indicators. Therefore, policies need to be considered through a gender lens and increasing access to women and improving their participation in the different sectors of the economy will not only empower women but also will contribute towards the growth process of the economy.

Youths, women and children together not only constitute the largest segment of Bangladesh population, but also have significant contribution in the economic development of the country. Yet according to both anecdotal as well as empirical evidences, children and women are arguably the most vulnerable groups in terms of different socio-economic indicators, e.g. income, education, employment, asset holding etc. These groups are therefore more likely to have low levels of education and skills and a higher incidence of poverty. Such factors have deprived these groups from effectively participating in economic and social activities resulting in weak integration to mainstream economic activities. The youth population are also characterized by low level of education and skill and as a consequence are often found to suffer from unemployment or are engaged in low paying, low productive jobs.

Under such a context, the government has put increased emphasis on policies focusing on the empowerment of these vulnerable groups. Success was seen with these policies with the conditions improving in many indicators. However, challenges still remain in a number of areas in mainstreaming these groups in different economic activities. Innovative methods and strategies need to be identified to harness the potential of these groups and utilizing the demographic dividend.

This study attempts to utilize nationally representative data to understand the existing status of youths, women and children and to explore ways to promote greater social inclusion and economic empowerment of these groups. **Section 2** uses the HIES data of several rounds to understand the current scenario of the stated groups in lieu of different

indicators of vulnerability e.g. poverty, employability, level of education etc. **Section 3** offers a brief discussion of relevant national policies that are in place in connection to the betterment of children, youth and women. **Section 4** offers simple projection of a number of variables related to the status as well as empowerment of children, women and youth using the existing data. In addition, this section also utilizes time series data to analyze the long run relationship between youth population and economic growth. **Section 5** first identifies the key challenges faced by these demographic groups and based on analyses of previous chapters and experiences of other countries, and then proposes a number of recommendations for greater social inclusion and empowerment of these groups.

Section 2: An Overview of Current Status of Children, Youth and Women[17]

Children, Youth and Women are specific demographic groups which, on one hand can have important implications towards economic growth and development and on the other are often argued to be at a vulnerable state in terms of socio-economic position. In the context of Bangladesh, these groups, especially the children and women are often deprived of access to basic necessities and left out of the mainstream economic activities. One important point to note in this regard is, children, women or even youths are often found to be at a 'vulnerable' state due to their economic position, e.g. children, youths, or women of poor households can mostly be termed as 'vulnerable' from an economic point of view. However, even if the households where they belong are not poor in general term, they might fall victim of poverty in case of any economic/environmental/ethnic/social shocks which can lead them into a poor state.

From a methodological point of view, in addition to the above mentioned shortcomings of measuring vulnerability status, it is also not that straight forward to determine 'vulnerability' as well as poverty of any particular member of a household as in most of the surveys it is typical to have information about economic status of a household rather than that of an individual. Therefore, household level poverty and vulnerability need not be synonymous to individual level poverty and vulnerability. In order to get insights of vulnerability and poverty of any specific group, we often have to rely on household level information, while keeping in mind the shortcomings. In this section, analysis of vulnerability of youths, women and children has mostly been carried out on the basis of household level data.

2.1 Analysis of Poverty:

This section attempts to measure the status of poverty of children, women and youth using the data from different rounds of the HIES (Household Income and Expenditure Survey) conducted by BBS (Bangladesh Bureau of Statistics). Here, assessment of poverty has been conducted on the basis of traditional measures of poverty such as the Head-Count Ratio (HCR), Poverty Gap (PG), and Squared Poverty Gap (SPG). The basic methods of calculating poverty have been outlined in Annex A.

2.1.1 Household Level Poverty over the Years:

Bangladesh has arguably made impressive progress in terms of sustainably reducing poverty and such progress can be seen both at rural as well as urban level. Household Income

17 There exist different definitions of defining youth and children. In the study, we defined Children as those who are 0-18 years old. In case of poverty and vulnerability estimate, we consider Youth as the group of people who are 18 to 35 years old.

and Expenditure Survey (HIES) of different years reveal that the country has significantly reduced both Extreme Poverty (as measured by lower poverty line) and Moderate Poverty (as measured by upper poverty line). The Head Count Ratio of 2016 for moderate poverty shows that it has reduced from 48.9 in 2000 to 24.3 in 2016. Similar achievement can also be observed in case of extreme poverty as the country has been able to reduce extreme poverty to 12.9 in 2016 from as high as 34.3 in 2000 (Table 2.1).

One of the major limitations of head count rates is that it gives the percentage value of poverty incidences and only indicates whether a household is poor or not, based on a simplistic line. But a household which is very close to poverty line is not the same as a household who is at a relatively greater distance from the poverty line. So we also need to know the severity/depth of poverty or the distance of the poor households from the poverty line-known as poverty gap. Trend of Poverty Gap reflects progress in terms of poverty reduction effort (Table 2.2). In addition to Poverty Gap, another widely used poverty estimate is Squared poverty gap (SPG), which measures the severity of poverty and a substantial decrease in SPG also indicates improvements in the severity of poverty. Table 2.2 shows the SPG for 2000, 2005, 2010, and 2016 which indicates that the value of SPG for national, rural and urban levels has decreased and hence improvement has been registered in case of severity of poverty too.

However, despite of such progresses, as reflected in HIES 2016 there are a significant proportion people below the poverty line. The 7th Five Year Plan aims at reducing poverty to 18.6% and extreme poverty to 8.9% by 2020 and according to the targets of SDGs, the target is to eliminate poverty by 2030. A number of strategies related to Social Safety Net programs along with creation of employment opportunities have already been taken into account to attain these targets. Despite such attempts, the targets are still quite challenging given the existing scenario.

Table 2.1: Head Count Rates of Incidence of Poverty (CBN Method)

	HIES	2000	2005	2010	2016
Upper Poverty Line	National	48.9	40.0	31.5	24.3
	Rural	52.3	43.8	35.2	26.4
	Urban	35.2	28.4	21.3	18.9
Lower Poverty Line	National	34.3	25.1	17.6	12.9
	Rural	37.9	28.6	21.1	14.9
	Urban	20.0	14.6	7.7	7.6

Source: HIES different years and author's calculation.

Table 2.2: Trend of Poverty Gap & Squared Poverty Gap (Upper poverty line)

	Poverty Gap				Squared Poverty Gap			
Year	**2016**	**2010**	**2005**	**2000**	**2016**	**2010**	**2005**	**2000**
National	5.0	6.5	9.0	12.8	1.5	2.0	2.9	4.6
Rural	5.4	7.4	9.8	13.7	1.7	2.2	3.1	4.9
Urban	3.9	4.3	6.5	9.0	1.2	1.3	2.1	3.3

Source: HIES different years.

A detailed analysis of head count poverty over different household characteristics reveals a number of interesting findings. For example, from Table 2.3 it can be seen that, for

female headed households the reduction in poverty from 2000 to 2005 was greater their male counterparts and it held true for both rural as well as urban areas. In recent years, e.g. from 2005 to 2016, we however observe the opposite picture. Especially in urban areas, according to recent estimates (HIES 2016) poverty as represented by HCR for female headed households has rather increased. In urban area, it is quite plausible that, due to slow pace of growth of RMG sector in recent years, the prime source of wage employment for females in urban area, women were affected. The relative progress in rural areas, on the other hand can be due to the fact that a lot of women are engaging themselves in various income-generating programs like that of micro-credit or initiatives involving remittance earning and thereby being able to move out of poverty.[18]

Table 2.3: Incidence of Poverty by Sex of Household Head

	Sex of Household Head	2000	2005	2010	2016
National	Male	49.0	40.8	32.1	24.8
	Female	47.2	29.5	26.6	19.9
Rural	Male	5 2.5	44.9	35.9	27.1
	Female	50.6	31.0	29.3	20.0
Urban	Male	35.1	28.7	21.7	18.8
	Female	37.1	24.4	17.5	19.7

Source: HIES different years.

Table 2.4: Division Wise Poverty Status (as % of population of that division): HIES 2016

Name	Lower poverty line		Upper poverty line	
	Non Poor	Extreme Poor	Non Poor	Poor
Barisal	84.25	15.75	71.60	28.40
Chittagong	84.36	15.64	73.04	26.96
Dhaka	91.73	8.27	81.85	18.15
Khulna	87.48	12.52	71.97	28.03
Mymensingh	79.33	20.67	62.93	37.07
Rajshahi	85.92	14.08	71.75	28.25
Rangpur	72.40	27.60	56.75	43.25
Sylhet	87.52	12.48	81.74	18.26

Source: HIES 2016 and author's calculation.

In the context of Bangladesh, there has been significant disparity across different regions in terms of poverty due to a variety of factors, some of which are simple economic, some are social, whereas some can be environmental. As shown in Table 2.4, Rangpur hosts the largest proportion of poor households and as high as 43% of households of Rangpur division are found to live below poverty line. Poor network of the inhabitants to the capital city, slow pace of industrialization, drought, seasonal unemployment/manga etc. can argued to have restricted economic opportunities of households of Rangpur. The district of Mymensingh have sizable proportion of poor households too and slow pace of industrialization, unfavourable environmental condition, etc. can be considered as the prime reasons for higher rate of poverty in that region. Sylhet and Dhaka divisions, on the other hand have lowest proportion of poor. High rates of internal as well as international migration and remittance flow as well as greater degree of industrialization and connectivity can be considered as the reasons behind.

18 Many of the remittance recipient households are found to be women headed where women are in charge of the family in absence of men.

2.1.2 Poverty of Youths:[19]

As HIES does not have information for calculating poverty at individual level, in this analysis household level poverty has been used as a proxy for poverty of youths. According to HIES 2016, education of youths appears to have an important role on poverty as it can be seen that proportion of both poor male and female youths having 'no education' are higher than other educational categories (Table 2.5). In addition, HCR reveals an important feature- with no education, primary education, or secondary education, there is greater proportion of poor females than that of males.

Table 2.5: Youth by Level of Education (as % of total youth and using Upper Poverty Line): HIES 2016 CoUsinlumn1ouy

	Poor		Non Poor Columnonn3	
	Male (%)	Female (%)	Male (%)	Female (%)
No Education	5.58	6.46	10.54	11.59
Primary	3.67	4.71	9.27	10.73
Secondary	2.77	2.96	11.27	12.16
Higher Secondary	0.25	0.23	2.49	2.23
Tertiary	0.13	0.09	1.41	1.48

Source: HIES 2016 and author's calculations.

2.1.3 Poverty of Women:

While interpreting incidence of poverty across males and females, HIES 2016 data reflects no significant difference in poverty level across different education clusters. However, this analysis has to be interpreted with much caution because both anecdotal as well as empirical evidences suggest that, in patriarchal South Asian societies women are often neglected and discriminated at households in terms of even basic necessities.[20] Therefore, unless we have data on intra- household consumption and expenditure, poverty of females should be interpreted with caution.

Table 2.6: Poverty by Level of Education of Male and Female: HIES 2016

	Poor		Non-Poor	
	Male (%)	Female (%)	Male (%)	Female (%)
No Education	6.50	6.49	12.04	11.77
Primary	4.38	4.35	10.64	9.95
Secondary	2.66	2.62	11.15	10.75
Higher Secondary	0.20	0.19	1.97	1.79
Tertiary	0.09	0.07	1.22	1.15

Source: HIES 2016 and author's calculations.

2.1.4 Poverty of Children:

As discussed, one of the shortcomings of household level poverty estimates as in HIES is, it does not offer information for poverty at individual level. From HIES poverty measures, it is therefore not possible to infer about poverty of any particular demographic group of a household e.g. woman, youth or child. However, as for the children, household level

19 For this exercise youth is defined as 'the portion of the population who are aged in between 18 and 35 years'.
20 See Razzaque et al. (2011).

poverty can be considered as a good approximation of child poverty so information of household poverty can be utilized as an alternative. From Table 2.7, we can say that poor children are mostly found in rural areas-around 29% boys and 26% girls, as opposed to 12% boys and 12% girls in urban areas are found to be rural based and are living below poverty line. The recent estimates however do not show any significant difference in poverty level between boys and girls (Table 2.7).

Table 2.7: Poverty of Children as Percentage of Total Children (HIES 2016)

	Rural		Urban	
	Boy (%)	Girl (%)	Boy (%)	Girl (%)
Poor	29.33	26.39	12.28	11.75
Non Poor	14.30	13.83	4.51	4.50

2.2 Vulnerability and Socio-Economic Position through Labour Market Status:[21]

There is no denying the fact that, economic position of an individual in the society is shaped by his/her labour market status. The labour force participation rate (LFPR) has been around 55% over the last few years with a stable LFPR of around 80% for males but a steady increase in female labour force participation rate- from a mere 23.9% in 1990 LFPR has increased to 33.5% in 2013. Concern still remains in terms of quality of employment and associated (low) earnings and informality of job. Besides, despite of increasing FLFPR, a vast majority of women are outside of the labour market and among those who are employed, almost half are engaged in unpaid activities without much scope of social or economic empowerment. Informality of jobs without job security, retirement benefit or security in terms of health and safety often makes an individual's economic position highly unstable and vulnerable too and according to Labour Force Survey (LFS) 2013, as high as 87% of the labour force was engaged in informal sector. In addition, 'decent' work is still not seen in most of the cases and according to a research only 10% of the wage employed and 9% of the self employed are in decent jobs (Raihan et al. 2016).

2.2.1 Youth Labour Force:[22]

As discussed, Bangladesh is now enjoying a phase of demographic transition and hosts a large pool of population within the working age group. According to LFS 2013, youths within the age range of 15 to 29 years, constitutes a significant part of the total labour force (Table 2.8). This vast number of youths can be converted into 'dividend', provided they are of high quality, endowed with skill and education. However as high as 12% of youths are found to have no education with only around 5-6% possess tertiary education. As for training is concerned only around 7% have found to have received any training. Therefore, significant effort should be given to improve the quality of youth population as defined by education and training (Table 2.9). Another important indicators of skill level is that of knowledge of ICT and as shown in Table 2.9 only 8.2% of youth population reported to have internet connection at home whereas only 17% claimed to have ever used internet. A vast majority of youths are therefore outside of ICT access, with no or low level of

21 For having consistency with Labour Force Survey of BBS, in this section, youths have been defined as those within the age range of 15 to 29 years.

22 For this exercise youth is defined as 'the portion of the population who are aged in between 15 and 29 years'.

education and without any training experience, resulting in a large pool of youths being unemployed, under employed or not in employment, education or training (NEET).

Table 2.8: Trend of Labour Market Profile of Youth Population (15-29 years)

	2005	2010	2013
% of Youth in Population	17.04	26.39	28.24
% of Youth in Total Labour Force	35.96	36.86	37.05

Source: Compilation from Labour Force Survey, Bangladesh.

Table 2.9: Key Features of Youth Population

Key Features	As Percentage of Youth Population (15-29)	As Percentage of Total Population
Male	47.63	49.60
Female	52.37	50.40
Married	97.50	90.50
Rural Dweller	52.85	53.78
Average Age	21.78	27.77
Received any Training	7.12	4.46
Ever Used Internet	16.98	9.27
Have Internet in HH	8.24	7.29
Ever Used Computer	13.67	7.46
Can Read and Write	81.30	56.21
Currently Studying	28.63	29.24
No Education	11.92	22.20
Primary (class I-V)	19.51	29.03
Secondary (class VI-X)	40.78	30.17
Higher Secondary (class XI, XII)	21.83	12.20
Tertiary Education	5.74	5.39
Other Education	0.23	1.02
Ever Drop Out	47.31	30.45

Source: LFS 2013

In terms of labour market participation, around 40% of youth females and 66% of youth males are found to be in the labour force. In terms of quality of employment of youths, as high as 22.5% of those who are unpaid family workers (Table 2.10). Engagement in unpaid occupation is strongly prevalent among females and as high as …% of employed youth females are found to be in unpaid jobs. Such unpaid jobs as family workers cannot be considered as main-stream economic activities and as for females, these jobs do not contribute to their economic or social empowerment.

Table 2.10: Labour Market Status of Youth Population (15-29 years): 2013

% of Youth Population	Male	Female	All
In Labour Force	66.23	39.59	52.28
Unemployed	5.12	4.97	5.04
Employed	61.10	34.62	47.23
Paid	81.98	46.27	67.82
Unpaid	10.28	41.18	22.54
Not in Labour Force	33.77	60.41	47.72

Source: LFS 2013

In Annex B, with the help of LFS 2013, labour market experience of male and female youths (15-29 years), particularly those of (i) participation and (ii) earnings have been analyzed.[23] Our estimates pointed out the importance of education and training in labour market participation of youths: for example, in comparison to an otherwise similar youth without any education, a youth with a primary degree have higher probability to join the labour force. The result is however not consistent across other stages of education. Annex B (Column 2 & Column 6) also shows that a female youth with training have as high as 43 percent higher probability to participate in labour market than an otherwise similar female youth without training where the corresponding probability for a youth male is around 2 percent. As it is often argued that, it is not participation in the labour force per se, rather the quality of work that matters for growth and productivity, probit estimates of participation in paid activities as opposed to non paid reveal that, training has significant and positive impact in paid engagement of youths where the contribution appeared to be stronger for youth females (Column 3 & Column 7). As for education, for paid participation, although the estimates for youth males are not quite clear, for youth females, our estimates provide evidence of importance of education in increasing participation probability in paid work. As for females, being married reduces probability of participating in paid jobs whereas having children less than five years of age also affects participation decision in a negative manner. In Column 4 & Column 8 of Annex B, simple Ordinary Least Square models and in Column 5 & Column 9, Heckman model for correcting sample selection bias have been run and the findings reflect positive and significant returns to education along with returns to training. The role of ICT has also been reflected in the analysis and having computer is found to have positive and significant impact of earning of youths. In case of training, the return to training has been found to be higher for female youths than their male counterparts. This analysis therefore, further justifies the importance of greater investment in training and skill development programmes for youth population.

2.2.2 Female Labour Force:

Over time, although there has been rapid rise in female labour market participation over the years, the rate is still far below that of males-according to Labour Force Survey 2013, male LFPR was 81.7% where the corresponding figure for females was 33.5%. In terms of quality of employment, only around 4% women above 15 years of age are found to be in wage employment with another 12.2% in self employment activities. The remaining 83.8% of working age women are either outside the labour force, or are unemployed or are engaged in unpaid family work-neither of these can be considered 'empowering' for them. Therefore, despite of rise in labour market participation of women, in case of social inclusion and economic empowerment, a large number of women are still outside of main stream economic activities.

Table 2.11: Labour Market Status of Working Age Population

	2010	2013	2010	2013
	Male		Female	
Self Employed	37.49	34.00	8.51	12.23
Wage Employed	35.85	40.77	5.76	3.97
Unpaid	5.79	3.78	19.09	13.35
Unemployed	2.06	2.77	1.27	3.24
Not in labour Force	18.82	18.69	65.37	67.21

Source: LFS various years

23 For detailed discussion and results, see Bidisha, S. H. (2016). This part is taken from that source.

In terms of education level, Table 2.12 shows that although at primary level, there is no gender gap, at higher levels females are found to be increasingly lagging behind their male counterparts. As a consequence, the representation of females in relatively high paying jobs is quite low--less than 1% females are engaged in 'professional, scientific and technical' occupation, i.e. occupations attached with stable and relatively high salary with essential institutional arrangements (Table 2.13). In 'administrative' jobs or in 'public service' similar scenario of low representation of females can also been seen. Women's representation on the other hand, was found to be highest in 'agriculture, forestry and fishery' and as high as 47% women are engaged in this sector, where the jobs are mostly informal, unstable, low paid without any contractual arrangement.

Table 2.12: Education Level of the Labour Force (in %): 2013

	Male	Female	All
No education	16.21	18.25	16.81
Primary Education (I-V)	25.15	30.35	26.68
Secondary Education (VI-X)	32.03	29.97	31.42
Higher Secondary (XI, XII)	15.57	13.90	15.08
Tertiary	10.66	7.18	9.63
Other	0.39	0.35	0.38

Source: Labour Force Survey 2013

Table 2.13: Employment of Females by Industry and Occupational Category (2013)

Major Industry	**% of Employed Female**
Agriculture, forestry and fishing	47
Manufacturing	20.67
Wholesale and retail trade, repair	5.14
Accommodation and food service activities	1.08
Education	6.14
Human health and social work activities	2.85
Other service activities	4.34
Activities of households as employers,	7.61
Status in employment	
Paid employee (waged/salaried worker)	35.38
Employer, self employed	13.43
Unpaid/contributing Family Worker	45.17
Day labour (agriculture/non agriculture)	Na
Domestic Worker	Na
Others	6.01
Occupation	
Managers	0.77
Professionals	7.88
Technicians and Associate Professionals	1.9
Clerical Support Workers	1.62
Service and Sales Workers	10.73
Skilled Agricultural, Forestry and Fish	39.38
Craft and Related Trades Workers	22.4
Plant and Machine Operators	2.87
Elementary Occupations	12.42

Source: LFS various years. na=not available; Mahmud & Bidisha (2016)

2.2.3 Child/Working Children in the Labour Force:

According to the 18th International Conference of Labour Statisticians and Bangladesh Labour Act 2006 and 2013, working children includes both child labour and non child labour where the latter group includes those of 12 to 17 years age and are engaged in non-hazardous/light work up to 42 hours each week. On the other hand, child labour is defined when any 5 to 11 years old works for any period of time in non-hazardous job. Based on such definition, hazardous child labour can be termed as those between 5 to 17 years working for more than 42 hours per week in non-hazardous job or are involved (Child Labour Survey 2013). Based on such definition, within 3.45 million working children, there are around 1.7 million child labour in the country, with 0.95 million male child labour and 0.75 million female child labour. Of that 1.7 million, 1.28 million are found to be involved in hazardous job. As shown in Table 2.14 majority of working children are involved in Agriculture sector, followed by Manufacturing, whereas a small percentage are involved in Construction, Wholesale and Retail Trade and in Transportation and Storage. In terms of types of occupation, the highest concentration is found in Crafts and Related Trades (Table 2.15).

Table 2.14: Distribution of Working Children by Sector (total 3.45 million)

Sector	Million
Agriculture, Forestry, Fishing	1.27
Manufacturing	0.94
Construction	0.16
Wholesale and Retail Trade	0.42
Transportation & Storage	0.15

Source: Child Labour Survey, 2013

Table 2.15: Distribution of Working Children by Leading Occupation (Total 3.45 million)

Occupation	Million
Elementary Occupations	0.62
Plant and Machine Operators	0.16
Craft and Related Trades	1.01
Skilled Occupations	0.95
Service and Sales Workers	0.60

Source: Child Labour Survey, 2013

2.3 Analyzing Vulnerability:

In this analysis, we attempted to understand vulnerability of households while distinguishing the traditional measure of ex post poverty from ex ante poverty. Vulnerability to poverty can be viewed as ex ante expectation of poverty which is, in other words, the probability that the consumption of a household will lie below the predetermined poverty line in near future (for example, the calorie intake of a person of a household will lie below 2,121 kilo calorie per day). Because of the presence of shocks, risks, uncertainty and many other unforeseen events, it is not very unlikely that some of the households or groups of people may fall below the poverty line even if they can currently be termed as non poor. Similarly, although not very likely but it is also feasible that some will be able to find themselves out of poverty. Thus it is possible to identify those groups who are highly likely to fall below the poverty line in near future even if the ex post measure of poverty suggests that they are currently above the poverty line.

It is therefore important, especially in the context of policy formulation to understand about those vulnerable population, e.g. those who are not currently below the poverty line but are expected to fall below the poverty line in near future. In the absence of nationally representative panel data set, as an alternative, in this analysis, a methodology applied by Chaudhuri (2003), Chaudhuri et al. (2002) and Suryahadi and Sumarto (2003) was followed. This method was implemented by Azam et.al. (2009) in the context of Bangladesh with HIES 2005 data set where they constructed an index for measuring vulnerability. For detailed analysis of methodology see Annex C.

2.3.1: Vulnerability Analysis:

As mentioned in Haughton and Khandker (2005), for a household (or individuals) according to the index of vulnerability, if the probability of vulnerability is greater than or equal to 0.50 then it can be considered as highly vulnerable to poverty. Households with probability less than 0.50 but greater than or equal to the headcount poverty rate (which is 0.17 using the lower poverty line of HIES, 2010) have lower probability of being poor in the next year, hence they can be regarded as 'low/moderately vulnerable' to poverty. Finally, if this probability is less than 0.17, they can be treated as 'not vulnerable' to poverty. Based on the above mentioned methodology, using the lower poverty line for ultra poor, the estimated results show that only 4% people are highly vulnerable to poverty, whereas 13% can be termed as moderately vulnerable, and 83% are not vulnerable according to the definition (Table 2.16). In addition, although 72% people were found to be non-poor, around 9% were considered to be vulnerable, of which 2% were highly vulnerable to poverty and the remaining 7% were moderately vulnerable. In other words, vulnerability (as defined here) can be considered as more widespread than poverty and a sizable proportion of the population are at the risk of falling into poverty, even if they are not currently poor.

Table 2.16: Vulnerability of Households (as the proportion of total population)

Degree of Vulnerability	Criterion	Non Poor	Poor (UPL)	Poor+ Non Poor
Highly Vulnerable	vhat≥0.50	1.81	2.16	3.96
Moderately Vulnerable	0.17<=v-hat<0.50	6.61	6.16	12.77
Not Vulnerable	v-hat<0.17	64.05	19.22	83.27
All groups		72.46	27.54	100.00

Source: HIES 2016 and author's calculation.

A clearer picture can be depicted through Table 2.17 where the percentage of people who are vulnerable to poverty to the pool of poor people has been calculated. Here, 8% of poor people were found to be highly vulnerable to poverty, that is, they are highly likely to remain poor in the next year. This proportion is relatively lower among those who are non-poor and only 2.5% of non-poor are found to be highly vulnerable to poverty. One noteworthy feature is that, as high as 70% of people who are currently poor are likely to bounce back in the next period as they can be termed as not vulnerable. The analysis of vulnerability and longer term socio-economic status should therefore be conducted while considering not only present status of poverty but also the probability of being poor in future.

Table 2.17: Percentage of Vulnerable People in Different Poverty Groups

Degree of Vulnerability	Criterion	% of Non-Poor	% of Poor (UPL)
Highly Vulnerable	vhat≥0.50	2.49	7.83
Low Vulnerable	0.17<=v-hat <0.50	9.12	22.36
Not Vulnerable	v-hat<0.17	88.39	69.81
All		100	100

Source: HIES 2016 and author's calculation.

It is widely accepted that in some parts of the country, poverty is much wide spread and prominent than in other parts. Similar scenario can be found for vulnerability too- due to a wide variety of socio-economic reasons, people in some parts of the country are found to be more vulnerable to any economic or environmental shocks. Given the geographical location of the country, a significant proportion of people are found to be at a vulnerable state and as shown in Table 2.18 that the district of Chittagong is found to be the most vulnerable as 4.8% of the total surveyed people are highly vulnerable to poverty and another 21% people are moderately vulnerable.[24] In addition, as high as 23% people of Feni and 21% of Cox's Bazar are found to be vulnerable to poverty. All of these districts are known to suffer from natural calamities and are not strongly connected to larger cities (except Chittagong), which can argued to have constrained their economic opportunities and made them susceptible to any shocks. On the other hand, Khulna and Chandpur district, which are relatively well connected to major economic poles are found to have the lowest percentage (3%) of people vulnerable to poverty (among the selected cities). In comparison to the national average of 4% of high vulnerability (Table 2.16), most of the districts as outlined in Table 2.18 are found to be more vulnerable, indicating a strong association of vulnerability with environmental calamities. The children, youths and women of these vulnerable areas are expected to be more vulnerable as well and therefore requires special attention in terms of relevant policies and strategies.

Table 2.18: Vulnerability in Different Environmentally Vulnerable Districts (as % of Districts' Population): HIES 2016

District	Highly Vulnerable	Low Vulnerable	Not Vulnerable
Borguna	1.36	11.19	87.46
Bhola	2.87	12.41	84.71
Barisal	3.07	13.24	83.69
Jhalokati	2.71	17.72	79.57
Patuakhali	0.49	8.06	91.45
Pirojpur	1.96	8.64	89.40
Chittagong	4.80	21.16	74.04
Lakshmipur	0.82	6.49	92.69
Noakhali	1.54	8.21	90.25
Gopalganj	3.27	11.16	85.57
Madaripur	2.87	14.94	82.19
Bagerhat	3.08	10.85	86.07
Jessore	1.12	8.94	89.95
Khulna	1.22	1.62	97.16
Narail	0.97	11.18	87.85
Satkhira	2.84	12.60	84.55
Feni	8.10	15.05	76.85
Cox's bazar	4.99	15.60	79.40
Chandpur	0.23	2.73	97.04
Shariatpur	5.01	9.69	85.30

Source: HIES 2016 and author's calculation.

24 Table 2.20 contains percentage of people vulnerable and non vulnerable as a percentage of total people surveyed from that district. The 20 districts listed comprise the coastal region of the country. Basically, there are 19 districts considered as coastal districts (PDO-ICZMP, 2003) but we have included Khulna district, since it is also in the coastal region.

2.3.2 Vulnerability of Youths :[25]

Table 2.19 reveals that around 13% of total youths are found to be vulnerable to poverty whereas 27% youths are found to be poor. Although 73% of the total youths are non poor, among them 6.4% (of the total youth) are vulnerable to poverty. In addition, though 27% youths are found to be poor, among them 6.5% of total youth (who are currently poor) are found not to be vulnerable. Table 2.20 shows similar findings from a different angel. Although 24% of poor youths are vulnerable to poverty, as high as 76% poor youths may hope to bail out from poverty in the next period as they are found not to be vulnerable. On the other hand, 9% of the non-poor youth are found to be vulnerable to poverty.

Table 2.19: Vulnerability of Youths (% of vulnerable youth to the total number of youth)

Degree of Vulnerability	Criterion	Non Poor	Poor (UPL)	Poor+ Non Poor
Highly vulnerable	vhat≥0.50	1.37	1.74	3.11
Moderately vulnerable	0.17<=v-hat<0.50	4.99	4.73	9.72
Not vulnerable	v-hat<0.17	66.80	20.37	87.17
All groups		73.16	26.84	100

Source: HIES 2016 and author's calculation.

Table 2.20: Vulnerability of Youths (% of vulnerable youth in different groups)

Degree of Vulnerability	Criterion	Non Poor	Poor (UPL)
Highly Vulnerable	vhat≥0.50	1.87	6.49
Moderately Vulnerable	0.17<=v-hat<0.50	6.82	17.62
Not Vulnerable	v-hat<0.17	91.31	75.89
Total		100	100

Source: HIES 2016 and author's calculation.

2.3.2 Vulnerability of Woman:

Table 2.21 shows that the total number of women constitutes of 28% poor and about 8% (1.95+6.25) of poor women are likely to remain vulnerable in the following year. Vulnerability index however reveals that, around 8% of women who are found to be 'non poor' during current period, can fall in the poverty trap in the next period (can become vulnerable). As a whole, among the total population of women, around 28% are found to be poor whereas 16% are in a vulnerable state-who are not poor at the present state but are likely to fall into poverty trap.

Table 2.21: Vulnerability of Women (% of vulnerable women to total women)

Degree of Vulnerability	Criterion	Non-poor	Poor (UPL)	Poor+ Non poor
Highly Vulnerable	vhat≥0.50	1.64	1.95	3.59
Moderately Vulnerable	0.17<=v-hat<0.50	6.50	6.25	12.75
Not Vulnerable	v-hat<0.17	63.92	19.74	83.66
All groups		72.07	27.93	100

Source: HIES 2016 and author's calculation.

2.3.3 Vulnerability of Children:

From the vulnerability index of children, 32% children are found to be poor and around 21% children are found to be vulnerable to poverty. Table 2.22 further highlights that, although 58% of non poor children are found not to be vulnerable in next period, around 10% (1.99+8.27) children can fall into poverty trap i.e. can become 'vulnerable'.

25 For this exercise youth is defined as 'the portion of the population who are aged in between 18 and 35 years'.

Table 2.22: Vulnerability of Children (as % of total children)

Degree of Vulnerability	Criterion	Non Poor	Poor (UPL)	Poor+ Non Poor
Highly Vulnerable	vhat≥0.50	1.99	2.50	4.50
Moderately Vulnerable	0.17<=v-hat<0.50	8.27	8.17	16.45
Not Vulnerable	v-hat<0.17	57.96	21.10	79.06
All groups		68.22	31.78	100

Source: HIES 2016 and author's calculation.

The analysis of vulnerability index therefore reveals that, simple poverty analysis per se is often not sufficient to understand the socio-economic position of an individual. A non poor person at the current period, can fall below the poverty line in the next period and vice versa. Given that the position of children and women are even more vulnerable than an adult/male, social inclusion of these demographic groups requires analyzing a number of indicators for them, including mere poverty, labour market status and also the likelihood of being poverty in near future.

Section 3: A Review of Past and Present Policies

With a view to attaining sustained economic growth with social inclusion of vulnerable and relatively disadvantaged groups, the GoB has incorporated a number of policies and strategies in its development plans. The importance of integrating women in the development programs has already been acknowledged through gender budgeting along with other gender sensitive policies and strategies in development plans. The Government's approach towards establishing gender equality has undergone a drastic transformation since the independence of the country. On the other hand, with a favourable position in demographic transition, Bangladesh is argued to enjoy a window of opportunity to consolidate its commendable economic growth performance by enacting policies to effectively utilize its youth and child population. To this end, the government has increasingly been working towards implementing policies tailoring to the needs of different demographic groups as well as those who are in a relatively vulnerable position in terms of access to different economic resources.

3.1 Existing Government Policies for Children, Youth and Women:[26]

3.1.1 Government Policies towards Youth Development:[27]

There is no denying the fact that, with a view to attaining the goal of the 7th Five Year Plan of 8% growth rate, the contribution of youth population cannot be over emphasized (Mahmud & Bidisha, 2016). In order to utilize the potential of demographic transition, it is crucial to have supportive government policies for the youths. Such policies should be targeted towards enhancing the quality of youth labor force through appropriate training and education. The 7FYP in this regard has given special emphasis on youth development policies in line with the Vision 2021 of the government. The Vision aims at establishing a proper balance between economic progress and human development (GoB, 2009). In this context, policies have been enacted focusing on skill development of the youth through vocational training to create quality employment for the youths.

26 Annex….highlights financing requirement for long term objective (SDG Financing).
27 Given that the core policy tool of the GoB is its five year plans, in this analysis the discussion on youth development policies has been based on the 7th Five Year Plan of the GoB.

Youth development as an agenda has also been considered as crucial policy issue in the context of Sustainable Development Goals (SDGs). In order to promote youth development, a number of supportive policies and strategies have also been formulated, including that of National Skills Development Policy. The Skills Development Policy 2011 for Bangladesh is a major initiative to improve the skill component of the labour force of the country where the policy also extends and complements other major government policies such as the Education Policy, 2009; the Non-Formal Education Policy, 2006; the National Training Policy, 2008; the NSDC Action Plan, 2008 etc. along with the National Youth Policy, 2017. The National Youth Policy, 2017 outlines the strategies and policies for engaging the youths for achieving Vision 2021 and SDGs. In addition, National Education Policy has also incorporated strategies and policies for education and skill development of youths with special emphasis to improve the skill in ICT (Ministry of Education, 2010).

3.1.1.1 Targets and Strategies for Youth Development in 7FYP:

As suggested in the 7FYP, there exists a number of challenges in case of youth development-one of those is that of youth unemployment. Given that, with the existing training, infrastructure and financial facilities there is not enough jobs as wage employed to cater the demands of huge number of unemployed youths, creating adequate decent jobs for youths is the key challenge in youth development (GoB, 2015b). Under the 7th Plan, it has been targeted that 19,25,150 youths will be trained up and out of them 5,96,000 youths will be involved in self-employment activities. In addition, 75,000 youths will be trained up for temporary employment under National Service Programme. Besides, to strengthen the institutional capacity and infrastructure for youth development, seven divisional offices with infrastructures for Youth Training Centres will be established.

3.1.1.2 Existing Scenario of Youths:

As mentioned, technical and vocational training plays an important role in reducing youth unemployment and some progress has been achieved throughout the years. From 2001 to 2010, youth employment has risen by more than 47%. In particular, the highest unemployment rate was found among youths, those within the age range of 15-17 and 18-24 years (more than 10%), followed by those aged 25-29 years (6.7%) (QLFS, 2015-16, BBS). In the context of tackling youth unemployment through job creation, there exist a number of practical challenges. For example, a large segment of youth with school education is not inclined to be engaged in agricultural sector jobs and therefore, job creation should emphasize on non-farm sector such as labour intensive industries including processing of food and other agricultural products, textiles, garments, etc. In the wake of intensifying climate change and rapid urbanization, rural-urban migration has argued to have put pressure on urban labour market and unplanned urbanization is posing serious threat to urban utlility services, infrastructure, environment and labour market, indicating the need to shift the policy focus towards sustainable cities and creating job opportunities in rural and peri-urban areas. Youth development strategies therefore should incorporate a wide range of issues and challenges (GoB, 2015b).

3.1.1.3 Strategies & Policies in Relation to Youth Development:

In the context of youth development, the 7FYP has particularly emphasized on expanding Technical and Vocational Education Training (TVET) system in the country. In addition to traditional TVET program included in SSC, HSC and Diploma courses, the Directorate of Technical Education (DTE) and the Bangladesh Technical Education Board (BTEB) target to strengthen technical and vocational education within formal certification through a number of public and private institutions e.g. courses at polytechnics, vocational training institutes etc. (GoB, 2015b). TVET has got particular emphasis through National Education Policy 2010 and National Skills Development policy 2011 (NSDP) along with the TVET Reform Project (2008-2015). Steps have already been taken to establish 21 Polytechnic Institutes, 389 technical schools and colleges at upazila level and 100 technical schools in rural areas emphasizing on rural based trades and technologies (GoB, 2015b).

Although there is a separate ministry for youths (Ministry of Youth and Sports), youth development can thought to be integrated under a number of ministries and therefore while considering public investment for youth development, we should consider it in a holistic manner while taking into account development programs in relevant ministries as well. Especially, Ministry of Education, Ministry of Primary & Mass Education along with the Ministry of Labour & Employment and Ministry of Expatriates Welfare and Overseas Employment have a wide range of programmes designed particularly for enhancing the quality of youths and to get them involved in productive employment. Table 3.1 highlights development expenditure under 7FYP in these relevant ministries.

Table 3.1: Ministry wise Proposed Resource Allocation in the 7FYP for Relevant Ministries (Development Expenditure): TK Billon in Constant FY16 Prices

Key Ministries	FY16	FY17	FY18	FY19	FY20
Primary and Mass Education	55.4	82.0	93.0	103.6	116.2
Education	42.0	56.2	63.4	70.8	79.2
Science & Technology	13.0	22.5	36.0	40.0	44.8
ICT	10.7	12.9	14.5	16.1	181
Youth & Sports	3.3	4.6	4.9	5.4	6.1
Other Relevant Ministries					
Labour & Employment	2.1	3.4	5.2	7.2	9.6
Expatriates Welfare & Overseas Employment	2.5	5.1	6.1	7.2	8.2
Health & Family Welfare	53.3	64.0	72.2	81.6	92.8
Ministry of Cultural Affairs	1.3	1.3	1.4	1.6	1.8
Ministry of Religious Affairs	2.5	2.5	2.9	3.2	3.6

Source: 7FYP, GoB

3.1.2 Policies in Relation to Women Empowerment:

3.1.2.1 Existing Scenario:

Bangladesh is argued to stand out well on gender equality among the developing countries. Especially, among the South Asian countries, it has made impressive progress in a number of gender related indicators. The country continues to perform well in a number of areas, e.g. in achieving gender parity in education. Despite being a patriarchal country, Bangladesh has also made progress in providing the regulatory framework for protection of women's

rights and privileges. In this context, the most important step has been to ratify the National Women Development Policy (NWDP) in 2011. With increased enrolment of girls/women at different stages of education, we observe increased number of women entering the labor force and gaining financial empowerment.

Notwithstanding such progresses on gender agenda, given the patriarchal structure of the society, there are still a number of challenges ahead in mainstreaming women in economic, social as well as in political spheres. According to the GGR, Bangladesh ranks low on this ranking due to a number of factors including those of continued low female labour force participation, wage discrimination against women, inadequate representation of women in senior civil service positions and inadequate female managerial jobs in the private sector. In the context of social empowerment, despite of a number of laws for securing women's position in the household as well as in the society, the implementation is quite weak. To implement these strategic objectives, GoB plans to increase access to human development opportunities and productive resources while promoting positive social norms. Steps have been taken to establish a conducive legal and regulatory environment with improved institutional capacity, accountability and oversight with increased participation and decision making. Greater social inclusion of women requires reducing such gender gaps.

The GoB has also taken a number of steps to reduce gender gaps at different spheres. For example, the 7FYP has aimed at raising female to male ratio in tertiary education from current 70% to 100% and the ratio of literate female to male for age group 20-24 to 100% from the current 86%. Steps will also be taken to encourage female enrolment in technical and vocational education (GoB, 2015b).

3.1.2.2 Progress in the Area of Gender Budgeting

For the implementation of National Women Development Policy, gender responsive budgeting is imperative for the government to track its financial resources. The Gender Budget Report prepared by the Finance Division is a tool for measuring the impact of gender focused budgeting and has helped to divert national priorities and interventions in the right direction and manages resources to gender focused programs in different sectors. The gender budget report has also ensured accountability and transparency of government's initiatives for women's advancement. In the area of gender budgeting, the Government of Bangladesh has made three important developments which are: (i) gender budgeting; (ii) gender analysis in MTBF process and (iii) gender analysis through RCGP model.

Gender Budget report of the GoB explains the policies and strategies for the advancement of women and activities of various ministries/divisions that have implications on women's development. It also contains KPIs connected with female welfare attained, major achievement for uplifting women's rights, allocation for women development etc. Gender budgeting was initially introduced in FY2009-10 and in the first year such analysis was done for four ministries. Gender budget report of 2015-16 fiscal year contains analysis of women's advancement of 40 Ministries/Divisions. As shown in Table 3.2, around one-fourth of total budgetary allocation can be considered to allocated for woman and over the years, in most cases we observe a slight increase in that percentage.

Table 3.2: Gender Budgeting

Fiscal Year	Total Budget (crore taka)	Allocation for women development (crore taka)	Allocation for women compared to total budget (%)	Allocation for women compared to GDP (%)	Ministries/ Divisions
2009-10	110523	27248	24.65	3.95	4
2010-11	130011	34221	26.32	4.36	10
2011-12	161213	42154	26.15	4.61	20
2012-13	189231	54302	28.68	5.23	25
2013-14	216222	59756	27.64	5.06	40
2014-15	239668	64087	26.74	4.23	40
2015-16	264565	71872	27.17	4.16	40
2016-17	340604	92765	27.25	4.73	40

Source: Ministry of Finance (2017)

In addition, the GoB has adopted Medium Term Budget Framework (MTBF) in preparing the national budget. Under MTBF a budget is to be prepared within a medium-term context and includes estimates and projections of revenues, financing and expenditures for the next fiscal year and also for two subsequent years. Gender issues are embedded in the MTBF process. To assess the impact of activities of a ministry on women's socio-economic betterment, a set of 14 standards including access to health care, education, employment, training, social safety, empowerment, access to law and justice etc. are incorporated. The Finance Division of the GoB has also developed the Recurrent, Capital, Gender and Poverty (RCGP) Model or database where all expenditure items are disaggregated to understand the allocation that goes for the betterment of women. Here, the gender and poverty proportioned percentage data for both revenue and development budget is estimated separately from a standard logic incorporated in the database.

3.1.3 Government Policies towards Child Development:

3.1.3.1 Existing Scenario

There is no denying the fact that, in order to exploit demographic dividend and to ensure consistent long run growth performance, right set of policies for securing the welfare of children is essential. To this end, the GoB has worked consciously towards securing child welfare and progress has particularly been made in the area of child protection. In this connection, there has been the adoption of Children Act of 2013, which provides legal instruments to protect children with regards to a wide range of potential exploitation and abuse including those of child marriage, child labour etc. However, implementation and enforcement of Children Act 2013 is the key challenge ahead. In addition, child focused budget has been introduced and implemented as a pilot within the Ministry of Women and Children Affairs, which is argued to be an important step in relation to public expenditure management towards the welfare of children.

Regarding child health, available evidence suggests that there has been further progress in reducing rates of infant and under-5 mortality as well as in decreasing maternal mortality.

Reduction in total fertility rate and population growth rate are also broadly on track. Bangladesh has already attained the MDG 4 target in reducing child mortality rate. Its under 5 mortality rate has dropped to 46 per 1,000 live births in 2014 from 144 per 1,000 live births in 1990, which is a 68% reduction against the target of 66% (GoB, 2015b). However, despite notable progress in reducing under nutrition in recent years, the overall state of malnutrition among children and women still remains a challenge. Prevalence of underweight children under 5 years of age has declined from 66% in 1990 to 33% in 2014. Stunting, a reflection of cumulative effect of chronic under nutrition is the most common form of malnutrition and between 2004 and 2011, although stunting has been reduced by 1.7% annually, out of every 5 children under 5 years of age, 2 are found to be stunted. Another indicator of nutritional deficit is the proportion of children who are wasted and it is estimated that 15.7% of children under the age of 5 are wasted, and there has not been any improvement in this indicator in the last decade.

3.1.3.2 Existing Policies in Relation to Child Welfare

The vision regarding children's advancement and rights is that all children in Bangladesh, irrespective of gender and socio-economic background should be ensured access to essential services, including social security, health care, nutrition and education, and to be able to enjoy protection from all forms of violence, abuse and exploitation, and to reach their full potential and to realize their rights.

In the context of child health, the programme areas include arrangements for safe child birth, eradication of polio, elimination of measles and neonatal tetanus, improvement of nutrition and strengthening school health programme (GoB, 2015b). In order to achieve these targets, the GoB has taken a number of initiatives in connection to maximizing efficiency and cost-effectiveness of health expenditure and to improve governance of health sector activities. The specific actions in this regard include (i) to aware primary and secondary students about critical child health and reproductive health issues, (ii) encouraging healthy practices and worm infestation, (iii) supplying iron and folic acid tablets to school girls etc.

With a view to incorporating the welfare of the children of poor and economically deprived families, a number of particular initiatives have also been included under National Social Safety and Security (NSSS) program of the government. The strategy advocates a number of core programmes for children, including those of child grant for the children up to age 4 of poor and vulnerable families and school stipend for all primary and secondary school going children belonging to the poor and vulnerable households. In addition, NSSS also aims at providing the children with disability benefit, along with school meals programme, orphans programme and legal provision to provide financial support to abandoned children (GoB, 2015a).

In case of education, significant progress has been made in increasing equitable access, reducing dropout, improvement in completion of primary education, and implementation of a number of quality enhancement measures in primary education. Access to primary education has increased steadily over the past decade. In this context, the contribution of government primary schools, which accounted for 85% of primary school children, played the most important role, which was complemented by Ebtedayee madrasas, and non-formal primary schools managed by NGOs. Net and gross enrolment rates therefore has increased

in recent years- in 2014 the GER and NER were 108.4% and 97.7% respectively. Gender parity has also achieved at primary level with Gender Parity Index being 1.03 for GER and 1.02 for NER in 2013. Distribution of free textbooks and provision of stipends (100 taka for one child and 125 Taka for more than one child in school per family) along with the school feeding programme for 34 lakh students is believed to have encouraged primary school attendance.

Under the 7th Plan, measures have been taken to ensure right to protection from abuse, exploitation and violence for all children, particularly those who are vulnerable. A widespread social awareness campaign and community mobilization on protection issues will be undertaken to foster positive attitudes towards children, particularly girls, and to aware the parents and decision makers on the need to protect children.

3.1.3.3 Public Expenditure for Child Welfare:

With a view to understand the child focus component of public expenditure and to design appropriate policies for taking care of welfare of the children, the government has initiated Child Budget for 13 ministries in FY17 and FY18 budget. As shown in Table 3.2 around 40% of budget allocated in these ministries can be termed as child focused. Therefore, the statistics of child budget suggests a child-friendly public expenditure pattern of those ministries. However, just like gender budget, child budgeting exercise is also argued to be mostly a statistical description of data and in many cases the methodology of ascertaining child-focus component is not the true reflection of the actual picture. A more sophisticated and detailed methodology for a better analysis of budgetary allocation of all the ministries should be the next step in this regard.

Table 3.2: Child Focused Budget in the Ministry of Women and Children Affairs (Billion Tk)

Description		2017-18	Revised 2016-17
MoWCA Budget		25.76	21.73
	Non-Development	23.18	20.16
	Development	2.58	1.57
Child focused Budget in MoWCA		9.24	8.31
	Non-Development	8.63	7.49
	Development	0.61	0.82
Total Govt Budget		4,003	3,172
	GDP	22,236	19,561
	Total government budget as % of GDP	18.00	16.21
	MoWCA Budget as % of GDP	0.12	0.11
	MoWCA budget as % of total budget	0.64	0.69
	Child-focused MoWCA budget as % of GDP	0.04	0.04
	Child-focused MoWCA budget as % of ministry budget	0.23	0.26
	Child-focused budget as % of Ministry Budget	35.87	38.24

Source: Ministry of Finance, 2017

Section 4: Projecting Future Scenario of Youths, Women and Children

Given the importance of children, youth and women in economic development, it is crucial to make prediction about relevant indicators crucial for empowerment of these demographic groups for designing future policies and strategies. The perspective plan as discussed has set a number of targets for different socio-economic indicators e.g. growth rate, labour market participation rate, poverty rate etc. for attaining the overall development goals. In this section, an attempt has been made to make simple projection of a number of key indicators of social inclusion and empowerment of the stated groups.[28]

4.1 Projection of Different Indicators of Youth's, Women's and Children's Empowerment:

4.1.1 Projection of Labour Market Status of Youths:

There is no denying the fact that, socio-economic status of an individual is closely linked to earnings potential of that individual. In this connection, labour market participation, employment, earnings etc. can considered to be important indicators. In order to design effective policies for economic betterment of children, women and youths, in this sub-section, a quantitative exercise based on a theoretical model as outlined by ADB (2016) has been conducted.

According to ADB (2016), employment at a future time t can be expressed in the following manner:

$$E_t=E_0\ (1+r_e)^t$$

where E_t is total employment in the final year of projection period, E_0 is employment in the base year, r_e is annual rate of growth of employment during the projection period and it is assumed that if η is elasticity of employment with respect to output and r_g is growth of output then the following relationship holds:

$$r_e = \eta\ r_g$$

The crucial parameter in this model is, employment elasticity of output. Under different assumptions of η (following ADB, 2016 and while estimating a simple ordinary least square model), a number of projections can be obtained.

In Table 4.1, based on the methodology as proposed by ADB (2016), under different growth scenario (average GDP growth) and with different assumptions of employment elasticity, youth (both male as well as female) labour force participation rate (s) for terminal years, e.g. 2020, 2030 and 2041 have been shown. Here, from an estimated value of employment elasticity obtained from a simple ordinary least square model, participation projection(s) have been made.[29] With a high growth scenario (average GDP growth of 9%), based on the projection, youth male's labour force participation rate in 2041 should reach around 83%. This number though not very high, is quite plausible given the expected rise in enrolment in education over time. Besides, male labour force participation, even for developed

28 Due to absence of time series data, this section mostly relies on simple forecasting exercise.
29 The OLS model is : lny= β¬0+β1x+u, Where, y= Employment rate of youth(male/ female)
x= Per capita GDP

countries, tend to be within the range of 80 to 90%. The projected youth female labour force participation rate, on the other hand shows a significant increase over time and is projected to reach 49.6% in 2041. Given the existing low participation rate of youths in education, with high economic growth (average GDP growth being 9%), it is expected that there will be greater investment in education of females and more gender friendly working condition, leading to a substantial rise in female's labour market participation. Given that labour force participation rate is closely related to educational attainment (Annex B), as a policy tool, educational expenditure of the government can proved to be crucial. In this connection, in Table 4.2 the corresponding level of educational expenditure of government (education expenditure as percentage of GDP) for attaining the desired participation rate(s) is shown.[30]

Table 4.1: Projected Youth LFPR (%)

Targeted Average GDP Growth	Projected Participation Rate for Youth Male and Youth Female (%)					
	Youth Male			Youth Female		
	If elasticity 0.0510			If elasticity 0.0925		
	2020	*2030*	*2041*	*2020*	*2030*	*2041*
5.57	74.21	76.33	78.72	40.36	42.47	44.92
6.5	74.59	77.10	79.95	40.73	43.25	46.19
7.0	74.78	77.49	80.59	40.92	43.65	46.86
7.5	74.97	77.88	81.22	41.11	44.05	47.53
8.0	75.16	78.28	81.86	41.30	44.46	48.21
9.0	75.54	79.08	**83.16**	41.68	45.28	**49.60**

Source: Author's calculation, LFS various years.

Table 4.2: Projected Government Expenditure (for projected youth LFPR) (% of GDP)

Targeted Average GDP Growth	Projected Participation Rate for Youth Male and Youth Female (%)					
	Youth Male			Youth Female		
	If elasticity 0.0510			If elasticity 0.0925		
	2020	*2030*	*2041*	*2020*	*2030*	*2041*
5.57	1.90	1.76	1.60	1.94	1.96	1.98
6.5	1.88	1.71	1.52	1.95	1.97	1.99
7.0	1.87	1.69	1.48	1.95	1.97	2.00
7.5	1.85	1.70	1.44	1.95	1.98	2.01
8.0	1.84	1.63	1.40	1.95	1.98	2.01
9.0	1.82	1.58	**1.31**	1.95	1.99	**2.03**

Source: Author's calculation, LFS various years.

4.1.2 Projection of Labour Market Status of Women:

In Table 4.3, female labour force participation rate (s) for terminal years, e.g. 2020, 2030 and 2041 have been shown. Here, following ADB (2016) for two different values of employment elasticity (0.44 and 0.47) and an estimated value obtained from a simple ordinary least square model, participation projection has been made.[31] Although depending on the future course of the economy in terms of labour absorption rate, the chosen rate should be considered, the participation rates based on the OLS based elasticity appears to

30 Method: Firstly, a regression was run: $Y= \beta_0+\beta_1X+ U$, Here, Y= Female/ Youth (male/female) labor force participation rate and X= Government expenditure as percentage of GDP
Secondly, from this regression we obtained the value of β0, β1 , then we solved for X, $X= (Y-\beta0)/\beta1$

31 The OLS model is : $\ln y= \beta_0+\beta_1x+u$, Where, y= Employment rate of women, x= Per capita GDP

be more reasonable than the rates based on other two scenarios. Based on such assumption, for attaining 9% GDP growth on average, FLFPR should be 37% in 2020, 40% in 2030 and 43% in 2041.

With an employment elasticity of 0.08, the corresponding government expenditure is found to be around 2% of GDP and this rate remains almost similar from 2020 to 2041- the terminal years of projection (Table 4.4). Though this allocation is quite low while considering the development needs of the country, given average GDP growth of 9%, in absolute term the allocation might suffice the purpose of required FLFP.

Given the significance of education in female's participation in the labour market (Annex B) based on similar methodology, the corresponding tertiary enrolment rate for females for years 2020, 2030 and 2041 have also been calculated.[32] The enrolment rates with elasticity of 0.44 and 0.47 (ADB, 2016) reveals similar results but with estimated OLS model of 0.08, the results are quite low (Table 4.5). The results should therefore be interpreted with caution.[33]

Table 4.3: Projection of Female Labour Force Participation Rate (%)

Year	Targeted Average GDP growth	Projected FLFPR(%) using different values of Employment Elasticity with respect to Output		
		Employment elasticity of female 0.44	Employment elasticity of female 0.47	Employment elasticity of female 0.08(OLS)
2020	5.57	40.13	40.46	36.38
	6.5	40.99	41.38	36.52
	7.0	41.43	41.85	36.59
	7.5	41.87	42.33	36.66
	8.0	42.32	42.82	36.73
	9.0	43.23	43.79	36.88
2030	5.57	51.01	52.26	37.99
	6.5	54.34	55.91	38.43
	7.0	56.11	57.85	38.66
	7.5	57.94	59.86	38.89
	8.0	59.82	61.93	39.11
	9.0	63.74	66.27	39.58
2041	5.57	66.40	69.25	39.84
	6.5	74.11	77.85	40.65
	7.0	78.34	82.60	41.07
	7.5	82.81	87.62	41.49
	8.0	87.51	92.95	41.91
	9.0	97.72	104.53	**42.77**

Source: Author's calculation, LFS various years.

32 To obtain the required education expenditure for different levels of desired economic growth in 2020, 2030 and 2041, a simple OLS regression was carried out where youth labor force participation rate was a dependent variable and female tertiary enrolment was independent variable. Using the coefficient estimate obtained from this regression, the required levels of government expenditure was calculated for the different values of projected female labor force participation rates.
33 For tertiary enrolment rate of youths, see Section 4.3.

Table 4.4: Projected Government Education Expenditure (for targeted female LFP) (% of GDP)

Year	Average Targeted GDP growth	Projected Government Expenditure in Education (% of GDP)		
		Employment elasticity of female 0.44	Employment elasticity of female 0.47	Employment elasticity of female 0.08(OLS)
2020	5.57	2.00	2.00	1.95
	6.5	2.01	2.01	1.95
	7.0	2.01	2.02	1.95
	7.5	2.02	2.03	1.95
	8.0	2.03	2.03	1.96
	9.0	2.00	2.00	1.95
2030	5.57	2.13	2.15	1.97
	6.5	2.18	2.19	1.98
	7.0	2.20	2.22	1.98
	7.5	2.22	2.24	1.98
	8.0	2.24	2.27	1.99
	9.0	2.29	2.32	1.99
2041	5.57	2.33	2.36	1.99
	6.5	2.42	2.47	2.00
	7.0	2.47	2.53	2.01
	7.5	2.53	2.59	2.01
	8.0	2.59	2.66	2.02
	9.0	2.72	2.80	**2.03**

Source: Author's calculation, LFS various years.

Table 4.5: Projected Tertiary Enrolment Rate (for targeted Female LFPR((%)

Year	Average Targeted GDP growth	Female Enrollment Rate in Tertiary Education (%)		
		Employment elasticity of female 0.44	Employment elasticity of female 0.47	Employment elasticity of female 0.08 (OLS)
2020	5.57	9.03	9.10	8.11
	6.5	9.23	9.33	8.15
	7.0	9.34	9.44	8.16
	7.5	9.45	9.56	8.18
	8.0	9.56	9.68	8.20
	9.0	9.78	9.92	8.23
2030	5.57	11.67	11.98	8.50
	6.5	12.49	12.87	8.61
	7.0	12.92	13.34	8.67
	7.5	13.36	13.83	8.72
	8.0	13.82	14.33	8.78
	9.0	14.77	15.39	8.89
2041	5.57	15.42	16.11	8.95
	6.5	17.30	18.21	9.15
	7.0	18.33	19.36	9.25
	7.5	19.42	20.59	9.35
	8.0	20.56	21.88	9.46
	9.0	23.05	24.71	**9.67**

Source: Author's calculation, LFS various years.

4.1.3 Projection of Labour Market Status of Children:

In case of children, there is no denying the fact that, over time with higher growth and socio-economic development, there will be improvement in the condition of children and will be reduction in the participation of children in the labour market. Reducing child labour by 2025 being one of the targets of SDGs (Goal 8) too. With 9% GDP growth on average, by 2041, it is projected that the country would be able to reduce labour force participation of children to 2.7%.

Table 4.6: Projection of Child Labour Force Participation Rate (Elasticity of -0.82)

Average Targeted GDP growth	Child Labour Force Participation Rate (%)		
	2020	*2030*	*2041*
5.57	4.31	3.91	1.54
6.5	3.97	3.54	3.54
7.0	3.81	3.36	3.36
7.5	3.66	3.20	3.20
8.0	3.51	3.04	3.04
9.0	3.22	2.74	2.74

Source: Author's calculation, LFS various years.

4.1.4 Projection of Different Health Indicators of Children:

Given the high prevalence of child mortality and high malnutrition rate, child welfare can greatly be enhanced by reducing child mortality and improving different indicators of malnutrition e.g. rates of stunting, wasting, underweight. Such improvements are expected to be influenced by different economic factors and policy tools e.g. higher rate of GDP growth, higher health expenditure, greater number of skilled health stuffs etc. Based on a simplistic ordinary least square model, it can be inferred that, for eliminating stunting (the key indicators of malnutrition), around 9.5% GDP growth is required whereas the required health expenditure (as % of GDP) is projected to be 5.5% and around 82% births are needed to be attended by skilled professionals. Similar projections for zero infant mortality are 8%, 5.4% and 58% respectively and for under-5 mortality, the required GDP is 9%, health expenditure is 2.7% and the percentage of births attended by skilled professionals is projected to be around 50% (Table 4.7).

Table 4.7 : Projected Policy Tools, Economic Factors for Child Welfare[34]

Indicators of Child Welfare	Necessary GDP growth rate (%)	Necessary total health expenditure (% of GDP)	Required % of Births attended by skilled health stuff
Zero stunting	9.49	5.47	81.65
Zero infant mortality	8.04	5.37	58.21
Zero under-5 mortality	9.23	2.74	49.74

Source: Author's Calculation.

34 All of the projected values of this table have been obtained from the estimates of two variable simple OLS model.

4.2 Demographic Dividend and Economic Growth- A Case of Youth Population:[35]

It has been widely accepted that the composition of labor force of a country can play a major role in its development and growth effort. Having greater proportion of working age population (15 to 64 years) which consists of youth population (15 to 29 years)[36] is argued to contribute positively by generating higher output and accumulating greater savings and thereby expected to have positive contribution towards economic growth-this plausible positive impact of the proportional increase of working age population on economic growth is commonly referred as demographic dividend (demographic dividend can be defined as the accelerated economic growth that may result from a decline in a country's mortality and fertility and the subsequent change in the age structure of the population). This expected growth enhancing effect of youth population however critically depends on the quality of youth population in terms of education, health and skill level. Based on such characteristics of population, the implications of rising trend of youth population on the growth prospects of a country can however be quite diverse.

From an initial high fertility-high mortality structure during 70's, Bangladesh with advancement in health care facilities and expansion of family planning program has succeeded to reduce its total fertility rate (TFR) close to the replacement level and over the course of time has also been able to reduce mortality rate substantially. This structural change in population has resulted in an eventual reduction in the proportion of dependent population (children and older age population) and a corresponding increase in working age population: from 45.33% in 1991, the percentage of population belonging to 0 to 14 years has come down to 31.59 % in 2011 and such a change has resulted in a shift towards increase in the proportion of working age population (15 to 64 years) from 54.66% to 68.41% in the corresponding period (Population and Housing Census, various years). This demographic transition has been reflected in its youth population and according to the Labour Force Survey 2013 (BBS, 2013), within the age group of 15 to 29 years, there was around 43.4 million people so the youth population consisted of around 28% of total population of the country. However, despite required shift in demographic composition, there is argument in terms of essential supporting policy instrument and public investment in education and health services and as a consequence the resulting 'dividend' is argued not to be attained at its fullest.

In this sub-section, an attempt has been made to understand the effect of demographic transition to economic growth while investigating the relationship between the share of youth in total population (RYP) to GDP growth (GDPG). While analyzing the time series data of Bangladesh from 1972 to 2014 and separately for different decades (1972-80; 1981-90; 1991-00; 2001-10; 2011-14) it can be inferred that, though in short run the relationship between these variables is not that clear, there is a significantly positive correlation between an increase in the share of youth in total population and economic growth of the country (Table 4.8).

35 This section is replicated from Bidisha, S.H. and Abdullah, S.M. (2017) "Youth Population and Economic Growth in Bangladesh: A Macroeconomic Analysis", Thinking Aloud, vol 3, issue 11.

36 There have been different definitions of 'youth', for example, 15 to 24 is defined as 'youth' by the UN, 15-29 has been used as a definition by Bangladesh Bureau of Statistics in their survey whereas the Government of Bangladesh defines 18 to 35 years as the reference category for youths.

Table 4.8: Summary Statistics of Key Variables

	GDPG		RYP		
Period	Mean	Std. Deviation	Mean	Std. Deviation	**Correlation (P – Value)**
1972-80	1.764	7.070	23.388	0.437	-0.477(0.193)
1981-90	4.021	1.549	26.984	1.453	-0.292(0.411)
1991-00	4.680	0.624	29.024	0.139	0.443(0.198)
2001-10	5.578	0.994	29.472	0.129	0.708*(0.021)
2011-14	6.265	0.264	28.977	0.169	0.840(0.160)
1972-2017	4.273	3.538	27.469	2.423	0.336*(0.027)

Source: Author's calculations (Abdullah & Bidisha, 2018)

However, in order to estimate long run relationship among a number of variables, the most conventional econometric tool is that of cointegration analysis and in this context, based on a standard growth model with relevant variables and while applying Johansen Cointegration analysis it can be deduced that in the long run, RYP has a significant positive impact on per capita GDP growth (Table 4.9). Among other key macro variables, the long run impact of trade-GDP ratio (GDPSTRADE), public spending in education as percentage of GDP (GDPSPSE) have found to be significant with expected sign. Most importantly the impact of GDPSPSE was found to be more than others implying the importance of investment in human capital on economic growth.

Table 4.9: Cointegrating Equation: Long Run Coefficients

GDPG	*RYP*	*GDPSGFCF*	*GDPSPSE*	*GDPSTRADE*	*SGER*	*Constant*
1.000	-0.431**	0.784*	-1.648**	-0.338*	-0.087	6.387
	0.193	0.201	0.614	0.068	0.045	-

Source: Author's calculations (Abdullah & Bidisha, 2018)

The evidence of positive and significant long run impact of youth population on economic growth of the country provides indication in favour of the possibility of attaining demographic dividend for the country. In this connection, it should however be kept in mind that, integrating and utilizing the youth population in the growth process of the country requires increased investment in education and skill development programmes and also careful planning and strategizing in favour of it. Given that a significant percentage of youth work force of Bangladesh possesses no education with a very small percentage holds university degree, it is of paramount importance for upgrading the education level of the youth. In terms of technical and vocational training, similar scenario can be found, which requires similar policy focus as well.

4.3 Projecting Future Skill Demand for Youth Development:[37]

Given the crucial contribution of youth population to growth, emphasis should be given in enhancing their quality through education and skill training. As discussed in Section 2, youth population of the country on one hand have lesser representation in TVE and on the other have low rate of enrolment in tertiary education-both acting as constraints for them to get absorbed in the labour market and also to move upwards in occupational ladder.

37 This section is replicated from Bidisha et al. (2016).

Tertiary education having significant contribution towards returns to earnings of youth's (Annex B), in this section, with the help of time series data from 1971 to 2014 (World Development Indicator, Health Nutrition and Population Statistics of the World Bank), an attempt has been made to examine the long run equilibrium relationship between enrolment in tertiary level of education and economic growth. The significance and magnitude of such impact can be utilized to determine the desired level of enrolment in education in the context of Bangladesh. Here, we considered real GDP growth (RGDPG) as the dependent variable with Gross Enrolment in Tertiary Education (GERT); Growth of Gross Fixed capital formation (GGFCF); Growth of 15 to 64 years of Population (GP1564) as explanatory variables. After checking the order of integration, we performed Johansen Cointegration Test and estimated the long run relationship (for detailed method, see Bidisha et al., 2016). Our analysis reveals that, in case of Bangladesh, there exists a positive long run relationship between tertiary enrolment and GDP growth, which emphasizes the importance of increased policy focus on expanding tertiary education. Based on the result of Table 4.11, the long run growth equation can be seen as:

RGDPG=0.924(GERT)-0.038(GERTSQ)+0.073(GGFCF)+0.092(GP1564)

In order to find the growth maximizing level of GERT, we have modified the initial growth equation and applied the conditions of optimization:

First Order Condition:

$$\frac{\partial RGDPG}{\partial GERT} = 0.924 - 0.038(GERT) = 0$$

Second Order Condition:

$$\frac{\partial^2 RGDPG}{\partial GERT^2} = -0.038 < 0$$

Solving this two condition yields that the **growth maximizing level of tertiary level of education is that of 24.32%:**

$$\text{Growth Maximizing Level of GERT} = \frac{0.924}{0.038} = 24.315$$

Table 4.10: Long run equation

RGDPG	*GERT*	*GGFCF*	*GP1564*	*GDPSTRADE*	*SGER*	*Constant*
1.000	-0.3214*	-0.122*	-0.603*	-0.338*	-0.087	6.387
	(0.042)	(0.032)	(0.121)	0.068	0.045	-

Note: * indicates 1% level of significance.

Table 4.11: Long Run Equation (Growth Maximizing Level of GERT)

RGDPG	*GERT*	*GERTSQ*	*GGFCF*	*GP1564*	*SGER*	*Constant*
1.000	-0.924*	0.038*	-0.073*	-0.092	-0.087	6.387
	(0.180)	(0.012)	(0.029)	(0.192)	0.045	-

Note: * indicates 1% level of significance

Section 5: Key Challenges & Proposed Recommendations

5.1 Challenges:

5.1.1 Key Challenges for Social Inclusion of Youths

As discussed in Section 2 the key concern in the context of youth population is related to the quality of youths particularly in terms of education, skill and training. Challenges also remain in youth female's access to higher education, participation in labour market etc. In terms of skill and training, a mis-match is argued to have constrained youths' employability and earnings capacity (Bidisha et al. 2016). Some of the areas of concern in this context are as follows:

- Low Budgetary Allocation in Education: One of the key challenges for quality enhancement of youths is low participation in higher education. As discussed in Section 4.3, for maximizing growth, the required tertiary enrolment rate should be much higher than the current rate. In this connection, one primary concern is that of insufficient funding (Annex E, Table 1) as it is one of the lowest even in South Asia (Annex E, Figure 1). In FY18, the budgetary allocation (development and non development expenditure) of education and technology stood at only 16.3% of total budget.
- Gender and Regional Disparity: Although the country has succeeded in reducing and in some cases even eliminating gender gap at primary and secondary level, the scenario is not that optimistic in case of higher education. This gap although narrower, prevails across youth labour force too (see Section 2). In terms of mere literacy, concern remains too as Bangladesh's performance is rather poor in comparison to even her neighbours (Annex E, Figure 2).
- Quality of Education: The importance of quality of education has repeatedly been emphasized in the 7th Plan. The existing curriculum and examination system at primary and secondary level often argued not to be in favour of the development of cognitive and analytical skill of pupils (7FYP, 2015) (Annex E, Table 2).[38] There is also concern regarding lack of coordination between university/degree education and actual demand for labour. This often results in high unemployment in one hand and skill wastage on the other. In addition, a widely cited challenge in terms of higher education system of Bangladesh is unbalanced curriculum across universities, particularly those of private and public and lack of quality control in terms of teaching and curriculum (7FYP, 2015).
- Low Level of Investment in TVET Programme: Although the requirement of skilled manpower is around 2 million, the existing facility can provide training of only 5,00,000, indicating even greater requirement of investment in expanding physical capacities (7FYP, 2015). At the moment, as envisaged in the 7th Plan, the allocated resource in the ADP is not sufficient for meeting the growing demand for skill development for attaining targeted economic growth.
- Lack of Accreditation System to Absorb Youths in Overseas Labour Market: Given that migrant workers are mostly young, youth development policies should incorporate their needs with highest priority. One of the key problems of young migrants is the inability to transfer their skills obtained at home to overseas labour market and in this regard, to equip them with relevant transferrable skill is the challenge (ADB, 2016).

38 Pupil-Teacher ratio at primary level is considered as one of the indicators of educational quality and in comparison to South Asian as well as East Asian countries, it is found to be quite high for Bangladesh.

- General and Reproductive Health of Youths: An important yet neglected area in case of youth development is health of youth population. Given the scarcity of trained professionals, another challenge is lack of trained professionals (Annex E, Table 3). In this regard, one area is that of general health whereas other is reproductive health of females. For example, the rate of four prenatal visits is only 31% in Bangladesh, where the South Asian average is 42% (Annex E, Table 4). Besides, given high incidence of child marriage and early pregnancy in the context of Bangladesh, the later issue is of crucial importance for labour productivity of youth population.

5.1.2 Key Challenges for Women's Social Inclusion and Empowerment:

Bangladesh has made significant progress in terms of labour market participation of women and from as low as around 8% in the mid 1980s it has increased to 35.6% in 2015, which is quite impressive in comparison to other South Asian countries.[39] However, in comparison to the participation rate of males, that of females is still quite low with concentration in low paid jobs. In case of education, as discussed in Section 2, gender gap still persists at tertiary level as well as in technical education. Besides, patriarchal and conservative social structure and lack of safety often argue to act as impediments towards women's social inclusion. The key challenges in this context can be outlined as below:

- Low Participation at Tertiary & Technical and Vocational Education: The participation of women at tertiary level of education, both at higher education as well as technical and vocational education is still quite low (Annex E, Figure 3). In case of participation of women in TVET, often social stigma and patriarchal mindset act as prime obstacles. As for participation at tertiary level of education, one important challenge is related to drop out rate and it is not only economic but primarily those of social factors that act behind this drop out. In this context, one important factor is that of child marriage.
- Low Level of Participation in the Labour Market: According to the (Quarterly) Labour Force Survey 2015, only 35.6% women are in the labour force. Economic empowerment of women is however critically conditional upon their increased labour market participation and bringing the women in the labour market is definitely a key challenge to confront.
- Concentration in Unpaid and Low Paid Jobs: As high as 13% of working age females of Bangladesh are found to be engaged as unpaid family workers (Annex E, Table 5). Despite of being in the labor force such an involvement is not contributing towards their empowerment or economic inclusion and the challenge is to bring them into mainstream economic activities. Besides, those women who are engaged in paid work are also found mainly in low paid and low productive jobs.
- Child Marriage & Early Pregnancy: It is widely accepted that in South Asian countries, the prevalence of child marriage and subsequent early pregnancy are key obstacle for social inclusion of women (Annex E, Table 6). In Bangladesh, as high as 52% girls get married under 18 years of age which can be considered as a prime cause for high dropout rate of girls from higher level of education.

39 According to the statistics of UNDP, labour force participation rates of females in South Asian countries in 2015 are: Sri Lanka 30.2%, India 26.8%, Pakistan 24.3%, Bangladesh 43.1% (UNDP, 2016).

- Lack of Security & Increased Violence against Women: There has been increased concern over women's safety and security and such issues have arguably obstructed women's empowerment and social inclusion. In Bangladesh, as high as 27.8% of women are found to be victims of physical violence by non-partner, whereas for partners almost half of the women (49.6%) reported to have experienced physical violence with another 27.3% experienced sexual violence (BBS, 2016).

5.1.3 Key Challenges for Social Inclusion of Children:

- Infant and Child Mortality: Although the country has made impressive progress over the years in reducing both infant and child mortality rate, the rates are still quite high while considering the targets set by the SDGs and also in comparison to East Asian countries (Annex E, Figure 4).[40] One of the key challenges in this regard is therefore to improve health service delivery particularly to rural based children and to those at hard to reach areas.
- Malnutrition among Children: The country has challenging targets of nutritional outcomes of children. For example, in case of stunting, although the rate has reduced from 71% in 1986 to 41% in 2011, there is more than 6 million children classified as stunted (PC, 2015). In addition, around 2.4 million children under 5 years of age are found to be wasted and 600,000 children suffer from severe acute malnutrition. Challenges also remain in dealing with different micronutrient related deficiency.
- Child Labour and Safety at Work: Between 5 to 17 years of age there is approximately 3.45 million working children and among them 1.75 million are those who are not classified as child labour whereas 1.70 million can be classified as child labour (BBS, 2013). Of the 1.70 million, 1.28 million are found to be engaged in hazardous work. It is not only mere engagement at work but also the type of work which is a matter of serious concern. For example, around 16.84% children are reported to be exposed of dust, fume, noise or vibration at work place with 17% reported to have experienced verbal abuse and 2.5% sexual abuse. Challenges therefore prevails in providing supportive environment with effective implementation of laws to stop child labour and to provide safety at work (BBS, 2016).
- Child Marriage: There is no denying the fact that, child marriage and early age pregnancy are acting as key obstacles towards empowerment of women and Bangladesh is lagging behind in comparison to many other countries in dealing child marriage. It is argued to be one of the key impediments towards continuation of education towards higher level, reproductive as well as general health along with participation in labour market and due to poor implementation of relevant laws, the situation is not improving as expected.

5.2 Recommendations:

5.2.1 Recommendations for Youths:

In order to utilize the fruits of demographic transition, government strategies and policies on one hand should emphasize on enhancing the quality of youths and on the other aims at providing them gainful employment opportunities. Based on the challenges of youths' empowerment as outlined in section 5.1.1, a number of recommendations can be proposed:

40 The country has attained MDG 4 in relation to child mortality.

- Allocation of Greater Amount of Resources for Education and Skill Development: With a view to achieving 9.9% growth by the end of 2041 and to attain the SDGs, the most crucial policy step would be to increase allocation in human resource development significantly. The government can also consider other innovative and cost minimizing strategies e.g. two shifts in technical institutes and degree level colleges, GO-NGO partnerships etc. (Bidisha 2016).
- Eliminating Inequality in terms of Gender and Region: One of the major challenges of youth employment, especially that of females is to increase participation of female students in TVET institutes. In addition, some of the regions of the country with weaker network to bigger cities often do not have access to TVET facilities. Strategies such as, specialized programs concentrating on non-formal, low-tech vocational training, gender sensitive curriculum, gender sensitive infrastructural support for working women etc. can turn out to be important solution in such cases (Bidisha et al. 2016). Given relatively higher return to training for youth females (as opposed to youth males), under the TVET, it is important to substantially increase female quotas to vocational institutes. Besides, it is crucial to recognize the constraints faced by young women in particular and to consider effective solutions for those. In this regard, establishing girls hostel, introducing residential facility in TVE institutes etc. can proved to be useful. Given the lack of flexibility and mobility of women, a significant percentage of women tend to work as family workers (Raihan et al., 2018). Especially in rural areas, in order to encourage them to switch to paid work (e.g. home/village based self employment activities) TVE policies should focus on skill training related to home based work involving less capital and localized techniques (Bidisha et al. 2016; Bidisha 2016).
- Emphasizing on Quality of Education: It is needless to mention that quality assessment is fundamental in education and skill development programmes and in this context monitoring of quality is important at all stages of educational programmes.
- A proper coordination and consistency across the modes of teaching, curricula, text books etc. (e.g. across public school, private school, NGO run schools, Madrassa etc.) is essential to bring about equity in terms of human resource development and to improve quality of education.
- In order to improve quality of education especially at tertiary level, it is crucial to invest in skill training and to expand the scope of research for the teachers. In this regard, strategies should be targeted, on one hand towards training of primary teachers and on the other to expand the research facilities at higher educational institutes where lack of funding is often argued to be a serious concern for quality development of higher education.
- Creating Employment Opportunities: The key policy focus for creating employment opportunities for the growing number of youths, should be to fill the gap in supply and demand both in the context of tertiary as well as technical and vocational education. As suggested in our analysis, youths with training tend to have higher earning than those without training- young women with training have 11% higher earning where the corresponding figure is 14% for young men, emphasizing the importance of training for youths (Annex B). In case of TVE institutes, assessing demand for any skill development programme, particularly at local is crucial. In the absence of formal Job Centres, the local level government bodies can play the leading role for absorbing

the local youths in relevant jobs. For resolving rural unemployment and seasonal unemployment problems, such entities can take initiative to engage the local youths in different non-farm activities (Bidisha et al. 2016). In order to provide the youths with gainful employment, it is crucial to consider about innovative job opportunities in sectors like those of, ICT and electronics, ship building, frozen foods, solar energy etc. In addition, it is essential to modify the curriculum at higher educational institutes.

- Studies (Bidisha et al. 2016) have found that, in major economic zones there is mis-match of skill so it is more important to build skills in major economic zones than to create new jobs. Due to such disproportionately distributed economic opportunities across different regions of the country, there is a felt need for decentralized labor market policies (e.g. district or at least region specific policies) to create balanced economic opportunities across the country.
- Emphasizing on General and Reproductive Health of Youths: One of the key strategies would definitely be to allocate greater amount of budget for the development of health sector, particularly for youth female's reproductive health. In addition, special emphasis should be given in the context of service delivery of hard to reach areas, those with disability along with maternal and health care service delivery and also in case of lack of trained health professionals especially in remote areas.

5.2.2 Recommendations for Women:

- Raising Participation at Tertiary & Technical and Vocational Education: In order to reduce gender gap in the job market, especially at the upper stages of occupational ladder, steps should be taken to increase participation of girls at tertiary level of education by a significant margin (Bidisha 2016). In addition to the conventional strategies of infrastructural development, a holistic approach incorporating residential facilities, transportation facilities along with much bigger agenda like preventing child marriage and early pregnancy should be considered with greater emphasis.
- Promoting Gender Friendly Strategies for Increasing Participation in the Labour Market: As revealed in Annex B, having children younger than 5 years of age reduces participation probability of women (also see Mahmud & Bidisha, 2016). Given such domestic responsibilities of women, an important policy tool could be that of providing support in establishing day care centers at the workplace and to formalize and implement the provision of six months maternity leave and to introduce innovative strategies like flexible working hour and part time jobs (Bidisha 2016). Such strategies are expected not only to raise labour force participation rate of women per se, but are also expected to bring more women into main stream paid jobs from unpaid and low paid activities.
- Policies for Ensuring Security & Eliminating Violence: In order to provide secured and violence free environment for women, more holistic approach is required. A number of strategies like those of one stop crisis centre, helpline number and awareness raising campaigns should be strengthened and the coverage should be expanded. In addition, stronger collaboration between government and NGOs is extremely crucial to stop violence against women. The importance of effective and efficient legal and criminal justice system is definitely pre-requisite for ensuring a safe environment for women both at home and outside. In this context, the most important consideration is however to ensure effective implementation of such laws.

5.2.3 Recommendations for Children:

- Strategy for reducing Infant and Child Mortality and for Dealing with Malnutrition among Children: Under the 7FYP, the government has already taken a number of strategies to reduce infant and child mortality and to improve nutrition of the children (see Section 3.1.3.2). Expanding the coverage and magnitude of such strategies, e.g. ensuring safe child birth, eradication of different life threatening diseases, provision of different nutritional supplements etc. is of prime importance in this context.
- Eliminating Child Labour and Ensuring Safety at Work: With a view to achieve the SDG-Goal 8 of eliminating child labour by 2025, it is of upmost importance to adhere strict monitoring of the use of child labour at different works and to take necessary steps to work for the elimination of child labour. In this regard, special attention should be given for the safety and security of domestic workers, along with prohibition of the use of child labour in hazardous work.
- Preventing Child Marriage and Early Pregnancy of Adolescent Mothers: As discussed in Section 5.1.2, Bangladesh has a very high rate of child marriage which often leads to early pregnancy and as a consequence high maternal mortality and infant and child mortality. For the prevention of child marriage, greater emphasis should be given in raising awareness and effective GO-NGO collaboration. Strengthening local administration and increasing awareness at rural level is critical. However, the most crucial challenge is to ensure stricter implementation of existing laws and especially at the local level the government should emphasize about it.

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ANNEX A: Methodology of Poverty Analysis

To measure poverty in this study, the Cost of Basic Needs (CBN) approach has been used. All the tables and figures, generated or adapted are calculated using the definitions of food poverty line, non food poverty line provided by HIES. Conventionally, the poor households are those households whose total expenditures on food and nonfood combined are equal to or less than the food poverty line (ref).However since the main goal of this study is to assess the poverty of children, women and youth, the poverty at household level are of little interest. So, we need to calculate the poverty rates at the individual level, that is, we need to check if each of the individuals can cross the poverty lines. To do so, we first calculated the per capita consumption of each individual in the households. Then, if it is below the pre-specified lower poverty line, he/she is considered to be ultra poor. If per capita consumption is greater than the lower poverty line but less than or equal to upper poverty line, the individual is said to be moderately poor. The rest of the individuals who are above the upper poverty line are considered to be non poor. The incidence of poverty by headcount rates for the children, females and youth are calculated using HIES, 2010. SPGI (Square Poverty Gap Index) is a good approach to measure the intensity of poverty. SPGI was also measured using the following formula:

$$\text{SPGI} = 1/\text{n}\sum_{\text{j=1}}^{\text{q}} \{(\text{z} - \text{yj})/\text{z}\}^2$$

Where, n = total number of population,
q = total number of poor,
z = poverty line, y_j= Per capita consumption

ANNEX B: Estimation Results of Labour Market Participation and Earnings of Youths41

Column1	Column2	Column3	Column4	Column5	Column 6	Column 7	Column 8	Column 9
	FEMALE				MALE			
Model	Probit(marginal effect)	Probit(marginal effect)	OLS	Heckman	Probit(marginal effect)	Probit(marginal effect)	OLS	Heckman
Dependent Variable	Labour Force Participation	Participation in Paid	Ln(Earning)	Ln(Earning)	Labour Force Participation	Participation in Paid	Ln(Earning)	Ln(Earning)
Age	-0.001	-0.003*	0.003**	-0.006***	-0.001***	0.013***	-0.001	0.008***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.003)
Received Training	0.426***	0.254***	0.107***	0.160***	0.016***	0.044***	0.135***	0.147***
	(0.013)	(0.022)	(0.018)	(0.032)	(0.002)	(0.007)	(0.012)	(0.018)
Primary Education	0.114***	0.014	0.201***	0.203***	0.023***	-0.001	0.097***	0.094***
	(0.015)	(0.021)	(0.028)	(0.030)	(0.004)	(0.011)	(0.013)	(0.018)
Secondary Education	-0.154***	0.192***	0.224***	0.244***	-0.001	-0.039**	0.125***	0.114***
	(0.014)	(0.021)	(0.027)	(0.035)		(0.013)	(0.013)	(0.019)
Higher Sec Education	-0.177***	0.136***	0.290***	0.301***	-0.002	-0.036**	0.205***	0.185***
	(0.015)	(0.027)	(0.029)	(0.036)	(0.005)	(0.018)	(0.017)	(0.024)
Tertiary Education	-0.068**	0.108**	0.182***	0.199***	0.010***	-0.015	0.275***	0.282***
	(0.029)	(0.045)	(0.038)	(0.049)	(0.004)	(0.020)	(0.021)	(0.028)
Other Education	-0.173**	0.526***	0.003	0.062		-0.093	0.072	-0.059
	(0.086)	(0.062)	(0.105)	(0.120)		(0.077)	(0.075)	(0.091)
Rural	0.075***	-0.127***	-0.056***	-0.091***	-0.016***	-0.008	-0.045***	
	(0.009)	(0.013)	(0.012)	(0.022)	(0.003)	(0.006)	(0.008)	
Whether HH have land	-0.056***	0.100***			-0.006**	-0.031***		
	(0.009)	(0.013)			(0.003)	(0.006)		
No of Children under 5	-0.012**	-0.033***						
	(0.005)	(0.008)						
Married	-0.156***	-0.183***			0.033*	0.065***		
	(0.026)	(0.034)			(0.013)	(0.026)		
Family Size	-0.002	-0.001			-0.001**	-0.011***		
	(0.001)	(0.002)			(0.000)	(0.001)		
HH Income (excluding the female)	2.88e-08***	-6.76e-09						
	(0.000)	(0.000)						
Whether Use Net	0.046**	0.027	0.073***	0.087***	-0.013	-0.029*	-0.014	-0.028
	(0.018)	(0.028)	(0.021)	(0.027)	(0.008)	(0.015)	(0.015)	(0.022)
Whether Have Computer	0.029	0.021	0.018	-0.001	-0.026**	0.015	0.065***	0.047**
	(0.023)	(0.036)	(0.214)	(0.033)	(0.011)	(0.012)	(0.016)	(0.023)
Constant			9.055***	9.218***			9.158***	9.118***
			(0.048)	(0.084)			(0.026)	(0.077)
Lambda	0.092							.118**
	(0.063)							(0.060)
No. of Observation	15329	6979	2851	1963	7179	6815	5281	2689

41 This table has been taken from Bidisha (2016).

ANNEX C: Methodology of Vulnerability Analysis

Following Haughton and Khandker (2005), if a household is denoted as h. then at time period t, the vulnerability

to poverty, denoted as $v_{h,t,}$ is the probability that the consumption level of the household will fall below the poverty line in the next period, t+1:

$v_{h,t}$=pr(ln$C_{h,t+1}$ ln z) ……(1)

where $C_{h,t+1}$ is the consumption of a household in the following period and z is the pre-specified poverty line.One must face a practical problem in this case, that is, ch,t+1 cannot directly be observed, it is just the expected per capita consumption level of household in the next period. However, it can be estimated by the following model given the determinants of consumption which is nothing but predicting the consumption of next period:

$C_{h,t+1}$=C(X_h,$\beta_{t,}$$\alpha h,e_{h,t}$)……(2)

where, $X_h$is a vector of observable household characteristics such as the age of head of the household, education level of the household head, size of household members etc. $\beta_t$is the vector of parameters,

α_h captures any unobserved time-invariant household effects, such as the abilities of household members, $e_{h,t}$ is the error term that measures idiosyncratic factors. The shock to one household is completely independent of the shock to other household. The variance of this error could vary substantially from one household to the next.

Given that we estimate the relationship given by (2) including the variance of expected consumption, vulnerability can be measured as:

$v_{h,t}$=pr(Ch$_{,t+1}$=C(X_h,$\beta_{(t+1)}$,α_h,eh$_{,t+1}$ < z|X_h,β_t ,α_h,$e_{h,t}$)…….(3)

Following Chaudhuri, Jalan, and Suryahadi (2002), a simplified version as shown in (4) can be estimated with data from a single cross-section (HIES,2010 for example, in the present analysis):

$$\ln C_h = X_h.b + e_h \quad \text{……(4)}$$

where,

$$e_h \sim N(0, X_h\theta) \quad \text{……...(5)}$$

In short, first, we need to regress the log of per capita consumption on a set of independent variables as described above in order to get the estimated coefficients of equation (4). The next step is to square the residuals from this estimated equation and to regress this square of the residuals on the same variables as in step 1 to get the coefficient θ-hat.Once this is obtained, it is then possible to get the estimated variance,X_hθ, which will be used to measure the idiosyncratic variance for each household. Finally, assuming that the independent variables that explain the variation of poverty (household size, education of household head, total land holding, residence, age of the household, hygienic condition of the household and so on) do not change from one year to the next, it is possible to get the value of expected log consumption as predicted by equation (4) and the standard deviation of the log of consumption (from equation (5)). Using these, the following measure of vulnerability to poverty for each household can be constructed:

$$v_{h,t} = pr(X_h) = \phi(ln\ z - X_h.b/ \text{ square root of } X_h\theta\text{^}) \quad \text{……..(6)}$$

where ϕ is the cumulative density function of the standard normal distribution.

As mentioned in Haughton and Khandker (2005), the choice of the line separating those who are vulnerable to poverty from those who are not can be calculated in the following manner:

Households (or individuals) with probability greater than or equal to 0.50 can be considered as highly vulnerable to poverty. Households with probability less than 0.50 but greater than or equal to the headcount poverty rate(which is 0.17 using the lower poverty line as in HIES,2010) have lower probability of being poor in the next year, hence they are regarded as “low vulnerable” to poverty. Finally, if this probability is less than 0.17, they can be treated as “not vulnerable” to poverty. However, as pointed by Haughton and Khandker (2005), the last category should not be taken literally, because there is positive probability that a household would fall in poverty in the next year (or over the next few years).

ANNEX D: Financing Strategy

Although this paper is concerned primarily to identify the challenges faced by youths, women and children and thereby to recommend strategies for their economic wellbeing, it is important to understand the financial requirement associated with such strategies. In this context, we can consider the SDG financing strategy of the Planning Commission as a guideline. Although the wellbeing of the stated groups are closely related to all of the 17 SDGs, it will not be inappropriate to isolate and simplify our analysis while focusing on the core goals (e.g. SDG 1, 3, 4 and 5) which are most closely associated with women, children and youth. Table 1 shows the amount of total additional costs required in FY 2020, FY 2025 and FY 2030 for accomplishing rge SDG Goals relevant to poverty, inequality education and skill development.

It is however important to note that these estimated costs are applicable for all relevant groups of people, not only for the woman/youth or child population per se. The table is therefore an indicative one for future financing strategy, targeting to these specific groups. One additional point to note here is that the proposed matrix of shares of financing in SDG financing strategy paper (GoB 2017) suggests that public sector will lead the key responsibility to finance SDG 1, SDG 2 and SDG 3 whereas private sector would play the lead role in financing SDG 5.

Table 1: Total Additional Cost required for implementing SDG goals for different fiscal year*

SDG Goals	Total additional cost required (in billion BDT at constant 2015-16 prices)		
FY 2020	**FY 2020**	**FY 2025**	**FY 2030**
SDG 1: No poverty	129.47	189.32	283.30
SDG 3:Good health & well-being	258.82	757.09	1274.57
SDG 4:Quality education	258.94	757.28	1161.54
SDG 5:Gender inequality	71.53	71.53	71.53

*SDGs Financing Strategy Bangladesh Perspective, General Economic Division (GED), Bangladesh Planning Commission, Government of the People's Republic of Bangladesh, June, 2017.

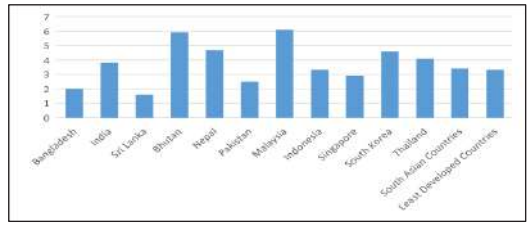
ANNEX E: Cross Country Comparison of Different Indicators

Table 1: Education Expenditure (2014/15)

Level	**Total Expenditure (in Million Tk)**	**Per Student Expenditure (Tk)**
Primary	136765.27	7173
Junior Secondary	47511.12	5761
Upper Secondary	56753.27	9155
Post Secondary, Non Tertiary	5526.76	19603
Tertiary	45705.66	16035
Total (MoE)	155496.80	
Total (MoE+MoPME)	292262.07	

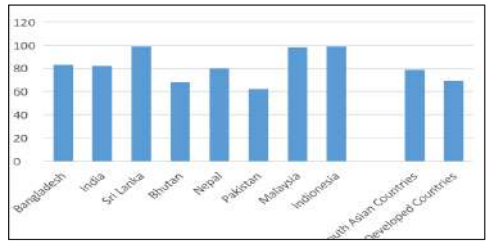
Source: BANBEIS

Figure 1: Government Expenditure on Education (2010-2014): % of GDP



Source: UNDP, 2016

Figure 2: Female Youth's Literacy Rate (aged 15-24): 2009-2014



Source: UNICEF, 2016

Table 2: Indicator of Quality of Educational Pupil-Teacher Ratio (Primary): 2010-15

Country	No of Pupil Per Teacher (Primary)
India	32
Bangladesh	40
Nepal	23
Pakistan	47
Sri Lanka	24
Bhutan	27
Indonesia	17
Malaysia	11
Singapore	NA
South Korea	17
Thailand	15
South Asian Countries	33
Least Developed Countries	41

Figure 2: Tertiary Enrollment Rate of Females (2014)

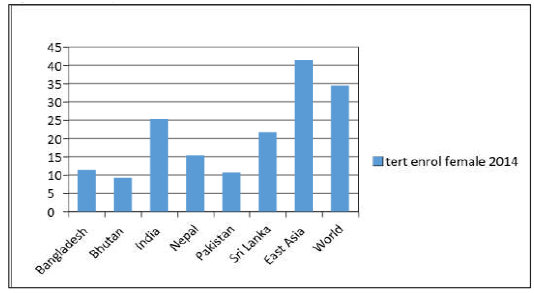


Table 3: Number of Physicians (per 1000 people): 2001-2014

Country	No. of Physicians
Bangladesh	3.6
India	7.0
Nepal	2.1
Pakistan	8.3
Bhutan	2.6
Sri Lanka	6.8
Malaysia	12.0
Indonesia	2.0
Thailand	3.9
South Asian Countries	6.8
Least Developed Countries	1.8
South Asian Countries	33
Least Developed Countries	41

Source: UNDP, 2016.

Table 4: Antenatal Care: 2010-2015

Country	% of At Least Four Visits
Bangladesh	31
India	45
Nepal	60
Pakistan	37
Bhutan	85
Sri Lanka	93
Indonesia	84
Thailand	93
South Asian Countries	42
Least Developed Countries	42

Source: UNICEF, 2016.

Table 5: Labour Market Status of Working Age Population (2013)

Labour Market Status	Male	Female
Self Employed	34.00	12.23
Wage Employed	40.77	3.97
Unpaid	3.78	13.35
Unemployed	2.77	3.24
Not in labour Force	18.69	67.21

Source: Labour Force Survey 2013.

Figure 3: Tertiary Enrollment Rate of Females (2014)

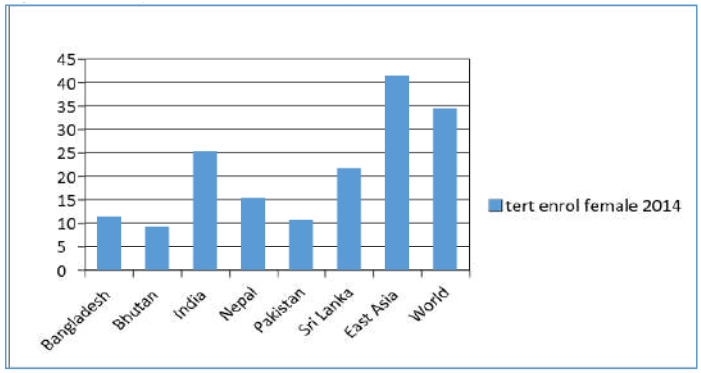
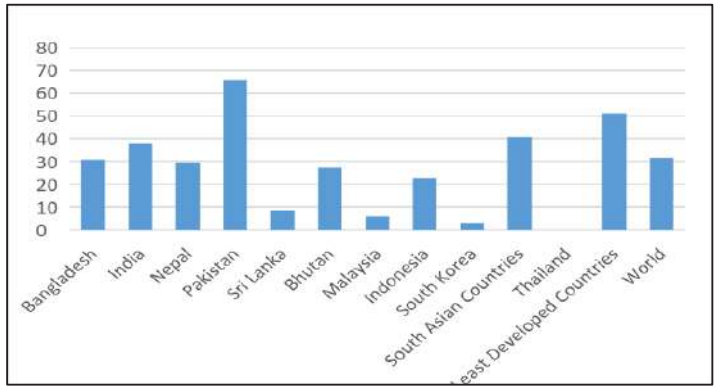


Table 6: Child Marriage Across South Asian Countries: 2008-2014

Country	Girls Married by Age of 18 (%)
Bangladesh	52
India	47
Nepal	37
Pakistan	21
Bhutan	26
Sri Lanka	12
Indonesia	14
South Asian Countries	NA
Least Developed Countries	41
South Korea	17

Source: UNICEF, 2016

Figure 4: Infant Mortality Rate : 2015 (per 1000 live births)



Source: UNDP

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 (৫১ টি 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) বাংলা অনুবাদ (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)
21.	বাংলাদেশের প্রথম প্রেক্ষিত পরিকল্পনা ২০১০-২০২১ রূপকল্প ২০২১ বাস্তবে রূপায়ণ (ফেব্রুয়ারি ২০১৩)
22.	National Sustainable Development Strategy (2010-2021) (May 2013)
23.	জাতীয় টেকসই উন্নয়ন কৌশলপত্র (২০১০-২০২১) [মূল ইংরেজি থেকে বাংলায় অনুদিত] (মে ২০১৩)
24.	Millennium Development Goals: Bangladesh Progress Report-2012 (June 2013)
25	Post 2015 Development Agenda: Bangladesh Proposal to UN (June 2013)
26.	National Policy Dialogue on Population Dynamics, Demographic Dividend, Ageing Population & Capacity Building of GED [UNFPA Supported GED Project Output1] (December 2013)

27.	Capacity Building Strategy for Climate Mainstreaming: A Strategy for Public Sector Planning Professionals (2013)
28.	Revealing Changes: An Impact Assessment of Training on Poverty-Environment Climate-Disaster Nexus (January 2014)
29.	Towards Resilient Development: Scope for Mainstreaming Poverty, Environment, Climate Change and Disaster in Development Projects (January 2014)
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31.	Manual of Instructions for Preparation of Development Project Proposal/Performa Part-1 & Part 2 (March 2014)
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34.	Millennium Development Goals: Bangladesh Progress Report 2013 (August 2014)
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36.	GED Policy Papers and Manuals (Volume 1-4) (June 2015)
37.	National Social Security Strategy (NSSS) of Bangladesh (July 2015)
38.	MDGs to Sustainable Development Transforming our World: SDG Agenda for Global Action (2015-2030)- A Brief for Bangladesh Delegation UNGA 70th Session, 2015 (September 2015)
39.	7th Five Year Plan (2015/16-2019/20) (December 2015)
40.	সপ্তম পঞ্চবার্ষিক পরিকল্পনা ২০১৫/১৬-২০১৯/২০ (জুন ইংরেজি থেকে বাংলা অনূদিত) (অক্টোবর ২০১৬)
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44.	Policy Coherence: Mainstreaming SDGs into National Plan and Implementation (Prepared for Bangladesh Delegation to 71st UNGA session, 2016) (September 2016)
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47.	Data Gap Analysis for Sustainable Development Goals (SDGs): Bangladesh Perspective (January 2017)
48.	Environment and Climate Change Policy Gap Analysis in Haor Areas (February 2017)
49.	Integration of Sustainable Development Goals into the 7th Five Year Plan (February 2017)
50.	Banking ATLAS (February 2017)
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52.	EXPLORING THE EVIDENCE : Background Research Papers for Preparing the National Social Security Strategy of Bangladesh (June 2017)
53.	Bangladesh Voluntary National Review (VNR) 2017 : Eradicating poverty and promoting prosperity in a changing world, (June 2017)
54.	SDGs Financing Strategy: Bangladesh Perspective (June 2017)
55.	A Training Handbook on Implementation of the 7th Five Year Plan (June 2017)
56.	7th Five Year Plan (FY 2015/16-FY 2019/20): Background Papers Volume 01: Macro Economic Management & Poverty Issues (June 2017)
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59.	7th Five Year Plan (FY 2015/16-FY 2019/20): Background Papers Volume 04: Agriculture, Water & Climate Change (June 2017)
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64.	National Action Plan of Ministries/Divisions by Targets for the implementation of Sustainable Development Goals (June 2018)
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71.	Journey with SDGs, Bangladesh is Marching Forward (Prepared for 73rd UNGA Session 2018) (September 2018)
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73.	Bangladesh Delta Plan 2100 (Bangladesh in the 21st Century) Volume 1: Strategy (October 2018)
74.	Bangladesh Delta Plan 2100 (Bangladesh in the 21st Century) Volume 2: Investment Plan (October 2018)
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76.	Bangladesh Delta Plan 2100: Bangladesh in the 21st Century (Abridged Version) (October 2018)
77.	Synthesis Report on First National Conference on SDGs Implementation (November 2018)
78.	Sustainable Development Goals: Bangladesh First Progress Report 2018 (December 2018)
79.	টেকসই উন্নয়ন অভীষ্টঃ বাংলাদেশ অগ্রগতি প্রতিবেদন ২০১৮ (ইংরেজি থেকে অনূদিত) (এপ্রিল ২০১৯)
80.	Study on Employment, Productivity and Sectoral Investment in Bangladesh (May 2019)
81.	Implementation Review of the Sixth Five Year Plan (FY 2011-FY 2015) and its Attainments (May 2019)
82.	Mid-term Implementation Review of the Seventh Five Year Plan (FY 2016-FY 2020) May 2019
83	Background Studies for the Second Perspective Plan of Bangladesh (2021-2041) Volume-1 June 2019
84.	Background Studies for the Second Perspective Plan of Bangladesh (2021-2041) Volume-2 June 2019
85.	Empowering people: ensuring inclusiveness and equality For Bangladesh Delegation to HIGH-LEVEL POLITICAL FORUM 2019 (July, 2019)
86.	Implementation Review of the perspective plan 2010-2021 (September 2019)
87.	Bangladesh Moving Ahead with SDGs (Prepared for Bangladesh Delegation to 74th UNGA session 2019) (September 2019)
88.	টেকসই উন্নয়ন অভীষ্ট অর্জনে এগিয়ে যাচ্ছে বাংলাদেশ (জাতিসংঘ সাধারণ পরিষদের ৭৪তম অধিবেশনে বাংলাদেশ প্রতিনিধিগণের জন্য প্রণীত) (সেপ্টেম্বর ২০১৯)
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91	Background Studies for the Second Perspective Plan of Bangladesh (2021-2041) Volume-4 October 2019
92	Background Studies for the Second Perspective Plan of Bangladesh (2021-2041) Volume-5 October 2019
93	Background Studies for the Second Perspective Plan of Bangladesh (2021-2041) Volume-6 October 2019

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