



DEVELOPMENT PROJECT PROFORMA/PROPOSAL (DPP) MANUAL

(Instructions for Preparing Development Project Proposal)

Part- 2: Appendixes

March 2014

General Economics Division (GED)
Planning Commission, Ministry of Planning
Government of the People's Republic of Bangladesh



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General Economics Division (GED)
Planning Commission, Ministry of Planning
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Resilient nations.



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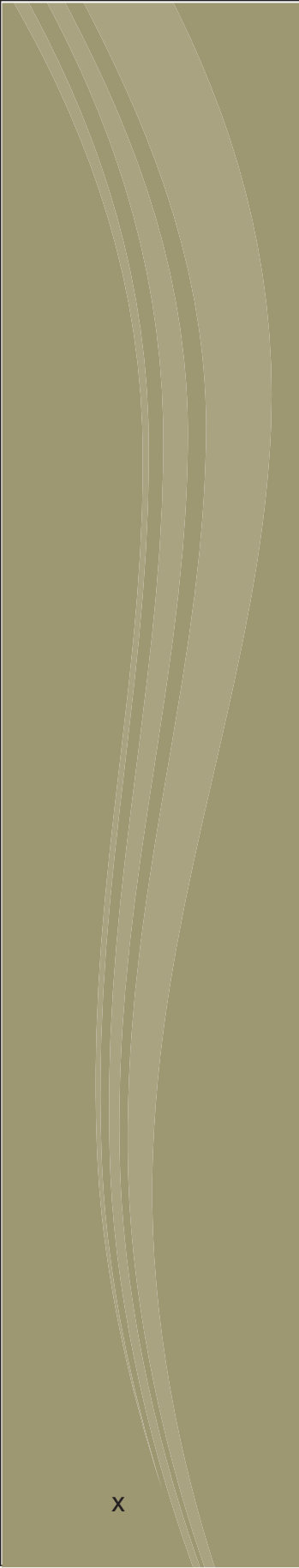
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ABBREVIATIONS

ADB	Asian Development Bank
ADP	Annual Development Programme
ATAP	Annual Technical Assistance Programme
BARC	Bangladesh Agricultural Research Council
BARD	Bangladesh Academy for Rural Development
BARI	Bangladesh Agricultural Research Institute
BBA	Bangladesh Bridge Authority
BBS	Bangladesh Bureau of Statistics
BCA	Benefit Cost Analysis
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BCR	Benefit-Cost Ratio
BCSIR	Bangladesh Council of Scientific and Industrial Research
BEPZA	Bangladesh Export Processing Zones Authority
BFRI	Bangladesh Forest Research Institute
BGTB	Bangladesh Treasury Bond
BIDS	Bangladesh Institute of Development Studies
BKB	Bangladesh Krishi Bank
BMD	Bangladesh Meteorological Department
BPC	Bangladesh Petroleum Corporation
BSCIC	Bangladesh Small and Cottage Industries Corporation
BUET	Bangladesh University of Engineering and Technology
BWDB	Bangladesh Water Development Board
CBO	Community Based Organization
CBRM	Community Based Resource Management
CC	Climate Change
CCA	Climate Change Adaptation
CCRF	Climate Change Resilience Fund
CCTF	Climate Change Trust Fund
CDE	Climate Change, Disaster, and Environment
CEA	Cumulative Effect Assessment
CGE	Computable General Equilibrium
CIDA	Canadian International Development Agency
CIF	Cost, Insurance and Freight
CIP	Country Investment Plan
CMLA	Chief Martial Law Administrator
CONTASA	Convertible Taka Special Account
CO	Country Office
COP	Conference of Parties (to UNFCCC)
CPM	Critical Path Method
CPTU	Central Procurement Technical Unit
CSO	Civil Society Organization
CUA	Cost Utility Analysis
CV	Contingent valuation
DAE	Department of Agricultural Extension

DAF	Development Assistant for Farmer & Farm Labours
DCC	Development Coordination Committee
DDM	Department of Disaster Management
DEPC	Department of Environmental Pollution Control
DFA	Deputy Financial Adviser
DFID	Department for International Development
DG	Director General
DLS	Department of Livestock Services
DoE	Department of Environment
DoF	Department of Fisheries
DOSA	Dollar Special Account
DPA	Direct Project Aid
DPEC	Departmental Project Evaluation Committee
DPHE	Department of Public Health Engineering
DPP	Development Project Proforma/Proposal
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EA	Environmental Assessment
EC	Executive Committee
ECA	Ecologically Critical Area
ECDC	European Centre for Disease Prevention and Control
ECLAC	Economic Commission for Latin America and the Caribbean
ECNEC	Executive Committee of the National Economic Council
EEC	European Economic Community
EIA	Environmental Impact Assessment
EIRR	Economic Internal Rate of Return
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
ENPV	Expected Net Present Value
EPA	Environmentally Protected Area
ERD	Economic Relations Division
ESCAP	Economic and Social Commission for Asia and the Pacific
FCD/I	Food Control and Drainage/ Irrigation
FD	Finance Division
FDI	Foreign Direct Investment
FFWC	Flood Forecasting and Warning Centre
FGD	Focus Group Discussion
FIRR	Financial Internal Rate of Return
FOB	Freight On Board/ Free On Board
FYP	Five Year Plan
GA	Gender Analysis
GAD	Gender and Development
GAF	Gender Analysis Framework
GCF	Group Conversion Factor
GCM	Global Circulation Model
GDP	Gross Domestic Product
GED	General Economics Division
GHG	Greenhouse Gas

GoB	Government of Bangladesh
GRB	Gender Responsive Budgeting
HEIS	Household Income and Expenditure Survey
HFL	Highest Flood Level
HP	Hedonic Pricing
HYV	High Yielding Variety
IAIA	International Association for Impact Assessment
ICB	International Competitive Bidding
ICCCAD	International Center for Climate Change and Development
ICOR	Incremental Capital Output Ratio
ICT	Information and Communication Technology
IDB	Islamic Development Bank
IEE	Initial Environmental Examination
I&FF	Investment and Financial Flows
IFAD	International Fund for Agricultural Development
IGAS	Income Generating Activities
ILO	International Labour Organization
IMED	Implementation Monitoring and Evaluation Division
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
IPEC	International Programme on the Elimination of Child Labour
IRD	Internal Resource Division
IRR	Internal Rate of Return
IWFM	Institute of Water and Flood Management
KGF	Krishi Gobeshona Foundation
LFS	Labour force Survey
LGED	Local Government Engineering Department
LLP	Low Lift Pump
LOA	Letter of Agreement
LSA	Local Study Area
LV	Land-Valuation
MEAs	Multilateral Environmental Agreements
M&E	Monitoring and Evaluation
MDG	Millennium Development Goals
MIS	Management Information System
MOA	Ministry of Agriculture
MODM	Ministry of Disaster Management
MoDMR	Ministry of Disaster Management and Relief
MOEF	Ministry of Environment and Forest
MoF	Ministry of Finance
MOLGRDC	Ministry of Local Government, Rural Development and Cooperatives
MOP	Ministry of Planning
MOPW	Ministry of Public Works
MOVs	Means of Verification
MOWCA	Ministry of Women and Children's Affairs
MOWR	Ministry of Water Resources
MTBF	Medium-Term Budgetary Framework

NAP	National Action Plan
NAPA	National Adaptation Programme of Action
NAPD	National Academy for Planning and Development
NATP	National Association of Tax Professionals
NBR	National Board of Revenue
NCLP	National Child Labour Project
NEC	National Economic Council
NEMAP	National Environmental Management Action Plan
NGO	Non-Government Organization
NNVAW	Nursing Network on Violence Against Women (International)
NPAW	National Policy for the Advancement of Women
NPDM	National Plan for Disaster Management
NPV	Net Present Value
NSAPR	National Strategy for Accelerated Poverty Reduction
NSDS	National Sustainable Development Strategy
NWMP	National Water Management Plan
OER	Official Exchange Rate
ODA	Official Development Assistance
OVI	Objectively Verifiable Indicators
PA	Personal Amount
PBME	Project Benefit, Monitoring and Evaluation
PC	Planning Commission
PDB	Power Development Board
PEC	Project Evaluation Committee
PECM	Poverty, Environment and Climate Mainstreaming Project
PEI	Poverty Environment Initiative
PIC	Project Implementation Committee
PECD	Poverty, Environment, Climate Change and Disaster
PICn	Public Information and Consultation
PID	Physical Infrastructure Division
PIP	Program Implementation Plan/ Public Investment Programme
PEI	Poverty Environment Initiative
PIU	Project Implementation Unit
PKSF	Palli Karma-Shayak Foundation (a Foundation for Rural Employment Generation)
PLAGE	Policy Leadership and Advocacy for Gender Equality
PMU	Project Management Unit
PP	Project Proforma/Proposal
PPP	Preliminary Project Proforma/Proposal
PSC	Project Steering Committee
PWD	Public Works Department
QCBS	Quality Cost Based System
QSBI	Quality Cost Based System
RDA	Rural Development Academy
RDPP	Revised Development Project Proforma/Proposal
RFP	Request for Proposals
RHD	Roads and Highways Department
RPA	Reimbursable Project Aid

RSA	Regional Study Area
RTPP	Revised Technical Assistance Project Proforma/Proposal
SAFE	Special Account for Foreign Exchange
SCF	Standard Conversion Factor
SDC	Swiss Agency for Development and Cooperation
SDG	SAARC Development Goals
SEI	Socio-Economic Infrastructure
SER	Shadow Exchange Rate
SFYP	Sixth Five Year Plan
SLF	Sustainable Livelihood Framework
SLR	Sea Level rise
SPARRSO	Space Research and Remote Sensing Organization
SPGR	Sponsored Public Goods Research
SRWSP	Special Rural Water Supply Project
STIFPP	Secondary Towns Integrated Flood Protection Project
SYB	Statistical Yearbook of Bangladesh
TAP	Technical Assistance Projects
TAPP	Technical Assistance Project Proforma/Proposal
TC	Travel -Cost
TPR	Tripartite Project Review
TSP	Triple Super Phosphate
UCCM	Union Coordination Committee Meeting
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNDAF	United Nations Development Assistance Framework
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Environmental, Social and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNICEF	United Nation Children's Fund
UNO	Upazila Nirbahi Officer
VAT	Value Added Tax
VEC	Valued Environmental Component
VGD	Vulnerable Group Development
WARPO	Water Resources Planning Organization
WASA	Water Supply & Sewerage Authority
WB	World Bank
WDB	Water Development Board
WID	Women in Development
WIMAX	Worldwide Interoperability for Microwave Access
WMCA	Water Management Co-operative Association

Preface

Historically, it is evident that human societies are characterised by their adaptability throughout human existence. The history of development of human society is also the history of battle against environmental adversity and major shocks. Human potential to absorb shocks through its cultural and physical process is the fundamental to the evolution of today's human being, the most intelligent species in the earth. Currently, with many other socio-economic problems, globally the human societies are facing new challenge of climate change impacts. The challenge is not only because of the expected rise in temperature and sea-levels, but also due to the current context of failure to address the causes of poverty adequately. As a result, policy supporting adaptation has been cast as a necessary strategy for responding to climate change and supporting development, making adaptation the focus of much recent scholarly and policy researches.

Climate change and sustainable development issues have been addressed in largely separate circles in both research and policy. Nevertheless, there are strong linkages between the two in both realms. The Planning Commission encourages the scientific linkages and discussion on the opportunities they provide for integrated policy development, and the necessity to consider the risk of trade-offs. We believe that this integration will not only provide new opportunities, but may even be a prerequisite for successfully addressing of both issues. Since the feasibility of stabilising greenhouse gas concentrations is dependent on general socio-economic development paths of developed and emerging economies. Climate policy responses should be fully placed in the larger context of technological and socio-economic policy development rather than be viewed as an add-on to those broader policies. The arguments are supported by a range of analysis of various economic sectors in the areas of both mitigation and adaptation, largely drawn from IPCC's Fifth Assessment Report (IPCC-AR5).

Planned adaptation to climate change denotes actions undertaken to reduce the risks and capitalize on the opportunities associated with global climate change. At the onset, Bangladesh articulates its long-term vision through a perspective plan, which begins its implementation through two consecutive five year plans (Sixth and Seventh). Every five year plan contains the general and the sectoral directions, the country will follow for a period of five year. A Five Year plan is implemented through Annual Development Programmes (ADP).

ADP is a sum of yearly costed development projects, following all approved Development Project Proposal (including technical assistance in terms of technical assistance project proposals). The main thrusts of ADP are attaining balanced development, poverty reduction, employment generation, food security, social protection, human resource development, gender equality, environmental protection and climate resilience.

Generally, GoB undertakes two types of development projects- investment projects and technical assistance projects and also schemes by the Ministries. Two standard formats are available to follow in submitting the projects proposal for approval to the planning commission. The first one is called the 'Development Project Proforma (DPP)' and the other is known as the 'Technical Assistance Project Proforma (TPP)'. At the project designing, therefore, DPP and TPP are key enabling instrument taken into consideration for climate change, disaster and environmental mainstreaming issues. The issue of climate change and disaster was largely missing in existing DPP formats. Therefore, GED, with the technical support of Poverty Environment Climate Mainstreaming (PECM) project has proposed some revisions in the DPP format and subsequently it coincided with Planning Division's ongoing effort for the revision of DPP format. A revised DPP format is therefore drafted and consulted with relevant stakeholders. As stated in the revised circular on the "Preparation, Processing, Approval and Revision of the Public Sector Development Projects", every implementing agency needs to fill in the Development Project Proforma to submit the proposal of an investment project, where now climate change and disaster issues are made integral part and environment aspects are thus further strengthened.

This DPP manual is an attempt to meet the request of the public sector planning professionals expressed in the various consultations in the DPP revision process. This DPP manual attempts to explain, step by step, how to prepare a good Development Project Proposal based on the upcoming revised Proforma and more robustly how climate change, disaster and environment issues could be better integrated in the design of development projects. To help the process further, the Manual is entailed with a number of reference materials along with some necessary indicators. I hope the manual will be a one stop solution of the problems faced by the officials preparing development project proposals taking care of climate change impact issues. One thing I want to make clear that this is not a hit and run effort of GED. We are expecting objective feedbacks from you while you start using this manual. We welcome your feedback in using this manual and subsequently will be updating the document. Finally, it will be our great pleasure if the proposed document be of any help to you.



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The Manual has been drafted and designed by the General Economics Division (GED) with the overall supervision and guidance of Dr. Shamsul Alam, Member, GED. His invaluable support throughout the process made it all possible. We are ever grateful to him. We are thankful to the former Division Chiefs of GED respectively Mr. Fakrul Ahsan, Mr. Md. Zobih Ullah and Mr. Nurul Hoque Mazumder. The former National Project Directors Mr. Md. Rezaul Karim and Mr. S.M. Nasim Uddin claim a great share of credit for this document.

Preparing this Manual was a mammoth task. A number of people were involved in every step of its formulation. For the space limit, it will not be possible to acknowledge the contribution of all, name by name. However, there are some names no way we can omit.

The manual, in fact, is the fruitful result of detailed and extensive consultations among the stakeholders of all level. Planning Professionals from the Planning Commission, Ministries/Divisions and Implementing Agencies have given their valuable time, effort and merit to make the Manual as it is now. We are indebted to them.

I recall the great effort of Team PECM: Mr. A.K.M Mamunur Rashid, National Project Manager; Dr. Nurun Nahar, Planning Expert; Ms. Mousumi Pervin, Training, Knowledge Management and Communication Expert; Mr. Md. Abdul Awal Sarkar, Monitoring Officer; Mr. Shohidul Alam, Project Secretary, and Ms. Naila Karim Chowdhury, IT Assistant.

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Appendix 9.0: Economic Code/ Sub-Codes

Appendix 9.0: Economic Code/ Sub-Codes

Classification Chart Economic Code

Detail Description

0100 - Consolidated Fund Receipts	০১০০ - সংযুক্ত তহবিল - গ্রাণ্টি
0100 - 0999 - NBR Tax	০১০০ - ০৯৯৯ - রাজস্ব বোর্ড কর
0100 - 0199 - Taxes on Income and Profit	০১০০ - ০১৯৯ - আয় ও মুনাফার উপর কর
0100 - 0199 - Taxes on Income and Profit	০১০০ - ০১৯৯ - আয় ও মুনাফার উপর কর
0101 - Taxes on Companies	0101 - আয়কি - ইকিউবিমগা
0109 - Deduct-Refund	০১০৯ - কর্তন-ফেরত
0111 - Taxes other than Companies	0111 - আয়কি - ইকিউবিমগা e ZIZ
0119 - Taxes from Vehicle	০১১৯ - আয়কর মোটরযান
0199 - Deduct-Refund	০১৯৯ - কর্তন-ফেরত
0200 - 0299 - Taxes on Property and Wealth	০২০০ - ০২৯৯ - সম্পত্তি কর ও সম্পদ হস্তান্তর কর
0200 - 0299 - Taxes on Property and Wealth	০২০০ - ০২৯৯ - সম্পত্তি কর ও সম্পদ হস্তান্তর কর
0201 - Tax on Property Transfer	০২০১ - সম্পত্তি ন্যস্তি কি
0211 - Gift Tax	০২১১ - দানকর
0221 - Wealth Tax	০২২১ - সম্পত্তি কি
0300 - 0399 - Value Added Tax (VAT)	০৩০০ - ০৩৯৯ - মূল্য সংযোজন কর (মূল্যক)
0300 - 0399 - Value Added Tax (VAT)	০৩০০ - ০৩৯৯ - মূল্য সংযোজন কর (মূল্যক)
0301 - VAT on Imported Commodities	০৩০১ - আমদানি পণ্যের উপর ভ্যাট
0311 - VAT on Domestic Products and Services	০৩১১ - দেশজ পণ্য ও সেবার উপর ভ্যাট
0313 - Turn Over Tax	০৩১৩ - টার্ন ওভার ট্যাক্স
0321 - Turnover Tax	০৩২১ - টার্ন ওভার ট্যাক্স
0391 - Other VAT	০৩৯১ - অন্যান্য ভ্যাট
0397 - Deduct- Refund for Duty draw-back	০৩৯৭ - কর্তন - ডিউটি ড্র ব্যাক বাবদ ফেরত
0399 - Deduct-Refund from VAT	০৩৯৯ - কর্তন - মূল্য সংযোজন কর বাবদ ফেরত
0400 - 0499 - Import Duty	০৪০০ - ০৪৯৯ - আমদানী শুল্ক
0400 - 0499 - Import Duty	০৪০০ - ০৪৯৯ - আমদানী শুল্ক
0401 - Customs Duty	০৪০১ - কাস্টমস ডিউটি
0411 - Customs Surcharge	০৪১১ - কাস্টমস - সারচার্জ
0412 - Infrastructure Development Surcharge	০৪১২ - অবকাঠামো উন্নয়ন সারচার্জ
0421 - Other Receipts - PSI Fee	০৪২১ - অন্যান্য - পিএসআই ফি
0497 - Deduct - Refund from Duty draw-back	০৪৯৭ - কর্তন - ডিউটি ড্র ব্যাক বাবদ ফেরত
0498 - Deduct Refund against duty Draw Back	০৪৯৮ - কর্তন ডিউটি ড্র ব্যাক বাবদ ফেরত
0499 - Deduct - Refund for Import Duty	০৪৯৯ - কর্তন - আমদানী শুল্ক বাবদ ফেরত
0500 - 0599 - Export Duty	০৫০০ - ০৫৯৯ - রপ্তানি শুল্ক
0500 - 0599 - Export Duty	০৫০০ - ০৫৯৯ - রপ্তানী শুল্ক
0501 - Export Duty	০৫০১ - রপ্তানি শুল্ক
0600 - 0699 - Excise Duty	০৬০০ - ০৬৯৯ - আবগারী শুল্ক
0600 - 0699 - Excise Duty	০৬০০ - ০৬৯৯ - আবগারী শুল্ক
0601 - Excise Duty	০৬০১ - আবগারি শুল্ক
0700 - 0799 - Supplementary Duty	০৭০০ - ০৭৯৯ - সম্পূরক শুল্ক
0700 - 0799 - Supplementary Duty	০৭০০ - ০৭৯৯ - সম্পূরক শুল্ক
0701 - Supplementary Duty on Imported Commodities	০৭০১ - আমদানি পণ্যের উপর সম্পূরক শুল্ক
0711 - Supplementary Duty on Domestically Produced	০৭১১ - দেশজ পণ্যের উপর সম্পূরক শুল্ক
0721 - Supplementary Duty on Domestic Services	০৭২১ - দেশজ সেবার উপর সম্পূরক শুল্ক
0797 - Deduct-Refund Against Duty Draw Back	০৭৯৭ - কর্তন-ডিউটি ড্র ব্যাক বাবদ ফেরত
0799 - Deduct-Refund	০৭৯৯ - কর্তন-ফেরত
0800 - 0899 - Electricity Duties	০৮০০ - ০৮৯৯ - বিদ্যুৎ শুল্ক
0800 - 0899 - Electricity Duty	০৮০০ - ০৮৯৯ - বিদ্যুৎ শুল্ক
0801 - Electricity Duty	০৮০১ - বিদ্যুৎ শুল্ক
0900 - 0999 - Other Taxes and Duties	০৯০০ - ০৯৯৯ - অন্যান্য কর ও শুল্ক
0900 - 0999 - Other Taxes and Duties	০৯০০ - ০৯৯৯ - অন্যান্য কর ও শুল্ক
0901 - Advertisement Taxes	০৯০১ - বিজ্ঞাপন কর
0911 - Travel Tax	০৯১১ - ভ্রমণ কর
0921 - Turnover Tax	০৯২১ - টার্ন ওভার ট্যাক্স
0923 - Betterment Tax	০৯২৩ - বেস্টারমেন্ট ট্যাক্স

Detail Description

0100 - Consolidated Fund Receipts	০১০০ - সংযুক্ত তহবিল - প্রাপ্তি
0100 - 0999 - NBR Tax	০১০০ - ০৯৯৯ - রাজস্ব বোর্ড কর
0900 - 0999 - Other Taxes and Duties	০৯০০ - ০৯৯৯ - অন্যান্য কর ও শুল্ক
0900 - 0999 - Other Taxes and Duties	০৯০০ - ০৯৯৯ - অন্যান্য কর ও শুল্ক
0925 - Shop Tax	০৯২৫ - দোকান কর
0931 - Air Ticket Tax	০৯৩১ - এয়ার টিকেট ট্যাক্স
0935 - Post Flood Rehabilitation Surcharge	০৯৩৫ - বন্যা উত্তর পূর্ণাবসন অতিরিক্ত
0941 - Tax on Insurance Premium	০৯৪১ - বীমা প্রিমিয়াম কর
0951 - Entertainment Tax	০৯৫১ - প্রমোদ কর
0961 - Other Taxes and Duties	০৯৬১ - অন্যান্য
1000 - 1399 - Non-NBR Tax	১০০০ - ১৩৯৯ - রাজস্ব বোর্ড বহির্ভূত কর
1000 - 1099 - Narcotics and Liquor Duty	১০০০ - ১০৯৯ - মাদক শুল্ক
1000 - 1099 - Narcotics and Liquor Duty	১০০০ - ১০৯৯ - মাদক শুল্ক
1001 - Narcotics Duty	১০০১ - মাদক শুল্ক
1011 - Duty on Liquor and Drinks	১০১১ - মদ ও মদা জাতীয় পণ্য শুল্ক
1100 - 1199 - Taxes on Vehicles	১১০০ - ১১৯৯ - যানবাহন কর
1100 - 1199 - Taxes on Vehicles	১১০০ - ১১৯৯ - যানবাহন কর
1101 - Vehicle Registration	১১০১ - যানবাহন রেজিস্ট্রিকরণ
1105 - Road Tax	১১০৫ - সড়ক কর
1111 - Driving Licence	১১১১ - গাড়ীচালনা লাইসেন্স
1121 - Other	১১২১ - অন্যান্য
1200 - 1299 - Land Revenue	১২০০ - ১২৯৯ - ভূমি রাজস্ব
1200 - 1299 - Land Revenue	১২০০ - ১২৯৯ - ভূমি রাজস্ব
1211 - Land Development Tax	১২১১ - ভূমি উন্নয়ন কর
1221 - Survey and Settlement Charges	১২২১ - জরিপ ও বন্দোবস্ত বাবদ আদায়
1231 - Lease of Hats and Bazars	১২৩১ - হাটবাজার ইজারা
1241 - Lease of Acquired Properties	১২৪১ - দখলকৃত ও অর্জিত মালমুলের BRবি
1243 - Lease of Abandoned Property	১২৪৩ - পরিত্যক্ত মালমুলের BRবি
1251 - Lease of Estates	১২৫১ - F-মালমুলের BRবি
1261 - Lease of Jalmahal, Ponds	১২৬১ - জলমহল ও পুকুর ইজারা
1263 - Lease of Balu Mahal	১২৬৩ - বালু মহাল ইজারা
1271 - Other Land Revenue	১২৭১ - অন্যান্য
1300 - 1399 - Stamp Duty (Non Judicial)	১৩০০ - ১৩৯৯ - স্ট্যাম্প ডিউটি (নন - জুডিসিয়াল)
1300 - 1399 - Stamp Duty (Non Judicial)	১৩০০ - ১৩৯৯ - ঠাকান্দা কর (bb-FgWimqj)
1301 - Sale of Stamp	১৩০১ - ঠাকান্দা কর
1311 - Duty on Impressing Documents	১৩১১ - ছাপমারা দলিলের উপর কর
1321 - Other Stamp Duty (Non-judicial)	১৩২১ - অন্যান্য
1500 - 2999 - Non-Tax Revenue	১৫০০ - ২৯৯৯ - কর ব্যতীত প্রাপ্তি
1500 - 1599 - Dividends and Profits	১৫০০ - ১৫৯৯ - লভ্যাংশ ও মুনাফা
1500 - 1599 - Dividend and Profit	১৫০০ - ১৫৯৯ - লভ্যাংশ ও মুনাফা
1501 - Dividend and Profit - Financial Institution	১৫০১ - লভ্যাংশ ও মুনাফা : আর্থিক প্রতিষ্ঠান
1511 - Dividend and Profit : Non Financial Institution	১৫১১ - লভ্যাংশ ও মুনাফা : আর্থিক প্রতিষ্ঠান বহির্ভূত
1600 - 1699 - Interest	১৬০০ - ১৬৯৯ - সুদ
1600 - 1699 - Interest	১৬০০ - ১৬৯৯ - সুদ
1601 - Interest on Internal Loans - Non development	১৬০১ - অভ্যন্তরীণ ঋণের সুদ - অনুনয়ন
1611 - Interest on Internal Loans - Development	১৬১১ - অভ্যন্তরীণ ঋণের সুদ - উন্নয়ন
1621 - Interest on Foreign Loans/ Grants	১৬২১ - বৈদেশিক ঋণ/মঞ্জুরীর উপর সুদ
1623 - Interest on Foreign Loans (Special Account)	১৬২৩ - বৈদেশিক ঋণের উপর সুদ (বিশেষ হিসাব)
1631 - Interest on Loans to Government Employees	১৬৩১ - সরকারি কর্মচারীদের অগ্রিমের সুদ
1632 - Interest on House Loan	১৬৩২ - গৃহ নির্মাণ অগ্রিমের সুদ
1633 - Interest on Computer Loan	১৬৩৩ - কম্পিউটার অগ্রিমের সুদ
1634 - Interest on Motor Car Loan	১৬৩৪ - মটর গাড়ি অগ্রিমের সুদ
1635 - Interest on Motor Cycle Loan	১৬৩৫ - মটর সাইকেল অগ্রিমের সুদ
1636 - Interest on By-cycle Loan	১৬৩৬ - বাই সাইকেল অগ্রিমের সুদ
1641 - Interest on Loans to Co-operatives	১৬৪১ - সমবায় ঋণের সুদ

Detail Description

0100 - Consolidated Fund Receipts	০১০০ - সংযুক্ত তহবিল - প্রাপ্তি
1500 - 2999 - Non-Tax Revenue	১৫০০ - ২৯৯৯ - কর ব্যতীত প্রাপ্তি
1600 - 1699 - Interest	১৬০০ - ১৬৯৯ - সুদ
1600 - 1699 - Interest	১৬০০ - ১৬৯৯ - সুদ
1645 - Return on Investment	১৬৪৫ - রিটার্ন অন ইনভেস্টমেন্ট
1651 - Other Interest	১৬৫১ - অন্যান্য সুদ
1689 - Deduct - Refund	১৬৮৯ - কর্তন - ফেরত
1699 - Probable Shortfall	১৬৯৯ - সুদ অনাদায় (কর্তন)
1700 - 1799 - Royalties and Property Income	১৭০০ - ১৭৯৯ - রয়্যালটি এবং সম্পত্তি হইতে আয়
1700 - 1799 - Royalties and Property Income	১৭০০ - ১৭৯৯ - রয়্যালটি এবং সম্পত্তি হইতে আয়
1701 - Mines and Minerals Royalty	১৭০১ - খনি ও খনিজ দ্রব্যের রয়্যালটি
1711 - Other Royalty and Property Income	১৭১১ - অন্যান্য রয়্যালটি
1800 - 1899 - Administrative Fees and Charges	১৮০০ - ১৮৯৯ - প্রশাসনিক ফিসসমূহ
1800 - 1899 - Administrative Fees and Charges	১৮০০ - ১৮৯৯ - প্রশাসনিক ফি
1801 - Import/Export Fees	১৮০১ - আমদানী/প্রস্থানী ফি
1802 - Patent and Design Application/Registration Fee	১৮০২ - পেটেন্ট ও ডিজাইন দরখাস্ত/রেজিস্ট্রেশন ফি
1803 - Patent and Design Renewal Fee	১৮০৩ - পেটেন্ট ও ডিজাইন নবায়ন ফি
1804 - Trade Mark Renewal Fee	১৮০৪ - ট্রেডমার্ক নবায়ন ফি
1806 - Fees under Insurance Act	১৮০৬ - বীমা আইনের আওতায় প্রাপ্ত ফি
1811 - Court Fees	১৮১১ - কোর্ট ফি
1813 - Admiralty Suite Fee	১৮১৩ - এ্যাডমিরালটি স্যুট ফি
1816 - Firms and Companies Registration Fees	১৮১৬ - চিহ্নিত ফি
1817 - Registration fee for Hotel and Restaurant	১৮১৭ - হোটেল ও রেস্তোরাঁ সমূহের রেজিস্ট্রেশন ফি
1818 - Licence Fee for Hotels & Restaurants	১৮১৮ - হোটেল ও রেস্তোরাঁ সমূহের লাইসেন্স ফি
1821 - Water Transport Registration Fees	১৮২১ - জলযান রেজিস্ট্রেশন ফি
1826 - Document Registration Fees	১৮২৬ - দলিল রেজিস্ট্রেশন ফি
1831 - Trade Mark Application/Registration Fees	১৮৩১ - ট্রেডমার্ক দরখাস্ত/রেজিস্ট্রেশন ফি
1836 - Non-profit Institution Registration Fees	১৮৩৬ - অলাভজনক প্রতিষ্ঠান রেজিস্ট্রেশন ফি
1841 - Copyright Fees	১৮৪১ - কপিরাইট ফি
1846 - Passport and Visa Fees	১৮৪৬ - পাসপোর্ট এবং ভিসা ফি
1851 - Educational Fees	১৮৫১ - শিক্ষা ফি
1854 - Licence Fee	১৮৫৪ - লাইসেন্স ফি
1856 - TV Licence Fees	১৮৫৬ - টেলিভিশন লাইসেন্স ফি
1859 - Firearms Licence Fees	১৮৫৯ - আগ্নেয়াস্ত্র লাইসেন্স ফি
1861 - Radio Licence Fees	১৮৬১ - রেডিও লাইসেন্স ফি
1862 - Frequency & Wireless Fees	১৮৬২ - ফ্রিকোয়েন্সী ও ওয়্যারলেস ফি
1863 - Drug Licence Fees	১৮৬৩ - ড্রাগ লাইসেন্স ফি
1866 - Transfer Fees	১৮৬৬ - ট্রান্সফার ফিস
1867 - Immovable Property Transfer Fees	১৮৬৭ - স্থাবর সম্পত্তি হস্তান্তর ফি
1868 - Marriage Registration Fees	১৮৬৮ - বিবাহ রেজিস্ট্রেশন ফি
1871 - Fees for copying Registered Documents	১৮৭১ - রেজিস্ট্রিকৃত দলিলের অনুলিপি বাদ ফি
1876 - Other Fees	১৮৭৬ - অন্যান্য ফিসমূহ
1899 - Deduct - Refund	১৮৯৯ - কর্তন - ফেরত
1900 - 1999 - Fines, Penalties and Forfeiture	১৯০০ - ১৯৯৯ - জরিমানা, দণ্ড ও বাজেয়াপ্তকরণ
1900 - 1999 - Fines, Penalties and Forfeiture	১৯০০ - ১৯৯৯ - জরিমানা, দণ্ড ও বাজেয়াপ্তকরণ
1901 - Fines and Penalties	১৯০১ - জরিমানা ও দণ্ড
1911 - Forfeitures	১৯১১ - বাজেয়াপ্তকরণ
1999 - Deduct - Refund	১৯৯৯ - কর্তন - ফেরত
2000 - 2099 - Receipts for Services Rendered	২০০০ - ২০৯৯ - সেবা বাদ প্রাপ্তি
2000 - 2099 - Receipts for Services Rendered	২০০০ - ২০৯৯ - সেবা বাদ প্রাপ্তি
2001 - Supply of Police Forces to Railways	২০০১ - রেলওয়েতে পুলিশ প্রেরণ
2002 - Police Supplied to Port Authority	২০০২ - বন্দর কর্তৃপক্ষে পুলিশ প্রেরণ
2003 - Military Forces Supplied to Railways	২০০৩ - রেলওয়েতে সামরিক বাহিনী প্রেরণ
2004 -	২০০৪ - জাতিসংঘে পুলিশ প্রেরণ
2005 - Police Forces Supplied to Others	২০০৫ - অন্যান্য কর্তৃপক্ষের নিকট পুলিশ প্রেরণ
2007 - Military Forces Supplied to Others	২০০৭ - অন্যান্য কর্তৃপক্ষের নিকট মিলিটারি প্রেরণ
2009 - Fire Services	২০০৯ - অগ্নি নির্দাপণ
2011 - Receipts from Convicts' Labour	২০১১ - কয়েদিদের কাজের বিনিময় প্রাপ্তি

Detail Description

0100 - Consolidated Fund Receipts	০১০০ - সংযুক্ত তহবিল - প্রাপ্তি
1500 - 2999 - Non-Tax Revenue	১৫০০ - ২৯৯৯ - কর বাতীত প্রাপ্তি
2000 - 2099 - Receipts for Services Rendered	২০০০ - ২০৯৯ - সেবা বাবদ প্রাপ্তি
2000 - 2099 - Receipts for Services Rendered	২০০০ - ২০৯৯ - সেবা বাবদ প্রাপ্তি
2013 - Commercial Broadcasting	২০১৩ - বাণিজ্যিক বেতার অনুষ্ঠান হইতে প্রাপ্তি
2015 - Inspection Fees	২০১৫ - পরিদর্শন ফি
2016 - Pre-Shipment Service Fee	২০১৬ - প্রি-শিপমেন্ট সার্ভিস
2017 - Testing Fees	২০১৭ - পরিক্ষণ ফি
2019 - Survey Fees	২০১৯ - জরিপ ফি
2021 - Advertising Fees	২০২১ - বিজ্ঞাপন ফি
2023 - Health and Family Planning Services	২০২৩ - স্বাস্থ্য ও পরিবার পরিকল্পনা সেবা
2024 - User Fee	২০২৪ - ইউজার ফি
2025 - Supplies and Inspection Services	২০২৫ - সরবরাহ ও পরিদর্শন সেবা
2027 - Lighthouse and Shipping Services	২০২৭ - বাতিঘর ও জাহাজ চলাচল
2028 - Navigation	২০২৮ - নৌ - পরিবহন
2029 - Audit Fees	২০২৯ - অডিট ফি
2031 - Examination Fees	২০৩১ - পরীক্ষা ফি
2033 - Admission Fees	২০৩৩ - ভর্তি ফি
2035 - Embarkation Fees	২০৩৫ - আরোহণ ফি
2037 - Use of Government Vehicles	২০৩৭ - সরকারি যানবাহনের ব্যবহার
2038 - Receipt form vehicle repair in Govt. Workshop	২০৩৮ - সরকারী কারখানায় গাড়ী মেরামত
2039 - Receipts from Ferries	২০৩৯ - ফেরি হইতে প্রাপ্তি
2040 - Receipt from Marine Academy	২০৪০ - মেরিন একাডেমী হইতে প্রাপ্তি
2041 - Public Health Engineering Services	২০৪১ - জনস্বাস্থ্য প্রকৌশল সেবা
2043 - Plant Protection Operation	২০৪৩ - উদ্ভিদ সংরক্ষণ
2045 - Sugarcane Research Cess	২০৪৫ - ইন্ধু গবেষণা সেস্
2046 - Road Development Cess	২০৪৬ - সড়ক উন্নয়ন সেস্
2047 - Angling Fees	২০৪৭ - মৎস্য শিকার ফি
2049 - Departmental Charges	২০৪৯ - ডিপার্টমেন্টাল চার্জেস
2071 - Other Fees and Charges	২০৭১ - অন্যান্য সেবা ও ফিস
2099 - Deduct - Refund	২০৯৯ - কর্তন - ফেরত
2100 - 2199 - Rents, Leases and Recoveries	২১০০ - ২১৯৯ - ভাড়া, ইজারা ও আদায়
2100 - 2199 - Rents, Leases and Recoveries	২১০০ - ২১৯৯ - ভাড়া ও ইজারা
2101 - Rentals - Non Residential	২১০১ - ভাড়া - আবাসিক
2111 - Rentals - Residential	২১১১ - ভাড়া - আবাসিক
2112 - Hospital Receipts	২১১২ - হাসপাতাল ভাড়া
2113 - Rent of Hired Houses	২১১৩ - ভাড়াটে বাড়ির ভাড়া
2115 - Rent of Abandoned Houses	২১১৫ - পরিত্যক্ত বাড়ির ভাড়া
2117 - Recoveries on Account of Titas Gas	২১১৭ - গ্যাস বাবদ আদায় - তিতাস
2119 - Recoveries on Account of Bakhrabad Gas	২১১৯ - গ্যাস বাবদ আদায় - বাখরাবাদ
2121 - Recoveries on Account of Jalalabad Gas	২১২১ - গ্যাস বাবদ আদায়-জালালাবাদ
2123 - Recoveries on Accounts of Water & Sewerage	২১২৩ - পানি ও পয়ঃ প্রণালী বাবদ আদায়
2125 - Recoveries on Accounts of Electricity	২১২৫ - বিদ্যুৎ বাবদ আদায়
2127 - Recoveries on Accounts of Municipal Tax	২১২৭ - পৌরকর বাবদ আদায়
2131 - Rent of Machinery and Equipment	২১৩১ - যন্ত্র ও সরঞ্জামাদির ভাড়া
2135 - Rent on Housing Estate	২১৩৫ - হাউজিং এন্ডেট হইতে ভাড়া
2137 - Lease	২১৩৭ - ইজারা
2151 - Others	২১৫১ - অন্যান্য ভাড়া
2199 - Deduct - Refund	২১৯৯ - কর্তন - ফেরত
2200 - 2299 - Tolls and Levies	২২০০ - ২২৯৯ - টোল এবং লেভী
2200 - 2299 - Tolls and Levies	২২০০ - ২২৯৯ - টোল এবং লেভী
2201 - Jamuna Bridge Surcharge and Levy	২২০১ - যমুনা ব্রিজ সারচার্জ ও লেভি
2211 - Tolls on Bridges	২২১১ - টোল আদায় - সেতু
2215 - Toll From Bangabondhu Jamuna Bridge	২২১৫ - বঙ্গবন্ধু যমুনা সেতু থেকে টোল আদায়
2221 - Tolls on Roads	২২২১ - টোল আদায় - রাস্তা
2231 - Other Tolls	২২৩১ - অন্যান্য টোল ও লেভী
2299 - Deduct - Refund	২২৯৯ - কর্তন - ফেরত

Detail Description

0100 - Consolidated Fund Receipts	০১০০ - সংযুক্ত তহবিল - প্রাপ্তি
1500 - 2999 - Non-Tax Revenue	১৫০০ - ২৯৯৯ - কর ব্যতীত প্রাপ্তি
2300 - 2399 - Non-Commercial Sales	২৩০০ - ২৩৯৯ - অ - বাণিজ্যিক বিক্রয়
2300 - 2399 - Non-Commercial Sales	২৩০০ - ২৩৯৯ - অ - বাণিজ্যিক বিক্রয়
2301 - Produce from Jails	২৩০১ - কারাগারে উৎপাদিত দ্রব্যাদি
2306 - Ration Goods	২৩০৬ - রেশন দ্রব্যাদি
2311 - Medicines and Vaccines	২৩১১ - ঔষধ ও টিকা
2316 - Paper, Stationery	২৩১৬ - কাগজ, মনিহারী দ্রব্য
2317 - Stamps (Judicial)	২৩১৭ - ঠান্ডা ঠোঁট (Rajwamtj)
2321 - Books and Publications	২৩২১ - বইপত্র ও প্রকাশনা
2326 - Fisheries Sales	২৩২৬ - মৎস্য ও মৎস্যজাত দ্রব্যাদি
2331 - Livestock	২৩৩১ - গবাদি পশু
2333 - Dairy	২৩৩৩ - ডেইরী
2335 - Poultry	২৩৩৫ - পোলট্রি
2336 - Receipt from Zoos.	২৩৩৬ - চিড়িয়াখানা হইতে প্রাপ্তি
2341 - Agricultural Products	২৩৪১ - কৃষিজাত দ্রব্যাদি
2346 - Timber	২৩৪৬ - কাঠ ও বনজ দ্রব্যাদি
2351 - Confiscated Produce	২৩৫১ - বাজেয়াপ্তকৃত দ্রব্যাদি
2356 - Plants and Seedlings	২৩৫৬ - উদ্ভিদ, চারা ও বীজ
2361 - Non-Commercial Products	২৩৬১ - অ - বাণিজ্যিক উৎপাদন
2366 - Tender and Other Documents	২৩৬৬ - টেন্ডার ও অন্যান্য দলিল পত্র
2371 - Old Stores, Used Goods, Scrap, etc.	২৩৭১ - অব্যবহৃত দ্রব্যাদি, জুগুপ ইত্যাদি
2376 - Other Non-commercial Sales	২৩৭৬ - বিবিধ অবাণিজ্যিক বিক্রয়
2399 - Deduct - Refund	২৩৯৯ - কর্তন - ফেরত
2400 - 2499 - Irrigation Receipts	২৪০০ - ২৪৯৯ - সেচ বাবদ প্রাপ্তি
2400 - 2499 - Irrigation Receipts	২৪০০ - ২৪৯৯ - সেচবাবদ প্রাপ্তি
2401 - Irrigation Receipts	২৪০১ - সেচ বাবদ আদায়
2411 - Water Rates	২৪১১ - জলকর
2421 - Others	২৪২১ - সেচ বাবদ অন্যান্য
2499 - Deduct - Refund	২৪৯৯ - কর্তন - ফেরত
2500 - 2599 - Defence Receipts	২৫০০ - ২৫৯৯ - প্রতিরক্ষা বাবদ প্রাপ্তি
2500 - 2599 - Defence Receipts	২৫০০ - ২৫৯৯ - প্রতিরক্ষা বাবদ প্রাপ্তি
2501 - Ration Goods	২৫০১ - রেশন সামগ্রী
2505 - Uniforms	২৫০৫ - পোশাক
2511 - Use of Government Vehicles	২৫১১ - যানবাহন
2521 - Arms and Ammunition	২৫২১ - অস্ত্রশস্ত্র
2525 - Rent of Buildings	২৫২৫ - ভবন ভাড়া
2531 - Military Farms	২৫৩১ - সামরিক খামার
2533 - Recoveries from Utilities	২৫৩৩ - গ্যাস, বিদ্যুৎ ও পানি বাবদ আদায়
2535 - UN Receipts	২৫৩৫ - জাতিসংঘ থেকে প্রাপ্তি
2537 - Military to UN Program	২৫৩৭ - জাতিসংঘ কর্মসূচীতে মিলিটারী প্রেরণ
2541 - Other Defence Receipts	২৫৪১ - অন্যান্য প্রতিরক্ষা প্রাপ্তি
2543 - Recovery of Foreign Allowance- Army	২৫৪৩ - বৈদেশিক ভাতা আদায়- সেনা বাহিনী
2545 - Recovery of Foreign Allowance - Air Force	২৫৪৫ - বৈদেশিক ভাতা আদায় - বিমান বাহিনী
2600 - 2699 - Other Non-Tax Revenue and Receipts	২৬০০ - ২৬৯৯ - কর ব্যতীত অন্যান্য রাজস্ব ও প্রাপ্তি
2600 - 2699 - Other Non-Tax Revenue and Receipts	২৬০০ - ২৬৯৯ - কর ব্যতীত অন্যান্য রাজস্ব ও প্রাপ্তি
2601 - Contribution for Pensions and Gratuities	২৬০১ - অবসর ভাতা ও আনুতোষিক বাবদ চাঁদা
2611 - Leave Salary Contribution	২৬১১ - ছুটির বেতন বাবদ চাঁদা
2621 - Gifts/Donations/Subsription	২৬২১ - উপহার/দান/চাঁদা
2631 - Election Receipts	২৬৩১ - নির্বাচন প্রাপ্তি
2641 - Receipts under Jute Act Ordinance	২৬৪১ - পাট আইনে প্রাপ্তি
2643 - Receipt under Arms Act.	২৬৪৩ - অস্ত্র আইনে প্রাপ্তি
2645 - Receipt from Mint.	২৬৪৫ - টার্কশাল হইতে প্রাপ্তি
2651 - Receipts under Guest Control Ordinance	২৬৫১ - অতিথি নিয়ন্ত্রণ আইনে প্রাপ্তি
2671 - Recovery of Overpayments	২৬৭১ - অতিরিক্ত প্রদত্ত টাকা আদায়
2673 - Loss or Gain by Exchange	২৬৭৩ - বিনিময় হারে লাভ/লোকসান
2681 - Miscellaneous Receipts	২৬৮১ - বিবিধ রাজস্ব ও প্রাপ্তি
2685 - Surplus Revenue-Bangladesh	২৬৮৫ - বাংলাদেশ টেলিযোগাযোগ নিয়ন্ত্রণ কমিশনের উদ্ধৃত রাজস্ব
2699 - Deduct - Refund	

Detail Description

3000 - 3599 - State Trading

3000 - 3099 - Food Operation

3000 - 3099 - Food Operation

- 3001 - Cash Sales-Rice
- 3003 - Cash Sales-Wheat
- 3005 - Cash Sales-Edible Oil
- 3007 - Cash Sales-Flour
- 3009 - Cash Sales - Maize
- 3021 - Food for Education - Rice
- 3023 - Food for Education - Wheat
- 3031 - Sales to Government Departments
- 3041 - Food for Work (FFW) - Rice
- 3043 - Food for Work (FFW) - Wheat
- 3045 - Food for Work (FFW) - ADP - Rice
- 3047 - Food for Work (FFW) - ADP - Wheat
- 3051 - Vulnerable Group Development (VGD) - Rice
- 3053 - Vulnerable Group Development (VGD) - Wheat
- 3055 - Vulnerable Group Feeding (VGF) -Rice
- 3056 - V G F - Wheat
- 3061 - Test Relief (TR) - Rice
- 3063 - Test Relief (TR) - Wheat
- 3071 - Gratuitous Relief (GR) - Rice
- 3073 - Gratuitous Relief (GR) - Wheat
- 3075 - School Feeding Programme-Wheat
- 3077 - Special Works for Chittagong Hill Tracts-Rice
- 3078 - Despatch Money
- 3079 - Special Works for Chittagong Hill Tracts - Wheat
- 3080 - Subsidy
- 3081 - Other Food Operations
- 3083 - Bank Grantee Encashment
- 3099 - Adjustment with Total Expenditure

3100 - 3199 - Railways

3100 - 3199 - Railway

- 3101 - Passenger Fares
- 3111 - Goods Fares
- 3119 - Subsidies - Return of Investment
- 3121 - Other Fares
- 3131 - Other Railway Receipts
- 3199 - Adjustment with Total Expenditure

3200 - 3299 - Post Offices

3200 - 3299 - Post Offices

- 3201 - Sale of Ordinary Postal Stamps
- 3211 - Sale of Service Postal Stamps
- 3221 - Postage Realised in Cash
- 3231 - Commission for Money Order and Postal Order
- 3235 - Receipts from Other Postal Administration
- 3241 - Commission from Issue of Licences
- 3243 - Other Commissions
- 3251 - Other Post Office Receipts
- 3299 - Adjustment with Total Expenditure

3300 - 3399 - Telegraph and Telephone Board

3300 - 3399 - Telegraph and Telephone Board

- 3301 - Telegraph
- 3311 - Telephone and Fax
- 3315 - Submarine Cable
- 3321 - Telex
- 3331 - Other

৩০০০ - ৩৫৯৯ - রাষ্ট্রীয় বাণিজ্য

৩০০০ - ৩০৯৯ - খাদ্য

৩০০০ - ৩০৯৯ - খাদ্য

- ৩০০১ - নগদ বিক্রয় - চাউল
- ৩০০৩ - নগদ বিক্রয় - গম
- ৩০০৫ - নগদ বিক্রয় - ভোজ্য তেল
- ৩০০৭ - নগদ বিক্রয় - আটা
- ৩০০৯ - নগদ বিক্রয় - ভুট্টা
- ৩০২১ - শিক্ষার জন্য খাদ্য - চাল
- ৩০২৩ - শিক্ষার জন্য খাদ্য - গম
- ৩০৩১ - সরকারি দপ্তরে বিক্রয়
- ৩০৪১ - কাজের বিনিময়ে খাদ্য কর্মসূচী - চাল
- ৩০৪৩ - কাজের বিনিময়ে খাদ্য কর্মসূচী - গম
- ৩০৪৫ - কাজের বিনিময়ে খাদ্য কর্মসূচী - এতিপি - চাল
- ৩০৪৭ - কাজের বিনিময়ে খাদ্য কর্মসূচী - এতিপি - গম
- ৩০৫১ - ভি জি ডি - চাল
- ৩০৫৩ - ভি জি ডি - গম
- ৩০৫৫ - ভি জি এফ - চাল
- ৩০৫৬ - ভি জি এফ - গম
- ৩০৬১ - টেষ্ট রিলিফ (টি, আর) - চাল
- ৩০৬৩ - টেষ্ট রিলিফ (টি, আর) - গম
- ৩০৭১ - খরচাতি সাহায্য (জি, আর) - চাল
- ৩০৭৩ - খরচাতি সাহায্য (জি, আর) - গম
- ৩০৭৫ - স্কুল ক্ষতিং কর্মসূচী - গম
- ৩০৭৭ - পার্বত্য চূড়াম্বে বিশেষ কার্যাদি - চাল
- ৩০৭৮ - ডেসপ্যাচ মানি
- ৩০৭৯ - পার্বত্য চূড়াম্বে বিশেষ কার্যাদি - গম
- ৩০৮০ - ভর্তুকী
- ৩০৮১ - বিবিধ প্রাপ্তি
- ৩০৮৩ - ব্যাংক গ্যারান্টি নগদায়ন বাবদ প্রাপ্তি
- ৩০৯৯ - সর্বমোট ব্যয়ের সাথে সমন্বয়

৩১০০ - ৩১৯৯ - রেলপথ

৩১০০ - ৩১৯৯ - রেলপথ

- ৩১০১ - যাত্রী বহন বাবদ আয়
- ৩১১১ - মাল বহন বাবদ আয়
- ৩১১৯ - রিটার্ন অব ইন্ভেস্টমেন্ট প্রদানে সরকারী সহায়তা
- ৩১২১ - অন্যান্য বিবিধ আয়
- ৩১৩১ - অন্যান্য প্রাপ্তি
- ৩১৯৯ - সর্বমোট ব্যয়ের সাথে সমন্বয়

৩২০০ - ৩২৯৯ - ডাক বিভাগ

৩২০০ - ৩২৯৯ - ডাক বিভাগ

- ৩২০১ - সাধারণ ডাক টিকেট বিক্রয়
- ৩২১১ - সার্ভিস ডাক টিকেট বিক্রয়
- ৩২২১ - নগদ আদায়কৃত ডাক মাসুল
- ৩২৩১ - মনি অর্ডার ও পোস্টাল অর্ডার কমিশন
- ৩২৩৫ - অন্যান্য ডাক প্রশাসন প্রাপ্তি
- ৩২৪১ - লাইসেন্স ইস্যুর কমিশন
- ৩২৪৩ - অন্যান্য কমিশন
- ৩২৫১ - অন্যান্য প্রাপ্তি
- ৩২৯৯ - সর্বমোট ব্যয়ের সাথে সমন্বয়

৩৩০০ - ৩৩৯৯ - তার ও টেলিফোন বোর্ড

৩৩০০ - ৩৩৯৯ - তার ও টেলিফোন বোর্ড

- ৩৩০১ - টেলিগ্রাফ
- ৩৩১১ - টেলিফোন ও ফ্যাক্স
- ৩৩১৫ - সাবমেরিন ক্যাবল
- ৩৩২১ - টেলিগ্রাম
- ৩৩৩১ - অন্যান্য

Detail Description

0100 - Consolidated Fund Receipts	০১০০ - সংযুক্ত তহবিল - প্রাপ্তি
3000 - 3599 - State Trading	৩০০০ - ৩৫৯৯ - রাষ্ট্রীয় বাণিজ্য
3300 - 3399 - Telegraph and Telephone Board	৩৩০০ - ৩৩৯৯ - তার ও টেলিফোন বোর্ড
3300 - 3399 - Telegraph and Telephone Board	৩৩০০ - ৩৩৯৯ - তার ও টেলিফোন বোর্ড
3399 - Adjustment with Total Expenditure	৩৩৯৯ - সর্বমোট ব্যয়ের সাথে সমন্বয়
3400 - 3499 - Other State Trading	৩৪০০ - ৩৪৯৯ - অন্যান্য রাষ্ট্রীয় বাণিজ্য
3400 - 3499 - Other State Trading	৩৪০০ - ৩৪৯৯ - অন্যান্য রাষ্ট্রীয় বাণিজ্য
3401 - Coal	৩৪০১ - কয়লা
3411 - Jute	৩৪১১ - পাট
3421 - Other	৩৪২১ - অন্যান্য
3500 - 3599 - Transfer, Adjustment and Others	৩৫০০ - ৩৫৯৯ - স্থানান্তর, সমন্বয় ও অন্যান্য
3500 - 3599 - Transfer, Adjustment and Others	৩৫০০ - ৩৫৯৯ - স্থানান্তর, সমন্বয় ও অন্যান্য
3599 - Offset of Trading Expenditure	৩৫৯৯ - অফসেট অব ট্রেডিং এক্সপেন্ডিচার
3600 - 3699 - Capital Revenue	৩৬০০ - ৩৬৯৯ - মূলধন রাজস্ব
3600 - 3699 - Sale of Assets	৩৬০০ - ৩৬৯৯ - সরকারের সম্পদ বিক্রয়
3600 - 3699 - Sale of Assets	৩৬০০ - ৩৬৯৯ - mi Kiti i m'u' wep q
3601 - Sale of Land	৩৬০১ - জমি বিক্রয়
3611 - Sale of Abandoned Property	৩৬১১ - mi Z' m'u'we' wep q
3621 - Sale of Industrial Units	৩৬২১ - শিল্প ইউনিট বিক্রয়
3622 - Sale of Commercial Firms.	৩৬২২ - ব্যবসা প্রতিষ্ঠান বিক্রয়
3623 - Sale of Denationalised Banks	৩৬২৩ - বিরোধিতাকৃত ব্যাংক বিক্রয়
3631 - Sale of Other Fixed Assets	৩৬৩১ - Ab'ib' 'lei m'u' wep q
3641 - Sale of Stocks and Shares	৩৬৪১ - স্টক ও শেয়ার বিক্রয়
3650 - Sale of Other Govt. Assets	৩৬৫০ - mi Kiti i Ab'ib' m'u' wep q
3700 - 3799 - Grants	৩৭০০ - ৩৭৯৯ - সাহায্য মঞ্জুরী
3700 - 3799 - Foreign Aid Grants	৩৭০০ - ৩৭৯৯ - বৈদেশিক সাহায্য মঞ্জুরি
3700 - 3799 - Foreign Aid Grants	৩৭০০ - ৩৭৯৯ - বৈদেশিক সাহায্য মঞ্জুরী
3701 - Food Aid General	৩৭০১ - খাদ্য সাহায্য - সাধারণ
3702 - Budget Support	৩৭০২ - বাজেট সাপোর্ট
3706 - Food Aid PL - 480, Title I	৩৭০৬ - খাদ্য সাহায্য - ৪৮০, টাইটেল - ১
3711 - Food Aid PL - 480, Title II	৩৭১১ - খাদ্য সাহায্য - ৪৮০, টাইটেল - ২
3716 - Food Aid PL - 480, Title III	৩৭১৬ - খাদ্য সাহায্য - ৪৮০, টাইটেল - ৩
3721 - Food Aid - Germany	৩৭২১ - খাদ্য সাহায্য - জার্মানি
3726 - Food Aid - Australia	৩৭২৬ - খাদ্য সাহায্য - অস্ট্রেলিয়া
3751 - Commodity Aid	৩৭৫১ - পণ্য সাহায্য
3761 - Project Aid	৩৭৬১ - প্রকল্প সাহায্য
3765 - Japanese Debt. Relief Grant Fund	৩৭৬৫ - জাপানী ঋণ মওকুফ অনুদান তহবিল
3771 - Non-ADP Project Aid	৩৭৭১ - এ. ডি. পি বহির্ভূত প্রকল্প সাহায্য
3780 - Sale under PL-480 Titie-2	৩৭৮০ - পি এল-৪৮০ টাইটেল-২ এর আওতায় প্রাপ্ত বিক্রয়লব্ধ অর্থ
3781 - Other Foreign Aid	৩৭৮১ - অন্যান্য বৈদেশিক সাহায্য
3784 - Others Miscellaneous	৩৭৮৪ - অন্যান্য বিবিধ
3785 - Grants to Structure Adjustment	৩৭৮৫ - অবকাঠামোপাত সমন্বয়ের জন্য অনুদান
3799 - DRG Adjustment with Public Accounts	৩৭৯৯ - প্রজাতন্ত্রের সরকারী হিসাবের সাথে ডিআরজি হিসাবের সমন্বয়
3800 - 3999 - Recovery of Loans and Advances	৩৮০০ - ৩৯৯৯ - ঋণ ও অগ্রিম আদায়
3800 - 3899 - Recovery of Loans and Advances	৩৮০০ - ৩৮৯৯ - ঋণ পরিশোধ - প্রাপ্তি
3800 - 3899 - Loan Repayments	৩৮০০ - ৩৮৯৯ - ঋণ পরিশোধ
3801 - Repayment of Cash Loans for Development	৩৮০১ - নগদ ঋণ - উন্নয়ন
3811 - Repayment of Cash Loans Non-development	৩৮১১ - নগদ ঋণ - অননুন্নয়ন
3821 - Repayment of On-Lent Foreign Loans	৩৮২১ - সংস্থাসমূহের পুশ; বিনিয়োগকৃত বৈদেশিক ঋণ
3835 - Loans to Cultivators	৩৮৩৫ - কৃষকদের প্রদত্ত ঋণ আদায়
3837 - Repayment of Loans to Local Bodies	৩৮৩৭ - স্থানীয় সংস্থাকে প্রদত্ত ঋণ আদায়
3839 - Co-operative Loan	৩৮৩৯ - সমবায় ঋণ
3897 - Repayment of Other Loans	৩৮৯৭ - অন্যান্য প্রাপ্তি
3899 - Probable Shortfall	৩৮৯৯ - সম্ভাব্য অনাদায়

Detail Description

0100 - Consolidated Fund Receipts

3800 - 3999 - Recovery of Loans and Advances

3900 - 3999 - Repayments of Advances to

3900 - 3999 - Repayments of Advances to

3901 - House Building Advances

3903 - Computer Advance

3911 - Motor Car Advances

3921 - Motor Cycle Advances

3931 - Bicycle Advances

3941 - Other Advances

4000 - 4199 - Domestic Loan Receipts

4000 - 4099 - Term Loan Receipts

4000 - 4099 - Term Loan Receipts

4001 - Prize Bonds

4003 - Wage Earner Development Bonds

4005 - National Bond

4006 - Bangladesh Treasury Bond (BGTB) 3 years

4007 - 1 year Treasury Bond

4008 - Bangladesh Treasury Bond (BGTB) 5 years

4009 - 2 year Treasury Bond

4011 - 3 year Treasury Bond - T&T

4012 - Bangladesh Treasury Bond (BGTB) 10 years

4013 - 3 year Treasury Bond -1998

4014 - Bangladesh Treasury Bond (BGTB) 15 years

4015 - 3 year Treasury Bond - BSRB Bond

4016 - Bangladesh Treasury Bond (BGTB) 20 years

4017 - 3 year Treasury Bond for Export Compensation -

4018 - 3 Years Treasury Bond (BSRS) - 2000

4019 - 3 year National Investment Bond

4020 - 3 Years Treasury Bond- 2000

4021 - 3 year BADC Treasury Bond - 1998

4022 - Bangladesh Treasury Bond (BGTB) 25 years

4023 - 3 year BTMC Treasury Bond - 1998

4024 - 3 Years Treasury Bond- 1997

4025 - 5 year Treasury Bond

4026 - 10 Years Bond (Liability Repayment of BPC -

4027 - 3 years Bond - BADC Bhaban (Pubali Bank)

4028 - 5 years Biman Treasury Bond - 2003

4029 - 7 year Treasury Bond

4030 - 10 year Bond for Loss Financing Under JSAC

4031 - 10 year Treasury Bond

4032 - 10 year BSC Bond - 2009

4033 - Treasury Bond 1992 @ 9%

4034 - 5 Years Biman Treasury Bond - 2004

4035 - 15 year Treasury Bond

4036 - 15 Years Treasury Bond-Rupali Bank

4037 - 15 year Treasury Bond for Recapitalisation of

4038 - 3 Years Treasury Bond : Biman-1998

4039 - 15 year Treasury Bond (BKB) - 2011

4040 - 5 Years Treasury Bond

4041 - 20 year Jute Bond

4042 -

4043 - 20 year BJC Bond

4045 - 25 year Treasury Bond - 2019

4046 - 10 Years Treasury Bond-2006 of Tk.25.56 crore

4047 - 25 year Treasury Bond - 2020

4048 - 10 Years Treasury Bond-2006 of Tk.88.78 crore

4049 - 25 year Treasury Bond - Jute Sector

4050 - 10 Years Treasury Bond-2006 of Tk.81.64 crore

4051 - Special Bond

০১০০ - সংযুক্ত তহবিল - গ্রাণ্ডি

৩৮০০ - ৩৯৯৯ - ঋণ ও অগ্রিম আদায়

৩৯০০ - ৩৯৯৯ - সরকারী কর্মচারীদের জন্য ঋণ আদায়

৩৯০০ - ৩৯৯৯ - সরকারী কর্মচারীদের জন্য ঋণ

৩৯০১ - গৃহ নির্মাণ অগ্রিম

৩৯০৩ - K#UDU#ri A#m#t#y

৩৯১১ - মটর গাড়ি অগ্রিম

৩৯২১ - মটর সাইকেল অগ্রিম

৩৯৩১ - বাই - সাইকেল অগ্রিম

৩৯৪১ - অন্যান্য অগ্রিম

৪০০০ - ৪১৯৯ - অভ্যন্তরীণ ঋণ গ্রাণ্ডি

৪০০০ - ৪০৯৯ - মেয়াদী ঋণ গ্রাণ্ডি

৪০০০ - ৪০৯৯ - মেয়াদী ঋণ-গ্রাণ্ডি

৪০০১ - প্রাইজ বন্ড

৪০০৩ - ওয়েজ আর্নার ডেভেলপমেন্ট বন্ড

৪০০৫ - ন্যাশনাল বন্ড

৪০০৬ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ৩ বছর মেয়াদী

৪০০৭ - ১ বছর মেয়াদি ট্রেজারি বন্ড

৪০০৮ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ৫ বছর মেয়াদী

৪০০৯ - ২ বছর মেয়াদি ট্রেজারি বন্ড

৪০১১ - ৩ বছর মেয়াদি ট্রেজারি বন্ড - টি এন্ড টি

৪০১২ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ১০ বছর মেয়াদী

৪০১৩ - ৩ বছর মেয়াদি ট্রেজারি বন্ড - ১৯৯৮

৪০১৪ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ১৫ বছর মেয়াদী

৪০১৫ - ৩ বছর মেয়াদী ট্রেজারী বন্ড - বি. এস. আর. এস

৪০১৬ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ২০ বছর মেয়াদী

৪০১৭ - রপ্তানী ক্ষতিপূরণের জন্য ৩ বছর মেয়াদি ট্রেজারি বন্ড

৪০১৮ - ৩বছর মেয়াদী ট্রেজারী বন্ড (বিএসআরএস)-২০০০

৪০১৯ - ৩ বছর মেয়াদি ন্যাশনাল ইনভেস্টমেন্ট বন্ড

৪০২০ - ৩বছর মেয়াদী ট্রেজারী বন্ড-২০০০

৪০২১ - ৩ বছর মেয়াদি বি. এ. টি. সি ট্রেজারি বন্ড - ১৯৯৮

৪০২২ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ২৫ বছর মেয়াদী

৪০২৩ - ৩ বছর মেয়াদি বি. টি. এম. সি ট্রেজারি বন্ড - ১৯৯৮

৪০২৪ - ৩বছর মেয়াদী ট্রেজারী বন্ড-১৯৯৭

৪০২৫ - ৫ বছর মেয়াদি ট্রেজারি বন্ড

৪০২৬ - ১০ বছর মেয়াদী বন্ড (বি.পি.সি.-এর দায় পরিশোধ - ৭৩২২.৫৪)

৪০২৭ - ৩ বছর মেয়াদী বন্ড - বি.এ.ডি.সি. ভবন (পূবালী ব্যাংক)

৪০২৮ - ৫ বছর মেয়াদী বিমান ট্রেজারী বন্ড - ২০০৩

৪০২৯ - ৭ বছর মেয়াদি ট্রেজারি বন্ড

৪০৩০ - পাট খাত সংস্কার কর্মসূচির আওতায় ঘাটতি অর্থায়নের জন্য

৪০৩১ - ১০ বছর মেয়াদি ট্রেজারি বন্ড

৪০৩২ - ১০ বছর মেয়াদি বি এস সি বন্ড - ২০০৯

৪০৩৩ - ট্রেজারি বন্ড ১৯৯২ ৯% হারে

৪০৩৪ - ৫ বছর মেয়াদী বিমান ট্রেজারী বন্ড - ২০০৪

৪০৩৫ - ১৫ বছর মেয়াদি ট্রেজারি বন্ড

৪০৩৬ - ১৫ বছর মেয়াদী ট্রেজারী বন্ড-রপালী ব্যাংক

৪০৩৭ - পূনঃ মূল্যনির্ধারণের জন্য ১৫ বছর মেয়াদি ট্রেজারি বন্ড

৪০৩৮ - ৩বছর মেয়াদী ট্রেজারী বন্ড (বিমান)-১৯৯৮

৪০৩৯ - ১৫ বছর মেয়াদি ট্রেজারি বন্ড (বি. কে. বি) - ২০১১

৪০৪০ - ৫বছর মেয়াদী ট্রেজারী বন্ড

৪০৪১ - ২০ বছর মেয়াদী জুট বন্ড

৪০৪২ - সোনালী ও জনতা ব্যাংকের কাছে বিপিসি'র বকেয়া দায়

৪০৪৩ - ২০ বছর মেয়াদি বি. জে. সি বন্ড

৪০৪৫ - ২৫ বছর মেয়াদি ট্রেজারি বন্ড - ২০১৯

৪০৪৬ - ২৫.৫৬ কোটি টাকার ১০বছর মেয়াদী ট্রেজারী বন্ড-২০০৬

৪০৪৭ - ২৫ বছর মেয়াদি ট্রেজারি বন্ড - ২০২০

৪০৪৮ - ৮৮.৭৮ কোটি টাকার ১০বছর মেয়াদী ট্রেজারী বন্ড-২০০৬

৪০৪৯ - ২৫ বছর মেয়াদি ট্রেজারি বন্ড - পাটখাত

৪০৫০ - ৮১.৬৪ কোটি টাকার ১০বছর মেয়াদী ট্রেজারী বন্ড-২০০৬

৪০৫১ - বিশেষ বন্ড

Detail Description

0100 - Consolidated Fund Receipts

4000 - 4199 - Domestic Loan Receipts

4000 - 4099 - Term Loan Receipts

4000 - 4099 - Term Loan Receipts

- 4052 - 10 Years Treasury Bond (BSC)-2008
- 4053 - Income Tax Bond
- 4054 - 10 Years Treasury Bond-2005 of Tk.26.46 crore
- 4055 - Other Bonds and Financial Instruments
- 4059 - 10 Years Treasury Bond (Jute)
- 4060 - B J M C Credit Bond
- 4061 - 25 Years Treasury Bond-2018
- 4062 - Corporation/Financial Institution Investment
- 4064 - Sick Industries Assistance Bond
- 4065 - Capital Restructuring Bond - Bank
- 4066 - Capital Restructuring Bond - Corporation
- 4067 - Bond for Loss Financing under JASAC
- 4068 - Exemption of Agricultural credit 25 Years
- 4069 - Agri-Loan Waiver Bond-BKB
- 4071 - Miscellaneous
- 4072 - 5 Years Govt. Treasury Bond-2008 (7.5%)
- 4073 - 10 Years Govt. Treasury Bond-2013 (8.5%)
- 4074 - 5 Years Govt. Treasury Bond-2008 (7.5%)
- 4075 - 10 Years Govt. Treasury Bond-2013 (8.5%)
- 4077 - 3 Years T&T Treasury Bond- 2006 (7%)
- 4099 - Adjustment with T & T Bond

4100 - 4199 - Floating Loan Receipts

4100 - 4199 - Floating Loan Receipts

- 4101 - Ways and Means Advances
- 4102 - Over Draft Current (OD Current)
- 4104 - Over Draft Block (OD Current)
- 4106 - Treasury Bills
- 4107 - Treasury Bill 28 days
- 4108 - Treasury Bill 91 days
- 4109 - Treasury Bill 182 days
- 4110 - Treasury Bill 364 days
- 4111 - Promissory Notes - IBRD
- 4112 - Treasury Bill 2 Years
- 4113 - Treasury Bill 5 Years
- 4116 - Promissory Notes - IDA
- 4121 - Ad-hoc Treasury Bills
- 4126 - Cash Credit Accommodation

4200 - 4299 - Foreign Loan Receipts

4200 - 4299 - Foreign Loan Receipts

4200 - 4299 - Foreign Loan Receipts

- 4201 - Food Loan
- 4202 - Budget Support
- 4205 - Policy Loan
- 4211 - Project Loan
- 4221 - Reimbursable Project Loan
- 4223 - Foreign Loan
- 4231 - Direct Project Loan
- 4241 - Non-ADP Project Loan
- 4251 - Commodity Loan
- 4261 - Other Foreign Loans
- 4271 - Special Support/Credit for Development
- 4273 - Miscellaneous Fund and Structural Adjustment

০১০০ - সংযুক্ত তহবিল - প্রাপ্তি

৪০০০ - ৪১৯৯ - অভ্যন্তরীণ ঋণ প্রাপ্তি

৪০০০ - ৪০৯৯ - মেয়াদী ঋণ প্রাপ্তি

৪০০০ - ৪০৯৯ - মেয়াদী ঋণ-প্রাপ্তি

- ৪০৫২ - ১০বছর মেয়াদী ট্রেজারী বন্ড (বিএসসি)-২০০৮
- ৪০৫৩ - ইনকাম ট্যাক্স বন্ড
- ৪০৫৪ - ২৬.৪৬ কোটি টাকার ১০বছর মেয়াদী ট্রেজারী বন্ড-২০০৫
- ৪০৫৫ - অন্যান্য বন্ড ও ফিন্যান্সিয়াল ইন্সট্রুমেন্ট
- ৪০৫৯ - ১০বছর মেয়াদী ট্রেজারী বন্ড (পাট খাত)
- ৪০৬০ - বি জে এম সি ক্রেডিট বন্ড
- ৪০৬১ - ২৫বছর মেয়াদী ট্রেজারী বন্ড-২০১৮
- ৪০৬২ - কর্পোরেশন/আর্থিক প্রতিষ্ঠানে বিনিয়োগ বন্ড
- ৪০৬৪ - i'Mak i mnqZi eU
- ৪০৬৫ - মূলধন পুনর্গঠন বন্ড - ব্যাংক
- ৪০৬৬ - মূলধন পুনর্গঠন বন্ড - কর্পোরেশন
- ৪০৬৭ - জেসাক কর্মসূচীর অধীনে লোকসান পূর্নভাবে বন্ডের মাধ্যমে ব্যাংকে প্রদেয়
- ৪০৬৮ - ১০বছর মেয়াদী কৃষি ঋণ মওকুফ বন্ড-রাজশাহী কৃষি উন্নয়ন ব্যাংক
- ৪০৬৯ - কৃষি ঋণ মওকুফ বন্ড-বাংলাদেশ কৃষি ব্যাংক
- ৪০৭১ - বিবিধ
- ৪০৭২ - ৫ বছর মেয়াদী সরকারী ট্রেজারী বন্ড-২০০৮ (৭.৫%)
- ৪০৭৩ - ১০ বছর মেয়াদী সরকারী ট্রেজারী বন্ড-২০১৩ (৮.৫%)
- ৪০৭৪ - ৫ বছর মেয়াদী সরকারী ট্রেজারী বন্ড-২০০৮ (৭.৫%)
- ৪০৭৫ - ১০ বছর মেয়াদী সরকারী ট্রেজারী বন্ড-২০১৩ (৮.৫%)
- ৪০৭৭ - ৩ বছর মেয়াদী টি এন্ড টি ট্রেজারী বন্ড-২০০৬ (৭%)
- ৪০৯৯ - টি এন্ড টি বন্ডের সাথে সমন্বয়

৪১০০ - ৪১৯৯ - চলতি ঋণ - প্রাপ্তি

৪১০০ - ৪১৯৯ - চলতি ঋণ-প্রাপ্তি

- ৪১০১ - উপায় ও উপকরণ অগ্রিম
- ৪১০২ - ওভার ড্রাফট কারেন্ট (ওডি কারেন্ট)
- ৪১০৪ - ওভার ড্রাফট বন্ড (ওডি কারেন্ট)
- ৪১০৬ - ট্রেজারী বিল
- ৪১০৭ - ট্রেজারী বিল ২৮ দিন
- ৪১০৮ - ট্রেজারী বিল ৯১ দিন
- ৪১০৯ - ট্রেজারী বিল ১৮২ দিন
- ৪১১০ - ট্রেজারী বিল ৩৬৪ দিন
- ৪১১১ - প্রমিসরি নোট - আই. বি. আর. ডি
- ৪১১২ - ট্রেজারী বিল ২ বছর মেয়াদী
- ৪১১৩ - ট্রেজারী বিল ৫ বছর মেয়াদী
- ৪১১৬ - প্রমিসরি নোট - আই. ডি. এ
- ৪১২১ - এডহক ট্রেজারী বিল
- ৪১২৬ - নগদ অগ্রিমের সংস্থান

৪২০০ - ৪২৯৯ - বৈদেশিক ঋণ প্রাপ্তি

৪২০০ - ৪২৯৯ - বৈদেশিক ঋণ প্রাপ্তি

৪২০০ - ৪২৯৯ - বৈদেশিক ঋণ প্রাপ্তি

- ৪২০১ - খাদ্য ঋণ
- ৪২০২ - বাজেট সাপোর্ট
- ৪২০৫ - পলিসি ঋণ
- ৪২১১ - প্রকল্প ঋণ
- ৪২২১ - পূর্নর্ভরণকৃত প্রকল্প ঋণ
- ৪২২৩ - বৈদেশিক ঋণ
- ৪২৩১ - সরাসরি প্রকল্প ঋণ
- ৪২৪১ - বার্ষিক উন্নয়ন কর্মসূচী বহির্ভূত প্রকল্প ঋণ
- ৪২৫১ - পণ্য ঋণ
- ৪২৬১ - অন্যান্য বৈদেশিক ঋণ
- ৪২৭১ - বিশেষ উন্নয়ন সহায়তা/ঋণ
- ৪২৭৩ - বিভিন্ন ফান্ড ও কাঠামোগত সমন্বয়

Detail Description

0100 - Consolidated Fund Receipts	০১০০ - সংযুক্ত তহবিল - প্রাপ্তি
4300 - 4399 - Transactions with IMF	৪৩০০ - ৪৩৯৯ - আই. এম. এফ -এর সহিত সমন্বয়
4300 - 4399 - Transactions with IMF	৪৩০০ - ৪৩৯৯ - আই. এম. এফ -এর সহিত সমন্বয়
4300 - 4399 - Transactions with IMF	৪৩০০ - ৪৩৯৯ - আই. এম. এফ -এর সহিত সমন্বয়
4301 - Promissory Notes	৪৩০১ - প্রমিসরি নোট
4305 - Cash	৪৩০৫ - নগদে

Detail Description

4500 - Consolidated Fund Expenditure	৪৫০০ - সংযুক্ত তহবিল - ব্যয়
4500 - 6799 - Revenue Expenditure	৪৫০০ - ৬৭৯৯ - রাজস্ব ব্যয়
4500 - 4599 - Pay of Officers	৪৫০০ - ৪৫৯৯ - অফিসারদের বেতন
4500 - 4599 - Pay of Officers	৪৫০০ - ৪৫৯৯ - অফিসারদের বেতন
4501 - Pay of Officers	৪৫০১ - অফিসারদের বেতন
4505 - Remuneration of Public Representatives	৪৫০৫ - জন প্রতিনিধিদের পারিভৌতিক
4507 - Income Tax of Officer's	৪৫০৭ - কর্মকর্তাদের আয়কর
4600 - 4699 - Pay of Establishment	৪৬০০ - ৪৬৯৯ - প্রতিষ্ঠান কর্মচারীদের বেতন
4600 - 4699 - Pay of Establishment	৪৬০০ - ৪৬৯৯ - প্রতিষ্ঠান কর্মচারীদের বেতন
4601 - Pay of Establishment	৪৬০১ - প্রতিষ্ঠান কর্মচারীদের বেতন
4605 - Income Tax of Establishment Staff	৪৬০৫ - প্রতিষ্ঠান কর্মচারীদের আয়কর
4687 - Production Strengthening in the Government	৪৬৮৭ - সরকারী পাবনা পণ্ড ও হাঁস মুরগীর খামারসমূহের উৎপাদন জোরদারকরণ
4700 - 4799 - Allowances	৪৭০০ - ৪৭৯৯ - ভাতাদি
4700 - 4799 - Allowances	৪৭০০ - ৪৭৯৯ - ভাতাদি
4701 - Dearness Allowance	৪৭০১ - মহার্ঘ ভাতা
4705 - House Rent Allowance	৪৭০৫ - বাড়িভাড়া ভাতা
4709 - Rest and Recreation Allowance	৪৭০৯ - শ্রান্তি বিদোহন ভাতা
4713 - Festival Allowance	৪৭১৩ - উৎসব ভাতা
4717 - Medical Allowance	৪৭১৭ - চিকিৎসা ভাতা
4721 - Hill Allowance	৪৭২১ - পাহাড়ী ভাতা
4722 - Defence Service Allowance	৪৭২২ - প্রতিরক্ষা - সার্ভিস ভাতা
4723 - Allowances for Chief, Headmen and Karbaries	৪৭২৩ - চীফ, হেডম্যান ও কারবারীদের ভাতা
4724 - Batsman Allowance	৪৭২৪ - ব্যাটসম্যান ভাতা
4725 - Washing Allowance	৪৭২৫ - ধোলাই ভাতা
4726 - Haircut Allowance	৪৭২৬ - চুলকাটা ভাতা
4729 - Foreign Allowance	৪৭২৯ - বৈদেশিক ভাতা
4733 - Entertainment/Sumptuary Allowance	৪৭৩৩ - আপ্যায়ন ভাতা / ব্যয় নিয়ামক ভাতা
4737 - Charge Allowance	৪৭৩৭ - দায়িত্ব ভার ভাতা
4741 - Retainery	৪৭৪১ - রিটেনারি ভাতা
4745 - Compensatory Allowance	৪৭৪৫ - ক্ষতিপূরণ ভাতা
4749 - Ration Allowance	৪৭৪৯ - রেশন ভাতা
4753 - Daily/Subsistence Allowance	৪৭৫৩ - দৈনিক/খোরাকী ভাতা
4755 - Tiffin Allowance	৪৭৫৫ - টিফিন ভাতা
4757 - Internee/Apprenticeship Allowance	৪৭৫৭ - ইন্টার্ন / শিকানবীশ ভাতা
4761 - Fixed Travel Allowance	৪৭৬১ - ভ্রমণ ভাতা
4765 - Conveyance Allowance	৪৭৬৫ - যাতায়াত ভাতা
4769 - Overtime	৪৭৬৯ - অতিরিক্ত কাজের ভাতা
4773 - Educational Allowances	৪৭৭৩ - শিক্ষা ভাতা
4775 - Uniform Allowance	৪৭৭৫ - পোশাক ভাতা
4777 - Training Allowance (Fixed)	৪৭৭৭ - প্রশিক্ষণ ভাতা
4781 - Hazardous Job Allowance	৪৭৮১ - ঝুঁকি ভাতা
4785 - Contract Allowance	৪৭৮৫ - চুক্তি ভাতা
4789 - Constituency Allowance	৪৭৮৯ - নির্বাচনী এলাকা ভাতা
4791 - Operation Allowance Electoral Area Office	৪৭৯১ - নির্বাচনী এলাকার অফিস পরিচালনা ভাতা
4793 - Telephone Allowance	৪৭৯৩ - টেলিফোন ভাতা
4795 - Other Allowances	৪৭৯৫ - অন্যান্য ভাতা
4799 -	৪৭৯৯ -
4800 - 4899 - Supplies and Services	৪৮০০ - ৪৮৯৯ - সরবরাহ ও সেবা
4800 - 4899 - Supplies and Services	৪৮০০ - ৪৮৯৯ - সরবরাহ ও সেবা
4801 - Travel Expenses	৪৮০১ - ভ্রমণ ব্যয়
4802 - Transfer Expenses	৪৮০২ - বদলি ব্যয়
4803 - Income Tax	৪৮০৩ - আয়কর
4804 - Contingent Staff	৪৮০৪ - আনুসঙ্গিক প্রতিষ্ঠান
4805 - Overtime	৪৮০৫ - ওভারটাইম
4806 - Rent - Office	৪৮০৬ - ভাড়া - অফিস
4807 - Rent - Residential	৪৮০৭ - ভাড়া - আবাসিক
4808 - Rent - Equipment	৪৮০৮ - ভাড়া - সরঞ্জামাদি
4809 - Satellite/Frequency	৪৮০৯ - স্যাটেলাইট/ফ্রিকোয়েন্সি
4810 - Municipal Rates and Taxes	

Detail Description

4500 - Consolidated Fund Expenditure	৪৫০০ - সংযুক্ত তহবিল - ব্যয়
4500 - 6799 - Revenue Expenditure	৪৫০০ - ৬৭৯৯ - রাজস্ব ব্যয়
4800 - 4899 - Supplies and Services	৪৮০০ - ৪৮৯৯ - সরবরাহ ও সেবা
4800 - 4899 - Supplies and Services	৪৮০০ - ৪৮৯৯ - সরবরাহ ও সেবা
4869 - Medical Expenses	৪৮৬৯ - চিকিৎসা ব্যয়
4870 - Provisions and Foodstuff Procurement	৪৮৭০ - খাদ্য দ্রব্য সংগ্রহ
4871 - Bedding	৪৮৭১ - বিছানাপত্র
4872 - Diet	৪৮৭২ - পথ্য
4873 - Rations	৪৮৭৩ - রেশন
4874 - Consultancy	৪৮৭৪ - কন্সাল্টেন্সী
4875 - Cleaning and Washing	৪৮৭৫ - Cui "ei Cui "QbZV
4876 - IUD and Norplant (Clinical Family Planning	৪৮৭৬ - বন্ধ্যাকরন আই.ইউ.ডি ও নরপ্লান্ট (ক্লিনিক্যাল প্ল্যানিং কর্মসূচী) ব্যয়
4877 - R R Fund	৪৮৭৭ - আর আর ফন্ড
4878 - Sattelite Clinic Organisation Expenditure	৪৮৭৮ - স্যাটেলাইট ক্লিনিক সংগঠন ব্যয়
4879 - Arms and Ammunition	৪৮৭৯ - অস্ত্রশস্ত্র ও গোলাবারুদ
4880 - Supplies for Public Order and Safety	৪৮৮০ - জনশৃংখলা ও নিরাপত্তা
4881 - Hire of Security Services	৪৮৮১ - নিরাপত্তা প্রবর্তী
4882 - Legal Expenses	৪৮৮২ - আইন সংক্রান্ত ব্যয়
4883 - Honorarium/Fees/Remuneration	৪৮৮৩ - সম্মানী ভাতা/ফি/পারিশ্রমিক
4884 - Examination Fees and Expenses	৪৮৮৪ - পরীক্ষা ফি/পরীক্ষা সংক্রান্ত ব্যয়
4885 - Testing Fee	৪৮৮৫ - টেস্টিং ফিস
4886 - Survey	৪৮৮৬ - সার্ভে
4887 - Copying Charges	৪৮৮৭ - কপি/অনুলিপি ব্যয়
4888 - Computer Consumables	৪৮৮৮ - KuDUhi mgM
4889 - Audit Fees	৪৮৮৯ - অডিট ফি
4890 - Functions/Ceremonies	৪৮৯০ - অনুষ্ঠান/উৎসববাদি
4891 - Subsistence	৪৮৯১ - খোরাকী
4892 - Royalties/Revenue Share	৪৮৯২ - রয়েন্টি/রেন্টনিউ শেয়ার
4893 - Hiring Charges	৪৮৯৩ - হায়ারিং চার্জ
4894 - Parliament Session	৪৮৯৪ - সংসদ অধিবেশন
4895 - Committee Meetings/Commission	৪৮৯৫ - কমিটি/মিটিং/কমিশন
4896 - Mail Bag	৪৮৯৬ - মেইল ব্যাগ
4897 - Sanitation	৪৮৯৭ - স্বাস্থ্য বিধান
4898 - Special Expenditure	৪৮৯৮ - বিশেষ ব্যয়
4899 - Other Expenses	৪৮৯৯ - অন্যান্য ব্যয়
4900 - 4999 - Repairs, Maintenance and	৪৯০০ - ৪৯৯৯ - মেরামত, সংরক্ষণ ও পুনর্বাসন
4900 - 4999 - Repairs, Maintenance and	৪৯০০ - ৪৯৯৯ - মেরামত ও সংরক্ষণ
4900 - Repair & Maintenance	৪৯০০ - মেরামত ও সংরক্ষণ
4901 - Motor Vehicles	৪৯০১ - মোটর যানবাহন
4906 - Furniture and Fixtures	৪৯০৬ - আসবাবপত্র
4907 -	৪৯০৭ -
4911 - Computers and Office Equipment	৪৯১১ - KuDUhi I Awdm mi Avg
4916 - Machineries & Equipment	৪৯১৬ - যন্ত্রপাতি ও সরঞ্জাম
4920 -	৪৯২০ - জাতিসংঘ মিশনে নিয়োজিত সশস্ত্র বাহিনীর মেরামত ও সংরক্ষণ ব্যয়
4921 - Office Buildings	৪৯২১ - অফিস ভবন
4922 - POA Stores and Civil Works	৪৯২২ - পি ও-এ মালামাল ও পূর্তকাজ
4923 - Government Structure	৪৯২৩ - সরকারী স্থাপনা
4924 - Ballot Boxes	৪৯২৪ - বালট বক্স নির্মাণ, সংরক্ষণ ও গুদামজাত করণ
4926 - Residential Buildings	৪৯২৬ - আবাসিক ভবন
4927 - Educational Institutions	৪৯২৭ - শিক্ষা প্রতিষ্ঠান
4930 - Meterology Equipment	৪৯৩০ - আবহাওয়া যন্ত্রপাতি
4931 - Other Buildings and Structures	৪৯৩১ - অন্যান্য ভবন ও স্থাপনা
4932 - Engineering Equipment	৪৯৩২ - ইঞ্জিনিয়ারিং যন্ত্রপাতি
4936 - Roads Bridges and Highways	৪৯৩৬ - সড়ক, সেতু ও মহাসড়ক
4941 - Rural Roads and Culverts	৪৯৪১ - পলী-সড়ক ও কালভার্ট
4946 - Irrigation Structures	৪৯৪৬ - সেচ অবকাঠামো
4947 - Drainage Structure	৪৯৪৭ - ড্রেনেজ কাঠামো
4951 - Sanitation and Water Supply	৪৯৫১ - স্বাস্থ্য বিধান ও পানি সরবরাহ
4955 - Signal/Wireless Equipment	৪৯৫৫ - সিগন্যাল/ওয়ারলেস সরঞ্জাম
4956 - Telecommunications Equipment	৪৯৫৬ - টেলিযোগাযোগ সরঞ্জাম

Detail Description

4500 - Consolidated Fund Expenditure

4500 - 6799 - Revenue Expenditure

4900 - 4999 - Repairs, Maintenance and

4900 - 4999 - Repairs, Maintenance and

4958 - Lines & Wires

4959 - Mast & Aerials

4961 - Electrical Installations

4966 - Rolling Stock

4971 - Railway Installations

4976 - Water Transport

4981 - Aircraft

4986 - Rehabilitation

4991 - Other Repairs and Maintenance

4993 - Pillar Construction and Maintenance

5000 - 5099 - Term Loan Interest Repayment

5000 - 5099 - Term Loan Interest

5001 - Prize Bonds

5002 - 5 Years Treasury Bond-2008 (10 & 20 Crore)

5003 - 5 Years Treasury Bond-2008 (9.3297 Crore)

5004 - 5 Years Treasury Bond-2008 (92.03 Lakh)

5005 - Wage Earner Development Bonds

5006 - Bangladesh Treasury Bond (BGTB) 3 years

5007 - 5-Year Treasury Bond-2008 (94.32 Crore, 5%)

5008 - Bangladesh Treasury Bond (BGTB) 5 years

5009 - 5-Year Treasury Bond-2007 (2.86 Crore, 6%)

5010 - National Bond

5011 -

5012 - Bangladesh Treasury Bond (BGTB) 10 years

5013 -

5014 - Bangladesh Treasury Bond (BGTB) 15 years

5015 - 1 year Treasury Bonds

5016 - Bangladesh Treasury Bond (BGTB) 20 years

5020 - 2 year Treasury Bond

5021 - 3-Year Sonali Bank Treasury Bond-2009 (1000

5022 - Bangladesh Treasury Bond (BGTB) 25 years

5023 -

5024 - Interest of 3 Years Treasury Bond-1997

5025 - 3 year Treasury Bond

5026 - T & T Bond

5027 - 3 year Treasury Bond -1998

5028 - 3 Year Treasury Bond (B. S. R. S) - 2000

5029 - 3 year BSRB Bond

5030 - 10 Year Treasury Bond for Loss Financing - Jute

5031 - 3 year Treasury Bond for Export

5032 - 10 Years Treasury Bond BSC

5033 - 3 year National Investment Bond

5034 - Interest of 3 Years Treasury Bond-2000

5035 - 3 year BADC Treasury Bond - 1998

5036 - 3 Years Treasury Bond (B. T. M. C) - 2001

5037 - 3 year BTMC Treasury Bond - 1998

5038 - 3 Year Treasury Bond (Biman) -1998

5040 - 5 year Treasury Bond

5041 - 5 Years Treasury Bond (Biman) - 2003

5042 - 5 Year Biman Treasury Bond - 2000

5043 - 5 Years Treasury Bond (Biman)

5044 -

5045 - 7 year Treasury Bond

5046 - 10 year Treasury Bond - 2006

5047 - 10 year Treasury Bond - 2006

5048 - 10 year Treasury Bond - 2006

8৫০০ - সংযুক্ত তহবিল - ব্যয়

8৫০০ - ৬৭৯৯ - রাজস্ব ব্যয়

8৯০০ - 8৯৯৯ - মেরামত, সংরক্ষণ ও পুনর্বাসন

8৯০০ - 8৯৯৯ - মেরামত ও সংরক্ষণ

8৯৫৮ - লাইন ও তার

8৯৫৯ - খুঁটি ও এরিয়াল

8৯৬১ - বৈদ্যুতিক অবকাঠামো

8৯৬৬ - রোলিং টক

8৯৭১ - রেলওয়ে স্থাপনা

8৯৭৬ - জলবান

8৯৮১ - আকাশযান

8৯৮৬ - Cpi'xai

8৯৯১ - অন্যান্য মেরামত ও সংরক্ষণ

8৯৯৩ - পিলার নির্মাণ ও রক্ষণাবেক্ষণ

৫০০০ - ৫০৯৯ - মেয়াদী ঋণের সুদ পরিশোধ

৫০০০ - ৫০৯৯ - মেয়াদী ঋণ এর সুদ

৫০০১ - প্রাইজ বন্ড

৫০০২ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৮ (১০ এবং ২০ কোটি)

৫০০৩ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৮ (৯.৩২৯৭ কোটি)

৫০০৪ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৮ (৯২.০৩ লাখ)

৫০০৫ - গুয়াজ আর্নার ডেভেলপমেন্ট বন্ড

৫০০৬ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ৩ বছর মেয়াদী এর সুদ

৫০০৭ - ৫-বছর মেয়াদী ট্রেজারী বন্ড-২০০৮ (৯৪.৩২ কোটি, ৫%)

৫০০৮ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ৫ বছর মেয়াদী এর সুদ

৫০০৯ - ৫-বছর মেয়াদী ট্রেজারী বন্ড-২০০৭ (২.৮৬ কোটি, ৬%)

৫০১০ - ন্যাশনাল বন্ড

৫০১১ - ৫ বছর মেয়াদী কোহিনুর ব্যাটারী ম্যানুঃ কোঃ সেরকারীকরণ ট্রেজারী

৫০১২ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ১০ বছর মেয়াদী এর সুদ

৫০১৩ - ২-১৫ বছর মেয়াদী ট্রেজারী বন্ড (বিপিসি'র দায় পরিশোধ ৭৩২২.৫৪ কোটি)

৫০১৪ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ১৫ বছর মেয়াদী এর সুদ

৫০১৫ - ১ বছর মেয়াদি ট্রেজারি বন্ড

৫০১৬ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ২০ বছর মেয়াদী এর সুদ

৫০২০ - ২ বছর মেয়াদি ট্রেজারি বন্ড

৫০২১ - ৩ বছর মেয়াদী সোনালী ব্যাংক ট্রেজারী বন্ড - ২০০৯ (১০০০ কোটি টাকা)

৫০২২ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ২৫ বছর মেয়াদী এর সুদ

৫০২৩ - ৩ বছর মেয়াদী ট্রেজারী বন্ড-২০১০ (বিএডিসি স্কন-Ceij X e'isK 33.65

৫০২৪ - ৩ বছর মেয়াদী ট্রেজারী বন্ড-১৯৯৭ এর সুদ

৫০২৫ - ৩ বছর মেয়াদি ট্রেজারি বন্ড

৫০২৬ - টি এড টি বন্ড

৫০২৭ - ৩ বছর মেয়াদি ট্রেজারি বন্ড - ১৯৯৮

৫০২৮ - ৩ বছর মেয়াদি ট্রেজারী বন্ড (বি. এস. আর. এস) - ২০০০

৫০২৯ - ৩ বছর মেয়াদি বি. এস. আর. এস বন্ড

৫০৩০ - ঘাটতি অর্থায়নের জন্য ১০ বছর মেয়াদী বন্ড, পাটখাত কর্মসূচী

৫০৩১ - ৩ বছর মেয়াদি রঙিন ক্ষতিপূরণ বন্ড - পাটখাত

৫০৩২ - ১০ বছর মেয়াদী বি এস সি বন্ড

৫০৩৩ - ৩ বছর মেয়াদি জাতীয় বিনিয়োগ বন্ড

৫০৩৪ - ৩ বছর মেয়াদী ট্রেজারী বন্ড-২০০০ এর সুদ

৫০৩৫ - ৩ বছর মেয়াদী বি. এ. ডি. সি ট্রেজারী বন্ড - ১৯৯৮

৫০৩৬ - ৩ বছর মেয়াদী ট্রেজারী বন্ড (বি. টি. এম. সি) - ২০০১

৫০৩৭ - ৩ বছর মেয়াদি বি. টি. এম. সি ট্রেজারি বন্ড - ১৯৯৮

৫০৩৮ - ৩ বছর মেয়াদী ট্রেজারি বন্ড (বিমান) - ১৯৯৮

৫০৪০ - ৫ বছর মেয়াদি ট্রেজারি বন্ড

৫০৪১ - ৫ বছর মেয়াদী ট্রেজারী বন্ড (বিমান) - ২০০৩

৫০৪২ - ৫ বছর মেয়াদি বিমান ট্রেজারি বন্ড - ২০০০

৫০৪৩ - ৫ বছর মেয়াদী ট্রেজারী বন্ড (বিমান) - ২০০২

৫০৪৪ - ৩ বছর মেয়াদী ট্রেজারী বন্ড-২০১১ (বিএডিসি স্কন-Ceij X e'isK 18.59

৫০৪৫ - ৭ বছর মেয়াদি ট্রেজারি বন্ড

৫০৪৬ - ১০ বছর মেয়াদি ট্রেজারি বন্ড ২০০৬

৫০৪৭ - ১০ বছর মেয়াদি ট্রেজারি বন্ড ২০০৬

৫০৪৮ - ১০ বছর মেয়াদি ট্রেজারি বন্ড ২০০৬

Detail Description

4500 - Consolidated Fund Expenditure

4500 - 6799 - Revenue Expenditure

5000 - 5099 - Term Loan Interest Repayment

5000 - 5099 - Term Loan Interest

5049 - 10 Years Treasury Bond (B. S. C) - 2008
 5050 - 10 year Treasury Bond
 5051 - 10 year Treasury Bond - 2005
 5052 - Treasury Bond (1992 - 2002) @ 9%
 5053 -
 5054 -
 5055 - 15 year Treasury Bond
 5056 - 15 year Special Treasury Bond - 2008
 5057 - 15 year Treasury Bond for Recapitalisation of
 5058 - BJMC Credit Bond
 5059 - 15 year Treasury Bond (BKB) - 2011
 5060 - 10 Years Treasury Bond (Jete Sector)
 5061 - 20 year Jute Bond
 5062 - Corporation/Financial Institution Investment
 5063 - 20 year BJC Bond
 5064 - Sick Industries Assistance Bond
 5065 - 25 year Treasury Bond - 2019
 5067 - 25 year Treasury Bond - 2020
 5068 - 25 Years Agriculture Credit Expenditure Bond -
 5069 - 25 year Treasury Bond (Jute Sector) - 2018
 5071 - Special Bond
 5072 - 5 Years Treasury Bond-2009 (53.2688 Crore)
 5073 - Income Tax Bond
 5074 - Recapitalisation Bond - Interest of Bank
 5075 - Recapitalisation Bond - Interest of Corporation
 5076 - Cash Assistance to Banks for Write off Loan
 5077 - 5 Years Non negotiable Bond (0.04 crore 5%)
 5078 - 5 Years Treasury Bond (0.4624 Crore)
 5079 - 5 Years Treasury Bond-2004
 5080 - 5 Years Treasury Bond-2005
 5081 - 7 Year Treasury Bond for Payment of State
 5083 - 5 Years Treasury Bond - 2004
 5084 - 10 Years (BJMC) Treasury Bond - 2006 (7%)
 5085 - 5 Years Treasury Bond (Compensation for
 5086 - 5 Years Treasury Bond-2005 (5%) Sick
 5087 - 5 Years Treasury Bond-2005 (Tk 64.51 crore 7%
 5088 - 5 Years Treasury Bond-2005 (Tk 30.45 crore 7%
 5089 - 5 Years Treasury Bond-2006 (Tk 2,23,49000 7%
 5090 - 5 Years Treasury Bond-2006 (Tk 62.31 Lac 7%
 5091 - 5 Years Treasury Bond-2005 (Sick Industries)
 5092 - 5 Years Treasury Bond-2005 (Sick Industries)
 5093 - 5 Years Treasury Bond-2006 (Tk 75.66 crore 5%
 5094 - 5 Years Treasury Bond-2006 (Tk 0.51 crore 5%
 5095 - 5 Years Treasury Bond-2005
 5096 - 5 Years Treasury Bond-2006 (Tk 70.22 crore,
 5097 - 5 Years Treasury Bond - 2008 (7.5%)
 5098 - 10 Years Treasury Bond - 2013 (8.5%)

5100 - 5199 - Floating Loan Interest

5100 - 5199 - Floating Loan Interest

5101 - Ways and Means
 5102 - Over Draft Current (OD Current)'s Interest
 5104 - Over Draft Block (OD Block)'s Interest
 5107 - Treasury Bill 28 day's Interest
 5108 - Treasury Bill 91 day's Interest
 5109 - Treasury Bill 182 day's Interest
 5110 - Treasury Bill 364 day's Interest

৪৫০০ - সংযুক্ত তহবিল - ব্যয়

৪৫০০ - ৬৭৯৯ - রাজস্ব ব্যয়

৫০০০ - ৫০৯৯ - মেয়াদী ঋণের সুদ পরিশোধ

৫০০০ - ৫০৯৯ - মেয়াদী ঋণ এর সুদ

৫০৪৯ - ১০ বৎসর মেয়াদী ট্রেজারী বন্ড (বি. এস. সি) - ২০০৮
 ৫০৫০ - ১০ বছর মেয়াদি ট্রেজারি বন্ড
 ৫০৫১ - ১০ বছর মেয়াদি ট্রেজারি বন্ড ২০০৫
 ৫০৫২ - ট্রেজারি বন্ড (১৯৯২ - ২০০২) ৯% হারে
 ৫০৫৩ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০১২ (কোহিনুর ব্যাটারী-১০.১১৬০ কোটি)
 ৫০৫৪ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০১২ (বিএসএফআইসি ২০.৪৭৩৯ কোটি)
 ৫০৫৫ - ১৫ বছর মেয়াদি ট্রেজারি বন্ড
 ৫০৫৬ - ১৫ বছর মেয়াদী বিশেষ ট্রেজারী বন্ড-২০০৮
 ৫০৫৭ - রাষ্ট্রীয় ব্যাংকসমূহের মূলধনের জন্য ১৫ বছর মেয়াদী বন্ড
 ৫০৫৮ - বিজেএমসি ক্রেডিট বন্ড
 ৫০৫৯ - ১৫ বছর মেয়াদী ট্রেজারী বন্ড - (বি. কে. বি) - ২০১১
 ৫০৬০ - ১০বছর মেয়াদী ট্রেজারী বন্ড (পাটখাত)
 ৫০৬১ - ২০ বছর মেয়াদী পাট বন্ড
 ৫০৬২ - কর্পোরেশন/আর্থিক প্রতিষ্ঠান বিনিয়োগ বন্ড
 ৫০৬৩ - ২০ বছর মেয়াদী বিজেসি বন্ড
 ৫০৬৪ - i'Makfi mniqZi eU
 ৫০৬৫ - ২৫ বছর মেয়াদী ট্রেজারী বন্ড - ২০১৯
 ৫০৬৭ - ২৫ বছর মেয়াদী ট্রেজারী বন্ড - ২০২০
 ৫০৬৮ - ২৫বছর মেয়াদী কৃষিঋণ মওকুফ বন্ড-রাজশাহী কৃষি উন্নয়ন ব্যাংকের সুদ
 ৫০৬৯ - ২৫ বছর মেয়াদী ট্রেজারী বন্ড (পাটখাত) - ২০১৮
 ৫০৭১ - বিশেষ বন্ড
 ৫০৭২ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৯ (৫৩.২৬৮৮ কোটি)
 ৫০৭৩ - ইনকাম ট্যাক্স বন্ড
 ৫০৭৪ - মূলধন পূর্ণগঠন বন্ড-ব্যাংকের সুদ
 ৫০৭৫ - মূলধন পূর্ণগঠন বন্ড-কর্পোরেশনের সুদ
 ৫০৭৬ - জেলাস্ব কর্মসূচির অধীনে লোকসান পূরণের ব্যয়ের মাধ্যমে ব্যাংকে প্রদেয়
 ৫০৭৭ - ৫ বছর মেয়াদী নন নেগোশিয়েবল বন্ড (০.০৪ কোটি ৫%) উত্তরা ব্যাংকের
 ৫০৭৮ - ৫ বছর মেয়াদী ট্রেজারী বন্ড (০.৪৬২৪ কোটি)
 ৫০৭৯ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৪
 ৫০৮০ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৫
 ৫০৮১ - ৭ বছর মেয়াদী রাষ্ট্রায়ত্ত্ব সংস্থার খেলাধী ঋণ পরিশোধ বন্ড
 ৫০৮৩ - ৫ বছর মেয়াদি ট্রেজারি বন্ড-২০০৪
 ৫০৮৪ - ১০ বছর মেয়াদী (বিজেএমসি) ট্রেজারী বন্ড ২০০৬ (৭%)
 ৫০৮৫ - ৫ বছর মেয়াদী ট্রেজারী বন্ড (কৃষি ঋণ মওকুফের ঘাটতি পূরণে) ২০০৫
 ৫০৮৬ - ৫ বছর মেয়াদী ট্রেজারী বন্ড ২০০৫ (৫%) i'Makfi
 ৫০৮৭ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৫ (৬৪.৫১ কোটি ৭% সুদ)
 ৫০৮৮ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৫ (৩০.৪৫ কোটি ৭% সুদ)
 ৫০৮৯ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৬ (২,২৩,৪৯,০০০ টাকা ৭%)
 ৫০৯০ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৬ (৬২.৩১ লক্ষ ৭%)
 ৫০৯১ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৫ (i'Makfi) 22.40 i'KniU 5%
 ৫০৯২ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৫ (i'Makfi) 28.06 i'KniU 5%
 ৫০৯৩ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৬ (৭৫.৬৬ কোটি ৫%)
 ৫০৯৪ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৬ (০.৫১ কোটি ৫% সুদ)
 ৫০৯৫ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৫
 ৫০৯৬ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৬ (৭০.২২ কোটি, ৬% সুদ)
 ৫০৯৭ - ৫ বছর মেয়াদী সরকারী ট্রেজারী বন্ড-২০০৮ (৭.৫%)
 ৫০৯৮ - ১০ বছর মেয়াদী সরকারী ট্রেজারী বন্ড-২০১০ (৮.৫%)

৫১০০ - ৫১৯৯ - চলতি ঋণের সুদ পরিশোধ

৫১০০ - ৫১৯৯ - চলতি ঋণ এর সুদ

৫১০১ - গুয়েজ এন্ড মিনস্
 ৫১০২ - গুজার ড্রাফট কারেন্ট (এডি কারেন্ট) এর সুদ
 ৫১০৪ - I fvi WdU eK (I MW eK) Gi mj
 ৫১০৭ - ট্রেজারি বিল ২৮ দিন এর সুদ
 ৫১০৮ - ট্রেজারি বিল ৯১ দিন এর সুদ
 ৫১০৯ - ট্রেজারি বিল ১৮২ দিন এর সুদ
 ৫১১০ - ট্রেজারি বিল ৩৬৪ দিন এর সুদ

Detail Description

4500 - Consolidated Fund Expenditure	৪৫০০ - সংযুক্ত তহবিল - ব্যয়
4500 - 6799 - Revenue Expenditure	৪৫০০ - ৬৭৯৯ - রাজস্ব ব্যয়
5100 - 5199 - Floating Loan Interest	৫১০০ - ৫১৯৯ - চলতি ঋণের সুদ পরিশোধ
5100 - 5199 - Floating Loan Interest	৫১০০ - ৫১৯৯ - চলতি ঋণ এর সুদ
5111 - Treasury Bills	৫১১১ - ট্রেজারী বিল
5121 - Promissory Notes -IDA	৫১২১ - প্রমিসরী নোট - আই, ডি, এ
5131 - Promissory Notes -IBRD	৫১৩১ - প্রমিসরী নোট - আই, বি, আর, ডি
5141 - Ad-hoc Treasury Bills	৫১৪১ - এড হক ট্রেজারী বিল
5151 - Cash Credit Accommodation	৫১৫১ - নগদ অগ্রিম সংস্থান
5161 - Others	৫১৬১ - অন্যান্য
5200 - 5299 - Interest on National Savings	৫২০০ - ৫২৯৯ - জাতীয় সঞ্চয়পত্রের সুদ পরিশোধ
5200 - 5299 - Interest on National Savings	৫২০০ - ৫২৯৯ - জাতীয় সঞ্চয় পত্রের সুদ
5201 - Postal Savings Bank - Ordinary Deposits	৫২০১ - ডাকঘরের সঞ্চয় ব্যাংক - সাধারণ জমা
5211 - Postal Savings Bank - Term Deposits	৫২১১ - ডাকঘরের সঞ্চয় ব্যাংক - মেয়াদি জমা
5212 - Interest on Deposit Savings Certificate	৫২১২ - জামানত সঞ্চয়পত্রের সুদ পরিশোধ
5213 - Bonus Deposits	৫২১৩ - বোনাস জমার সুদ
5215 - Bonus Savings Certificate	৫২১৫ - বোনাস সঞ্চয়পত্র
5221 - Ten Year Bangladesh Sanchaypatra	৫২২১ - ১০ বছর মেয়াদি বাংলাদেশ সঞ্চয় পত্র
5227 - 5 years Pensioner Savings Certificate	৫২২৭ - ৫ বছর মেয়াদী পেনশনার সঞ্চয় পত্র
5231 - Five Year Bangladesh Sanchaypatra	৫২৩১ - ৫ বছর মেয়াদি বাংলাদেশ সঞ্চয় পত্র
5241 - Three Year Bangladesh Sanchaypatra	৫২৪১ - ৩ বছর মেয়াদি বাংলাদেশ সঞ্চয়পত্র
5251 - Defence Savings Certificates	৫২৫১ - প্রতিরক্ষা সঞ্চয় পত্র
5252 - Bonus Certificate with 3 Months Profit	৫২৫২ - তিন মাস অন্তর মুনাফা ভিত্তিক সঞ্চয়পত্রের সুদ
5253 - Bonus Certificate with 6 Month Profit	৫২৫৩ - ছয় মাস অন্তর মুনাফা ভিত্তিক সঞ্চয়পত্রের সুদ
5255 - Family Savings Certificates	৫২৫৫ - পরিবার সঞ্চয় সার্টিফিকেট
5257 - Interest on Pension Savings Certificate	৫২৫৭ - পেনশনার সঞ্চয়পত্রের সুদ পরিশোধ
5261 - Others	৫২৬১ - অন্যান্য
5281 - Interest on Prize Bond	৫২৮১ - প্রাইজ বন্ডের সুদ
5282 - Interest on Wage Earner Development Bond	৫২৮২ - ওয়েজ আর্নার ডেভেলপমেন্ট বন্ডের সুদ
5283 - Interest on National Bond	৫২৮৩ - ন্যাশনাল বন্ডের সুদ
5285 - Interest on US Dollar Premium Bond	৫২৮৫ - ইউ এস ডলার প্রিমিয়াম বন্ডের সুদ
5287 - Interest on US Dollar Investment Bond	৫২৮৭ - ইউ এস ডলার ইনভেস্টমেন্ট বন্ডের সুদ
5300 - 5399 - Provident Fund Interest	৫৩০০ - ৫৩৯৯ - ভবিষ্যৎ তহবিলের সুদ পরিশোধ
5300 - 5399 - Provident Fund Interest	৫৩০০ - ৫৩৯৯ - ভবিষ্যৎ তহবিলের উপর সুদ
5301 - General Provident Fund	৫৩০১ - সাধারণ ভবিষ্যৎ তহবিল
5302 - Interest on General Provident Fund - Railway	৫৩০২ - সাধারণ ভবিষ্যৎ তহবিলের সুদ-রেলওয়ে
5303 - Interest on General Provident Fund - Postal	৫৩০৩ - সাধারণ ভবিষ্যৎ তহবিলের সুদ-ডাক বিভাগ
5304 - Interest on GPF- T&T	৫৩০৪ - সাধারণ ভবিষ্যৎ তহবিলের সুদ-টি এন্ড টি
5305 - Interest on General Provident Fund - Defence	৫৩০৫ - সাধারণ ভবিষ্যৎ তহবিলের সুদ-প্রতিরক্ষা
5310 - Interest on General Provident Fund - Others	৫৩১০ - সাধারণ ভবিষ্যৎ তহবিলের সুদ-অন্যান্য
5311 - Contributory Provident Fund	৫৩১১ - কন্ট্রিবিউটারী ভবিষ্যৎ তহবিল
5400 - 5499 - Postal Life Insurance Interest	৫৪০০ - ৫৪৯৯ - ডাক জীবন বীমার সুদ পরিশোধ
5400 - 5499 - Postal Life Insurance Interest	৫৪০০ - ৫৪৯৯ - ডাক জীবন বীমা (সুদ)
5401 - Postal Life Insurance	৫৪০১ - ডাক জীবন বীমা
5500 - 5599 - Other Interest	৫৫০০ - ৫৫৯৯ - অন্যান্য সুদ পরিশোধ
5500 - 5599 - Other Interest	৫৫০০ - ৫৫৯৯ - অন্যান্য সুদ
5500 -	৫৫০০ - অন্যান্য সুদ পরিশোধ
5501 - Reserve Fund	৫৫০১ - সংরক্ষিত তহবিল
5511 - Sinking Fund	৫৫১১ - প্রতিপূরক তহবিল
5521 - Depreciation Fund	৫৫২১ - অবচয় তহবিল
5531 - Bank Loan on Food Account	৫৫৩১ - ব্যাংক ঋণ - খাদ্য হিসাব
5535 - Return on Investment	৫৫৩৫ - বিনিয়োগের উপর রিটার্ন
5541 - Management of Loans	৫৫৪১ - ঋণ ব্যবস্থাপনা
5542 - 5 Years Treasury Bond - 2008 (7.5%)	৫৫৪২ - ৫ বছর মেয়াদী সরকারী ট্রেজারী বন্ড-২০০৮ (৭.৫%)
5543 - 10 Years Treasury Bond - 2013 (8.5%)	৫৫৪৩ - ১০ বছর মেয়াদী সরকারী ট্রেজারী বন্ড-২০১৩ (৮.৫%)
5550 - Death Risk	৫৫৫০ - মৃত্যু ঝুঁকি
5551 - Death Risk & Others	৫৫৫১ - মৃত্যু ঝুঁকি ও অন্যান্য

Detail Description

4500 - Consolidated Fund Expenditure

4500 - 6799 - Revenue Expenditure

5600 - 5699 - Interest on Foreign Debt

5600 - 5699 - Interest on Foreign Debt

5600 - Interest on Foreign Debt.

5601 - Food Loan

5611 - Project Loan

5621 - Reimbursable Project Loan

5631 - Direct Project Loan

5641 - Non-ADP Project Loan

5651 - Commodity Loan

5661 - Other Foreign Loans

5800 - 5899 - Subsidies

5800 - 5899 - Subsidies

5801 - Food

5803 - News Print

5805 - Rural Electrification

5807 - Internal Water Transport

5808 - Hazz Flight Subsidy

5809 - Steel and Engineering

5811 - Agriculture

5813 - Fuel

5821 - Fertilizer

5831 - Jute Goods

5835 - Export Subsidy

5840 - Exemption of Agriculture Credit

5841 - Subsidies - Export Agricultural Commodities

5843 - Fertilizer, Agricultural Loan & Other Agricultural

5845 - Segregated Loan

5850 - Interest Exemption under FSRP

5855 - Other Subsidies

5856 - Payment to BKB for Outstanding loan disbursed

5858 - Fertilizer Trade Gap

5860 - Subsidies -Agricultural Sectors

5900 - 5999 - Grants in Aid

5900 - 5999 - Grants in Aid

5900 -

5901 - Grant in Aid - General

5902 - Development Budget -General Grant

5903 - Salary Support

5904 - Income Tax Grant

5905 - Uniform Grant

5907 - House Grant

5909 - House Rent Grant

5911 - Medical Grant

5913 - Festival Bonus

5914 - Pension and Retirement Benefits Grant

5915 - Union Council Members Honourarium

5916 - Union Council Chairman's Honourarium

5917 - Sports Grants

5919 - Book Grant

5921 - Research Grant

5922 - Grant for Training

5923 - Cultural Grant

5925 - Welfare Grant

5927 - Burial Grant

5929 - Car Grant

5930 - Machinery Grant

5931 - Salary Support to Non-Government Teacher

৪৫০০ - সংযুক্ত তহবিল - ব্যয়

৪৫০০ - ৬৭৯৯ - রাজস্ব ব্যয়

৫৬০০ - ৫৬৯৯ - বৈদেশিক ঋণের উপর সুদ

৫৬০০ - ৫৬৯৯ - বৈদেশিক ঋণের উপর সুদ

৫৬০০ - বৈদেশিক ঋণের উপর সুদ

৫৬০১ - খাদ্য ঋণ

৫৬১১ - প্রকল্প ঋণ

৫৬২১ - পূণর্ভরণকৃত প্রকল্প ঋণ

৫৬৩১ - সরাসরি প্রকল্প ঋণ

৫৬৪১ - এ. টি. পি বহির্কৃত প্রকল্প ঋণ

৫৬৫১ - পণ্য ঋণ

৫৬৬১ - অন্যান্য বৈদেশিক ঋণ

৫৮০০ - ৫৮৯৯ - ভর্তুকী ও অন্যান্য সাহায্য মঞ্জুরি

৫৮০০ - ৫৮৯৯ - ভর্তুকী

৫৮০১ - খাদ্য

৫৮০৩ - নিউজ প্রিন্ট

৫৮০৫ - Cj H-#E jZiqb

৫৮০৭ - অভ্যন্তরীণ নৌ পরিবহন

৫৮০৮ - হজু ফ্লাইট বাবদ ভর্তুকী

৫৮০৯ - B`inZ l cIKSkj

৫৮১১ - কৃষি

৫৮১৩ - জ্বালানী

৫৮২১ - সার

৫৮৩১ - পাটজাত দ্রব্যাদি

৫৮৩৫ - রপ্তানি ভর্তুকী

৫৮৪০ - কৃষি ঋণ মওকুফ

৫৮৪১ - কৃষিপণ্য রপ্তানী ভর্তুকী

৫৮৪৩ - সার ও অন্যান্য কৃষি কার্যক্রম

৫৮৪৫ - পৃথককৃত ঋণ

৫৮৫০ - এক. এস. আর. পি -এর অধীন সুদ মওকুফ

৫৮৫৫ - অন্যান্য

৫৮৫৬ - সরকারী গ্যারান্টির বিপরীতে বাংলাদেশ কৃষি ব্যাংক কর্তৃক যাবীনতা পূর্বকালে

৫৮৫৮ - সারের ট্রেড-গ্যাপ

৫৮৬০ - কৃষি ঋণের জন্য ভর্তুকী

৫৯০০ - ৫৯৯৯ - সাহায্য, মঞ্জুরি

৫৯০০ - ৫৯৯৯ - সাহায্য, মঞ্জুরী

৫৯০০ - সাহায্য, মঞ্জুরী

৫৯০১ - সাধারণ মঞ্জুরী

৫৯০২ - উন্নয়ন বাজেট - সাধারণ মঞ্জুরী

৫৯০৩ - বেতন বাবদ সহায়তা

৫৯০৪ - আয়কর মঞ্জুরি

৫৯০৫ - পোশাক বাবদ মঞ্জুরী

৫৯০৭ - গৃহ বাবদ মঞ্জুরী

৫৯০৯ - বাসা ভাড়া বাবদ মঞ্জুরী

৫৯১১ - চিকিৎসা বাবদ মঞ্জুরী

৫৯১৩ - উৎসব মঞ্জুরী

৫৯১৪ - পেনশন মঞ্জুরী

৫৯১৫ - ইউনিয়ন পরিষদ সদস্যদের সম্মানী

৫৯১৬ - চেয়ারম্যানদের সম্মানী

৫৯১৭ - খেলাধুলা মঞ্জুরী

৫৯১৯ - বই পুস্তক মঞ্জুরী

৫৯২১ - গবেষণা মঞ্জুরী

৫৯২২ - প্রশিক্ষণ মঞ্জুরী

৫৯২৩ - সাংস্কৃতিক মঞ্জুরী

৫৯২৫ - কল্যাণ অনুদান

৫৯২৭ - দাফন অনুদান

৫৯২৯ - গাড়ী বাবদ মঞ্জুরী

৫৯৩০ - যন্ত্রপাতি ও অন্যান্য সরঞ্জাম ক্রয় মঞ্জুরী

৫৯৩১ - বেসরকারি শিক্ষকদের বেতন সহায়তা

Detail Description

4500 - Consolidated Fund Expenditure	৪৫০০ - সংযুক্ত তহবিল - ব্যয়
4500 - 6799 - Revenue Expenditure	৪৫০০ - ৬৭৯৯ - রাজস্ব ব্যয়
5900 - 5999 - Grants in Aid	৫৯০০ - ৫৯৯৯ - সাহায্য, মঞ্জুরি
5900 - 5999 - Grants in Aid	৫৯০০ - ৫৯৯৯ - সাহায্য, মঞ্জুরি
5933 - Non-Government Educational Institutions	৫৯৩৩ - বেসরকারী শিক্ষা প্রতিষ্ঠান অনুদান
5935 - Film Production	৫৯৩৫ - Pj rPI mbgth Abj vb
5937 - Grants for Religious Purposes	৫৯৩৭ - ধর্মীয় উদ্দেশ্যে মঞ্জুরি
5938 - Grants for Non Government Orphanages	৫৯৩৮ - বেসরকারী এতিম খানায় মঞ্জুরি
5939 - Government Employees Benevolent Fund	৫৯৩৯ - কর্মচারী কল্যাণ তহবিল
5941 - Group Insurance Grant	৫৯৪১ - যৌথ বীমা
5942 - Project Grant	৫৯৪২ - প্রকল্প মঞ্জুরি
5943 - Vulnerable Group Development (VGD)	৫৯৪৩ - চি. জি. ডি
5944 - Vulnerable Group Feeding	৫৯৪৪ - ভি জি এফ
5945 - Test Relief (TR)	৫৯৪৫ - টি. আর
5947 - Gratuitous Relief (GR)	৫৯৪৭ - জি. আর
5949 - Relief and Charities	৫৯৪৯ - ত্রাণ ও দান
5951 - Donations, Gifts, Presents	৫৯৫১ - উপহার ও দান
5953 - Discretionary Grants	৫৯৫৩ - i "Quab gAj i
5955 - Grants to Employees for Medical Treatment	৫৯৫৫ - কর্মচারীদের চিকিৎসা বাবদ মঞ্জুরি
5957 - Flood	৫৯৫৭ - বন্যা
5959 - Drought	৫৯৫৯ - অনাবৃষ্টি
5961 - Electricity Expenses	৫৯৬১ - বিদ্যুৎ/বৈদ্যুতিক কাজ বাবদ মঞ্জুরি
5962 - Water Grants	৫৯৬২ - পানি মঞ্জুরি
5963 - Stipend / Scholarship	৫৯৬৩ - বৃত্তি/স্কলারশীপ
5965 - Special Grant	৫৯৬৫ - বিশেষ অনুদান
5967 - Welfare Fund	৫৯৬৭ - কল্যাণ তহবিল
5969 - Trust Fund	৫৯৬৯ - ট্রাস্ট ফান্ড
5971 - Agriculture Rehabilitation Grant	৫৯৭১ - কৃষি পুনর্বাসন মঞ্জুরি
5972 - Rehabilitation grants for Fisheries	৫৯৭২ - মৎস খাতে পুনর্বাসন মঞ্জুরি
5973 - Flood Rehabilitation Grant	৫৯৭৩ - বন্যা পুনর্বাসন মঞ্জুরি
5974 - Repair Grant	৫৯৭৪ - মেরামত মঞ্জুরি
5975 - Cyclone Rehabilitation Grant	৫৯৭৫ - ঘূর্ণীঝড় পুনর্বাসন মঞ্জুরি
5976 - Rural Road Construction Grants	৫৯৭৬ - পলী-সড়ক নির্মাণ মঞ্জুরি
5977 - Others	৫৯৭৭ - অন্যান্য মঞ্জুরি
5978 - Rehabilitation Grants for Livestock	৫৯৭৮ - পশুপালন খাতে পুনর্বাসন মঞ্জুরি
5980 - Grants in Revolving Fund	৫৯৮০ - রিভলভিং ফান্ডে পুনর্ভরণ
5981 - Annuity	৫৯৮১ - এ্যানুইটি
5985 - Miscellaneous	৫৯৮৫ - বিবিধ
5990 - Micro-Credit Grant	৫৯৯০ - ক্ষুদ্র ঋণ মঞ্জুরি
5991 - Maintaining Life Fund Deficit	৫৯৯১ - লাইফ ফান্ড ঘাটতি
5992 - TR Cash	৫৯৯২ - টিআর নগদায়ন
5999 - Education Grants for Disabled	৫৯৯৯ - প্রতিবন্ধীদের জন্য শিক্ষা মঞ্জুরি
6100 - 6199 - Contributions to International	৬১০০ - ৬১৯৯ - আন্তর্জাতিক প্রতিষ্ঠানের চাঁদ
6100 - 6199 - Contributions to International	৬১০০ - ৬১৯৯ - আন্তর্জাতিক প্রতিষ্ঠানের চাঁদ
6101 - Subscriptions to International Organisation	৬১০১ - আন্তর্জাতিক প্রতিষ্ঠানের চাঁদ
6111 - Contributions to Foreign Governments	৬১১১ - বৈদেশিক সরকারের চাঁদ
6200 - 6299 - Write-Off of Loans and Advances	৬২০০ - ৬২৯৯ - ঋণ ও অগ্রিম মওকুফ
6200 - 6299 - Write-Off of Loans and Advances	৬২০০ - ৬২৯৯ - ঋণ ও অগ্রিম মওকুফ
6201 - Write Off of Loans and Advances	৬২০১ - ঋণ ও অগ্রিম মওকুফ
6211 - Write Off of Government Property	৬২১১ - mi Kri i m mUfE
6221 - Others	৬২২১ - অন্যান্য
6300 - 6399 - Pensions and Gratuities	৬৩০০ - ৬৩৯৯ - অবসর ভাতা ও আনুতোষিক
6300 - 6399 - Pensions and Gratuities	৬৩০০ - ৬৩৯৯ - অবসর ভাতা ও আনুতোষিক
6301 - Pensions and Family Pensions	৬৩০১ - অবসর ভাতা ও পারিবারিক অবসর ভাতা
6302 - Festival Allowance to Pensioner's	৬৩০২ - অবসর ভাতাভোগীদের উৎসব ভাতা
6311 - Gratuities	৬৩১১ - আনুতোষিক
6321 - Pension for Meritorious and Praiseworthy Deeds	৬৩২১ - প্রশংসনীয় ও কৃতিত্বপূর্ণ কাজের জন্য অবসর ভাতা
6323 - Medal for	৬৩২৩ - প্রশংসনীয় ও কৃতিত্বপূর্ণ কাজের জন্য পদক
6331 - Other Pensions and Gratuities	

Detail Description

4500 - Consolidated Fund Expenditure

4500 - 6799 - Revenue Expenditure

6600 - 6699 - Block Allocations for Repair

6600 - 6699 - Block Allocations

6617 - Education Week

6621 - Medical Surgical Requisites

6622 - Lump for Oxygen

6631 - Renewal and Reserve Fund

6632 - Utility Services Charge

6633 - New Recruitment

6634 - Manpower Rationalization

6635 - Transfer to Suspense Account

6641 - Non-Recurring

6643 - Repairs and Maintenance Government Schools

6645 - Repairs and Maintenance Non-Government

6647 - Repairs and Maintenance Technical Institutions

6649 - Military Wanted for Relief Works

6650 - Demonstration Plot

6651 - Unexpected

6661 - Food for Suspend

6671 - Welfare Fund

6675 - Anti Smuggling Operation

6681 - Unallocated Block Allocation

6683 - Compensation in Lieu of Duty Drawback

6685 - Refund of Tax Deducted

6687 - Pay Scale Implementation

6691 - Defence Expenditure

6693 - Special Relief Works

6699 - Armed forces aid to Civil Administration

6700 - 6799 - Revenue - General

6700 - 6799 - Revenue - General

6701 - Revenue Expenditure

6799 - Revenue General

6800 - 7999 - Capital Expenditure

6800 - 6899 - Acquisition of Assets

6800 - 6899 - Acquisition of Assets

6801 - Office Buildings

6803 - Residential Buildings

6805 - Other Buildings

6807 - Motor Vehicles

6809 - Water Transport

6811 - Aircraft

6812 - Camera and Accessories

6813 - Machinery and Other Equipment

6814 - Engineering Equipment

6815 - Computers and Accessories

6816 -

6817 - Computer Softwares

6819 - Office Equipment

6820 - Teaching and Learning Material

6821 - Furniture and Fixtures

6822 - Laboratory Equipments / Material

6823 - Telecommunication Equipment

6824 - Ballot Box (Procurement)

6825 - Radio Equipment

6826 - Military Hardware

6827 - Electrical Equipment

6828 - Military Equipment

6829 - Rolling Stock

8৫০০ - সংযুক্ত তহবিল - ব্যয়

৪৫০০ - ৬৭৯৯ - রাজস্ব ব্যয়

৬৬০০ - ৬৬৯৯ - মেরামত বাবদ খোক বরাদ্দ

৬৬০০ - ৬৬৯৯ - খোক বরাদ্দ

৬৬১৭ - শিক্ষা সপ্তাহ

৬৬২১ - চিকিৎসা ও শৈশ্য চিকিৎসা মূল্যাদি (এম.এস.আর)

৬৬২২ - অক্সিজেন বাবদ খোক

৬৬৩১ - নবায়ন ও সংরক্ষিত ফাউ

৬৬৩২ - ইউটিলিটি সার্ভিসেস চার্জ

৬৬৩৩ - নতুন নিয়োগ

৬৬৩৪ - জনবল সুশমকরন

৬৬৩৫ - অনিশ্চিত খাতে স্থানান্তর

৬৬৪১ - অনাবর্তক

৬৬৪৩ - মেরামত ও সংরক্ষণ খোক - সরকারী বিদ্যালয় ও মহাবিদ্যালয়

৬৬৪৫ - মেরামত ও সংরক্ষণ খোক - বেসরকারী বিদ্যালয় ও মহাবিদ্যালয়

৬৬৪৭ - মেরামত ও সংরক্ষণ খোক - কারিগরী শিক্ষা প্রতিষ্ঠান

৬৬৪৯ - ত্রাণ কাজে সেনাবাহিনী নিয়োগ

৬৬৫০ - Cl kDx cU

৬৬৫১ - অপ্রত্যাশিত

৬৬৬১ - কাজের বিনিময়ে খাদ্য

৬৬৭১ - কল্যাণ তহবিল

৬৬৭৫ - চোরালান প্রতিরোধ

৬৬৮১ - খোক বরাদ্দ

৬৬৮৩ - ভিউটি ড্রব্যাক এর পরিবর্তে ক্ষতিপূরণ বাবদ খোক

৬৬৮৫ - বর প্রত্যর্পণ

৬৬৮৭ - বেতন ফেল বাস্তবায়ন

৬৬৯১ - প্রতিরক্ষা বাবদ খরচ

৬৬৯৩ - বিশেষ ত্রাণ কার্য

৬৬৯৯ - বেসামরিক প্রশাসনকে সহায়তার জন্য সশস্ত্র বাহিনী

৬৭০০ - ৬৭৯৯ - উন্নয়ন রাজস্ব - সাধারণ

৬৭০০ - ৬৭৯৯ - উন্নয়ন রাজস্ব - সাধারণ

৬৭০১ - রাজস্ব ব্যয়

৬৭৯৯ - উন্নয়ন রাজস্ব সাধারণ

৬৮০০ - ৭৯৯৯ - মূলধন ব্যয়

৬৮০০ - ৬৮৯৯ - সম্পদ সঞ্ছ

৬৮০০ - ৬৮৯৯ - m=U' mslM/p q

৬৮০১ - অফিস ভবন

৬৮০৩ - আবাসিক ভবন

৬৮০৫ - অন্যান্য ভবন

৬৮০৭ - মোটর যান

৬৮০৯ - জলযান

৬৮১১ - আকাশযান

৬৮১২ - ছুঁড়িও ক্যামেরা

৬৮১৩ - যন্ত্রপাতি ও অন্যান্য সরঞ্জাম

৬৮১৪ - প্রকৌশল যন্ত্রপাতি

৬৮১৫ - K=UDui l h\$sk

৬৮১৬ - আর্টিকেল ইন ইউজ (এ-ইন-ইউ)

৬৮১৭ - K=UDui mDUl qii

৬৮১৯ - অফিস সরঞ্জাম

৬৮২০ - শিক্ষা উপকরণ

৬৮২১ - আসবাবপত্র

৬৮২২ - ল্যাবরেটরী যন্ত্রপাতি/সামগ্রী

৬৮২৩ - টেলিযোগাযোগ সরঞ্জাম

৬৮২৪ - ব্যালট বক্স (সঞ্ছ)

৬৮২৫ - বেতার সরঞ্জাম

৬৮২৬ - মিলিটারী সরঞ্জাম - স্থগিত ব্যয়

৬৮২৭ - বৈদ্যুতিক সরঞ্জাম

৬৮২৮ - মিলিটারি হার্ডওয়্যার

৬৮২৯ - রোলিং ষ্টক

Detail Description

4500 - Consolidated Fund Expenditure

6800 - 7999 - Capital Expenditure

6800 - 6899 - Acquisition of Assets

6800 - 6899 - Acquisition of Assets

6830 - Meteorological Equipment

6831 - Rail Installations

6833 - Roads and Highways

6834 - Military Hardware (Arrears)

6835 - Bridges

6837 - Rural Roads and Culverts

6839 - Irrigation Structures

6841 - Drainage Structures

6843 - Sanitation and Water Supply

6845 - Afforestation

6847 - Monuments

6849 - Museum Artefacts, Paintings, Archives, Films

6850 - Tubewell & Equipment

6851 - Others

6852 - Bullet Proof Jacket

6853 - Firefighting Equipments

6855 - Mobile Instrument

6865 - Tents & Equipments

6867 -

6868 - Arms, Motor Vehicle and Equipment for Police

6869 - Aircooler

6900 - 6999 - Acquisition / Purchase and Landed

6900 - 6999 - Acquisition / Purchase of Land &

6901 - Acquisition / Purchase of Land

6911 - Forest

6921 - Inland Water Body

6931 - Sub-Soil Deposits

6941 - Others

7000 - 7099 - Construction and Works

7000 - 7099 - Construction and Works

7000 - Construction & Works

7001 - Land Development

7006 - Office Buildings

7011 - Residential Buildings

7016 - Other Buildings and Structures

7021 - Roads and Highways

7026 - Bridges

7031 - Rural Roads and Culverts

7036 - Irrigation Structures

7041 - Drainage Structures

7046 - Sanitation and Water Supply

7047 - Sinking of Tubewell

7051 - Telecommunication

7053 - Lines & Wires

7054 - Mast and Aerials

7055 - Small Capital Works

7056 - Electrical Installation

7061 - Rail Installations

7066 - Mineral Exploration

7071 - Mines and Mineral Extraction

7076 - Excavation Religious Sites and Monuments

7081 - Others

8৫০০ - সংযুক্ত তহবিল - ব্যয়

৬৮০০ - ৭৯৯৯ - মূলধন ব্যয়

৬৮০০ - ৬৮৯৯ - সম্পদ সংগ্রহ

৬৮০০ - ৬৮৯৯ - m=U' mSLM/p q

৬৮০০ - আবহাওয়া সরঞ্জাম

৬৮০১ - রেলওয়ে অবকাঠামো সমূহ

৬৮০৩ - সড়ক ও মহাসড়ক

৬৮০৪ - মিলিটারী হার্ডওয়্যার (বকেয়া)

৬৮০৫ - সেতু

৬৮০৭ - Cj # moK I Kij fIU®

৬৮০৯ - সেচ অবকাঠামো

৬৮১১ - পানি নিষ্কাশন অবকাঠামো

৬৮১৩ - স্বাস্থ্য পরিচর্যা ও পানি সরবরাহ

৬৮১৫ - বনায়ন

৬৮১৭ - স্মৃতিসৌধ

৬৮১৯ - যাদুঘর নৃতাত্ত্বিক সামগ্রী, আর্কিহিট, ফিল্ম ইত্যাদি

৬৮২০ -

৬৮২১ - অন্যান্য

৬৮২২ - বুলেট প্রুফ জাকেট ক্রয়

৬৮২৩ - অগ্নিনির্বাপক সরঞ্জাম

৬৮২৫ - ভ্রাম্যমাণ যন্ত্রপাতি

৬৮৬৫ - তালু ও অন্যান্য সরঞ্জাম

৬৮৬৭ - জাতিসংঘ মিশনে নিয়োজিত "সশস্ত্র বাহিনীর" যানবাহন, যন্ত্রপাতি ও সরঞ্জাম

৬৮৬৮ - জাতিসংঘ মিশনে নিয়োজিত পুলিশ বাহিনীর জন্য অস্ত্র, যানবাহন ও সরঞ্জামাদি

৬৮৬৯ - শীতাতপ নিয়ন্ত্রণ যন্ত্র

৬৯০০ - ৬৯৯৯ - ভূমি ও অন্যান্য সম্পত্তি সংগ্রহ

৬৯০০ - ৬৯৯৯ - fig I Ab ib m=UE mSLM

৬৯০১ - ভূমি অধিগ্রহণ/ক্রয়

৬৯১১ - বন

৬৯২১ - অভ্যন্তরীণ জলাশয়

৬৯৫১ - fMF® m=U'

৬৯৪১ - অন্যান্য

৭০০০ - ৭০৯৯ - নির্মাণ ও পূর্ত

৭০০০ - ৭০৯৯ - নির্মাণ ও পূর্ত

৭০০০ - নির্মাণ ও পূর্ত

৭০০১ - ভূমি উন্নয়ন

৭০০৬ - অফিস ভবন

৭০১১ - বাস ভবন

৭০১৬ - অন্যান্য ভবন ও অবকাঠামো

৭০২১ - সড়ক ও মহাসড়ক

৭০২৬ - সেতু

৭০৩১ - Cj # moK I Kij fIU®

৭০৩৬ - সেচ অবকাঠামো

৭০৪১ - পানি নিষ্কাশন অবকাঠামো

৭০৪৬ - স্বাস্থ্য পরিচর্যা ও পানি সরবরাহ

৭০৪৭ - নলকূপ স্থাপন

৭০৫১ - টেলিযোগাযোগ

৭০৫৩ - লাইন ও তার

৭০৫৪ - খুঁটি ও এরিয়াল

৭০৫৫ - স্থল কাপিটাল ব্যয়

৭০৫৬ - বৈদ্যুতিক স্থাপনা

৭০৬১ - রেলওয়ে অবকাঠামো সমূহ

৭০৬৬ - খনিজ অনুসন্ধান

৭০৭১ - খনিজ সম্পন্ন আহরণ

৭০৭৬ - স্মৃতিসৌধ ও ধর্মীয় স্থান সমূহ বনন

৭০৮১ - অন্যান্য

Detail Description

4500 - Consolidated Fund Expenditure

6800 - 7999 - Capital Expenditure

7100 - 7199 - Investments in Shares and Equities

7100 - Investments in Shares and Equities

7101 - Share Capital

7102 - Development Budget - Equity

7111 - Equity

7113 - Investment for Recapitalisation of Bank

7114 - Investment for Recapitalisation of State owned

7115 - Jesac

7116 - Sick Industries

7117 - Compensation Payable to BKB Against

7121 - International Financial Institutions

7123 - Conversion of Cash Loan into Equity

7124 - Conversion of Bank Loan into Equity - BADC

7125 - Conversion of Bank Loan into Equity

7127 - Conversion of Foreign Loan into Equity

7131 - Non-ADP Projects

7141 - Other Investments

7150 -

7199 - Adjustment

7200 - 7299 - Capital Grants

7200 - 7299 - Capital Grants

7201 - Financial Institutions

7202 - Development Budget - Capital Grant

7206 - Non-Financial Institutions

7211 - T & T

7216 - Railway

7221 - Post Office

7226 - District Councils

7231 - City Corporations

7236 - Pourshavas

7241 - Other Local Bodies

7246 - Non-government Education Institutions

7251 - Other Non-government Institutions

7256 - Others

7300 - 7399 - Loans

7300 - 7399 - Loans

7300 - Loans

7301 - Cash Loans for Development

7302 - Development Budget - Loan

7311 - Cash Loans Non-Development

7313 - Loan for payment of State Owned Corporation

7315 - Liability repayment against bond

7321 - On-lent Foreign Loans

7331 - Interest Free Loan

7335 - Agriculture Loan

7337 - Loans to Local Bodies

7339 - Co-operative Loan

7340 -

7351 - Other Loan

7400 - 7499 - Advances to Government Employees

7400 - 7499 - Advances to Government Employees

7401 - House Building Advances

7403 - Computer Advance

7411 - Motor Car Advances

7421 - Motor Cycle Advances

7431 - Bicycle Advances

7441 - Other Advances

8000 - সংযুক্ত তহবিল - ব্যয়

৬৮০০ - ৭৯৯৯ - মূলধন ব্যয়

৭১০০ - ৭১৯৯ - শেয়ার ও ইকুয়িটিতে বিনিয়োগ

৭১০০ - ৭১৯৯ - শেয়ার ও ইকুয়িটিতে বিনিয়োগ

৭১০১ - শেয়ার মূলধন

৭১০২ - উন্নয়ন বাজেট - ইকুইটি

৭১১১ - ইকুয়িটি

৭১১৩ - ব্যংকের মূলধন পুনর্গঠনে বিনিয়োগ

৭১১৪ - রাষ্ট্রায়ত্ত্ব কর্পোরেশনের মূলধন পুনর্গঠনে বিনিয়োগ

৭১১৫ - জেসাক কর্মসূচীর অধীনে লোকসান পূর্নভাবে ব্যাংককে প্রদেয় সহায়তা

৭১১৬ - I/M/KA পুনর্বাণন কর্মসূচীর আওতায় লোকসান পূর্নভাবে ব্যাংককে প্রদেয়

৭১১৭ - ১৯৯১ সনে মওকুফকৃত কৃষি ঋণ বাবদ বাংলাদেশ কৃষি ব্যাংককে প্রদেয়

৭১২১ - আন্তর্জাতিক আর্থিক প্রতিষ্ঠান

৭১২৩ - নগদ ঋণকে ইকুয়িটিতে রূপান্তর

৭১২৪ - ব্যাংক ঋণকে ইকুইটিতে রূপান্তর - বি এ ডি সি ঋণ

৭১২৫ - ব্যাংক ঋণকে ইকুইটিতে রূপান্তর - শিপিং কর্পোরেশন ঋণ

৭১২৭ - বৈদেশিক ঋণকে ইকুয়িটিতে রূপান্তর

৭১৩১ - বার্ষিক উন্নয়ন কর্মসূচী বহির্ভূত প্রকল্প

৭১৪১ - অন্যান্য বিনিয়োগ

৭১৫০ -

৭১৯৯ - সময়

৭২০০ - ৭২৯৯ - মূলধন মঞ্জুরি

৭২০০ - ৭২৯৯ - মূলধন মঞ্জুরী

৭২০১ - আর্থিক প্রতিষ্ঠান

৭২০২ - উন্নয়ন বাজেট - মূলধন মঞ্জুরী

৭২০৬ - আর্থিক ঋণ বহির্ভূত প্রতিষ্ঠান

৭২১১ - টেলিগ্রাফ ও টেলিফোন

৭২১৬ - রেলওয়ে

৭২২১ - ডাক বিভাগ

৭২২৬ - জিলা পরিষদ

৭২৩১ - সিটি কর্পোরেশন

৭২৩৬ - পৌরসভা

৭২৪১ - অন্যান্য স্থানীয় প্রতিষ্ঠান

৭২৪৬ - বেসরকারী শিক্ষা প্রতিষ্ঠান

৭২৫১ - অন্যান্য বেসরকারী শিক্ষা প্রতিষ্ঠান

৭২৫৬ - অন্যান্য

৭৩০০ - ৭৩৯৯ - ঋণ ও অগ্রিম

৭৩০০ - ৭৩৯৯ - ঋণ ও অগ্রিম

৭৩০০ - অগ্রিম

৭৩০১ - উন্নয়ন বাজেট নগদ ঋণ

৭৩০২ - উন্নয়ন বাজেট - ঋণ

৭৩১১ - অনুন্নয়ন বাজেট নগদ ঋণ

৭৩১৩ - রাষ্ট্রায়ত্ত্ব সংস্থার ব্যাংক পরিশোধার্থে ঋণ

৭৩১৫ - বতের বিপরীতে দায় পরিশোধ

৭৩২১ - বৈদেশিক ঋণ

৭৩৩১ - সুদ মুক্ত ঋণ

৭৩৩৫ - কৃষি ঋণ

৭৩৩৭ - স্থানীয় সংস্থাকে দেয় ঋণ

৭৩৩৯ - সমবায় ঋণ

৭৩৪০ - ব্যাংকের অনুকূলে বন্ড ইস্যু

৭৩৫১ - অন্যান্য ঋণ

৭৪০০ - ৭৪৯৯ - সরকারি কর্মচারীদের জন্য ঋণ

৭৪০০ - ৭৪৯৯ - সরকারী কর্মচারীদের জন্য ঋণ ও অগ্রিম

৭৪০১ - গৃহ নির্মাণ অগ্রিম

৭৪০৩ - K#UD#i AM#b

৭৪১১ - মোটর গাড়ি অগ্রিম

৭৪২১ - মোটর সাইকেল অগ্রিম

৭৪৩১ - বাই-সাইকেল অগ্রিম

Detail Description

4500 - Consolidated Fund Expenditure	৪৫০০ - সংযুক্ত তহবিল - ব্যয়
6800 - 7999 - Capital Expenditure	৬৮০০ - ৭৯৯৯ - মূলধন ব্যয়
7400 - 7499 - Advances to Government Employees	৭৪০০ - ৭৪৯৯ - সরকারি কর্মচারীদের জন্য ঋণ
7400 - 7499 - Advances to Government Employees	৭৪০০ - ৭৪৯৯ - সরকারি কর্মচারীদের জন্য ঋণ ও অগ্রিম
7445 - Lump Allocation	৭৪৪৫ - ঠোক বরাদ্দ
7500 - 7599 - Term Loan Repayments	৭৫০০ - ৭৫৯৯ - মেয়াদী ঋণ পরিশোধ
7500 - 7599 - Term Debt Repayments	৭৫০০ - ৭৫৯৯ - মেয়াদী ঋণ - আসল পরিশোধ
7500 - Term Loan Repayment	৭৫০০ - মেয়াদী ঋণ পরিশোধ
7501 - Prize Bonds	৭৫০১ - প্রাইজ বন্ড
7502 - 5 Years Treasury Bond-2005 (Sick Industries)	৭৫০২ - ৫ বছর মেয়াদী ট্রেজারী বন্ড- ২০০৫ (২৮.০৬৫২ কোটি টাকা)
7503 - 5 Years Treasury Bond-2006 (Tk 75.66 crore 5%)	৭৫০৩ - ৫ বছর মেয়াদী ট্রেজারী বন্ড- ২০০৬ (৭৫.৬৬৬৭ কোটি টাকা)
7504 - 5 Years Treasury Bond-2006 (Tk 0.51 crore 5%)	৭৫০৪ - ৫ বছর মেয়াদী ট্রেজারী বন্ড- ২০০৬ (০.৫১৪৫ কোটি টাকা)
7505 - Wage Earner Development Bonds	৭৫০৫ - গয়েজ আর্নার ডেভেলপমেন্ট বন্ড
7506 - Bangladesh Treasury Bond (BGTB) 3 years	৭৫০৬ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ৩ বছর মেয়াদী
7507 - 5 Year Treasury Bond-2006	৭৫০৭ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৬
7508 - Bangladesh Treasury Bond (BGTB) 5 years	৭৫০৮ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ৫ বছর মেয়াদী
7509 -	৭৫০৯ - ৫ বছর মেয়াদী কোহিনুর ব্যাটারী ম্যানুঃ কোং বেসরকারীকরণ ট্রেজারী
7510 - National Bond	৭৫১০ - ন্যাশনাল বন্ড
7511 - 10 Years (BJMC) Treasury Bond-2006	৭৫১১ - ১০ বছর মেয়াদী (বিজেএমসি) ট্রেজারী বন্ড-২০০৬
7512 - Bangladesh Treasury Bond (BGTB) 10 years	৭৫১২ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ১০ বছর মেয়াদী
7514 - Bangladesh Treasury Bond (BGTB) 15 years	৭৫১৪ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ১৫ বছর মেয়াদী
7515 - 1 year Treasury Bonds	৭৫১৫ - ১ বছর মেয়াদি ট্রেজারি বন্ড
7516 - Bangladesh Treasury Bond (BGTB) 20 years	৭৫১৬ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ২০ বছর মেয়াদী
7517 - 5 Years Treasury Bond-2006 (94.32 Crore Taka)	৭৫১৭ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৬ (৯৪.৩২ কোটি টাকা)
7518 - 5 Years Treasury Bond-2006 (30.00 Crore Taka)	৭৫১৮ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৬ (৩০.০০ কোটি টাকা)
7519 - 5 Years Treasury Bond-2006 (2.86 Crore Taka)	৭৫১৯ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৬ (২.৮৬ কোটি টাকা)
7520 - 3 year Treasury Bond	৭৫২০ - ৩ বছর মেয়াদি ট্রেজারি বন্ড
7521 - Exemption of Agriculture Credit 25 year term -	৭৫২১ - ২৫ বছর মেয়াদি কৃষি ঋণ মওকুফ বন্ড - রাজশাহী কৃষি উন্নয়ন
7522 - Bangladesh Treasury Bond (BGTB) 25 years	৭৫২২ - বাংলাদেশ ট্রেজারি বন্ড (বিজিটিবি) ২৫ বছর মেয়াদী
7524 - 5 Year Biman Treasury Bond - 2003	৭৫২৪ - ৫ বছর মেয়াদী বিমান ট্রেজারী বন্ড - ২০০৩
7525 - 3 year Treasury Bond - T&T	৭৫২৫ - ৩ বছর মেয়াদী ট্রেজারী বন্ড
7526 - T & T Bond	৭৫২৬ - টি এন্ড টি বন্ড
7527 - 3 year Treasury Bond -1998	৭৫২৭ - ৩ বছর মেয়াদী ট্রেজারী বন্ড - ১৯৯৮
7528 - 3 year Treasury Bond 1997	৭৫২৮ - ৩ বছর মেয়াদী ট্রেজারী বন্ড ১৯৯৭
7529 - 3 Years Treasury Bond (B S R S)	৭৫২৯ - ৩ বৎসর মেয়াদী ট্রেজারী বন্ড (বি. এস. আর. এস)
7530 - 3 Year Treasury Bond-2000	৭৫৩০ - ৩ বছর মেয়াদী ট্রেজারী বন্ড, ২০০০
7531 - 3 year Treasury Bond for Export	৭৫৩১ - ৩ বছর মেয়াদী রপ্তানী ক্ষতিপূরণ বন্ড - পাট খাত
7532 - 10 Year Treasury Bond - BSC	৭৫৩২ - ১০ বছর মেয়াদী বিএসসি বন্ড
7533 - 3 year National Investment Bond	৭৫৩৩ - ৩ বছর মেয়াদী জাতীয় বিনিয়োগ বন্ড
7534 - 5 Year Biman Treasury Bond - 2004	৭৫৩৪ - ৫ বছর মেয়াদী বিমান ট্রেজারী বন্ড - ২০০৪
7535 - 3 year BADC Treasury Bond - 1998	৭৫৩৫ - ৩ বছর মেয়াদী বি. এ. ডি. সি ট্রেজারী বন্ড - ১৯৯৮
7536 - 10 Year Treasury Bond for Loss Financing - Jute	৭৫৩৬ - ঘাটতি অর্থায়নের জন্য ১০ বছর মেয়াদী বন্ড, পাট খাত কর্মসূচী
7537 - 3 year BTMC Treasury Bond - 1998	৭৫৩৭ - ৩ বছর মেয়াদী বি. টি. এম. সি ট্রেজারী বন্ড - ১৯৯৮
7538 - 3 Years Treasury Bond (Biman) - 1998	৭৫৩৮ - ৩ বছর মেয়াদী ট্রেজারী বন্ড (বিমান)-১৯৯৮
7539 - 3 Years Treasury Bond (BTMC) - 2001	৭৫৩৯ - ৩ বছর মেয়াদী ট্রেজারী বন্ড (বিটিএমসি)-২০০১
7540 - 5 year Treasury Bond	৭৫৪০ - ৫ বছর মেয়াদী ট্রেজারী বন্ড
7541 - 3 Years Treasury Bond (BSRS) - 2000	৭৫৪১ - ৩ বছর মেয়াদী ট্রেজারী বন্ড (বিএসআরএস)-২০০০
7542 - 5 Year Biman Treasury Bond - 2000	৭৫৪২ - ৫ বছর মেয়াদি বিমান ট্রেজারি বন্ড - ২০০০
7543 - 5 Years Treasury Bond (Biman)	৭৫৪৩ - ৫ বৎসর মেয়াদী ট্রেজারী বন্ড (বিমান)
7545 - 7 year Treasury Bond	৭৫৪৫ - ৭ বছর মেয়াদী ট্রেজারী বন্ড
7546 - 10 Years Treasury Bond - 2006 of 25.56 Crore	৭৫৪৬ - ২৫.৫৬ কোটি টাকার ১০বছর মেয়াদী ট্রেজারী বন্ড-২০০৬
7547 - 10 Years Treasury Bond - 2006 of 81.64 Crore	৭৫৪৭ - ৮১.৬৪ কোটি টাকার ১০বছর মেয়াদী ট্রেজারী বন্ড-২০০৬
7548 - 10 Years Treasury Bond - 2006 of 88.78 Crore	৭৫৪৮ - ৮৮.৭৮ কোটি টাকার ১০বছর মেয়াদী ট্রেজারী বন্ড-২০০৬
7549 - 10 Years Treasury Bond (BSC) - 2008	৭৫৪৯ - ১০ বছর মেয়াদী ট্রেজারী বন্ড (বিএসসি)-২০০৮
7550 - 10 year Treasury Bond	৭৫৫০ - ১০ বছর মেয়াদী ট্রেজারী বন্ড
7551 - 10 Years Treasury Bond - 2005 of 26.46 Crore	৭৫৫১ - ২৬.৪৬ কোটি টাকার ১০বছর মেয়াদী ট্রেজারী বন্ড-২০০৫
7552 - Treasury Bond 1992 @ 9%	৭৫৫২ - ট্রেজারি বন্ড ১৯৯২ - ৯% হারে
7555 - 15 year Treasury Bond	৭৫৫৫ - ১৫ বছর মেয়াদি ট্রেজারি বন্ড
7556 - Payment of Bonds & Other Loans	৭৫৫৬ - বন্ড ও অন্যান্য ঋণ পরিশোধ
7557 - 15 year Treasury Bond for Recapitalisation of	৭৫৫৭ - রুট্টায় ব্যাংকসমূহের মূলধনের জন্য ১৫ বছর মেয়াদী বন্ড

Detail Description

4500 - Consolidated Fund Expenditure	৪৫০০ - সংযুক্ত তহবিল - ব্যয়
6800 - 7999 - Capital Expenditure	৬৮০০ - ৭৯৯৯ - মূলধন ব্যয়
7500 - 7599 - Term Loan Repayments	৭৫০০ - ৭৫৯৯ - মেয়াদী ঋণ পরিশোধ
7500 - 7599 - Term Debt Repayments	৭৫০০ - ৭৫৯৯ - মেয়াদী ঋণ - আসল পরিশোধ
7558 - BJMC Credit Bond	৭৫৫৮ - বিজেএমসি ক্রেডিট বন্ড
7559 - 15 year Treasury Bond (BKB) - 2011	৭৫৫৯ - ১৫ বছর মেয়াদী ট্রেজারী বন্ড (বি. কে. বি) - ২০১১
7560 - Treasury Bond - RAKUB	৭৫৬০ - ট্রেজারী বন্ড - রাজধানী উন্নয়ন সংস্থা
7561 - 20 year Jute Bond	৭৫৬১ - ২০ বছর মেয়াদী পাট বন্ড
7562 - Corporation/Financial Institution Investment	৭৫৬২ - কর্পোরেশন/আর্থিক প্রতিষ্ঠান বিনিয়োগ বন্ড
7563 - 20 year BJC Bond	৭৫৬৩ - ২০ বছর মেয়াদী বি. জে. সি বন্ড
7564 - 25 year Treasury Bond 2018	৭৫৬৪ - ২৫ বছর মেয়াদী ট্রেজারী বন্ড ২০১৮
7565 - 25 year Treasury Bond - 2019	৭৫৬৫ - ২৫ বছর মেয়াদী ট্রেজারী বন্ড - ২০১৯
7566 -	৭৫৬৬ - ১০ বছর মেয়াদী বি.এস.সি ট্রেজারী বন্ড-২০০৮
7567 - 25 year Treasury Bond - 2020	৭৫৬৭ - ২৫ বছর মেয়াদী ট্রেজারী বন্ড - ২০২০
7568 - Sick Industries Assistance Bond	৭৫৬৮ - i'Makfi mngZi eÜ
7569 - 25 year Treasury Bond - Jute Sector	৭৫৬৯ - ২৫ বছর মেয়াদী ট্রেজারী বন্ড - পাট খাত
7570 -	৭৫৭০ - ১০ বছর মেয়াদী ট্রেজারী বন্ড-২০০৮ (কৃষি ঋণের সুদ মওকুফ ও
7571 - Special Bond	৭৫৭১ - বিশেষ বন্ড
7572 -	৭৫৭২ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৮ (i'Makfi i mj gl KdKiY 0.9203)
7573 - Income Tax Bond	৭৫৭৩ - ইনকাম ট্যাক্স বন্ড
7574 - Recapitalisation Bond - Bank	৭৫৭৪ - মূলধন পূরণ বন্ড-ব্যাংক
7575 - Recapitalisation Bond - Corporation	৭৫৭৫ - মূলধন পূরণ বন্ড-কর্পোরেশন
7576 - Cash Assistance to Banks for Write off Loan	৭৫৭৬ - জেলায় কর্মসূচির অধীনে লোকসান পূর্ণভরনে বন্ডের মাধ্যমে ব্যাংকে প্রদেয়
7577 - 5 Years Treasury Bond (Biman) 2002	৭৫৭৭ - ৫ বছর মেয়াদী ট্রেজারী বন্ড (নিমান) ২০০২
7578 -	৭৫৭৮ - ৩ বছর মেয়াদী ট্রেজারী বন্ড-২০০৯ (সোনালী ব্যাংক-বিপিসি'র দায় পরিশোধ
7579 -	৭৫৭৯ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৮ (কৃষকদের বন্যা পরবর্তী সুদ মওকুফ
7580 - Other Bonds and Financial Instruments	৭৫৮০ - অন্যান্য বন্ড ও দলিল পত্রাদি
7581 - 5 year Treasury Bond-2006 (2.2349 crore)	৭৫৮১ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৬ (২.২৩৪৯ কোটি)
7582 - 5 Years Treasury Bond-2006 (.6231 crore)	৭৫৮২ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৬ (০.৬২৩১ কোটি)
7586 - 3 Years Treasury Bond : Biman-2003 (Tk. 1000	৭৫৮৬ - ৫ বছর মেয়াদী ট্রেজারী (নিমান) - ২০০৩ (১০০ কোটি)
7587 - 9% Bangladesh Govt. Loan-2002 (Tk.63.75	৭৫৮৭ - ৯% বাংলাদেশ গভঃ লোন-২০০২ (৬৩.৭৫ কোটি)
7588 - 5 Years Treasury Bond - 2005	৭৫৮৮ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৫
7589 - 5 Years Treasury Bond - 2008 (7.5%)	৭৫৮৯ - ৫ বছর মেয়াদী সরকারী ট্রেজারী বন্ড-২০০৮ (৭.৫%)
7590 - 10 Years Treasury Bond - 2013 (8.5%)	৭৫৯০ - ১০ বছর মেয়াদী সরকারী ট্রেজারী বন্ড-২০১৩ (৮.৫%)
7592 - 3 Years T&T Treasury Bond- 2006 (7%)	৭৫৯২ - ৩ বছর মেয়াদী টি এন্ড টি ট্রেজারী বন্ড-২০০৬ (৭%)
7593 - 5 Years Treasury Bond 2004 (Tk. 103.36 crore)	৭৫৯৩ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৪ (১০৩.৩৬ কোটি)
7594 - 5 Years Treasury Bond 2004 (Tk. 165.33 crore)	৭৫৯৪ - ৫ বছর মেয়াদী ট্রেজারী বন্ড-২০০৪ (১৬৫.৩৩ কোটি)
7595 - 10 Years Treasury Bond-2005 of Tk.26.46 crore	৭৫৯৫ - ১০ বছর মেয়াদী ট্রেজারী বন্ড-২০০৫ (২৬.৪৬ কোটি টাকা)
7596 - 10 Years Treasury Bond-2005 of Tk.1.91 crore	৭৫৯৬ - ১০ বছর মেয়াদী ট্রেজারী বন্ড-২০০৫ (১.৯১ কোটি টাকা)
7597 - 5 Years Treasury Bond-2005 (Tk 64.51 crore)	৭৫৯৭ - ৫ বছর মেয়াদী ট্রেজারী বন্ড - ২০০৫ (৬৪.৫১ কোটি টাকা)
7598 - 5 Years Treasury Bond : Biman-2005 (Tk. 30.45	৭৫৯৮ - ৫ বছর মেয়াদী ট্রেজারী বন্ড (নিমান)- ২০০৫ (৩০.৪৫ কোটি টাকা)
7599 - 5 Years Treasury Bond-2005 (Tk 22.40 crore)	৭৫৯৯ - ৫ বছর মেয়াদী ট্রেজারী বন্ড- ২০০৫ (২২.৪০৫৯ কোটি টাকা)
7600 - 7699 - Floating Loan Repayments	৭৬০০ - ৭৬৯৯ - চলতি ঋণ পরিশোধ
7600 - 7699 - Floating Debt Repayments	৭৬০০ - ৭৬৯৯ - চলতি ঋণ - আসল পরিশোধ
7600 - Floating Loan Repayment	৭৬০০ - চলতি ঋণ পরিশোধ
7601 - Ways and Means Advances	৭৬০১ - উপায় ও উপকরণ অগ্রিম
7602 - Over Draft Current (OD Current)	৭৬০২ - ওভার ড্রাফট কারেন্ট (ওডি কারেন্ট)
7604 - Over Draft Block (OD Block)	৭৬০৪ - I fri WldU eK (I W eK)
7606 - Treasury Bills	৭৬০৬ - ট্রেজারী বিল
7607 - Treasury Bill 28 days	৭৬০৭ - ট্রেজারী বিল ২৮ দিন
7608 - Treasury Bill 91 days	৭৬০৮ - ট্রেজারী বিল ৯১ দিন
7609 - Treasury Bill 182 days	৭৬০৯ - ট্রেজারী বিল ১৮২ দিন
7610 - Treasury Bill 364 days	৭৬১০ - ট্রেজারী বিল ৩৬৪ দিন
7611 - Promissory Notes - IBRD	৭৬১১ - প্রমিসরি নোট - আই. বি. আর. ডি
7612 - Treasury Bill 2 Years	৭৬১২ - ট্রেজারী বিল ২ বছর মেয়াদী
7613 - Treasury Bill 5 Years	৭৬১৩ - ট্রেজারী বিল ৫ বছর মেয়াদী
7616 - Promissory Notes - IDA	৭৬১৬ - প্রমিসরি নোট - আই. ডি. এ
7621 - Ad-hoc Treasury Bills	৭৬২১ - এডহক ট্রেজারী বিল
7626 - Cash Credit Accommodation	৭৬২৬ - নগদ অগ্রিমের সংস্থান

Detail Description

4500 - Consolidated Fund Expenditure	৪৫০০ - সংযুক্ত তহবিল - ব্যয়
6800 - 7999 - Capital Expenditure	৬৮০০ - ৭৯৯৯ - মূলধন ব্যয়
7700 - 7799 - Foreign Debt Repayment	৭৭০০ - ৭৭৯৯ - বৈদেশিক ঋণ পরিশোধ
7700 - 7799 - Foreign Debt Repayment	৭৭০০ - ৭৭৯৯ - বৈদেশিক ঋণ পরিশোধ
7700 - Debt Repayment-Foreign	৭৭০০ - বৈদেশিক ঋণ পরিশোধ
7701 - Food Loan	৭৭০১ - খাদ্য ঋণ
7711 - Project Loan	৭৭১১ - প্রকল্প ঋণ
7721 - Reimbursable Project Loan	৭৭২১ - পুনর্ভরণ প্রকল্প ঋণ
7731 - Direct Project Loan	৭৭৩১ - সরাসরি প্রকল্প ঋণ
7741 - Non-ADP Project Loan	৭৭৪১ - বার্ষিক উন্নয়ন কর্মসূচী বহির্ভূত প্রকল্প ঋণ
7751 - Commodity Loan	৭৭৫১ - পণ্য ঋণ
7755 - Indian Loan	৭৭৫৫ - ভারতীয় ঋণ
7761 - Other Foreign Loans	৭৭৬১ - অন্যান্য বৈদেশিক ঋণ
7800 - 7899 - Transaction with IMF	৭৮০০ - ৭৮৯৯ - আই. এম. এফ -এর সাথে সমন্বয়
7800 - 7899 - Transaction with IMF	৭৮০০ - ৭৮৯৯ - আই. এম. এফ -এর সহিত লেনদেন
7801 - Promissory Notes	৭৮০১ - টাকার মূল্যমান সমন্বয়-প্রমিসরি নোটে দেয়
7805 - Cash	৭৮০৫ - টাকার মূল্যায়ন সমন্বয় - নগদে
7807 - Promissory Notes on Extended Quotas	৭৮০৭ - বর্ধিত কোটা প্রমিসরি নোটে প্রদান
7809 - Promissory Notes Paid in Foreign Exchange	৭৮০৯ - বর্ধিত কোটা নগদ বৈদেশিক মুদ্রায় দেয়
7900 - 7999 - Misc. Capital Expenditure	৭৯০০ - ৭৯৯৯ - উন্নয়ন আমদানি ষ্কে ও ভ্যাট
7900 - 7959 - Development Import Duty and VAT	৭৯০০ - ৭৯৫৯ - উন্নয়ন আমদানী ষ্কে ও ভ্যাট
7901 - CD / V A T	৭৯০১ - আমদানী ষ্কে ও ভ্যাট
7960 - 7969 - Transfer, Adjust and Others (Capital)	৭৯৬০ - ৭৯৬৯ - স্থানান্তর, সমন্বয় ও অন্যান্য (মূলধন)
7969 - Transfer, Adjustment and Others (Capital)	৭৯৬৯ - স্থানান্তর, সমন্বয় ও অন্যান্য (মূলধন)
7980 - 7999 - Capital Block Allocation & Misc. Capital	৭৯৮০ - ৭৯৯৯ - মূলধন খোক ও বিবিধ মূলধন ব্যয়
7981 - Miscellaneous Capital Expenditure	৭৯৮১ - বিবিধ মূলধন ব্যয়
7982 - Capital Lumpsum	৭৯৮২ - মূলধন খোক
7983 - Manpower Rationalization	৭৯৮৩ - জনবল সুষমকরণ
7985 - Consultant	৭৯৮৫ - পরামর্শক
7999 - Capital General	৭৯৯৯ - উন্নয়নমূলক সাধারণ ব্যয়

Detail Description

8000 - Public Accounts Receipts	৮০০০ - প্রজাতন্ত্রের হিসাব - গ্রাণ্ডি
8000 - 8999 - Public Account Receipts	৮০০০ - ৮৯৯৯ - প্রজাতন্ত্রের সরকারী হিসাব - গ্রাণ্ডি
8000 - 8099 - National Savings Schemes	৮০০০ - ৮০৯৯ - জাতীয় সঞ্চয় প্রকল্পসমূহ
8001 - 8020 - Saving Certificates	৮০০১ - ৮০২০ - সঞ্চয় পত্রসমূহ
8001 - Bonus Savings Certificates	৮০০১ - বোনাস সঞ্চয় পত্র
8002 - Bangladesh Savings Certificate	৮০০২ - বাংলাদেশ সঞ্চয় পত্র
8003 - Family Savings Certificate	৮০০৩ - পরিবার সঞ্চয় পত্র
8006 - Defence Savings Certificates	৮০০৬ - প্রতিরক্ষা সঞ্চয় পত্র
8007 - Savings Certificate with 6 Months Profit	৮০০৭ - ছয় মাস অন্তর মুনাফা ভিত্তিক সঞ্চয় পত্র
8008 - Savings Certificate with 3 Months Profit	৮০০৮ - তিন মাস অন্তর মুনাফা ভিত্তিক সঞ্চয় পত্র
8011 - 3 Years Savings Certificates	৮০১১ - ৩ বৎসর মেয়াদী বাংলাদেশ সঞ্চয় পত্র
8012 - 3 Years Deposit Savings Certificate	৮০১২ - ৩ বছর মেয়াদী জামানত সঞ্চয়পত্র
8016 - 5 Years Savings Certificates	৮০১৬ - ৫ বৎসর মেয়াদী বাংলাদেশ সঞ্চয় পত্র
8018 - Deposit of pension Saving Certificate Sale	৮০১৮ - পেনশন সঞ্চয়পত্র বিক্রয়লাভ অর্থ জমা
8021 - 8040 - Postal Saving	৮০২১ - ৮০৪০ - ডাকঘর সঞ্চয় ব্যাংক জমা
8021 - Savings Bank Ordinary Deposit	৮০২১ - ডাকঘর সঞ্চয় ব্যাংক জমা - সাধারণ জমা হিসাব
8026 - Fixed and Term Deposit	৮০২৬ - ডাকঘর সঞ্চয় ব্যাংক জমা - মেয়াদী জমা হিসাব
8031 - Bonus Deposit	৮০৩১ - ডাকঘর সঞ্চয় ব্যাংক জমা - বোনাস জমা হিসাব
8041 - 8050 - Postal Life Insurance and Annuity	৮০৪১ - ৮০৫০ - ডাক জীবন বীমা ও আনুইটি
8041 - Postal Life Insurance and Annuity Scheme	৮০৪১ - ডাক জীবন বীমা ও আনুইটি
8051 - 8060 - Saving Bonds	৮০৫১ - ৮০৬০ - সঞ্চয় বন্ডসমূহ
8051 - Prizebond	৮০৫১ - প্রাইজবন্ড
8055 - Wage Owner Development Bond	৮০৫৫ - গুয়েজ আর্নার ডেভেলপমেন্ট বন্ড
8057 - 3 Years National Investment Bond	৮০৫৭ - ৩ বছর মেয়াদী জাতীয় বিনিয়োগ বন্ড
8058 - US Dollar Premium Bond	৮০৫৮ - ইউ এস ডলার প্রিমিয়াম বন্ড
8059 - US Dollar Investment Bond	৮০৫৯ - ইউ এস ডলার ইনভেস্টমেন্ট বন্ড
8100 - 8199 - State Provident Funds	৮১০০ - ৮১৯৯ - রাষ্ট্রীয় প্রভিডেন্ট ফান্ড
8100 - 8199 - State Provident Funds	৮১০০ - ৮১৯৯ - রাষ্ট্রীয় প্রভিডেন্ট ফান্ড
8101 - General Provident Fund - Civil	৮১০১ - সাধারণ প্রভিডেন্ট ফান্ড - বেসামরিক
8106 - General Provident Fund - Defence	৮১০৬ - সাধারণ প্রভিডেন্ট ফান্ড - প্রতিরক্ষা
8111 - General Provident Fund - Railway	৮১১১ - সাধারণ প্রভিডেন্ট ফান্ড - রেলওয়ে
8116 - General Provident Fund - Postal Department	৮১১৬ - সাধারণ প্রভিডেন্ট ফান্ড - ডাক বিভাগীয়
8121 - General Provident Fund - T & T	৮১২১ - সাধারণ প্রভিডেন্ট ফান্ড - টি এন্ড টি
8126 - General Provident Fund - Others	৮১২৬ - সাধারণ প্রভিডেন্ট ফান্ড - অন্যান্য
8131 - Contributory Provident Fund	৮১৩১ - কন্ট্রিবিউটরি প্রভিডেন্ট ফান্ড
8200 - 8299 - Renewal, Reserve & Depreciation	৮২০০ - ৮২৯৯ - রিনিউয়াল, রিজার্ভ ও ডিপ্রিসিয়েশন ফান্ড
8201 - 8230 - Renewal, Reserve and Depreciation	৮২০১ - ৮২৩০ - রিনিউয়াল, রিজার্ভ ও ডেপ্রিসিয়েশন ফান্ড
8201 - Railway Depreciation Reserve Fund	৮২০১ - অবচয়ের জন্য সংরক্ষিত তহবিল - রেলপথ
8206 - Railway Development Fund	৮২০৬ - উন্নয়ন তহবিল - রেলপথ
8211 - Renewal and Reserve Fund T & T	৮২১১ - রিনিউয়াল এন্ড রিজার্ভ ফান্ড - টি এন্ড টি
8214 - Depreciation Reserve Fund - Security Printing	৮২১৪ - অবচয়ের জন্য সংরক্ষিত তহবিল - সিকিউরিটি প্রিন্টিং প্রেস
8215 - Depreciation Reserve Fund - B G Press	৮২১৫ - অবচয়ের সংরক্ষিত তহবিল - বি জি প্রেস
8216 - Post Office Renewal Reserve Fund	৮২১৬ - রিনিউয়াল এন্ড রিজার্ভ ফান্ড - পোস্ট অফিস
8217 - Depreciation Reserve Fund-Government Printing	৮২১৭ - অবচয়ের সংরক্ষিত তহবিল - সরকারী মুদ্রণালয়
8218 - Cultural Heritage Fund	৮২১৮ - সাংস্কৃতিক ঐতিহ্য তহবিল
8219 - Depreciation Reserve Fund-Government Flour	৮২১৯ - অবচয়ের সংরক্ষিত তহবিল - সরকারী আটারল
8220 - Renewal and Reserve Fund-Dairy Farm	৮২২০ - রিনিউয়াল এন্ড রিজার্ভ ফান্ড - ডেইরী ফার্ম
8221 - Others	৮২২১ - অন্যান্য
8231 - 8250 - Welfare Funds	৮২৩১ - ৮২৫০ - কল্যাণ তহবিল
8231 - T&T Welfare Fund	৮২৩১ - তার ও টেলিফোন কল্যাণ তহবিল
8236 - Postal Department Welfare Fund	৮২৩৬ - ডাক বিভাগীয় কল্যাণ তহবিল
8241 - Government Employees Benevolent Fund	৮২৪১ - সরকারি কর্মচারী কল্যাণ তহবিল
8246 - Government Employees Group Insurance Fund	৮২৪৬ - সরকারি কর্মচারী গোষ্ঠী বীমা তহবিল
8248 - Defence Welfare Fund	৮২৪৮ - প্রতিরক্ষা কল্যাণ তহবিল
8251 - 8260 - Relief Fund	৮২৫১ - ৮২৬০ - ত্রাণ তহবিল
8251 - Prime Ministers Relief Fund	৮২৫১ - প্রধানমন্ত্রীর ত্রাণ তহবিল

Detail Description

8000 - Public Accounts Receipts

8000 - 8999 - Public Account Receipts

8300 - 8499 - Deposit Accounts

8301 - 8310 - Advance Income Tax Deposit

8301 - Advance Income Tax Deposit

8311 - 8340 - Deposit of Local Funds

8311 - Divisional Funds Deposit

8316 - District Funds Deposit

8321 - Municipal Funds Deposit

8326 - Upazilla Funds Deposit

8327 - Town Fund

8331 - Other Local Funds Deposit

8341 - 8380 - Departmental and Judicial Deposits

8341 - Revenue Deposits

8346 - Civil Courts Deposits

8351 - Criminal Courts Deposit

8353 - CD VAT Deposit

8356 - Forest Deposits

8357 - Postal Department Deposit

8358 - Railway Deposit

8359 - T & T Deposit

8360 - Supplies and Inspection Departmental Deposits

8361 - Public Works Deposit

8366 - Public Health Engineering Deposits

8371 - Local Rate Deposit

8376 - Ships Captain Deposits

8377 - Deposits for Armed Forces

8381 - 8420 - Deposits against Supplies and Works

8381 - Letter of Credit

8382 - Subscription to International Organization and

8386 - Customs Duty and VAT

8391 - Contractor and Supplier Security Deposit

8396 - Coal Deposit

8401 - Works of Public and Private Bodies

8406 - Reservation of Government Right

8411 - Liquidated Damages

8418 - Miscellaneous Deposit

8421 - 8430 - Personal Ledger Account Deposit

8421 - Personal Ledger Account Deposit

8423 - Deposit and Payment of Lease amount of

8431 - 8460 - Food Aid Deposit Account

8431 - US Food Aid Title II

8436 - US Food Aid Title III

8441 - German Food Aid

8443 - UK Food Aid

8446 - EEC Food Aid

8448 - Australian Food Aid

8451 - Canadian Food Aid

8452 - Return of Fund Deposited in Bank

8454 - Japanese Food Aid

8455 - Japanese Debt Relief Grant

8456 - Accumulated Surplus - Food Account

8457 - World Food Programme

8458 - S I F A D

8459 - Others

8461 - 8470 - Commodity Aid Deposit Account

8461 - Commodity Aid Deposit Account

৮০০০ - প্রজাতন্ত্রের হিসাব - প্রাপ্তি

৮০০০ - ৮৯৯৯ - প্রজাতন্ত্রের সরকারী হিসাব - প্রাপ্তি

৮৩০০ - ৮৪৯৯ - জমার হিসাব

৮৩০১ - ৮৩১০ - অগ্রিম আয়কর জমা

৮৩০১ - অগ্রিম আয়কর প্রদান

৮৩১১ - ৮৩৪০ - স্থানীয় তহবিলের জমা

৮৩১১ - বিভাগীয় তহবিল

৮৩১৬ - জেলা তহবিল

৮৩২১ - পৌর তহবিল

৮৩২৬ - উপজেলা তহবিল

৮৩২৭ - শহর তহবিল

৮৩৩১ - অন্যান্য স্থানীয় তহবিল

৮৩৪১ - ৮৩৮০ - বিভাগীয় ও কিচর বিভাগীয় জমা

৮৩৪১ - রাজস্ব জমা

৮৩৪৬ - দেওয়ানী আদালতের জমা

৮৩৫১ - ফৌজদারী আদালতের জমা

৮৩৫৩ - গুরু জমা

৮৩৫৬ - বন বিভাগীয় জমা

৮৩৫৭ - ডাক বিভাগীয় জমা

৮৩৫৮ - রেলওয়ে জমা

৮৩৫৯ - টি এন্ড টি জমা

৮৩৬০ - সরবরাহ ও পরিদর্শন বিভাগীয় জমা

৮৩৬১ - গণপূর্ত বিভাগীয় জমা

৮৩৬৬ - জনস্বাস্থ্য বিভাগীয় জমা

৮৩৭১ - স্থানীয় রেট জমা

৮৩৭৬ - জাহাজ কাগানের জমা

৮৩৭৭ - সামরিক বাহিনীর জমা

৮৩৮১ - ৮৪২০ - সরবরাহ ও কাজের জন্য জমা

৮৩৮১ - ঋণপত্র বাবদ জমা

৮৩৮২ - আন্তর্জাতিক প্রতিষ্ঠানের চাঁদা ও অন্যান্য বিশেষ সমন্বয়

৮৩৮৬ - গুরু ও ভ্যাট জমা

৮৩৯১ - ঠিকাদার ও সরবরাহকারীর সিকিউরিটি জমা

৮৩৯৬ - কয়লা বাবদ জমা

৮৪০১ - সরকারি সংস্থা বা বেসরকারি ব্যক্তিদের কাজের জন্য জমা

৮৪০৬ - সরকারী অধিকার সংরক্ষণ

৮৪১১ - দেনাদায় সংক্রান্ত

৮৪১৮ - বিবিধ জমা

৮৪২১ - ৮৪৩০ - ব্যক্তিগত খতিয়ান হিসাব জমা

৮৪২১ - ব্যক্তিগত খতিয়ান হিসাব জমা

৮৪২৩ - AicZ m=UUEi BRii j à A_rGv ciib Ges e'q m=umkZ

৮৪৩১ - ৮৪৬০ - খাদ্য সাহায্য বাবদ জমার হিসাব

৮৪৩১ - খাদ্য সাহায্য যুক্তরাষ্ট্র - টাইটেল - ২

৮৪৩৬ - খাদ্য সাহায্য যুক্তরাষ্ট্র - টাইটেল - ৩

৮৪৪১ - খাদ্য সাহায্য - জার্মানী

৮৪৪৩ - খাদ্য সাহায্য - লন্ডন

৮৪৪৬ - খাদ্য সাহায্য - ই. ই. সি

৮৪৪৮ - খাদ্য সাহায্য - অস্ট্রেলিয়া

৮৪৫১ - খাদ্য সাহায্য - কানাডা

৮৪৫২ - ব্যাংক জমাকৃত অর্থ ফেরত

৮৪৫৪ - খাদ্য সাহায্য - জাপান

৮৪৫৫ - জাপানী ঋণ মওকুফ

৮৪৫৬ - পূর্ববর্তী বৎসরের খাদ্য হিসাবের উদ্ধৃত

৮৪৫৭ - বিশ্ব খাদ্য কর্মসূচী

৮৪৫৮ - সিফাদ

৮৪৫৯ - অন্যান্য

৮৪৬১ - ৮৪৭০ - পণ্য সাহায্য জমার হিসাব

৮৪৬১ - পণ্য সাহায্য জমার হিসাব

Detail Description

8000 - Public Accounts Receipts

8000 - 8999 - Public Account Receipts

8700 - 8799 - Suspense Accounts

8700 - 8749 - Suspense Accounts

- 8701 - Bangladesh Bank
- 8706 - Chief Accounts Officers
- 8711 - District Accounts Officers
- 8716 - Railway
- 8721 - Public Works Department
- 8726 - Deposits against Civil Works
- 8731 - Defence
- 8736 - Roads and Highway Department Suspense
- 8741 - Others
- 8746 - Foreign Aid

8750 - 8799 - Departmental Cash Control Account

- 8751 - Postal Department
- 8752 - T & T Board
- 8753 - Foreign Affairs
- 8754 - Forest Department
- 8755 - Public Health Engineering
- 8756 - Public Works
- 8757 - Roads & Highway
- 8758 - Railway
- 8759 - Customs
- 8760 - Departmental Cash Control

8800 - 8899 - Remittance Accounts

8801 - 8840 - Remittances between DAO/TAO

- 8801 - Post Office
- 8806 - T & T Board
- 8811 - Public Works
- 8816 - Housing and Settlement
- 8821 - Roads and Highways
- 8826 - Public Health Engineering
- 8831 - Forest
- 8833 - CAO Pre-audit Cheque
- 8834 - Customs
- 8835 - G.P.F. Transfer
- 8836 - Others

8841 - 8870 - Transfers between Departmental

- 8841 - Transfers between Post Office Officers
- 8846 - Transfers between T&T Officers
- 8851 - Transfers between Forest Officers
- 8856 - Transfers between Railway Officers
- 8857 - Transfer between Defence Officers
- 8861 - Transfers within same Department
- 8862 - Post Office
- 8863 - T & T Board
- 8864 - Public Works
- 8865 - Housing and Settlement
- 8866 - Roads & Highways
- 8867 - Public Health Engineering
- 8868 - Forest
- 8869 - Customs

8871 - 8890 - Cash and Bank Remittances

- 8871 - Cash Remittances between Treasuries
- 8872 - Internal Money Order
- 8873 - Foreign Money order
- 8876 - Bangladesh Bank Remittances
- 8878 - Small Coin

৮০০০ - প্রজাতন্ত্রের হিসাব - প্রাপ্তি

৮০০০ - ৮৯৯৯ - প্রজাতন্ত্রের সরকারী হিসাব - প্রাপ্তি

৮৭০০ - ৮৭৯৯ - অনিশ্চিত হিসাব

- ৮৭০০ - ৮৭৪৯ - অনিশ্চিত হিসাব
- ৮৭০১ - বাংলাদেশ ব্যাংক
- ৮৭০৬ - প্রধান হিসাব রক্ষণ কর্মকর্তা
- ৮৭১১ - জেলা হিসাব রক্ষণ কর্মকর্তা
- ৮৭১৬ - রেলওয়ে
- ৮৭২১ - গণপূর্ত বিভাগ
- ৮৭২৬ - পূর্ত কার্যের জন্য জমা
- ৮৭৩১ - প্রতিরক্ষা
- ৮৭৩৬ - সড়ক ও জনপথ বিভাগ
- ৮৭৪১ - অন্যান্য
- ৮৭৪৬ - বৈদেশিক সাহায্য

৮৭৫০ - ৮৭৯৯ - বিভাগীয় ক্যাশ কন্ট্রোল হিসাব

- ৮৭৫১ - ডাক বিভাগ
- ৮৭৫২ - টি এন্ড টি বোর্ড
- ৮৭৫৩ - পররাষ্ট্র বিষয়ক
- ৮৭৫৪ - বন বিভাগ
- ৮৭৫৫ - জনস্বাস্থ্য প্রকৌশল বিভাগ
- ৮৭৫৬ - গণপূর্ত
- ৮৭৫৭ - সড়ক ও জনপথ
- ৮৭৫৮ - রেলওয়ে
- ৮৭৫৯ - কাস্টমস
- ৮৭৬০ - বিভাগীয় ক্যাশ নিয়ন্ত্রক

৮৮০০ - ৮৮৯৯ - প্রেরিত টাকার হিসাব

৮৮০১ - ৮৮৪০ - ডি. এ. ও / টি. এ. ও এর মধ্যে প্রেরিত টাকার হিসাব

- ৮৮০১ - ডাক বিভাগ
- ৮৮০৬ - তার ও টেলিফোন বোর্ড
- ৮৮১১ - গণপূর্ত বিভাগ
- ৮৮১৬ - গৃহ সংস্থান
- ৮৮২১ - সড়ক ও জনপথ
- ৮৮২৬ - জনস্বাস্থ্য প্রকৌশল বিভাগ
- ৮৮৩১ - বন বিভাগ
- ৮৮৩৩ - সিএও প্রি-অডিট চেক
- ৮৮৩৪ - কাস্টমস
- ৮৮৩৫ - সাধারণ ভবিষ্য তহবিল স্থানান্তর
- ৮৮৩৬ - অন্যান্য

৮৮৪১ - ৮৮৭০ - বিভাগীয় কর্মকর্তাদের মধ্যে স্থানান্তর

- ৮৮৪১ - ডাক বিভাগীয় কর্মকর্তাদের মধ্যে স্থানান্তর
- ৮৮৪৬ - তার ও টেলিফোন বিভাগীয় কর্মকর্তাদের মধ্যে স্থানান্তর
- ৮৮৫১ - বন বিভাগীয় কর্মকর্তাদের মধ্যে স্থানান্তর
- ৮৮৫৬ - রেল বিভাগীয় কর্মকর্তাদের মধ্যে স্থানান্তর
- ৮৮৫৭ - প্রতিরক্ষা বিভাগীয় কর্মকর্তাদের মধ্যে স্থানান্তর
- ৮৮৬১ - একই বিভাগীয় কর্মকর্তাদের মধ্যে স্থানান্তর
- ৮৮৬২ - ডাক বিভাগ
- ৮৮৬৩ - তার ও টেলিফোন বোর্ড
- ৮৮৬৪ - গণপূর্ত বিভাগ
- ৮৮৬৫ - গৃহ সংস্থান
- ৮৮৬৬ - সড়ক ও জনপথ
- ৮৮৬৭ - জনস্বাস্থ্য প্রকৌশল বিভাগ
- ৮৮৬৮ - বন বিভাগ
- ৮৮৬৯ - কাস্টমস

৮৮৭১ - ৮৮৯০ - নগদ ও ব্যাংক স্থানান্তর

- ৮৮৭১ - ট্রেজারী সমূহের মধ্যে স্থানান্তর
- ৮৮৭২ - অভ্যন্তরীণ মানি অর্ডার
- ৮৮৭৩ - বিদেশ হতে প্রেরিত মানি অর্ডার
- ৮৮৭৬ - বাংলাদেশ ব্যাংক স্থানান্তর
- ৮৮৭৮ - সুল কয়েন

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8000 - Public Accounts Receipts	৮০০০ - প্রজাতন্ত্রের হিসাব - প্রাপ্তি
8000 - 8999 - Public Account Receipts	৮০০০ - ৮৯৯৯ - প্রজাতন্ত্রের সরকারী হিসাব - প্রাপ্তি
8800 - 8899 - Remittance Accounts	৮৮০০ - ৮৮৯৯ - প্রেরিত টাকার হিসাব
8871 - 8890 - Cash and Bank Remittances	৮৮৭১ - ৮৮৯০ - নগদ ও ব্যাংক স্থানান্তর
8881 - Remittance to Embassy	৮৮৮১ - বিদেশে প্রেরিত অর্থ
8882 - Remittance from Embassy	৮৮৮২ - বিদেশে হতে প্রেরিত অর্থ
8883 - Cash adjustment of previous year	৮৮৮৩ - পূর্ববর্তী নগদ সমন্বয়
8891 - 8899 - Exchange Accounts	৮৮৯১ - ৮৮৯৯ - বিনিময় হিসাব
8891 - Remittance from Defense to Civil	৮৮৯১ - সামরিক খাত হতে বেসামরিক খাতে অর্থ প্রেরণ
8892 - Remittance from Civil to Defense	৮৮৯২ - বেসামরিক খাত হতে সামরিক খাতে অর্থ প্রেরণ
8893 - Items adjustable by Civil	৮৮৯৩ - বেসামরিক কর্তৃপক্ষ কর্তৃক সমন্বয়যোগ্য
8894 - Items adjustable by Defense	৮৮৯৪ - সামরিক কর্তৃপক্ষ কর্তৃক সমন্বয়যোগ্য
8896 - Adjustment with Railway-Accounts	৮৮৯৬ - রেলওয়ের সাথে সমন্বয় - হিসাব
8897 - Adjustment with Railway-Cash	৮৮৯৭ - রেলওয়ের সাথে সমন্বয় - নগদ
8898 - Inter-ministry adjustment-Expenditure	৮৮৯৮ - আন্তঃ মন্ত্রণালয় ব্যয় সমন্বয়
8899 - Inter-ministry adjustment-Deducted at source	৮৮৯৯ - আন্তঃ মন্ত্রণালয় উৎসমূলে কর্তৃক অর্থ সমন্বয়
8900 - 8999 - Cash Balances and Miscellaneous	৮৯০০ - ৮৯৯৯ - ক্যাশ ব্যালান্স ও বিবিধ হিসাব
8901 - 8920 - Bangladesh Bank Deposits	৮৯০১ - ৮৯২০ - বাংলাদেশ ব্যাংকে জমা
8901 - Bangladesh Bank Deposit-Civil	৮৯০১ - বাংলাদেশ ব্যাংকে জমা - সিভিল
8906 - Bangladesh Bank Deposit- Railway	৮৯০৬ - বাংলাদেশ ব্যাংকে জমা - রেলপথ
8911 - Bangladesh Bank Deposit- T&T	৮৯১১ - বাংলাদেশ ব্যাংকে জমা - তার ও টেলিফোন
8913 - Mismatch between Bank and Accounts Office-	৮৯১৩ - ব্যাংক ও হিসাব রক্ষণ অফিসের গারমিল-হিসাব
8915 - Mismatch between Bank and Accounts Office-	৮৯১৫ - ব্যাংক ও হিসাব রক্ষণ অফিসের গারমিল-নগদ
8921 - 8930 - Cash Balances	৮৯২১ - ৮৯৩০ - ক্যাশ ব্যালান্স
8921 - Cash at Bangladesh Bank	৮৯২১ - বাংলাদেশ ব্যাংকে নগদ
8926 - Remittances in Transit	৮৯২৬ - প্রেরিত নগদ
8931 - 8940 - Miscellaneous Government Account	৮৯৩১ - ৮৯৪০ - বিবিধ সরকারি হিসাব
8931 - Closing Account	৮৯৩১ - সমাপনী স্থিতি

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9000 - Public Accounts Expenditure	৯০০০ - প্রজাতন্ত্রের সরকারী হিসাব - ব্যয়
9000 - 9999 - Public Account Expenditure	৯০০০ - ৯৯৯৯ - প্রজাতন্ত্রের সরকারী হিসাব - ব্যয়
9000 - 9099 - National Savings Schemes	৯০০০ - ৯০৯৯ - জাতীয় সঞ্চয় প্রকল্প সমূহ
9001 - 9020 - Saving Certificates	৯০০১ - ৯০২০ - সঞ্চয় পত্রসমূহ
9001 - Bonus Savings Certificates	৯০০১ - বোনাস সঞ্চয় পত্র
9002 - Bangladesh Sanchaypatra	৯০০২ - বাংলাদেশ সঞ্চয় পত্র
9003 - Family Savings Certificate	৯০০৩ - পরিবার সঞ্চয় পত্র
9006 - Defence Savings Certificates	৯০০৬ - প্রতিরক্ষা সঞ্চয় পত্র
9007 - Savings Certificate with 6 Months Profit	৯০০৭ - ছয় মাস অন্তর মুনাফা ভিত্তিক সঞ্চয় পত্র
9008 - Savings Certificate with 3 Months Profit	৯০০৮ - তিন মাস অন্তর মুনাফা ভিত্তিক সঞ্চয় পত্র
9011 - 3 Years Savings Certificates	৯০১১ - ৩ বছর মেয়াদী বাংলাদেশ সঞ্চয় পত্র
9012 - 3 Years Deposit Savings Certificate	৯০১২ - ৩ বছর মেয়াদী জামানত সঞ্চয়পত্র
9016 - 5 Years Savings Certificates	৯০১৬ - ৫ বছর মেয়াদী বাংলাদেশ সঞ্চয় পত্র
9018 - Deposit of pension Seving Certificate Sale	৯০১৮ - পেনশনার সঞ্চয়পত্রের ভাঙ্গানো/নিগদায়নকৃত অর্থ (আসল/মূল) পরিশোধ
9021 - 9040 - Postal Savings	৯০২১ - ৯০৪০ - ডাকঘর সঞ্চয় ব্যাংক জমা
9021 - Savings Bank Ordinary Deposit	৯০২১ - ডাকঘর সঞ্চয় ব্যাংক জমা - সাধারণ জমা হিসাব
9026 - Fixed and Term Deposit	৯০২৬ - ডাকঘর সঞ্চয় ব্যাংক জমা - মেয়াদি জমা হিসাব
9031 - Bonus Deposit	৯০৩১ - ডাকঘর সঞ্চয় ব্যাংক জমা - বোনাস জমা হিসাব
9041 - 9050 - Postal Life Insurance and Annuity	৯০৪১ - ৯০৫০ - ডাক জীবন বীমা ও অ্যানুইটি
9041 - Postal Life Insurance and Annuity Scheme	৯০৪১ - ডাক জীবন বীমা ও অ্যানুইটি
9051 - 9060 - Saving Bonds	৯০৫১ - ৯০৬০ - সঞ্চয় বন্ডসমূহ
9051 - Prizebond	৯০৫১ - প্রাইজ বন্ড
9055 - Wage Owner Development Bond	৯০৫৫ - গ্যেজ আর্নার ডেভেলপমেন্ট বন্ড
9057 - 3 Years National Investment Bond	৯০৫৭ - ৩ বছর মেয়াদী জাতীয় বিনিয়োগ বন্ড
9058 - US Dollar Premium Bond	৯০৫৮ - ইউ এস ডলার প্রিমিয়াম বন্ড
9059 - US Dollar Investment Bond	৯০৫৯ - ইউ এস ডলার ইনভেস্টমেন্ট বন্ড
9100 - 9199 - State Provident Funds	৯১০০ - ৯১৯৯ - রাষ্ট্রীয় প্রভিডেন্ট ফান্ড
9100 - 9199 - State Provident Funds	৯১০০ - ৯১৯৯ - রাষ্ট্রীয় প্রভিডেন্ট ফান্ড
9101 - General Provident Fund - Civil	৯১০১ - সাধারণ প্রভিডেন্ট ফান্ড - কেনামরিক
9106 - General Provident Fund - Defence	৯১০৬ - সাধারণ প্রভিডেন্ট ফান্ড - প্রতিরক্ষা
9111 - General Provident Fund - Railway	৯১১১ - সাধারণ প্রভিডেন্ট ফান্ড - রেলওয়ে
9116 - General Provident Fund - Postal Department	৯১১৬ - সাধারণ প্রভিডেন্ট ফান্ড - ডাক বিভাগীয়
9121 - General Provident Fund - T & T	৯১২১ - সাধারণ প্রভিডেন্ট ফান্ড - টি এন্ড টি
9126 - General Provident Fund - Others	৯১২৬ - সাধারণ প্রভিডেন্ট ফান্ড - অন্যান্য
9131 - Contributory Provident Fund	৯১৩১ - কন্ট্রিবিউটরি প্রভিডেন্ট ফান্ড
9200 - 9299 - Renewal, Reserve & Depreciation	৯২০০ - ৯২৯৯ - রিনিউয়াল, রিজার্ভ ও ডিপ্রিসিয়েশন ফান্ড
9201 - 9230 - Renewal, Reserve and Depreciation	৯২০১ - ৯২৩০ - রিনিউয়াল, রিজার্ভ এন্ড ডেপ্রিসিয়েশন ফান্ড
9201 - Railway Depreciation Reserve Fund	৯২০১ - অবচয়ের জন্য সংরক্ষিত তহবিল - রেলপথ
9206 - Railway Development Fund	৯২০৬ - উন্নয়ন তহবিল - রেলপথ
9211 - Renewal & Reserve Fund T & T	৯২১১ - রিনিউয়াল এন্ড রিজার্ভ ফান্ড - টি এন্ড টি
9214 - Depreciation Reserve Fund - Security Printing	৯২১৪ - অবচয়ের জন্য সংরক্ষিত তহবিল - সিকিউরিটি প্রিন্টিং প্রেস
9215 - Depreciation Reserve Fund - B G Press	৯২১৫ - অবচয়ের জন্য সংরক্ষিত তহবিল - বি জি প্রেস
9216 - Post Office Renewal Reserve Fund	৯২১৬ - রিনিউয়াল এন্ড রিজার্ভ ফান্ড - পোস্ট অফিস
9217 - Depreciation Reserve Fund-Government Printing	৯২১৭ - অবচয়ের জন্য সংরক্ষিত তহবিল - সরকারী মুদ্রাশালায়
9218 - Cultural Heritage Fund	৯২১৮ - সাংস্কৃতিক ঐতিহ্য তহবিল
9219 - Depreciation Reserve Fund-Government Flour	৯২১৯ - অবচয়ের জন্য সংরক্ষিত তহবিল - সরকারী আটকল
9220 - Renewal and Reserve Fund - Dairy Firm	৯২২০ - রিনিউয়াল এন্ড রিজার্ভ ফান্ড - ডেইরী ফার্ম
9221 - Others	৯২২১ - অন্যান্য
9231 - 9250 - Welfare Funds	৯২৩১ - ৯২৫০ - কল্যাণ তহবিল
9231 - T&T Welfare Fund	৯২৩১ - তার ও টেলিফোন কল্যাণ তহবিল
9236 - Postal Department Welfare Fund	৯২৩৬ - ডাক বিভাগীয় কল্যাণ তহবিল
9241 - Government Employees Benevolent Fund	৯২৪১ - সরকারি কর্মচারী কল্যাণ তহবিল
9246 - Government Employees Group Insurance Fund	৯২৪৬ - সরকারি কর্মচারী গোষ্ঠী বীমা তহবিল
9248 - Defence Welfare Fund	৯২৪৮ - প্রতিরক্ষা কল্যাণ তহবিল
9251 - 9260 - Relief Fund	৯২৫১ - ৯২৬০ - ত্রাণ তহবিল
9251 - Prime Ministers Relief Fund	৯২৫১ - প্রধানমন্ত্রীর ত্রাণ তহবিল

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9000 - Public Accounts Expenditure	৯০০০ - প্রজাতন্ত্রের সরকারী হিসাব - ব্যয়
9000 - 9999 - Public Account Expenditure	৯০০০ - ৯৯৯৯ - প্রজাতন্ত্রের সরকারী হিসাব - ব্যয়
9300 - 9499 - Deposit Accounts	৯৩০০ - ৯৪৯৯ - জমার হিসাব
9301 - 9310 - Advance Income Tax Deposit	৯৩০১ - ৯৩১০ - অগ্রিম আয়কর জমা
9301 - Advance Income Tax Deposit	৯৩০১ - অগ্রিম আয়কর প্রদান
9311 - 9340 - Deposit of Local Funds	৯৩১১ - ৯৩৪০ - স্থানীয় তহবিলের জমা
9311 - Divisional Funds Deposit	৯৩১১ - বিভাগীয় তহবিল
9316 - District Funds Deposit	৯৩১৬ - জেলা তহবিল
9321 - Municipal Funds Deposit	৯৩২১ - পৌর তহবিল
9326 - Upazilla Funds Deposit	৯৩২৬ - উপজেলা তহবিল
9327 - Urban Fund	৯৩২৭ - শহর তহবিল
9331 - Other Local Funds Deposit	৯৩৩১ - অন্যান্য স্থানীয় তহবিল
9341 - 9380 - Departmental and Judicial Deposits	৯৩৪১ - ৯৩৮০ - বিভাগীয় ও বিচার বিভাগীয় জমা
9341 - Revenue Deposits	৯৩৪১ - রাজস্ব জমা
9346 - Civil Courts Deposits	৯৩৪৬ - দেওয়ানী আদালতের জমা
9351 - Criminal Courts Deposit	৯৩৫১ - ক্রীমিনাল আদালতের জমা
9353 - CD VAT Deposit	৯৩৫৩ - শুষ্ক জমা
9356 - Forest Deposits	৯৩৫৬ - বন বিভাগীয় জমা
9357 - Postal Department Deposit	৯৩৫৭ - ডাক বিভাগীয় জমা
9358 - Railway Deposit	৯৩৫৮ - রেলওয়ে জমা
9359 - T & T Deposit	৯৩৫৯ - টি এন্ড টি জমা
9360 - Supplies and Inspection Departmental Deposits	৯৩৬০ - সরবরাহ ও পরিদর্শন বিভাগীয় জমা
9361 - Public Works Deposit	৯৩৬১ - গণপুত্র বিভাগীয় জমা
9366 - Public Health Engineering Deposits	৯৩৬৬ - জনস্বাস্থ্য বিভাগীয় জমা
9371 - Local Rate Deposit	৯৩৭১ - স্থানীয় রেট জমা
9376 - Ships Captain Deposits	৯৩৭৬ - জাহাজ কাপ্তানের জমা
9377 - Deposits for Armed Forces	৯৩৭৭ - সামরিক বাহিনীর জমা
9381 - 9420 - Deposits against Supplies and Works	৯৩৮১ - ৯৪২০ - সরবরাহ ও কাজের জন্য জমা
9381 - Letter of Credit	৯৩৮১ - স্বপত্র বাবদ জমা
9382 - Subscription to International Organization and	৯৩৮২ - আন্তর্জাতিক প্রতিষ্ঠানের চাঁদা ও অন্যান্য বিশেষ সময়
9386 - Customs Duty and VAT	৯৩৮৬ - শুষ্ক জমা
9391 - Contractor and Supplier Security Deposit	৯৩৯১ - ঠিকাদার ও সরবরাহকারীর সিকিউরিটি জমা
9396 - Coal Deposit	৯৩৯৬ - কয়লা বাবদ জমা
9401 - Works of Public and Private Bodies	৯৪০১ - সরকারি সংস্থা বা বেসরকারী ব্যক্তিদের কাজের জন্য জমা
9406 - Reservation of Government Right	৯৪০৬ - সরকারি অধিকার সংরক্ষণ
9411 - Liquidated Damages	৯৪১১ - ক্ষতিপূরণ সক্রান্ত জমা
9418 - Miscellaneous Deposits	৯৪১৮ - বিবিধ জমা
9421 - 9430 - Personal Ledger Account Deposit	৯৪২১ - ৯৪৩০ - ব্যক্তিগত খতিয়ান হিসাব জমা
9421 - Personal Ledger Account Deposit	৯৪২১ - ব্যক্তিগত খতিয়ান হিসাব জমা
9423 - Deposit and Payment of Lease amount of	৯৪২৩ - AUCZ m=úñEi BRiv j ä A_Rgr cñb Ges e'q m=úñKZ
9431 - 9460 - Food Aid Deposit Account	৯৪৩১ - ৯৪৬০ - খাদ্য সাহায্য বাবদ জমার হিসাব
9431 - US Food Aid Title II	৯৪৩১ - খাদ্য সাহায্য যুক্তরাষ্ট্র - টাইটেল - ২
9436 - Previous year deposit with different Commercial	৯৪৩৬ - উন্নয়ন কর্মসূচীর জন্য বিভিন্ন বাণিজ্যিক ব্যাংক এ পূর্ববর্তী অর্থ বছরের জমা
9441 - German Food Aid	৯৪৪১ - খাদ্য সাহায্য - জার্মানী
9443 - UK Food Aid	৯৪৪৩ - খাদ্য সাহায্য - লন্ডন
9445 - Japanese Debt Relief Grant	৯৪৪৫ - জাপানী ঋণ মওকুফ
9446 - EEC Food Aid	৯৪৪৬ - খাদ্য সাহায্য - ই. ই. সি
9448 - Australian Food Aid	৯৪৪৮ - খাদ্য সাহায্য - অস্ট্রেলিয়া
9451 - Canadian Food Aid	৯৪৫১ - খাদ্য সাহায্য - কানাডা
9452 - Refund of Fund Deposited in Bank	৯৪৫২ - ব্যাংকে জমা কৃত অর্থ ফেরত
9454 - Japanese Food Aid	৯৪৫৪ - খাদ্য সাহায্য - জাপান
9455 - Japanese Debt Relief Grant	৯৪৫৫ - জাপানী ঋণ মওকুফ
9456 - Accumulated Surplus - Food Account	৯৪৫৬ - পূর্ববর্তী বৎসরের খাদ্য হিসাবের উদ্ধৃত
9457 - World Food Programme	৯৪৫৭ - বিশ্ব খাদ্য কর্মসূচী
9458 - S I F A D	৯৪৫৮ - সিফাদ
9459 - Monitized Fund for Development Activities	৯৪৫৯ - উন্নয়ন কর্মসূচীর জন্য বিক্রয়লব্ধ অর্থ স্থানান্তর (এডিপি বহির্ভূত)
9461 - 9470 - Commodity Aid Deposit Account	৯৪৬১ - ৯৪৭০ - পণ্য সাহায্য জমার হিসাব
9461 - Commodity Aid Deposit Account	৯৪৬১ - পণ্য সাহায্য জমার হিসাব

Detail Description

9000 - Public Accounts Expenditure	৯০০০ - প্রজাতন্ত্রের সরকারী হিসাব - ব্যয়
9000 - 9999 - Public Account Expenditure	৯০০০ - ৯৯৯৯ - প্রজাতন্ত্রের সরকারী হিসাব - ব্যয়
9700 - 9799 - Suspense Accounts	৯৭০০ - ৯৭৯৯ - অনিশ্চিত হিসাব
9700 - 9749 - Suspense Accounts	৯৭০০ - ৯৭৪৯ - অনিশ্চিত হিসাব
9701 - Bangladesh Bank	৯৭০১ - বাংলাদেশ ব্যাংক
9706 - Chief Accounts Officers	৯৭০৬ - প্রধান হিসাব রক্ষণ কর্মকর্তা
9711 - District Accounts Officers	৯৭১১ - জেলা হিসাব রক্ষণ কর্মকর্তা
9716 - Railway	৯৭১৬ - রেলওয়ে
9721 - Public Works Department	৯৭২১ - গণপূর্ত বিভাগ
9726 - Deposits against Civil Works	৯৭২৬ - পূর্ত কার্যের জন্য জমা
9731 - Defence	৯৭৩১ - প্রতিরক্ষা
9736 - Roads and Highway Department Suspense	৯৭৩৬ - সড়ক ও জনপথ বিভাগ
9741 - Others	৯৭৪১ - অন্যান্য
9746 - Foreign Aid	৯৭৪৬ - বৈদেশিক সাহায্য
9750 - 9799 - Departmental Cash Control Account	৯৭৫০ - ৯৭৯৯ - বিভাগীয় ক্যাশ কন্ট্রোল হিসাব
9751 - Postal Department	৯৭৫১ - ডাক বিভাগ
9752 - T & T Board	৯৭৫২ - টি এন্ড টি বোর্ড
9753 - Foreign Affairs	৯৭৫৩ - পররাষ্ট্র বিষয়ক
9754 - Forest Department	৯৭৫৪ - বন বিভাগ
9755 - Public Health Engineering	৯৭৫৫ - জনস্বাস্থ্য প্রকৌশল বিভাগ
9756 - Public Works	৯৭৫৬ - গণপূর্ত
9757 - Roads & Highway	৯৭৫৭ - সড়ক ও জনপথ
9758 - Railway	৯৭৫৮ - রেলওয়ে
9759 - Customs	৯৭৫৯ - কাষ্টমস্
9760 - Departmental Cash Control	৯৭৬০ - বিভাগীয় ক্যাশ নিয়ন্ত্রক
9800 - 9899 - Remittance Accounts	৯৮০০ - ৯৮৯৯ - প্রেরিত টাকার হিসাব
9801 - 9840 - Remittances between DAO/TAO	৯৮০১ - ৯৮৪০ - ডি.এ.ও/ডি.এ.ও -এর মধ্যে প্রেরিত টাকার হিসাব
9801 - Post Office	৯৮০১ - ডাক বিভাগ
9806 - T & T Board	৯৮০৬ - তার ও টেলিফোন বোর্ড
9811 - Public Works	৯৮১১ - গণপূর্ত বিভাগ
9816 - Housing and Settlement	৯৮১৬ - গৃহ সংস্থান ও বন্দোবস্ত
9821 - Roads and Highways	৯৮২১ - সড়ক ও জনপথ
9826 - Public Health Engineering	৯৮২৬ - জনস্বাস্থ্য প্রকৌশল বিভাগ
9831 - Forest	৯৮৩১ - বন বিভাগ
9833 - CAO Pre-audit Cheque	৯৮৩৩ - সিএও প্রি-অডিট চেক
9834 - Customs	৯৮৩৪ - কাষ্টমস্
9835 - G.P.F. Transfer	৯৮৩৫ - সাধারণ ভবিষ্য তহবিল স্থানান্তর
9836 - Others	৯৮৩৬ - অন্যান্য
9841 - 9870 - Transfers between Departmental	৯৮৪১ - ৯৮৭০ - বিভাগীয় কর্মকর্তাদের মধ্যে স্থানান্তর
9841 - Transfers between Post Office Officers	৯৮৪১ - ডাক বিভাগীয় কর্মকর্তাদের মধ্যে স্থানান্তর
9846 - Transfers between T&T Officers	৯৮৪৬ - তার ও টেলিফোন বিভাগীয় কর্মকর্তাদের মধ্যে স্থানান্তর
9851 - Transfers between Forest Officers	৯৮৫১ - বন বিভাগীয় কর্মকর্তাদের মধ্যে স্থানান্তর
9856 - Transfers between Railway Officers	৯৮৫৬ - রেল বিভাগীয় কর্মকর্তাদের মধ্যে স্থানান্তর
9857 - Transfer between Defence Officers	৯৮৫৭ - প্রতিরক্ষা কর্মকর্তাদের মধ্যে স্থানান্তর
9861 - Transfers within same Department	৯৮৬১ - একই বিভাগীয় কর্মকর্তাদের মধ্যে স্থানান্তর
9862 - Post Office	৯৮৬২ - ডাক বিভাগ
9863 - T & T Board	৯৮৬৩ - তার ও টেলিফোন বোর্ড
9864 - Public Works	৯৮৬৪ - গণপূর্ত বিভাগ
9865 - Housing and Settlement	৯৮৬৫ - গৃহ সংস্থান
9866 - Roads & Highways	৯৮৬৬ - সড়ক ও জনপথ
9867 - Public Health Engineering	৯৮৬৭ - জনস্বাস্থ্য ও প্রকৌশল বিভাগ
9868 - Forest	৯৮৬৮ - বন বিভাগ
9869 - Customs	৯৮৬৯ - কাষ্টমস্
9871 - 9890 - Cash and Bank Remittances	৯৮৭১ - ৯৮৯০ - নগদ ও ব্যাংক স্থানান্তর
9871 - Cash Remittances between Treasuries	৯৮৭১ - ত্রেজারীসমূহের মধ্যে স্থানান্তর
9872 - Inland Money Order	৯৮৭২ - অভ্যন্তরীণ মনিঅর্ডার
9873 - Foreign Money order	৯৮৭৩ - বিদেশ হইতে প্রেরিত মনিঅর্ডার
9876 - Bangladesh Bank Remittances	৯৮৭৬ - বাংলাদেশ ব্যাংক স্থানান্তর
9878 - Small Coin	৯৮৭৮ - স্মল কয়েন

Detail Description

9000 - Public Accounts Expenditure	৯০০০ - প্রজাতন্ত্রের সরকারী হিসাব - ব্যয়
9000 - 9999 - Public Account Expenditure	৯০০০ - ৯৯৯৯ - প্রজাতন্ত্রের সরকারী হিসাব - ব্যয়
9800 - 9899 - Remittance Accounts	৯৮০০ - ৯৮৯৯ - প্রেরিত টাকার হিসাব
9871 - 9890 - Cash and Bank Remittances	৯৮৭১ - ৯৮৯০ - নগদ ও ব্যাংক স্থানান্তর
9881 - Remittance to Embassy	৯৮৮১ - বিদেশে প্রেরিত অর্থ
9882 - Remittance from Embassy	৯৮৮২ - বিদেশে হতে প্রেরিত অর্থ
9883 - Cash adjustment of previous year	৯৮৮৩ - পূর্ববর্ষী নগদ সমন্বয়
9891 - 9899 - Exchange Accounts	৯৮৯১ - ৯৮৯৯ - বিনিময় হিসাব
9891 - Remittance from Defense to Civil	৯৮৯১ - বিনিময় হিসাব
9892 - Remittance from Civil to Defense	৯৮৯২ - বেসামরিক খাত হতে সামরিক খাতে অর্থ প্রেরণ
9893 - Items adjustable by Civil	৯৮৯৩ - বেসামরিক কর্তৃপক্ষ কর্তৃক সমন্বয়যোগ্য
9894 - Items adjustable by Defense	৯৮৯৪ - সামরিক কর্তৃপক্ষ কর্তৃক সমন্বয়যোগ্য
9896 - Adjustment with Railway-Accounts	৯৮৯৬ - রেলওয়ের সাথে সমন্বয় - হিসাব
9897 - Adjustment with Railway-Cash	৯৮৯৭ - রেলওয়ের সাথে সমন্বয় - নগদ
9898 - Inter-ministry adjustment-Expenditure	৯৮৯৮ - আন্তঃ মন্ত্রণালয় ব্যয় সমন্বয়
9899 - Inter-ministry adjustment-Deducted at source	৯৮৯৯ - আন্তঃ মন্ত্রণালয় উৎসমূলে কর্তৃক অর্থ সমন্বয়
9900 - 9999 - Cash Balances and Miscellaneous	৯৯০০ - ৯৯৯৯ - ক্যাশ বালান্স ও বিবিধ হিসাব
9901 - 9920 - Bangladesh Bank Deposits	৯৯০১ - ৯৯২০ - বাংলাদেশ ব্যাংক জমা
9901 - Bangladesh Bank Deposit-Civil	৯৯০১ - বাংলাদেশ ব্যাংক জমা - সিজিল
9906 - Bangladesh Bank Deposit- Railway	৯৯০৬ - বাংলাদেশ ব্যাংক জমা - রেলপথ
9911 - Bangladesh Bank Deposit- T&T	৯৯১১ - বাংলাদেশ ব্যাংক জমা - তার ও টেলিফোন
9913 - Mismatch between Bank and Accounts Office-	৯৯১৩ - ব্যাংক ও হিসাব রক্ষণ অফিসের গরমিল-হিসাব
9915 - Mismatch between Bank and Accounts Office-	৯৯১৫ - বাংলাদেশ ব্যাংক জমা-নগদ
9921 - 9930 - Cash Balances	৯৯২১ - ৯৯৩০ - ক্যাশ ব্যালান্স
9921 - Cash at Bangladesh Bank	৯৯২১ - বাংলাদেশ ব্যাংক নগদ
9926 - Remittances in Transit	৯৯২৬ - প্রেরিত নগদ
9931 - 9940 - Miscellaneous Government Account	৯৯৩১ - ৯৯৪০ - বিবিধ সরকারী হিসাব
9931 - Cash Balance	৯৯৩১ - সমাপনী স্থিতি

Appendix 10. A Guide for Developing A Logical Framework

10: A Guide For Developing A Logical Framework¹¹

10.0 INTRODUCTION

The Logical Framework is a tool to help strengthen project design, implementation and evaluation. This means that we use it throughout the project cycle.

The Logical Framework is a simple tool which helps:

1. organize our thinking;
2. relate activities and investment to expected results;
3. set performance indicators;
4. allocate responsibilities;
5. communicate information on the project concisely and unambiguously.

10.1 Advantages of the logical framework approach

The major advantages of the Logical Framework approach are:

- It brings together in one place a statement of all key components of the project or programme. Having all key components of projects or programme in a systematic, concise and coherent way helps us clarify and demonstrate the logic of how projects and programmes are expected to work. It can also help us separate the various levels in the hierarchy of objectives, and consequently ensure that inputs and outputs are not confused with each other or with objectives. This can be particularly helpful when there is a change of staff.
- It meets the requirements of good project design and enables possible responses to past weaknesses in many designs. It can help ensure that fundamental questions are asked and weaknesses are addressed in order to provide decision makers with better and more relevant information. It can also guide us in systematically and logically analysing the inter-related key elements which constitute a well designed project. This approach can help us improve planning by highlighting linkages between project elements and important external factors.
- It is easy to learn and use. Effective training in the basics of the Logical Framework approach can be given in a few days. If this is combined with follow-up training and process consultancy to sort out difficulties a key group of project staff can be trained effectively in a short period of time.
- It does not add time or effort to project management, but reduces it. Like many other management tools the Logical Framework approach has to be learnt before it can be effectively used. Once learnt however, it can save us a lot of time. Many project staff report that they are often short of time and work against the clock on a regular basis. Any time saved in relation to project management work would be of great value.

¹¹ Adapted largely from Mel Blunt's (Organisation Development Associates) adaption of the PC Team Up User's Manual

- It can be used internally for design and appraisal process and can be used externally with consultants working for development organisations.
The Logical Framework approach can be used to help both design and appraise projects internally. Likewise it can be used with external consultants who may be involved with design and appraisal processes. In addition the Logical Framework approach encourages a multidisciplinary approach to project design and supervision.
- It anticipates implementation.
The Logical Framework approach helps set up project activities with a clear purpose. The approach facilitates common understanding and better communication between decision makers, managers and other parties involved in projects. Likewise the use of Logical Frameworks, with systematic monitoring, ensures continuity of approach if and when any original project staff move or are replaced.
- It sets up a framework for monitoring and evaluation where planned and actual results can be compared.
By having objectives and indicators of success clearly stated before the project starts the approach helps we set up a framework for evaluation. It is highly difficult to evaluate projects retrospectively if the original objectives are not clearly stated. The Logical Framework approach can help clarify the relationships which underlie judgments about the likely efficiency and effectiveness of projects, likewise it can help identify the main factors related to the success of the project.
- It assists communications between project donors and implementers.
As more and more institutions adopt the Logical Framework concept communications between project implementers and donors will be facilitated. This will have major advantages for organisations who are continually presenting projects to donors for funding. In earlier times, budgets seemingly grew more easily and rapidly than now is often the case.

10.2 Limitations to the logical framework approach

There are a few limitations to Logical Framework approach. These are as follows:

- It is not a substitute for other technical, economic, social and environmental analyses. It cannot replace the use of professionally qualified and experienced staff.
The Logical Framework approach can help project design, implementation and evaluation, but clearly does not do away with the need for other project tools especially those related to technical, economic, social and environmental analyses. Likewise the approach does not replace the need for professional expertise and experience.
- Rigidity in project management may arise when objectives and external factors specified during design are over emphasised.
Rigidity in project administration and management can sometimes arise when Logical Framework objectives and external factors specified during design are over emphasised. Note that this can, however, be avoided by regular project reviews where the key elements can be re-evaluated and adjusted. If the Logical Framework approach is taken up it is recommended that regular project reviews are undertaken and Logical Framework project documents kept up to date.
- It requires a team process with good leadership and facilitation skills to be most effective.
To prepare a good Logical Framework, where different professional perspectives are taken

into consideration, a team approach is required. In order to get the team functioning there is a need for both leadership and facilitation skills. Many organisations that have adopted the Logical Framework approach have used external consultants to train their staff in the Logical Framework approach, facilitate their Logical Framework workshops and assist with the preparation of finalised Logical Frameworks. In the development of these Logical Frameworks the objectives, objectively verifiable indicators, means of verification and assumptions/risks are agreed by all participants.

- The process requires strong facilitation skills to ensure real participation by appropriate stakeholders.
To prepare a good Logical Framework with the active participation of appropriate stakeholders is not easy. Participation requires the active involvement of stakeholders in the decision making process. Such participation will lead to greater effectiveness, ownership, efficiency, transparency, equity and sustainability. Facilitating, for example illiterate primary stakeholders effectively through the process requires great skill.
- The whole culture of the Logical Framework can be alien.
The jargon can be intimidating even for those familiar with its 'culture'. In some cultures the Logical Framework can be very alien.

10.3 Logical framework layout and steps

One can present Logical Framework as a table with the following layout:

	Summary	Indicators	Verification	Assumptions
Goal				
Purpose				
Outputs				
Activities				

STEPS

Step 1: Define the overall goal to which our project contributes

The Goal is the higher-order objective that we are seeking to achieve through this project, often in combination with others. It usually relates to a programme or a sector. As an example we may have a programme Goal of increasing farm family income. This may be partially achieved through a project with the Purpose of increasing farm production. Very often a group of projects will share a common Goal statement.

Step 2: Define the purpose to be achieved by the project

This is why we are proposing to carry out the project. It summarises the impact we hope the project will have. It may describe how the things will be changed as a result of producing the project's Outputs.

The purpose often describes a change in the behavior of the project beneficiaries. For example, a Purpose often relates to the use of project outputs: "new production methods used or new systems implemented".

We should normally have only one Purpose in a project. The reason for this is very practical. Experience has shown that it is easier to focus project Outputs on a single Purpose. If we have several Purposes the project efforts become diffused and the design is weakened.

Although the Purpose describes the reasons why the Outputs are being undertaken it is outside the control of the project team. We can hold a project team responsible for producing a certain set of results, but not for what people or institutions will do with those results. This means that we can insist that the project team achieve certain Outputs which will help to bring about the desired impact, but we cannot hold them accountable for achieving that impact.

We may design a project with the Purpose of improving food production by farmers. We may design it to provide the farmers with new skills and inputs (credit, seed, tools, etc.). Although the team may achieve all of these planned Outputs, they cannot be held responsible if the farmers decide to do something completely different.

Step 3: Define the outputs for achieving this purpose

Outputs describe what we want the project to deliver. They are often described in the Terms of Reference (TOR) for the project. If we provide the necessary resources, we can hold the project team directly accountable for achieving these results.

Step 4: Define the activities for achieving each output

Activities define how the team will carry out our project. Generally we should aim at providing a brief summary of three to seven activities they must implement to accomplish each Output objective. One should supply just enough detail to outline the strategy for accomplishing each Activity, and to provide the basis for a Work Breakdown analysis or more elaborate Activity Chart, Bar Chart, or Gantt Chart.

Remember that project management involves carrying out certain Activities. We must include these Activities in our Logical Framework. Provide a summary schedule of periodic meetings, monitoring events and evaluations. Some planning teams emphasise these Activities by including an initial Output called "Project Management System Installed and Operational".

Step 5: Verify the vertical logic with the if/then test

The Logical Framework's structure is based on the concept of Cause and Effect. If something occurs or is achieved, then something else will result. By definition, each project described by a Logical Framework is based on this If/Then or cause-and-effect logic.

In a well planned Logical Framework, at the lowest levels on the Logical Framework we can say that if certain Activities are carried out we can expect certain Outputs to result. There should be the same logical relationship between the Outputs and the Purpose, and between the Purpose and the Goal.

As an example, we could argue that if we achieve the output to supply farmers with improved seed then the Purpose of increased production will be seen.

As we make the cause and effect linkages between objectives at the different levels stronger, our project design will be improved. The Logical Framework forces us to make this logic explicit. It does not guarantee a good design because the validity of the cause and effect logic depends on the quality and experience of the design team.

Step 6: Define the assumptions related to each level

Although there may be a clear logical link between the statements in the Narrative Summary column, there is always the possibility that other factors may break the links. Assumptions are statements about the uncertainty factors which may affect the link between each level of objectives. These may be external factors which we cannot control in the project or those which we choose not to control. This is the external logic of the project.

The Assumptions may describe important natural conditions, such as 20 centimetres of rain falling between May and October. They may be human factors such as no labor strikes during start up of project, timely release of budget, farmers willing to try new methods, farmers willing to use new credit mechanism. They may be external economic factors such as crop prices remaining stable. They may relate to other projects that must be carried out in conjunction with this project, like a World Bank irrigation project remaining on schedule, or UN fertiliser project completed by start-up.

The Narrative Summary describes the IF/THEN logic, that is the necessary conditions linking each level. Assumptions complete the picture by adding the if/AND/then logic. They describe the conditions which are needed to support the cause and effect link between each level. They are also known as the sufficient conditions.

If cause and effect is the core concept of good project design, necessary and sufficient conditions are the corollary. The necessary conditions describes the cause and effect relationship between the Activity-to-Output, Output-to-Purpose and the Purpose-to-Goal objectives for accomplishing project objectives. This is the internal logic, but it does not define the different conditions at each level for accomplishing the next higher level.

These other conditions are the assumptions. This is the external logic. The objectives (necessary conditions) plus the assumptions (sufficient conditions) give us a much clearer idea of the project's design.

By definition, the project team is not responsible for assumptions. These are outside their control. The team is responsible for producing Outputs. When Assumptions fail or change, this management agreement no longer applies. The project team agrees to monitor changes in assumptions, and if this is to happen we must make the assumptions as specific as possible. This may mean putting indicators on assumptions so they can be tracked more easily, but the project team is not responsible for producing them.

In spite of the fact that they are not responsible for the Assumptions, high-performance project teams spend a great deal of time trying to influence the probability of their project assumptions holding true.

The importance of clarifying Assumptions

Assumptions are external conditions over which the project chooses not to exert or does not have control, but on which the accomplishment of objectives depends.

We can determine the assumptions by asking, "What conditions must exist in addition to my objective (at Activity, Output, Purpose or Goal levels) in order to achieve the next level?"

In our example, we may make the Assumption that sufficient rain will fall. Without this rainfall, the new seeds will not give the increased production we expect. If we want to measure the degree of uncertainty, we need to know the probability of this Assumption holding true. If 20

centimetres of rain during the planting season is the minimum requirement for projected crop yields, and this has occurred only three years out of the past ten, the probability of this Assumption holding true for this project is bleak (30% probability).

We can never have 100% certainty that project Outputs will cause the Purpose or the Purpose cause the Goal. In working with projects we make assumptions about the degree of uncertainty between these levels of objectives. The lower the uncertainty, the stronger the project design. Any experienced project manager will agree that killer assumptions, that is those which will prove fatal to a project, can derail a project as often as poorly executed outputs.

Step 7: Define the objectively verifiable indicator (OVI) at goal, then purpose, then output, and then activity levels.

The basic principle of the OVI column is that "if we can measure it, we can manage it". Indicators demonstrate results. As performance measures, they tell us how to recognise successful accomplishment of objectives. They are not the conditions necessary to achieve those results. There is no cause and effect relationship. But they define in measurable detail the performance levels required by objectives in the Narrative Summary column.

The Necessary and Sufficient Test

The OVIs tell us not only what accomplishment is necessary, but also what will be sufficient performance to assure that we can reach the next level of objective. For this reason, it is best to begin at the end. That is, begin with the higher order objective and work backwards through the causal chain: Goal then Purpose, then Outputs, then Activities.

Quantity, Quality and Time (QQT)

Normally we will state Indicators in terms of Quantity, Quality and Time (and sometimes place and cost). Putting numbers and dates on indicators is called Targeting. Although it is often claimed that higher order objectives are not measurable, this is not true. We may choose not to put targets on them, but we can give all of Goals, Purposes and Outputs indicators and targets.

How many Indicators?

The fewer the better. Use only the number of indicators required to clarify what must be accomplished to satisfy the objective stated in the Narrative Summary column.

How do we construct an OVI?

We should begin with the basic indicator. One has to make sure it is numerically quantifiable and then add the Quality and then Time dimensions.

(Quantity + Quality + time = QQT)

As an example:

Step 1: Basic Indicator: Rice yields of small farmers increased

Step 2: Add Quantity: Rice yields of small farmers increased by X maunds

Step 3: Add Quality: Rice Yields (of some quality as 1997 crop) of small farmers (owning 3 hectares or less) increased by X maunds.

Step 4: Add Time: Rice Yields (of same quality as 1997 crop) of small farmers (owning 3 hectares or less) increased by X maunds by the end of 1998 harvest.

Goal Level Indicators

Goal level indicators often describe the program or sector objectives to which this project and

several others are directed. For this reason, the Goal level indicators may include targets beyond the scope of this project, such as small farmer income increased, where farmer income may be increased by the combined outcomes of several projects. Improved rice yields may be one necessary condition; but pricing policy, government subsidies etc. may also be required to hit income levels set at the goal level.

Examples of a Goal statement might be "wheat production in northern region doubled in 2010" or "small farmer income in northern region increased", or "import of X products reduced."

Purpose Level Indicators

The project Purpose is the primary reason why we are doing the project. It is why we are producing Outputs. But the Purpose very often defines the change in behavior of project beneficiaries, or the change in the way institutions function as a result of the project's Outputs. This makes defining the OVI's at Purpose level difficult and complex. Nevertheless, the End of Project Status (EOPS), or the OVI's for Purpose, require QQT targeting as much as the Outputs do. Getting good clarity on Purpose level targets makes setting Output targets much easier.

Also when we do a cost/effectiveness assessment of a project design, it is the relationship between EOPS and costs that we look at, rather than simply Outputs and costs.

It is recommended to adopt a single Purpose in the Narrative Summary column. We should also aim at stating the EOPS simply so that it can be easily grasped. Its power will depend on its ability to galvanise action on the Outputs so that they result in the Purpose being achieved. To that end, design the Purpose EOPS so that it is motivating.

Output Level Indicators

By definition, these indicators establish the terms of reference for the project. If a project team or contractor is responsible for all the Outputs, then these indicators define the deliverables for which the contractor is accountable.

Activity Level Indicators

The OVI's at the Activity level are usually the Inputs or the Budget. Often this will look like a performance budget, since costs can be related directly to activities. Some agencies enter budget costs using standard categories like Commodities, Technical Services, Training, etc. The budget statement is usually a summary of resources which are described in greater detail in an attached document. The cost requirement defined in these OVI's are used for analysing the cost-effectiveness of the project by comparing the budget with the EOPS.

Step 8: Define the means of verification (MOV)

In the Means of Verification (MOV) we describe the sources of information that will demonstrate what has been accomplished.

If our objective is "Farmer income raised by X% in 20....", where will we get the information to demonstrate this has happened? If we decide that a survey is needed, then we may need to add some action steps to the Activities List. If this costs money, we must add this to the budget.

The rule is that the Indicators we choose for measuring our objectives must be verifiable by some means. If they are not, we must find another indicator.

Step 9: Prepare the performance budget

We have already seen that the OVIs at the Activity level are usually the Inputs or the Budget. Now we need to prepare the full Performance Budget. Relate the costs directly to the activities. We may need to use a set of standard categories to meet the requirements of the agency we are working for.

The Performance Budget does not form part of the Logical Framework, but is an essential document which is attached to the Logical Framework. Remember that the cost requirements defined in the Performance Budget will be used for analysing the cost-effectiveness of the project by comparing the budget with the OVIs at Purpose level.

Step 10: Check the logical framework using the project design checklist

Work through the Project Design Checklist as an aid to ensuring that our project meets all the requirements of a well designed Logical Framework. It may be helpful to print our Logical Framework prior to reviewing the project with the checklist.

Step 11: Review the logical framework design in the light of previous experience

We should have been thinking about our previous experience of projects throughout the preparation of the Logical Framework. Now is the time to make a final check on this.

10.4 Project design checklist

The following checklist will help design a Project

- The project has one purpose.
- The purpose is not a reformulation of the outputs.
- The purpose is outside the management responsibility of the project team.
- The purpose is clearly stated.
- All the outputs are necessary for accomplishing the purpose.
- The outputs are clearly stated.
- The outputs are stated as results.
- The activities define the action strategy for accomplishing each output.
- The goal is clearly stated.
- The if/then relationship between the purpose and goal is logical and does not miss important steps.
- The assumptions at the activity level do not include any pre-existing conditions. (These are listed separately).
- The outputs plus the assumptions at that level produce the necessary and sufficient conditions for achieving the purpose.
- The purpose plus assumptions at that level describe the critical conditions for achieving the goal.
- The relationship between the inputs/resources and the activities is realistic.
- The relationship between the activities and outputs is realistic.
- The relationship between the outputs and the purpose is realistic
- The vertical logic among activities, outputs, purpose and goal is realistic as a whole.

- The indicators at the purpose level are independent from the outputs. They are not a summary of outputs but a measure of the purpose.
- The purpose indicators measure what is important.
- The purpose indicators have quantity, quality and time measures.
- The output indicators are objectively verifiable in terms of quantity, quality and time.
- The goal-level indicators are objectively verifiable in terms of quantity, quality and time.
- The inputs described at the activity level define the resources and costs required for accomplishing the purpose.
- The Means of Verification column identifies where the information for verifying each indicator will be found.
- The activities identify any actions required for gathering Means of Verification.
- The outputs define the management responsibility of the project.
- When reviewing the Logical Framework, we can define the evaluation plan for the project.
- The purpose indicators measure the project impact to be sustained.
- The output strategy includes a description of the project management systems.
- The teams designing the project are completely exhausted!

10.5 Objectives checklist

For checking Column 1 of the logical framework:

1. Do they answer
 1. Goal Greater Why?
 2. Purpose Why?
 3. Outputs What?
 4. Activities How?

2. Does the logic work?

* Vertical logic in Column 1;

Then



If*

Necessary and sufficient?

3. Where are the boundaries of the project?
4. Is there only one Purpose?
5. Is the Purpose too remote from the Outputs?
- *Is it assessable? Is the causal link reasonably strong?
6. Do we see Process as well as Product objectives?
7. Are the Outputs and Activities linked /cross-numbered?

10.6 Risks and assumptions checklist

For checking Column 4 of the logical framework:

1. Have all the risks been identified?
 - Stakeholder analysis?
 - Problem trees? etc.
2. Are the risks specific? Or too general?

3. Are the risks/assumptions at the right level?

4. Does the logic work?

a. Diagonal logic between Columns 1 and 4

b. Necessary and sufficient?

5. Where risks are manageable, have they been managed?

Where possible, have they been turned into Activities and Outputs? i.e. moved into Column 1?

6. What are the pre-conditions?

7. Should the project proceed in view of the remaining assumptions/risks?



10.7 Indicators and verification checklist

For checking Columns 2 and 3 of the logical framework:

1. Are the Indicators QQT'ed?

2. Are the Indicators and Means of Verification:

- Relevant
- Valid
- Reliable
- Measurable / verifiable
- Cost-effective / proportionate?

3. Are the Indicators necessary and sufficient? Do they provide enough triangulation?

4. Are the Indicators varied enough?

- Product and Process
- Direct and Indirect
- Formative, Summative and beyond
- Qualitative and Quantitative
- Cross-sectoral?

1. Who has set / will set the Indicators? How will indicators be owned?

2. Are the data collection / Means of Verification

- Already available
- Set up where necessary within the project?

3. Is there need for baseline measurement?

10.8 Examples of logical framework

10.9.1 Hypothetical example of logical framework - violence against women

Table A-1: Hypothetical Example of Logical Framework -Violence Against Women

Narrative Summary	OVI	MoV	Assumptions
Super Goal: To fulfill rural and urban women's rights to safety and well-being in South Africa.			
Goal: Reduced violence against women.	Improvement in services for women victims of violence, and greater attention given to the issue at all levels, by mid-2001.	NNVAW / Soul City evaluation surveys.	
Purpose: To contribute to reducing violence against women and addressing the needs of victims, through strengthening the capacity of the NNVAW to effectively advocate and co-ordinate initiatives.	At least five providers in each of at least six provinces demonstrate markedly improved services by end 2000. Awareness of violence against women increased significantly amongst South African population by end 1999.	Service audit. Evaluation of media campaign.	
Outputs:			
1. Increased capacity of NNVAW to plan and implement strategically at national and provincial levels.	Comprehensive national and provincial action plans under implementation by March 1999. Consensus on clear and democratic decision-making Network structure by end 1999. Provincial / national training in management, accounting and communications completed by end 2000.	Action plans and records of. Implementation. Records of meetings and constitution. Record of training.	Network maintains cohesion. Consensus between national and provincial network levels.

Narrative Summary	OVis	MoV	Assumptions
2. Plans and agreements to ensure long term funding for NNVAW.	Secure financial future by mid-2001.	Accounts; concrete commitments to funding.	Funding is forthcoming.
3. Successful multi-media campaign.	Increase in understanding of key VAW issues across the adult population by >10% above baseline by end 1999.	External evaluation report.	Material reaches remote areas and campaign influences women in need and offenders' behavior.
	Increased awareness amongst women of rights and of service availability by >20% above baseline by end 1999.	External evaluation report.	
4. Effective co-operation between NNVAW and partner organisations.	VAW-related activities of Department of Welfare, SAPS, and at least 2 other government departments enhanced at national and provincial levels by mid-2001.	Government records; qualitative feedback from victims.	Government capacity to cooperate Services reach rural areas.
	Regular communications with all Network members and other NGO bodies established by mid-1999.	NNVAW Action plans.	Other NGOs interested in cooperation.

Narrative Summary	OVIs	MoV	Assumptions
5. Effective contribution to official policy formulation.	National and provincial government policy, practice and legislation on VAW in Department of Welfare, Police Service and at least two other departments enhanced by mid-2001.	Government policy documents.	Government interest in co-operation, and ability to shift policy and practice.
6. Strategic assistance given to improve reach and quality of service provision by network members and other service providers.	Quality training conducted in at least two areas for all members by mid-2000; information exchanges available by end 1999.	Records of training; feedback from members and users on training and information provision.	Sufficient agreement on information and training needs across network Services reach rural areas.

Indicative Activities:	Inputs	TK 000s	
1a. Conduct needs assessments and develop National and Provincial Action Plans for NNVAW. 1b. Set up staffed Provincial and National offices and develop staff training programme. 1c. Establish accountable financial and decision-making mechanisms at Provincial and National levels.	Soul City NNVAW Monitoring & evaluation Total budget	1,000,000 870,000 30,000 1,900,000	
2a. Conduct audit of diverse potential funding sources, including income-generating possibilities. 2b. Develop plan for long-term network sustainability. 2c. Build capacity in provinces to seek funds independently.			
3a. Produce and broadcast television and radio series on VAW. 3b. Produce and disseminate as widely as possible accompanying printed material. 3c. Establish explicit means of collaboration between NNVAW and Soul City, in short and long term. 3d. Evaluate effect on public.			
4a. Broaden membership and raise awareness and of NNVAW. 4b. Encourage better service provision by government departments at National and Provincial levels.			
5a. Identify key landmarks and stakeholders for specific coordinated awareness raising activities. 5b. Brief 1999 general election candidates on VAW in South Africa. 5c. Contribute to policy in National and Provincial governments.			
6a. Develop key "fast track" services and responses for the media initiatives 6b. Formulate and co-ordinate Provincial network strategies 6c. Co-ordinate national audit of services 6d. Develop information bank with communication channels to provincial centres 6e. Develop demand-led strategic training programme for members 6f. Enhance members' own capacity to deliver training			

10.9.2 Hypothetical example of a log frame - jamaica all-age schools project

Table A-2: Hypothetical Example of a Log Frame - Jamaica All-Age Schools Project

Narrative Summary	Indicators	Means of Verification	Risks and Assumptions
Goal: Improved lifetime opportunities for poorer children	Increased number of children from poor communities finding employment or accessing higher levels of education	Tracer Studies of pupils from programme schemes GoJ School Profile Document.	4 Jamaican economy provides employment opportunities 5 Places available a nearby full secondary schools
Purpose: Better education for children from poor communities	By EOP 4 10% increase in the number of pupils reading at, or above, expected reading age at Grade 4 5 10% increase in attainment in core subjects at Grade 6 and Grade 7 and 9 tests. 6 10% increase in the number of pupils progressing to secondary education 7 School attendance at 85%	NAP assessment data Student Assessment Unit data	6 GoJ remains committed to poverty reduction through investment in education
Outputs: 4 Increased community participation in the management of schools	1.1 80% of school boards and PTAs operating effectively with representation from all groups in the community by Y2. 1.2 50% reduction in school vandalism by Y3 1.3 50% reduction in boys' and 25% reduction in girls' absenteeism by Y3	Minutes of meetings Empanelment reports Logbooks and attendance records Community profile conducted by CREOs	4 Co-operation from other agencies. 5 Interest of community members.
5 Improved school management	2.1 School Development plan prepared in all project schools by Y1 2.2 School Development Plans implemented in all schools by Y2.	Plans submitted to Project manager. REO records and reports TEO Monitoring reports	6 Training and support is sufficient to enable schools to formulate and implement plans

<p>6 Distance learning established to provide initial training for unqualified teachers.</p>	<p>3.1 Programme designed and accredited by Y1 3.2 120 teachers from project schools enrolled in training programme by Y1</p>	<p>Programme documentation Course registers and records</p>	<p>7 JBTE approves programme 8 Officers and college staff sufficiently competent to make distance model effective 9 There are sufficient untrained teachers with entry qualifications</p>
<p>7 Regional and national systems strengthened to provide training and support for improved learning.</p>	<p>4 Systematic REO plans for INSET provision to remote school effectively implemented by Y2 5 School based staff development in all schools by Y2 6 All teachers using interactive teaching with focus on literacy by Y2 7 Effective learning support in all schools by Y2 8 One teacher from each feeder Basic school trained in the Reading Readiness Programme by Y2 9 40% more children score higher in the NAP entry assessment by Y3 10 Effective guidance and counseling in every project school by Y2 11 50% of teachers of Grades 7-9 trained in ROSE curriculum and methodology by Y3 12 Improved data collection and processing in REOs (MIS) by Y3</p>	<p>Reports to project steering committee Staff development plans in SDPs Course register TEO monitoring Course registers NAP data Programme documentation NAP data TEO reports</p>	<p>10 Training overload of teachers, especially those in small schools. 11 Early drop-out by untrained teachers from programme 12 Sufficient capacity in Ministry to fund employment and training of Guidance Counselors 13 ROSE training teams available to the project</p>

8	Appropriate levels of learning resources provided to meet curriculum needs	5.1 Books and equipment being used effectively by Y2	Observation reports by TEOs	14	Efficient procurement and delivery system
9	Minor rehabilitation works identified and carried out through school development plan process	6.1 Completed work by Y3		15	Time taken to complete work
10	Phase 2 designed	7.1 Action research taking place by Y1 7.2 Appraisal and design process by Y2 7.3 Project memorandum completed by Y2	Baseline data and research reports Monitoring reports from Project Manager	16	A culture of learning will develop

Activities:	Years		
	Y1	Y2	Y3
1.1 Sensitisation of communities and formalisation of community representation. 1.2 Establish partnerships with SDC and other agencies e.g. Peace Corps, RADA, Public Health, UNICEF, JAMAL to target other forms of community development and job creation.			
2.1 Training for Principals/School Boards/TEOs in School Development planning. 2.2 Training for Principals in Instructional Leadership/School Management. 5 days pa			
3.1 Develop a programme to meet the needs of untrained teachers in remote rural all age schools (to include a gender component) 3.2 Inset for College staff 3.3 Contract with Teacher Training Colleges for implementation and monitoring programmes			
4.1 Preparation of REO Development Plan to include INSET delivery 4.2 Strengthen literacy and learning support training for Montague college staff/MOEC officers at regional level. 4.3 College staff to train literacy resource teachers 4.4 Literacy training is provided for project school teachers 4.5 Training of teachers in assessing and addressing special needs 4.6 Create a focus on literacy in the community 4.7 Provide Reading Readiness Programme to feeder Basic Schools 4.8 Group of teachers to conduct action research on gender and boys achievement in school 4.9 Training for College tutors of Guidance Counselors and MOEC officials using action research model 4.10 Study visits for MOEC officers 4.11 Capacity of Regional Office to support remote rural schools strengthened including MIS			
5.1 Project menu of materials and equipment established 5.2 Schools' Needs Assessment carried out as part of School Development Planning Training in use of materials and equipment			
6.1 Minor works which will enhance the quality of teaching and learning identified through School Development Plan			
7.1 Baseline study undertaken 7.2 Action Research on specific aspects of the project 7.3 Appraisal and design of Phase II			

Appendix 14.8: Poverty Mapping

Appendix 14.8: Poverty Mapping 2005 and 2010

Table A-3: Incidence of Poverty (Head Count Rate) by Cost of Basic Needs Method by Divisions

Poverty Line and Division	2010			2005		
	National	Rural	Urban	National	Rural	Urban
1. Using Lower Poverty Line						
National	17.6	21.1	7.7	25.1	28.6	14.6
Barisal	26.7	27.3	24.2	35.6	37.2	26.4
Chittagong	13.1	16.2	4.0	16.1	18.7	8.1
Dhaka	15.6	23.5	3.8	19.9	26.1	9.6
Khulna	15.4	15.2	16.4	31.6	32.7	27.8
Rajshahi (Former)	21.6	22.7	15.6	34.5	35.6	28.4
-Rajshahi (New)	16.8	17.7	13.2	...	...	...
-Rangpur	30.1	30.8	24.0	...	...	...
Sylhet	20.7	23.5	5.5	20.8	22.3	11.0
2. Using Upper Poverty Line						
National	31.5	35.2	21.3	40.0	43.8	28.4
Barisal	39.4	39.2	39.9	52.0	54.1	40.4
Chittagong	26.2	31.0	11.8	34.0	36.0	27.8
Dhaka	30.5	38.8	18.0	32.0	39.0	20.2
Khulna	32.1	31.0	35.8	45.7	46.5	43.2
Rajshahi (Former)	35.7	36.6	30.7	51.2	52.3	45.2
-Rajshahi (New)	29.8	30.0	29.0	...	...	...
-Rangpur	46.2	47.2	37.0	...	...	...
Sylhet	28.1	30.5	15.0	33.8	36.1	18.6

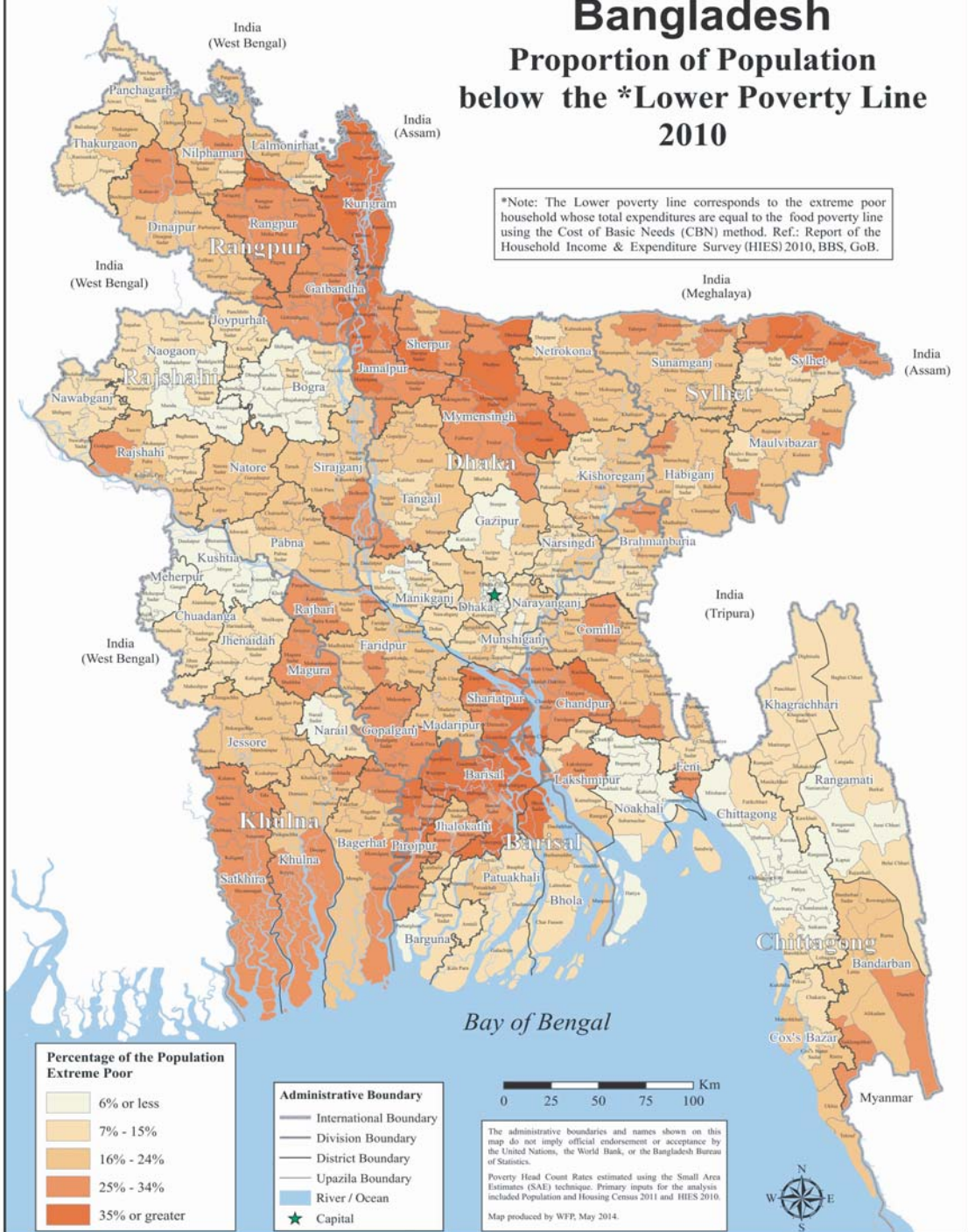
Source: Household Income and Expenditure Survey (HIES), 2010, Bangladesh Bureau of Statistics



Bangladesh

Proportion of Population below the *Lower Poverty Line 2010

*Note: The Lower poverty line corresponds to the extreme poor household whose total expenditures are equal to the food poverty line using the Cost of Basic Needs (CBN) method. Ref.: Report of the Household Income & Expenditure Survey (HIES) 2010, BBS, GoB.



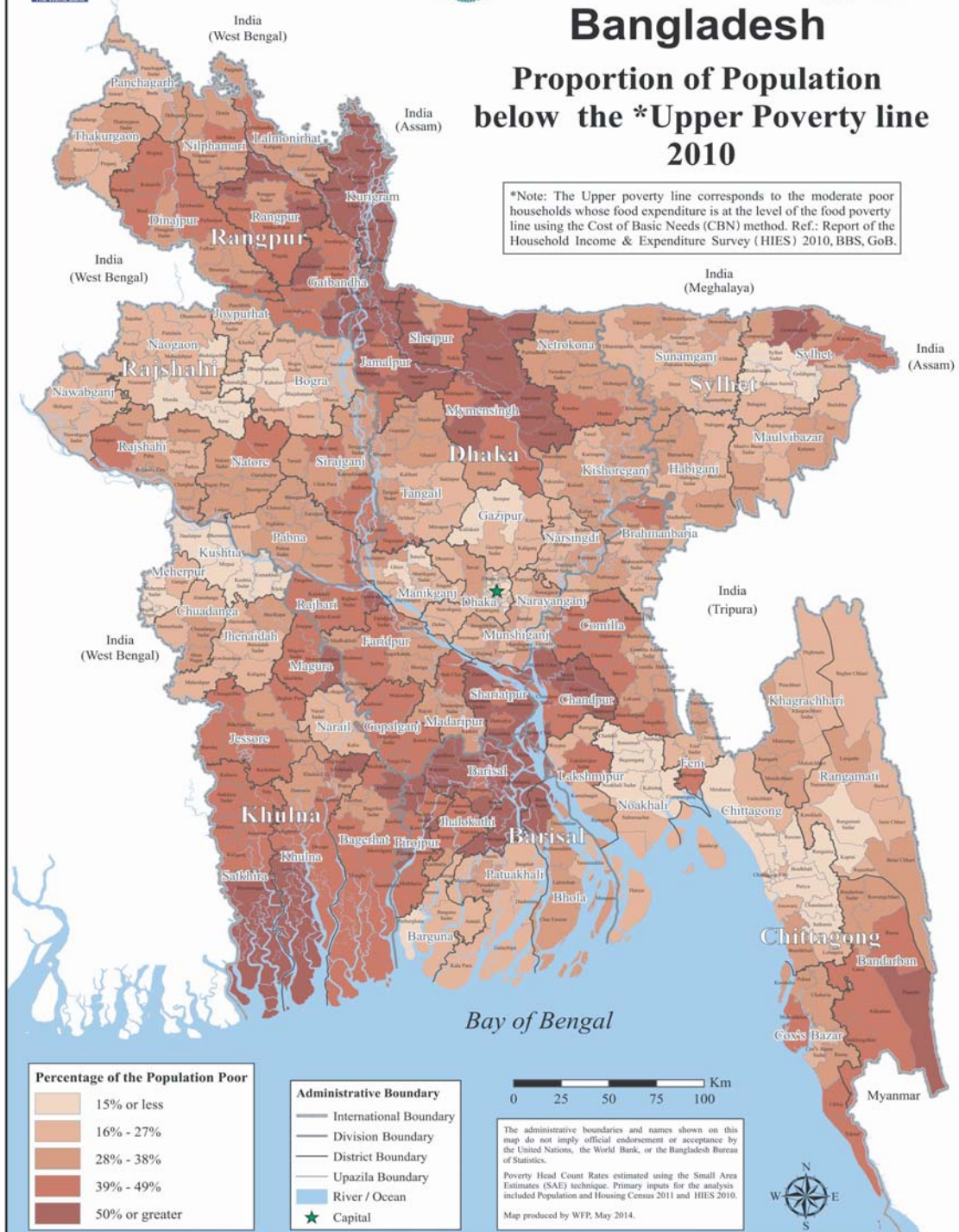
The poverty maps were prepared by the Bangladesh Bureau of Statistics, the World Bank, and the World Food Programme. The printing and dissemination of the maps was funded by IFAD. IFAD
<http://www.worldbank.org/content/dam/Worldbank/Feature%20Story/sar/Bangladesh/Bangladesh-Poverty-Map.jpg>



Bangladesh

Proportion of Population below the *Upper Poverty line 2010

*Note: The Upper poverty line corresponds to the moderate poor households whose food expenditure is at the level of the food poverty line using the Cost of Basic Needs (CBN) method. Ref.: Report of the Household Income & Expenditure Survey (HIES) 2010, BBS, GoB.



The poverty maps were prepared by the Bangladesh Bureau of Statistics, the World Bank, and the World Food Programme. The printing and dissemination of the maps was funded by IFAD. IFAD Investing in rural people

Table A-4.1: Upazila wise headcount poverty rate (lower) in Bangladesh, 2010

Upazila Code	Upazila Name	Rate of lower poverty	Upazila Code	Upazila Name	Rate of lower poverty	Upazila Code	Upazila Name	Rate of lower poverty
108	Bagerhat sadar	18.6	1347	Haim char	41.0	2605	Bangshal	0.9
114	Chitalmari	30.0	1349	Hajiganj	32.5	2606	Biman bandar	0.3
134	Fakirhat	19.2	1358	Kachua	35.0	2608	Cantonment	0.0
138	Kachua	23.6	1376	Matlab dakshin	32.4	2609	Chak bazar	1.0
156	Mollahat	26.7	1379	Matlab uttar	28.6	2610	Dakshinkhan	11.8
158	Mongla	22.7	1395	Shahrasti	29.5	2611	Darus salam	2.1
160	Morrelganj	27.0	1504	Anowara	5.6	2612	Demra	2.8
173	Rampal	22.5	1506	Bayejid bostami	2.2	2614	Dhamrai	9.1
177	Sarankhola	28.2	1508	Banshkhal	11.3	2616	Dhanmondi	0.1
304	Alikadam	23.2	1510	Bakalia	0.7	2618	Dohar	10.1
314	Bandarban sadar	15.6	1512	Boalkhal	3.8	2624	Gendaria	0.8
351	Lama	21.6	1518	Chandanaish	4.8	2626	Gulshan	0.8
373	Naikhongchhari	26.3	1519	Chandgaon	4.9	2628	Hazaribagh	1.5
389	Rowangchhari	16.2	1520	Chittagong port	3.6	2629	Jatrabari	1.0
391	Ruma	23.4	1528	Double mooring	0.0	2630	Kafrul	0.4
395	Thanchi	31.7	1533	Fatikchhari	7.1	2632	Kadamtali	1.7
409	Amtali	12.0	1535	Halishahar	1.1	2633	Kalabagan	1.4
419	Bamna	8.9	1537	Hathazari	0.1	2634	Kamrangir char	2.6
428	Barguna sadar	9.9	1541	Kotwali	0.0	2636	Khilgaon	1.5
447	Betagi	10.3	1543	Khulshi	0.1	2637	Khilkhet	1.8
485	Patharghata	6.1	1547	Lohagara	6.9	2638	Keraniganj	10.2
602	Agailjhara	38.2	1553	Mirsharai	4.6	2640	Kotwali	1.1
603	Babuganj	36.8	1555	Pahartali	11.7	2642	Lalbagh	1.8
607	Bakerganj	42.2	1557	Panchlaish	0.1	2648	Mirpur	0.5
610	Banari para	38.1	1561	Patiya	2.4	2650	Mohammadpur	0.3
632	Gaurnadi	39.9	1565	Patenga	0.6	2654	Motijheel	0.1
636	Hizla	49.5	1570	Rangunia	5.1	2662	Nawabganj	8.8
651	Barisal sadar (kotwali)	31.0	1574	Raozan	2.9	2663	New market	0.7
662	Mhendiganj	50.0	1578	Sandwip	7.4	2664	Pallabi	1.8
669	Muladi	44.1	1582	Satkania	5.5	2665	Paltan	0.3
694	Wazirpur	37.8	1586	Sitakunda	3.6	2666	Ramna	0.2
918	Bhola sadar	35.7	1807	Alamdanga	9.9	2667	Rampura	1.0
921	Burhanuddin	16.3	1823	Chuadanga sadar	11.7	2668	Sabujbagh	1.1
925	Char fasson	14.9	1831	Damurhuda	10.5	2672	Savar	18.0
929	Daulat khan	18.0	1855	Jiban nagar	11.5	2674	Shah ali	3.0
954	Lalmohan	15.2	1909	Barura	20.2	2675	Shahbagh	0.3
965	Manpura	19.4	1915	Brahman para	21.7	2676	Shyampur	1.2
991	Tazumuddin	11.3	1918	Burichang	17.3	2680	Sher-e-bangla nagar	1.0
1006	Adamdighi	5.1	1927	Chandina	22.6	2688	Sutrapur	0.3
1020	Bogra sadar	9.1	1931	Chauddagram	19.0	2690	Tejgaon	0.3
1027	Dhunat	7.3	1933	Comilla sadar dakshin	19.3	2692	Tejgaon ind. Area	0.8
1033	Dhupchanchia	5.1	1936	Daudkandi	21.0	2693	Turag	12.5
1040	Gabtali	5.7	1940	Debidwar	24.5	2695	Uttara	0.8
1054	Kahaloo	4.0	1954	Homna	19.8	2696	Uttar khan	4.3
1067	Nandigram	6.3	1967	Comilla adarsha sadar	12.6	2710	Birampur	19.0
1081	Sariakandi	8.7	1972	Laksam	20.0	2712	Birganj	24.8
1085	Shajahanpur	5.0	1974	Manoharganj	28.0	2717	Biral	20.6
1088	Sherpur	5.6	1975	Meghna	19.0	2721	Bochaganj	21.0
1094	Shibganj	6.3	1981	Muradnagar	27.0	2730	Chirirbandar	22.6
1095	Sonatola	10.3	1987	Nangalkot	26.2	2738	Fulbari	17.8
1202	Akhaura	12.9	1994	Titas	19.4	2743	Ghoraghat	24.3
1204	Banchharampur	13.2	2216	Chakaria	13.2	2747	Hakimpur	22.4
1207	Bijoynagar	19.1	2224	Cox's bazar sadar	12.2	2756	Kaharole	25.6
1213	Brahmanbaria sadar	12.2	2245	Kutubdia	13.8	2760	Khansama	25.8
1233	Ashuganj	9.6	2249	Maheshkhali	21.4	2764	Dinajpur sadar	16.5
1263	Kasba	11.9	2256	Pekua	14.3	2769	Nawabganj	20.5
1285	Nabinagar	15.0	2266	Ramu	17.8	2777	Parbatipur	22.1
1290	Nasirnagar	25.0	2290	Teknaf	19.7	2903	Alfadanga	15.5
1294	Sarail	15.5	2294	Ukhia	20.1	2910	Bhanga	17.0
1322	Chandpur sadar	25.9	2602	Adabor	1.4	2918	Boalmari	21.5
1345	Faridganj	26.8	2604	Badda	1.2	2921	Char bhadrasan	19.8

Upazila Code	Upazila Name	Rate of lower poverty
2947	Faridpur sadar	21.3
2956	Madhukhali	16.1
2962	Nagarkanda	19.2
2984	Sadarpur	20.5
2990	Saltha	24.4
3014	Chhagalnaiya	14.4
3025	Daganbhuiyan	7.5
3029	Feni sadar	9.4
3041	Fulgazi	17.8
3051	Parshuram	18.6
3094	Sonagazi	28.5
3221	Fulchhari	39.8
3224	Gaibandha sadar	28.3
3230	Gobindaganj	29.0
3267	Palashbari	27.1
3282	Sadullapur	31.1
3288	Saghata	34.1
3291	Sundarganj	29.4
3330	Gazipur sadar	8.1
3332	Kaliakair	3.9
3334	Kaliganj	7.9
3336	Kapasia	17.8
3386	Sreepur	5.9
3532	Gopalganj sadar	25.2
3543	Kashiani	24.6
3551	Kotalipara	27.7
3558	Muksudpur	29.9
3591	Tungipara	26.1
3602	Ajmiriganj	26.4
3605	Bahubal	19.3
3611	Baniachong	22.2
3626	Chunarughat	22.5
3644	Habiganj sadar	12.2
3668	Lakhai	20.0
3671	Madhabpur	20.7
3677	Nabiganj	21.5
3813	Akkelpur	13.4
3847	Joypurhat sadar	13.0
3858	Kalai	12.1
3861	Khetlal	11.7
3874	Panchbibi	13.6
3907	Bakshiganj	34.3
3915	Dewanganj	41.6
3929	Islampur	38.2
3936	Jamalpur sadar	32.7
3958	Madarganj	38.2
3961	Melandaha	30.6
3985	Sarishabari upazila	27.6
4104	Abhaynagar	15.9
4109	Bagher para	20.9
4111	Chaugachha	20.7
4123	Jhikargachha	17.9
4138	Keshabpur	20.4
4147	Jessore sadar	16.4
4161	Manirampur	19.4
4190	Sharsha	19.4
4240	Jhalokati sadar	22.3
4243	Kanthalia	21.4
4273	Nalchity	32.5
4284	Rajapur	29.8
4414	Harinakunda	10.6

Upazila Code	Upazila Name	Rate of lower poverty
4419	Jhenaidah sadar	9.7
4433	Kaliganj	9.6
4442	Kotchandpur	7.5
4471	Maheshpur	9.4
4480	Shaikupa	12.1
4643	Dighinala	8.2
4649	Khagrachhari sadar	7.3
4661	Lakshmichhari	12.6
4665	Mahalchhari	7.5
4667	Manikchhari	12.8
4670	Matiranga	11.4
4677	Panchhari	8.4
4680	Ramgarh	14.8
4712	Batiaghata	22.7
4717	Dacope	24.9
4721	Daulatpur	17.4
4730	Dumuria	19.6
4740	Dighalia	21.9
4745	Khalishpur	23.5
4748	Khan jahan ali	16.8
4751	Khulna sadar	18.8
4753	Koyra	29.1
4764	Paikgachha	23.3
4769	Phultala	17.0
4775	Rupsa	20.2
4785	Sonadanga	7.3
4794	Terokhada	30.0
4802	Austagram	20.5
4806	Bajitpur	14.8
4811	Bhairab	15.4
4827	Hossainpur	18.5
4833	Itna	21.1
4842	Karimganj	14.0
4845	Katiadi	17.1
4849	Kishoreganj sadar	14.5
4854	Kuliar char	17.2
4859	Mithamain	23.0
4876	Nikli	17.0
4879	Pakundia	13.5
4892	Tarail	14.7
4906	Bhurungamari	44.7
4908	Char rajibpur	48.7
4909	Chilmari	42.1
4918	Phulbari	48.8
4952	Kurigram sadar	40.5
4961	Nageshwari	45.4
4977	Rajarhat	48.6
4979	Raumari	36.0
4994	Ulipur	46.2
5015	Bheramara	0.8
5039	Daulatpur	1.0
5063	Khoksa	1.0
5071	Kumarkhali	0.9
5079	Kushtia sadar	0.7
5094	Mirpur	0.7
5133	Kamalnagar	7.6
5143	Lakshmipur sadar	28.8
5158	Roypur	8.7
5165	Ramganj	12.0
5173	Ramgati	16.0
5202	Aditmari	17.3

Upazila Code	Upazila Name	Rate of lower poverty
5233	Hatibandha	18.4
5239	Kaliganj	16.6
5255	Lalmonirhat sadar	15.1
5270	Patgram	17.0
5440	Kalkini	15.8
5454	Madaripur sadar	17.5
5480	Rajoir	15.4
5487	Shib char	20.2
5557	Magura sadar	24.1
5566	Mohammadpur	30.6
5585	Shalikha	24.7
5595	Sreepur	25.5
5610	Daulatpur	15.7
5622	Ghior	5.7
5628	Harirampur	8.3
5646	Manikganj sadar	7.3
5670	Saturia	6.2
5678	Shibalaya	7.0
5682	Singair	7.1
5747	Gangni	5.2
5760	Mujib nagar	4.5
5787	Meherpur sadar	5.1
5814	Barlekha	20.8
5835	Juri	31.3
5856	Kamalganj	22.0
5865	Kulaura	23.1
5874	Maulvibazar sadar	12.7
5880	Rajnagar	18.0
5883	Sreemangal	24.7
5924	Gazaria	14.7
5944	Lohajang	20.1
5956	Munshiganj sadar	15.1
5974	Serajdikhan	16.5
5984	Sreenagar	14.4
5994	Tongibari	14.0
6113	Bhaluka	14.8
6116	Dhobaura	38.4
6120	Fulbaria	32.8
6122	Gaffargaon	25.8
6123	Gauripur	30.5
6124	Haluaghat	30.6
6131	Ishwarganj	35.8
6152	Mymensingh sadar	39.3
6165	Mukttagachha	23.9
6172	Nandail	41.8
6181	Phulpur	39.2
6194	Trishal	28.8
6403	Atrai	5.0
6406	Badalgachhi	5.7
6428	Dhamoirhat	7.7
6447	Manda	5.4
6450	Mahadebpur	6.1
6460	Naogaon sadar	8.3
6469	Niamatpur	8.4
6475	Patnitala	8.1
6479	Porsha	9.4
6485	Raninagar	4.9
6486	Sapahar	9.0
6528	Kalia	9.7
6552	Lohagara	7.6
6576	Narail sadar	6.1

Upazila Code	Upazila Name	Rate of lower poverty
6702	Araihazar	19.8
6704	Sonargaon	9.9
6706	Bandar	4.0
6758	Narayanganj sadar	10.1
6768	Rupganj	8.7
6807	Belabo	11.7
6852	Manohardi	11.8
6860	Narsingdi sadar	10.8
6863	Palash	9.9
6864	Roytura	16.2
6876	Shibpur	9.8
6909	Bagatipara	18.6
6915	Baraigram	22.1
6941	Gurudaspur	22.8
6944	Lalpur	21.8
6963	Natore sadar	18.8
6991	Singra	23.4
7018	Bholahat	8.9
7037	Gomastapur	12.2
7056	Nachole	11.4
7066	Chapai nababganj sadar	12.9
7088	Shibganj	12.2
7204	Atpara	17.2
7209	Barhatta	20.1
7218	Durgapur	11.9
7238	Khaliyuri	22.3
7240	Kalmakanda	22.6
7247	Kendua	24.1
7256	Madan	23.5
7263	Mohanganj	18.2
7274	Netrokona sadar	16.2
7283	Purbadhala	20.3
7312	Dimla	17.4
7315	Domar	15.5
7336	Jaldhaka	24.9
7345	Kishoreganj	14.7
7364	Nilphamari sadar	21.0
7385	Saidpur	16.2
7507	Begumganj	1.8
7510	Chatkhil	1.5
7521	Companiganj	2.5
7536	Hatiya	5.9
7547	Kabirhat	4.4
7580	Senbagh	1.7
7583	Sonaimuri	1.5
7585	Subarnachar	7.3
7587	Noakhali sadar	3.7
7605	Atgharia	16.0
7616	Bera	22.9
7619	Bhangura	18.3
7622	Chatmohar	16.1
7633	Faridpur	16.6
7639	Ishwardi	13.2
7655	Pabna sadar	14.3
7672	Santhia	17.5
7683	Sujanagar	19.4
7704	Atwari	11.1
7725	Boda	12.0
7734	Debiganj	16.6
7773	Panchagarh sadar	11.2

Upazila Code	Upazila Name	Rate of lower poverty
7790	Tentulia	8.8
7838	Bauphal	13.9
7852	Dashmina	11.3
7855	Dumki	13.1
7857	Galachipa	14.4
7866	Kala para	9.7
7876	Mirzaganj	9.6
7895	Patuakhali sadar	23.3
7914	Bhandaria	29.9
7947	Kawkhali	39.6
7958	Mathbaria	25.6
7976	Nazirpur	36.6
7980	Pirojpur sadar	28.7
7987	Nesarabad (swarupkati)	30.1
7990	Zianagar	35.8
8110	Bagha	18.3
8112	Baghmara	14.9
8122	Boalia	10.5
8125	Charghat	16.8
8131	Durgapur	12.3
8134	Godagari	27.3
8140	Matihar	15.2
8153	Mohanpur	12.0
8172	Paba	17.1
8182	Puthia	13.3
8185	Rajpara	10.7
8190	Shah makhdom	13.4
8194	Tanore	20.7
8207	Baliakandi	24.0
8229	Goalanda	31.8
8247	Kalukhali	24.0
8273	Pangsha	28.8
8276	Rajbari sadar	23.0
8407	Baghaichhari	8.1
8421	Barkal	8.5
8425	Kawkhali (betbungia)	8.7
8429	Belai chhari	14.6
8436	Kaptai	3.9
8447	Jurai chhari	6.2
8458	Langadu	9.9
8475	Naniarchar	6.2
8478	Rajsthali	7.2
8487	Rangamati sadar	1.7
8503	Badarganj	30.6
8527	Gangachara	39.0
8542	Kaunia	33.2
8549	Rangpur sadar	25.8
8558	Mitha pukur	29.0
8573	Pirgachha	30.5
8576	Pirganj	28.3
8592	Taraganj	32.4
8614	Bhedarganj	38.3
8625	Damudya	29.4
8636	Gosairhat	40.7
8665	Naria	30.5
8669	Shariatpur sadar	31.6
8694	Zanjira	34.9
8704	Assasuni	32.0
8725	Debhata	27.5
8743	Kalaroa	28.7

Upazila Code	Upazila Name	Rate of lower poverty
8747	Kaliganj	31.7
8782	Satkhira sadar	26.0
8786	Shyamnagar	33.8
8790	Tala	28.9
8811	Belkuchi	26.4
8827	Chauhali	28.1
8844	Kamarkhanda	17.6
8850	Kazipur	20.2
8861	Royganj	22.8
8867	Shahjadpur	25.1
8878	Sirajganj sadar	21.6
8889	Tarash	20.0
8894	Ullah para	20.9
8937	Jhenaigati	21.6
8967	Nakla	28.5
8970	Nalitabari	24.1
8988	Sherpur sadar	35.6
8990	Sreebardi	30.4
9018	Bishwambarpur	24.7
9023	Chhatak	18.6
9027	Dakshin sunamganj	19.5
9029	Dera	20.7
9032	Dharampasha	20.2
9033	Dowarabazar	24.3
9047	Jagannathpur	15.8
9050	Jamalganj	19.4
9086	Sulla	22.9
9089	Sunamganj sadar	19.3
9092	Tahirpur	25.3
9108	Balaganj	15.8
9117	Beani bazar	11.8
9120	Bishwanath	9.7
9127	Companiganj	28.7
9131	Dakshin surma	7.8
9135	Fenchuganj	13.4
9138	Golapganj	11.1
9141	Gowainghat	46.5
9153	Jaintiapur	28.9
9159	Kanaighat	39.7
9162	Sylhet sadar	9.7
9194	Zakiganj	32.9
9309	Basail	11.1
9319	Bhuapur	21.4
9323	Delduar	14.5
9325	Dhanbari	21.1
9328	Ghatail	17.7
9338	Gopalpur	16.9
9347	Kalihati	12.5
9357	Madhupur	21.5
9366	Mirzapur	16.0
9376	Nagapur	26.4
9385	Sakhipur	15.5
9395	Tangail sadar	20.9
9408	Baliadangi	11.3
9451	Haripur	13.1
9482	Pirganj	9.6
9486	Ranisankail	11.1
9494	Thakurgaon sadar	17.7

Table A-4.2: Upazila wise headcount poverty rate (upper) in Bangladesh, 2010

Upazila Code	Upazila Name	Rate of lower poverty
108	Bagerhat sadar	35.9
114	Chitalmari	50.0
134	Fakirhat	36.4
138	Kachua	42.5
156	Mollahat	46.1
158	Mongla	41.9
160	Morrelganj	46.5
173	Rampal	41.1
177	Sarankhola	48.0
304	Alikadam	42.9
314	Bandarban sadar	30.8
351	Lama	41.0
373	Naikhongchhari	46.0
389	Rowangchhari	32.9
391	Ruma	42.3
395	Thanchi	53.0
409	Amtali	22.8
419	Bamna	17.1
428	Barguna sadar	19.2
447	Betagi	19.6
485	Patharghata	12.9
602	Agailjhara	51.1
603	Babuganj	48.7
607	Bakerganj	55.4
610	Banari para	52.2
632	Gaurnadi	55.5
636	Hizla	62.3
651	Barisal sadar (kotwali)	49.9
662	Mhendiganj	64.4
669	Muladi	58.2
694	Wazirpur	52.1
918	Bhola sadar	49.2
921	Burhanuddin	28.3
925	Char fasson	28.2
929	Daulat khan	30.3
954	Lalmohan	27.8
965	Manpura	32.8
991	Tazumuddin	22.3
1006	Adamdighi	13.1
1020	Bogra sadar	17.6
1027	Dhunat	19.8
1033	Dhupchanchia	13.2
1040	Gabtali	15.6
1054	Kahaloo	11.7
1067	Nandigram	16.1
1081	Sariakandi	21.6
1085	Shajahanpur	12.5
1088	Sherpur	15.7
1094	Shibganj	16.9
1095	Sonatola	23.7
1202	Akhaura	26.9
1204	Banchharampur	27.3
1207	Bijoynagar	35.8
1213	Brahmanbaria sadar	26.0
1233	Ashuganj	21.8
1263	Kasba	25.5
1285	Nabinagar	30.5
1290	Nasirnagar	43.7
1294	Sarail	31.1
1322	Chandpur sadar	45.5
1345	Faridganj	46.6

Upazila Code	Upazila Name	Rate of lower poverty
1347	Haim char	61.3
1349	Hajiganj	53.7
1358	Kachua	56.3
1376	Matlab dakshin	53.7
1379	Matlab uttar	49.9
1395	Shahrasti	50.5
1504	Anowara	15.5
1506	Bayejid bostami	9.2
1508	Banshkhali	27.9
1510	Bakalia	4.9
1512	Boalkhali	10.5
1518	Chandanaish	13.5
1519	Chandgaon	16.9
1520	Chittagong port	12.4
1528	Double mooring	0.0
1533	Fatikchhari	17.6
1535	Halishahar	5.6
1537	Hathazari	1.1
1541	Kotwali	0.3
1543	Khulshi	1.1
1547	Lohagara	18.3
1553	Mirsharai	13.4
1555	Pahartali	30.0
1557	Panchlaish	0.8
1561	Patiya	8.1
1565	Patenga	3.9
1570	Rangunia	14.0
1574	Raozan	8.5
1578	Sandwip	19.1
1582	Satkania	15.2
1586	Sitakunda	11.5
1807	Alamdanga	26.0
1823	Chuadanga sadar	29.2
1831	Damurhuda	27.1
1855	Jiban nagar	29.1
1909	Barura	37.9
1915	Brahman para	39.9
1918	Burichang	33.3
1927	Chandina	41.2
1931	Chauddagram	34.4
1933	Comilla sadar dakshin	33.3
1936	Daudkandi	38.5
1940	Debidwar	41.4
1954	Homna	38.3
1967	Comilla adarsha sadar	24.4
1972	Laksam	37.4
1974	Manoharganj	47.1
1975	Meghna	37.3
1981	Muradnagar	45.0
1987	Nangalkot	45.1
1994	Titas	37.7
2216	Chakaria	28.5
2224	Cox's bazar sadar	26.2
2245	Kutubdia	31.1
2249	Mareshkhali	40.2
2256	Pekua	30.9
2266	Ramu	34.3
2290	Teknaf	38.2
2294	Ukhia	37.8
2602	Adabor	12.5
2604	Badda	13.4

Upazila Code	Upazila Name	Rate of lower poverty
2605	Bangshal	9.4
2606	Biman bandar	1.3
2608	Cantonment	1.5
2609	Chak bazar	10.7
2610	Dakshinkhan	24.6
2611	Darus salam	14.2
2612	Demra	19.9
2614	Dhamrai	22.8
2616	Dhanmondi	1.4
2618	Dohar	23.9
2624	Gendaria	9.3
2626	Gulshan	3.3
2628	Hazaribagh	12.2
2629	Jatrabari	11.6
2630	Kafrul	7.0
2632	Kadamtali	15.0
2633	Kalabagan	10.1
2634	Kamrangir char	22.0
2636	Khilgaon	13.7
2637	Khilkhet	14.7
2638	Keraniganj	25.9
2640	Kotwali	5.9
2642	Lalbagh	16.0
2648	Mirpur	6.7
2650	Mohammadpur	4.0
2654	Motijheel	1.3
2662	Nawabganj	21.1
2663	New market	3.7
2664	Pallabi	12.0
2665	Paltan	2.7
2666	Ramna	3.8
2667	Rampura	10.2
2668	Sabujbagh	11.6
2672	Savar	34.0
2674	Shah ali	15.7
2675	Shahbagh	1.5
2676	Shyampur	12.9
2680	Sher-e-bangla nagar	7.7
2688	Sutrapur	4.6
2690	Tejgaon	5.3
2692	Tejgaon ind. Area	6.7
2693	Turag	25.1
2695	Uttara	3.7
2696	Uttar khan	24.9
2710	Birampur	35.9
2712	Birganj	43.1
2717	Biral	38.8
2721	Bochaganj	38.4
2730	Chirirbandar	38.5
2738	Fulbari	33.8
2743	Ghoraghat	41.8
2747	Hakimpur	38.9
2756	Kaharole	44.3
2760	Khansama	46.5
2764	Dinajpur sadar	28.2
2769	Nawabganj	37.3
2777	Parbatipur	39.7
2903	Alfadanga	29.9
2910	Bhanga	33.5
2918	Boalmari	39.3
2921	Char bhadrason	35.8

Upazila Code	Upazila Name	Rate of lower poverty
2947	Faridpur sadar	38.3
2956	Madhukhali	30.5
2962	Nagarkanda	35.9
2984	Sadarpur	36.9
2990	Saltha	42.1
3014	Chhagalnaiya	25.9
3025	Daganbhuiyan	16.3
3029	Feni sadar	18.6
3041	Fulgazi	31.8
3051	Parshuram	30.6
3094	Sonagazi	44.5
3221	Fulchhari	58.1
3224	Gaibandha sadar	44.8
3230	Gobindaganj	45.4
3267	Palashbari	44.8
3282	Sadullapur	51.0
3288	Saghata	52.8
3291	Sundarganj	47.6
3330	Gazipur sadar	22.1
3332	Kaliakair	11.0
3334	Kaliganj	15.7
3336	Kapasia	27.0
3386	Sreepur	14.4
3532	Gopalganj sadar	41.1
3543	Kashiani	39.1
3551	Kotalipara	43.6
3558	Muksudpur	46.5
3591	Tungipara	42.6
3602	Ajmiriganj	32.6
3605	Bahubal	24.1
3611	Baniachong	27.6
3626	Chunarughat	27.5
3644	Habiganj sadar	16.9
3668	Lakshai	25.2
3671	Madhabpur	25.9
3677	Nabiganj	26.8
3813	Akkelpur	26.9
3847	Joypurhat sadar	26.0
3858	Kalai	25.6
3861	Khetlal	26.1
3874	Panchbibi	28.3
3907	Bakshiganj	50.4
3915	Dewanganj	58.5
3929	Islampur	55.0
3936	Jamalpur sadar	49.8
3958	Madarganj	55.5
3961	Melandaha	47.2
3985	Sarishabari upazila	44.7
4104	Abhaynagar	36.0
4109	Bagher para	42.5
4111	Chaugachha	42.8
4123	Jhikargachha	38.9
4138	Keshabpur	42.0
4147	Jessore sadar	35.3
4161	Manirampur	40.2
4190	Sharsha	40.8
4240	Jhalokati sadar	37.7
4243	Kanthalia	34.2
4273	Nalchity	46.5
4284	Rajapur	42.0
4414	Harinakunda	26.0

Upazila Code	Upazila Name	Rate of lower poverty
4419	Jhenaidah sadar	23.9
4433	Kaliganj	24.0
4442	Kotchandpur	20.2
4471	Maheshpur	23.6
4480	Shailkupa	28.2
4643	Dighinala	22.5
4649	Khagrachhari sadar	19.5
4661	Lakshmichhari	31.0
4665	Mahalchhari	21.4
4667	Manikchhari	30.1
4670	Matiranga	28.3
4677	Panchhari	23.4
4680	Ramgarh	32.6
4712	Batiaghata	40.5
4717	Dacope	44.5
4721	Daulatpur	34.5
4730	Dumuria	37.2
4740	Dighalia	39.3
4745	Khalishpur	41.1
4748	Khan jahan ali	31.9
4751	Khulna sadar	35.5
4753	Koyra	49.1
4764	Paikgachha	42.4
4769	Phultala	33.7
4775	Rupsa	36.9
4785	Sonadanga	19.3
4794	Terokhada	49.6
4802	Austagram	33.7
4806	Bajitpur	28.2
4811	Bhairab	33.9
4827	Hossainpur	33.0
4833	Itna	34.9
4842	Karimganj	27.1
4845	Katiadi	31.6
4849	Kishoreganj sadar	27.6
4854	Kuliar char	32.7
4859	Mithamain	35.2
4876	Nikli	30.0
4879	Pakundia	26.1
4892	Tarail	26.1
4906	Bhurungamari	65.1
4908	Char rajibpur	68.8
4909	Chilmari	61.1
4918	Phulbari	68.5
4952	Kurigram sadar	58.0
4961	Nageshwari	65.0
4977	Rajarhat	67.7
4979	Raumari	57.0
4994	Ulipur	65.3
5015	Bheramara	3.4
5039	Daulatpur	4.0
5063	Khoksa	4.7
5071	Kumarkhali	4.0
5079	Kushtia sadar	3.0
5094	Mirpur	3.3
5133	Kamalnagar	18.7
5143	Lakshmipur sadar	45.6
5158	Roypur	16.7
5165	Ramganj	21.4
5173	Ramgati	30.4
5202	Aditmari	36.0

Upazila Code	Upazila Name	Rate of lower poverty
5233	Hatibandha	38.1
5239	Kaliganj	35.3
5255	Lalmonirhat sadar	31.3
5270	Patgram	33.3
5440	Kalkini	33.2
5454	Madaripur sadar	35.0
5480	Rajoir	31.4
5487	Shib char	38.8
5557	Magura sadar	43.0
5566	Mohammadpur	50.8
5585	Shalika	44.2
5595	Sreepur	45.0
5610	Daulatpur	29.4
5622	Ghor	13.7
5628	Harirampur	18.1
5646	Manikganj sadar	18.7
5670	Saturia	15.0
5678	Shibalaya	15.8
5682	Singair	18.1
5747	Gangni	15.8
5760	Mujib nagar	13.6
5787	Meherpur sadar	15.1
5814	Barlekha	25.7
5835	Juri	36.3
5856	Kamalganj	26.7
5865	Kulaura	28.1
5874	Maulvibazar sadar	16.7
5880	Rajnagar	22.3
5883	Sreemangal	29.3
5924	Gazaria	26.8
5944	Lohajang	33.6
5956	Munshiganj sadar	30.8
5974	Serajdikhan	28.8
5984	Sreenagar	26.3
5994	Tongibari	25.1
6113	Bhaluka	31.1
6116	Dhobaura	58.2
6120	Fulbaria	52.6
6122	Gaffargaon	43.9
6123	Gauripur	50.6
6124	Haluaghat	50.3
6131	Ishwarganj	56.0
6152	Mymensingh sadar	52.3
6165	Mukttagachha	43.3
6172	Nandail	60.7
6181	Phulpur	58.8
6194	Trishal	47.8
6403	Atrai	13.5
6406	Badalgachhi	15.0
6428	Dhamoirhat	17.9
6447	Manda	14.7
6450	Mahadebpur	15.6
6460	Naogaon sadar	17.4
6469	Niamatpur	19.4
6475	Patnitala	18.6
6479	Porsha	21.7
6485	Raninagar	13.3
6486	Sapahar	21.4
6528	Kalia	23.3
6552	Lohagara	19.9
6576	Narail sadar	17.3

Upazila Code	Upazila Name	Rate of lower poverty
6702	Araihazar	34.4
6704	Sonargaon	21.3
6706	Bandar	20.9
6758	Narayanganj sadar	27.9
6768	Rupganj	22.5
6807	Belabo	21.9
6852	Manohardi	22.7
6860	Narsingdi sadar	22.8
6863	Palash	22.2
6864	Royपुरা	29.4
6876	Shibpur	18.9
6909	Bagatipara	31.6
6915	Baraigram	36.1
6941	Gurudaspur	37.0
6944	Lalpur	35.7
6963	Natore sadar	31.8
6991	Singra	37.8
7018	Bholahat	20.8
7037	Gomastapur	26.1
7056	Nachole	24.2
7066	Chapai nababganj sadar	25.4
7088	Shibganj	26.0
7204	Atpara	31.6
7209	Barhatta	35.2
7218	Durgapur	30.2
7238	Khaliajuri	37.2
7240	Kalmakanda	37.6
7247	Kendua	40.9
7256	Madan	41.6
7263	Mohanganj	34.3
7274	Netrokona sadar	30.8
7283	Purbadhala	35.4
7312	Dimla	35.2
7315	Domar	31.3
7336	Jaldhaka	43.5
7345	Kishoreganj	30.9
7364	Nilphamari sadar	36.4
7385	Saidpur	27.7
7507	Begumganj	5.9
7510	Chatkhil	4.8
7521	Companiganj	7.6
7536	Hatiya	16.0
7547	Kabirhat	12.4
7580	Senbagh	5.4
7583	Sonaimuri	5.0
7585	Subarnachar	18.7
7587	Noakhali sadar	10.2
7605	Atgharia	31.2
7616	Bera	39.4
7619	Bhangura	33.5
7622	Chatmohar	31.4
7633	Faridpur	31.5
7639	Ishwardi	26.2
7655	Pabna sadar	27.8
7672	Santhia	33.1
7683	Sujanagar	35.4
7704	Atwari	24.1
7725	Boda	26.6
7734	Debiganj	34.2
7773	Panchagarh sadar	24.2

Upazila Code	Upazila Name	Rate of lower poverty
7790	Tentulia	21.5
7838	Bauphal	24.0
7852	Dashmina	21.8
7855	Dumki	22.0
7857	Galachipa	26.0
7866	Kala para	20.3
7876	Mirzaganj	17.8
7895	Patuakhali sadar	36.9
7914	Bhandaria	42.0
7947	Kawkhali	52.2
7958	Mathbaria	38.0
7976	Nazirpur	51.5
7980	Pirojpur sadar	42.7
7987	Nesarabad (swarupkati)	43.3
7990	Zianagar	49.1
8110	Bagha	33.6
8112	Baghmara	29.4
8122	Boalia	24.1
8125	Charghat	31.4
8131	Durgapur	25.7
8134	Godagari	44.1
8140	Matihar	33.3
8153	Mohanpur	24.9
8172	Paba	33.4
8182	Puthia	26.8
8185	Rajpara	24.4
8190	Shah mahdum	30.9
8194	Tanore	35.7
8207	Baliakandi	39.7
8229	Goalanda	50.5
8247	Kalukhali	39.6
8273	Pangsha	45.7
8276	Rajbari sadar	38.7
8407	Baghaichhari	24.8
8421	Barkal	26.1
8425	Kawkhali (betbunia)	23.4
8429	Belai chhari	34.7
8436	Kaptai	12.2
8447	Jurai chhari	19.3
8458	Langadu	29.3
8475	Naniarchar	21.2
8478	Rajsthali	20.5
8487	Rangamati sadar	7.3
8503	Badarganj	48.3
8527	Gangachara	58.3
8542	Kaunia	45.0
8549	Rangpur sadar	37.1
8558	Mitha pukur	45.4
8573	Pirgachha	49.7
8576	Pirganj	46.9
8592	Taraganj	52.4
8614	Bhedarganj	56.3
8625	Damudya	47.9
8636	Gosairhat	58.3
8665	Naria	48.1
8669	Shariatpur sadar	49.8
8694	Zanjira	54.0
8704	Assasuni	48.4
8725	Debhata	43.1
8743	Kalaroa	46.0

Upazila Code	Upazila Name	Rate of lower poverty
8747	Kaliganj	48.0
8782	Satkhira sadar	43.1
8786	Shyamnagar	50.2
8790	Tala	45.2
8811	Belkuchi	42.5
8827	Chauhali	45.5
8844	Kamarkhanda	32.5
8850	Kazipur	36.2
8861	Royganj	39.4
8867	Shahjadpur	41.8
8878	Sirajganj sadar	36.7
8889	Tarash	35.8
8894	Ullah para	36.6
8937	Jhenaigati	36.9
8967	Nakla	46.8
8970	Nalitabari	41.8
8988	Sherpur sadar	55.8
8990	Sreebardi	49.1
9018	Bishwambarpur	30.4
9023	Chhatak	23.6
9027	Dakshin sunamganj	24.4
9029	Derai	26.2
9032	Dharampasha	25.5
9033	Dowarabazar	29.9
9047	Jagannathpur	21.0
9050	Jamalganj	24.6
9086	Sulla	28.3
9089	Sunamganj sadar	25.1
9092	Tahirpur	31.2
9108	Balaganj	19.7
9117	Beani bazar	15.9
9120	Bishwanath	12.5
9127	Companiganj	34.5
9131	Dakshin surma	10.3
9135	Fenchuganj	16.9
9138	Golapganj	14.9
9141	Gowainghat	52.6
9153	Jaintiapur	34.7
9159	Kanaighat	45.8
9162	Sylhet sadar	14.3
9194	Zakiganj	39.0
9309	Basail	19.7
9319	Bhuapur	34.4
9323	Delduar	24.3
9325	Dhanbari	37.0
9328	Ghatail	28.7
9338	Gopalpur	29.3
9347	Kalihati	23.5
9357	Madhupur	36.4
9366	Mirzapur	26.7
9376	Nagarpur	39.9
9385	Sakhipur	26.0
9395	Tangail sadar	31.7
9408	Baliadangi	26.5
9451	Haripur	29.7
9482	Pirganj	23.3
9486	Ranisankail	25.8
9494	Thakurgaon sadar	28.6

Appendix 15.0.1

A Guideline on Preparing Feasibility Study

Appendix 15.0.1: A Guideline on Preparing Feasibility Study¹²

15.1 Why undertake such studies?

A feasibility study is defined as an evaluation or analysis of the potential impact of a proposed project or program. A feasibility study is conducted to assist decision-makers in determining whether or not to implement a particular project or program in the interest of the society. This involves an analysis and evaluation of the proposed project to determine if it is

- 1 technically feasible
- 2 is socially feasible within the estimated cost, and
- 3 profitable.

Undertaking a feasibility study is important as a decision made without thorough research can be costly. A feasibility study reduces the risk of making poor decisions and increases success. It gives us an objective and independent view of our potential ideas and enables us to make informed decisions about how it could be launched.

Feasibility studies are almost always conducted where large sums are at stake, an approach to evaluating a project idea which helps us identify :

- if the idea is viable or not
- useful facts and figures to aid decision-making
- alternative approaches and solutions to putting idea into practice

A feasibility study can involve some or all of the following:

- Purpose of a feasibility study
- An assessment of the current situation
- An assessment of potential situation
- An evaluation of the possible options
- A short list of the possible options
- The development of a financial model to estimate the potential input and output for each of the short listed options
- An assessment of the potential impact of the project and activity

A rationale of the project or programme explaining why this project is needed for the society or locality should be well spelled out. Of course, this will include problem statement explaining base line scenario of the locality concerned.

A feasibility study will contain extensive **data related to financial and operational impact upon which to base a decision**, and will include advantages and disadvantages of both the current situation and the proposed plan.

¹² The government is likely to make conducting a feasibility study mandatory for any development project involving a cost of more than Tk 5 crore from the next fiscal year. A decision to this effect was taken at a pre-budget discussion recently. At present, mainly big projects and donor-funded initiatives carry out feasibility studies. Successive governments used to approve many projects on political grounds, without availability of funds and feasibility studies.

A "best guess" **schedule for the project** would be included as part of the feasibility study. Realistic dates for each phase of the project would be included; however, there often are delays during implementation of a project, particularly one with a major construction component. It is important that all necessary data are collected and presented so that the best decision can be made. An example of some of the tasks included in the project schedule or timeline are:

- Review of the feasibility study, and the final recommendation is appropriate for the district.
- Develop a project team
- Identify a lead consultant for the project
- Prepare schematic design
- Prepare design drawings
- Obtain construction cost estimates
- Review design with experts
- Start construction documents
- Complete construction documents
- Advertise for bids
- Begin construction
- Begin operational planning
- Ensure on-going evaluation process

It is important that all necessary data are collected and presented so that the best decision can be made.

15.2 Format of feasibility study

This can be broken down into several sections:

15.2.1 Executive summary

An executive summary (2 pages ideal) should be included at the beginning of the report. The main points of the feasibility study are summarized for a quick review by busy administrators and policy makers. The executive summary provides the reader with an overview of the feasibility study and will help them see the entire picture before they read the details. Some decision-makers may only read the executive summary. Thus, the executive summary should be concise and include the major findings of the study followed by a recommendation.

15.2.2 Background information

Some background or setting information is critical to provide the context of the feasibility study. Included in the background information are:

- Summary of the location including such information as socio-economic conditions, the number of beneficiaries, geographical location
- Mission of the project
- Goals of the project

It is important to provide the context and justification for consideration of the proposed project. In other words, what benefits could be obtained by implementing the proposed project.

15.2.3 Site possibilities

The feasibility study should provide one or two recommended sites. The cost of the site is included. Also, the rationale for the site selected should be discussed.

15.2.4 Final recommendation

A final recommendation is provided in the feasibility study based on the research conducted. This recommendation includes the rationale for the recommendation and financial evidence that supports the recommendation.

15.3 Proposed outline for a feasibility study

15.3.1 Executive summary

Context, problem statement and rationale

- Project development context problem statement and rationale
- Policy, governance and institutional issues, and economic issues

Background information

- Poverty information and analysis
- The target group, including gender issues
- Targeting strategy and gender mainstreaming
- Geographic coverage of the project

Project description

- The knowledge base: Lessons from previous/ongoing projects
- Advantages and Disadvantages of the Proposed project
- Opportunities for economic development and poverty reduction
- Project goal and objectives
- Alignment with country development policies and strategies
- Project components
- Staffing
- Space Requirements
- Equipment Needs and Costs
- Site Possibilities
- Comparison of Current and Proposed Situation

Implementation and institutional arrangements

- Project Schedule
- Institutional development and outcomes
- The collaborative framework
- Results-based M&E

Project benefits, costs and financing

Financial and Economic Analyses:

- Net Present Value (NPV)
(considering 15% discount rate)

- (i) Financial
- (ii) Economic

- Benefit-Cost Ratio (BCR)
(considering 15% discount rate)

- (i) Financial
- (ii) Economic

- Internal Rate of Return (IRR)

- (i) Financial
- (ii) Economic

(considering 15% discount rate)

- Calculation sheet attached
- Project financing

Project risks and sustainability

- Risk analysis
- Exit strategy and post-project sustainability

Innovative features, learning and knowledge management

- Innovative features
- Project knowledge products and learning processes

Final recommendation

The current guide suggests undertaking a feasibility study at least in abridged form for all projects irrespective of its size . Economic and Fanatical Analyses are necessary component of a feasibility study, which is elaborated in Appendix 16.0.1 . During the preparation of feasibility studies, proper techno-economic viability including other pre-investment analyses studies should be carried out with the help of competent consultants where-ever necessary for projects involving complex technologies, having large financial implications and requiring market investigations/development.

Project designing and development

During the preparation of feasibility studies, proper techno-economic viability including other pre-investment analyses studies should be carried out with the help of competent consultants where-ever necessary for projects involving complex technologies, having large financial implications and requiring market investigations/development.

Project designing and development are of crucial impatience. The project idea has to be spelled out in specified terms in order to enable the decision-making bodies to evaluate and approve or reject it. In designing a project various technological alternative will have to be systematically examined and most suitable technical method will have to be adopted. The success of a development strategy emphasizing generation of employment opportunities is linked to the country's capacity to choose, adapt and adopt technologies appropriate to these objectives. In the absence of a necessary connection with appropriate . choice and, application of technology it is seen that many technologies used in Bangladesh have adverse effects on generation of employment opportunities in the rural areas.

It is, therefore, important to examine technological alternatives in designing a project and to have a more rational approach to the choice of appropriate technologies. It is also to be examined as to how the project will lead to the development of indigenous technology as well as transfer of foreign technologies. Since it is of utmost importance to follow a more rational approach to the choice of appropriate technologies, a write-up on technology transfer as envisaged in the project is to be appended with the Feasibility Report. In justifying the technological alternatives the following indicators can be examined:

- Capital output ratio
- Capital labor ration
- Output labor ratio
- Investment per worker
- Energy intensity

The write-up should indicate the present status of the proposed technology in the world market - highlighting its position in the technology life-cycle. The nature and form of technology transfer in the world market highlighting its position in the technology life-cycle. The nature and form of technology transfer envisaged in the project it is to be explained/analysed with reference to :

- a. the ways in which human resources are involved in the process of transfer of the technology;
- b. the institutional arrangements for selecting the transfer of technology;
- c. the extent of utilization of local manufacturing facilities in fabrication and erection works with the names and address of the manufacturers/suppliers of this technology ;
- d. promotion of technology development through the output of the project explaining whether the output in a new technology having a ready market or any extension/promotional work would be needed with an outline of the extension/promotion programme ;
- e. identification of the major spare-parts that can be fabricated and capability of the existing manufacturers/firms to supply inputs/ materials as well as spares ;
- f. '(f) training programme arranged to develop manpower for design, erection, operation and maintenance.

Appendix 15.0.2: Gender Analysis Process¹³

15.2.1 Introduction

Women's inability to make decisions regarding their own, their children and family in respect to health, nutrition, education, finances and safety are underlying causes of poverty, poor health and nutrition status. Food insecurity and child malnutrition are often strongly correlated with women's empowerment. Therefore, it is important to improve women's ability to influence decision making through women's empowerment.

Gender Analysis Framework (GAF) is an important tool to systematically analyze gender relations within a community and identify issues and barriers facing women in the community.

15.2.2 Key areas of the ga focus include

The key areas of the GA focus include the following:

1. Women's access to and control over income and resources.
2. Women and children, specially girl child's health care (nutrition, treatment, reproductive)
3. Violence against women (at Family and Community level).
4. Women leadership (in family, at different committee at community level).

Some of the key areas of interventions are as follows:

1. Agriculture and Livelihoods
2. Health Hygiene and Nutrition
3. Women and Girls Empowerment
4. Strengthen Services to Poor
5. Disaster Risk Management and Climate Change Adaptations

Bangladesh is committed to ensuring equality for all citizens particularly to eliminating all forms of discrimination against women. In line with this, the Ministry of Women and Children Affairs (MOWCA), the lead ministry for women's development, formulated the 1997 National Policy for the Advancement of Women (NPAW) and the 1998 National Action Plan for the Advancement of Women (NAP). The Ministry developed various programmes to address gender equality concerns in Bangladesh. GOB is a signatory to the Millennium Development Goals (MDGs). This policy commitment has been translated into action on the domestic front through the incorporation of gender equality concerns in the 2005 National Strategy for Accelerated Poverty Reduction (NSAPR).

To fulfill GoB's gender equality commitments it is necessary for officials to have a general grasp of gender concepts and to understand how to integrate gender equality considerations into policies, programmes, projects and actions. PLAGE II, a project of MOWCA supported by CIDA has

¹³ The discussion is heavily drawn on Gender Glossary, Policy Leadership and advocacy for Gender Equality, Ministry of Women and Children Affairs, government of Bangladesh.

taken the initiative to develop a user-friendly gender glossary for GoB officials and Non Governmental Organisations (NGOs).

This Glossary includes definitions taken from various sources in and outside Bangladesh. Specific examples, drawn mainly from the Bangladeshi context, are provided to illustrate how the concepts can be applied.

15.2.3 Glossary and concepts

Some glossary and concepts relating to gender and gender analysis are furnished as follows

Empowerment

Article 28 of the Bangladesh Constitution provides that: "The State shall not discriminate against any citizen on grounds only of religion, race, caste, sex or place of birth." In addition, it provides that: "Women shall have equal rights with men in all spheres of the state and of public life."

Empowerment is about people - women and men - taking control over their lives, setting their own agendas, gaining skills, building self-confidence, participating in decision making process and solving problems. Empowerment requires having access to and control over resources and the benefits that are derived from development efforts.

Economic Empowerment:

Economic empowerment of women means "ensure women's full participation in mainstream economic activities (decision making, implementation, access & control and enjoy equal benefits). The introduction of micro credit programmes in Bangladesh has offered disadvantaged women opportunities for empowerment by providing the skills and credit required to earn an income, manage money, development a business and determine the use of their earnings.

Social Empowerment:

The transformation of attitudes and beliefs about the rights, roles and capacities of women has enabled them to participate more fully in various spheres of life. In Bangladesh, some women now occupy senior positions in the government. Women are actively participating in socio-civic organizations, thus expanding their sphere of experience and increasing their opportunities to be agents and participants of developments process.

Political Empowerment:

GOB has put in place positive discrimination measures for women. The number of reserved seats for women to be elected by members of the parliament has increased from 30 to 45. This has expanded opportunities for an increasing number of women to serve in parliaments.

Gender Equity and Gender Equality

Gender Equity is the process of being fair to women and men. Gender equity calls for those who are in disadvantaged positions to have a fair share of the benefits of development as well as the substantive responsibilities in society. This means giving to those who have less on the basis of needs, and introducing special measures and interventions to compensate for the historical and social disadvantages that prevent women and men from operating on a level playing field. Equity leads to equality.

Gender Equality simply implies that the equal opportunity to reach their full potential as human beings in the development process should be equally accorded to both women and men. It refers to women and men having equality in terms of the following:

- **rights:** social, economic, political and legal (e.g., right to own land, manage property, conduct business, travel);
- **resources:** command over productive resources including education, land, information and financial resources;
- **voice:** power to influence resource allocation and investment decisions in the home, in the community, and at the national level.

Gender Mainstreaming

Gender Mainstreaming is a strategy to integrate women's and men's concerns and experiences in the design, implementation, monitoring and evaluation of policies, programmes, and projects in all political, economic, and social agendas. Gender mainstreaming within government can take numerous forms. Some of the more frequent activities consist of:

- strengthening political will for addressing gender inequality;
- increasing the number of women in decision making positions with government and the public sector;
- incorporating gender concerns into the government planning and budgetary processes;
- engendering the planning cycles of sectoral ministries and capacity building programmes;
- integrating gender concerns in the Ministries' human resource management and development policies and practices.

As a follow-up to commitments made in the framework of the 1995 Beijing Platform for Action, G08 developed a National Action Plan (NAP) for the Advancement of Women. Action Plans were developed by fifteen ministries/divisions, identifying critical interventions for mainstreaming gender in the public sector. The following actions were suggested, among others, in the NAP, for strengthening gender mainstreaming within the Ministry of Planning and the Planning Commission:

- develop a coordinated and consistent women's development approach for integrating women's needs and interests into plans and projects;
- provide guidance to sectoral ministries in order to mainstream women's development in the preparation of project proposals; facilitate monitoring of resources earmarked for women; develop gender disaggregated data to allow planners to assess women's situation in any particular sector and to compare it with that of men in order to take informed decisions on policies and programmes;
- ensure incorporation of women's concerns, needs and interests in sectoral plans and projects;
- create awareness about gender, the need for women's empowerment and its relation with overall development of the country.

Sex and Gender

Sex refers to the biological characteristics (e.g., hormones, genes, chromosomes and reproductive organs) that define human as female and male. It refers to physical attributes pertaining to a person's body contours, features, Sex differences between females and males are natural and remain the same regardless of time and place **(See Box A1)**.

Gender refers to attitudes, roles, behaviors and values assigned by culture and society to women and men. Gender differences between women and men vary over time and between places.

Box A-1: Concept of sex and gender

Sex	Gender
Sex is a biological fact	Gender is culturally and socially
Sex is natural attribute that a person is born with	Gender is created produced and maintained by social institutions such as families, communities, schools, and media
Sex remains the same everywhere and all the time.	Gender varies from culture to culture and from one period to another because it is determined by the society

Practical Gender Needs and Strategic Gender Interests

The needs and interests of women and men arise from existing gender roles and gender relations characterized as practical and strategic.

Practical Gender Needs refer to the basic and immediate necessities of life such as food, housing, health services, safe water, and education for children. Meeting practical needs includes, for example, provision of a safe water supply system and safe motherhood services. Meeting practical gender needs leads to an improvement in women's condition.

Strategic Gender Interests refer to addressing the culturally determined subordination of women in society in the economic, social and political spheres. Strategic gender interests are addressed through actions that challenge or change existing gender roles and relations. Meeting women's strategic gender interests will result in the improvement of gender relations and women's position in medium and long terms.

Examples of actions that address strategic interests include:

- a) improving access to productive assets through measures such as providing women with legal status in terms of land ownership
- b) enabling women to participate in decision-making within their home, community, local government and Parliament
- c) promoting employment opportunities for women, and
- d) encouraging campaigns to change attitudes, beliefs and norms concerning the status of women and men.

Box A-2: Practical and strategic gender needs

Practical Gender Needs	Strategic Gender Interests
Include basic, daily needs such as food, housing, safe water, health services, and education for children	Relate to the gender division of labor and the position of women in society, and respond to such issues as legal rights, equal etc.
Can improve the conditions of women's lives.	Aim to improve women's position in society.
Do not bring about any change in traditional role of women, gender relations, or society, attitudes and beliefs.	Bring about positive changes in attitudes and beliefs about the gender division of labor and about women's capacities and rights; can empower women and transform gender relations.

Women In Development (WID)

Women in Development (WID) is a development approach that views women in isolation from men and does not attempt to transform the unequal relations between women and men. This approach focuses mainly on increasing women's participation in development projects and on ensuring that projects respond to women's basic needs such as income generation or access to water. Women are viewed as passive recipients of development assistance rather than as active participants in decision making process. An example is to take initiative to install tube wells at the community level, and reduce the time that women had to spend in carrying water from distant places. Women were then passive recipients of this activity.

Gender and Development (GAD)

The Gender and Development (GAD) approach is a response to the failure of WID projects to bring about qualitative and long lasting changes in women's social status. GAD focuses on the social, economic, political and cultural forces that determine how men and women participate in, benefit from, and control project resources and activities differently. This approach shifts the focus from women as a group to the socially determined relations between women and men. For example, a project provides scope for women to actively participate in site selection process and thereby their empowerment was ensured.

Box A-3: Women in Development (WID) and Gender and Development (GAD)

Women in Development (WID)	Gender and Development (GAD)
Focuses on women in isolation from men	Focuses on the gender relations; between women and men.
Focuses on providing women with access to resources.	Focuses on providing women with access to and control over resources and benefits.
Addresses women's practical gender needs such as access to food, shelter, safe water.	Addresses women's strategic gender interests, e.g., introduction of a quota system to increase women's representation in the public sector.
Regards women as passive recipients of development	Involves women as active participants and agents of change.
Addresses women's condition.	Fosters change in women's position.

Gender Analysis

Gender Analysis is a tool for examining the differences between the roles that women and men play; the different levels of power they hold; their differing needs, constraints and opportunities; and the impact of these differences on their lives.

To analyse a situation from a gender perspective, the following issues can be considered:

- access to resources
- control over resources
- constraints and opportunities
- practical needs.

Condition and Position

Condition refers to women's visible or material state.

Position refers to women's social, political and economic standing relative to men. (e.g., characterized by disparities in wages and employment between women and men; participation in political activities; economic, political and social status; vulnerability to poverty and violence; and so on.

Access to and Control Over Resources

Access provides the opportunity for a person to make use of and benefit from existing resources and/or benefits.(e.g., access to land, education, health services)

Control is the ability of a person to define the use of resources and the right to make decisions about them. It also includes the notion of possession.

When a person has control over a resource he/she has the ability to enjoy the benefits. Equal access to resources, benefits and services is one of the objectives of women's quest for equality of treatment and opportunity. Control over resources and/or benefits, on the other hand, goes one step further as it entails having the ability to direct or influence how resources and/or benefits can be enjoyed.

Double/Multiple Burden

The heavy responsibilities imposed on women by marriage, motherhood and employment are referred to as the double/multiple burden. The term refers to the numerous tasks that are continually taken on mainly by women on top of tasks in paid work outside of their homes. This workload consists of unpaid domestic work, (e.g., caring for children and the elderly, cleaning, cooking, etc.), paid productive work, and all other work necessary for the survival and well-being of the family.

Engendering Research

'Engendering' Research is the process of incorporating a gender perspective into all the steps of conducting research, from conceptualization to report preparation. This process would include consideration of gender roles and relations, needs, priorities, and concerns in formulating the theoretical and conceptual framework of the research, in designing the research objectives, in developing the research methodology, in processing and analyzing the data/information generated, and in drawing up recommendations.

Engendering Statistics

'Engendering' Statistics is the process of integrating the different roles, socio-economic realities, needs and concerns of women and men in the definition of data categories, methods of data collection, compilation, processing, analysis and dissemination of statistics. Engendered statistics offer a portrait of society that differentiates the situation of women and girls from that of men and boys. This information permits policy makers and development planners to take into account women's and men's, girls' and boys' gender-specific needs and interests. Engendered statistics can also be used for lobbying and advocacy to promote women's participation in the processes of national development.

Gender Division of Labor

Gender Division of Labor refers to the allocation of differential tasks, responsibilities and activities to women and men according to what is considered socially and culturally appropriate. For instance, paid work done outside the home and in the public arena is usually attributed to men because society assigns them the role of primary breadwinner for the family. On the other hand, unpaid, domestic work done within the private domain of the home is assigned primarily to women. Men's productive work is considered more important because of the economic benefits and advantages it gives to those engaged in it and due to the social recognition given to it. On the other hand, women's domestic work is mostly unrecognized, undervalued and either not paid or poorly paid. This lack of social recognition contributes to women's subordinate position in society in relation to men.

Gender Responsive Budgeting

Gender Responsive Budgeting (GRB) entails gender analysis of government revenue, budgets, allocation of resources, and expenditures in order to assess the differential impact of the budgeting process on women and men. Gender Responsive Budgets are tools and processes designed to facilitate gender analysis in the formulation of government budgets and the allocation of resources. Gender budgets are not separate budgets for women or for men. They are attempts to breakdown or disaggregate the government's mainstream budget according to its impacts on women and men.

The purpose of assessing the gender impact of budgets is three-fold and interrelated (1) to raise awareness and understanding of gender issues in budgets/policies (2) to foster accountability of governments for their gender equality commitments, and (3) to ultimately revise, budgets and policies in the light of the assessments and to thus increase accountability.

Resources and Benefits

Resources can be tangible or intangible. Tangible resources are material or physical resources like land, water, forests, etc. Intangible resources include human resources, intellectual resources and organisational resources. Human resources are labor and skills. Intellectual resources are knowledge, information, ideas, etc. Organisational resources consist of membership of a person or group of persons in organisations such as NGOs/CSOs, cooperatives, credit societies, political parties, or trade unions, etc.

Benefits are economic, social, and political results derived from the utilization of resources, including the satisfaction of practical needs (food, housing) and/or strategic interests (education and training, political power, prestige, economic viability, and so on).

Gender Equality Lens

A gender equality lens is a way of looking at the work to identify ways of supporting the well-being of women and men (girls and boys); taking special care to ensure inclusion of the full diversity of women. Using a gender equality lens, following queries may be fulfilled:

Are women and men affected differently by the need or social problem, policy or service? Are there steps we can take to address these differences and reduce inequalities?

Are some groups of women more acutely affected or at-risk of exclusion according to their income, marital status, age etc?

Gender Sensitive Management System

A Gender Management System is a network of structures, mechanisms and processes put in place within an existing organisational framework, to guide, plan, monitor and evaluate the process of mainstreaming gender into all areas of the organisation's work. In Bangladesh, the following elements suggested in the National Action Plan for the Advancement of Women (NAP) that could constitute a Gender Management System:

- Strengthening women's machinery (MOWCA, WID-Focal Points, National Council for Women's Development, Women's Development Implementation and Evaluation Committee, Parliamentary Standing Committee, District and Upazila Level WID Coordinating Committees);
- Support in stakeholders including government and nongovernment actors (NGOs and CSOs, such as the media, academic institutions, professional association) in implementing international commitments such as the Beijing Platform for Action
- Building the capacity of stakeholders to mainstream gender equality concerns in policies, programmes, projects and budgets; and
- Facilitating partnership building among government and nongovernment stakeholders.

Appendix 16.0.1

Guidelines for Benefit- Cost Analysis

Appendix 16.0.1: Guidelines For Benefit-Cost Analysis¹⁴

Benefit-Cost Analysis is a specialized and an involved area of knowledge. So, before we get on to the Guidelines for Benefit-Cost Analysis it is considered important to introduce at the very outset Glossary containing basic concepts and terminology relating to Benefit-Cost Analysis. It is expected that the familiarization of such a broad range of concepts will facilitate the users to follow this guide more readily.

Part I : Glossary

Accounting price: Reflects the economic value of inputs and outputs, rather than a financial or market value. Synonymous with shadow price and social price.

Adjustment factor: The percentage by which the financial price of an input or output must be raised or lowered to reflect its true economic value. Synonymous with conversion factor.

Appraisal: A before the fact (ex ante) evaluation.

Base case: The optimised without-project scenario.

Benefit-cost analysis: A procedure that evaluates the desirability of a program or project by weighing the benefits against the costs.

Benefit-cost ratio: The ratio of benefits to costs. It is calculated using the present values of each, discounted at an appropriate rate of interest. The ratio should be at least 1.0 for the project to be acceptable.

Budget-Year Taka: Face value Taka of varying purchasing power (depending on when a transaction is undertaken). Synonymous with nominal Taka and current Taka.

Capital: Resources that will yield benefits gradually over time. Related to investment (in contrast to consumption). May be divided into physical and financial; fixed and working; etc. Sometimes defined more broadly to include human capital (for example, in regard to an education that yields benefits over time).

Cash flow: The funds generated or used by the project. Reflects the costs and benefits over time from a stated point of view.

¹⁴ This guideline on BCA is drawn on various literatures (See References and Selected Readings), particularly the study Treasury Board of Canada Secretariat (1998). The conditions described here for BCA should be considered from general points of view. In extraordinary cases, the conditions may be slightly different, and should be accordingly adjusted.

Cash-flow statement. A financial statement that records the cash flow of a project or financial entity. Synonymous with sources-and-uses-of-funds statement.

Constant Taka. Taka: of constant purchasing power. The units of purchasing power are fixed by stating the base year, for example, 100 in 1995 constant Taka. A better term is real Taka.

Constant price: A price that has been deflated to real terms by an appropriate price index.

Consumer surplus: The value consumers receive over and above what they actually have to pay. Varies from one person to another and is measured by willingness to pay.

Contingent valuation: A method of inferring the value of benefits and costs in the absence of a market. What people would be willing to pay to gain a benefit (or willing to accept to compensate for a loss) if a market existed for the good.

Cost: An expense related to purchase of inputs, including capital equipment, buildings, materials, labor and public utilities. Costs such as environmental damage or injuries to health are sometimes referred to as negative externalities.

Cost-effectiveness analysis: A type of analysis commonly used to compare alternative projects or project designs when the value of outputs (benefits) cannot be measured adequately in Taka. If it can be assumed that the benefits are the same for all alternatives being considered, then the task is to minimize the cost of obtaining them through cost-effectiveness analysis. Synonymous with least-cost analysis.

Decision rule: A criterion for accepting or rejecting a project or for ranking investments in order of desirability.

Delphi method: A technique for obtaining subjective judgmental values through iterative estimations by a group of experts.

Demand, Demand curve: Need or desire for a good or service. The need varies with person, price and circumstance, so demand is usually expressed in terms of the quantities demanded at various prices. The demand curve usually slopes downward, indicating that people will demand more at lower prices than at higher prices. Opposite of supply.

Depreciation: Not a term used in benefit-cost analysis. In other financial frameworks, depreciation is the allocation of the cost of an asset over time. This is necessary for a working estimate of production costs, but because rates of depreciation are usually determined primarily by legal and accounting requirements, the amount of depreciation often has little relationship to the actual rate of use or cost of replacement.

Deterministic model: A benefit-cost model that uses single fixed values for each input (rather than a range of values and probabilities).

Distributional gain or loss: A change in the distribution of wealth or income.

Discounting, Discounted cash flow: The process of adjusting future values to an equivalent present value at a stated point in time by a discount rate. The costs and benefits (cash flows) discounted to present values to give a common basis for comparison.

Discount rate: The interest rate at which future values are discounted to the present and vice

versa. Either the opportunity cost of capital (applied to investment Taka) or the time preference for consumption (applied to consumption Taka).

Distortion: A difference between market prices and true values (economic prices).

Distributional effect: A change in the income or wealth of the people from whose point of view the benefit-cost analysis is done.

Economic, economic price: Having to do with the national economy, especially as in economic value. The value of a good or service to the country as a whole, as opposed to its private or commercial value. Price that reflects the relative value that should be assigned to inputs and outputs if the economy is to produce the maximum value of physical output efficiently. There is no consideration of income distribution or other non-efficiency goals in such a price. Synonymous with efficiency price and true price.

Economic rate of return: An internal rate of return based on economic prices.

Equity, grant, loan While the terms "grant" and "loan" are commonly understood, the term "equity" may need to be explained. Equity means subscription towards share capital of an investment project.

Expected net present value (ENPV): The sum of all of the possible net present values multiplied by their probabilities.

Externality: A benefit or cost falling on third parties who normally cannot pay or be compensated for it through a market mechanism. An external benefit is a positive externality; an external cost is a negative externality. Externalities are not reflected in the financial accounts. For example, a project may harm the environment, train workers, or make it easier for other firms to get started in a related line of business, but these effects do not show up in the project's financial statements. For economic analysis, however, it is necessary to take such externalities into account and place a value on them.

Financial: Using market prices and taking a commercial point of view.

Financial rate of return: The financial profitability of a project. Usually refers to an annual return on net fixed assets or on investment but may refer to the internal rate of return, which is determined through discounted cash flow analysis.

Fixed costs: The costs such as management salaries, interest and loan repayments that must be met, at least in the short term, regardless of production volume.

Incremental: Additional or marginal.

Index number: Any index calculated to compare an amount in one period with that in another, for example, growth of production, population. See price index.

Inflation: A general increase in market price levels (a fall in the general purchasing power of the currency unit).

Input: That which is consumed by the project (as opposed to the project's output). Usually refers to the physical inputs used by the project, including materials, capital, labor and public utilities.

Internal rate of return (IRR): The yield or profitability of a project based on discounted cash-

flow analysis. The IRR is the discount rate that, when applied to the stream of benefits and costs reflected in the cash flow of a project, produces a net present value of zero.

Investment horizon: The period over which benefits and costs will be compared.

Marginal. Last, in the sense of the last additional unit. For example, the marginal benefit is the value of one more (or one less) unit of output. Synonymous with incremental.

Marginal productivity of capital: The productivity of the last unit of investment that would be undertaken if all investment alternatives were ranked in descending order according to their economic profitability and the available funds were distributed until exhausted. More loosely, the profitability of the marginal project (the project that should receive the last Taka of investment).

Market price: (a) The price of a good in the domestic market (see financial); as opposed to the economic price, efficiency price, shadow price or social price; (b) the cost of a good, including indirect taxes and subsidies.

Model: A representation or simulation of a system or process showing how parameters, benefits and costs interact to produce a bottom-line result by which the project can be judged.

Multiplier: The ratio of a change in the total community income to the initial change in expenditure that brought it about.

Mutually exclusive: Alternatives that cannot be undertaken simultaneously: if one alternative is carried out, the other cannot be. The alternatives may be mutually exclusive because they represent alternative times of beginning the same project, because funds are limited, or because if one is carried out the other will not be required (for example, a choice between a thermal and a hydro power station).

Net present value (NPV): The net value of an investment when all costs and benefits expressed in standard units of value (numerares) are summed up. Synonymous with net present worth.

Nominal Taka, nominal prices: Prices prevailing in a particular year. Synonymous with budget-year Taka.

Non-tradable: Referring to a good that has no apparent markets.

Numeraire: The standard unit of value that makes it possible to add and subtract costs and benefits that are otherwise expressed in unlike units. For example, apples and oranges, as everyone knows, should not be added up. But if they are expressed in terms of a common numeraire, such as pieces of fruit, kilograms or Taka, it is then possible to say that we have 20 pieces or three kilograms, or TK 40 worth of fruit. Common numeraires in benefit-cost analysis are Taka of investment, Taka of consumption, and Taka of foreign exchange.

Operational and maintenance costs: The recurring costs for operating and maintaining the value of physical assets.

Opportunity cost: The value of something foregone. For example, the direct opportunity cost of a person-day of labor is what the person would otherwise have produced had the person not been taken away from his or her best alternative occupation to be employed in the project.

Opportunity cost of capital: The best alternative return foregone elsewhere by committing assets to the project.

Output: That which is produced. Usually refers to the physical product of the project. Other effects of the project, such as harming environment, housing for workers, employment, training of labor, and foreign-exchange savings, are usually called externalities, positive or negative.

Payback period: The time required for the cumulative present value of benefits to become equal to the cumulative present value of costs.

Present value: A future value discounted to the present by the appropriate discount rate.

Price index: The market value of a fixed basket of goods and services at one date divided by the market value of the same basket at some base date. Subtracting 1.0 from the index gives the decimal equivalent of the percentage increase in prices between the two periods. Useful in measuring rates of inflation.

Probability: The quantified likelihood of something occurring.

Producer surplus: The value a producer receives over and above the minimum payment needed to continue to supply the good.

Rate of return: The profitability of a project. A shorthand term usually applied in economic analysis to the internal economic rate of return and in financial analysis to the annual return on net fixed assets or to the internal financial rate of return (it is important to specify which).

Real Taka, real prices: Standard units of purchasing power, defined by stating a base year.

Residual value: The market value of an asset at the investment horizon.

Risk: The degree to which outcomes are uncertain. The extent of possible variation in the outcome.

Risk analysis: A benefit-cost analysis that recognizes the simultaneous variation of the values of several inputs, according to specified ranges and probabilities, and analyzes the resulting variability in the bottom line.

Risk variable: A variable in risk analysis, chosen because of its likely importance to the outcome of the analysis.

Salvage value: The residual value of an asset at the investment horizon.

Scale: The size of a project.

Scenario: An outline or portrait of a possible future; usually portrays unfolding events, rather than being static in time.

Sensitivity analysis: An examination of the effect that a change in a single variable (parameter, cost or benefit) has on the outcome of a project.

Shadow price: The true or economic value of a good (as opposed to the market price, which might be distorted). Synonymous with accounting price and social price.

Simulation: A mathematical model that sets out a system of interacting parameters, costs and benefits to predict the likely outcome of an investment.

Social net present value: The net present value of a project, calculated using true or economic values (social prices or shadow prices).

Social price: A price that reflects the true value to the country of inputs and outputs of the project. Synonymous with accounting price and shadow price.

Supply, Supply curve: Supply is usually expressed in terms of the quantities that would be supplied at various prices. The supply curve usually slopes upward, indicating that suppliers will supply more at higher prices than at lower prices. Where economies of scale exist, however, the supply price may drop as scale increases over the range where such economies prevail. Opposite of demand.

Trade-off: The give and take involved in compromise or deal making; the negatives that come along with the positives and vice versa.

Transfer payments: Payments that redistribute wealth but do not use up resources or create them.

Weight: A factor that, when multiplied by the value to be weighted, adjusts that value to reflect certain considerations, and to reflect relative importance.

Willingness to pay: What consumers are willing to pay for a good or service. Consumers willing to pay substantially more than the actual market price enjoy a consumer surplus (the amount they would pay minus the amount they actually have to pay).

Part II : Guidelines for Benefit-Cost Analysis

1. 0 INTRODUCTION

This Guide provides a framework for benefit-cost analysis (BCA) in a form as user-friendly as possible. It should be used in submissions to the appropriate authority for approval when the project has significant social, economic or environmental implications. Although specialized experts are required to be engaged in carrying out necessary benefit-cost analyses, and standard procedures are commonly available in the literatures this Guide presents basic features related to BCA in a simple way.

1.1 Resource-allocation decisions involve choices

Difficult choices are involved when resources are scarce. Any action that consumes resources that could be put to another, and perhaps better, use must have a convincing justification. Frequently, there are several alternatives. Governments are often forced to finance new programs at the expense of existing ones

Regardless of who makes the decision, the principles to be used are the same; what varies is the level of investment in analysis justified by the resources at stake. As the title of this guide suggests, the principles are those of benefit-cost analysis. The basic elements are benefits, costs and choices. With a limited budget, we must ensure that each project chosen has the highest value per Taka expended. This guide is intended for two groups:

- analysts who conduct studies in support of decisions through BCA; and
- managers who use the results of the studies.

The guide has the following objectives:

- to provide an understanding of how BCA can help in decision-making ;
- to establish a general framework that will lend consistency to analyses, facilitating their comparison and
- ensuring good practices whether the analyses are performed by departmental specialists or by consultants;
- to serve as a self-instruction manual with concrete and detailed guidance on the basic elements of analysis; and

Benefit-cost analysis is simply rational decision-making. However, the analysis sometimes becomes inadequate when the alternatives are complex or the data are uncertain. As far as possible, benefit-cost analysis puts both costs and benefits into standard units (e.g., Taka) so that they can be compared directly. In some cases, it is difficult to put the benefits into Taka, so we use cost-effectiveness analysis, which is a cost-minimization technique. For example, there might be two highway-crossing upgrade options that will result in the same saving of lives. In this case, we choose between the options on the basis of minimum cost.

1.2 The steps in benefit-cost analysis

A set of standard steps is listed below. Each step is explained in the chapter indicated.

1. Examine needs, consider constraints, and formulate objectives and targets. State the point of view from which costs and benefits will be assessed.
2. Define options in a way that enables the analyst to compare them fairly. If one option is being assessed against a base case, ensure that the base case is optimised.
3. Analyze incremental effects and gather data about costs and benefits. Set out the costs and benefits over time in a spreadsheet.
4. Express the cost and benefit data in a valid standard unit of measurement (for example, convert Taka to constant Taka, and use accurate, undistorted prices).
5. Conduct a sensitivity analysis to determine which variables appear to have the most influence on the NPV. Consider whether better information about the values of these variables could be obtained to limit the uncertainty, or whether action can limit the uncertainty (negotiating a labor rate, for example).
6. Analyse risk by using what is known about the ranges and probabilities of the costs and benefits values and by simulating expected outcomes of the investment. What is the expected net present value (ENPV)? Apply the standard decision rules.
7. Identify the option, which gives the desirable distribution of income (by income class, gender or region - whatever categorisation is appropriate).
8. Considering all of the quantitative analysis, as well as the qualitative analysis of factors that cannot be expressed in Taka, make a reasoned recommendation.

1.3 Point of view - why is important?

A good way to start a discussion of benefit-cost analysis is by noting that the benefit-cost analyst must work consistently from a clear point of view. Whose costs and benefits are being assessed? The analyst is not restricted to a single point of view. The government might take the narrow fiscal point of view, for example, or a broad social point of view, or both. Whatever the point of view chosen, each analysis must take a single point of view and it must be stated clearly at the outset.

1.4 The components of benefit-cost analysis

All public-investment decisions can be modelled in the same standard way, using as the general framework for analysis the same four components:

- a parameters table;
- an incremental-effects model;
- a table of costs and benefits over time; and
- a table of possible investment results and a statistical and graphical analysis of NPV and investment risk.

The first component of this investment model is the parameter table, which is a list of variables used to calculate the costs and benefits. For example, both costs and benefits of a project might be influenced over time by the population growth rate of the community. Rather than retype the population growth rate every time it appears in a formula within the table of costs and benefits, it is better to list it in the parameter table and refer to it in other parts of the spreadsheet as it is needed. Although not absolutely essential, the use of a parameter table also facilitates all kinds of 'what if' analyses, including sensitivity analysis and risk analysis. It simplifies the analyst's task when changing the value of the parameter, a key requirement of risk analysis. The second component is the incremental-effects model. In business or industrial contexts, this is sometimes called the production model. It sets out the expected events and consequences over time.

The third component of the model is the table of costs and benefits over time. This is a list of all costs and benefits, with the values for each noted for every period within the investment horizon. These values are best-expressed in nominal Taka so that adjustments normally calculated in nominal Taka can be made (adjustments for taxes, for example). Nominal Taka cannot be added or subtracted across periods, however, so they must at some stage be converted to constant Taka, and then to present values, before they can be summed up. It is good to calculate the full table of costs and benefits in nominal Taka, then another table in constant Taka, and then in another table in present values.

The final component of the model is the investment results table. Each time the benefit-cost model is run, it estimates an NPV of the investment. With this information, the analyst can apply decision rules to ascertain whether the project is a good one and whether it is the best alternative.

1.5 Constructing tables of costs and benefits

By far the greatest amount of time in a benefit-cost analysis is spent in constructing the tables of costs and benefits over time. To construct these tables, the analyst identifies the full set of relevant costs and benefits, estimates their quantities for each period, and calculates their values by applying their prices to their quantities in each period.

The greatest difference between benefit-cost cash flows and business cash flows is that the latter may include accrued values, depreciation and similar allowances. Benefit-cost analysis does not use accruals, depreciation allowances or other 'non-cash' items. In benefit-cost analysis, each cost and benefit is fully recognised at the time it occurs (not accrued beforehand), timing is dealt with through discounting, and changes in the values of assets are dealt with by including residual values at the investment horizon.

1.6 The investment horizon

The investment horizon is the end of the period over which costs and benefits will be compared to ascertain whether an investment is a good one. If costs and benefits can be identified for the whole economic life of the project, then the full economic life provides the best investment horizon. It is important, however, that the investment horizon is not chosen to deliberately favor the project.

1.7 Time-of-occurrence assumptions

Costs and benefits occur at different points within the standard period being used (within the year, for example). Therefore, we need a convention for establishing where all costs and benefits will be assumed to fall within the period. Normally, the analyst selects one of three possibilities: either at the beginning of each period, in the middle, or at the end.

1.8 The numeraire - a common unit of value

Before they can be summed up, all costs and benefits must be expressed in a common unit of value. This involves three main things: expressing them all in a common numeraire (say Taka of investment funds); adjusting for inflation where necessary (converting to constant Taka); and expressing all in present values (adjusting for differences in the time of occurrence of costs and benefits).

Both constant Taka and present values (they are not the same things!) are defined at a particular point in time. Any point will do, but the most frequent choices for to are the time at which the analysis is being done, the start of the project, or the start of a new fiscal year. Costs that are incurred before to would, of course, be inflated, rather than deflated, to an equivalent to value.

Box A-4: Basic Features of General Benefit-Cost Model

- Benefit-cost analysis can be applied to a wide range of decisions made by the Government of Bangladesh.
- Every benefit-cost analysis must state the point of view from which benefits and costs will be assessed.
- There is no cookbook for benefit-cost analysis, but a standard set of steps is a useful starting point.
- Each benefit-cost analysis should contain a parameter table; an incremental-effects model; a table of costs and benefits over time; and a table of possible investment results.

1.9 Incremental effects analysis

Before we can undertake a financial or economic analysis of a proposed project or program, we need a clear understanding of the incremental events and consequences to be expected. In general, we will need input from subject-matter experts. If the project is to build a road by-pass, for example, the analysis team should include traffic engineers to estimate the incremental improvements in safety and travel time that will result. In benefit-cost analysis, then, two 'subject matter' skills will always be needed:

- expertise in estimating the expected frequency of events; and
- expertise in assessing the potential consequences of events.

The benefit-cost analyst brings two additional skills to bear on the information provided by the subject-matter experts:

- expertise in valuing outcomes in Taka; and
- expertise in making fair comparisons between benefits and costs.

2.0 COST EFFECTIVENESS ANALYSIS (CEA) AND COST UTILITY ANALYSIS (CUA)

When the output of a project is undefined or cannot be measured in monetary units, BCA is of limited use. One of the alternatives to this is cost-effectiveness analysis (CEA). CEA is an economic analysis that compares the relative costs and outcomes (benefits) of two or more similar courses of actions or programs or projects.

Typically, the CEA is expressed in terms of a ratio where the denominator is a measure of gain in health, for example, (e.g., number of lives saved, or cases prevented) or project/program outcome (e.g., number of trainee, building, workers etc.) and the numerator is the cost associated with the health gain or program/project (Tengs et al., 1995). If the denominator of CEA is replaced by increase in efficiency, for example, then the ratio is expressed as Cost Utility (CU) ratio. Therefore, the CE ratio and CU ratio for project analyses are given by the formulae :

$$\text{CE Ratio} = \frac{\text{PC}}{\text{PBQ}} \quad (1)$$

and

$$\text{CU Ratio} = \frac{\text{PC}}{\text{PBI}}, \quad (2)$$

where PC indicates the project cost, PBQ indicates the project benefits in terms of quantity such as number of trainee, workers etc., PBI denotes the increasing amount of project benefits i.e., efficiency increases in existing level compared to pre-project level for the project.

Benefit Cost Analysis (BCA) is used when both project outputs and benefits can be quantified in monetary terms. When the project output/benefits can not be converted to monetary terms CEA or CUE is used. However, CEA and CUA are basically similar. The CEA results are presented by the Cost Effectiveness ratio, which is expressed in present value of costs in terms of treatment objects such as "Per student", "Per trainee", "Per patient" and the like. The results may also be expressed in terms of Cost Utility ratios. Therefore, both CEA and CUA necessarily involve analyses through comparisons of alternative interventions. That is, CEA or CUA is a form of economic analysis that compares the relative costs and outcomes of two or more similar courses of actions or programs or projects.

3.0 SOME IMPORTANT CONCEPTS

Even when we know how to count in standard units, we still need to be careful about what we count. In particular, transfers, opportunity cost, sunk cost and residual value are important concepts in benefit-cost analysis (See also Glossary at the beginning).

To avoid double counting, the analysis must maintain a consistent point of view. The analysis team also needs an in-depth understanding of the proposed investment to be able to identify a coherent set of costs and benefits without double counting. For example, suppose a new sewage-

treatment plant is installed. The recreation value of the river improves, land values in the neighborhood increase, and health problems decrease. However, if all these effects are counted as benefits there is probably double counting. The increase in land values is probably a measure of the other benefits, not an additional benefit.

3.1 Transfers compared with true benefits and costs

In benefit-cost analysis we count resources that are created or used up. Resources that are simply transferred from one pocket to another are not counted as costs or benefits.

Box A-5: Example of Transfers

Income taxes are transfers from the point of view of the whole country. Taxes move resources around but apart from administrative and disincentive costs nothing is used up.

'Point of view' establishes whether a transaction is a transfer or not. It determines whether resources are passed from one pocket to another (a transfer) or passed out of the group or used up (a cost). From the point of view of a private business, for example, income taxes are a cost.

In certain circumstances, tariffs, grants, taxes, social-welfare payments and many other items can be considered transfers. What is important here is whether resources are gained by or lost to the stakeholder(s) and from whose point of view the analysis is being done.

3.2 Opportunity cost and sunk cost

In calculating the benefits of public projects, the proper valuation to use is the price consumers are willing to pay for the output, that is, producer's price plus taxes minus subsidies.

The opportunity cost is the true value of any resource foregone. It must be counted even if explicit cash transactions are not involved.. A cost is 'sunk' if it is permanently made or committed. A sunk cost is not to be counted in a prospective benefit-cost analysis because it cannot be affected by the decision in question.

Box A-6: Example of Opportunity Cost

If one could sell his computer for TK 1000 but instead he uses it on a project, the opportunity cost of the computer (to be counted against the project) is TK 1000, although there is no cash transaction involved.

If one originally paid TK 3000 for his computer but its market value at the time of the analysis is TK 1000, then TK 1000 is the opportunity cost if he decides to use the computer on a proposed project rather than sell it, and the remaining TK 2000 is a sunk cost that is no longer relevant.

3.3 Externalities

It is important to take into account all of the allocative effects in evaluations of the efficiency of government expenditures, some of which may be less obvious than others. Such implicit effects may be internal (to direct actors in the project) or external (to persons not directly acting in the project but included in the group whose point of view is being taken in the analysis).

Box A-7: Example of Internal/External Implicit Effects

An example of internal implicit effects is foregone wages during one's education. External implicit effects (also referred to as spillovers, or social effects, or third party effects) are commonly things like pollution or congestion. Ignoring implicit costs or benefits could lead to major errors in any BCA.

3.4 Residual value

A residual value is the value of an asset at the end of the investment horizon. In most cases, the residual value is the market value of the asset. Suppose we invest in a rental property. At the end of the investment horizon, the land is still a valuable asset. The residual value is a benefit to be counted when we appraise the project. However, governments often maintain 'special-use facilities' (research laboratories, for example) for which market value might not be a good measure. The value of a special-use facility may be as little as the market value of the land minus demolition costs to remove the buildings. On the other hand, the true value can be as high as the replacement costs of the buildings and the land.

Box A-8: Example of Residual Value

In calculations of residual value for a benefit-cost analysis, the land and the buildings are often treated separately. The analyst uses an index to estimate the expected market value of the land. The analyst then estimates the economic life of the buildings and assess proportionately the replacement value according to the percentage of economic life that will have passed by the end of the investment horizon. For example, suppose at t_0 a real property consists of land worth TK 1 million and buildings worth TK 2 million. By t_{10} (10 years is the investment horizon in this case), we expect the land value to have increased to TK 1.5 million (nominal Taka) and the replacement value of the buildings to have increased to TK 3.5 million (nominal Taka). Suppose also that 10 years is 50 per cent of the economic life of the building. The residual value of the real property at t_{10} would thus be approximately TK 1.5 million (land) plus TK 1.75 million (half the replacement value of the buildings).

Several problems can arise in treatments of residual values. One mistake is to count a residual value on an already owned asset without counting the balancing opportunity cost at t_0 . Whether the asset is already owned or not, its full value must be counted as a cost at t_0 if its residual value is to be counted as a benefit at t_n .

Another mistake is to make a conservative estimate of cost and a generous estimate of residual benefit. The way the cost is computed at t_0 must be comparable to the way the benefit is computed at t_n . One has, however, to make sure that the asset in question really is an essential part of the project.

3.5 General administrative and overhead costs

When a large organization, like a government, analyzes many possible investments over time, it may have a problem deciding how to treat general costs that are not specific to a particular project. Such costs are sometimes called overhead costs or general and administrative costs. These are more or less fixed costs. One additional project will often make little difference.

Box A-9: Standard Practice - General administrative and Overhead Costs

The standard practice in benefit-cost analysis is to take the marginal or incremental approach to counting costs and benefits, but this approach ignores most of the program and overhead costs. The problem with this as a standard practice, therefore, is that it is too generous to the investments and overstates the true returns. In the extreme, overhead costs never get counted anywhere in the organization's decision-making process.

If the organization only occasionally makes major investments, it may be reasonable to ignore program and overhead costs - in essence, letting them be borne by the run-of-the-mill operations of the organization. In this case, it is reasonable to take a marginal-cost approach. In contrast, if the organization makes many investments, it is preferable to include an 'average' allowance for overhead in the costs, although any single investment has little effect on overhead at the margin. If all investment options bear overhead equally, this factor is unlikely to influence the choice among them very much. Even so, it is preferable to have a realistic picture of investment returns, including overhead costs, than to have an unrealistically rosy picture.

3.6 Insurance and contingencies

Both insurance and contingencies are efforts to adjust for risk. We should not include the costs for either of these in the table of costs and benefits if one intends to do a risk analysis through simulation.

3.7 Valuing costs and benefits by market prices- consumers and producer surplus

In benefit-cost analysis, we normally consider market prices as being good measures of the costs and benefits of an investment. When market prices do not exist in usable form, then the analyst has to construct them. Frequently, however, the market price is only an approximate measure of a cost or benefit.

Consumer surplus is the value consumers receive over and above what they actually have to pay, which varies from one person to another and is measured by willingness to pay.

Producer surplus is the value a producer receives over and above the minimum payment needed to continue to supply the good.

Box A-10: Example of Consumer Surplus

If one buys an apple for TK 1, for example, the benefit to him of the apple is at least TK 1 or he would not have purchased it. Clearly, though, the benefit could be higher. The apple might be worth TK 1.50 to him; that is, he might be willing to pay TK 1.50 for it if necessary. If he only has to pay TK 1, then he has a total benefit of TK 1.50, a cost of TK 1, and a 'surplus' of TK 0.50. Therefore, when we use market prices as measures of benefits, we are ignoring the consumer surplus, which might be important in some cases. Similar is the concept of producers surplus.

3.8 Consumer surplus and producer surplus as components of value

The concepts of consumer surplus and producer surplus are basic to modern benefit-cost analysis. The market price is the minimum social benefit produced by the output of a project. In fact, some consumers would be willing to pay more for the outputs than they actually have to pay.

3.8.1 Price

The benefit-cost analyst must decide whether price \times quantity is an appropriate approximation of value; if the simplification is off the mark, more detailed calculations of value are needed. More detailed calculations of consumer and producer surplus are also needed when price \times quantity is not an option because prices do not exist or are highly distorted.

3.8.1 Consumer surplus when a public investment changes the price of a good

Public investments in sectors such as power, water, sanitation and telecommunications projects (and many others) may lower the price of the output. If so, valuing the benefits of the project at the new lower price understates the project's contribution to society's welfare.

3.8.2 Valuing costs and benefits without good market prices

When market prices exist but are distorted for some reason, the analyst must estimate what prices would be in the absence of the distortions and then use these adjusted market prices (sometimes called social prices or true prices). When there is no market for the good or service in question, there are no market prices - distorted or undistorted. In this case, the analyst has to start from first principles, using the concepts of consumer surplus and producer surplus to estimate the values for costs and benefits.

3.8.3 Estimating value when market prices are distorted

In benefit-cost analyses, the country as a whole is the most important point of view for the analyst. This requires the analyst to use social prices (sometimes called shadow prices) rather than market prices if the market prices are distorted. Such social prices may be substantially different from market prices in some situations, including the following:

- when the currency is misvalued because of foreign-exchange controls;
- when wage rates are kept artificially high by union rules or legislation, despite unemployment;
- when anti-competitive conditions, monopolies (only one or a few buyers) exist;
- when taxes or tariffs are applied directly to the good or service, as in value-added taxes; and
- when the government regulates or otherwise controls or subsidises prices.

3.9 Estimating value when no market prices exist

The true values of resources used or generated by an investment may be difficult to obtain when there are no market prices at all or the market mechanisms are indirect and difficult to observe. Examples are:

- the value of health and safety;
- the value of the environment;
- the value of jobs created;

- the value of foreign exchange;
- the residual value of special-use facilities; and
- heritage values.

3.10 Examples of difficult-to-estimate values

3.10.1 *The value of health and safety*

Researchers use three methods to estimate the value of reductions in risk to health and safety. Method 1 is to observe people's actual behavior in paying to avoid risks or in accepting compensation to assume additional risk. Method 2 is to ask people to declare how much they value changes in the risks to which they are exposed. Both of these methods are based on the willingness-to-pay principle, and both of them assume that people have the information and skills needed to assess risk and to report their risk-and-reward preferences accurately.

Method 3 is to assess statistically the number and type of injuries expected on the basis of historical data. The researcher then counts the treatment costs and wage-loss costs and extrapolates these to the whole affected population. This is a rational approach because it ignores people's preferences (which are subjective and may or may not be well informed and rational) in favor of a rigorous estimate of the treatment costs and wage-loss costs that would be avoided by the proposed investment.

3.10.2 *The value of environment*

Environmental benefits and costs are often a composite of several factors: health, aesthetics, recreation, and respect for nature. Respect for nature (apart from the health and aesthetic components) is close to an absolute value and extremely difficult to quantify, let alone value in Taka. The aesthetic aspects are also difficult to deal with in benefit-cost analysis: first, it is difficult to quantify the aesthetics of a situation at all; and, second, even if quantified, there is no market for aesthetic environmental benefits, or at least no direct market.

Although valuation of environmental goods presents problems, economists have developed some techniques to estimate the value that people place on such things as water quality and environmental protection. A general technique, which relies on the willingness-to-pay principle, does exist (contingent valuation), but its use in the environmental area is controversial because the results it produces may not be as reliable as those produced by other techniques.

A brief synopsis of some of the major techniques is presented here [see, for example, Hanley and Splash (1993)]. Such techniques are also presented elsewhere of this guideline.

Sometimes the value of a benefit can be inferred from the cost (for example, money or time) that a consumer is willing to spend to enjoy them. Two techniques that use this approach are the travel-cost (TC) method; and 'hedonic' pricing and land-valuation (LV) method.

Box A-11: Example of Value of the Environment

It is often appropriate to use a combination of techniques to measure all environmental consequences. This will be required for example if one has to measure both ecological and commercial losses associated with a resource such as the loss to the fishery of a toxic spill. In such cases care must be taken to avoid counting the same loss more than once.

3.10.2.1 The travel-cost (TC) method

The TC method uses the prices for market-traded goods to establish the value of untraded goods. The untraded goods are typically recreational in nature. The costs for traded goods are those that the recreationalist incurs to reach the destination and carry out the activity (the travel cost explains the name of this method). Application of the TC method is limited to certain use values of the environment, particularly in relation to site-specific activities.

3.10.2.2 Hedonic pricing (HP) and the land-valuation (LV) method

Hedonic pricing or the land-valuation (LV) method is another technique that links market values to the enjoyment of untraded environmental goods. The objective is to find items that are alike except for one factor (for example, the value of waterfront cottages compared with similar cottages not on waterfront and then compare market values.

3.10.2.3 Contingent valuation (CV) method

The CV method essentially asks people what value they give to a resource (use and non-use values). One can ask people what they would be willing to pay to avoid some damaging action or, alternatively, how much compensation they would require to put up with it. The advantage to this approach is that it can be applied to any valuation problem, including those for which other methods exist.

3.10.3 The value of foreign exchange

In some cases, a substantial portion of the benefits is generated because the project earns foreign exchange from exports, and the value of foreign exchange is an important consideration. In Bangladesh, the government has at times allowed various levels of premium on net export earnings, depending on circumstances, to reflect the true value of foreign exchange to the country. The difference between the market price of foreign exchange and the shadow or true price should be considered.

3.10.4 The residual value of special-use facilities

Many of the projects of the Government of Bangladesh involve special-use facilities, such as laboratories or training facilities. At the end of the investment horizon, these facilities have a residual value that may be positive or negative. At a minimum, their value might be land value minus demolition and clean-up costs. At the other extreme, the residual value might be a substantial positive number that reflects a stream of benefits from the ongoing operations of the facility.

Box A-12: Best Practice - Measurement

- The benefit-cost framework can be learned in a short time. In contrast, measurement of costs and benefits is a limitless topic. Specialists are generally needed as part of the team in the job of benefit-cost analysis
- When market prices are distorted or do not exist, the main methods for estimating the value of costs and benefits are based on willingness-to-pay.
- Income multipliers can generally be avoided but, when used, must be applied even-handedly to costs as well as benefits.

- The literature can sometimes provide approximate values for such difficult-to-measure items as the value of a clean and natural environment, the value of timesaving for commuters, the value of jobs created, and the value of foreign exchange. Government of Bangladesh standard parameters and benchmarks should be used whenever possible.

4.0 TIME VALUES

4.1 Why time matters

The fact that costs and benefits are spread over time matters for two reasons. First, people prefer to make payments later and receive benefits sooner. Our financial system is built on this basic time preference. The value of the unit of measurement itself changes over time because of inflation leading to loss of the purchasing power of the currency.

The benefit-cost analyst should make two separate adjustments to cash flow figures across time to convert them to standard units of value that can be added or subtracted. The first adjustment is for changes in the purchasing power of the Taka, and the second adjustment involves discounting to reflect time preference.?

4.2 Inflation, nominal taka and constant taka

The costs and benefits across all periods should be tabulated initially in nominal Taka for three reasons. First, this is the form in which financial data are usually available. Second, adjustments, such as tax adjustments, are accurately and easily made in nominal Taka.

Nominal Taka do not have standard purchasing power. They are sometimes called budget-year Taka or current Taka. They are simply the face value of the currency that is paid or received in that period. They cannot be aggregated if they occur at different times because they are not in standard units of purchasing power. In practice, it is acceptable to add and subtract nominal Taka occurring within the same period as long as the period is short (commonly one year), but it is not acceptable to add and subtract them across periods.

As soon as we are confident that the tables of nominal-Taka costs and benefits are complete and accurate, it is a good idea to convert all figures, or at least the net cash-flow line, to constant Taka before proceeding with calculations (constant Taka have constant purchasing power). To do this, we must select a base point in time at which to express the constant-Taka values. This can be any point in time, but it is often convenient to use to, which is the start of the investment period. Selecting the same point in time for constant-Taka conversions, and for present values, is best but not essential. By the way, conversion to constant Taka should not cause us to lose sight of the nominal-Taka tables. They need to be kept visible in the benefit-cost report at all times.

Every index of inflation is based on price changes for a specific basket of goods and services, and one can use price index in this respect. One can also use Consumer Price Index to convert nominal Taka to constant Taka. This is satisfactory if the appropriate reference group is consumers in general. Once we have chosen a suitable index of inflation, we are ready to calculate constant Taka.

The mechanics of adjusting future values to present values, and vice versa, is simple. These values are linked by compound interest. Interest is compounded when the interest earned on an initial principal becomes part of the principal at the beginning of the second compounding

period. For example, if one invests TK 100 at 12 per cent interest compounded annually, then at the end of one year the investment will be worth $TK\ 100 \times (1 + 0.12) = TK\ 112$.

In general form, at the end of n years, t_n , the investment will be worth $TK\ 100 \times (1 + 0.09)^n$. The relationship between constant Taka and nominal Taka is the same. If we start with a constant-Taka amount at t_0 and want to calculate the equivalent nominal-Taka amount at t_n , then we use the formula:

$$N = C (1 + i)^n \quad [1]$$

where N is the amount in nominal Taka (TK); C is the same amount in constant Taka (TK); i is the annual rate of inflation (%); and n is the number of periods between t_0 and the actual occurrence of the cost or benefit at t_n .

4.3 Future and present values

Even when the table of costs and benefits is in constant Taka, the figures are not yet in a standard unit. Constant Taka have standard purchasing power, but it makes a difference whether this is current purchasing power or future purchasing power. To make costs and benefits fully comparable, we must convert their values at various times to values at a single point in time. Present values are Taka values that are not only standardized for constant purchasing power, but are also standardized for the time of occurrence.

To make the conversion to present values, we need a discount rate that reflects the time preference of the reference group. How much is it worth to receive a benefit now rather than at some future time? Advocates of a project have tended to argue against high discount rates because they make projects look bad (benefits tend to occur later than costs; therefore, high discount rates tend to decrease the benefits more than the costs).

Once the discount rate is selected, calculating present values from future values and vice versa is straightforward. The formula is similar to equation for the adjustment for inflation:

$$PV = FV / (1 + k)^n$$

where PV is the present value at t_0 (TK); FV is the future value at t_n (TK); k is the discount rate (%); and n is the number of periods between t_0 and t_n .

4.4 Discount rates

It is important to understand that the appropriate discount rate depends entirely on the point of view taken in the analysis and that this point of view must be stated explicitly. If, for example, the point of view is that of a particular group of people, then the appropriate discount rate would be one that reflects the time preference of the members of that group. Research shows that if the members of the reference group are poor, the discount rate that reflects their time preference is likely to be high - they will highly value immediate benefits because they have basic needs that are unmet. The cost of borrowing might not approximate their discount rate (unlike the case of a business corporation) if their access to credit is limited or distorted.

Unlike most individuals and organizations, governments frequently take two different points of view in assessing investments - the fiscal point of view (is the project a good one from the government's narrow fiscal perspective?) and the social point of view (is the project a good one for the country?). The discount rates can be quite different from these two perspectives.

4.4.1 The fiscal discount rate

(Narrow fiscal point of view of government)

The fiscal discount rate is the government's cost of borrowing. It is appropriate to use the actual cost of borrowing when the analysis is from the narrow fiscal point of view of the government.

Box A-13: Use of Fiscal Discount Rate

The use of the fiscal point of view and thus of the fiscal discount rate is only appropriate when the proposed investment has few, if any, social implications. Examples are decisions to purchase computers or lease minor accommodation. If the project is large enough to matter to the general economy or if it has aspects that are of interest to the public, then the narrow fiscal point of view is probably inappropriate

4.4.2 The social discount rate

(Broad social point of view of government)

The social discount rate is roughly equal to the opportunity cost of capital, weighted according to the source of investment capital. For the Government of Bangladesh, this is often foreign borrowing, foregone investment in the private sector, or foregone consumption. Essentially, the government must achieve a return on investment at least equivalent to what the money would earn if left in the private sectors to justify taxing the private economy to undertake public-sector investments. If the government cannot achieve this it would be better for Bangladesh if the money is left untaxed in the private sector.

4.4.3 Strategic effects of high and low discount rates

The choice of a discount rate is extremely important. It has a strong (although hidden) influence on the direction of an organization.

Box A-14: Effects of High and Low Discount Rates

A low discount rate is favorable for the following:

- an active investment program, because capital seems inexpensive;
- outright purchase of assets;
- many and larger projects and programs; and
- projects whose benefits may be long-term.

A high discount rate is favorable for the following:

- an expensive capital investment program;
- leasing and other kinds of deferred-payment options;
- short-term, flexible planning; and
- labor-intensive rather than capital-intensive solutions.

The current guidelines suggests discount rate to be between 12 and 15 per cent across projects, revenue projects or aided projects for Bangladesh. The government of Bangladesh lately decides to consider 15% as discount rate in financial and economic analyses of any proposed project.

4.4.4 The discount rate as a risk variable

Because there is some uncertainty about the correct value of the discount rate, we should include it as a risk variable in the parameter table of a benefit-cost and risk analysis using simulation. This makes it less important to fix on a precise value of the discount rate and places more emphasis on identifying impacts of the likely range of values of the discount rate and on interpreting the results of the financial simulation.

5.0 DECISION RULES

A decision rule tells us whether an investment is worthwhile and whether one investment is better than another is.

5.1 Net present value

NPV is the present value of all benefits, discounted at the appropriate discount rate, minus the present value of all costs discounted at the same rate. An NPV is always specific to a particular point in time, generally, the time of the analysis, or t_0 the start of the project.

Box A-15: Net Present Value (NPV)

The formula for the calculation of net present value is as follows:

NPV = initial investment costs + the sum of the present values of costs and benefits for each period within the investment horizon.

Obviously, we can calculate the NPV of benefits and the NPV of costs separately and then subtract them. More often, the analyst subtracts costs from benefits in each period, giving a single line of net cash flow, and then discounts the net cash flow to give the NPV. The arithmetic of this latter procedure is a little simpler, but, more important, the net cash flow is itself useful information for managers.

Box A-16: Example of NPV

If the initial investment were TK 100 and there were TK 70 in benefits and TK 25 in costs for each of 3 years, and the discount rate were 10 per cent per annum, then the NPV would be:

$$\text{NPV} = \text{TK } 100 + (\text{TK } 70 - \text{TK } 25)/(1 + 0.1)^1 + (\text{TK } 70 - \text{TK } 25)/(1 + 0.1)^2 + (\text{TK } 70 - \text{TK } 25)/(1 + 0.1)^3 = \text{TK } 100 + \text{TK } 40.91 + \text{TK } 37.19 + \text{TK } 33.81 = \text{TK } 11.91$$

All costs and benefits are here assumed to occur at the end of their period, except for large initial expenditures, which occur at t_0 and are not discounted.

5.1.1 Net present value and break even

If a project has an NPV of zero, the project earns the normal rate of return (which is, of course, equal to the discount rate). For example, if a project earns 10 per cent per annum and its cash flows are discounted by 10 per cent per annum, the result will be an NPV of zero.

We value NPV not because it tells us whether the project breaks even, but because it tells us whether it is worth doing the project instead of leaving the money in the normal alternative investment (which earns 10% per annum).?

5.2 Two essential decision rules

Many projects have complex patterns of costs and benefits over time. We need decision rules to guide us. Many decision rules have been proposed.

Some work well only in particular situations; others are prone to error. Only two rules are consistently accurate and reliable, which area as follows.

Box A-17: Case 1- Single Project, Unconstrained Budget, 'GO' Or 'No GO' Decision

Decision rule 1: Do not undertake projects whose NPV is less than zero, unless we are willing to 'lose money' to achieve a non economic objective.		
Example of NPV Decision		
Project	NPV	Decision
Project A	+ TK 3	Accept
Project B	+ TK 0	Indifferent
Project C	- TK 1	Reject

Box A-18: Case 2- Alternative Projects, with Constrained Budget, a 'Best Set' Decision

Decision rule 2: Given a choice among alternative projects maximize the total NPV

5.2.1 Problem of independence from the scale of investment

People are generally comfortable with the idea that a project with an NPV of -TK 27 is unacceptable, but they are less comfortable with the idea that project B, whose NPV is +TK 3, is always preferable to project A, whose NPV is +TK 2, no matter how much investment went into each. The reason is about NPV being like excess profit rather than profit.

A simple example for one period should make clear why we should always prefer the larger NPV. The key is to realize what happens when we standardize the level of investment - that is, when we take into consideration what happens to the capital we have left over if we choose the smaller investment.

Box A-19: Example of Different NPVS

Suppose project A requires an investment of TK 100 and project B an investment of TK 150. If we invest in project A instead of project B, then we have an unused residual of TK 50, which earns the normal rate of return invested somewhere else. This residual, however, has an NPV of zero (it earns the same rate of return, say 10 per cent, as the rate used to discount it to a present value). Therefore, if we choose project A, we have a total of TK 100 earning 10 per cent plus an NPV of TK 2, and we also have TK 50 earning the normal rate of return. If we choose project B, similarly, we have TK 150 earning the normal rate of return plus an NPV of TK 3. Project A earns (10% of TK 100 + 10% of TK 50) + TK 2 Project B earns (10% of TK 150) + TK 3.

Project A earns (10% of TK100 + 10% of TK50) +TK2

Project B earns (10% of TK150) + TK3

The figure in parentheses will be the same for project A and project B whatever their scale of investment, so it is only in the NPV that differences will show. The amount of investment involved in two alternatives is irrelevant to our decision once we know the NPVs. Simply choosing the better NPV will always be correct.

5.3 The internal rate of return

The Internal Rate of Return (IRR) is the discount rate that makes the NPV of the project zero. An IRR higher than the standard discount rate indicates that we should go ahead with the project.

Box A-20: IRRS of Alternative Projects

When we are choosing among alternative projects, a higher IRR is preferred. If project A earns an IRR of 15 per cent, for example, whereas another project earns 10 per cent, then project A is a more attractive investment.

5.3.1 Limitations of IRR

IRR has three important limitations that make it a poor substitute for NPV as a decision rule. Nevertheless, many managers find the IRR intuitively appealing in a way that the NPV is not. They tend to think that the meaning of an IRR is transparent, but it is not. When we calculate the IRR, we need to interpret it with care.

The underlying formula for the IRR is the same as for the NPV. If we know the discount rate, we can calculate the NPV and vice versa. The mathematics of the IRR calculation, however, is not based on a proof and a formula. In practice, the analyst uses a computer to calculate the IRR by trial and error iterations. Given a guess at the likely IRR, the computer enters higher and lower values for i in the formula until it results in an NPV of zero. Most spreadsheets in common use have a limit on the number of iterations the computer will try. If the computer does not find a discount rate that gives an NPV of zero within this limited number of iterations, it gives an error message. The analyst then has to start the process again with a different guess at the value of the IRR.

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Box A-21: IRR Limitation 1

Simple comparisons between IRRs may be misleading if the projects are not the same size. A project with an IRR of 7 per cent is not necessarily a better choice than one with an IRR of 6 per cent. The size of each project and the discount rate can influence which project is best.

Example

		Project A		Project b
Total cost		TK 100		TK 10,000
IRR		7%		6%
Discount rate		5%		5%

If we choose project A, we will have TK 100 earning 7 per cent plus the residual TK 9,900 earning 5 per cent (total return = TK 7 + TK 495 = TK 502). If we choose project B, we will have the whole TK 10,000 earning 6 per cent (TK 600). Project B is better, even though it has a lower IRR than project A.

Box A-22: IRR Limitation 2

In many cases more than one value of the IRR will solve the equation and it may not be apparent to the analyst that other equally good values exists because the computer typically stops when it finds any acceptable value of the IRR.

Multiple values of the IRR (some negative, some positive) are especially likely if the annual net cash flow of the project alternates between positive and negative figures, a common event because of the cyclical re-capitalisation requirements of projects and/or fluctuations in the prices of inputs and outputs. In some cases, analysts 'bend' the accounting rules to obtain a cash-flow pattern that gives a single value for the IRR, but this is not a satisfactory solution. At best, the possible existence of multiple values of the IRR throws a shadow over its use; at worst, it may lead to incorrect choices among projects.

5.3.2 The benefit-cost ratio, payback period, and present value of costs

Decision rules other than the NPV ones are sometimes used correctly, but none of them are satisfactory as a general rule. The three most common involve benefit-cost ratios, payback period and the present value of costs.

5.3.2.1 Benefit-cost ratios

A benefit-cost ratio is the ratio of the present value of benefits to the present value of costs. The decision rule here is that we should reject any project with a benefit-cost ratio of less than 1, and we should rank projects in order of their benefit-cost ratios. The first part of this rule works. The second part, however, may not. This is because it is possible to change the benefit-cost ratio substantially by artificial changes in the accounting for benefits and costs.

Remember that a positive benefit is equivalent to a negative cost. Almost any cost or benefit could serve as an example. Consider expenditures on an access road to a new park. These could be added to the costs of the park or subtracted from the benefits. Either choice is correct. However, the benefit-cost ratio would be increased or decreased artificially, depending on this arbitrary accounting decision.

Box A-23: Example B/C Ratios

		Project A		Same Project A*
Costs		TK 100		TK 70
Benefits		TK 60		TK 30
Discount rate		1.66		2.33

* Same project (Project A), but netting TK 30 out of the benefits rather than listing it as a cost

5.3.2.2 Payback period

The payback period is the time it takes for the cumulative present value of benefits to become equal to the cumulative present value of costs. In general, shorter payback periods are better. However, this can be a misleading decision rule because it ignores everything that happens after the payback point. It is quite possible for a project to have a higher NPV and a longer payback period.

Box A-24: Best Practice - Decision Rules

NPV decision rules are best. Other decision rules should be used with extreme care. The two basic decision rules are the following:
1. Do not undertake projects whose NPV is less than zero, unless we are willing to 'lose money' to achieve a non-financial objective.
2. Given a choice among alternative projects, maximize the total NPV

6.0 SENSITIVITY ANALYSIS

6.1 Why sensitivity analysis?

In benefit-cost analysis, the outcome is typically influenced by several uncertain factors. This is true in the areas as diverse as health, education, employment, and economic development. It is important to know how 'sensitive' the outcome is to changes in those uncertain factors. It helps us to determine whether it is worthwhile spending money to obtain more precise data and whether we can act to limit uncertainty (for example, we could redesign the project components or simply keep a watchful eye when managing the project). As well, sensitivity analysis helps us to communicate to decision makers the extent of the uncertainty and risk in the program.

Nevertheless, sensitivity analysis is a limited tool. It treats variables one at a time, holding all else constant.

Simultaneous actions and interactions among variables in the real world are ignored. It can be a mistake to take the results too seriously because a variable that appears to be key when considered in isolation might or might not be key when considered along with other variables that strengthen or weaken its effect on the outcome of the project. Only a risk analysis (Hertz and Thomas 1983, 1984) can accurately identify the influence of each variable.

Sensitivity analysis gives us a better understanding of the model. As this understanding develops, we can take action when appropriate. In some cases, the only action we can take is to obtain better data. For example, if we are deciding whether to purchase a heart-lung machine, the outcome is sensitive to 'probability of an influenza epidemic,' a variable that we cannot control. In other cases, we might be able to fix or constrain the value of the variable. For example, if the outcome is particularly sensitive to an operator's wage rate, then we could negotiate this rate beforehand. Fixing the wage rate would dramatically lower the sensitivity of the outcome to this variable.

6.2 Precision on sensitivity analysis

The more we can minimize the sensitivities, the more precise the estimate of the outcome will be. In its simplest form, which we might call gross sensitivity, sensitivity analysis involves calculating (one variable at a time) how much the NPV changes if the influencing variable changes by a standard percentage, say 10 per cent. Suppose we are deciding whether to purchase a heart-lung machine whose NPV is affected by four variables: insurance costs, operating costs, the price of the machine, and the usage rate. A quick examination indicates that the decision is quite sensitive to three of the four variables.

Box A-25: Factors Affecting 'Effective Sensitivity'

The 'effective sensitivity' of the outcome to a particular variable is determined by four factors:

- the responsiveness of the NPV to changes in the variable;
- the magnitude of the variable's range of plausible values;
- the volatility of the value of the variable (that is, the probability that the value of the variable will move within that range of plausible values); and
- the degree to which the range or volatility of the values of the variable can be controlled.

The first of these factors, the responsiveness of the NPV to changes in the variable, has two components. The first component is the direct influence of the variable on the NPV. The second component is the indirect influence of the variable, through its relationships with other variables that themselves are related to the NPV. Positive correlations with other influential variables will magnify the ultimate influence of both, and negative correlations will dampen their influence. These influences cannot be fully identified until we have set up a simulation model that is capable of dealing with the simultaneous interactions of many variables.

6.3 Sensitivity and decision making

We are most interested in the sensitivities that might change a positive decision on the project to a negative decision and vice versa. Four calculations help us estimate the likelihood of such a switch:

1. What is the range of influence? That is, how much does the NPV change when the variable changes from its lowest plausible value to its highest plausible value?
2. Does this range of influence contain an NPV of zero? If it does, then the variable has a switching value - that is, a value at which our appraisal of the project switches from positive to negative.
3. What is the switching ratio for the variable? That is, by what percentage does the variable have to change to hit a switching value?

What is the switching probability? That is, how likely is the variable to reach the switching value?

Box A-26: Best Practice - Sensitivity Analysis

- Sensitivity analysis is a useful technique for finding out how important each variable in the benefit cost model is.
- Sensitivity analysis cannot deal with more than two variables at a time, so it does not tell us much about the project's level of risk. Until all variables are allowed to vary simultaneously, we do not know whether their individual effects on risks are magnified or cancelled out by each other.
- Four factors contribute to sensitivity: the responsiveness of the NPV to changes in the variable; the magnitude of the variable's range of plausible values; the volatility of the value of the variable (that is, the probability that the value of the variable will move within that range of plausible values); and degree to which the range or volatility of the value of the variable can be controlled.
- Graphic analysis, including the use of sensitivity curves, spider plots etc are often useful.
- The switching value of a risk variable can be an important consideration in an investment decision. It can help the decision maker weigh the risk.

7.0 RISK ANALYSIS

7.1 Why risk analysis?

Financial and economic risk analysis is a technique that enables us to determine how much risk there is in accepting or rejecting a particular project. We can also use it to compare the likely outcomes of two or more alternative projects. It is an important technique because it allows us to use data that are uncertain to obtain results that are a good picture of the likely outcomes. The technique takes into account possible variations in the costs and benefits that we may be aware of but that we ignore when we use single best-guess numbers in an everything-goes-according-to-plan analysis.

Box A-27: Best Practice - Financial and Economic Risk Analysis

For situations where there is significant uncertainty, the following benefit-cost decision rules apply:

1. If the lowest possible NPV is greater than zero, accept the project.
 - a. If the highest possible NPV is less than zero, reject the project.
 - b. If the maximum NPV is higher than zero and the minimum is lower, calculate the ENPV
 - c. If the ENPV is greater than zero, accept the project. (Keep an eye on the risk of loss.)
2. If the cumulative-probability-distribution curves for two mutually exclusive projects do not intersect, choose the option whose probability distribution is farther to the right.
3. If the cumulative-probability-distribution curves for two mutually exclusive projects intersect, be guided by the ENPV. If the ENPVs are similar, consider the risk profile of each alternative.

7.2 Common project risks

A variety of risks can affect an investment. Some common sources of risk are the following:

- Investment lumpiness - Can the results be tested gradually, or is it all or nothing?
- Timing - What if the project is delayed? What if it takes longer than expected for the project to reach full production? Is there a best time to start the project?
- Salvageability - How much of the investment can be recouped if things go wrong?
- Uncertain incremental effect - What will the outputs of the project be?
- Uncertain parameter values - What discount rate and inflation rates are appropriate?
- Volatile preferences - Are the target beneficiary's needs or preferences unstable?

An investment decision is highly risky if a big investment has to be made without a chance to test the results, delay is highly damaging, little can be salvaged if the project goes wrong, the likely output is uncertain, and some of the key measurement parameters are uncertain.

In order to achieve greater precision in Benefit Cost (BC) analysis, both Pre-project and Post-project impacts should be considered, and then, 'With and Without' approach (difference of different method) should be adopted through collection of data from both Project and Control areas. Cost-effectiveness or utility analysis is undertaken when quantification is not readily possible. As far as possible, all tangible and intangible, direct and indirect impacts, and multiplier effects of the proposed project (i.e., project benefits) should be included in the financial and economic analyses. **(For examples, see Box A-28).**

Box A-28: Typology & Examples of Loss/Damage

Form of Loss/Damage	Measurement	
	Tangible	Intangible
Direct	Damage to crops, buildings/infrastructure Damage to machinery Damage to stock/contents	Loss of an archaeological site Human casualties, injuries Loss of employment Cost of stress/worries
Indirect	Loss to industrial production (value added) Loss of business/productivity Loss in terms of increased medical costs	Cost of morbidity Cost of diseases Long run effects (mortality)

'With and without' is a key method in assessing cost benefit of any interventions. The method is used when the assumption of the interventions is yet to prove. The method is used to understand the significance of the intervention. The relative value of intervention as 'with' in comparison to the absence of such intervention as 'without', provides the precision of the benefits of the intervention.

7.3 Summary of key tasks

Box A-29: Financial and Economic Analysis for Investment Projects

Summary of Key tasks

Describe the project costs clearly and succinctly in the project document and the cost tables, in appropriate depth. Above all, keep the project expenditure accounts transparent and unambiguous in all cases, and include estimates of fees and per diems for services paid by the project in distinct accounts. Use standard software (COSTAB) to enable: the aggregation and display of investment and recurrent costs at different levels and forms; the presentation of unit costs and quantities; the links to disbursement and procurement accounts; and the estimation of physical and price contingencies. Present clearly the assumptions and the sources of data.

Formulate the without-project scenario in the financial and economic analysis, taking into account underlying trends in technology, policy, local economy and physical environment in the project and wider system area, in order to reflect changes in productivity (positive or negative) that would have occurred without the intervention. For the with-project scenario in economic analysis, check for possible substitution effects to determine net incremental output and impact.

For the financial analysis, present appropriate measures of the attractiveness of the investment to the target group. Return to capital calculations can be supplemented with returns to labor and land. Check the assumptions underpinning the availability of inputs, labor, and when relevant - access to credit. Estimate uptake rates for the proposed project activities based when possible on past project experiences, and preferably with references to M&E and supervision reports. Examine the distribution of incremental benefits and incremental private costs along the value chain in order to arrive at realistic producer prices.

Include an analysis of demand (with due consideration to willingness to pay and affordability) for project supported services that are provided on a partial or full cost recovery basis.

Undertake economic analysis using standard shadow pricing methods for the adjustment of financial prices and the elimination of transfer payments to reflect the economic prices of resources. Extend shadow pricing to estimate significant non-marketed project outputs and impacts.

Calculate rates of return at the level of the whole project where the total cost of infrastructure, agricultural development, irrigation, and other 'hard' investments, is dominant in the cost tables. The analysis will be more informative if rates of return are also calculated separately per component.

Test key project assumptions and risks using sensitivity and risk analysis. At the enterprise level, important parameters for testing are variability of yields and seasonal price volatility; and at the project level implementation delays and availability of counterpart financing (especially the projected contributions from targeted communities and government institutions to meet O&M and other recurrent costs; and donor co-financing for critical investment components). Use switching values for sensitivity analysis, and justify the choice of scenarios examined.

Invest Analysis

The ultimate aim of project analysis is the determination of investment worth of projects which is defined as the net benefits over costs of projects. Inevitably, projects differ from one another in respect of their benefits. Benefits comprise broadly two groups, direct and indirect. Direct benefits are usually 'visible' arising out of direct effect. Indirect benefits are the consequences of direct impacts and are revealed through interruption and disruption of economic and social activities. Indirect effects can involve effects both in the short and long run. Indirect impacts, together with the direct ones, may result in a further chain of effects over time, called linkage effects. In yet another perspective - from the viewpoint of economic values - impacts or benefits are recognised as belonging broadly to two further categories: tangible and intangible. The tangible impacts are those to which a monetary value can be assigned in order to estimate them. Intangible impacts are defined as those which cannot directly be evaluated in terms of money. So, tangible benefits can be quantified while intangible can not be directly monetized.

An example of direct benefits is the increased production of crops as a result of an embankment: Improved fisheries or transportation facilities as a result of embankment may be cited as indirect benefits. Secondary benefits reflect the impact of the project on the rest of the economy. An example of secondary benefits is the incremental income generated in the industries having forward and backward linkages with the project or the additional income and employment generated in a particular region. Reduction in unemployment in a particular region may be secondary benefit. Usually indirect and secondary benefits are qualitative in nature as broad externalities of the project. But in a broader sense, external diseconomies should also be taken into account. Increasing problem on law and order, stress on public utilities are some of the broader diseconomies of an accelerated pace for industrialization. Any analysis should try to quantify and be Objective with these externalities.

Some projects provide tangible benefits in the form of goods and/or services and some provide only service benefits. In the earlier category again, projects may be self-financing, i.e. may earn revenue through the sale of goods and/or services to meet its operating cost as well as to earn sufficient profit. Most industrial projects fall in this category. Such projects may be classified as category 'X' projects. Some projects which give tangible benefits but may not earn any revenue at all. Benefits of such projects go to third parties other than the projects. Most irrigation and embankment projects fall in this category. These may be classified as category 'Y' projects. However, these two types of projects have one thing in common : that is that the benefits accruing from these projects: are quantifiable. Then, there are projects which provide only service benefits which can hardly be quantified in unambiguous terms. Most education and health projects fall in this category. Projects of this nature may be classified as category 'Z' projects for which cost benefits analysis is a little problematic.

The methods of assessing benefits and conducting BCA with respect to 'X' and 'Y' category projects- are discussed as follows:

The primary consideration that lies behind any investment decision is whether a particular project would offer adequate benefits over costs of projects. A project may be appraised from either (a) financial point of view or (b) economic or social point of view. However, the coverage of costs and benefits and the standard of valuation used in economic appraisal differ from other type of appraisals. The financial analysis is undertaken from the point of view of an entrepreneur i.e. from private profitability point of view. The entrepreneur decides on the cost that is incurred, and the potential benefits through the implementation and operation of the project; obviously,

one is inclined to take up the project to maximize profit from investment. In financial appraisal, only the direct costs and benefits with which the entrepreneur is concerned are included and the inputs with and outputs measured in terms of the prevailing expected market prices.

Economic Analyses

Economic analysis of a project is concerned with ascertaining the net benefit a project will earn for the nation rather than for the entrepreneur undertaking the investment. In economic analysis costs and benefits are therefore to be looked from the point of view of the entire economy. Economic analysis may lead to different results and hence different investment decision from that of financial analysis due to differences in between (a) social benefit and private benefit, (b) social cost and private cost and (c) market distortions. Social benefit and cost may be different from private benefit and cost due to externalities of a project. Market distortions result in market prices being different from the value of a product/service unit to the economy. A private entrepreneur in the financial analysis does not take such deviations and market distortions into account.

In order to measure economic costs and benefits two sets of changes need to be made to the financial data. Firstly, the costs and benefits of a project as opposed to private costs and benefits need to be identified. Secondly, market prices do not always measure true economic values because of distortions for various economic reasons including market imperfections. This involves estimation of an internally consistent set of prices reflecting opportunity costs as well as societal objectives and applying such prices to the projects' inputs and outputs, i.e. costs and benefits. In other words, market prices should be adjusted to the maximum possible extent to reflect the shadow prices of all goods and services produced or used by the project.

This calls for estimating economic prices (shadow prices or accounting prices). Based on Little and Mirrless approach, all values of the project inputs and outputs are to be expressed in terms of their border price equivalents. Project inputs and outputs are to be broken down into their internationally tradable and non-tradable parts.

Accounting Value of Inputs

Inputs may be broadly divided into the following three categories :

- (i) Tradeable inputs, i.e. inputs which are normally traded internationally;
- (ii) Non traded inputs, i.e. inputs which are not normally traded internationally;
- (iii) Direct labor inputs

(i) Valuation of tradeable inputs: In case of direct foreign import of inputs or if local purchase is expected to lead to an increase imports; the market cost elements should be derived as follows:

- (a) C. I. F. cost of imports
- Plus (b) Landing charges and transport costs to site
- Plus (c) Duty on C. I. F. values
- Plus (d) Others or extra-market price ;caused by controls or monopoly elements in domestic market. etc.

If, on the other hand, the input use is done from exports the market price should be derived as follows:

	(a) F. O. B. price of export
Plus	(b) Extra cost of transport (i.e. transport cost incurred for export
Minus	(c) Transport costs for domestic use
plus	(d) Export subsidy
Minus	(e) Export tax
Plus	(f) Extra export price made possible by controls monopoly etc.

(ii) Valuation of normally non-traded goods and services.

Inputs such as electricity, water, transport etc. are normally non-traded goods. Their market prices do not reflect true social cost. The accounting prices for major non-tradable goods and services are presented in **Appendix 16.0.1**.

There are items of expenditure where price and quantity data are not readily available, i.e. insurance, banking etc. Such services will be socially priced by the Planning Commission and these information will be forwarded to the agencies.

(iii) Valuation of labor inputs.

Direct labor use of the project may be properly ascertained. However, it may be difficult to quantify the indirect labor use generated through the purchase of non-tradable domestic goods and services. Labor component of civil engineering may be segmented out from among; various indirect uses of labor.

Distinction should be made between skilled and unskilled labor. Unskilled labor will have separate accounting value while skilled labor may socially be priced at market values. The accounting value of unskilled labor may vary regionally. A set of conversion factors in this regards may be seen from **Appendix 16.0.4**.

Accounting value of outputs

Where foreign exchange is expected to be earned by exporting to be earned by exporting the product, the market price of the output will be divided into following categories :

	(a) F.O.B. price of the output
Minus	(b) Transport cost from the project to the port
Plus	(c) Export subsidies
Minus	(d) Export taxes.

If, however, foreign exchange is saved by import substitution, the market price of the output should be divided into the following categories:

	(a) Of value of output
Plus	(b) Any saving as a result of import substitution.
Minus	(c) Any dis-saving in transport cost as a result of import substitution.
Plus	(d) Import duty, excise duty, etc.
Plus	(e) Any residual rise in price due to import control, monopoly or government policy.

There are three methods of project appraisal: namely, (a) Benefit-cost analysis (BCA) or Benefit-cost ratio (b) Internal Rate of Return (IRR), and (c) Net Present Value (NPV). The methodology of calculation of BC ratio, IRR and NPV in terms of both financial and economic analysis have been elaborated in Appendix 16.0.1. In financial appraisal, market prices should be used and in economic analysis these prices should be adjusted by excluding taxes and duties/adding subsidies. Foreign exchange earning/expenditure should be calculated at its real values and not at the official rate in economic analysis.

In order to carry out a systematic project appraisal, it would be necessary to use the following appraisal parameters :

- (a) Standard Conversion Factor (SCF) or Shadow Exchange Rate (SER).
- (b) Appropriate Discount Rate
- (c) Shadow Wage Rate
- (d) Conversion factors or shadow prices for non-tradeables

Conversion Factors

A conversion factor is the ratio of accounting price to market price. A detailed list of conversion factors or accounting price indices for some major non-tradeables estimated by the planning commission and later by TIP is presented in Appendix 16.0.4. These are intended to determine the value of the inputs, outputs, labors and so on at accounting prices.

Questions to ask about a benefit-cost analysis

A Quick Guide

1. Is the problem or opportunity clearly stated? Is there a compelling rationale for the federal government acting in this situation? Are the objectives clear and coherent?
2. Is the analysis set out separately from the point of view of each important actor?
3. Are the alternatives defined in a fair and comparable way? Are the important alternatives analyzed?
4. Is this an open and transparent analysis? Is each stage of the analysis set out so that we can follow the reasoning and the numbers?
5. Are the likely incremental effects of the project or program alternatives well analyzed?
6. Are the costs and benefits of these effects measured well and set out in detail over the full life of the project?
7. Are likely changes in relative prices taken into account or does the analyst take short cuts?
8. Are inflation adjustments and discounting done separately? Are the price index and discount rate the appropriate ones?
9. Does the analysis take into account uncertainty in the data and risk in the investment?
10. Does the analysis describe who pays and who benefits?
11. Does the analysis make a reasoned recommendation and give a fair showing to the alternatives it does not recommend?

Key Best Practices

A good benefit-cost analysis meets the following criteria:

- the objectives and priorities are clear;
- the best alternative ways of achieving the objectives are identified for analysis;
- the alternatives are defined in a way that enables fair comparison;

- the 'point of view' of the analysis is stated;
- assumptions and calculations are visible to the reader at every stage of analysis;
- benefits and costs are estimated in detail for every time period, without short cuts;
- the technical analysis is well done (in regard to discount rates, inflation adjustments, choice of decision rule, etc);
- uncertainty and risk are carefully considered;
- distribution effects are clearly set out (who pays, who benefits?); and
- the recommendation is well reasoned and gives fair consideration to all alternatives.

Example of A Project'S Benefit-Cost Analysis

Project:

Flood-proofing of roads and highways by raising road height to the highest recorded flood and provision of adequate cross-drainage facilities (relevant to the DFID-supported programme "Roads and Highways Policy Management, budgetary and TA Support" (RHD)) (Islam and Reinhard (2007); K M Nabiul Islam and Reinhard Mechler 2007, IDS, UK).

Introduction

This annex discusses the appraisal of economic efficiency of selected adaptation options to extreme climate-related event risks of the DFID development assistance portfolio in Bangladesh via Cost-Benefit Analysis (CBA). Economic efficiency is assessed by comparing benefits and costs. Costs and benefits arising over time need to be discounted to render current and future effects comparable. From an economic point of view, 1 \$ today has more value than 1 \$ in 10 years, thus future values need to be discounted by a discount rate representing the preference for the present over the future. Last, costs and benefits are compared under a common economic efficiency decision criterion to assess whether benefits exceed costs. Basically, three decision criteria are of major importance in CBA:

- Net present value (NPV): costs and benefits arising over time are discounted and the difference taken, which is the net discounted benefit in a given year. The sum of the net benefits is the NPV. A fixed discount rate is used to represent the opportunity costs of using the public funds for the given project. If the NPV is positive (benefits exceed costs), then a project is considered desirable.
- The BC-Ratio is a variant of the NPV: The benefits are divided by the costs. If the ratio is larger than 1, i.e. benefits exceed costs, a project is considered to add value to society.
- Internal Rate of return (IRR): Whereas the former two criteria use a fixed discount rate, this criterion calculates the interest rate internally, which represents the return of the given project. A project is rated desirable if this IRR surpasses the average return of public capital determined beforehand (e.g. 12%).

In most circumstances, the three methods are equivalent. In this assessment, due to its intuitive appeal, the BC-ratio will be used.

Assessing Impacts and Potential Benefits

Natural disasters and associated impacts are triggered by a specific event. Risk is commonly defined as the probability of a certain event and associated impacts occurring. Potentially, there are a large number of impacts, in actual practice however, only a limited amount of those can and is usually assessed. Table A-5 presents the main indicators for which usually at least some data can be found.

Table A-5: Summary of quantifiable disaster impacts equalling benefits in case of risk

	Monetary		Non-monetary	
	Direct	Indirect	Direct	Indirect
Social			Number of casualties Number of injured Number affected	Increase of diseases Stress symptoms
Households				
Economic				
Private sector				
Households	Housing damaged or destroyed	Loss of wages, reduced purchasing power		Increase in poverty
Public sector				
Education Health Water and sewage Electricity Transport Emergency spending	Assets destroyed or damaged: buildings, roads, machinery, etc.	Loss of infrastructure services		
Economic Sectors				
Agriculture Industry Commerce Services	Assets destroyed or damaged: buildings, machinery, crops etc.	Losses due to reduced production		
Environmental			Loss of natural habitats	Effects on biodiversity
Total				

The list is structured around the 3 broad categories of social, economic and environmental indicators, whether the effects are direct or indirect and whether they are originally indicated in monetary or non-monetary terms:

- Direct: Due to direct contact with disaster, immediate effect.
- Indirect: Occur as a result of the direct impacts, medium-long term effect.
- Monetary: Impacts that have a market value and will be measured in monetary terms.
- Non-monetary: Non-market impacts, such as health impacts.

Economic impacts are usually grouped into three categories: direct, indirect, and macroeconomic effects (ECLAC, 2003). These effects fall into stock and flow effects: direct economic damages are mostly the immediate damages or destruction to assets or "stocks," due to the event per se. The direct stock damages have indirect impacts on the "flow" of goods and services: Indirect economic losses occur as a consequence of physical destruction affecting households and firms. Assessing the macroeconomic impacts involves taking a different perspective and estimating the aggregate impacts on economic variables like gross domestic product (GDP), consumption and inflation due to the effects of disasters, as well as due to the reallocation of government resources to relief and reconstruction efforts. As the macroeconomic effects reflect indirect effects as well as the relief and restoration effort, these effects cannot simply be added to the direct and indirect effects without causing duplication, as they are partially accounted for by those already (ECLAC, 2003).

Care needs to be taken not to double-count when including direct and indirect impacts. Generally, good data are often only easily available for the direct monetary impacts. In the following, also information on indirect losses, such as income losses will be employed.

Uncertainty

Estimating extreme event risk and the benefits of risk reduction is fraught with a substantial amount of uncertainty, particularly so in this case, as disasters by definition are low-frequency, high consequence events. Uncertainties are inherent in

- The recurrence of hazards: estimates are often based on a limited number of data points only.
- Incomplete damage assessments: data will not be available for all relevant direct and indirect effects, particularly so for the non-monetary effects.
- Fragility: fragility curves do often not exist.
- Exposure: the dynamics of population increase and urban expansion, increase of welfare need to be accounted for.
- Benefits of risk management estimates: often difficult to accurately measure the effect and benefit of risk management measures.
- Discounting: the discount rate used reduces benefits over the lifetime of a project and thus has very important impact on the result.
- Valuation issues: exchange rates, deflators and different cost concepts (replacement, market values) used.
- Additionally for climate change, uncertainties are due to estimating the changes in frequency and intensity of natural hazards

Bangladesh Roads Network

Bangladesh is covered by a large road and highway network, most of it traversing through the flood plains of the country. The Roads and Highways Department (RHD) is responsible for a huge number of assets in the form of roads, bridges and culverts. Protecting and maintaining about 20,798 kilometers of roads and 14,712 bridges and culverts with an estimated asset value of TK 727,000 Million is of prime importance for the national economy.

Flood loss potentials to roads infrastructure have been huge. In the 1998 and 2004 flood, for example, the direct damage to roads sector is estimated as TK 15,272 and TK 10,031 Million, accounting for 15 and 9 per cent of the total damage respectively. The situation is expected to be deteriorating in the days to come, with the increased extent and intensity of flooding due to potential climate change and sea level rise in future. Hence, it is important to develop flood proofing systems as a response to natural disasters, in designated flood risk zones, to protect life, property and vital infrastructure such as roads. As yet, flood proofing to roads in areas under CLP has not prominently featured in its activities and programmes. As more and more households benefit from raised homesteads (see option 2), the priorities may change and the demand for raised roads is expected to increase.

The maintenance of these assets and protecting them against disasters such as floods is a fundamental requirement for the economy to sustain. It is, therefore, the national policy that all national and regional roads are planned and designed to be constructed for above the highest flood level (HFL). The district roads are planned to be constructed over the normal flood level. It is also the policy that the damages are minimised by measures through increasing openings of bridges and culverts as, it has been observed that inadequate openings of bridges and culverts cause damage to both structures and approach roads.

Historical records show that the roads, which were raised above the 1988/1998 flood-level, suffered minimum damage in the 2004 floods. After the 1988 flood, for example, national highways such as the Dhaka-Chittagong, Dhaka-Mawa-Khulna, Dhaka-Sylhet and Dhaka-Aricha highways were raised by 1 to 1.5 meters above HFL. As a result, these highways suffered no significant damages during the 2004 flood (Rahman 2006).

In recent time, relevant experts suggested that roads constructed along the east-west direction were given extra attention to ensure proper drainage of water, by providing extra spans for adequate passage at the peak flow stage. Experts also warned that the existing bituminous pavements are more susceptible to water than cement-concrete ones. Provision of asphalt concrete topping and hard shoulder can reduce the damage to roads caused by the flow of water over the road surface. Asphalt concrete produce more durable pavements than the usual road with mixed carpeting.

Knowledgeable people also opine that in order to minimize the erosion of the road embankments and vulnerable road sections, slopes have to be protected with hard layers (C.C. blocks with geotextile); less vulnerable sections should be protected with flood resistant natural turfs and plants like vetiver (Kashful).

Currently There are Three Types of Maintenance:

- (1) Routine maintenance, carried out year round (at cost of TK50,000-70,000 per Km)
- (2) Periodic maintenance, carried out in 4 -5 years (at cost of TK500,000-1500,000 per Km)
- (3) Partial/Full/Rehabilitation/Reconstruction (at cost of TK5000,000 per Km)

The requirement for maintenance depends on the roughness, caused due to inundation and heavy rains, and associated traffic loads. Ironically, routine and periodic maintenance are often overlooked by policy makers, in consequence of which more and more roads are becoming subject to complete rehabilitation over years, turning this to a great backlog. Only recently, a sum of TK10000 Million has been allocated to rehabilitate only a few roads. Had there be regular and routine maintenance no such backlog could crop up at a very short interval of time. Over and above, pavement designs constructed in the past were generally inadequate to adaptation to floods in terms of alignment, height, widths, slopes and provision of adequate drainage openings. Apart from the roads having been previously constructed at a level lower than HFL, this is one of the reasons why older roads have generally become yet more vulnerable to flood water. For example, relatively older roads, the Comilla-Brahamanbaria highway appears to have now become vulnerable to floods. As a result, it is now planned to undergo full rehabilitation for at least 37 out of 74 Km length. Similar is the case with the Bhariab-Mymensingh road. The development partners while funding these projects have asked to pay proper attention to flood risks. It has been suggested that while undergoing complete rehabilitation such types of roads are raised up to a safe flood level.

Hence, policies, guidelines and technologies are already there but, ironically, these are not properly practiced in real situations, with the exception of, perhaps, new national highways. Hence, it is important that they are enforced at least phase-wise and on a priority basis. The Roads Master Plan (Government of Bangladesh, 2007) also recently reiterated the maintenance of 1 to 1.2 meter freeboard above a 50 year flood, although directives in this respect have been in existence since the time of the floods back in 1987 and 1988. Notwithstanding the above facts, so far, the efforts and resources of the RHD are meagre compared to the enormous dimension of the

problem. The proposed option in its entire scope will provide appropriate flood proofing to nearly 800 Km of roads through roads raising across the country.

In the calculations it is assumed that costs and benefits are evenly spread over time, i.e. every year a constant amount is spent for flood-proofing, resulting in a gradual building-up of flood protection. Benefits considered are the avoided infrastructural asset losses (direct losses).

Regional Focus and Time Horizon

This is an option with a national coverage. The National Water Management Plan- NWMP (2001) divided the entire country into eight ecological regions: South Western (SW), South Central (SC), North Western (NW), North Central (NC), North Eastern (NE), South Eastern (SE), Right Eastern (RE) and Eastern Hills (EH). This option relates to the six major regions of Bangladesh, but does not include the RH and EH region of the country.

The option comprises a long-term programme (25 years) but since the costs would be very high if incurred at one time it is intended that roads raising will be carried out when a particular road is due for full rehabilitation, with priority given to high risk areas. Since the work involves simply the raising of existing roads, environmental impacts would be minimal.

Table A-6 shows the estimated regional distribution of roads according to high and low flood risk levels, (NWMP 2001). The distribution refers to year 2000 and it is assumed that, since then, according to government policy all new roads have been constructed keeping in view of the highest flood level of the 1998 flood. It is intended that all national and regional roads not above flood level at present, and one-fifth of the district (feeder) roads in high risk areas only, will be raised by the end of 25 year period.

Table A-6: Estimated regional distribution of roads to be raised

Road Type	Risk level	Length of road to be raised, by type and region (Km)						
		SW	SC	NW	NC	NE	SE	Total
National Highways	High	6.7	15.8	19.4	39.6	0.4	7.3	89.2
National Highways	Low	10.3	0.6	12.8	12.5	1.4	9.6	47.2
Regional Roads	High	19.9	7.4	16.1	18.6	2.9	14.6	79.5
Regional Roads	Low	7.7	4.0	41.1	8.9	5.4	9.9	77.0
District Road Type A	High	17.8	34.8	48.3	94.5	4.2	41.2	240.7
District Road Type A	Low	31.9	38.8	62.8	108.8	8.4	26.7	277.5

Source: Government of Bangladesh, 2001.

The investment period for the option upon which the cost benefit analysis is undertaken is 25 years, reflecting existing practices in RHD.

Cost estimates

The option is targeted at the flood proofing needs of key portions of Bangladesh's highway network. Specifically, some 170 Km of national and regional roads and some 518 Km of district (feeder) roads in high risk areas will be raised by 1 meter. Under the option, about 124 km of national and regional roads in low risk area will be raised by 0.5m.

Table A-7 presents cost estimates for road raising and related drainage improvements by roads category of high and low risk areas. In total, about TK 8,794 Million will be required for the implementation of the option. The costs estimates have considered average two culverts per Km (for cross-drainage facilities) for each category of roads, instead of currently practiced 0.71 culvert per Km. An average culvert costs 1 million Taka. The road maintenance cost assumed to be at the rate 4% will have to be incorporated while estimating NPV.

Table A-7: Costs estimates by category of roads by risk level

Roads type	Length of roads to be raised (Km)	% of total in each category	Rate M Tk/Km (2007 prices)	Total (TK-Million)
In high flood risk areas				
National Highway	89.2	2.5	13.8	1,228
Regional Highway	79.5	1.9	13.2	1,053
District (Feeder) Roads-Type A	240.7	3.7	9.9	2,388
District(Feeder) Roads-Type B	277.5	4.2	8.8	2,455
Subtotal	686.9	3.3		7,125
In low flood risk areas				
National Highway	47.2	1.3	13.8	650
Regional Highway	77.0	1.9	13.2	1,020
Sub-total	124.2	0.6		1,670
Grand Total				8,794

Assessing Risks and Benefits of Drm

Benefits of the option would be the avoided rehabilitation costs due to floods. Table A-8 lists the major riverine floods that have occurred in all of Bangladesh, its impacts on the roads sector and estimated recurrency.

Table A-8: Potential costs of flood to roads sector : Bangladesh (2007 prices)

Floods	Cost of flood (Million TK - 2005-06 price)				Return period	Exceedance probability
	National	Regional	District	Total		
1987	307	852	4240	5399	13.0	0.077
1988	369	1021	5089	6479	55.0	0.018
1998	875	2404	11995	15273	90.0	0.011
2004	572	1577	7882	10031	12.0	0.083
Average, expected cost of floods	531	1463	7301	9295		

Source: compiled form Siddiqui, K. U. and Hossain, A. N. H. A. (2006), Islam (2005).

Note: Actual cost of rehabilitation per km (for 2004 flood) is used to estimate potential cost of floods in various events; US\$ = 70 Taka (approx).

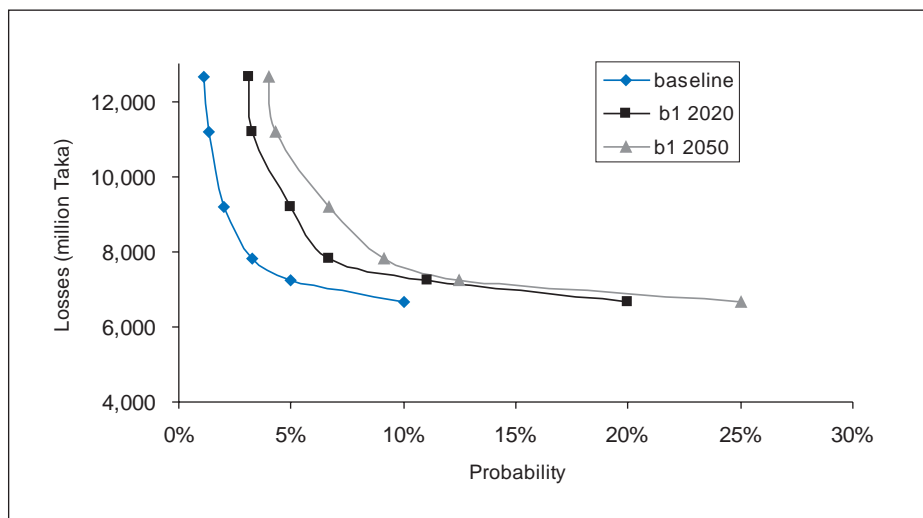
In order to smoothen loss probability curve, $Y = Ae^{BX}$ ($\log Y = \log A + BX$) is fitted using data on potential cost of floods of actual flood events where Y is the cost of flooding in selected events, and X represents the return period. The estimated equation is $Y = 8.724 + 0.008 (\text{Return Period})$, (Table A-9). This is then combined with exceedance probabilities to arrive at annual benefits, which is equivalent to expected annual flood losses to the roads sector.

Table A- 9: Flood risk for the road sector

Floods (Return period)	Cost of flood (Million TK- 2007 prices)				Baseline	b1 2020	b1 2050
	National	Regional	District	Total			
10 Yr	363	1,007	5,012	6,382	10.0%	14.3%	25.0%
20 Yr	401	1,113	5,540	7,054	5.0%	6.7%	13.3%
30 Yr	444	1,230	6,123	7,796	3.3%	4.3%	9.1%
50 Yr	542	1,502	7,478	9,521	2.0%	3.3%	6.7%
75 Yr	696	1,928	9,602	12,226	1.3%	3.6%	4.5%
90 Yr	808	2,241	11,162	14,211	1.1%	3.1%	4.0%
E(X)	100	277	1,377		1,754	2,919	5,004

Based on the assessment of the projected change in frequency of impacts of severe flooding presented elsewhere in this report, the above curve can be transformed to account for increased frequency in the b1 2020 and b1 2050 scenarios (Fig. 1).

Figure A-1: Potential Impacts of Flooding on the Road Sector Now and in The Future (2020/2050)



The expected value of the benefits is considered to equal the area under the curve, assuming that roads and highways are flood-proofed to the highest ever-recorded flood and floods can thus be avoided¹⁶. The annual increase in risk from adding in these climate change scenarios to the hazard burden is estimated to amount to 2.6% per year, where the assumption is taken that increases over time are linearly distributed.

Results

Based on the estimates of costs and benefits, the economic efficiency of this option can be estimated. The following table outlines the process of estimating the BC ratio, NPV and IRR. For each given year over the time horizon of 25 years, costs and benefits and net benefits are displayed both in discounted and non-discounted format in constant 2007 values for a (high) discount rate of 12%, the rate most commonly assumed in similar exercises¹⁷. Dividing benefits by costs leads to the B-C ratio, subtracting costs from benefits to the net present value (NPV), and the IRR is calculated as the rate that discounts the NPV to zero.

¹⁶ In reality, full protection against extreme events is normally not possible and cost-efficient.

¹⁷ The return on capital in most developing countries is considered to be between 8-15% in real terms and often 12% is used as a default value (see, for example, OAS 1991; ADB 2001).

Table A-10 : Cost and benefits flows (in Million 2007 TK)

Discount rate	12%						
Year	Calendar Year	Costs	Benefits	Net benefits: benefits-costs	Discounted costs	Discounted benefits	Discounted net benefits
1	2007	352	70	-282	352	70	-282
2	2008	352	144	-208	314	128	-186
3	2009	352	217	-134	280	173	-107
4	2010	352	291	-61	250	207	-43
5	2011	352	365	13	224	232	8
6	2012	352	438	87	200	249	49
7	2013	352	512	160	178	259	81
8	2014	352	586	234	159	265	106
9	2015	352	659	308	142	266	124
10	2016	352	733	381	127	264	138
11	2017	352	807	455	113	260	147
12	2018	352	880	529	101	253	152
13	2019	352	954	602	90	245	155
14	2020	352	1028	676	81	236	155
15	2021	352	1101	750	72	225	153
16	2022	352	1175	823	64	215	150
17	2023	352	1249	897	57	204	146
18	2024	352	1322	971	51	193	141
19	2025	352	1396	1044	46	182	136
20	2026	352	1470	1118	41	171	130
21	2027	352	1543	1192	36	160	124
22	2028	352	1617	1265	33	150	117
23	2029	352	1691	1339	29	140	111
24	2030	352	1764	1413	26	130	104
25	2031	352	1838	1486	23	121	98
	Sum	8794	23853	15058	3090	4998	1907 NPV
						1.62	B/C ratio
						12.1%	Estimated internal rate of return
				Net benefits: increasing due to increasing risk			

Discount rate	0%	5%	10%	12%	15%	20%
NPV	15,058	6,214	2,673	1,907	1,128	399
B/C ratio	2.7	2.2	1.8	1.6	1.4	1.2
IRR	26%	20%	14%	12%	9%	5%

Table A-11: Sensitivity analysis

interest rate	0%	5%	10%	12%	15%	20%
best estimate	2.7	2.2	1.8	1.6	1.4	1.2
costs +50%	1.8	1.5	1.2	1.1	1.0	0.8
costs +50%, benefits - 50%	0.9	0.7	0.6	0.5	0.5	0.4

According to Table A-10, for a discount rate of 12%, the net present value would be TK 1,907, the B-C ratio 1.6 and the estimated internal rate of return of about 12% (thus the same as the discount rate). For all these criteria, the suggestion of this analysis would thus be to conduct the project (for the internal rate of return it would just be fulfilled).

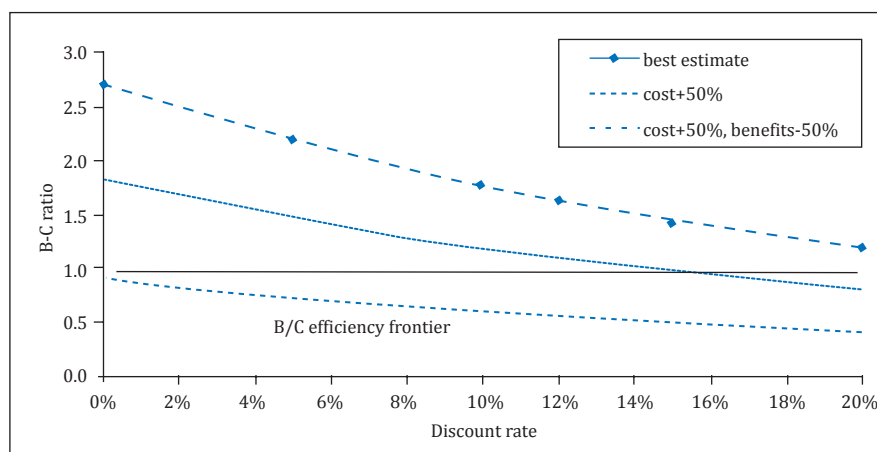
Tables A-11 & A-12, and Figure 2 show the effects of varying the discount rates and costs/benefits by +/- 50% in order to account for uncertainty. Although very costly and an option with national coverage, the flood-proofing of RHD investments seems to be efficient given the assumptions taken. For the best estimate case, a range of 1.2-2.7 is calculated; thus for this set of assumptions, the option would be beneficial. It would mostly still be larger than 1 with more pessimistic assumptions such as costs increasing by 50%. If however, under very pessimistic assumptions, costs are increased and benefits are supposed to be decreased by 50%, then for all discount rates considered the option would not be efficient anymore.

Table A-12: Results in terms of B-C ratio for current and future conditions

Scenario\Discount rate	0%	5%	10%	12%	15%	20%
Best estimate	2.7	2.2	1.8	1.6	1.4	1.2
Costs +50%	1.8	1.5	1.2	1.1	1.0	0.8*
Costs +50%, benefits-50%	0.9*	0.7*	0.6*	0.5*	0.5*	0.4*

Not efficient

Figure A-2: BC Ratios for RHD Option for best Estimate and Sensitivity Analysis



Concluding Remarks

Obviously, the raising of roads as suggested is highly expensive. However, as this is a long term project with national coverage the roads raising should be considered when a particular road is due for major rehabilitation. This way, substantial costs can be reduced, as long as costs and benefit fall broadly within the range of estimates. Also, apart from protecting roads infrastructure, the roads raising option will also create a number of direct and indirect benefits, which are not factored into the analysis, but would increase benefits and should be kept in mind:

- **Social benefits which are largely intangible and difficult to quantify:**

- Avoidance of loss of human lives and livestock,
- Use as a refuge during the emergency period,
- Reducing stress and sufferings of flood victims,
- Facilitation of the movement of relief goods during flood emergencies.

- **Avoidance of inventory damage:**

Substantial inventory damage can be avoided. Besides, protecting foodgrains and livestock fodder can also be a major benefit during floods. It is estimated that over 81,000 households will be able to take refuge on the raised roads during extreme floods. Additionally, there will be substantial damage that can be avoided (to e.g., inventory and livestock) by using the raised roads and highways. This is estimated to save in the tune of TK 581 Million in the event of a 50 year flood, for example (at the rate of TK 7,165 per household).

- **Transport benefits**

Traffic disruption is by far the most common type of disruption caused by floods. Indirect costs due to traffic disruption arise in the form of additional transport costs (comprising fuel etc) and opportunity costs by delay in journey. In developed countries, such costs of disruption can be substantial. In Bangladesh, however, dependencies on roads during floods are likely to be largely offset by 'natural' redundancies created by wide-spread waterways through a large number of water transports. Even then, there will be considerable indirect costs, arising out of time consuming commuting by water transports.

- **Poverty reduction through employment generation:**

The option, when implemented, will generate employment opportunities largely for the disadvantaged groups of people, particularly women, especially during construction. Additionally, during repair and maintenance phase there will be some extra employment. Total person-days that will be generated by earthwork alone estimates are 4 million. Total wages that will be earned by way of this employment estimates as TK 600 Million. Obviously, this will have some implication to poverty reduction.

Appendix 16.0.2: Financial/Economic Analyses For Water, Flood Control, Embankments and Polders and Roads New/Rehabilitation Projects

16.1 Introduction

It is well known that the projects such as Roads, Water, Irrigation, Flood, Embankments, Urban Protection and other infrastructure projects call for the maximum allocation in the country's Annual Development Plan. In view of this, Pre-appraisal /feasibility study or pre-investment study of such projects assumes special significance. This section deserves some discussion in this respect. In the absence of such projects, huge damages are caused to properties of various sectors such as residential, business, industries and other economic sectors. In other words, most of such projects when implemented generate immense benefits, both direct and indirect, tangible and intangible.

As such, this section is intended to briefly present appraisal methods of such type of projects. (For detailed appraisal methods and techniques, see Islam 2011a; 2011b). The research assessed the flood loss potentials in the various economic sectors such as residential, industries, business, public buildings and roads and generated potential standard flood loss database, at various levels - per household/industries/business (1) absolute damages (2) proportional (to values) damages and (3) per square metre absolute damage, disaggregated at various levels of depths and various levels of durations (See Appendix 16.0.2). Through land use survey of various properties, these potential damage data sets can be used in assessing flood protection benefits. This may also help the evaluation of even the agricultural protection projects more comprehensively, through taking into consideration the property losses in rural areas that can be averted in agricultural schemes- the aspect of which has so long largely been ignored.

Given that there can be a wide range of methods and alternative approaches to loss assessments suiting various requirements and situations, which, again, generally largely depend on the levels of details in the data availability, one can use this database and use those methods which are rapid and cost minimising (a sort of 'intermediate/appropriate technology'). This feature is crucially important for countries like Bangladesh. With the availability of fine-level loss and land use data, however, the methods can be extended for use in 'full' project appraisals. Such assessment methods, including the generated loss data sets, apply largely to the river flood under study and hence they are applicable only in similar flood, area and other conditions.

Estimates of per Km physical damage caused to various types of roads (Municipality and R&H) for flood events are also presented (See Appendix 16.0.2). Some damage ratios (to values) have also been contemplated. Such proportional damage data sets standardized to flood return periods will have potential and wider applicability in similar flood and other conditions. Such data sets are particularly helpful for quick and preliminary appraisals of roads rehabilitation projects.

A Feasibility Study largely involves Financial and Economic Analyses. Benefit assessment methodology of projects the first and foremost component of such analyses. The following section aims to develop some broad principles to be adopted for appraisal methods, and benefit assessment methodology for Water, Flood Control, Embankments, Polders and Roads projects, towards preparation of DPPs before undertaking economic or financial analysis of the proposed projects (Islam 2011a).

16.2 Types of risk/impacts

Potential impacts of a proposed project are either benefits or costs. Impacts comprise broadly two groups, direct and indirect (See Table A.1). Direct damages are physical and usually 'visible' impacts arising out of direct implementation of the Project contact with water (e.g., damages to house structure). Indirect impacts are the consequences of direct contact of property with water and are revealed through interruption and disruption of economic and social activities (e.g., production losses due to direct losses to machinery). Indirect effects can involve effects in both the short and long run. Indirect impacts, together with the direct ones, may result in a further chain of effects over time, called linkage effects. In yet another perspective - from the viewpoint of economic values - flood impacts are recognised as belonging broadly to two further categories: tangible and intangible. The tangible impacts are those to which a monetary value can be assigned in order to estimate them. Intangible impacts are defined as those, which cannot directly be evaluated in terms of money.

Table A-13: Typology & examples of flood loss/damage

Form of Loss/Damage	Measurement	
	Tangible	Intangible
Direct	Damage to crops, buildings/ infrastructure Damage to machinery Damage to stock/contents	Loss of an archaeological site Human casualties, injuries Loss of employment Cost of stress/worries
Indirect	Loss to industrial production (value added) Loss of business/productivity Loss in terms of increased medical costs	Cost of morbidity Cost of diseases Long run effects (mortality)

For use in appraisal of water or flood related projects (e.g., embankments, polders, roads, growth centers, cyclone shelters) the following principles of assessments for various economic sectors should be adopted to achieve benefit assessments.

16.3 Principles of quantification of damage values

One of the problems of flood damage assessments (or potential flood protection benefits) involves quantification of damage values or flood protection benefits. Damages are the cost of returning the relevant property to pre-event conditions. This may be carried out by repairs or replacements of various items of the damaged properties. The value of damages to buildings or inventories thus amounts to total involvement comprising (a) repair works already undertaken (b) replacement works already undertaken and (c) the remaining damages, if any, that are to be recovered in future. The estimates for the unrecovered damages are worked out on the basis of the prices of works that have already been accomplished. Further problems arise as the recovery

activities usually take place not at a point in time, but stretched over a range of period, often months or even years. The problem is surmounted by converting these costs at constant prices, through deflating by relevant indices for different points (parts of year) in time.

16.4 Present value of properties

Differences in values of different properties are due to many factors; among these are, (a) durability characteristics (b) safety characteristics (c) locational characteristics (d) flood damage (e) flood proneness (f) modifications/extensions (g) age (depreciation), and (h) price inflation.

When the cost of repairs exceeds the cost of replacements minus depreciations, it is rational to consider replacement values in order to have estimates of the flood damages. The 'average remaining values', which are the replacement cost net of depreciations, are estimated chiefly through respondents' estimates at existing conditions, in combination with the prior knowledge of second-hand prices. Inventories are valued as if resold (second hand) in current prices according to respondents' estimates, corrected with market prices of similar items.

Care must be taken to minimise over- and under-estimation of damages. Possible over-estimations arise due to (i) better quality of house constructions (ii) better materials used (iii) claims from e.g., insurances and (iv) respondents' deliberate exaggerations. Likewise, under-estimations arise due to (i) works not done yet (ii) works done by self/family workers and (iii) works done poorly.

Repair/replacement of inventories is estimated net of scrap value, if any. Similarly, loss to stock and materials, livestock and trees is calculated net of remaining residual value, if any.

Wages to laborers constitute a considerable part of losses; labor employed in the process of the recovery includes (i) hired workers and (ii) family laborers, including respondents' own labors. If family workers are involved in repair/clean-up works, the costs are estimated at the rate of 50 per cent (as opportunity cost) of the existing casual workers' wage rates.

Potential damage data sets for various economic sectors have immense use in assessing flood protection benefits. This will also help the evaluation of agricultural projects more comprehensively, through taking into consideration the residential losses in rural areas that can be averted in agricultural schemes-the aspect of which has so long largely been ignored.

Following the above broad principles, depth-damage standard flood loss data base for various economic sectors are constructed through modeling (See Islam 2011a for details). Although the data base presented her refers to a river flood and a secondary town (Tangail) for various economic sectors such data base would be applicable to achieve benefit assessments and thereby appraisals for projects in other places of the country for particularly Water, Flood Control, Embankments, Polders and Roads projects¹⁸. These can particularly be used in conducting feasibility studies via financial analysis of the proposed projects. For economic analyses, however, appropriate conversion factors need to used presented in Appendix 16.0.4: Conversion Factors. Like these data base for river flood, a comprehensive database for flash flood and tidal flood can be consulted from Islam (2011b).

¹⁸ The assessment methodology and the data base constructed were widely used in macro-level flood loss assessments for the recent three major floods, 1998, 2004 and 2007 based on a few broad assumptions.

16.5 Residential sector

Table A-14 : Per household potential damage by damage components at various depths
Value in Taka: 2009-10 prices

		Per household mean damage by components			
		Main house Structure	All house Structure	Inventory	Total
DEPTH.	30m	2583	3185	10658	16426
HTYPE	1	2165	2580	17530	22275
HTYPE	2	2195	3147	13722	19064
HTYPE	3	3337	4043	8004	15384
HTYPE	4	2631	2977	3375	8983
DEPTH	.61m	4229	5249	17440	26919
HTYPE	1	3787	4651	28689	37126
HTYPE	2	4281	5970	22456	32706
HTYPE	3	5110	6189	13099	24398
HTYPE	4	3741	4197	5524	13462
DEPTH	.91m	5615	7002	23023	35640
HTYPE	1	5189	6483	37867	49539
HTYPE	2	6239	8563	29644	44445
HTYPE	3	6474	7866	17293	31633
HTYPE	4	4563	5092	7293	16948
DEPTH	1.22m	6933	8667	28218	43818
HTYPE	1	6536	8269	46414	61218
HTYPE	2	8219	11154	36335	55709
HTYPE	3	7700	9380	21194	38274
HTYPE	4	5276	5867	8936	20079
DEPTH	1.52m	8134	10189	32869	51191
HTYPE	1	7773	9923	54064	71760
HTYPE	2	10109	13602	42323	66034
HTYPE	3	8767	10703	24687	44157
HTYPE	4	5886	6527	10408	22820
DEPTH	1.83m	9318	11691	37467	58477
HTYPE	1	8996	11576	61802	82374
HTYPE	2	12036	16091	48141	76268
HTYPE	3	9786	11963	28084	49833
HTYPE	4	6453	7140	11841	25434
DEPTH	2.13m	10422	13087	41630	65140
HTYPE	1	10137	13132	68670	91938
HTYPE	2	13887	18440	53492	85819
HTYPE	3	10706	13104	31205	55015
HTYPE	4	6958	7682	13157	27796

		Per household mean damage by components			
		Main house Structure	All house Structure	Inventory	Total
DEPTH	2.44m	11526	14490	45748	71764
HTYPE	1	11284	14699	75462	101445
HTYPE	2	15780	20846	58782	95409
HTYPE	3	11603	14216	34291	60110
HTYPE	4	7443	8204	14459	30106
Sector average		7345	9195	29632	46172

Source : Islam (2011a)

Table A-15: Per household potential damage by damage components at various depths
Value in Taka: 2009-10 prices

		Per household mean damage by components			
		Main house Structure	All house Structure	Inventory	Total
DEPTH	30m	4854	5996	17325	28175
HTYPE	1	5635	6637	28496	40768
HTYPE	2	4947	7071	22307	34325
HTYPE	3	4802	5707	13014	23523
HTYPE	4	4020	4564	5488	14072
DEPTH	.61m	8132	10137	28355	46624
HTYPE	1	9855	11964	46636	68455
HTYPE	2	9646	13414	36509	59569
HTYPE	3	7309	8735	21296	37339
HTYPE	4	5718	6436	8980	21134
DEPTH	.91m	10950	13706	37428	62084
HTYPE	1	13505	16676	61559	91740
HTYPE	2	14056	19242	48188	81487
HTYPE	3	9261	11103	28112	48476
HTYPE	4	6972	7810	11854	26636
DEPTH	1.22m	13653	17145	45876	76674
HTYPE	1	17015	21269	75454	113738
HTYPE	2	18521	25068	59066	102655
HTYPE	3	11016	13240	34457	58713
HTYPE	4	8063	8999	14528	31590
DEPTH	1.52m	16136	20296	53436	89868
HTYPE	1	20229	25527	87888	133644
HTYPE	2	22778	30547	68802	122126

		Per household mean damage by components			
		Main house Structure	All house Structure	Inventory	Total
HTYPE	3	12545	15104	40135	67785
HTYPE	4	8993	10006	16921	35921
DEPTH	1.83m	18601	23442	60909	102953
HTYPE	1	23416	29776	100469	153661
HTYPE	2	27124	36156	78261	141542
HTYPE	3	14002	16884	45655	76541
HTYPE	4	9861	10947	19250	40058
DEPTH	2.13m	20906	26370	67676	114953
HTYPE	1	26389	33776	111632	171797
HTYPE	2	31287	41436	86958	159682
HTYPE	3	15317	18493	50727	84537
HTYPE	4	10633	11781	21387	43800
DEPTH	2.44m	23225	29324	74372	126920
HTYPE	1	29371	37808	122674	189853
HTYPE	2	35558	46840	95559	177957
HTYPE	3	16599	20064	55745	92409
HTYPE	4	11375	12582	23504	47460
Sector average		14557	18302	48172	81031

Source: Islam (2011a)

Table A-16: Potential Damage Proportion by Damage Components at Various Depths
Value in Taka: 2009-10prices

		Mean damage proportion (to value) by components			
		Main house Structure	All house Structure	Inventory	Total
DEPTH.	.30m	.0359	.0336	.0682	.0466
HTYPE	1	.0072	.0108	.0563	.0301
HTYPE	2	.0110	.0198	.0619	.0366
HTYPE	3	.0318	.0276	.0605	.0406
HTYPE	4	.0937	.0761	.0940	.0793
DEPTH	.61m	.0553	.0558	.1188	.0744
HTYPE	1	.0128	.0179	.0989	.0499
HTYPE	2	.0213	.0330	.1076	.0619
HTYPE	3	.0480	.0458	.1052	.0649
HTYPE	4	.1389	.1266	.1634	.1207

		Mean damage proportion (to value) by components			
		Main house Structure	All house Structure	Inventory	Total
DEPTH	.91m	.0703	.0743	.1618	.0969
HTYPE	1	.0174	.0238	.1336	.0665
HTYPE	2	.0309	.0439	.1469	.0834
HTYPE	3	.0593	.0610	.1436	.0846
HTYPE	4	.1735	.1686	.2231	.1533
DEPTH	1.22m	.0810	.0916	.2033	.1179
HTYPE	1	.0225	.0293	.1679	.0820
HTYPE	2	.0406	.0541	.1845	.1038
HTYPE	3	.0699	.0752	.1804	.1027
HTYPE	4	.1911	.2079	.2803	.1829
DEPTH	1.52m	.0966	.1073	.2412	.1365
HTYPE	1	.0269	.0343	.1992	.0961
HTYPE	2	.0499	.0634	.2190	.1223
HTYPE	3	.0791	.0881	.2141	.1188
HTYPE	4	.2305	.2433	.3326	.2090
DEPTH	1.83m	.1088	.1225	.2787	.1548
HTYPE	1	.0315	.0392	.2302	.1102
HTYPE	2	.0605	.0724	.2530	.1406
HTYPE	3	.0878	.1006	.2473	.1344
HTYPE	4	.2555	.2779	.0384	.2339
DEPTH	2.13m	.1198	.1366	.3137	.1714
HTYPE	1	.0357	.0436	.2591	.1229
HTYPE	2	.0697	.0807	.2848	.1576
HTYPE	3	.0956	.1121	.2784	.1486
HTYPE	4	.2780	.3098	.4324	.2566
DEPTH	2.44m	.1305	.1505	.3487	.1879
HTYPE	1	.0398	.0482	.2880	.1355
HTYPE	2	.0791	.0889	.3165	.1746
HTYPE	3	.1032	.1236	.3094	.1626
HTYPE	4	.2997	.3414	.4807	.2788
Sector average		.0873	.0965	.2168	.1233

Source : Islam (2011a)

Table A-17: Potential damage proportion by damage components at various depths
Value in Taka: 2009-10prices

Mean damage proportion (to value) by components					
		Main house Structure	Main house Structure	Inventory	Total
DEPTH.	30m	.0586	.0629	.1128	.0763
HTYPE	1	.0185	.0201	.0932	.0530
HTYPE	2	.0252	.0371	.1024	.0642
HTYPE	3	.0432	.0516	.1001	.0629
HTYPE	4	.1473	.1427	.1556	.1252
DEPTH	.61m	.0914	.1045	.1961	.1225
HTYPE	1	.0330	.0335	.1619	.0886
HTYPE	2	.0489	.0617	.1780	.1096
HTYPE	3	.0653	.0858	.1740	.1007
HTYPE	4	.2183	.2371	.2703	.1910
DEPTH	.91m	.1175	.1392	.2677	.1603
HTYPE	1	.0457	.0446	.2211	.1184
HTYPE	2	.0711	.0822	.2430	.1484
HTYPE	3	.0806	.1142	.2376	.1313
HTYPE	4	.2725	.3157	.3690	.2430
DEPTH	1.22m	.1367	.1717	.3363	.1954
HTYPE	1	.0580	.0550	.2778	.1465
HTYPE	2	.0935	.1014	.3053	.1854
HTYPE	3	.0950	.1409	.2985	.1596
HTYPE	4	.3002	.3894	.4636	.2902
DEPTH	1.52m	.1635	.2009	.3991	.2269
HTYPE	1	.0694	.0643	.3296	.1719
HTYPE	2	.1147	.1187	.3623	.2192
HTYPE	3	.1075	.1649	.3542	.1847
HTYPE	4	.3622	.4557	.5502	.3317
DEPTH	1.83m	.1853	.2295	.4611	.2577
HTYPE	1	.0812	.0734	.3808	.1975
HTYPE	2	.1391	.1355	.4186	.2528
HTYPE	3	.1193	.1884	.4092	.2090
HTYPE	4	.4015	.5205	.6357	.3715
DEPTH	2.13m	.2048	.2557	.5189	.2858
HTYPE	1	.0919	.0816	.4286	.2206
HTYPE	2	.1603	.1510	.4711	.2839
HTYPE	3	.1300	.2100	.4605	.2313

Mean damage proportion (to value) by components					
		Main house Structure	Main house Structure	Inventory	Total
HTYPE	4	.4368	.5802	.7154	.4076
DEPTH	2.44m	.2240	.2819	.5768	.3137
HTYPE	1	.1026	.0903	.4764	.2436
HTYPE	2	.1820	.1665	.5236	.3151
HTYPE	3	.1403	.2314	.5119	.2532
HTYPE	4	.4710	.6395	.7952	.4431
Sector average		.1476	.1808	.3586	0.2048

Source : Islam (2011a)

Table A-18 Per Square Metre Potential Damage by Components at Various Depths

Value in Taka: 2009-10 prices

Per square metre damage by components				
		Main house Structure	Inventory	Total
DEPTH	30m	63	212	275
HTYPE	1	37	294	331
HTYPE	2	40	244	284
HTYPE	3	72	173	245
HTYPE	4	104	134	238
DEPTH	.61m	100	347	447
HTYPE	1	65	482	547
HTYPE	2	76	398	474
HTYPE	3	110	284	394
HTYPE	4	148	219	367
DEPTH	.91m	129	457	586
HTYPE	1	87	638	725
HTYPE	2	110	526	636
HTYPE	3	141	375	516
HTYPE	4	181	290	471
DEPTH	1.22m	157	560	717
HTYPE	1	110	781	891
HTYPE	2	146	645	791
HTYPE	3	168	459	627
HTYPE	4	209	354	563

Per square metre damage by components				
		Main house Structure	Inventory	Total
DEPTH	1.52m	184	651	835
HTYPE	1	131	911	1042
HTYPE	2	181	751	932
HTYPE	3	190	535	725
HTYPE	4	234	413	647
DEPTH	1.83m	209	744	953
HTYPE	1	151	1041	1192
HTYPE	2	215	854	1069
HTYPE	3	213	609	822
HTYPE	4	256	469	725
DEPTH	2.13m	231	826	1057
HTYPE	1	171	1155	1326
HTYPE	2	247	950	1197
HTYPE	3	231	675	906
HTYPE	4	276	522	798
DEPTH	2.44m	254	907	1161
HTYPE	1	190	1270	1460
HTYPE	2	281	1044	1325
HTYPE	3	250	742	992
HTYPE	4	295	573	868
Sector average		166	588	754

Source : Islam (2011a)

Table A-19: Per Square Metre Potential Damage by Components at Various Depths

Value in Taka: 2009-10 prices

Per square metre damage by components				
		Main house Structure	Inventory	Total
DEPTH	30m	112	344	456
HTYPE	1	96	481	577
HTYPE	2	87	395	482
HTYPE	3	104	281	385
HTYPE	4	159	219	378
DEPTH	.61m	181	563	744
HTYPE	1	165	785	950
HTYPE	2	171	650	821
HTYPE	3	157	462	619
HTYPE	4	228	357	585

Per square metre damage by components				
		Main house Structure	Inventory	Total
DEPTH	.91m	240	742	982
HTYPE	1	228	1036	1264
HTYPE	2	250	854	1104
HTYPE	3	201	609	810
HTYPE	4	276	469	745
DEPTH	1.22m	294	911	1205
HTYPE	1	287	1270	1557
HTYPE	2	328	1050	1378
HTYPE	3	240	747	987
HTYPE	4	320	578	898
DEPTH	1.52m	344	1060	1404
HTYPE	1	341	1480	1821
HTYPE	2	404	1223	1627
HTYPE	3	272	870	1142
HTYPE	4	357	670	1027
DEPTH	1.83m	392	1210	1602
HTYPE	1	394	1692	2086
HTYPE	2	482	1389	1871
HTYPE	3	304	989	1293
HTYPE	4	391	764	1155
DEPTH	2.13m	438	1344	1782
HTYPE	1	444	1880	2324
HTYPE	2	556	1545	2101
HTYPE	3	332	1100	1432
HTYPE	4	423	848	1271
DEPTH	2.44m	484	1476	1960
HTYPE	1	495	2067	2562
HTYPE	2	632	1696	2328
HTYPE	3	359	1207	1566
HTYPE	4	451	932	1383
Sector average		311	956	1267

Source : Islam (2011a)

16.6 Commercial sectors

Table A-20: Per Industry Estimated Potential Damage to Firm By Damage Components at Various Depths

Duration =up to 7 days:Value at 2009-2010 price

Industry Type/Damage Components	Flood Depth above Floor (metres)				
	.30	.61	.91	1.22	1.52
Food and agro - based					
: Structure	11970	18693	24030	28887	33163
: Machinery	32796	45967	55600	63921	70967
: Stock	52713	82573	106340	128005	147094
: P Indirect	77531	112095	138127	161036	180737
: Linkage effects	95750	138437	170588	198879	223209
: TOTAL	270759	397764	494684	580728	655170
Cotton and textiles					
: Structure	13427	20970	26957	32408	37204
: Machinery	39018	57415	69450	79846	88645
: Stock	106381	166642	214601	258328	285168
: P Indirect	240820	350901	434220	507804	571149
: Linkage effects	507648	739698	915337	107 0451	1203983
: TOTAL	907294	1335626	1660565	1948836	2186150
Timber and furniture					
: Structure	3363	5252	6753	8117	9318
: Machinery	4964	6959	8417	9677	10743
: Stock	29612	44285	57030	68650	78888
: P Indirect	33942	50017	62266	73130	82510
: Linkage effects	48572	71574	89103	104648	118072
: TOTAL	120453	178088	223569	264222	299530
Engineering and electrical					
: Structure	1436	2243	2883	3466	3979
: Machinery	8957	12552	15184	17456	19379
: Stock	7694	12055	15523	18687	21472
: P Indirect	30620	43590	55420	61711	68927
: Linkage effects	53768	76544	97318	108364	121035
: TOTAL	102475	146985	186328	209684	234793

Industry Type/Damage Components	Flood Depth above Floor (metres)				
	.30	.61	.91	1.22	1.52
Miscellaneous and service					
: Structure	2615	4084	5248	6311	6105
: Machinery	11588	16239	19644	22584	25072
: Stock	16889	26456	34070	41009	47127
: P Indirect	31674	45633	56123	65346	73259
: Linkage effects	45263	65209	80200	93379	104688
: TOTAL	108029	157621	195285	228628	256250
Sector average					
: Structure	6564	10247	13173	15836	18182
: Machinery	19854	27827	33659	38696	42964
: Stock	42389	66401	85514	102937	118286
: P Indirect	82918	120447	148799	173805	195319
: Linkage effects	130845	190067	234805	274265	308213
: TOTAL	282569	414990	515949	605540	682965

Source : Islam (2011a)

Table A-21: Per Industry Estimated Potential Damage to Firm by Damage Components at Various Depths

Duration > 7 days: Value at 2009-2010 price

Industry Type/Damage Components	Flood Depth above Floor (metres)				
	.30	.61	.91	1.22	1.52
Food and agro-based					
: Structure	13642	21303	27388	32925	37797
: Machinery	44913	62948	76142	87539	97186
: Stock	69922	109530	141054	169792	195112
: P Indirect	99000	142955	176028	205137	230131
: LINKAGE EFFECTS	122266	176548	217395	253344	284213
: TOTAL	349743	513284	638007	748737	844439
Cotton and textiles					
: Structure	15304	23899	30726	36935	42404
: Machinery	56100	78627	95108	109343	121394
: Stock	141108	221041	284664	342657	393759
: P Indirect	308499	449120	555497	649412	730246
: Linkage effects	650315	946746	1170987	1368961	1539359
: TOTAL	1171326	1719433	2136982	2507308	2827162
Timber and furniture					
: Structure	3832	5986	7695	9251	10621
: Machinery	6799	9530	11526	13252	14712
: Stock	37500	58741	75648	91061	104639
: P Indirect	43278	63747	79337	93160	105093
: Linkage effects	61931	91221	113533	133311	150388
: TOTAL	153340	229225	287739	340035	385453

Industry Components	Type/Damage	Flood Depth above Floor (metres)				
		.30	.61	.91	1.22	1.52
Engineering and electrical						
	: Structure	1638	2556	3285	3950	4535
	: Machinery	12264	17190	20792	23907	26539
	: Stock	10206	15989	20592	24787	28483
	: P Indirect	39518	56182	68587	79430	88695
	: Linkage effects	69394	98656	120439	139479	155749
	: TOTAL	133020	190573	233695	271553	304001
Miscellaneous and service						
	: Structure	2981	4654	5983	7191	8256
	: Machinery	15867	22240	26901	30927	34336
	: Stock	22400	35090	45189	54397	62509
	: P Indirect	40710	58581	72002	83793	93908
	: Linkage effects	58175	83712	102891	119740	134195
	: TOTAL	140133	204277	252966	296048	333204
Sector average						
	: Structure	7479	11681	15016	18052	20723
	: Machinery	27189	38107	46095	52992	58835
	: Stock	56228	88079	113431	136538	156900
	: P Indirect	106203	154118	190290	222188	249615
	: Linkage effects	167589	243198	300278	350613	393892
	: TOTAL	364688	535183	665110	780383	879965

Source : Islam (2011a)

Table A-22: Per business unit estimated potential damage to firm by damage components at various depths

Duration = up to 7 days: Value at 2009-2010 price

Industry Components	Type/Damage	Flood Depth above Floor (metres)				
		.30	.61	.91	1.22	1.52
Food and grocery						
	: Structure	2324	2837	3172	3444	3663
	: Stock	57426	94270	124 650	152977	178360
	: Indirect	39081	53091	63147	71733	78939
	: TOTAL	98831	150198	190969	228154	260962
Cotton and footwear						
	: Structure	6283	7665	8575	9308	9900
	: Stock	47381	77782	102850	126223	147165
	: Indirect	33632	45029	53202	60176	66028
	: TOTAL	87296	130476	164627	195707	223093
Drugs and chemical						
	: Structure	8339	10174	11381	12354	13139
	: Stock	307270	504407	666968	838010	954345
	: Indirect	70738	96317	114684	13 0363	143523
	: TOTAL	386347	610898	793033	980727	1111007
Electrical and electronics						
	: Structure	7350	8968	10031	10891	11584
	: Stock	77434	127112	168081	206275	240499
	: Indirect	134254	180767	214142	242622	266520
	: TOTAL	219038	316847	392254	459788	518603

Industry Type/Damage Components	Flood Depth above Floor (metres)				
	.30	.61	.91	1.22	1.52
Motor/cycle parts					
: Structure	4185	5105	5712	6200	6594
: Stock	52148	85604	113193	138916	161966
: Indirect	49721	67101	79573	90220	99152
: TOTAL	106054	157810	198478	235336	267712
Construction materials					
: Structure	2811	3427	3832	4163	4426
: Stock	18354	30129	39840	48894	57007
: Indirect	58815	78519	92645	104695	114804
: TOTAL	79980	112075	136317	157752	176237
Miscellaneous					
: Structure	5854	7141	7988	8673	9223
: Stock	12879	21143	27955	34308	40000
: Indirect	41733	53881	6065	69907	76077
: TOTAL	60466	82165	42008	112888	125300
Sector average					
: Structure	5307	6474	7243	7859	8361
: Stock	81841	134351	177650	230847	254192
: Indirect	61139	82101	97135	97135	120721
: TOTAL	148287	222926	282028	335841	383274

Table A-23: Per Business Unit Estimated Potential Damage to Firm by Damage Components at Various Depths

Duration > 7 days: Value at 2009-2010 price

Industry Type/ Damage Components	Flood depth above floor (metres)				
	.30	.61	.91	1.22	1.52
Food and grocery					
: Structure	2548	3108	3478	3775	4015
: Stock	65255	107120	141645	173832	202673
: Indirect	42332	57517	68421	77729	85541
: TOTAL	110135	167745	213544	255336	292229
Cotton and footwear					
: Structure	6885	8401	9398	10202	10852
: Stock	53843	88387	116871	136939	167229
: Indirect	36358	48710	57571	65130	71474
: TOTAL	97086	145498	183840	212271	249555
Drugs and chemical					
: Structure	9139	11150	12473	13542	14400
: Stock	349157	573171	757895	930122	1084447
: Indirect	76643	104374	124289	141288	155554
: TOTAL	434939	688695	894657	1084952	1254401
Electrical and electronics					
: Structure	8056	9830	10996	11936	12695
: Stock	87990	144442	190994	234396	273286
: Indirect	145239	195661	231840	262718	288626
: TOTAL	241285	349933	433830	509050	574607
Motor / cycle parts					
: Structure	4588	5598	6261	6796	7229
: Stock	59257	97273	128625	157854	184045
: Indirect	53806	72646	86168	97708	107394
: TOTAL	117651	175517	221054	262358	298668
Construction materials					
: Structure	3080	3757	4203	4561	4851
: Stock	20858	34238	45272	55559	64778
: Indirect	63554	84912	100225	113286	124246
: TOTAL	87492	122907	149700	173406	193875
Miscellaneous					
: Structure	6415	7826	8757	9505	10109
: Stock	14634	24026	31767	38986	45454
: Indirect	44900	58056	67433	75414	82097
: TOTAL	65949	89908	107957	123905	137660
Sector average					
: Structure	5815	7096	7937	8617	9164
: Stock	93000	152665	201866	247738	288845
: Indirect	66118	88838	96479	119039	130705
: TOTAL	164933	248599	306282	375394	428714

Source : Islam (2011a)

Table A-24: Per Square Metre Estimated Potential Damage to Firm by Damage Components at Various Depths: Industries

Duration = up to 7 days: Value at 2009-2010 price

Industry Type/ Damage Components	Flood depth above floor (metres)				
	.30	.61	.91	1.22	1.52
Food and agro-based					
: Structure	103	159	207	248	285
: Machinery	281	394	476	547	609
: Stock	453	707	911	1097	1261
: P Indirect	664	961	1183	1380	1549
: Linkage effects	820	1188	1461	1705	1914
: TOTAL	2321	3409	4238	4977	5618
Cotton and textiles					
: Structure	46	71	91	110	125
: Machinery	138	194	234	270	298
: Stock	359	563	725	872	1003
: P Indirect	813	1183	1466	1714	1929
: Linkage effects	1714	2495	3090	3613	4066
: TOTAL	3070	4506	5606	6579	7421
Timber and furniture					
: Structure	87	137	176	213	243
: Machinery	129	182	221	253	281
: Stock	738	1158	1489	1793	2059
: P Indirect	888	1307	1627	1911	2155
: Linkage effects	1270	1870	2328	2734	3084
: TOTAL	3112	4654	5841	6904	7822
Engineering and electrical					
: Structure	72	113	146	176	201
: Machinery	454	637	770	885	982
: Stock	390	610	785	948	1088
: P Indirect	1551	2209	2699	3127	3493
: Linkage effects	2724	3879	4739	5490	6133
: TOTAL	5191	7448	9139	10626	11897
Miscellaneous and service					
: Structure	47	74	96	113	131
: Machinery	210	294	354	409	454
: Stock	306	478	617	742	853
: P Indirect	573	826	1017	1183	1326
: Linkage effects	819	1180	1454	1691	1895
: TOTAL	1955	2852	3538	4138	4659
Sector average					
: Structure	72	112	143	172	197
: Machinery	243	340	412	472	526
: Stock	448	703	904	1091	1252
: P Indirect	898	1297	1596	1862	2090
: Linkage effects	1417	2046	2520	2939	3299
: TOTAL	3078	4498	5575	6536	7364

Source : Islam (2011a)

Table A-25: Per square metre estimated potential damage to firm by damage components at various depths: Industries

Duration > 7 days: Value at 2009-2010 price

Industry Type/Damage Components	Flood Depth above Floor (metres)				
	.30	.61	.91	1.22	1.52
Food and agro-based					
: Structure	118	182	235	282	325
: Machinery	385	539	654	751	833
: Stock	600	939	1210	1454	1673
: P Indirect	848	1225	1508	1757	1971
: Linkage effects	1048	1513	1862	2170	2434
: TOTAL	2999	4398	5469	6414	7236
Cotton and textiles					
: Structure	51	82	104	125	143
: Machinery	191	266	320	370	409
: Stock	476	747	961	1155	1329
: P Indirect	1041	1514	1874	2192	2465
: Linkage effects	2193	3191	3951	4620	5196
: TOTAL	3952	5800	7210	8462	9542
Timber and furniture					
: Structure	100	156	201	241	276
: Machinery	178	248	301	347	385
: Stock	980	1535	1976	2378	2733
: P Indirect	1129	1664	2073	2433	2743
: Linkage effects	1616	2381	2966	3481	3925
: TOTAL	4003	5984	7517	8880	10062
Engineering and electrical					
: Structure	84	129	168	201	229
: Machinery	620	870	1054	1211	1344
: Stock	517	810	1044	1255	1444
: P Indirect	2002	2846	3475	4025	4494
: Linkage effects	3516	4998	6102	7068	7891
: TOTAL	6739	9653	11843	13760	15402
Miscellaneous and service					
: Structure	53	84	109	131	150
: Machinery	288	403	487	560	620
: Stock	404	637	817	985	1132
: P Indirect	738	1060	1302	1517	1701
: Linkage effects	1054	1514	1861	2168	2430
: TOTAL	2537	3698	4576	5361	6033
Sector average					
: Structure	82	126	163	196	223
: Machinery	334	465	563	647	719
: Stock	595	932	1201	1 445	1661
: P Indirect	1151	1661	2048	2384	2674
: Linkage effects	1817	2621	3231	3763	4219
: TOTAL	3979	5805	7206	8435	9496

Source : Islam (2011a)

Table A-26: Per square metre estimated potential damage to firm by damage components at various depths: Business

Duration = up to 7 days: Value at 2009-2010 price

Industry Type/Damage Components	Flood Depth above Floor (metres)				
	.30	.61	.91	1.22	1.52
Food and grocery					
: Structure	119	144	162	176	185
: Stock	2930	4810	6359	7806	9099
: Indirect	1993	2709	3222	3659	4026
: TOTAL	5042	7663	9743	11641	13310
Cotton and footwear					
: Structure	260	318	354	385	410
: Stock	1965	3224	4264	5232	6102
: Indirect	1394	1867	2205	2495	2737
: TOTAL	3619	5409	6823	8112	9249
Drugs and chemical					
: Structure	197	241	269	293	309
: Stock	7252	11901	15738	19292	22519
: Indirect	1668	2273	2706	3077	3387
: TOTAL	9117	14415	18713	22662	26215
Electrical and electronics					
: Structure	423	516	579	628	667
: Stock	4464	7326	9687	11888	13862
: Indirect	7738	10419	12342	13986	15362
: TOTAL	12625	18261	22608	26502	29891
Motor/cycle parts					
: Structure	304	370	413	448	476
: Stock	3772	6190	8183	10045	11710
: Indirect	3594	4851	5754	6524	7169
: TOTAL	7670	11411	14350	17017	19355
Construction materials					
: Structure	93	113	126	138	148
: Stock	613	1005	1330	1632	1904
: Indirect	1965	2622	3094	3497	3832
: TOTAL	2671	3740	4550	5267	5884
Miscellaneous					
: Structure	306	373	417	453	482
: Stock	673	1104	1461	1792	2087
: Indirect	2179	2814	3265	3650	3973
: TOTAL	3158	4291	5143	5895	6542
Sector average					
: Structure	243	295	332	360	384
: Stock	3094	5080	6719	8244	9612
: Indirect	2934	3937	4657	5268	5784
: TOTAL	6271	9312	11708	13872	15780

Source: Islam (2011a)

Table A-27: Per square metre estimated potential damage to firm by damage components at various depths: Business

Duration > 7 days: Value at 2009-2010 price

Industry Type/Damage Components	Flood Depth above Floor (metres)				
	.30	.61	.91	1.22	1.52
Food and grocery					
: Structure	131	159	178	194	204
: Stock	3330	5465	7227	8870	10341
: Indirect	2159	2934	3490	3966	4364
: TOTAL	5620	8558	10895	13030	14909
Cotton and footwear					
: Structure	285	348	390	423	450
: Stock	2233	3663	4845	5946	6933
: Indirect	1508	2018	2387	2700	2962
: TOTAL	4026	6029	7622	9069	10345
Drugs and chemical					
: Structure	216	263	294	319	340
: Stock	8238	13524	17884	21947	25590
: Indirect	1810	2462	2933	3334	3671
: TOTAL	10264	16249	21111	25600	29601
Electrical and electronics					
: Structure	465	567	634	689	732
: Stock	5072	8325	11007	13509	15751
: Indirect	8372	11278	13362	15142	16636
: TOTAL	13909	20170	25003	29340	33119
Motor cycle parts					
: Structure	332	404	453	491	522
: Stock	4285	7034	9301	11415	13308
: Indirect	3891	5254	6230	7065	7766
: TOTAL	8508	12692	15984	18971	21596
Construction materials					
: Structure	103	125	141	151	162
: Stock	697	1142	1513	1855	2164
: Indirect	2123	2834	3346	3782	4148
: TOTAL	2923	4101	5000	5788	6474
Miscellaneous					
: Structure	335	409	457	497	528
: Stock	764	1255	1660	2036	2374
: Indirect	2346	3031	3521	3938	4287
: TOTAL	3445	4695	5638	6471	7189
Sector average					
: Structure	266	325	365	394	419
: Stock	3516	5773	7632	9367	10924
: Indirect	3172	4254	5039	5702	6262
: TOTAL	6954	10352	13036	15463	17605

Source : Islam (2011a)

16.7 Appraisal methods, benefit assessment methodology for roads projects¹⁹

16.7.1 Potential flood impacts on roads network

Floods may cause physical damage to roads and other transport networks, such as railways, seaports or airports. At the same time, floods may cause traffic and communication disruptions. The physical damage is termed as the direct damage, and the damage due to traffic disruptions is termed as the indirect damage. Depending on the traffic network with the provision of alternative routes in individual locations, commuters may suffer two major types of indirect losses. The first type includes additional costs incurred due to use of an alternative route or journey. The second type includes the opportunity cost caused by deferment or delay in a journey. If a flood snaps a road link, for example, and if there is no alternative route, commuters dependent on it will, unless they can 'defer', have to suffer maximum losses because of lack of 'redundancies' (Parker et al 1987).

16.7.2 Potential indirect impacts of flooding on roads sector

In Bangladesh, dependencies on roads during floods are likely to be largely offset by 'natural' redundancies created by widespread waterways through a large number of water transports. Bangladesh being traversed by more than 700 rivers and tributaries (total length being 22,000 kilometres) covering a navigable water network of more than 8,000 kilometres, natural 'redundancies' at times of floods are enormous compared with roads. Hence, it is believed that indirect impacts of flooding of roads will largely be offset by water transports²⁰.

16.7.3 Potential direct impacts of flooding on roads

Bangladesh is covered by a large road and highway network, most of it traversing through the flood plains of the country. Protecting and maintaining about 21 thousand (R & H) kilometres of roads and 15 thousand bridges and culverts with an estimated asset value of TK 727,000 Million is of prime importance for the national economy (Islam and Mechler 2007).

Therefore, flood loss potentials to roads infrastructure have been huge. In the 1998 and 2004 flood, for example, the direct damage to roads sector is estimated as 15 and 9 per cent of the total damage respectively. The situation is expected to be deteriorating in the days to come, with the increased extent and intensity of flooding due to potential climate change and sea level rise in future.

The direct physical damage caused to road infrastructure by floods can be colossal in Bangladesh. Because of the requirement of bridges and culverts to cross many rivers and canals, and poor engineering characteristics of the soil, the cost of construction of roads is one of the highest in the world (Jansen et al 1989). Conditions also require that greater than normal attention be devoted to maintenance. In the 2004 flood, for example, more than 27,000 kilometres of metalled roads were damaged/destroyed, and about 3,000 bridges and culverts were washed away. Unfortunately, the assessment of direct damage potential to roads has received little attention in the contemporary flood research, either in advanced countries or developing societies²¹. The present research, thus, seeks assessment of only the direct damage caused to roads infrastructure, based on a small case study town as a demonstration.

19 For flood loss potentials in office and public buildings, see Islam (2011a)

20 'Natural' redundancies are expected also to create considerable income and employment impact in the face of a stimulus to the boat making industry during floods.

21 For indirect impacts (e.g., for journey deferment, additional fuel and time costs), however, detailed methods of assessment are available in Parker et al (1987).

16.7.4 Problems of assessing direct damage to roads

The assessment of flood loss potential in roads sector has always been a problem. Roads are always subject to wear and tear due to host of factors such as traffic loads, construction type and quality, and other external events. Almost every year roads demand attention. Additionally, some modifications or improvements to existing structures are often carried out. All these contribute to the failure to precisely separate repair works exclusively attributable to floods.

Thus, the construction of depth-damage data sets for the roads transport sector poses special problems. It is complicated to construct standard or average depth-damage data as the physical damage are often unrelated to depths. Moreover, flood losses in this sector are more likely to be a function of durations, rather than depths. The situation is made more complex by the presence of several other factors. First, not all roads are expected to be equally vulnerable to flood water. Different roads are flooded at different depths for different durations, while the road-specific repair costs are not usually available. Such costs are often available for the total number of roads combined. The physical damages largely depend on the type of construction e.g., rod-concrete-cement (RCC), concrete-cement (CC), herring-bone (HB) or kutcha (made of earth) (Islam 2011a). For example, a RCC road is not normally damaged even with a deep and long duration flooding, while a CC road may be subject to considerable damage even with a shallow depth and moderate duration of flooding. A HB or kutcha road, on the other hand, may substantially be damaged with the increase in durations.

Second, the physical damages largely depend on the pre-flood conditions and subsequent traffic loads during flood. Some roads are not likely to be considerably damaged in shallow flooding (e.g., 0.15 metre), but they are significantly damaged if motor or robust traffic is in operation during flooding, as is often the case in Bangladesh. These roads, on the other hand, are not substantially damaged even with a deep flooding as no such robust vehicles can ply in that situation. In such conditions, shallow flooding can create more damages to some roads than those being deeply flooded.

Hence, in all these complex situations, only some guidelines can be set towards assessing potential damages in some actual flood events with specified magnitude, as outlined in the following section (See Islam 2011a) for detailed methodology).

The roads maintained by the R & H are wide, elevated and of high quality while those maintained by municipal authority are generally relatively narrow, less elevated and of a sub-standard construction quality. As regards potential traffic loads during floods, the R & H roads usually experience relatively a lesser amount of loads as compared to the crowded municipality roads.

The per kilometre flood damage in the R & H roads estimates as TK 99,340 and TK 252,080 in the two floods, respectively (**Table A.28**). The potential per kilometre flood damages to municipality roads are estimated as TK. 273,700 and TK 717,600, for a 10 and 40 year flood respectively (at 2009-10 prices).

Table A-28: Per Km potential direct damage to pucca roads in various floods

Value in TK 2009-10 price

Major roads	Pre km direct damage in various floods				
	Flood frequency				
	2 yr	5 yr	10 yr	20 yr	40 yr
R & H	9,583	72,450	99,340	112,086	252,080
% of value	0.01	0.47	0.75	0.90	2.02
Municipality road	44,373	155,916	273,700	281,750	717,600
% of value	0.29	2.94	5.42	5.6	14.22

Source : Islam (2011a)

Evidently, the municipality roads are the most affected ones, suffering damage in the range of 5.4 per cent and 14.2 per cent (of value) in the two floods (10 Yr and 40 Yr) respectively. The proportional damage to the R & H roads is much less, compared to the municipality roads, estimating at 0.75 per cent and 2.02 per cent of their value in a 10-year and a 40-year flood, respectively. It is evident that the damage to roads in a 2-year flood is not considerable, estimated as 0.01 and 0.29 per cent of value for the two types of roads respectively.

In summary, a major component of a Feasibility Study involves Financial and Economic Analyses. For such analyses, it is important to develop some broad principles to be adopted for appraisal methods, and benefit assessment methodology for Water, Flood Control, Embankments, Polders and Roads projects, which has to be included in the preparation of DPPs

For the residential sector, two broad damage components are distinguished while constructing potential data sets: (1) Structural damage and (2) Inventory damage. The residential potential damage data sets are constructed at various levels: (1) per household absolute damage (2) per household proportional damage and (3) per square metre absolute damage. The data sets are constructed for individual house groups and the whole sector, at levels of 8 depths and 2 durations categories.

For the commercial sectors, five broad damage components are distinguished while constructing potential loss data sets: (1) Structural damage (2) Machinery and equipment damage (3) Stock damage (4) Production (primary indirect) loss and (5) Linkage effects. Per enterprise and per square metre damage data sets, for individual sub-sectors and the whole sector, are constructed at levels of 5 depths and 2 durations categories. As regards roads sector, per kilometre flood damages to R & H and municipal roads have been estimated for floods with various magnitudes.

The data sets are limited to use in river flooding only. Flood damage assessments or flood protection benefits are heavily based on host of estimation procedures. The various data sets and assessment methods presented can be used as per appraisal needs and according to basic information available (e.g., floor space, or value or number of properties/value of properties in the area under appraisal). For a more generalised use (e.g., desk-level appraisal), the sector average can be used, while for a more refined level appraisal, per household, per enterprise or per square metre damage data sets can be used(See Islam 2011a for more details)

The data sets for economic sectors (e.g., Residential, Industries, Business and Roads), refer to 2009-10 prices, which should be updated through use of appropriate deflators, presented as follows:

Table A-29: National Deflators Table

F. years	National Deflators (84-85=100)	National Deflators (95-96=100)	National Deflators (2009-10=100)
1973	23	13	7
1974	28	16	8
1975	44	26	13
1976	48	28	15
1977	50	29	15
1978	50	29	15
1979	53	31	16
1980	64	37	19
1981	71	42	22
1982	78	46	24
1983	87	51	26
1984	92	54	28
1985	100	58	30
1986	106	62	32
1987	107	63	33
1988	113	66	34
1989	121	71	37
1990	131	77	40
1991	144	84	44
1992	153	89	46
1993	156	91	47
1994	159	93	48
1995	163	95	49
1996	171	100	52
1997	173	105	54
1998	180	111	58
1999	184	113	59
2000	189	115	60
2001	194	118	61
2002	201	122	63
2003	207	126	65
2004	217	132	68
2005	228	139	72
2006	242	147	76
2007	256	156	81
2008	279	170	88
2009	297	181	94
2010	317	193	100
2011	339	207	107
2012	359	219	113

Source: Constructed Deflators from National Accounts Statistics, BBS Various years

Source : Islam (2011a; 2011b)

Appendix 16.0.3: Benefits Assessments of Projects and Valuation in the Context of Climate Impacts Assessment

16.3.1 Benefits assessments of projects

While estimate of costs of a project is relatively straightforward estimate of benefits assessment is the difficult part. The ultimate aim of project analysis is the determination of investment worth of projects which is defined as the net benefits over costs of projects. Inevitably, projects differ from one another in respect of their costs and benefits. Benefits comprise broadly two groups, direct and indirect. Direct benefits are usually 'visible' arising out of direct effect. Indirect benefits are the consequences of direct impacts and are revealed through interruption and disruption of economic and social activities. Indirect effects can involve effects both in the short and long run. Indirect impacts, together with the direct ones, may result in a further chain of effects over time, called linkage effects. In yet another perspective - from the viewpoint of economic values - impacts or benefits are recognised as belonging broadly to two further categories: tangible and intangible. The tangible impacts are those to which a monetary value can be assigned in order to estimate them. Intangible impacts are defined as those which cannot directly be evaluated in terms of money. So, tangible benefits can be quantified while intangible can not be directly monetized.

An example of direct benefits is the increased production of crops as a result of an embankment: Improved fisheries or transportation facilities as a result of embankment may be cited as indirect benefits. Secondary benefits reflect the impact of the project on the rest of the economy. An example of, secondary benefits is the incremental income generated in the industries having forward and backward linkages with the project or the additional income and employment generated in a particular region. Reduction in unemployment in a particular region may be secondary benefit. Usually indirect and secondary benefits are qualitative in nature as broad externalities of the project. But in a broader sense, external diseconomies should also be taken into account. Increasing problem on law and order, stress on public utilities are some of the broader diseconomies of an accelerated pace for industrialization. Any analysis should try to quantify and be Objective with these externalities.

Some projects provide tangible benefits in the form of goods and/or services and some provide only service benefits. In the earlier category again, projects may be self-financing, i.e. may earn revenue through the sale of goods and/or services to meet its operating cost as well as to earn sufficient profit. Most industrial projects fall in this category. Such projects may be classified as category 'X' projects. Some projects which give tangible benefits but may not earn any revenue at all. Benefits of such projects go to third parties other than the projects. Most irrigation and embankment projects fall in this category. These may be classified as category 'Y' projects. However, these two types of projects have one thing in common : that is that the benefits accruing from these projects are quantifiable. Then, there are projects which provide only service benefits which can hardly be quantified in unambiguous terms? Most education and health projects fall in this category. Projects of this nature may be classified as category 'Z' projects for which cost benefits analysis is a little problematic.

The methods of assessing benefits and conducting BCA with respect to 'X' and 'Y' category projects- are discussed as follows:

The primary consideration that lies behind any investment decision is whether a particular project would offer adequate benefits over costs of projects. A project may be appraised from either (a) financial point of view or (b) economic or social point of view. However, the coverage of costs and benefits and the standard of valuation used in economic appraisal differ from other type of appraisals. The financial analysis is undertaken from the point of view of an entrepreneur i.e. from private profitability point of view. The entrepreneur decides on the cost that is incurred, and the potential benefits through the implementation and operation of the project; obviously, one is inclined to take up the project to maximize profit from investment. In financial appraisal, only the direct costs and benefits with which the entrepreneur is concerned are included and the inputs with and outputs measured in terms of the prevailing expected market prices.

The cost-benefit analyses should be briefly stated following project appraisal. It is preferable that aspects relating to the BCA and other analyses should be explicitly stated in non-technical terms, as far as feasible, which will particularly help reduce the time of review process of the government. In the case of projects for which benefits cannot be quantified, a qualitative statement should be made as to the probable intangible benefits the project is likely to make.

16.3.2 Valuation in the context of climate impacts assessment

This Section discusses impacts of climate change and their assessment/valuation tools and methods. Science-based research provides a necessary foundation for understanding the impacts of climate change. At the same time, measurement or valuation of impacts of climate change enables stakeholders to develop policy responses that reflect the relevant tradeoffs among mitigation and adaptation options. In fact, the Intergovernmental Panel on Climate Change (IPCC), in its Fourth Assessment Report, has specifically highlighted²² the need for quantitative information to aid in designing climate policy.

Accurate, reliable, and consistent treatments of the implications of action and inaction are needed to facilitate national, regional and local level policymaking. Economic valuation has received somewhat more attention than other valuation approaches. Economic valuation enables stakeholders to compare the effects and consequences of alternative policies and decisions using a common monetary unit (e.g. Taka). Unfortunately, available literature on costs associated with impacts of climate change (i.e., the costs of inaction) and associated adaptation options is very limited in both geographic scope and the impact categories considered.

Nevertheless, it is important for both the government and the private sector to know how climate change will influence the future costs of protecting public health, providing shelter against known hazards (e.g., flood and cyclone), and maintaining public infrastructure. The policy makers face questions regarding what response options they should adopt, and what investments should be made in view of climate change and its impacts.

The Second National Communication of Bangladesh to UNFCCC identified a range of socioeconomic, physical, and scientific dimensions of the impacts of climate change (MOEF, 2012). Impacts are generally expressed in terms of potential or likely physical changes in human

²² Better valuation methods and quantification of current and future trends in climate and its related costs would make the case for informed action (or inaction). The Intergovernmental Panel on Climate Change (IPCC), in their Fourth Assessment Report, identified the need for quantitative evaluation of direct trade-offs using valuation techniques as a key research gap that has direct relevance to designing climate policy (IPCC, 2007a).

or natural systems, such as damage to roads, buildings and industry due to extreme weather events. Ironically, climate change impacts are rarely measured (i.e., valued) and almost no methods are provided on assessment of economic damages or consequences.

Economic and Non-Economic Valuation: Tools and Methods

The climate change policy context suggests that valuation can make an important contribution to decision-making. In this context, the purpose of incorporating valuation into research on climate change is to better understand the nature and magnitude of climate change impacts, the potential of adaptation to mitigate those impacts, and the tradeoffs inherent in different choices. Valuing current and future impacts and response options may inform decision makers and the public about economic and non-economic benefits and costs, and potential tradeoffs.

The policy context, the strengths and weaknesses of the various tools provided by relevant disciplines, and the nature of climate change impacts and available mitigation and adaptation options, will each have important implication for valuation. Thus, it is important to explore the nature, purpose and appropriate applications of valuation. However, quantitatively estimating the impacts of (and responses to) climate change poses many challenges. These challenges include issues of uncertainty, inter-and intra-generational equity, discounting, and levels of aggregation/disaggregation.

16.3.4 The valuation landscape

Valuation can refer to some sort of measurement, obtained by employing the tools of economics or alternative methods that rely on physical, socioeconomic, or psychological metrics to measure output or progress.

Different disciplines view "value" in different ways as people have material, moral, spiritual, aesthetic, and other interests. Furthermore, experts of different disciplines (e.g., decision science, ecology, economics, philosophy, psychology) understand the concept of value in different ways. Traditional economics, for example, views value in terms of how something contributes to the satisfaction of human wants and needs. A physical system approach, however, might view value in terms of how a component interacts with or contributes to the functioning of a system. Consequently, no single, simple definition of value exists, and different disciplines view the concept differently, having various strengths and weaknesses.

16.3.5 Methods for assessing value

The concepts of value include:

Attitudes or judgments. This concept of value acknowledges the individuals' priorities and preferences. The expression of these values is not constrained by income or prices. They are based on empirical evidence as captured by surveys, choices, or ratings.

Economic values and other economic or financial measures. The economic approach to value specifically takes into account the tradeoffs that individuals are willing to make, given constraints of income and price.

Community-based values. In this approach, individuals purposefully make choices that will benefit the broader public, rather than their own interests and priorities.

Constructed values. This concept begins from the premise that individuals do not have well-established preferences or values when confronted with unfamiliar situations.

Bio-ecological values. This value depends on the relationships between the ecosystem conditions, functions and a pre-determined biophysical goal or standard. Here, biophysical values refer to the contribution of ecological changes to a certain ecosystem-based goal or standard.

Energy-based values. These values are not defined in terms of preference-based tradeoffs. Rather, they are defined in terms of energy required to produce a good or service.

16.3.6 Climate change and valuation: the methodological considerations

Valuing climate change impacts, using quantitative or qualitative approach, face a number of challenges. One of the challenges is related to the intangible nature of some impacts (such as culture), and the uncertainty surrounding effects such as thresholds. Understanding these issues and, where possible, providing for consistent treatment across analyses, will improve the quality of assessments and comparison of analytical results across national, sectoral and regional analyses. A few of these aspects of climate change are summarized briefly below.

Although some impacts of climate change are already occurring, the magnitude of impacts is expected to increase over coming decades and centuries. The long-term frame is one of the most difficult aspects of climate change to address. Any quantitative valuation effort will need to provide values for a time far into the future, which is made difficult by the uncertainty surrounding future changes in climate and in human and natural systems. In addition, valuation efforts that rely on preferences will need to make assumptions about the stability or changes in those preferences over time. Valuation approaches that aggregate quantitative estimates over time (such as the discounting approach employed by economists) will need to determine whether and how to weigh future impacts relative to current impacts.

Distributional effects will be important not only over time, but also across populations, regions, and within/between generations. The treatment of values for different populations, or populations that are affected disproportionately by climate change, will be an important issue for valuation efforts to address. The concept of "winners and losers" is an important consideration for decision makers, since the consequences of a decision may favor one location or population over another. Failures to acknowledge who pays the costs and who receives the benefits can have major implications for decisions makers.

The extent to which impacts and options can be valued depends, in part, on the availability of robust and complete data. Data gaps and incomplete information can complicate the process of valuation and exacerbate the level of uncertainty associated with such analyses.

Further, certain changes are generally difficult to value. For example, cultural practices and traditions are subjective in nature, and their values depend on how their importance is viewed by individuals and society. This subjectivity further challenges the application of valuation techniques.

Uncertainty exists about the evolution of the human systems that might lead to greenhouse gas emissions, the physical systems that govern the fate of these gases and their influence on the global climate, the effects of a changing climate on human and natural systems, and finally the human response to a changing climate.

The first approach of addressing uncertainty involves the use of scenario-based, which is a common way to understand complex systems in the context of uncertainty. They have been used extensively in climate change analysis to explore mitigation, impacts, and adaptation. However, the assignment of probabilities to scenarios has been subject to debate.

A second approach of addressing uncertainty deals with a decision: whether to work the impact assessment "forwards" or "backwards." A common approach to the treatment of uncertainty is to operate "forward" along a linear path from greenhouse gas emissions to atmospheric concentrations to regional climate projections and associated impacts, and so forth toward assessments of outcomes, including valuation. In this approach, however, the basic goal is to identify the most likely future, and design responses that are optimized for it. The basic question that underlies this framework is, "what will happen?"

In contrast, working the problem "backwards" involves identifying the greatest vulnerabilities across a full range of plausible futures, as a function of the sensitivity of particular places, ecosystems, and socioeconomic sectors to external drivers of change. Fundamentally, this approach asks the question, "How does my system work?" It may be noted that working the problem forwards focuses on maximizing expected utility, whereas working the problem backwards focuses on minimizing regret.

Generally, economic sectors are so intertwined that it is impossible to fully understand the effects of a change in one sector without taking into account changes in other sectors. Sectoral interactions can take a number of different forms.

- A sector affected by climate change may use inputs from other sectors also affected by climate. For example, the livestock sector uses crops to feed livestock, and crops use water for irrigation.
- Multiple sectors compete for a common input. For example, hydropower, irrigation, industrial/household demand all compete for water.
- The incidence of impacts may also matter. For example, changes may differentially affect producers and consumers, poorer and wealthier households, or various demographic groups.
- Climate impacts may also interact economic distortions in an economy. For example, existing agricultural subsidies, tariffs, and taxes, all distort markets and affect the economic outcome resulting from climate change.
- Impacts have an inter-temporal character in that economic damage in one period reduces overall real income, and may redirect savings toward investments that make up for damage or protect from increased threat.

It is necessary to account for these broader interactions discussed above. Because of competition for common inputs, evaluating sectors in isolation could result in underestimating the impacts of climate change. Impacts are also likely to be underestimated if any analysis misses cumulative effects on saving/investments, for example, and crowding out of other productive investments. More broadly, a failure to account for changes in the global prices of commodities may miss a major channel for domestic impacts.

Valuation Covers A Broad Range of Metrics That Can Be Used to Evaluate Tradeoffs.

Valuation metrics that might be used to consider tradeoffs associated with climate impacts and response strategies span a large range. At one end of the valuation spectrum are economic

approaches that focus on monetizing impacts. These rely on concepts like willingness to pay and opportunity cost and on commonly used metrics of aggregate economic welfare such as Gross Domestic Product (GDP) or consumption expenditures.

Other economic metrics that are commonly used include measures of jobs, the production of particular goods (e.g., domestic food production), or reliance on imports (e.g., oil). There are a host of physical, ecological, human health, and other metrics that can also be used to evaluate impacts and response strategies. Some are amenable to monetization with modest transformations (e.g., applying a value to human life) while some are difficult to monetize (e.g. loss of biodiversity, loss of ecosystem services or cultural traditions).

Given the diversity of economic and non-economic measures, the question arises of how to decide which metrics to use and how to integrate these metrics in a given analysis. Retaining disaggregated data is of critical importance. Impacts aggregated within or across locations/upazilas can distort the unique character of local value. For example, the impacts of a devastating flood in one portion of a Upazila may have little effect outside the Upazila, and so average or aggregated impacts may not adequately capture and represent these effects. Models that estimate economy-wide impacts are able to integrate sectoral interactions, but may sometimes obscure these local effects.

Furthermore, users of a few valuation techniques face difficulties, such as those that use survey rather than market data. It is generally advocated to use a variety of approaches to present a better view of value and address the needs of diverse decision makers. The need for multi-disciplinary teams in the analysis may also be considered in order to ensure that the assessment capture the viewpoints of different disciplines, ecology, sociology, psychology etc. on the range of impacts important to value.

16.3.7 Economic valuation: methods, applications, strengths and weaknesses

In welfare economics, value is based on tradeoffs that people are willing to make. In turn, these tradeoffs reflect both what people care about (preferences over goods and services) and how much they have available to trade (reflecting resource constraints). Other concepts of value exist, such as measures of importance that do not depend on resource constraints, or values that are based on physical or other metrics, and not human preferences.

Each point in the chain of economic valuation, as illustrated in Figure-X (reproduced from SAP report, USA), is subject to small or large gaps in data or in available techniques and methodologies. As a consequence, economic measures may not capture all aspects of value and so typically represent a lower bound estimate. Gaps may arise due to limitations in our ability to apply available economic techniques to the task of valuing those changes. Thus, our ability to develop economic values for climate change impacts depend on outputs from multiple disciplines, climatology, ecology, engineering, and epidemiology, as well as economics. Ethics may also play into the determination of a valid approach to valuation.

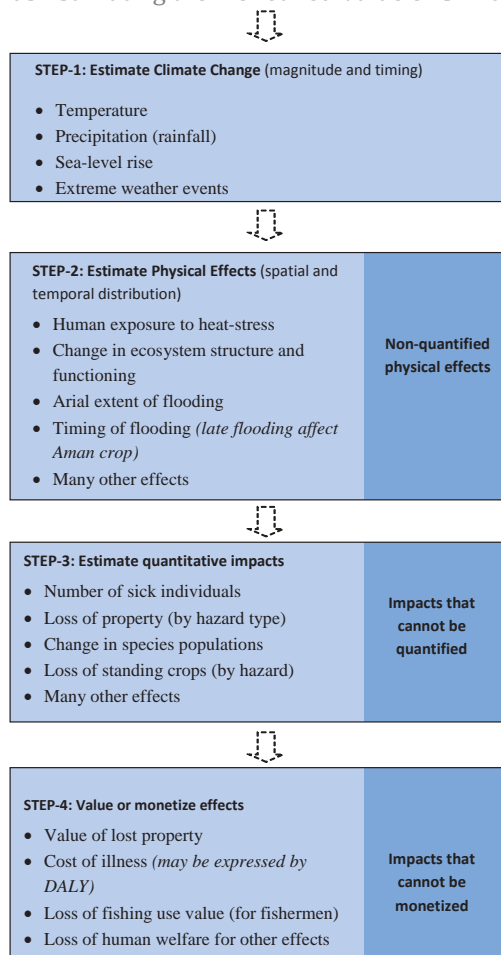
Economics has an evolved theory of valuation. Numerous tools have been developed, and applied in the context of both project assessment and policy analysis, that allow economists to value changes in a wide range of types of goods and services and environmental conditions. Understanding the boundaries of economic valuation requires understanding what economics does well and does not do well, as well as the nature and quality of the data and inputs that other disciplines contribute to the process of valuation. While economic valuation can be incredibly

powerful, as with all sciences its application has both best practices and best uses. Consequently, economic methods will have both strengths and weaknesses in the context of valuing the impacts of climate change and possible human responses.

The appropriate valuation method will depend on the type of good or service to be valued, and whether it is a "market" or "non-market" good. Most methods fit into the following broad categories:

- Changes in producer and consumer surpluses (derived from market behavior) which measure the resources consumers and producers are willing to (or need to) give up in order to obtain or produce goods and services
- Measuring financial damages directly, e.g., the costs of medical treatment, or damage to infrastructure.
- Looking at related market behavior, e.g., the amount spent to travel to recreational areas, the premiums paid to workers in risky occupations, or expenditures to increase safety
- Simulating market behavior to determine how much individuals are willing to pay for a change, by means of questionnaires or experiments.

Figure A-3: Steps Towards Estimating the Monetized Value of Climate Change Effects



As measures of the economic value of a good or service, each of these tools can be evaluated in terms of costs and benefits that they capture. Some are only partial measures, and so represent a lower bound on the "true" economic value. For example, a cost-of-illness (COI) measure does not include the cost of pain and suffering, or declines in quality of life associated with disease, even though these effects can be important to individuals and society. Increased maintenance and repair costs for transportation infrastructure do not include the aggravation and lost time for commuters or travelers, or lost profits for business. On the other hand, willingness to pay measures generally includes both psychic and physical costs borne by the individual, but may not capture all the social costs and benefits.

"Willingness to pay" is often used as a standard method in order to addressing both market and non-market impacts in water resources management. The techniques used may include those based on actual or simulated markets, changes in net income, the cost of the most likely alternative.

Aspects of human health impacts valuation can also be addressed in the context of both analyses to support air quality regulations and climate change. Valuation of health impacts generally involves complementary use of both economic (monetized) and non-economic metrics. Monetized measures include cost of illness (which may include both medical care cost and opportunity costs, such as lost income. Non-monetized approaches include estimating the incidence of illness (e.g., the number of new cases in a given time period (per population)), non-financial measures of the burden of disease (such as estimates of morbidity or mortality), and estimates of the years of life lost²³ (YLLs) or disability-adjusted life-years²⁴ (DALYs).

Managed forests and ecosystems provide examples of both market and non-market goods and valuation techniques. These techniques include methods for valuing ecosystem services using traditional economic techniques (including surveys and replacement costs). Techniques also include focusing on physical dimensions, such as acres of wetlands, rather than economic valuation, and then relying on cost-effectiveness/incremental cost analysis, rather than comparing benefits and costs. From the perspective of climate change, most of the work thus far has focused on timber impacts-changes in net primary productivity, species changes due to temperature and precipitation change, etc. Valuing these impacts is, however, hampered by data limitations.

16.3.8 Monetizing and valuing non-market goods and benefit cost analyses

While the measurement of marketed goods and services is relatively straightforward economists have developed a range of methods to estimate willingness to pay for non-market goods (See Appendix 16.0.3 for Guidelines for benefit cost analyses for a discussion of the market vs. non-market goods/services). To measure individual preferences the concept of willingness-to-pay for a good or service is used, such as the flood damage reducing service provided to a business by a flood protection scheme.

23 **Years of potential Life Lost (YPLL):** The concept of years of potential life lost (YPLL) involves estimating the average time a person would have lived had he or she not died prematurely. It is, therefore, a measure of premature mortality. YPLL inherently incorporates age at death, and its calculation mathematically weights the total deaths by applying values to death at each age (WHO 2010).

24 **Disability-adjusted life year (DALY):** The disability-adjusted life year (DALY) is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death. One DALY can be thought of as one lost year of "healthy" life. The sum of these DALYs across the population, or the burden of disease, can be thought of as a measurement of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability (WHO, 2010).

In principle, people would be willing to pay for flood protection services, but because such services have a 'public good' characteristic they cannot be sold in the normal way (Parker and Thompon 1987). Economists therefore attempt to estimate what residents or businesses would be willing to pay for flood protection.

These methods can be grouped into two broad categories, based largely on the source of the data: revealed preference and stated preference approaches (Freeman, 2003; U.S. EPA, 2000). The first approach relies on the observation of preferences and willingness-to-pay as revealed in the market place by market prices. Revealed preference, sometimes referred to as the indirect valuation approach, involves inferring the value of a non-market good using data from market transactions. For example, a lake may be valued for its ability to provide a good fishing facilities. This value can be estimated by the time and money expended by the angler to fish at that particular site, relative to all other possible fishing sites. Similarly, the amenity value of a coastal property that is protected from storm damage (by a dune, perhaps) can be estimated by comparing the price of that property to other properties similar in every way but the enhanced storm protection.

Revealed preference approaches include recreational demand models, which estimate the value of recreational amenities through time and money expenditures to enjoy recreation; hedonic wage and hedonic property value models, which attempt to isolate the value of particular amenities of property and jobs not themselves directly traded in the marketplace based on their price or wage outcomes. This 'revealed preference' approach is commonly used in benefit-cost analysis where market prices are used to value benefits. For example, the benefits of protecting manufacturing plants are assessed by estimating the full costs of repairs of plant and equipment at market prices. Although the principle of seeking to measure willingness-to-pay is simple enough, establishing theoretically correct measures is highly complex (see consumer surplus in the glossary) where the goods involved are not available in an approximately competitive market.

However, it is not always necessary to determine willingness-to-pay directly. Opportunity costs or 'shadow prices' may be used; the opportunity cost of a good is the value of the opportunities foregone by its consumption. Because an individual's willingness-to-pay reflects the opportunity cost to the individual, if we can evaluate the opportunity foregone by the consumption of some good, we can use this opportunity cost to estimate willingness-to-pay for the good. 'Shadow prices' are the implicit prices that would exist in efficiently working markets.

Stated preference approaches, sometimes referred to as direct valuation approaches, and are survey methods that estimate the value individuals place on particular non-market goods based on choices they make in hypothetical markets²⁵. The stated preference studies involve simply asking individuals what they would be willing to pay for a particular non-market good. In other

words, expressed preference approaches have found their principal application in the evaluation of impacts which are not traded in the marketplace and in market research, where the requirement is to establish what people will be willing to pay for a good which is not yet available (Mahajan et al., 1982). The problem is to ensure that these estimates are reliable and unbiased. A possible form of bias is 'free-riding'. 'Free-riding' might occur where individuals seek to exaggerate their willingness-to-pay for a good and thus the benefits of consuming that good in order to make more likely the provision of that good.

²⁵ The contingent valuation method (CVM), or a modern variants, a stated choice model (SCM), are forms of the stated preference methods.

Thus, it involves great care in constructing a credible, though still hypothetical, trade-off between money and the non-market good of interest to discern individual preferences for that good and hence, willingness to pay (WTP). For example, economists might construct a hypothetical choice between multiple housing locations, each of which differs along the dimensions of price and health risk. Repeated choice experiments of this type ultimately map out the individual's tradeoff between money and the non-market good. The major challenges in stated preference methods involve study design, particularly the construction of a reasonable and credible market for the good, and estimation of a valuation function from the response data.

In theory, if individuals understand the full implications of their market choices, in real or constructed markets, then both revealed and stated preference approaches are capable of providing robust estimates of the total value of non-market goods. The major challenge is to ensure that individuals are sufficiently informed that their observed or stated choices truly reflect their preferences for a particular outcome.

16.3.8 Other methods of monetizing

Analysts can employ other non-market valuation methods: avoided cost or replacement cost. These methods do not measure willingness to pay as defined in welfare economic terms, but because the methods are relatively straightforward to apply and the results often have a known relationship to willingness to pay, they provide insights into non-market values. Thus, such alternative methods may provide insights and sometimes be more manageable (or appropriate) to estimate a particular non-market value, given data constraints and the limitations imposed by available methods.

No method is full proof. Most benefit-cost analyses include evaluations of only those impacts for which estimates could be derived from market prices; all other impacts are left as 'intangibles'. Economists have tended to prefer estimates of willingness-to-pay derived from revealed preferences on the grounds that what people can be observed to do is a more reliable indication of willingness-to-pay than what they say they will do.

Finally, like in economic sectors, flood or climate hazards give rise to disasters on human health in many ways although there appears to be no clear-cut classification or dividing line between direct and indirect, or tangible and intangible health impacts. As a general rule, however, injuries or premature deaths (through drowning, for example) may be termed as direct effects, whereas the effects such as the outbreak of diseases, the cost of medical treatments, morbidity, malnutrition, worries and miseries may be termed as indirect effects. Of these, the effects such as the cost of recovery from injuries or diseases can be categorised as the tangible impacts, while the impacts such as mental stress, worries or the losses to human lives may fall under intangible ones.

Thus, the health effects caused by climate or flood hazards, for example, can be divided broadly into three groups: 1) Mental stresses, worries and anxieties 2) Injuries and casualties and 3) Vulnerability to diseases and immature deaths. All these effects, individually or together, interact to produce effects on the morbidity, mortality or productivity in the long run.

Few impacts of intangible categories (e.g., health effects, stress), however, can be directly measured in terms of money. There are only a few methods of evaluating human losses and causalities. Whether or not a value should be assigned to human losses may be a subject of controversy, but some methods are available to assign monetary values to human lives²⁶. Nevertheless, the method based on either 'foregone earnings', or the 'human capital' approach is somewhat advanced-countries oriented, but still can be used in our region.

²⁶ In many cultures and religions, however, it is 'illogical' to evaluate premature deaths as there is no way to prevent deaths, which is the 'act of God' fixed in advance.

Appendix 16.0.4: Conversion Factors for Economic Analyses

Table A-30: Conversion Factors for estimating shadow prices of agricultural outputs:

Item	Conversion Factor a/
L. Aus (Paddy)	0.95
HYV Aus (Paddy)	0.95
B. Aman (Paddy)	0.95
L. T. Aman (Paddy)	0.95
HYV Aman (Paddy)	0.95
L. Boro (Paddy)	0.95
HYV Boro	0.95
Rice straw:	
HYV	0.78
Local	0.78
Wheat	0.92
Potato	1.00
Jute b/	0.95
Jute sticks	0.78
Sugarcane	0.78
Pulses (masur)	0.96
Oil seed (rape & mustard)	0.78
Spices (anion)	1.00
Vegetable (radish) c/	1.00
Tobacco d/	0.78

Source: Master Plan Organization (MPO) 1987.

Notes :

For relevant values, see MPO 1987

a/ Unless otherwise noted, the source is: A.R. Bhuyan et al 1985.

b/ Source: T. L. Hutcheson 1985

c/ Source: BADC Agro-Services Centre Division.

d/1983 Price. Source: Agricultural Marketing Directorate.

Table A-31: Conversion Factors for estimating shadow prices of agricultural inputs

Item	Conversion factor a/
1. Fertilizer	
Urea	1.30b/
TSP	1.40 b/
MP	1.43 b/
2. Pesticides	.87
3. Seeds	
L. Aus	.95
HYV. Aus	.95
B. Aman	.95
L. T. Aman	.95
HYV Aman	.95
L. Boro	.95
HYV Boro	.95
Wheat	.92
Potato	1.00
Jute	1.00
Sugarcane	.78
Pulses	.96
Oilseed	.78
Spices (onion)	1.00
Vegetables (per ha)	.87
Tobacco (per ha)	.78
4. Labor (per man day)	.75
5. Draft power (per bullock pair day)	.78

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Unless otherwise noted, the source is : A. R. Bhuyan et al 1985.

b/ Estimated from 1983 World Bank Price estimate plus freight, internal transportation, handling and storage.

Table A-32: Conversion Factors for estimating shadow prices of project costs

Item	Conversion factor ^{1/}
Skilled Labour	0.78
Unskilled Labour	0.75
Vehicles and components	0.71
Cart bridge (total)	.71
Project building (total)	.74
Physical contingencies	.78
Engineering and administration	.78
Engine, pump and accessories	0.61
Liner, screen	0.57
Sinking	
Materials	
Regulator	0.69
Canal structures	.69
Mechanical and electrical	0.77
Pump station	0.71
Pumping cost, Major FCD of FCDI project	1.27
Pumping cost, minor irrigation (diesel)	0.81

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

1/ Unless otherwise noted, the source is: A. R. Bhuyan et al 1985.

Table A- 33: Conversion Factors for shadow pricing of material costs

Items	Conversion factor a/
Building	
Cement	.77
Bricks	.78
M.S . Rod	.54
Others	.78
Regulator	
Cement	.77
Bricks	.78
Steel	.54
Others	.78
Pump Station	
Cement	.77
Bricks	.78
Steel	.54
Others	.78
Canal Structures	
Cement	.77
Bricks	.78
Steel	.54
Others	.78
Cart Bridge	
Cement	.77
Bricks	.78
Steel	.54
Others	.78

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Source is A. R. Bhuyan, et al 1985.

Table A-34: Conversion Factors for shadow pricing of Hand Tubewell costs

Item of works	Conversion factor a/
<u>FIXED COSTS</u>	
1. Hand pump	0.80
2. Strainer	0.57
3. Accessories	0.57
4. Superstructure	0.77
5. Installation	0.75
6. Development	0.75
7. Transportation	0.71
<u>VARIABLE COST</u>	
1. PVC pipe	0.78
2. Sinking cost	0.75
3. Commissioning	0.78
4 cost of canal system	0.75
Capital cost / ha	
<u>O & m cost</u>	
1. Spares	0.57
2. Operation	0.75
3. Distribution	0.75

Source: Master Plan Organization (MPO) 1987.

Notes :

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-35: Conversion Factors for shadow pricing of Treadle tube well costs

Item of works	Conversion factor a/
FIXED COSTS	
1. Pump head	0.80
2. Strainer	0.57
3. Superstructure	0.77
4. Installation	0.75
5. Development	0.75
6. Transportation	0.71
VARIABLE COST	
1.PVC pipe	0.78
2. Sinking cost	0.75
3 Cost of canal system	0.75
O & M COST	
1. Spares	0.57
2. Operation	0.75
3. Distribution	0.75

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-36: Conversion Factors for shadow pricing of Treadle tube well costs

Item of works	Conversion factor a/
<u>FIXED COSTS</u>	
1 Pump head	0.60
2 Roboscreen	0.57
3 Installation	0.75
4 Development	0.75
5 Transportation	0.71
<u>VARIABLE COST</u>	
1. PVC pipe	0.78
2. Sinking cost	0.75
3. COST OF CANAL SYSTEM	0.75
<u>O & M COST</u>	
1. Spares	0.57
2. Operation	0.75
3. Distribution	0.75

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-37: Conversion Factors for shadow pricing of Tara tubewell costs

Item of Works	Conversion factor a/
<u>FIXED COSTS</u>	
1. Pump head	0.80
2. Handle with finger guard	0.57
3. Top & bottom connector	0.75
4. Piston	0.78
5. Foot valve	0.78
6. Cylinder	0.57
7. Retrieving rod	0.57
8. Roboscreen	0.57
9. Installation	0.75
10. Development	0.75
11. Transportation	0.71
<u>VARIABLE COST</u>	
1. 54 mm PVC pipe upper case	0.78
2. 38 mm PVC pipe lower case	0.78
3. 32 mm piston rod	0.57
4. Sinking cost	0.75
<u>COST Of CANAL SYSTEM</u>	
	0.75
<u>O & M COST</u>	
1. Spares	0.57
2. Operation	0.75
3. Distribution	0.75

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-38: Conversion Factors for shadow pricing of Shallow tube well costs

Item of works	Conversion factor a/
1. Engine (diesel eng.)	0.61
2. PUMP, centrifugal pump	0.61
3. Accessories	0.61
4. Transportation	0.71
5. DRILLING	
a. skilled labour	0.78
b. unskilled labour	0.75
6. SCREEN	0.57
7. CASING PIPE	0.57
8. ENGG. ADMIN & overhead (15%)	0.78
9. Cost of Canal System	
a. Material	0.69
b. Skilled labour	0.78
c. Unskilled labour	0.75
<u>FIXED COST</u>	
1. Manager	0.78
2. Operator	0.78
3. Repair and parts	0.78
4. Distribution system	
a. Material	0.69
b. Skilled labour	0.78
c. Unskilled labour	0.75
5. MISCELLANEOUS	
a. Material	0.71
b. Skilled labour	0.78
c. Unskilled labour	0.75
<u>PUMPING COST</u>	
6. COST OF FUEL/OIL etc.	0.81

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/Conversion factor applies to local costs only.

Table A-39: Conversion Factors for shadow pricing of Deepset Swallow tubewell costs

Item of works	Conversion factor a/
1. Engine (diesel eng.)	0.61
2. PUMP, centrifugal pump	0.61
3. Accessories	0.61
4. Transportation	0.71
VARIABLE COST	
5. Drilling	
a. Skilled labour	0.78
b. Unskilled labour	0.75
6. Screen	0.57
7. Casing Pipe	0.57
8. Cost of Pump PIT	
a. Earth work	0.75
b. A.C.C. slab	0.74
c. Lean concrete	0.74
d. M. S. rod	0.54
e. Brick masonry	0.74
f. Brick plaster	0.77
y. Contingency	0.78
9. ENGG. ADMIN & Overhead (15%)	0.78
10. Cost of Canal System	
a. Material	0.69
b. Skilled labour	0.78
c. Unskilled labour	0.75

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/Conversion factor applies to local costs only.

(Contd): Deepest shallow Tubewell costs

Item of Works	Conversion factor a/
FIXED COST	
1. Manager	0.78
2. Operator	0.78
3. Repair and parts	0.78
4. Distribution system	
a. Material	0.69
b. Skilled labour	0.78
c. Unskilled labour	0.75
5. PUMP PIT	0.78
6. MISCELLANEOUS	
a. Material	0.71
b. Skilled labour	0.78
c. Unskilled labour	0.75
SUB-TOTAL	
PUMPING COST	
6. Cost of Fuel / Oil etc.	0.81
O & M cost / ha	
Benefited Area (in ha)	

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-40: Conversion Factors for shadow pricing of Deep Tubewell costs

Item of works	Conversion factor a/
1 Engine (diesel eng.)	0.61
2. Pump	
Turbine pump	0.61
Gear head	0.61
3. Pump House	0.71
4. Transportation	0.71
5. Commissioning	
a. Material	0.78
b. Skilled labour	0.78
c. Unskilled labour	0.75
6. Development	0.78
<u>VARIABLE COST</u>	
7. Test Boring	0.75
8. Drilling (33.52m)	
a. Skilled labour	0.78
b. Unskilled labour	0.75
9. Sinking Materials	0.57
10. Installation	
a. Material	0.78
b. Skilled labour	0.78
c. Unskilled labour	0.75
11. Shrouding of well	0.75
12. ENGG.ADMIN & Overhead(15%)	0.78
13. Cost of canal system	
a. Material	0.69
b. Skilled labour	0.78
c. Unskilled labour	0.75
Capital cost / HA =	

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

(Contd): Deep Tube well costs

Item of works	Conversion factor a/
FIXED COST	
1. Manager	0.78
2. Operator	0.78
3. Repair and parts	0.78
4. Distribution system	
a. Material	0.69
b. Skilled labour	0.78
c. Unskilled labour	0.75
5. Miscellaneous	
a. Material	0.71
b. Skilled labour	0.78
c. Unskilled labour	0.75
SUB-TOTAL	
PUMPING COST	
6. Cost of Fuel / Oil etc.	0.81
O & M cost / ha	
Benefited Area (in ha)	

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-41: Conversion Factors for shadow pricing of Low lift pump costs

Item of works	Conversion factor a/
1. Pump, Trolley & Coupling	0.61
2. Engine (diesel eng. H.P.=6)	0.61
3. Accessories, pipes, bends & foot valves	0.61
4. Duty, handling, commission & insurance	
5. Overhead	0.78
SUB-TOTAL	
6. Cost of canal system	
a. Material	0.69
b. Skilled labour	0.78
c. Unskilled labour	0.75
CAPITAL COST/ HA	
FIXED COST	
1. Manager	0.78
2. Operator	0.78
3. Repair and parts	0.78
4. Distribution system	
a. Material	0.69
b. Skilled labour	0.78
c. Unskilled labour	0.75
5. Miscellaneous	
a. Material	0.71
b. Skilled labour	0.78
c. Unskilled labour	0.75
PUMPING COST	
6. Cost of Fuel / Oil etc.	0.81
O & M cost / ha	
Benefited Area (in ha)	

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-42: Conversion Factors for shadow pricing of gravity distribution system major irrigation project cost

Item of works	Conversion factor a/
1. Earth Work	
a. Irrigation Canal	
Skilled labour	0.78
Unskilled labour	0.75
b. Intake Channel	
Skilled labour	0.78
Unskilled labour	0.75
2. Drainage Channel	0.69
Skilled labour	0.78
Unskilled labour	0.75
3. Structures	
a. Canal & Dist. System	0.69
b. Cart fridges	0.71
4. Pumping Station	
a. Civil York's	0.71
b. Mech. & elec.	0.77
5. Transformer	0.78
6. Vehicle & Equipment	0.71
7. Project Building	0.74
8. Physical contingency	0.78
9. Engineering admin.	0.78
10. Land Acquisition	
11. Administrative cost	0.78
13. Running cost	1.27
Gross area (ha)	
Cost / ha (in Tk.)	
N. C. A. (ha)	
Benefited area (in ha)	

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-43: Conversion Factors for shadow pricing of LLP distribution system major irrigation project costs

Item of works	Conversion factor a/
1. Drainage Channel	
Skilled labour	0.78
Unskilled labour	0.75
2. Distribution System	
3. Intake Channel	
Skilled labour	0.78
Unskilled labour	0.75
4. Cart Bridges	0.71
5. Pump Station	
a. Civil Works	0.71
b. Mech. & elec.	0.77
6. Low Lift Pump	0.61
7. Transformer	0.78
8. Workshop Facilities	0.80
9. Equipment & Special Tool	0.71
10. Vehicles	0.70
11. Project Building	0.71
12. Physical contingency	0.78
13. Engineer.& administer	0.78
14. Land Aquisition	
15. Running cost (Major + LLP)	1.3
Gross area (ha)	
N. C. A. (ha)	
Benefited area (in ha)	

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-44: Conversion Factors for shadow pricing of Floating pump/LLP distribution system major Irrigation project costs

Item of works	Conversion factor a/
A. FLOATING PUMP PLANT	
1. Pump/Engines	0.61
2. Spare Parts	0.61
3. Contingency	0.78
4. Overhead	0.78
5. Pontoon & Accessories	0.57
6. Discharge Pipe	0.78
7. Supports. Boats, etc.	0.78
B. LLP DISTRIBUTION	
1. Drainage Channel	0.69
2. Distribution System	
a. Material	0.69
b. Skilled labour	0.78
c. Unskilled labour	0.75
3. Cart Bridge	0.71
4. LLP	0.61
5. Workshop	0.78
6. Equip. for LLP maint.	0.61
7. Vehicles	0.71
8. Project Building	0.71
9. Contingency	0.78
10. Engineering admin.	0.78

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-45 (Contd): Floating Pump/LLP distribution system major irrigation project costs

Item of works	Conversion factor a/
A. FLOATING PUMP PLANT	
1. Manager's Salary	0.78
2. Operators/Helpers	0.78
3. Repairs/Parts	0.61
4. Transport/Boats	0.71
5. Contingency	0.78
6. Pumping Cost	0.81
SUB-TOTAL	
B. LLP Distribution	
1. Drainage Channel	0.69
2. Distribution System	
a. Material	0.69
b. Skilled labour	0.78
c. Unskilled labour	0.75
3. Cart Bridge	0.71
4. LLP	0.61
5. Workshop	0.78
6. Project Building	0.71
7. Contingency	0.78
8. Engineering & admin.	0.78
9. Pumping Cost	0.81
O & M cost / NA (in Tk.)	
Benefited Area (in ha) =	

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-46: Conversion Factors for shadow pricing of gravity distribution system FCDI project costs on shallow flooding land

Item of works	Conversion factor a/
1. Earth Work	
a. Irrigation Canal	
Skilled labour	0.78
Unskilled labour	0.75
b. Intake Channel	
Skilled labour	0.78
Unskilled labour	0.75
c. Embankment	
Skilled labour	0.78
Unskilled labour	0.75
2. Drainage Channel	0.69
Skilled labour	0.78
Unskilled labour	0.75
3. Structures	
a. Canal & Dist. System	0.69
b. Cart Bridges	0.71
c. Regulator	0.69
4. Pump Station	
a. civil works	0.71
b.Hech.1 elec.	0.77
5. Transformer	0.78
6. Vehicle & Equipment	0.71
7. Project Building	0.74
8. Physical Contingency	0.78
9. Engineering & admin.	0.78
10. Land Acquisition	
11. Administrative Cost	0.78
13. Running Cost	1.27

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A- 47: Conversion Factors for shadow pricing of gravity distribution system FCDI project costs on medium flooded land

Item of works	Conversion factor a/
1. Earth Work	
a. Irrigation Canal	
Skilled labour	0.78
Unskilled labour	0.75
b. Intake Channel	
Skilled labour	0.78
Unskilled labour	0.75
c. Embankment	
Skilled labour	0.78
Unskilled labour	0.75
2. Drainage Channel	0.69
Skilled labour	0.78
Unskilled labour	0.75
3. Structures	
a. Canal & Dist. System	0.69
b. Cart Bridges	0.71
c. Regulator	0.69
4. Pump Station	
a. civil works	0.71
b.Hech.1 elec.	0.77
5. Transformer	0.78
6. Vehicle & Equipment	0.71
7. Project Building	0.74
8. Physical Contingency	0.78
9. Engineering & admin.	0.78
10. Land Acquisition	
11. Administrative cost	0.78
13. Running cost	1.27

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-48: Conversion Factors for shadow pricing of gravity distribution system FCDI project costs on deeply flooded land

Item of works	Conversion factor a/
1. Earth Work	
a. Irrigation Canal	
Skilled labour	0.78
Unskilled labour	0.75
b. Intake Channel	
Skilled labour	0.78
Unskilled labour	0.75
c. embankment	
Skilled labour	0.78
Unskilled labour	0.75
2. Drainage Channel	
Skilled labour	0.78
Unskilled labour	0.75
3. Structures	
a. Canal & Dist. System	0.69
b. Cart Bridges	0.71
c. Regulator	0.69
4. Pump Station	
a. civil works	0.71
b.Hech.1 elec.	0.77
5. Transformer	0.78
6. Vehicle & Equipment	0.71
7. Project Building	0.74
8. Physical Contingency	0.78
9. Engineering & admin.	0.78
10. Land Acquisition	
11. Administrative Cost	0.78
13. Running Cost	1.27

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-49: Conversion Factors for shadow pricing of LLP distribution system FCDI project costs on shallow flooded land

Item of works	Conversion factor a/
1. Embankment	
Skilled labour	0.78
Unskilled labour	0.75
2. Drainage Channel	
Skilled labour	0.78
Unskilled labour	0.75
3. Distribution System	0.69
4. Intake Channel	
Skilled labour	0.78
Unskilled labour	0.75
5. Care Bridge	
a. Civil Works	0.71
b. Mech. & elec.	0.77
7. Low Lift Pump	0.61
8. Transformer	0.78
9. Workshop Facilities	0.78
10. Equip. & special idol	0.71
11. Vehicle	0.71
12. Project Building	0.71
13. Physical Contingency	0.78
14. Engineering admin.	0.78
16. Administrative Cost	0.78
17. Running Cost	1.27

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-50: Conversion Factors for shadow pricing of LLP distribution system FCDI project costs on medium flooded land

Item of works	Conversion factor a/
1. Embankment	
Skilled labour	0.78
Unskilled labour	0.75
2. Drainage Channel	
Skilled labour	0.78
Unskilled labour	0.75
3. Distribution System	0.69
4. Intake Channel	
Skilled labour	0.78
Unskilled labour	0.75
5. Care Bridge	0.71
a. Civil Works	0.71
b. Mech. & elec.	0.77
7. Low Lift Pump	0.61
8. Transformer	0.78
9. Workshop Facilities	0.78
10. Equip. & special idol	0.71
11. Vehicle	0.71
12. Project Building	0.71
13. Physical Contingency	0.78
14. Engineering admin.	0.78
16. Administrative Cost	0.78
17. Running Cost	1.27

Source: Master Plan Organization (MPO) 1987.

Notes:

a/ Conversion factor applies to local costs only.

Table A-51: Conversion Factors for shadow pricing of LLP distribution system FCDI project cost on deeply flooded land

Item of works	Conversion factor a/
1. Embankment	
Skilled labour	0.78
Unskilled labour	0.75
2. Drainage Channel	
Skilled labour	0.78
Unskilled labour	0.75
3. Distribution System	0.69
4. Intake Channel	
Skilled labour	0.78
Unskilled labour	0.75
5. Care Bridge	
a. Civil Works	0.71
b. Mech. & elec.	0.77
7. Low Lift Pump	0.61
8. Transformer	0.78
9. Workshop Facilities	0.78
10. Equip. & special idol	0.71
11. Vehicle	0.71
12. Project Building	0.71
13. Physical Contingency	0.78
14. Engineering admin.	0.78
16. Administrative Cost	0.78
17. Running Cost	1.27

Source: Master Plan Organization (MPO) 1987.

Notes: For relevant values, see MPO 1987, a/ Conversion factor applies to local costs only.

Table A-51 (1): Conversion Factors for shadow pricing of Gravity drainage FCD project costs on shallow flooded land

Item of works	Conversion factor a/
1. Embankment	
Skilled labour	0.78
Unskilled labour	0.75
2. Drainage Channel	
Skilled labour	0.78
Unskilled labour	0.75
3. Regulator	0.69
4. Cart Bridge	0.71
5. Vehicle	0.71
6. Project Building	0.71
7. Physical Contingency	0.78
8. Engineering admin.	0.78
9. Land Aquisition	0.78

Source: Master Plan Organization (MPO) 1987.

Notes: For relevant values, see MPO 1987 a/ Conversion factor applies to local costs only.

Table A-52: Conversion Factors for shadow pricing of Gravity drainage FCD project costs on medium flooded land

Item of works	Conversion factor a/
1. Embankment	
Skilled labour	0.78
Unskilled labour	0.75
2. Drainage Channel	
Skilled labour	0.78
Unskilled labour	0.75
3. Regulator	0.69
4. Cart Bridge	0.71
5. Vehicle	0.71
6. Project Building	0.71
7. Physical Contingency	0.78
8. Engineering admin.	0.78
9. Land Aquisition	

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-52 (1): Conversion Factors for shadow pricing of Gravity drainage FCD project costs on deeply flooded land

Item of works	Conversion factor a/
1. Embankment	
skilled labour	0.78
unskilled labour	0.75
2. Drainage Channel	
skilled labour	0.78
unskilled labour	0.75
3. Regulator	0.69
4. Cart Bridge	0.71
5. Vehicle	0.71
6. Project Building	0.71
7. Physical Contingency	0.78
8. Engineering admin.	0.78
9. Land Aquisition	

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-53: Conversion Factors for shadow pricing of Submersible embankment FCD project costs

Item of works	Conversion Factor a/
1. Embankment	
Skilled labour	0.78
Unskilled labour	0.75
2. Fine Dressing and Tur	
Skilled labour	0.78
Unskilled labour	0.75
3. Drainage Channel	
Skilled labour	0.78
Unskilled labour	0.75
4. Sluice	
Skilled labour	0.78
Unskilled labour	0.75
Material	0.69
Transport	0.71
5. Over Flow Passage	
Skilled labour	0.78
Unskilled labour	0.75
Material	0.69
Transport	0.71
6. Minor Items	
Skilled labour	0.78
Unskilled labour	0.75
Material	0.69
Transport	0.71
7. Physical Contingency	0.78
8. Engineering Admin	0.78
Cost/Ha (IN TK)	
Gross Area (ha)	
Benefited Area (ha)	

Source: Master Plan Organization (MPO) 1987.

Notes:

For relevant values, see MPO 1987

a/ Conversion factor applies to local costs only.

Table A-54: Conversion Factors for shadow pricing of Project Inputs used for NWMP analysis

Item	Shahabuddin and Iqbal 1998 Conversion Factors	1992 GPA Conversion Factors
1. Standard Conversion Factor (SCF)	0.90	0.87
2. Specific Project Inputs :		
Skilled labour	0.90	0.87
Unskilled labour	0.85	0.65
- In agriculture	0.84	0.65
- In construction		
Cement	0.71	0.79
Steel (basic metal)	0.73	0.75
Liner, screen (metal products)	0.67	0.61
Vehicles and components (transport equipment)	0.61 0.67	0.68 0.62
Machinery : Normal duty	0.86	0.74
Machinery : Concessionary Duty	0.77 0.90	0.62 0.87
Engine, pump and accessories (pump motor)	0.90 0.82	- -
Bricks	0.77	-
Dredging	0.90	-
Regulators	0.75	-
River training	0.75	-
Earthwork	0.90	0.87
Permanent bank protection	0.90	0.87
Slope protection (hard)		
Physical Contingencies		
Engineering and Administration		

Source: NWMP DDS Report, Vol. 8: Annex J: Economics, 2000, Estimation of Economic Prices of Selected Products for Use in Evaluation of Water Management Projects in Bangladesh, Quazi Shahabuddin and Iqbal Ahmed Syed, March 1998, and the FPCO Guidelines for Project Assessment, 1992.

Notes: These are the conversion factors to be applied to costs at financial prices in order to convert them to economic costs. For relevant values, see NWMP DDS Report, Vol. 8: Annex J: Economics, 2000

Table A-55: Crop yields, cost of irrigation, rental value of land and use of labor and chemical fertilizers in crop production activities

Crop	Irrigation Technique	Yield** (kg/hectare)	Rental Value of Land (kg/hectare) , in 1990/91 prices)	Cost of Irrigation (Tk./hectare)	Labor (person days/hectare)	Fertilizer*** (kg/hectare)
<u>Rice Crop</u>						
<u>Boro Paddy</u>						
HYV	Modern	4344	8366	3678	198	357
Local	All	2189	7840	397	135	69
<u>Aman Paddy</u>						
HYV	Modern	3588	6833	268	215	259
HYV	Rainfed	3531	6833	0	184	261
HYV	All	3499	6833	268	189	259
Paijam	All	2956	7266	258	194	173
Local T	Rainfed	2096	6661	28	160	79
Local B	Rainfed	1646	2817	48	132	26
<u>Aus Paddy</u>						
HYV	Rainfed	2998	8047	0	164	226
HYV	Modern	3627	8047	576	202	242
HYV	All	3090	8047	576	178	242
Local B	Rainfed	1554	3999	9	161	85
<u>Non-rice crops</u>						
Wheat	Modern	2292	4731	1437	159	313
Wheat	Non-irrigated	1959	4731	0	146	193
Wheat	All	2199	4731	843	156	272
Jute (White)	Rainfed	1530	4988	0	247	112
Jute (Tossa)	All	1765	4782	298	245	135
Cotton	Rainfed	1306	4134	97	211	235
Tobacco	Modern	1577	7113	1346	236	347
Tobacco	All	1445	7113	1346	255	347
Sugarcane	Modern	71333	12013	427	318	541
Sugarcane	Non-irrigated	54550	12013	0	341	511
Tea (processed)	Rainfed	4369	5822	0	2420	-

Source : BDS (2000).

Table A-56 (Contd.)

Crop*	Irrigation Technique	Yield** (kg/hectare)	Rental Value of Land (kg/ hectare) in 1990/91 prices)	Cost of Irrigation (Tk./hectare (Tk./	Labor (person days/hectare)	Fertilizer** * (kg/hectare)
<u>Oilseeds</u>						
Mustard	Traditional/Non-irrigated	894	6125	136	118	207
Sesame	Traditional/Non-irrigated	775	5946	0	196	92
Linseed	Traditional/Non-irrigated	508	2077	0	51	32
<u>Pulses</u>						
Masur (Lentil)	Traditional/Non irrigated	818	3127	44	82	92*
Gram	Traditional/Non irrigated	767	2068	0	81	81
Khesari	Traditional/Non irrigated	1088	3314	0	73	73
<u>Spices</u>						
Chilli (Dry)	Modern	897	7320	1220	264	435
Chilli	Traditional/Non-irrigated	699	7320	0	407	221
Onion	All	8078	5182	452	321	192
<u>Potato</u>						
HYV Potato	Modern	19417	6208	1582	299	819
HYV Potato	Traditional/Rainfed	18372	6208	0	314	695
HYV Potato	All	18502	6208	1582	295	695
HYV Potato	All	7961	6790	926	237	327
<u>Vegetables</u>						
Brinjal	Traditional	12273	8105	0	391	464
Brinjal	Modern	16484	8105	1132	514	824
Radish	Modern/Traditional	10722	8267	328	267	433
Cucumber	Modern/Traditional	8449	10230	988	164	317
Tomato	Modern/Traditional	16365	7628	575	332	372
Cabbage	Modern/Traditional	19909	8203	1689	275	502
Barbati (Long Yard bean)	Traditional/Non-irrigated	7696	6490	0	352	304
Arum	Traditional/Non-irrigated	13912	8072	0	296	653

Source : BDS (2000). Source : These estimates are based on the findings of farm survey in Zohir (1993) and Mahmud et al. (1994).

Note : HYV = High-Yielding Variety, T = Transplanted, B = Broadcast. ** Does not include by-products.*** Chemical Fertilizers other than Urea, TSP & MP are not included here.

Table A-57: Conversion Factors of various agricultural products from various sources

Crop	Price Parity Basis	IFRI-BIDS Study (1994)	Shilpi, World Bank (1998)
Paddy	Import	1.28	1.51 (1.15)
	Export	0.83	1.06 (0.81)
	Non-traded	1.06	-
Wheat	Import	0.97	1.29 (1.12)
Jute (White)	Export	1.55	1.16 (1.37)
Jute (Tossa)	Export	1.51	-
Cotton	Import	1.20	1.29 (1.12)
Sugar/Sugarcane	Import (Sugar)	0.43*	1.16 (1.37)
Gur/Sugarcane	Import (Sugar)	0.38	1.16 (1.37)
Mustard/Oilseeds	Import (Oil)	0.41	-
Mustard/Oilseeds	Import (Seed)	0.61	-
Sesame	Import (Oil)	0.43	-
Masur (lentil)	Import (High)	1.31	-
	Import (Low)	1.05	-
	Export (High)	1.01	-
Chilli (Dry)	Import	0.67	-
Onion	Import	0.88	-
Potato (Fresh)	Import	2.32	-
	Export	0.71	-
	Non-traded	1.27	-
Potato (Chilled)	Import	1.67	-
	Non-traded	1.40	-
Tobacco	Export	2.93	-
Brinjal	Non-traded	1.26	-
	Export	3.73	-
Radish	Export	9.99	-
Cucumber	Export	4.73	-
Barbati	Export	4.15	-
Arum	Export	5.53	-
Tomato	Export	4.78	-
Cabbage	Export	7.29	-
Reference		1990/91	1997

Source :Bangladesh Development Studies:Quazi Shahabuddin (2000), No. 1, Vol XXVI, March, BIDS

Notes: (1) * represents the ratio of border price to domestic price (conversion factors) at the wholesale level and for sugar only.

(2) ** represents the specific conversion factors of sugarcane (used in sugar refineries) estimated directly for this study.

(3) Figures in parentheses represent the specific conversion factors for 1991 reference years.

Table A- 58: Specific conversion factors for agricultural inputs

Inputs	Shabuddin and Rahman (1992)	IFPRI Study on Wheat (1997)	Shilpi, world Bank 1998
Urea	1.45	1.00	1.39 (1.10)
TSP	1.88	1.12	0.97 (1.46)
MP	2.02	1.19	0.93 (1.10)
Human Labor	0.75	(0.50-1.00)	(0.75-1.00)
Draft Power	0.87	-	-
Seeds	Same as Crops	0.85	1.00 (1.00)
Pesticides	0.87	0.89	0.92 (0.80)
Diesel Fuel	-	0.85	-
Irrigation	0.63(pumping cost, diesel)	-	0.86 (0.86)
Manure	0.87	-	1.00 (1.00)
Reference	1991	1992/93	1997

Source :Bangladesh Development Studies:Quazi Shahabuddin (2000), No. 1, Vol XXVI, March, BIDS.

Note : Figures in parentheses represent the specific conversion factors for 1991 reference year.

Table A-59: Productivity of selected major rice crops

Crop	Project area		
	Area (acres)	Quantity (maunds)	Yield (maund/acre)
HYV Aus	45.90	1629.50	35.5
LV Aus	148.44	3087.50	20.8
HYV Aman	503.09	17818.00	35.4
LV Aman	305.92	7108.00	23.2
HYV Boro	825.12	42210.08	51.2
LV Boro	25.03	605.73	24.2

Note: Data refers to 2007 in 30 selected areas across Bangladesh

Source: SSWRDSP-II Benchmark Survey, BIDS (2007).

Table A-60: Cost of Production of selected major crops

Crop	Per acre cost of production (Tk.)					
	Land preparation	Seeds	Irrigation	Fertilizer and pesticides	Labor	Total
HYV Aus	1289	561	247	1169	3985	7252
LV Aus	1665	304	12	522	2776	5278
HYV Aman	1277	434	383	1423	3877	7394
LV Aman	1430	373	60	417	2782	5061
HYV Boro	1310	545	3371	1900	5147	12273
LV Boro	1022	540	-	537	2934	5033

Note: Data refers to 2007 in 30 selected areas across Bangladesh; labor inputs included that of family, imputed in terms of average wage of hired labor.

Source: SSWRDSP-II Benchmark Survey, BIDS (2007).

Table A-61: Net returns from cultivation of selected crops

Crop	Gross value per acre (Tk.)	Total cost per acre (Tk.)	Net return per acre (Tk.)
HYV Aus	12321	7252	5069
LV Aus	7821	5278	2543
HYV Aman	13367	7394	5972
LV Aman	9458	5061	4397
HYV Boro	19830	12273	7557
LV Boro	8841	5033	3808

Note: Data refers to 2007 in 30 selected areas across Bangladesh

Source: SSWRDSP-II Benchmark Survey, BIDS (2007).

Appendix-23.1
Various Considerations for
Undertaking Environmental Assessments

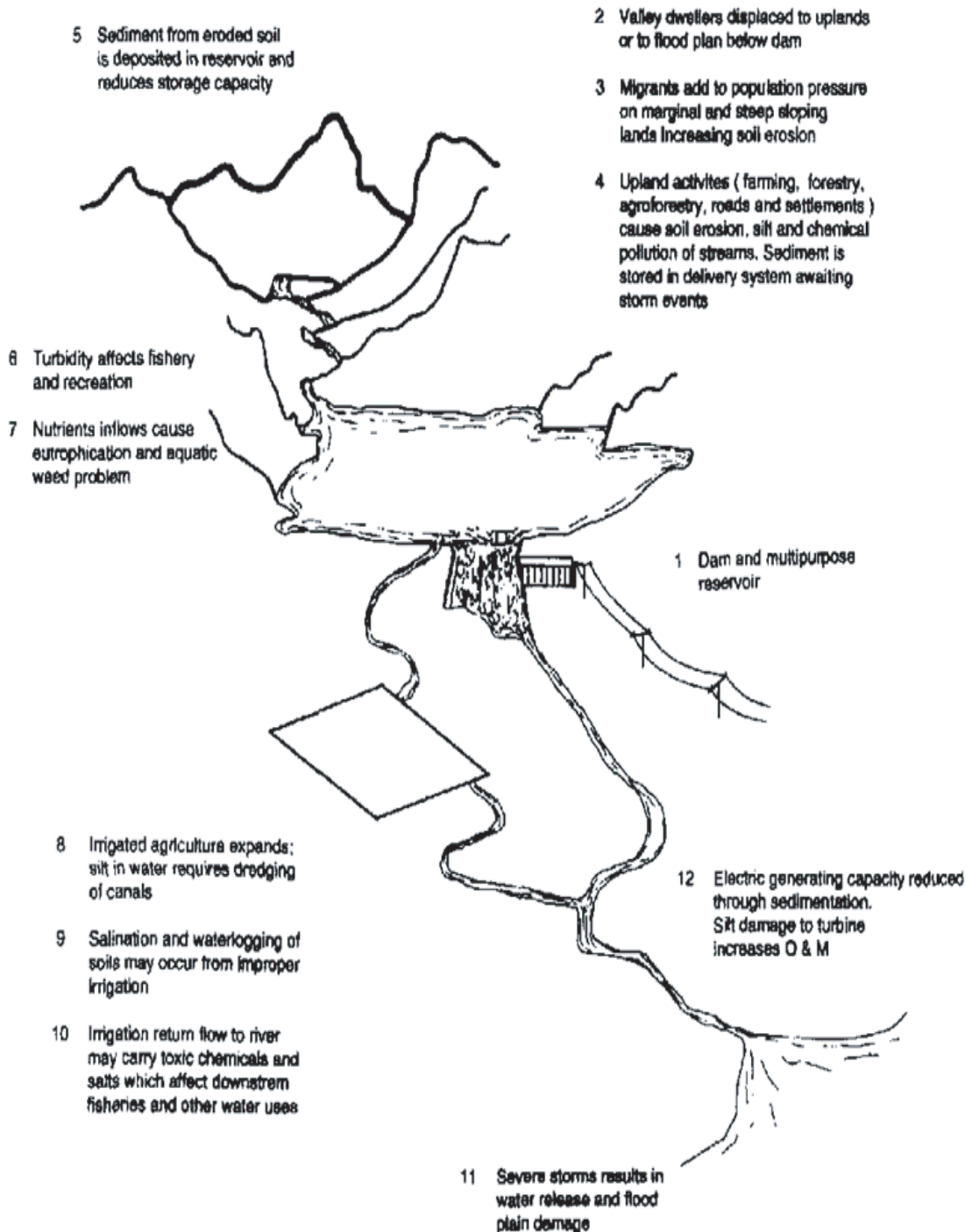
Appendix-23.I: Various Considerations for Undertaking Environmental Assessments

Considerations of appropriate geographic boundary: Setting the correct geographic boundary for analyses is essential. Consider, for example, a multi-purpose dam and reservoir project in a large upland watershed (refer to Fig. 23.1). A narrow financial analysis might include just the costs of the dam and hydroelectric generator and just the benefits of the power delivered to an electric grid. From the standpoint of society, however, many related effects on natural systems would be important.

In the case of industrial projects, the scope should include reasonably important factors (e.g., transport of raw materials and products, worker housing, and effluent discharge related pollution or waste discharges) extending beyond the site (i.e., geographic boundary). Highly imaginative indirect effects may be mentioned but need not be evaluated (e.g., civil unrest, price fluctuations in distant markets, rare natural calamities). [Example: If the industry is located on a critically important Highway (leading towards a port), labour unrest might easily choke functioning of the highway, thereby restricting passage of good and services.]

Considerations of appropriate time boundary: All time phases of the project (i.e., construction, operation, and decommissioning maintenance) should be covered under scoping analysis. The more important question, however, is how far into the future predictions should be taken. Although their accuracy falls off rapidly with time, predictions of effects out to the expected lifetime of the project or facilities should be attempted. Instances where some sort of perpetual management is necessary (e.g., hazardous waste or radioactive materials) should be noted. If dismantling of a facility is necessary, the impacts of that activity at a future time should be covered. [Example: In power development, transmission and distribution, adverse effects of a few carcinogenic pollutants are found in the project site and beyond up to 100 years.]

Figure A-4 : Significant Environmental Issues to be Examined in Scoping



Appendix-23.II: About Initial Environmental Examination (IEE)

IEE is a process of further inquiry into the impact assessment, taking clues from the exercise of scoping. There is, however, a fairly thin dividing line between scoping and an IEE when it comes to identification and gradation of the impact issue. Scoping lays an emphasis on the identification of issues and on the boundaries of the analysis. IEE attempts to examine the issues in more detail by carrying out an exercise of prediction and assessment to identify required mitigation measures. In this manner each alternative is assessed. Later, these alternatives are analyzed to rank them and find the alternative which may be either cleared or taken to the next tier of detailed EIA.

IEE focuses on the assessment of impacts and identification of obvious mitigation measures. This is generally done by conducting baseline information and by collecting any available secondary data. The issues are assessed by carrying out a prediction exercise by using informal judgment, the opinion of experts, or in some occasions by using screening level mathematical models.

The idea of assessment is to grade the impacts in terms of significance. Significance of the impact is expressed in terms of "highly significant" or "of minor significance", or in terms of additional descriptors such as "reversible", "irreversible", etc. The idea of assessing the significance is to identify suitable mitigation measures. The level of mitigation measures suggested is based on the understanding of the severity of the impacts.

An IEE is carried out to determine whether potentially adverse environmental effects are significant or whether mitigation measures can be adopted to reduce or eliminate these adverse effects. IEE requires more in-depth analysis than applied in the screening procedure. Consequently, an IEE involves more time and resources. IEE also requires expert advice and technical input from environmental specialists so that potential environmental problems can be clearly defined. When an IEE is able to provide a definite solution to environmental problems, an EIA is not necessary.

Appendix-23.III: Model Template For Initial Environmental Examination (IEE)

1. INTRODUCTION

- 1.1 Background of the project
- 1.2 Objective(s) of the project
- 1.3 Brief description of the project
- 1.4 Components of the project
- 1.5 Component-wise detailed activities of the project (as envisaged)

2. ENVIRONMENTAL ASSESSMENT

- 2.1 Environmental clearance requirements
 - 2.1.1 GOB Laws, regulations and guidelines on environmental management
 - 2.1.2 (Specific Donor)'s environmental requirements (as applicable)
- 2.2 Environmental Issues and Concerns under the Project
 - 2.2.1 Description of the available environment in the Project Area(s)
 - 2.2.2 Currently available environmental quality of lands, air, and water and their past trends (~20 years)
- 2.3 Environmental assessment of each activity envisaged (as in sub-section 1.5 above):a present time, (b) into the future (~20 to 30 years)
- 2.4 Envisaged environmental safeguard actions
- 2.5 Potential of failures of envisaged safeguard actions (based on current practices)
- 2.6 Final assessment of degradation of environmental quality due to project implementation
- 2.7 Notification of unavoidable irreversible degradation of environment

3. STAKEHOLDERS' RESPONSES ON ENVIRONMENTAL ASSESSMENT

- 3.1 Modalities of stakeholders' response on environmental assessment (prior disclosure is a pre-requisite)
- 3.2 Specific responses and recommendations of various stakeholder groups

4. OVERALL RESULTS OF ENVIRONMENTAL EXAMINATION

5. CONCLUSIONS

Annexes

1. Layout maps of project areas
2. Visual design/graphics of project activities which will cause environmental degradation
3. Specific time-series data on quality of environmental resources
4. Documentation on targeted discussions of various focus groups

Appendix-23.IV: The Essence and Spirit of the Exercises of Prediction, Assessment, and Management Responses

Prediction:

As far as possible, prediction scientifically characterizes the impact's causes and effects, and its secondary and synergistic consequences for the environment and the local community. Prediction follows an activity-component relationship (e.g., discharge of liquid effluent as an activity and river water quality as an environmental component) and estimates the subsequent effects (e.g., such as reduced concentration of dissolved oxygen, reduced fisheries). Prediction draws on physical, biological, socio-economic, and anthropological data and techniques. In quantifying impacts, it may employ mathematical models, photomontages, physical models, socio-cultural models, economic models, experiments, or expert judgements.

To prevent unnecessary expense, the sophistication of the prediction methods used should be kept in proportion to the "scope" of the EIA. For instance, a detailed mathematical model of atmospheric dispersion should not be used if only a small amount of relatively harmless pollutant is emitted. Simpler models are available and are sufficient for the purpose. Also, it is unnecessary to undertake expensive analysis if they are not required by the decision makers for whom the EIA is being done.

All prediction techniques, by their nature, involve some degree of uncertainty. So, along with each attempt to quantify an impact, the study team should also quantify the prediction's uncertainty in terms of probabilities of "margins of error".

A shortcoming of many detailed EIAs is that social and cultural impacts are not given the prominence they deserve in describing the extent of changes expected to result from a major development project. This has probably been due to the bias of physical and biological scientists against the comparatively younger disciplines of cultural anthropology and sociology. This is an unfortunate bias, since socio-cultural impacts are the ones that would affect the local community in their everyday lives.

A consideration of socio-cultural impacts should be integrated, wherever possible, into every discussion of physical/biological change, and not just treated separately in a minor chapter or appendix.

Assessment:

The next question addressed by the EIA - "Do the changes matter?" - is answered in the next step, assessment, so called because it evaluates the predicted adverse impacts to determine whether they are significant enough to need mitigation. This judgment of significance can be based on one or more of the following:

- comparison with laws, regulations, or accepted standards;
- consultation with the relevant decision makers;
- reference to pre-set criteria such as protected sites, features, or species;
- consistency with government policy objectives;
- acceptability to the local community or the general public.

Management Responses:

If the answer to the previous question is "Yes, the changes do matter", then the EIA answers the fourth question - "What can be done about them?". In this phase, the study team formally analyses management response measures/processes. A wide range of measures are proposed to prevent, reduce, remedy, or compensate each of the adverse impacts evaluated as significant. Possible management response measures include:

- changing project sites, routes, processes, raw materials, operating methods, waste disposal routes or locations, or engineering designs;
- introducing pollution controls, monitoring, phased implementation, landscaping, personnel training, involving social services or public education;
- offering (as compensation) restoration of damaged resources, money to affected persons, concessions on other issues, or fit site programmes to enhance some other aspects of the environment or quality of life for the community.

Appendix-23.V: About A Few Important EIA Processes

23.1 Design and environmental interface

Environmental issues may influence the development of scheme(s) under the proposed project in that they have been incorporated from the outset of the design process and have been considered as part of decision-making. This may be achieved through a coordinated relationship between project design (where project-related activities and processes are clearly defined), EIA and project management (environmental management being a part of it). EIA is intended to be an iterative process rather than an assessment of end state. Applied in this way there is a much greater opportunity for environmental adverse effects to be reduced or eliminated through changes to design rather than by means of offsetting or compensating.

If the design processes have incorporated 'alternative pathways' emanated from EIA exercises, it needs to be highlighted in the EIA report. Even if the EIA processes had influenced the determination of a less-damaging alternative pathway in the design phase, that should be highlighted in the EIA.

23.2 Baseline condition and assessment of effects

The EIA should consider the likely environmental effects of the proposed development based upon current knowledge of the site- and location-specific and surrounding environment. Following the findings of various studies contributing to the EIA, ways of avoiding, reducing or offsetting any potential significant adverse effects (collectively known henceforth as 'management response measures') need to be identified.

An EIA should consider both positive and negative impacts during both the construction phase of the development and once it is completed. In accordance with the legislative requirements, direct, indirect, secondary and cumulative; short, medium and long term; permanent and temporary; and positive and negative effects should ideally be addressed where applicable. The risks of inability to address any of the adverse effects (i.e., residual effects) should be presented and its overall impact on environment should be assessed. The latter greatly helps decision-making processes.

23.3 Environmental assessment framework

The framework consists of a few generic steps that enable the project proponent to analyze environmental impacts and recommend management response measures to reduce environmental risks. The major steps and tasks against each step are provided below.

<i>Major EIA Steps</i>	<i>Tasks to complete for EIA</i>
Scoping	Identify regional issues of concern Select appropriate regional/local Valued Environmental Components (VEC ²⁷) Identify spatial and temporal boundaries Identify actions that may affect the same VECs
Analysis of effects (both positive and negative)	Identify potential impacts due to actions and possible effects Complete the collection of regional baseline data Assess effects of proposed action on selected VECs
Identification of management responses Evaluation of significance	Assess effects of all selected actions on Selected VECs Recommend response measures in order to minimize adverse effects (i.e., managing environmental damage)
Follow up	Evaluate significance of residual effects on environmental resources Compare results against threshold or land use objectives and trends Recommend regional monitoring and effect management

The purpose of the scoping exercise is to identify issues of concern, the appropriate Project VECs, and the study area boundaries. Identification of issues of concern should be based on:

- Concerns expressed by stakeholders and the public including the scientific community, government organizations/departments and civil society organizations and NGOs;
- EIA Terms of Reference;
- Review of legislation/legal instruments;
- Consideration of available reference material and literature;
- Previous assessment experience including proposed developments in the Project study areas; and
- Considerations of issues and concerns related to resources traditionally used by indigenous communities (generally dependent on the local resources for livelihoods) in the locality, if applicable.

Based on the evaluation of these issues, the Project VECs need to be identified. Generally, Project VECs are selected for analyses based on the extent of the interaction between the Project-related activities/processes and the issue of concern. For some VECs, key questions also need to be developed/framed to focus the assessment.

²⁷ The definition is placed below in the following section.

Throughout the EIA process, new VECs may be identified and grouped into the appropriate resource discipline. Spatial and temporal boundaries for each resource discipline need to be established and other activities need to be identified.

23.4 Analysis of effect and identification of management response measures

Baseline conditions for each resource need to be collected. There may be a number of sources from where specific environmental data may be obtained. For example, weather/climatological data may be obtained from the Bangladesh Meteorological Department (BMD). Data related to water level and flow regime in rivers is available in Bangladesh water Development Board (BWDB). Bangladesh Bureau of Statistics (BBS) regularly publishes many resource related data including socio-economic data which are of extreme importance to portray the baseline condition. BBS publishes yearbooks, occasionally publishes Agricultural Census, Population Census (once in every 10 years), and Household Expenditure Survey reports. Macro-economic data are regularly published by General Economic Division (GED) of Planning Commission (PC), while the Bangladesh Bank publishes monthly bulletins that give a general sense of economic progress. Moreover, the Bangladesh Economic Review is a great source of periodic evaluation of economic performance of the country by sector, as published by GED. BBS has once published a Compendium on Environmental Data, which can also be made useful in the baseline analysis.

Once baseline conditions for the resource are determined and Project activities are defined as per design of the project, an assessment needs to be carried out to evaluate sensitivity of each VEC with any or all of the project related activities/processes. This thorough and elaborate analysis determines whether environmental protection measures are required to reduce adverse impacts on the VECs. The evaluation must consider those protection or impacts-reducing measures that would be required to meet either regulatory, institutional or public acceptance during the planning, design, construction, operation and/or reclamation phases of the Project.

23.5 Evaluation of significance

For all VECs except for socio-economic, predicted, residual project-specific and cumulative effects are characterized using a number of environmental criteria (described in the table below). The type of effect needs to be determined and the environmental component's sensitivity to and ability to recover from the impact need to be considered by evaluating the geographic extent, duration, magnitude and reversibility of the impact resulting from various project-related activities.

Table A-62: Evaluation Criteria for Assessing the Significance of the Environmental Impact of the Project

Evaluation Criteria for Assessing the Significance of the Environmental Impact of the Project		
Criteria	Criteria definition	
Geographic extent of impact	Local	Effects occurring mainly within or close proximity to the proposed development area.
	Regional	Effects extending outside of the project boundary to regional surroundings.
	Divisional	Effects extending outside of the regional surroundings, but within divisional boundary.
	National	Effects extending outside of the provincial surroundings, but within national boundary
	Trans-boundary	Effects extending outside of national boundary
Duration of impact	Short	Effects occurring within development phase
	Long	Effects occurring after development and during operation of facility/project operation
	Extended	Effects occurring after facility/project operation closes but diminishing with time.
	Residual	Effects persisting after facility/project operation closes for a long period of time.
Frequency	Continuous	Effects occurring continually over assessment timelines.
	Isolated	Effects confined to a specific period (e.g. during construction)
	Periodic	Effects occurring intermittently but repeatedly over assessment period (e.g. routine maintenance activities).
	Occasional	Effects occurring intermittently and sporadically over assessment period
	Accidental	Effects occurring rarely over assessment timeline.
	Seasonal	Effects occurring seasonally.
Ability to recovery	Reversible in short-term	Effects which are reversible and diminish upon cessation of activities.
	Reversible in long-term	Effects which remain after cessation of activities but diminish with time.
	Irreversible (rare)	Effects which are not reversible and do not diminish upon cessation of activities and do not diminish with time.
Magnitude	Nil	No change from background conditions anticipated after mitigation.
	Low	Disturbance predicted to be somewhat above typical background conditions, but well within established or accepted protective standards and normal socioeconomic fluctuations, or to cause no detectable change in ecological, social or economic parameters.
	Moderate	Disturbance predicted to be considerably above background conditions but within scientific and socio-economic effects thresholds, or to cause a detectable change in ecological, social or economic parameters within range of natural variability.
	High	Disturbance predicted to exceed established criteria or scientific and socioeconomic effects thresholds associated with potential adverse effect, or to cause a detectable change in ecological, social or economic parameters beyond the range of natural variability.

Project contribution	Neutral	No net benefit or loss to the resource, communities, region or province.
	Positive	Net benefit to the resource, community, region or province.
	Negative	Net loss to the resource, sites; access roads, communities, region or province.
Confidence rating	Low	Based on incomplete understanding of cause-effect relationships and incomplete data pertinent to study area.
	Moderate	Based on good understanding of cause-effect relationships using data from elsewhere or incomplete understood cause-effect relationship using data pertinent to study area.

For all VECs, except for socio-economic, the severity of the predicted residual project-specific and cumulative effect needs to be rated as being either significant, or not significant. The determination of significance is generally made in reference to existing standards, guidelines or recognized thresholds where available²⁸. If the severity of the predicted residual effect is identified as significant, it must be discussed adequately and placed into perspective.

Non-significant impacts are determined to be those residual effects:

- where the project-related effect(s) in combination with the existing baseline conditions does not result in exceeding values in the national guidelines, thresholds or criteria (as notified by the legal/regulatory provisions);
- where the project-related effect(s) in combination with existing baseline conditions as well as future (disclosed) projects/activities does not result in exceeding values in the national guidelines, thresholds or criteria; or
- where the project-related effect(s) occurs to a population or species in a localized manner over a short period of time similar to natural variation or are reversible and have no measurable effects on the integrity of the population as a whole.

²⁸ Secondary sources provide insights into thresholds, where national legal framework does not provide such values in specific terms. The Environmental Protection Rules 1997 clearly defines many of the standards and respective threshold.

APPENDIX-23.VI: Detailing Out the Scope of EIA Exercise

23.2.1 Scope of the project

The scope of the project for the purposes of the EIA involves all phases, including construction, operation, decommissioning, reclamation and closure of the project and associated facilities and infrastructure to carry out the project-related activities. The scope may include the following (a non-exhaustive list provided here):

- Temporary construction facilities, including utilities, infrastructure and temporary water supply,
- Wastewater handling and materials handling;
- Site preparation (surface water diversion, clearing, soil salvage);
- Earth digging/limestone quarry operation and processing (blasting, drilling, pit dewatering, loading, hauling, crushing, screening and washing), if applicable;
- Reclamation (overburden placement, soil placement and vegetation)
- Infrastructure (process water supply, potable water supply, access roads, electrical power)

23.2.2 Valued environmental components (VEC)

The Project EIA report addresses environmental effects by identifying Valued Environmental Components (VECs). VECs for the Project are those environmental attributes associated with the proposed Project development, which are generally identified to be of concern by the public, government or professional community including NGOs and civil society organizations (CSOs). VECs can include biophysical aspects, such as air, water, soils, terrain, vegetation, wildlife, fish, and avifauna, land use, and social and economic aspects.

VECs are not the same for every project, those are required to be project-specific. VECs of the proposed project need to be identified by consulting with location-specific literature and through open consultation with local community, public, government and professional community including NGOs and CSOs. The project proponent must engage in an ongoing communication²⁹ with these bodies to determine the VECs for the proposed Project.

For each VEC, one or more parameters need to be selected to facilitate quantitative or qualitative measurement of potential project effects and cumulative effects. Measurable parameters provide

²⁹ The proponent of the project should supply all baseline environmental data to stakeholders groups, then engage in consultation to identify VECs based on all activities and processes which have been planned for the project. The stakeholders' will respond to their perception regarding each project-related activity and/or process and identify one or more VEC. Ideally, this process should be followed in several iterations.

a means to determine the level or amount of change in a VEC. Ideally, thresholds or standards should be identified for each measurable parameter. For example, a measure of total suspended solids might be chosen as the measurable parameter for sedimentation effects in watercourses and on fish habitat and condition. Every aspect of environment should be brought into the process for identifying and defining measurable parameters for their VECs. The degree of change in these measurable parameters needs to be used to help characterize project-specific and cumulative effects and evaluate the significance of the residual effects. As appropriate to the assessment, a list of the VECs identified for a typical project or impacts thereof needs to be presented in the report. The categories identified that may be affected by a typical project are (again, a non-exhaustive list is provided here for example):

- Air quality
- Water quality
- Volume of water in stream
- Level of piezometric surface of groundwater
- Noise
- Land use
- Soils (type, quality and quantity) and terrain
- Vegetation
- Wildlife
- Hydrology
- Hydro-geology
- Aquatic resources
- Traditional ecological knowledge and land use
- Conservation and reclamation
- Human health
- Socioeconomic and
- Paleontological resources.

23.2.3 Analytical dimensions

VEC-specific spatial and temporal dimensions need to be presented in this section of the EIA report. Administrative boundaries are identified as the time and space limitations imposed because of administrative or economic reasons. Administrative boundaries are more relevant for management response analyses with a view to reduce adverse effects on environmental elements and resources.

The spatial boundaries for the EIA include the project development area, which includes the project footprint and associated infrastructure, as well as other local and regional areas, determined by the characteristics of each VEC where an effect from the project can be reasonably expected. The project footprint needs to be highlighted here. Spatial boundaries for each discipline are based on the zone of the project influence beyond which the potential environmental, cultural and socio-economic effects of the project are expected to be non-detectable. Spatial boundaries are established for both a Local Study Area (LSA) and a Regional Study Area (RSA).

Temporal boundaries are defined as those boundaries that will exist during the life of the Project including the construction, operation and reclamation phases. Temporal boundaries for the assessment of effects need to be established in consideration of the construction period for the

project, operational life of the project and anticipated period of reclamation and closure of the site. One may anticipate that the lifespan of a project operation will be in the order of at least 30+ years³⁰. For most VECs, analyses of effects generally consider construction and operations separately. Where an activity adds a measurable short-term change to an identified VEC, impacts during construction can be quite different compared to that in the operation phase of the project. This is why analyses of effects need to be assessed separately. [For example, the noise pollution can be quite dramatic during construction phase, which may subside significantly during operation period.] The analyst must keep in mind that there may be sequencing of both the removal and reclamation of terrestrial systems. This sequential development and reclamation process need to consider either that everything is undeveloped, developed or reclaimed. A conservative approach may be considered here for the assessment so that effects are not under-estimated.

23.2.4 Assessment cases

The assessment scenarios for the EIA report include the following:

- A Baseline Scenario, which includes existing environmental conditions, existing and approved projects, activities and processes;
- An Application Scenario, which includes the Baseline Scenario plus the proposed project; and
- A Cumulative Effects Assessment (CEA) Scenario, which includes the Application Scenario (Baseline Scenario plus Project) plus planned projects, activities and processes.

For the purposes of defining assessment scenarios, "approved" means approved by any appropriate regulatory authority, and "planned" means any project, activity or process that has been publicly disclosed by the proponent prior to the issuance of the Terms of Reference or up to six months prior to the submission of the Project Application and the EIA report, whichever is most recent.

For the CEA, each of the environmental, social, economic, health, and land use components need to be evaluated, assessed and discussed where combined effects could reasonably be considered to result due to development of the project in combination with other existing, approved and planned projects in the region. Industrial projects as well as activities associated with other land uses and infrastructure need to be included.

23.2.5 Significance

An important step in the environmental assessment process is the determination of significance of residual environmental effects. The significance of predicted residual effects of the project is determined only after the incorporation of the planned environmental management response (i.e., mitigative) measures proposed for the project.

Residual environmental effects are determined to be significant or not significant based on well-defined criteria, an understanding of the environmental effects of the project and the importance of those effects and the social consequences derived directly from them. Predicted residual environmental effects are characterized in terms of the following criteria:

³⁰ For certain pollution cases, longer time horizons should be kept in mind, as situation demands (from case to case).

Magnitude of the Impact - "Magnitude refers to the severity of the adverse environmental effects. Minor or inconsequential effects may not be significant. On the other hand, if the effects are major or catastrophic, the adverse environmental effects will be significant. When using this criterion, it is important to consider the extent to which the project could trigger or contribute to any cumulative environmental effects."

Geographic Extent - "Localized adverse environmental effects may not be significant. Alternatively, widespread effects may be significant. [For example, if a project-related activity is going on next to a river and sludge is likely to be discharged on a regular basis into the river. In such a case, the immediate environmental effect on the river may not be significant, however its cumulative effect in several kilometers downstream of the river can be catastrophic for the aquatic life and biota.] When considering this criterion, it will be important to take into account the extent to which adverse environmental effects caused by the project may occur in areas far removed from it (e.g., acid rain and the long-range transportation of atmospheric pollutants), as well as contribute to any cumulative environmental effects."

Duration and frequency - "Long term and/or frequent adverse environmental effects may be significant. Future adverse environmental effects should also be taken into account. For example, many human cancers associated with exposure to ionizing radiation have long latency periods of up to 30 years. Obviously when considering future adverse environmental effects, the question of their likelihood becomes very important."

Degree to which the effects are reversible or irreversible - "Reversible adverse environmental effects may be less significant than adverse environmental effects that are irreversible. It will be important to consider any planned decommissioning activities that may influence the degree to which the adverse environmental effects are reversible or irreversible."

Ecological context - "The adverse environmental effects of projects may be significant if they occur in areas or regions that have already been adversely affected by human activities; and/or are ecologically fragile and have little resilience to imposed stresses. The location of the project within certain proximity to any of the Ecologically Critical Areas (ECA)³¹ or Environmentally Protected Areas (EPA) should warrant special care in taking into consideration of ecological context in the assessment."

Environmental standards, guidelines, or objectives - "If the level of an adverse environmental effect is less than the standard³², guideline, or objective, it may be insignificant. If, on the other hand, it exceeds the standard, guideline, or objective it may be significant."

The factors used to assess the predicted environmental effects of the project are specific to the VECs for each biophysical or socio-economic component. For example, the assessment of environmental effects and determination of significance for each VEC that is population based (e.g. fish, wildlife, vegetation and biodiversity) may not be applicable for those VECs that are not population based (e.g. air quality, water quality, flow regime, groundwater, etc.). The assessor must pay attention to each parameter towards determining significance for each VEC. Where possible, the determination of significance should make clear reference to existing standards, guidelines or recognized thresholds with proper citation(s).

31 There are a host of ECA and EPAs in the country. A few are UNESCO Global Heritage sites and Ramsar (protected) sites, which are of global significance. GOB is treaty bound with international community to protect such ecologically important sites. A complete list is available with the MOEF and DOE.

32 Standards are provided in Environmental Conservation Rules 1997.

Appendix-23.VII: Suggested Template for Environmental Impacts Assessment (EEA) Report

1. INTRODUCTION

2. DESCRIPTION OF THE PROJECT

3. DESCRIPTION OF THE ENVIRONMENT

3.1 Description of the project location(s)

3.2 Physical and biological environment

3.2.1 Meteorology and climate

3.2.2 Hydrological setting and water quality

3.2.3 Aquatic environment and resources

3.2.4 Air quality

3.2.5 Land use and soil quality

3.2.6 Other environmental resources and quality

3.2.7 Land-based biodiversity

3.2.8 Avian biodiversity

3.2.9 Aquatic biodiversity

3.3 Socio-cultural setting

3.3.1 Primary livelihoods in the project area(s)

3.3.2 Inter-dependence of various livelihood groups with available environmental resources

3.3.3 Prevailing concerns regarding socio-cultural interactions with environmental goods and services

3.4 Benefit streams from environmental goods and services in the project impact zones/areas

4. ASSESSMENT OF POTENTIAL ENVIRONMENTAL IMPACTS AND MANAGEMENT RESPONSE MEASURES

4.1 General discussion (the summary of findings of IEE including stakeholders' responses)

4.2 Potential interactions of project activities (as in section 2) on Physical and Biological environment

4.2.1 Impacts on climate/weather parameters

4.2.2 Impacts on local/regional hydrology, sediment flow and navigational routes

4.2.3 Impacts on water quality and water availability (a) surface water, (b) ground water, & (c) drinking water from any origin

4.2.4 Impacts on aquatic environment and resources

4.2.5 Impacts on air quality

4.2.6 Impacts in relation to alteration in noise level

4.2.7 Impacts on land use and soil quality

4.2.8 Impacts on neighbouring Ecologically Critical Areas (ECAs) etc.

4.2.9 Impacts on land based biodiversity (including agricultural and forest biodiversity)

- 4.2.10 Impacts on avian biodiversity including migratory species
- 4.2.11 Impacts on aquatic biodiversity including fish, mollusks, turtles, reptiles, etc.
- 4.3 Potential interactions of project activities (as in section 2) on Socio-cultural setting
- 4.3.1 Impacts on all major livelihood types prevailing in the project area(s)
- 4.3.2 Impacts on inter-dependence of various livelihood groups with available environmental goods and services in the project area(s)
- 4.3.3 Impacts on issues and concerns in relation to socio-cultural interactions with environmental goods and services
- 4.4 Assessment of reduction/alteration of benefit streams as a consequence of project activities on environmental elements

5. MANAGEMENT RESPONSES TO POTENTIAL ENVIRONMENTAL DEGRADATION

- 5.1 Management responses towards reducing adverse impacts of project activities (as in section 2) on Physical and Biological environment
 - 5.1.1 Management responses towards reducing adverse impacts on climate/weather parameters
 - 5.1.2 Management responses towards reducing adverse impacts on local/regional hydrology, sediment flow and navigational routes
 - 5.1.3 Management responses towards reducing adverse impacts on water quality and water availability (a) surface water, (b) ground water, & (c) drinking water from any origin
 - 5.1.4 Management responses towards reducing adverse impacts on aquatic environment and resources
 - 5.1.5 Management responses towards reducing adverse impacts on air quality
 - 5.1.6 Management responses towards reducing adverse impacts in relation to alteration in noise level
 - 5.1.7 Management responses towards reducing adverse impacts on land use and soil quality
 - 5.1.8 Management responses towards reducing adverse impacts on neighbouring Ecologically Critical Areas (ECAs) etc.
 - 5.1.9 Management responses towards reducing adverse impacts on land based biodiversity (including agricultural and forest biodiversity)
 - 5.1.10 Management responses towards reducing adverse impacts on avian biodiversity including migratory species
 - 5.1.11 Management responses towards reducing adverse impacts on aquatic biodiversity including fish, mollusks, turtles, reptiles, etc.
- 5.2 Management responses towards reducing adverse impacts on Socio-cultural setting
 - 5.2.1 Management responses towards reducing adverse impacts on all major livelihood types prevailing in the project area(s)
 - 5.2.2 Management responses towards reducing adverse impacts on inter-dependence of various livelihood groups with available environmental goods and services in the project area(s)
 - 5.2.3 Management responses towards reducing adverse impacts on issues and concerns in relation to socio-cultural interactions with environmental goods and services
- 5.3 Assessment of added benefit streams as a consequence of management responses towards reducing adverse impacts on overall environment

6. ALTERNATIVE SCENARIOS

- 6.1 No project scenario
- 6.2 Technological alternatives (a) ..., (b) ..., (c) ...,
- 6.3 Potential environmental impact(s) of each alternative
 - 6.3.1 Full assessment (sections 4 and 5 above) for alternative a
 - 6.3.2 Full assessment (sections 4 and 5 above) for alternative b
- 6.4 Cost and benefit scenarios with each alternative above

7. ENVIRONMENTAL MANAGEMENT PLAN

- 7.1 Various management activities under each alternative scenario
- 7.2 Institutional measures to ensure transparency and accountability
- 7.3 Current institutional practices and loopholes in relation to environmental management
- 7.4 Risk assessment (envisaged risks & likelihoods)
- 7.5 Proposed risk reduction response arrangements and practices
- 7.6 Environmental auditing and self-control mechanisms
- 7.7 Economic cost-benefit analysis of EMP implementation by option

8. PUBLIC CONSULTATION AND DISCLOSURE

- 8.1 Public involvement
- 8.2 Disclosure plan and execution
- 8.3 Consultation modalities and results at EIA stage
 - 8.3.1 Consultation with key government agencies and Union stakeholders
 - 8.3.2 Consultation with NGOs, CBOs, and CSOs
 - 8.3.3 Documentation of opinions of non-proponent experts
 - 8.3.4 Village and/or ward level consultation
 - 8.3.5 Individual group discussion
- 8.4 Subject specific surveys
- 8.5 Assessment of public opinion and outcomes

9. CONCLUSIONS

Appendix-23.VIII: Climate Change Related Risks for Bangladesh and Major Gaps In Understanding

23.3.1 Risks

It is reported that the surface average temperature has been rising in Bangladesh, though there is no agreement among studies on the rate of change³³ (Quadir et al., 2001; Chowdhury et al., 2003). Available literature suggest that a general warming is expected in future, where the rate of warming will be higher for the winter months (i.e., DJF) than the monsoon months (i.e., JJA) (Ahmed and Alam, 1998; Agrawala et al., 2003).

There is a great deal of local-level perception-based evidence that the rainfall pattern has become erratic in recent years, if not in recent decades (RVCC, 2003; AAB-SDRC, 2005; Ahmed, 2008). However, the official agency has ruled out any possibility of drastic change in rainfall patterns beyond climate variability. Intriguingly, a bi-modal shift in rainfall behaviour has already been reported (Chowdhury, 2007), which may further be attributed to recent shifts in hydrological peaks in various rivers inside Bangladesh. Local level experience and anecdotal evidence clearly show that in both Gaibandha and Jamalpur, people now observe two to three flood peaks instead of one, as the latter had been regularly observed decades ago.

The literature on future rainfall projections, based on climate modeling exercises, clearly show two distinct features: (a) the monsoon will be wetter (which is consistent with IPCC projections), and (b) the winter (already insignificant) rainfall will further diminish (Ahmed and Alam, 1998; Agrawala et al., 2003).

The above findings lead to a few inferences:

- a) Wetter monsoon would lead to increased flood vulnerability, which will be compounded if the observed shift in the second rainfall peak in September persists (Alam et al., 1998);
- b) Drier winter months would give rise to higher evapo-transpiration in combination with higher temperature and diminishing rainfall, leading to further intensification of degree of aridity (phonological drought) (Huq et al., 1996; Asaduzzaman et al., 1997); and
- c) Decline in winter rainfall would reduce flow in the rivers, which would aggravate saline ingress along the coastal region (BCAS-RA-Approtech, 1994; Ahmed, 2005; CEGIS, 2006).

All the above phenomena clearly highlight the increased hazard susceptibility in terms of flood, drought and salinity ingress in Bangladesh. As it has been reported in many articles, floods will be more intense, will inundate more areas and occasionally will perhaps prolong to devastate people's livelihoods, national economy and infrastructure (BCAS-RA-Approtech, 1994; Huq et al., 1996; Alam et al., 1998). Similarly, literature suggest that the central western region will be hit

³³ The apparent reasons for non-agreement are the quality as well as the source of data, the level of effort to identify and exclude outliers and variation in methodology being applied.

hard due to exacerbated drought and marginal farmers would not be able to maintain livelihood thrusts by switching technologies to offset moisture stress (Ahmed, 2005). Simultaneously, increased salinity would tend to reduce crop suitability throughout the southwestern region and perhaps appear to be a deterring factor for industrial activities in the affected areas (Ahmed, 2005).

A northward shift in isohaline lines under climate change would compound the already alarming effect of water logging in the southwestern region (Ahmed et al., 2007). It has been reported that the SST along the northern Indian Ocean (i.e., Bay of Bengal) has gradually been rising steadily (Khole, 2005). Though there is no evidence that the frequency of occurrence of cyclone along the Bay of Bengal has actually changed over the past five decades due to rising SST, it is argued by Ali (1999) that cyclone intensity might be increased by as high as 10% due to increased warming.

It is reported by Ahmed and Neelormi (2007) that there is a strong correlation between increasing SST and the occurrence of too many rough sea events³⁴ in the recent years. Coastal fisher folks are not only facing extreme challenges to maintain livelihoods due either to incomplete fishing trips or to too many days lost for not being able to fish in the open sea, many have been tried to out migrate and faced extreme conditions in foreign jails. According to Nishat (2009), high wind actions have been causing economic damage to fisher folks by quickly damaging the traditional boats.

High wind actions have been eroding sea-facing coastal islands, even embankments located far inland than the open sea (Ahmed, 2008). Sudden breaches in embankments have been destroying standing crops, inundating crop lands with saline water, thereby diminishing economic potential of the coastal lands, and forcing poor people to out-migrate from the affected areas by destroying their livelihoods (Ahmed and Neelormi, 2008). The cases of Gabura and Padmapukur Union of Satkhira District have been providing evidences of increased wave actions due to increased SST.

It is rather premature to infer whether there is any increase in frequency of high intensity cyclones along the Bay of Bengal. There are many decadal-scale return periods of occurrence of high intensity cyclones, without the effect of higher SST. However, the contribution of higher SST cannot be completely taken out of the influence of it causing the occurrence of recent major cyclones such as Sidr (November, 2007).

23.3.2 Gaps in knowledge regarding climate change related risks

There is no systematic analysis on future climatology by using globally acknowledged climate models useful at regional scales (i.e., below 50 X 50 km² grid). Moreover, the monthly averaged outputs provided by the GCMs and much simplified nested RCMs (that too, without any validation procedure) cannot be utilized for agro-meteorological advisory. The gap, therefore, appears too big considering its economic and social implications.

Due to absence of localized hydrological analyses, it appears too difficult to project how the discharge requirement of certain chainage in any river would be changed under which climate scenario. Therefore, it appears too difficult to understand infrastructure vulnerability, especially in view of exacerbated floods.

³⁴ Identified by the issuance of signal # 3 by the port authority in Cox's Bazar and Mongla in order to save lives of people in the sea for various reasons/occupations, as per guidance of the Standing Orders on Disasters (MODM, 1998).

The health related understanding is also too limited. The only analysis on human health did not consider the effect of general increase in population, which is why the results of increased intensity of diarrhea and malaria due to rising temperature provide inconclusive results. The lack of health related data is a limiting factor, especially in terms of gender and age-segregated information is completely missing. Such gaps in data need to be addressed quickly.

The performance of agriculture sector, especially the crop production sub-sector cannot be properly understood due to two contrasting features contributing simultaneously. In one hand, the modernization of agricultural practices including agronomic behaviour of farmers is contributing immensely to the increase in overall production despite loss of prime agricultural lands, and on the other hand, the interplay between general background warming and enhancement of photosynthetic conditions through the rise in CO₂ concentration might be giving rise to both positive and negative results in aggregate crop production. It is never certain which element is dominating now and more importantly, will dominate in the future. The performance of crop production sector under various climate scenarios will have to be appreciated better in order to maintain food security in the future.

Appendix 23.IX: Perceived Adaptation and Mitigation Responses to Climate Change In Bangladesh

The Government of Bangladesh is keen on responding to the climate change challenge. GOB has expressed its intention to adapt to climate change whenever possible and to consider 'low carbon development' pathways towards contributing to a global effort to reduce emission load of greenhouse gases in the atmosphere. While both the strategies are necessary, it is widely recognized that if the global effort to curb greenhouse gas emission does not make much of a difference in the atmospheric load of such gases, the adaptation efforts of Bangladesh would not really ensure safety to its lackluster population who are likely to face the brunt of climate change.

23.4.1 Global response- unfccc and kyoto protocol

As the evidence and impacts of climate change became increasingly clear through studies and research and deliberations at the global and national levels became clear, demand arose for doing something about it. The first definitive action came in 1992 at the UN Conference on Environment and Development held in Rio de Janeiro. The Conference established the United Nations Framework Convention on Climate Change (UNFCCC, or, Convention) which came into force in 1994. Countries which have signed the Convention and ratified are called Parties (192 in number). A Conference of Parties (COP) takes place every year. The upcoming Copenhagen COP is COP 15.

Linked to the Convention, a protocol has been signed in 1997 in Kyoto (hence called Kyoto Protocol, or, KP) which came into effect much later in 2005. The KP is a legally binding instrument under which industrialized countries committed themselves to a lowering of emission on an average of 5% below the 1990 level. The first commitment period ends in 2012. The KP has several market-based instruments to lower emission. Its main drawbacks are the low level of commitment and the exclusion of the USA, the largest emitter country. In fact, the KP targets have been hardly achieved. Many countries actually have overshoot the 1990 level emission.

It is against such a background that the COP 13 had been held in Bali. It stands out as a landmark and the present negotiations have much to do with the decisions taken in Bali. The post-Bali submission of Bangladesh remains the watershed against which later activities including the integration of CC issues in planning for development have to be judged. The COP 17 in Durban, South Africa decided to take the Kyoto Protocol in its Second Commitment Period, however only a few countries have committed to the renewed targets under the second commitment period which accounts for about 12% of total greenhouse gases in the atmosphere. In Durban, a COP decision was taken to reach a binding agreement by 2015 with a timeline of implementation of emission reduction starting 2020.

23.4.2 The bali action plan and subsequent developments

The COP 13 in Bali saw some path-breaking changes in the negotiations for mitigation (i.e.,

emission reduction). The decision 1/CP 13 or the Bali Action Plan (BAP) calls for a global shared vision and enhanced actions on 4 areas, mitigation (i.e., emission reduction), adaptation, finance and technology transfer and development as well as capacity development. The most interesting were the decisions 1(b)(i) and 1 b(ii) which dealt respectively with mandatory mitigation commitment by developed country parties and voluntary mitigation actions by developing country parties. All country parties are expected to reduce emission. Much of the debate that is going on since then revolves around these two provisions, the conditions under which these should be operational, the relationships of these with the commitments under KP beyond 2012 and of course the level of reduction pledged given the scientific evidence that there has to be drastic cuts in emission and its peaking within a few years (2015 to be exact).

At the same time, however, there has been some substantial progress in adaptation talks, how these can be facilitated and the resources that might be necessary, how to generate those and how to allocate the available resources among the adversely affected countries equitably. There has also been progress in technology transfer and development issues. While nothing is final yet, it is almost certain that substantial resources will flow under different circumstances, bilaterally and multilaterally, for adaptation and also for mitigation. Bangladesh will have to prepare itself for utilizing such funds in the most effective way to quicken her process of development. And this has to be within the Bali Action Plan and Bangladesh's own ideas regarding the operationalisation of the Bali Action Plan.

23.4.3 Operationalising bali action plan in bangladesh context

The BAP makes it clear that the developing countries responsibilities and actions have to be looked at within the framework of sustainable development. Bangladesh in subsequent submission regarding how to operationalise the BAP, has put it in terms of ensuring four types of security. These are food security, water security, energy security and livelihood security (including health). Given that agriculture is expected to be heavily adversely affected, food security becomes the most important issue for Bangladesh. On the other hand, much of what happens to various sectors due to climate change relates to water, too much or too little of it or its spatial distribution between and within years. Furthermore, water is also a shared natural resource for Bangladesh with some of the country's neighbours which calls for regional actions for ensuring availability. Water security is thus absolutely essential. Livelihood security relates to the ultimate well-being of the people without which development is meaningless. As health becomes a major issue under climate change, this is also included as part of well-being under climate change.

The issue of energy security is interesting in Bangladesh context. Given that bangladesh is low energy consumer while she needs energy in increasingly for development, the country must be allowed to consume as much energy as necessary for development. While this may seem obvious, a potential conflict may arise with the decision 1b(ii) under BAP which calls upon all developing countries to contribute as their situations permit to lower emission which means in many cases lowering energy consumption. But this may conflict with the right to development. Bangladesh has made it clear that while she will use energy in the most efficient way, she will not compromise with her need for energy for development. Indeed, the four securities are inviolate principles of development which has been later incorporated in the Bangladesh Climate Change Strategy and Action Plan to which we now turn as the precursor of planning under climate change.

23.4.4 Bangladesh climate change strategy and action plan, 2008 and 2009

Bangladesh prepared the Bangladesh Climate Change Strategy and Action Plan (BCCSAP) in 2008 and revised it in 2009. This is now an approved document of the Government. This is expected to be the blue print for subsequent integration of climate change issues such as mitigation, adaptation, technology transfer and development, and capacity building into the mainstream planning process.

The BCCSAP takes the Bangladesh submission on Bali Road Map, particularly the 4 securities, as the starting point and develops a strategy of sustainable development centred around the issue of climate change. Note that the strategy and action plan does not say anything about the non-CC related development strategy for planning. In fact, as has become apparent, all our development thinking and practice from now on has to centre around CC even when it is not affected by CC because the resource envelop for CC-centred planning will have obvious implications for allocations to non-CC projects and programmes.

On the basis of the 4 securities, the strategy is to safeguard the development prospects of Bangladesh in a way that the country becomes a middle-income one by 2021 and achieves the targets under MDGs as fast as possible. Under the action plan, there are six major themes and 44 programmes (Table 23.1). The very first relates to ensuring food and livelihood security. The programmes mainly fall under development of crop varieties and development of technology suitable for agricultural production under various adverse climatic conditions that are likely to obtain in future. Three of the themes including food and livelihood security fall under adaptation which is the prime need of the country. The other two adaptation programmes relate to construction and maintenance of necessary infrastructure, particularly those related to water management. The third important area is disaster management as disaster risk reduction and post-disaster rehabilitation are going to engage a lot of energy and resources of the country due to climate change.

Two of the themes fall under cross-cutting issues of capacity development and research and knowledge management. The last one is extremely important because, a lot of the possible impacts of climate change are still unknown and uncertain. Continuous research will be necessary for understanding the unfolding situations as well as development of country-specific solutions to the emerging problems or adapting technology imported from elsewhere. It must be noted that many of these activities already exist in some form. What is needed is their consolidation and reorientation to the purpose at hand.

The last in the list of major theme is low carbon development and mitigation. Here again the reference is to the decision 1b(ii) of the BAP. The developing countries are expected to develop their Nationally Appropriate Mitigation Action the implementation of which is contingent upon provision of financial resources and technology. Bangladesh expects to pursue a path of energy-efficient development path and seek resources and technology for the purpose. But this will not be at the expense of the required consumption of energy.

In Bangladesh the operational aspects of planning is to prepare the so called annual development programme (ADP) which lists the investment and capacity building programmes and projects prepared and implemented under public management. If the BCCSAP is to be implemented these programmes will also have to be part of the ADP as well as the private investment program either on a stand alone or a partnership basis. A clear understanding of the present characteristics of the ADP as well as the extent of private investment from the view point of CC is therefore needed.

The higher growth rate in the Perspective Plan is predicated upon a substantial increase in the investment rate in the economy from the current level of 24.7% of GDP to 38% by the end of the Plan, averaging 32.7% of GDP per year during the Plan period. Much of the increase in investment could be financed through national savings, and foreign direct investment (FDI). The incremental Capital Output Ratio (ICOR) is expected to improve due to increased competitiveness and productivity engendered through expected improvements in infrastructure and greater economic openness as well as through technological progress resulting from partnership with foreign investors in strategic areas and the implementation of the ICT strategy (digital Bangladesh).

Table A-63: Key Macroeconomic Indicators

	Benchmark FY09	Target FY15	Target FY21
Real GDP Growth (%)	6.1	8.0	10.0
As per cent of GDP			
Gross Investment (%)	24.2	32.1	37.5
Gross National Savings (%)	30.0	27.0	30.0
Total government revenue (%)	11.45	15.5	17.1
Total government expenditure (%)	15.92	20.5	21.8
Exports (billion US\$)	14.76	36.3	91.1
Imports (billion US\$)	23.74	49.6	131.3
Remittances (billion US\$)	10.9	22.7	48.5
Unemployment rate (%)	30.0	20.0	15.0
Poverty (head count, %)	31.5	22.5	13.5

Source: Perspective Plan projections

Growth in real GDP will rise to 8.0 per cent in 2015, and then to 10.0 per cent in 2021, to provide the required reduction in unemployment and poverty and improve people's living standards. While factor accumulation, especially capital, will act as the major stimulus to growth, for which gross investment rate will rise to about 38 per cent of GDP in 2021, productivity growth will begin to play an increasing role and is expected to contribute about 20 per cent of economic growth by 2021. The new initiatives proposed in the areas of education, IT, R&D and science and technology will be key to this outcome. Along with pursuing a high growth strategy, measures will be taken to ensure that fast growth does not lead to serious imbalances in fiscal operations, inflation, or balance of payments. The private sector will be the leading agent in raising economic growth, and public investment will be restructured to become more effective in promoting growth and development. Although the domestic savings rate has improved, it needs to be further geared up for which several strategies will be adopted, e.g. reforms in the financial system to provide easy access of rural population and small savers to formal financial institutions; and low inflation to facilitate more savings.

Above all, high growth will have to be inclusive and pro-poor so that its benefits reach all sections of the population. The thrust on employment generation, promotion of human resource development, and wider network of safety nets for the poor, elderly and disabled population will address this objective.

24.3 Public revenue and expenditure strategy

Bangladesh has one of the lowest tax-GDP ratios in the world and the ratio has not improved much over the last several decades despite the pickup in real GDP growth. Low revenue productivity aside, tax evasion remains high. The target is to raise the contribution of direct taxes to the total tax revenue to 40 per cent in 2021. In recent years, Bangladesh's tax collection has recorded an impressive growth averaging 25% per annum. Reform measures undertaken in the areas of income tax, VAT and customs have contributed to a positive turnaround at the National Board of Revenue (NBR). The NBR has undertaken a comprehensive organizational renewal program that seeks to put in place an efficient, effective, fair and responsive tax regime which is benchmarked against international best practice. The reform will review and modernize both tax policy (tax laws and statutory rules) and tax administration (business process, organizational design, human resources policies, taxpayer services etc.). The strategies to collect the required public revenues shall include:

- Broadening of the tax base, raising both direct and indirect taxes with appropriate rationalization and reforms;
- Modernization of the VAT and income tax administration, including computerization of tax administration and much greater reliance on accounts based audit will play central roles in this regard.
- Strengthen the professional and technical capacity of the revenue administration to monitor potential tax payers, countering tax evasion, and making available strengthened and effective services to tax payers to raise tax compliance;
- Deepen organizational and other reforms of revenue collecting organizations to transform into quality institutions to meet the revenue needs, service requirement of tax payers, and facilitation of productive activities.

In general, a pro-poor bias is observed in public expenditure due to large spending in relative terms on social sectors including education, health, social safety nets. Total public expenditure is, however low at around 14 per cent of GDP which is not enough to meet the public sector's expanding needs. In addition, the need during the Perspective Plan will be to make the budget an effective instrument of economic management. The thrust will be to make public expenditure more pro-poor; gender sensitive and environment friendly; to improve the effectiveness of public spending; and to establish accountability and transparency of public expenditure.

24.4 Inflation control

Bangladesh has generally succeeded in maintaining reasonable price stability. Occasional spikes in the inflation rate arose mainly as a result of supply disruptions due to natural disasters, and global price shocks. Since high inflation, especially led by food price inflation directly hurts poor people, the target will be to maintain a moderate rate of inflation of around 5-7 per cent per year by ensuring well coordinated monetary and fiscal policies; improvements in productivity; attention to supply augmentation; enhanced public sector role and strengthened competition policies.

24.5 Monetary management for growth and stability

Monetary management will play a central role in ensuring macroeconomic stability and allocating adequate levels of credit for private sector economic activity/expansion. Effects will be made to broaden and deepen stock market and reduce dependence on credit finance transaction. Thus the key objective of the monetary policy during the Plan period will be to allow monetary aggregates to expand in a manner consistent with the growth and inflation targets envisaged under the Plan. Consistent with this strategy, broad money (M2) in nominal terms is projected to increase at around 16% percent per annum in line with GDP growth rates and inflation targets.

Ensuring adequate levels of domestic credit for the private sector over the Plan period, within the aggregate limits of the targeted broad money expansion will require containing credit to the government (net) and other public entities within reasonable limits. The fiscal deficit targets under the Plan, while sustainable will however require sizable new borrowing from the banking system. If needed, the Government may have to seek additional external financing to avoid any crowding out of the private sector. Particularly important in this respect will be to limit credit to the loss making public enterprises which would potentially crowd out private sector credit and at the same time lead to the accumulation of nonperforming assets of the state-owned commercial banks.

In addition to the existing policies to attract Foreign Direct and Portfolio Investments, the introduction and promotion of newer dimensions in credit and equity markets, such as debt trading and debt securitization, venture capital and private equity funds, will be promoted. Moreover crop insurance for agriculture and partial guarantee scheme for SME will be initiated such that SMEs can raise money from the market.

24.6 Exchange rate policy for external stability

Bangladesh Bank has been following a flexible market-based exchange rate policy since the adoption of the floating exchange rate regime in 2003. This policy has generally served the economy very well by allowing the rate to be determined in the interbank foreign exchange market with some interventions from Bangladesh Bank to minimize the exchange market volatility. This policy has enabled Bangladesh Bank to ensure stability in the exchange rate, primarily against the US dollar, while at the same time enabling it to build up foreign exchange reserves to a very comfortable level.

The policy of exchange rate flexibility with limited interventions to ensure market stability will be continued during the Plan period. While maintaining the exchange market stability, the rate will be allowed to be determined by economic fundamentals and taking into account the objective of maintaining comfortable reserve levels throughout the Plan period. The Government will follow a policy that will ensure satisfactory level of reserve taking into account the international economic environment. Given the balance of payments outlook, characterized by moderate external current account deficits and surpluses in the overall balance, there should not be any major instability in the exchange market. The current comfortable reserve position of Bangladesh Bank should help fending off any speculative pressure in the exchange market. The comfortable external position will also allow Bangladesh Bank to consider easing some of the

capital accounts restrictions in a phased manner. Such a phased liberalization of the capital account, in a stable macroeconomic and strong external environment, would help boost investor confidence in the economy and promote inflow of FDI.

24.7 Investment to boost productivity and growth

Productivity growth accounting reveals a modest contribution (about 8 per cent per annum) thus far of technological change to growth in Bangladesh. Improvements in total factor productivity contributed as much as 25-50 per cent of post World War II growth in East Asia, and in the recent high growth of some neighboring countries. This will therefore be a major potential growth source for Bangladesh as well, over and beyond the Plan period.

By 2021, total factor productivity enhancement is needed to contribute about 20 per cent of economic growth in Bangladesh. The strategies for productivity enhancement include

- Initiatives planned in education, Information Technology, Science and Technology, Research and Development. Innovations in production techniques and processes will be promoted and supported. There will be co-ordination in public and private sector programmes and initiatives; and there will be joint public and private sector collaboration initiatives wherever appropriate.
- Integration and coordination of input-output activities in the agriculture, and inter-sectoral allocations among these agriculture, industry and service sectors.

24.8 Public investment

One of the major problems Bangladesh economy is facing today is the stagnation of the overall level of investment in the domestic economy. Aggregate investment has stagnated in the 24%-25% of GDP range in recent years compared with the national savings rate of 30%². Although private sector investment has been increasing at a pace slightly above the rate of growth of GDP, a secular decline in public investment in relation to GDP largely offsets that, keeping total investment broadly stagnant in relation to GDP. The declining trend in public investment in relation to GDP is a matter of concern. Past difficulties in ADP implementation prevented the government from investing in many critical areas such as infrastructure and agriculture. Over the years the infrastructure gap has been widening and has become a binding constraint by choking Bangladesh's economic growth potential. It has also become clear that the past practice of relying solely on the ADP for providing the required infrastructure must give way to the adoption of Public Private Partnership arrangements in delivering large infrastructure projects. Strategy to improve investment environment:

Remittance is treated as saving. However, the recipients of remittance use the receipt for consumption as well as investment. Reflection of the use of the remittance by the recipients can remove the discrepancy of investment being lower than saving.

- To ensure the quality of spending and better ADP implementation, all ministries are being brought under the Medium Term Budget Framework (MTBF). The planning and budgeting processes are being strengthened to improve the quality of public investment.

- In addition to launching a bigger ADP in relation to GDP during the plan period, the Plan also envisages bigger public sector investment in infrastructure programs under the newly approved PPP framework. The Government has also announced a major initiative for boosting power generation and expand power distribution network to alleviate the ongoing energy crisis in the country.

24.9 Private investment

As in the past, much of the additional increase- in the growth of investment is projected to come from the private sector. The growing share of private sector investment during the last two decades reflects favorable private sector response to the improved investment climate. However, the rate of growth of private sector growth in investment has slowed down in recent years due to infrastructure constraints which tended to intensify on account of declining public investment and the inability of the public sector to undertake large infrastructure projects.

Against this backdrop, public investments and policies outlined above would create the necessary investment climate and heighten investors' (both national and foreign) confidence to undertake the required investments. Some key areas of improvement in this respect are: (i) energy supply including electricity and gas; (ii) infrastructure including roads, railways, bridges, embankments and dykes; (iii) telecommunications; (iv) ports; (v) legal and administrative systems including property rights issues; (vi) socio-economic environment including law and order situation; and (vii) sound monetary policy and sustainable management of public finances.

24.10 Savings mobilization for higher investment

The sharp rise in investment projected in the plan period will be largely supported by a significant increase in national savings. National savings, comprising domestic savings and inflow of workers' remittances, have been on a rising trend owing to increased domestic saving but also because of rapid growth in the inflow of remittances. Building on the recent positive performance on the national savings front, the Plan aims to increase national savings rate by 9.1 percentage points to 39.1 % of GDP. The increase in national savings projected under the Plan will depend on the continued growth in remittances, albeit at a slower pace, as discussed in the balance of payments section below. Improved investment climate and more attractive rates of return on domestic investment, in part augmented by increased demand for investment, would also encourage transfer of savings held by expatriate Bangladeshi workers abroad. A part of the increased national savings would come from the public sector through increased revenue mobilization efforts.

24.11 Reducing poverty and inequality

The poverty profile measured by head count ratio using the cost of basic needs approach revealed that 31.5 per cent of the 2010 population, lived below the poverty line. It also indicated a 1.8 per cent annual poverty decline between 2005 and 2010. At this rate, the head count ratio of national poverty will stand at 22.5 per cent of the population in 2015, thereby achieving one of the major MDGs. The projected higher growth of around 9.2 percent during FYI 6 and FY21 is expected to reduce head count poverty rate to about 13.5 percent of 2021 population. Anti-

poverty, anti-inequality measures need to target removal or reduction of inequalities in advancing opportunities for people in different income brackets. This particularly includes targeting the opening of blocked advancement opportunities for disadvantaged rural and urban poor people. These cross sectoral issues and measures are dealt within the various relevant chapters of this Plan document. For Bangladesh to reach middle income country by FY21, the following key economic indicators have to address:

Box A-31: Key Economic Indicators

- Real GDP Growth
- Nominal GDP Growth
- CPI inflation (average)
- Gross investment, Private, Public
- National savings
- Total revenue
- Tax, Non Tax
- Grants
- Total expenditure , Current expenditure
- ADP (PPP + Public entitles)
- Other expenditure
- Overall balance (incl. grants)
- Overall balance (excl grants)
- Primary balance
- Financing, External, Domestic
- Total debt, External debt

24.12 Strategy for food security: agriculture and rural development

Strategic Goals

Ensuring food security for the poor is a fundamental objective of the Government. It involves the physical availability of food at all times and its access to all at affordable prices. Seventy per cent people of Bangladesh live in rural areas and draw their income and employment from agriculture and related activities. Food security is ensured through an optimal level of stock, by undertaking special programmes for subsidized food marketing (e.g. OMS) in poverty and disaster prone areas in times of scarcity and while maintaining a public food distribution system.

Agricultural land is limited and is reducing at 1 per cent per annum. Modern methods of production, including water resource management, high yielding drought and submergence resistant seeds, increase in land productivity through efficient irrigation, flood control and drainage, are among the key factors in achieving a higher level of self-sufficiency in food production to feed the ever increasing population and to save foreign exchange for food imports. Future growth in agricultural production will depend, among other things, on increase in irrigation efficiency. Therefore, water resource management is a crucial issue to ensure self-sufficiency in food production. Despite a spectacular increase in food production, Bangladesh has faced persistent challenges in achieving food security due to:

- i. natural disasters and consequent crop losses;
- ii. fluctuations in food prices caused by volatility in the international markets;
- iii. failure to steady maintenance of domestic stocks;
- iv. inept monitoring of markets to prevent syndication that creates an artificial scarcity of food items and increases prices; and
- v. absence of income generating activities that could add to the purchasing power of poor people.

With a view to enhance agriculture production and ensuring food security, the target is that, by 2021, food deficiency will be eliminated and the country will attain self-sufficiency in food production enabling to meet nutritional requirement of the population. The crop sector accounts for 12 per cent of GDP, 60 per cent of the agricultural value addition and occupies over three-quarters of the cropped area. Rice production tripled from 11 million tonnes in 1972 to 32 million tonnes in 2009. The other major crops are jute, wheat, potato, rapeseed/mustard, pulses, chillies, onions, vegetables, sugarcane, tobacco, tea and cotton. Jute is showing signs of re-emergence in the global market. Maize production has been increasing in an agro ecological environment and has been a feed for the expanding poultry industry. Potato and vegetable production has also made good progress. For food security, agriculture and rural development, the following challenges have to be addressed:

- Rice production must increase by over 300,000 tonnes annually to feed the additional population.
- Growth-induced demand due to high income elasticity, according to the National Commission of Agriculture Report, will mean a 3.1 per cent increase in demand for food crops for every 7 per cent growth in GDP.

Source: Perspective plan of Bangladesh 2010-2021, Making Vision 2021 A Reality, General Economic Division, Planning Commission, July 2012, Dhaka.

Appendix 24.0.2
Salient Features of Sixth Five
Year Plan FY 2011-2015

Appendix 24.0.2: Salient Features of Sixth Five Year Plan FY 2011-2015

24.2.1 Development context

Over the past 40 years since independence, Bangladesh has increased its real per capita income by more than 130 percent, cut poverty by more than half, and is well set to achieve most of the Millennium Development Goals. Bangladesh's development experience is particularly remarkable in that it stands out as a positive example of a resilient young nation that has fought many natural and global disasters as well as internal political debacles and yet stayed firm on the development path. Notwithstanding many external and internal shocks, per capita income has risen continuously and steady progress has been made in lowering poverty. This positive development experience provides the basis for optimism, notwithstanding the many remaining policy and institutional constraints and the global uncertainties, that Bangladesh will continue to make efforts in improving the living standards of its citizens.

24.2.2 Growth of income

Bangladesh witnessed decades of slow economic growth until 1990. Growth rate started to rise since early 1990s. During the first decade of the 21st century, the average economic growth rate approached 6 percent per annum (**Table A-64**).

Table A-64: Growth performance in the Five Year Plans

Plan period	Annual average growth (%)	
	Target	Actual
First five year plan (FY73-FY78)	5.5	4.0
Two year plan (FY78-FY80)	5.6	3.5
Second five year plan (FY80-FY85)	5.4	3.8
Third five year plan (FY85-FY90)	5.4	3.8
Fourth five year plan (FY90-FY95)	5.0	4.2
Fifth five year plan (FY97-FY02)	7.0	5.1
FY02-FY06		5.5
FY06-FY10		6.3

Source: Bangladesh Bureau of Statistics

24.2.3 Poverty reduction

Poverty is the single most important socio-economic policy challenge for Bangladesh. It has been striving for a long time to reduce the incidence of poverty and to improve the living standards of its millions of impoverished citizens. Bangladesh has made substantial progress in reducing poverty, where the percent of population living below the poverty line went down from more than 80 percent in early 1970s to 31.5 percent in FY10 (**Table A-65**).

Table A-65: Headcount Poverty Rate (%)

Year	Rural	Urban	National
FY74	82.9	81.4	
FY82	73.8	66.0	
FY92	61.2	44.9	58.8
FY96	55.2	29.4	51.0
FY00	52.3	35.2	48.9
FY05	43.8	28.4	40.0
FY10	35.2	21.3	31.5

Source: Bangladesh Bureau of Statistics

The decline in poverty in Bangladesh stems in large part from strong economic growth over the past two decades. The economy's expansion during the 1990s - On average, annual GDP increase of almost 5 percent - meant a rise in real, per capita GDP of 36 percent or twice the average rate of other low-and middle-income countries in the same decade. This impressive performance was fueled by growth in real GDP in the manufacturing sector where the output of export-oriented, ready-made garment (RMG) enterprises grew by double-digit. Also, the remarkable growth in the inflow of remittances helped reduce poverty by supporting the expansion of construction and services GDP and by providing a strong safety net Bangladesh has also made significant strides in the area of human development, though the agenda remains far from complete.

24.2.4 Human development

In the education sector, there is notable progress, especially in regard to increasing access and gender equity, both at primary and secondary levels. Net primary enrollment rates rose from 61 percent in FY91 to 91 percent in FY06, while a corresponding increase in enrollment rates at the secondary level rose to 41 percent from 28 percent. Gender parity in access to primary and secondary education has also been achieved. These achievements are particularly noteworthy when compared to countries in the South Asia region and other countries at similar levels of per-capita income.

Notable progress has also been achieved in health indicators over the last 40 years. The total fertility rate (TFR) declined from 7 live births per woman in the mid 1970s to about 2.7 children per woman in 2007, while the contraceptive use rate has increased from 7.7 per cent to 55.8 per cent during the same period. Life expectancy has increased from 46.2 years in 1974 to 66.6 years in 2007. Though remarkable improvements have been made in reducing infant and child mortality, Bangladesh is behind in meeting MDG targets on proportion of malnourished children.

24.2.5 Employment

Employment provides the key link between economic growth and poverty making it the major instrument for poverty reduction in Bangladesh. Labor force (age 15 +) in Bangladesh increased from around 19.7 million in 1974 to 49.5 million in 2006, the latest available year for Labor Force

Survey (LFS). That gives an annual long term trend growth rate of 2.9 percent (Figure 1.2). The labor force growth rate was more expansive in recent years owing to the changing demographic structure of higher share of population in the working age group as well as a rising female participation rate. Thus, the average annual growth of labor force between 2000 and 2006 was 3.3 percent.

As compared to labor force, employment grew at a slightly slower pace of 2.8 percent annually. As a result, the unemployment rate, traditionally defined, increased modestly, 15 reaching 2.1 million people, which is about 4 percent of the labor force. This relatively modest unemployment rate, however, hides the true employment challenge in Bangladesh. Like other poor agrarian economies, Bangladesh suffers from what is known as the problem of "disguised unemployment" that is characterized by the concentration of a large number of workers in low hours, low productivity, and low income jobs. These disguised unemployed are engaged in agriculture and informal services.

24.2.6 Millennium development goals (MDGS)

The MDGs reflect the actions and targets contained in the Millennium Declaration that was adopted by 189 nations during the UN Millennium Summit in September 2000. Bangladesh has made noteworthy progress in the attainment of MDGs during 2000s. Bangladesh's advancement towards MDGs is evident in human development, for example attainment of gender parity in primary and secondary school enrolment.

The end of the Sixth Plan coincides with the terminal year for the MDGs (2015). This provides an opportunity to take stock of progress with MDGs so far and undertake corrective actions in areas where progress is lagging. A review of progress shows that Bangladesh has covered significant grounds and can safely be said to be on track in relation to most of the targets (**Table A-66**). Bangladesh is making strides in reducing poverty, already brought down the poverty gap ratio to 6.5 against 2015 target of 8 with the rate of poverty reduction being 1.44 percent in relation to the required rate of 1.23 percent. With regard to targets such as expansion of primary and secondary education, infant and child mortality rate, containing the spread and fatality of malaria and tuberculosis, reforestation, access to safe drinking water and sanitation latrines especially in urban areas, Bangladesh has done remarkably and may well reach several of these targets before the stipulated time. The country has already achieved gender parity in primary and secondary education.

However, among the challenges that Bangladesh faces, improving maternal health is a major concern. Maternal mortality, although currently on track, should be monitored closely. The country is also struggling in terms of forest cover and maintaining protected areas, specially the wet lands, for bio-diversity. Access to safe drinking water and sanitary latrines particularly in the rural areas is another aspect where greater attention is required. Yet another challenge that Bangladesh faces is in addressing certain pockets of poverty that are lagging far behind with respect to the national averages and where the benefits of MDGs attainment need to be specifically reached. These areas include the urban slums, the hill tracts, coastal belts and other ecologically vulnerable areas.

Table A-66: Status of Millennium Development Goals in Bangladesh

	Base year 1990-95	2000-02	Current 2005-10	Target 2015	Status
Goal 1: Eradicate Extreme Poverty and Hunger	Goal will probably be met				
<i>Target 1: Halve by 2015 the proportion of people living below the poverty line</i>					
Poverty headcount ratio (2010)	59	50	31.5	29	On Track
Poverty Gap Ratio (2010)	17	13	6.5	8	Goal met
<i>Target 2: Halve by 2015 the proportion of people who suffer from hunger</i>					
Prevalence of child malnutrition (percent of children under 5)	68	51	45	33	Off Track
Population below minimum level of dietary energy consumption (percent)	28	...	20	14	On Track
Goal 2: Achieve Universal Primary Education	Goal will probably be met				
<i>Target 3: Ensure that all boys and girls complete a full course of primary schooling</i>					
Net enrollment ratio in primary education	61	83	91	100	On Track
Percentage of cohort reaching grade 5 (percent)	43	...	55	100	Needs attention
Adult literacy rate	37	39	58	--	Needs attention
Goal 3: Promote Gender Equality and Empower Women	Goal will probably be met				
<i>Target 4: Eliminate gender disparity in primary & secondary education preferably by 2005 & at all levels by 2015</i>					
Ratio of girls to boys in primary and secondary education (percent)	77	104	106	100	Achieved
Ratio of girls to boys in tertiary education (percent)	37	32	32	100	Needs attention
Ratio of literate females to males (percent of ages 20 - 24)	65	77	85	100	Needs attention
Share of women employed in the non- agricultural sector (percent)	19	...	25	50	Needs attention
Goal 4: Reduce child mortality	Goal will probably be met				
<i>Target 5: Reduce by two thirds by 2015 the under 5 mortality rate</i>					
Under 5 Mortality Rate (per 1000)	146	82	54	50	On Track
Infant Mortality Rate (per 1000 live births)	92	56	41	31	On Track
Immunization, measles (percent of children under 12 months)	54	69	82	100	On Track
Goal 5: Improve Maternal Health	Goal will probably be met				
<i>Target 6: Reduce by three quarters, by 2015, the maternal mortality ratio</i>					
Maternal Mortality Ratio (per 100,000 live births)	574	400	194	143	On Track
Births attended by skilled health staff (percent of total)	5	12	24	50	Needs attention
Goal 6: Combat HIV/AIDS, malaria and other diseases	Goal will probably be met				

Target 7: Have halted by 2015 and begin to reverse the spread of HIV/AIDS					
Contraceptive Prevalence Rate (percent of women ages 15-49)	40		60	72	Needs attention
Target 8: Have halted by 2015 and begin to reverse the incidence of malaria and other major diseases					
Deaths of malaria per 100,000 population	1.4	...	0.4	0.0	Needs attention
Incidence of tuberculosis (100,000 people)	264	233	225	Halving	Needs attention
Tuberculosis cases detected under DOTS (percent)	21	34	74	75	On Track
Goal 7 : Ensure Environmental Sustainability	Goal will probably be met				
Target 9: Integrate the principles of sustainable development into country policies and reverse the loss of environmental resources					
Productive forest area (%) (70 % tree density)	9	10	13	20	Needs attention
Consumption of ozone depleting CFCs (per capita tonnes)	195	0.0	128	0	Needs attention
Proportion of terrestrial and marine areas protected	1.6	--	1.7/0.5	5.0	Needs attention
CO2 emissions (tonnes per capita)	0.1	0.2	0.3	...	Needs attention
Target 10 : Halve, by 2015, the proportion of people without sustainable access to safe drinking water and sanitation					
Proportion of urban population with access to safe drinking water	98.8	82.0	99.9	100	On Track
Proportion of rural population with access to safe drinking water	93.1	72.0	79	96.5	Needs attention
Proportion of urban population with access to sanitary latrines	56.2	56.0	88.0	85.5	On Track
Proportion of rural population with access to sanitary latrines	15.3	29.0	85.0	55.5	On Track
Target 11: By 2020, have achieve a significant improvement in the lives of at least 100 million slum dwellers					
Proportion of households with access to secure tenure	...	...	36.4	...	Insufficient data
Goal 8: Develop a Global Partnership for Development	Goal will probably be met				
Target 12 : Develop and implement strategies for decent and productive work for youth					
Youth unemployment rate (percent of total labor force ages 15 24)	2.9	8.0	13.4	...	Needs attention
Target 13 : Make available the benefits of new technologies, especially information and communication					
Fixed line and mobile telephones (per 100 people)	0.2	1.3	13.6	50	On Track
Internetusers (per 100 people)		0.2	3.4	...	Insufficient data

Source: UNDP 2009, Bangladesh Bureau of Statistics HIES 2010 and Bangladesh Planning Commission.

24.2.7 Income inequality and regional disparities

While rapid growth has helped reduce poverty substantially, there are two negative developments associated with the growth process that need attention and better management. First, there is evidence of growth in income inequality. And second, evidence also suggests that there are significant regional disparities of growth and development outcomes.

There is considerable concern in Bangladesh about the growing income inequality. It is revealed that the distribution of income is much more unequal than the distribution of consumption. Income inequality as measured by the gini coefficient for the distribution of income rose substantially during the 1980s and the 1990s. During 2000 and 2005 the income gini coefficient increased further from 0.451 to 0.467 due to an increase in rural income inequality. Thus, the rural income gini coefficient increased from 0.393 in 2000 to 0.428 in 2005. The urban income gini coefficient remained unchanged at 0.497. However, the latest data show that income gini coefficient at the national declined slightly to 0.458 in 2010 though it was still higher than the level in 2000. The urban income gini coefficient also declined to 0.452 and it was lower than the level in 2000. On the whole, income inequality is a serious problem in Bangladesh and reversing the trend in a sustainable manner will be a major challenge for the Sixth Plan.

Bangladesh development experience also shows considerable spatial differences. Broadly speaking, the Divisions of Barisal, Khulna and Rajshahi show higher poverty and lower income growth than the Divisions of Chittagong, Dhaka and Sylhet.

24.2.8 Sixth plan core targets in the context of vision 2021

Notwithstanding past progress with poverty reduction, the Government recognizes that Bangladesh is still a low income developing country. An estimated 47 million people are living below the poverty line. Most of the labor force is engaged in informal low productivity and low income jobs. The access to secondary and tertiary education is limited and the quality of education at all levels is deficient. The poor group in Bangladesh is severely disadvantaged in terms of ownership of assets and has inadequate access to institutional finance as well as to basic services including quality education, healthcare, water and sanitation. This group of people is also disproportionately affected by natural disasters and the adverse effects of climate change. Publicly supported mitigating measures in the form of social protection programs are inadequate.

In recognition of these substantial development challenges, recently the Government has embarked on a Perspective Plan covering 2010 to 2021 aimed at implementing Vision 2021. The key message of Vision 2021 and the associated Perspective Plan is summarized as follows.

The broad development goals underlying the Perspective Plan include:

- building a secular tolerant liberal progressive democratic state
- promoting good governance and curbing corruption
- promoting sustainable human development
- reducing the growth of population
- instituting a prudent macroeconomic policy mix
- promoting a favorable industrialization and trade policy regime
- addressing globalization and regional cooperation challenges
- ensuring adequate supply of electricity and fuel
- achieving food security

- making available adequate infrastructure
- pursuing environmental friendly development and
- building a digital Bangladesh

Nevertheless, the objectives and targets of the two plans to be implemented [i.e. the Sixth Five Year Plan (FY11-FY15) and the Seventh Five Year Plan (FY16-FY20)] within the purview of the Perspective Plan period must be consistent with the visions, objectives, and targets contained in the Perspective Plan.

A number of core targets have been identified to monitor the progress of the Sixth Plan. These targets have been set according to the vision and objectives of the perspective plan as well as the goals of the Millennium Development Goals¹. The achievement of these targets by the end of the Sixth Plan should likely put Bangladesh on course to realize most of the objectives of the Vision 2021 and MDG goals. These targets fall in seven broad categories: (i) Income and Poverty; (ii) Human Resource Development (iii) Water and Sanitation; (iv) Energy and Infrastructure, (v) Gender Equality and Empowerment; (vi) Environment Sustainability; and (vii) Information and Communications Technology (ICT). Brief descriptions of the targets under each of these broad categories are given below. **Table A-67** summarizes the targets for the Sixth Plan against targets of the 'Vision 2021' and the MDGs.

I. Income and Poverty

- Attaining average real GDP growth rate of 7.3% per year over the Plan period.
- Reduction in the head-count poverty ratio by about 10 percentage points.
- Creating good jobs for the large pool of under-employed and new labor force entrants by increasing the share of employment in the industrial sector from 17 percent to 25 percent.
- Increasing the contribution of factor productivity in economic growth to 10 percent.
- Overseas employment of skilled labor to be increased from 35% to 50%

II. Human Resource Development (Education, Health and Population)

- Achieving 100 percent net enrollment rate for primary education.
- Increasing enrollment rate in 12th class to 60%.
- Percentage of cohort reaching grade 5 to be increased to 100 from current 55 percent.
- Under 5 mortality rate to be reduced to 50 per 1000 live birth.
- Infant Mortality Rate to be reduced to 31 per 1000 live birth.
- Maternal Mortality Ratio to be reduced to 143 per 100,000 live births.
- Immunization, measles (percent of children under 12 months) to be increased to 100 percent.
- Births attended by skilled health staff to be increased to 50 percent.
- Reduction of Total Fertility Rate to 2.2
- Increasing Contraceptive Prevalence Rate to 72 percent.

III. Water and Sanitation

- Safe drinking water to be made available for all urban population.
- Proportion of rural population with access to safe drinking water to be increased to 96.5 percent.
- Proportion of urban population with access to sanitary latrines to be increased to 100 percent.
- Proportion of rural population with access to sanitary latrines to be raised to 90 percent.

IV. Energy and Infrastructure

- Generation of electricity to be increased to 15,457 MW by FY15 such that the target of 20,000 MW electricity generated by FY21 is attained
- Electricity coverage to be increased to 68 percent.
- To increase energy efficiency by 10%
- Improve railways and waterways as energy efficient multi-modal transport system to reduce carbon emission.
- Production of natural gas to reach about 4500 mmcft by December 2015
- Optimizing domestic production of primary energy resources including renewable energies.
- Expanding access of the poor to primary and secondary energy sources through affordable pricing and targeted distribution.
- Construction of 6.15km. long Padma Multipurpose Bridge at Mawa-Janjira;
- Construction of about 26 km. long Dhaka Elevated Expressway.

V. Gender Equality and Empowerment

- Female to male ratio in tertiary education to be raised from current 32 percent to 60 percent.
- The ratio of literate female to male for age group 20-24 to be raised to 100 percent from the current 85 percent.

VI. Environmental Sustainability

- Increase productive forest coverage by 2 percentage points.
- Improve air quality in Dhaka and other large cities and enacted Clean Air Act
- Treat all urban waste water by FY15 to clean river waters
- Promote Zero discharge of industrial effluents.
- Urban wetlands are restored and protected in line with Wetland Conservation Act
- At least 10% of the wetland in peak dry season is protected as aquatic sanctuary
- Jolmahal leasing system phased out in favor of pro-poor community based management
- Risk Atlas for at least 7 cities/towns developed by 2015.
- 500 meter wide permanent green belt established and protected along the coast
- Eco-tourism promoted at least in 15 protected areas and ECAs
- Comprehensive Marine Resources Management Plan developed
- Land zoning for sustainable land/water use completed.
- Environmental, Climate Change and disaster risk reduction considerations are integrated into project design, budgetary allocations and implementation process.
- Canals and natural water flows of Dhaka and other major cities restored.

VII. Information and Communications Technology (ICT)

- Increase public spending on Research and Development to 1 percent of GDP by FY15 and 1.4 percent by FY 21.
- Establish compulsory ICT education at secondary level by FY13 and extend it to the primary level by FY21.
- Establish tele-centre /community e-centre with internet facilities at all union level.
- Establish computer laboratory at the primary government school with 5 computers per school.
- Introduce of E-governance at all executive levels of government and at all district level.
- Introduce electronic GD and FIR at all Police Stations in Dhaka.
- Raise telephone density to 70 percent.o Expand Broad Band to 30 percent.

- Expand Broad Band to 30 percent.
- Introduce Wireless Broad Band (Wi Max) across the country.
- Introduce digitalization of land records

These targets may appear ambitious but with concerted efforts they are achievable. The development experience of Bangladesh is a testimony to the dynamism and resilience of a young nation. Despite the massive development challenges and constraints that Bangladesh faced immediately after independence, the country has successfully pushed ahead with many aspects of the development agenda. Some of these remarkable achievements include:

- Reducing Total Fertility Rate from 7.0 in mid-1970s to 2.7 by 2007
- Increasing life expectancy from 46.2 years to 66.6 in 2007
- Increasing the rate of economic growth from an average rate of 4% in the 1970s to 6% in the 2000s
- Increasing the savings and investment rates from below 10 percent each in the 1970s to 24 percent (investment rate) and 30 percent (savings rate) in FY10
- Cutting the incidence of poverty by 60% between the mid 1970s and FY10
- Achieving gender parity in primary and secondary education
- More than tripling of the production of rice (from 10 million tonnes in FY73 to 32 million tonnes in FY10) thereby achieving near self-sufficiency in normal production years.

Admittedly, the future development challenges are more complex in terms of the governance and institutional development agenda. The extremely high population to land ratio is a major limiting factor. Additionally, the adverse effects of environmental degradation and climate change pose substantial downside risks. Similarly, the global recession and food and fuel price inflation present significant risks. Even so, with a dynamic population, strong political leadership and a commitment to addressing the underlying governance and institutional development agenda, Bangladesh is well poised to push ahead with the implementation of Vision 2021.

Table A-67: Sixth Five Year Plan (SFYP) Targets

Targets		Current Situation (20052010)	Vision 2021	SFYP 2015	MDGs
A.	Production, Income Generation and Poverty				
1.	Real Income Growth (%)	6.1	10	8.0	
2.	Head Count Poverty (%)	31.5	14	22	29
3.	Industrial Sector Employment	17	30	25	
4.	Contribution of Productivity to Economic Growth (%)	8	20	10	
5.	Overseas employment of skilled labor (%)	35	20	50	
B.	Human Resource Development (Education, Health and Population)				
6.	Net Enrolment at Primary Level (%)	91		100	100
7.	Enrollment Rate in 12thClass (%)		100	60	
8.	Percentage of cohort reaching grade 5 (%)	55		100	100
9.	Total Fertility Rate Reduction	2.7	1.8	2.2	
10.	Increase Contraceptive Prevalence Rate (%)	60	80	72	
11.	Under 5 Mortality Rate (per 1000)	62		50	50

12.	Immunization, measles (percent of children under 12 months)	87		100	100
13.	Maternal Mortality Ratio (per 100,000 live births)	194		143	143
14.	Births attended by skilled health staff (percent of total)	24		50	50
C.	Water and Sanitation				
15.	Proportion of urban population with access to safe drinking water	99.9	100	100	100
16.	Proportion of rural population with access to safe drinking water	79	100	96.5	96.5
17.	Proportion of urban population with access to sanitary latrines	88.0	100	100	85.5
18.	Proportion of rural population with access to sanitary latrines	85.0	100	90	55.5
D.	Energy and Infrastructure				
19.	Electricity Generation (MW)	5803	20000	15457	
20.	Electricity Coverage (%)	47	100	68	
E.	Gender Equality and Women Empowerment				
21.	Ratio of girls to boys in tertiary education (%)	32		60	100
22.	Ratio of literate females to males (percent of ages 20-24)	85		100	100
23.	Female Overseas Employment Rate (%)	5%	20%	10%	
F.	Environment Sustainability				
24.	Productive Forest Coverage (%) (70 % tree density)	13	20	15	20
G.	ICT				
25.	Research and Development Spending/GDP (%)	0.6	1.4	1	
26.	Compulsory ICT Education (education levels)		5	12	
27.	Tele-centre/Community centre with Internet facilities at unions (%)		100	100	
28.	Computer laboratory at the primary government school		20	5	
29.	Increase tele density (%)		90	70	
30.	Expansion of Broad Band Coverage (%)		40	30	

Source: Current situation data are obtained from various sources (i.e. Perspective Plan, BBS, and the Planning Commission). Targets for Vision 2021 are collected from the Perspective Plan. MDG Targets are provided by UNDP. Targets for Sixth Plan are estimates. The 10 percent GDP growth for 2021 refers to end of period.

24.2.9 Sixth five year plan strategy

Table A-67 summarizes the targets for the Sixth plan against targets of the 'Vision 2021' and the MDGs. At the operational level the fundamental task of the SFYP is to develop strategies, policies and institutions that allow Bangladesh to accelerate growth and reduce poverty. Poverty is still pervasive. In developing the strategy for higher growth, employment, and poverty reduction and the Sixth Plan will draw on the lessons of past experience.

Acceleration of Economic Growth and Employment:

An essential pre-requisite for rapid reduction of poverty is to attain high economic growth ensuring sustainable productive employment and incomes for large number of people of Bangladesh. Productive employment is the most potent means of reducing poverty. But this is not easily achieved. This requires strategies and actions on the demand side of the labor market (driven primarily by economic growth) as well as strategies and policies on the supply side (labor force growth and quality).

Benefiting From Higher Labor Force Growth (The Demographic Dividend) and Ensuring Labor Quality

Although Bangladesh is currently experiencing 'demographic transition' as a result of slower population growth, entry of young population in the labor force will continue due to demographic factors. This demographic dividend needs to be properly used through a well articulated human development strategy. The quality of labor force is weak due to low access and low quality of education. The Sixth Plan will seek to address these challenges by developing and implementing a well thought out education and training strategy.

Improving Factor Productivity Through Information Technology

Although factor accumulation (i.e. of labor and capital) would be the main source of economic growth in the Sixth Plan, strong efforts will be made to increase the contribution of total factor productivity in all areas of production including manufacturing, agriculture and services. Among the contributing policies is the introduction of appropriate information and communication technology (ICT). One of the central visions of the Perspective Plan is 'Digital Bangladesh' where it is conceived that through the successful implementation of the vision of the ICT policy and its principles it will be possible to build a 'Digital Bangladesh' by 2021.

Reducing The Growth of Population

In additional to the focus on economic growth and employment, strong attention needs to be given to reducing the further growth of population. Notwithstanding past progress with the reduction of growth of population,

Ensuring Food Security

The emphasis on productivity improvements will be particularly helpful in reconciling food security objectives with farmer incentives. In case of food production, climate change adaptation strategy in the agriculture sector will be prioritized to tackle the global food insecurity susceptibility due to climate change. The achievements of goals under the three dimensions of food security - availability, access and utilization, will be facilitated by the implementation of the National Food Policy and its Plan of Action and the Country Investment Plan (CIP) 2010-2015.

Addressing The Land Constraint

Future growth strategy must take this binding constraint into account in order to ensure its sustainability. Efforts to reduce the growth of population will help, but better management of land is of paramount importance for sustaining rapid GDP growth in Bangladesh. The main goal of the government's land use policy and management is to ensure best possible use of land resources and delivery of land related services to the people through modernized and efficient land administration for sustainable development with accelerated poverty reduction.

Managing The Spatial Dimensions of Growth

Growth experiences in Bangladesh and elsewhere show both a tendency towards urbanization as well as uneven pattern of regional growth. The urbanization problem has become particularly acute in Bangladesh owing to the primacy of Dhaka. The unbalanced growth of Dhaka shows both a large concentration of wealth and income as well as unsustainable pressure on Dhaka's already fragile infrastructure. Concerning regional disparities, the divisions of Dhaka, Chittagong and Sylhet seem to do better in terms of both growth and poverty reduction as compared with Rajshahi, Khulna and Barisal. The Sixth Plan will make efforts to address both these spatial dimensions of growth. On the urbanization front the strategy will emphasize a more balanced growth of urban centers across the entire country through proper institutional reforms that involves the establishment of locally elected and accountable municipalities and city corporations. Regarding regional disparities, the Plan would strive to address the lagging regions problems, especially focused on Khulna, Rajshahi, and Barisal Divisions, through a strategy that involves public expenditure in infrastructure and human development, by improving the access to financial services, by promoting international labor migration from these divisions, and by facilitating more trade and investment in the border districts with neighbors including India.

Reducing Income Inequality

Inequality emerges from a combination of greatly unequal distribution of physical assets as well as human capital. Accordingly, the Sixth Plan's strategy to reduce income inequality will follow a two-prong strategy. First, it will include efforts to increase the access of the poor to assets and means of production. And second, it will strengthen the delivery of human development services to the poor.

Ensuring Social Protection For The Under-Privileged Population

The Sixth Plan aims at significantly strengthening the social protection programs. The strategy will be to design and implement a range of social protection programs that meets the needs of this under-privileged group. In this regard, existing programs will be reviewed and reformed to establish better targeting with a view to ensuring that all under-privileged groups including the disable, the elderly, the tribal population, and children and women at risk are given priority in the distribution of benefits. Particular attention will be given to strengthening the underlying institutions.

Ensuring Gender Parity

Establishing equal opportunities for women in all sections of the society with an objective of integrating them into social and economic sphere is a major strategic element underlying the Sixth Plan. The Sixth Plan strategy embeds the critical role of women in nation building and thus ensures that their needs, rights, entitlements and contributions are appropriately reflected in the Plan document. The human development and social protection strategies underlying the Plan will place particular emphasis on gender aspects of development. It is also recognized that women are a heterogeneous groups such that their situations, deprivations, and needs vary according to their locations within various communities, religions, and regions. Thus, along with promoting rights and entitlements of women, Sixth plan envisages to cater to all these differential and specific requirements.

Ensuring Environmental Sustainability

A key element of the strategy of the Sixth Plan is a firm commitment to pursue an environmentally sustainable development process. Thus, the focus of the Sixth Plan's environmental protection strategy would be the conservation and maintenance of natural resources, reducing air and water pollution, and liberating encroached rivers, water bodies, forest areas and khas land.

Bangladesh is a victim of climate change caused by rapid urbanization, industrialization and economic development activities worldwide. Bangladesh will be adversely affected by climate change in the form of melting of Himalayan glaciers, global warming and rising sea level, intensified natural calamities, and greater water scarcity leading to loss of livelihood, rising unemployment and poverty. Therefore, effective steps must be explored and adopted in collaboration with the international community within the Sixth Plan period to mitigate the adverse consequences of climate change.

Improving Governance

Proper implementation of the Plan requires attention to good governance, public administration capacity and monitoring and evaluation. Fundamental reforms of core institutions, improvement in public administration capacity and a strong anti-corruption strategy, the ability to implement Vision 2021 and the underlying five year development plans will be needed. A strong M&E capacity is an urgent national priority.

For the Sixth Plan the governance improvement strategy will consist of focus on a number of key areas that require immediate attention and strengthening of a number of core institutions.

- First, efforts will continue to ensuring equality of opportunity and full mobility for all with freedom and dignity, and without religious, social or political barriers.
- Second, good governance requires not only rule of law but also harmony and consistency of the laws. Good laws are a sine qua non of the rule of law. Review of the laws and their proper implementation will be considered as a priority. The capacities and efficiency of the law enforcing agencies and the judiciary will be strengthened.
- Third, to provide better and speedier service and to improve the transparency and accountability of public service agencies, priority will be given to the implementation of e-governance through the implementation of the Digital Bangladesh initiative.
- Attention will be focused on developing and strengthening a number of core public institutions including the Central Bank, the Ministry of Finance, the Tax Department, the Planning Commission, Audits and Accounts, the parliamentary sub-committees, land administration, and the public utilities.
- Emphasis will be given to improving service delivery in basic services such as education, health, nutrition and water supply.
- Steps will be taken to strengthen public administrative capacity by reforming the civil service.
- Emphasis will be placed in developing capacities of local governments to play their development role in terms of delivery of basic services.
- Efforts will be made to implement the medium-term budgetary framework in all line ministries and to institute and implement an effective results-based Monitoring and Evaluation (M&E) system for public programs.
- All efforts will be made to reduce corruption in public services and take appropriate actions when corruption happens in an open and transparent manner.

Enhancing Administrative Capacity

The Sixth Plan's strategy for public administration capacity development and efficiency improvement consists of four pillars: strengthening the civil service; promoting devolution to local governments; strengthening public-private partnerships; and strengthening planning and budgetary processes.

Strengthening The Civil Service

The basic features of the reform strategy includes merit-based recruitment and promotion; strong training; ensuring a proper incentive and work environment; establishing and enforcing clear rules of business and codes of conduct; and seeking feedback on performance through a citizen's charter.

Establishing Strong Local Governments

The strengthening of local governments is a key institutional development challenge for Bangladesh. The Plan is committed to instituting an effective and accountable local government to help implement Vision 2021 and the programs of associated development plans.

Strengthening Public Private Partnerships (PPP)

Through a well-defined policy framework, private initiatives would be encouraged to promote quality service delivery in the area of essential economic infrastructure. The Government is keen to encourage private investments in energy and power, roads, waterways, railways, ports, water and sanitation, telecommunications/ICT, housing and tourism. The Government will also consider expanding the scope of PPP further in the social sector. The positive experience of collaboration with NGOs in the delivery of basic education, health and population management services will be further enhanced.

Improving The Planning and Budgetary Processes

One major initiative is the implementation of a move away from the traditional incremental budgeting towards a medium term budget framework (MTBF) process. The MTBF is intended to support the implementation of development plans by (i) ensuring that the government's fiscal management contributes to macroeconomic stability and supports an enabling environment for economic growth and poverty reduction; and (ii) adequate public resources are allocated through a more strategic and policy-led budget planning process directed towards priority programs identified in the context of the approved medium-term development plan. A second initiative is to move away from the traditional public-investment focused plans to more strategic and indicative planning that puts emphasis on strategies, programs and policies for the entire economy. A third initiative is to link better the medium-term development plans to the MTBF process by making the plan a living document with annual review of performance.

The Sixth Plan will further improve the planning and budgetary processes by building on the above initiatives. Specifically, following actions will be taken:

- The Sixth Five Year Plan already makes a fundamental shift in the planning process by moving towards an indicative plan and focusing much more deeply on growth, employment and poverty reduction strategies, policies and programs. This indicative plan will serve as a living document through instituting a system of annual review of development performance and plan implementation.

- The capacities of line ministries will be substantially strengthened to do proper planning and budgeting in the context of the implementation of the MTBF.
- Project approval process will be strengthened and streamlined to reduce delays and proliferation of tiny projects.
- Project approval at the Planning Commission level will be substantially strengthened. All projects that go to the Planning Commission must provide a proper appraisal report along with sound analysis that shows the consistency and relevance of the project to sectoral/economy-wide objectives, strategies and policies. The appraisal report will do proper economic and financial analysis of the proposed project, do gender and environmental analysis as relevant, and show an implementation plan while providing clear evidence of implementation capacity.
- Proliferation of projects and long implementation lags are a perennial problem. The Sixth Plan will seek to undertake a proper review of all approved and active projects in the pipeline in cooperation with the line Ministries. The review of this portfolio stock will seek to clean out dormant or irrelevant projects and help line ministries close the projects that are facing implementation problems through restructuring or through other relevant interventions. The results of this exercise will be shared with the cabinet for endorsement and approval.
- The technical capacities of the Ministry of Finance and the Planning Commission will be substantially strengthened through proper staffing and training to ensure the timely implementation of the Sixth Plan and the MTBF. All efforts will be made to strengthen coordination between these two core ministries with a view to avoiding duplication, overlap and delays.

Establishing A Results-Based Monitoring and Evaluation (M&E) System

The proper implementation of the Plan will require careful monitoring and evaluation of the underlying policies and programs. In the past the focus has been on monitoring public spending in terms of achieving financial targets. In the Sixth Plan the emphasis will shift to the monitoring of results. To achieve this, the capacities of the Planning Commission and the line ministries to undertake results-based M&E will be strengthened. This will entail adopting proper M&E Frameworks, improving the database, and strengthening technical skills. This Framework will be monitored by GED under the guidance of the Minister for Planning. The findings will be properly disseminated to all stakeholders to ensure the usefulness of this endeavor.

Appendix 24.0.3: Salient Features of MDGs

Introduction

Building on the United Nations global conferences of the 1990s, the United Nations Millennium Declaration of 2000 marked a strong commitment to the right to development, to peace and security, to gender equality, to the eradication of the many dimensions of poverty and to sustainable human development. Embedded in that Declaration, which was adopted by 147 heads of State and 189 states, were what have become known as the eight Millennium Development Goals, which are as follows :

- Goal 1: Eradicate Extreme Poverty & Hunger
- Goal 2: Achieve Universal Primary Education
- Goal 3: Promote Gender Equality and Empower Women
- Goal 4: Reduce Child Mortality
- Goal 5: Improve Maternal Health
- Goal 6: Combat HIV/AIDS, Malaria and Other Diseases
- Goal 7: Ensure Environmental Sustainability

Goal 8: Develop a Global Partnership for Development

In line with the Millennium Declaration, to monitor progress towards the goals and targets, the United Nations system, including the World Bank and the International Monetary Fund, as well as the Development Assistance Committee of the Organisation for Economic Co-operation and Development, came together under the Office of the Secretary-General and agreed a set of time-bound and measurable goals and targets to assess progress over the period from 1990 to 2015. This is known as "Road map towards the implementation of the United Nations Millennium Declaration", the framework which consisted of 8 goals, 18 targets and 48 indicators to measure progress towards the MDGs. However, from January 2008, the following 21 targets and 60 indicators have been used to monitor the MDGs:

Table A-68: Millennium Development Goals (MDGs)

Goals and Targets	Indicators for monitoring progress
Goal 1: Eradicate Extreme Poverty and Hunger	
Target 1.A: Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day	1.1 Proportion of population below \$1 (PPP) per day 1.2 poverty gap ratio 1.3 Share of poorest quintile in national consumption
Target 1.B: Achieve full and productive employment and decent work for all, including women and young people	1.4 Growth rate of GDP per person employed 1.5 Employment-to-population ratio 1.6 Proportion of employed people living below \$1 (PPP) per day 1.7 Proportion of own-account and contributing family workers in total employment
Target 1.C: Halve, between 1990 and 2015, the proportion of people who suffer from hunger	1.8 Prevalence of underweight children under five years of age' 1.9 Proportion of population below minimum level of dietary energy consumption

Goal 2: Achieve Universal Primary Education	
Target 2.A: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling	2.1 Net enrolment ratio in primary education 2.2 proportion of pupils starting grade 1 who reach last grade of primary school 2.3 Literacy rate of 15-24 year-olds, women and men
Goal 3: Promote gender equality and empower women	
Target 3.A: Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015	3.1 Ratios of girls to boys in primary, secondary 3.2 Share of women in wage employment in the non-agricultural sector 3.3 Proportion of seats held by women in national parliament
Goal 4: Reduce Child Mortality	
Target 4.A: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate	4.1 Under-five mortality rate 4.2 Infant mortality rate 4.3 Proportion of 1 year-old children immunised against measles
Goal 5: Improve Maternal Health	
Target 5.A: Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio	5.1 Maternal mortality ratio 5.2 Proportion of births attended by skilled health personnel
Target 5.13: Achieve, by 2015, universal access to reproductive health	5.3 Contraceptive prevalence rate 5.4 Adolescent birth rate 5.5 Antenatal care coverage (at least one visit and at least four visits) 5.6 Unmet need for family planning
Goal 6: Combat HIV/AIDS, Malaria and other Diseases	
Target 6.A: Have halted by 2015 and begun to reverse the spread of HIV/AIDS	6.1 HIV prevalence among population aged 15-24 years 6.2 Condom use at last high-risk sex 6.3 Proportion of population aged 15-24 years with comprehensive correct knowledge of HIV/AIDS 6.4 Ratio of school attendance of orphans to school attendance of non-orphans aged 10-14 years
Target 6.B: Achieve, by 2010, universal access to treatment for HIV/AIDS for all those who need it	6.5 Proportion of population with advanced HIV infection with access to antiretroviral drugs
Target 6.C: Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases	6.6 Incidence and death rates associated with malaria 6.7 Proportion of children under 5 sleeping under insecticide-treated bed nets 6.8 Proportion of children under 5 with fever who are treated with appropriate anti-malarial drugs 6.9 Incidence, prevalence and death rates associated with tuberculosis 6.10 Proportion of tuberculosis cases detected and cured under directly observed treatment short course
Goal 7: Ensure Environmental Sustainability	
Target 7.A: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources	7.1 Proportion of land area covered by forest 7.2 CO ₂ emissions, total, per capita and per \$1 GDP (PPP) 7.3 Consumption of ozone-depleting substances 7.4 Proportion of fish stocks within safe biological limits 7.5 Proportion of total water resources used 7.6 Proportion of terrestrial and marine areas protected
Target 7.B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss	7.7 proportion of species threatened with extinction
Target 7.C: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation	7.8 Proportion of population using an improved drinking water source 7.9 Proportion of population using an improved sanitation facility
Target 7.D: By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers	7.10 Proportion of urban population living in slums

Goal 8: Develop a Global Partnership for Development	
<p>Target 8.A: Develop further an open, rule-based, Official development assistance (ODA) predictable, non-discriminatory trading and financial system Includes a commitment to good governance, development and poverty reduction - both nationally and internationally</p> <p>Target 8.B: Address the special needs of the least developed countries Includes: tariff and quota free access for the least developed countries' exports; enhanced programme of debt relief for heavily indebted poor countries (HIPC) and cancellation of official bilateral debt; and more generous ODA</p> <p>Target 8.C: Address the special needs of landlocked developing countries and small island developing States (through the Programme of Action for the Sustainable Development of Small Island Developing States and the outcome of the twenty-second special session of the General Assembly) developing countries And least developed countries, admitted free of duty</p>	<p>8.1 Net ODA, total and to the least developed countries, as percentage of OECD/DAC donors' gross national income</p> <p>8.2 proportion of total bilateral, sector-allocable nationally and internationally ODA of OECD/DAC donors to basic social services (basic education, primary health care, least developed countries nutrition, safe water and sanitation)</p> <p>8.3 Proportion of bilateral official development assistance of OECD/DAC donors that is untied</p> <p>8.4 ODA received in landlocked developing Countries as a proportion of their gross incomes</p> <p>8.5 ODA received in island developing States as a proportion of their gross incomes</p> <p>Market access</p> <p>8.6 Proportion of total developed country imports (by value and excluding arms) from developing countries and least development countries, admitted free of duty. countries and least developed countries, admitted free of duty</p>
<p>Target 8.D: Deal comprehensively with the debt problems of developing countries through national and international measures in order to countries make debt sustainable in the long term</p>	<p>8.7 Average tariffs imposed by developed countries on ricultural products and textiles and clothing from developing countries</p> <p>8.8 Agricultural support estimate for OECD countries as a percentage of their gross domestic product</p> <p>8.9 Proportion of ODA provided to help build trade capacity</p>
	<p>Debt sustainability</p> <p>8.10 Total number of countries that have reached their HIPC decision points and number that have reached their HIPC completion . points (cumulative)</p> <p>8.11 Debt relief committed under HIPC and MDRI Initiatives</p> <p>8.12 Debt service as a percentage of exports of goods and services</p>
<p>Target 8.E: In cooperation with pharmaceutical ernet users per 100 population companies, provide access to affordable essential drugs in developing countries</p> <p>Target 8.F: In cooperation with the private population sector, make available the benefits of new information and technologies, especially communications</p>	<p>8.13 Proportion of population with access to affordable affordable essential drugs on a sustainable basis</p> <p>8.14 Telephone lines per 100 population</p> <p>8.15 Cellular subscribers per 100 population</p> <p>8.16 Internet users per 100 population</p>

It is encouraging to note that Bangladesh is well on track in achieving the MDG targets in the areas of poverty, net enrolment in primary education, gender parity in primary and secondary education, reducing child mortality & maternal mortality and improving immunization coverage, rolling back malaria and controlling tuberculosis, and improved drinking water supply and sanitation. However, the areas in need of more attention are hunger-poverty reduction and employment generation, increases in the primary school completion rate and adult literacy rate, creation of more decent wage employment for women, increase in the presence of skilled health professionals at delivery, increase in correct and comprehensive knowledge of HIV/AIDS, increase in forest coverage, and coverage of Information and Communication Technology.

**Appendix-29.I:
Assessment of Risks Associated
With Climate Change and Disasters
in an Integrated CDE Framework**

Appendix-29.I: Assessment of Risks Associated With Climate Change and Disasters In an Integrated CDE Framework

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- 5. GENERAL RECOMMENDATIONS AND WAYS FORWARD**
- 6. INTEGRATED ASSESSMENT SUMMARY TABLE FOR THE PROJECT**

APPENDIX-29.II: Key Questions Regarding Enabling Policy and Legal Aspects In Relation to an Integrated CDE Framework

The key questions regarding enabling policy and legal aspects are the following:

Current policy regime

What national/regional policies are there to address climate variability and change? {29.3.1.1a}

What national/regional policies are there to reduce risks of hazards/disasters? {29.3.1.1b}

What national/regional policies are there to address environmental degradation, improve restoration, ensure protection and self-rejuvenation processes of environmental resources? {29.3.1.1c}

Perceived gaps in relation to these policies?

Available legal framework & instruments (29.3.1.2)

What is the legal framework and legal instruments (Laws & Acts) which are in place to address climate variability and change? {29.3.1.2a}

What is the legal framework and legal instruments (Laws & Acts) which are in place to reduce risks of hazards/disasters? {29.3.1.2b}

What are the legal framework and legal instruments (Laws & Acts) which are in place to address environmental degradation, improve restoration, ensure protection and self-rejuvenation processes of environmental resources? {29.3.1.2c}

Real life practices despite the legal regime?

Perceived gaps towards application of such legal instruments?

APPENDIX-29.III: Methodology for the Analysis of Policy And Legal Aspects in Relation to an Integrated CDE Framework

Methods to be Followed

Policy documents need to be collected on each of the three aspects under CDE integrated framework. The following documents will facilitate.

Bangladesh Climate Change Strategy and Action Plan (BCCSAP)	[MOEF, 2009]
Climate Change Section of the Sixth Five Year Plan (SFYP)	[MOP, 2012]
Disaster Management Act 2012	[MODM, 2012]
Standing Orders on Disaster (revised)	[MODM, 2012]
National Environmental Policy and Implementation Plan, 1992	[MOEF, 1992]
Environmental Conservation Rules, 1997	[MOEF, 1997]
Bangladesh Environment Conservation Act, 1995	[MOEF, 1995]
Water Pollution Control Ordinance, 1970	[MOEF, 1970]
Environmental Pollution Control Ordinance, 1977	[MOEF, 1977]
Environmental Court Act, 2000	[MOEF, 2000]
Coastal Zone Policy, 2005	[MOWR, 2005]
National Water Policy, 1999	[MOWR, 1999]
National Agriculture Policy, 1999	[MOA, 1999]
National Forest Policy	
National Wetland Policy	
Wetland Conservation Act, 2000	

Collect the documents. Frame relevant research questions. Find out what gaps exist today in terms policy and legal provisions that might hinder application of the policy and legal instruments. Identify what needs to be done to address such gaps. Identify institution(s) which need to work on such gap areas. Propose steps which might address such institutional shortcomings/gaps.

APPENDIX-29.IV: Key Institutions in Bangladesh Which are Working in Relation to an Integrated CDE Framework

The following are the key institutions³⁵ that are working in CDE and associated areas.

- Asian Development Bank (ADB)
- Bangladesh Academy of Rural development (BARD)
- Bangladesh Agricultural Research Council (BARC)
- Bangladesh Forest Research Institute (BFRI)
- Bangladesh Institute for Development Studies (BIDS)
- Bangladesh Livestock Department
- Bangladesh Meteorological Department (BMD)
- Bangladesh Space Research and Remote Sensing Organization (SPARRSO)
- Bangladesh Water Development Board (BDWB)
- Department of Environment (DOE)
- Department of Fisheries
- Department of Forestry
- Department of Public Health Engineering (DPHE)
- District Administration
- Facilities Department, Ministry of Education
- Flood Forecasting and Warning Centre (FFWC)
- Islamic Development Bank (IDB)
- Local Government Engineering Department (LGED)
- Ministry of Disaster Management (MODM)
- Ministry of Environment and Forest (MOEF)
- Ministry of Local Government, Rural Development, and Cooperatives (MOLGRDC)
- Ministry of Planning (MOP)
- Ministry of Public Works (MOPW)
- Ministry of Women and Children's Affairs (MOWCA)
- Palli Karma-sangsthan Foundation (PKSF)
- Planning Commission (PC)
- Public Works Department (PWD)
- Rural Development Academy (RDA)
- Secretariat of Climate Change Trust Fund
- Union Parishad
- Upazila Administration
- Water Resources Planning Organization (WARPO)
- World Bank (WB)

³⁵ Arranged in alphabetical order, suggesting no hierarchy or priority.

APPENDIX-29-V: Summary of Ecosystem-Specific Impacts and Key Response Measures in Relation to Climate Change In Bangladesh

Table A-69: Summary of Ecosystem-Specific Impacts and Key Response Measures In Relation to Climate Change in Bangladesh

Ecosystem type	Vulnerability contexts within the ecosystem*	CC induced direct & primary effects	Resulting changes	Key Response Measures
Floodplain ecosystem	Subject to occasional to regular flooding Subject to erosion, primarily along major rivers Subject to moderate to slight drought during Rabi season Coastal floodplains (CFP) are affected by salinity CFPs are subject to occasional inundation by tidal actions, wave interactions, and cyclonic storm surge	Rise in temperature (irrespective of seasons) Increased monsoon rainfall Increased runoff & flow volume Decreased dry season rainfall Sea Level Rise along the CFPs Invigorated cyclonic storms Frequently occurring 'low' & 'depressions'	Increase in extent & duration of floods, high intensity floods occurring more frequently High degree of losses and damages (crops, infrastructure, homesteads, manufacturing activities ...) Disruption of WASH efforts Increased spreading of disease vector Disruption of education Occasional food insecurity Increased erosion along erosion-prone rivers Erosion-induced losses and damages (infrastructure, dwellings, ...) Increased drought proneness & crop loss during dry season Increased salinity ingress along the coastal plains, salinization Increased difficulties to find non-saline surface water in coastal plains Increased disease burden due to salinity Increased wave interaction along CFPs (resulting saline inundation) Increased risk of drowning in CFPs Increased loss of livelihoods of coastal fisherfolks	User-friendly dissemination of early warnings on flood Multi-purpose flood shelters Development & extension of flood tolerant crop varieties Enhancing capacity of drainage infrastructure along roads Greater drainage capacity in urban centers in floodplains Relocation of manufacturing units from most vulnerable regions Improved management of FC, FCD, FCDI infrastructure Improved WASH efforts Academic infrastructure to be built/rebuilt above record flood danger levels Geo-engineering based slope protection of raised plinths (dwelling, infrastructure, ...) EWS on riverbank erosion Relocation of erodible valuable/sensitive infrastructure Irrigation to fight drought Improved irrigation/water management (promoting IWD, water conservation, water retention, efficiency, ...) Maintaining increased flow volume in rivers/

Ecosystem type	Vulnerability contexts within the ecosystem*	CC induced direct & primary effects	Resulting changes	Key Response Measures
				<p>rivulets flowing to the sea</p> <p>Searching for sustainable groundwater tables (instead of exhaustible tiny lenses), desalinization of water</p> <p>Artificially breaking capillary action to safeguard standing crops</p> <p>Choosing less water requiring crops in the dry season, choose/promote saline tolerant crops in CFPs</p> <p>Enhanced medical support</p> <p>Refurbishment of weak embankment system (where social acceptance is high)</p> <p>Revisiting design criteria of polders</p> <p>Innovative EWS for coastal fisherfolks to safeguard livelihoods</p> <p>Promote alternative livelihoods where current livelihoods will not remain useful under climate effects</p>
Barind ecosystem	<p>Subject to moisture stress at the root zone of preferred crops (i.e., staples)</p> <p>Lowering of GW table during peak dry season, sustained trends of lowering of piezometric surface of GW table</p> <p>Non-availability of adequate quantum of fresh drinking water due to drying up of hand tube wells</p>	<p>Rise in temperature (irrespective of seasons)</p> <p>Significant decrease in dry season rainfall</p>	<p>Adverse health effects due to deterioration of WASH conditions</p> <p>Much intensified drought leading to crop loss (primarily Boro, also affecting Aman potential)</p> <p>Wheat becoming increasingly non-viable due to incurring high losses</p> <p>Requirement for irrigation water significantly increasing against a reduction in availability of water</p> <p>Tube wells becoming inoperable during peak dry season</p> <p>Food insecurity among PEP households, marginalized groups</p>	<p>Enhanced efforts on WASH</p> <p>Improved health care services (especially at the grassroots)</p> <p>Legal provisioning for Boro-zoning as a function of water availability</p> <p>Development of drought tolerant crops and extension, crop diversification towards less water requiring crops</p> <p>Mobilization towards skill enhancement of people dependent on irrigated crops</p> <p>Excavation/re-excavation of ponds/khals (where possible) for water retention</p> <p>Revitalization of SSN programmes</p> <p>Provisioning of knowledge-driven WASH support to PEP and marginalized groups</p>

Ecosystem type	Vulnerability contexts within the ecosystem*	CC induced direct & primary effects	Resulting changes	Key Response Measures
Haor ecosystem (Sylhet Basin agro-ecosystem)	Subject to Afal (high speed gale) & associated high wave interactions Erosion of raised areas, roadside slopes Inundation of floodplains resulting in (a) non-availability of lands for cropping during Kharif-I, & (b) fish breeding/growing opportunities in open water (beneficial)	Rise in temperature (irrespective of seasons) Early pre-monsoon rainfall & resulting rapid runoff Increased monsoon rainfall Increased runoff & flow volume Decreased dry season rainfall	Increased flash flood risks that diminish crop (i.e., rice) production potential Potential loss of food security following early flash floods Increase in extent & duration of flood (inundation), high intensity floods occurring more frequently (though the overall effect is small compared to that in case of other floodplains) Losses and damages (infrastructure, homesteads, manufacturing activities ...) Afal threatening lives, causing disruption of daily lives Increased erosion of dwellings & unprotected infrastructure Disruption of WASH efforts Increased spreading of disease vector Disruption of education Occasional food insecurity Increased erosion along erosion-prone rivers Erosion-induced losses and damages (infrastructure, dwellings, ...) Increased drought proneness & crop loss during dry season Increased salinity ingress along the coastal plains, salinization Increased difficulties to find non-saline surface water in coastal plains Increased disease burden due to salinity Increased wave interaction along CFPs (resulting saline inundation) Increased risk of drowning in CFPs Increased loss of livelihoods of coastal fisherfolks	Development & dissemination of EWS on flash flood A shift from paddy to other short duration crops Skills enhancement training & market linkage facilitation (value chain) for alternative livelihoods SSN support (food aid) following occasional crop loss Increased WASH support and awareness Slope protection of Haatis/roadside slopes/ other infrastructure (innovative geo-engineering + BAU engineering) Robust communication system to be developed to offer protection during Afal Improved grassroots level health care services Maintenance of submergible embankments (governance aspects) Vegetative protection of haatis, infrastructure (Hijol + Koroch + binna) Dissemination of knowledge towards enhancing tensile strength of bamboo (i.e., protection material) by means of chemical treatment Community efforts towards management of rims (Kanda) of Haatis

Ecosystem type	Vulnerability contexts within the ecosystem*	CC induced direct & primary effects	Resulting changes	Key Response Measures
Char ecosystem	<p>Subject to occasional to regular seasonal inundation/ flooding in parts of chars</p> <p>Subject to both erosion and accretion, primarily in chars of major rivers, resulting in instability of the charlands</p> <p>Subject to sudden coarse sediment deposition (sand casting), resulting in soil composition that is unsuitable for preferred cultivation</p> <p>Poor water retention capacity of the top soils</p>	<p>Rise in temperature (irrespective of seasons)</p> <p>Increased monsoon rainfall</p> <p>Increased runoff & flow volume</p> <p>Decreased dry season rainfall</p> <p>Much invigorated surface evaporation from top soils (much prolonged: October-April timeframe)</p>	<p>Increased severity of bank/edge erosion in the chars</p> <p>Increase in extent & duration of floods, high intensity floods occurring more frequently</p> <p>High degree of losses and damages (crops, infrastructure, homesteads,...)</p> <p>Degradation of WASH infrastructure</p> <p>Increased spreading of disease vector</p> <p>Disruption of education</p> <p>Occasional food insecurity</p> <p>Erosion-induced losses and damages (infrastructure, dwellings, ...)</p> <p>Increased moisture stress & crop loss during prolonged dry season</p> <p>Increased risk of loss of livelihoods due to sand casting</p>	<p>EWS on riverbank erosion</p> <p>Relocation of erodible valuable/sensitive infrastructure</p> <p>User-friendly dissemination of early warnings on flood</p> <p>Multi-purpose flood shelters for humans, killas for livestock relocation during inundation</p> <p>Development & extension of flood tolerant and/or short duration crop varieties</p> <p>Improved WASH efforts, with design components in the infrastructure that are detachable and re-installable as necessary</p> <p>Academic infrastructure to be built/rebuilt above record flood danger levels</p> <p>Geo-engineering based slope protection of raised plinths (dwelling, infrastructure, ...)</p> <p>Pit cultivation system to optimize water use in sandy soils</p> <p>Irrigation to fight moisture stress</p> <p>Improved irrigation/water management (promoting IWD, water conservation, water retention, efficiency, ...)</p> <p>Livelihoods diversification to facilitate out migration in urban centres</p> <p>Academic calendar adjustment according to annual water cycle</p> <p>Administrative, academic and rural market infrastructure built on stilts</p>

Ecosystem type	Vulnerability contexts within the ecosystem*	CC induced direct & primary effects	Resulting changes	Key Response Measures
Coastal ecosystem	Coastal floodplains (CFP) are affected by salinity (which is primarily due to conditions created by the operation of Farakka Dam) Coastal river systems are affected by seasonal distribution of flow CFPs are subject to occasional inundation by tidal actions, wave interactions, and cyclonic storm surge The northward movement of freshwater-saline mixing zone in coastal rivers along with siltation of riverbeds give rise to water logging in certain locations in the SW and SC regions Coastal erosion has been shrinking a few highly populated islands, threatening other islands	Rise in temperature (irrespective of seasons) Increased monsoon rainfall Increased runoff & flow volume in river system Decreased dry season rainfall, flow volume resulting in ingress of salinity (horizontally along the river networks) Sea Level Rise along the CFPs (both horizontal spread and vertical movement through capillary actions) Invigorated cyclonic storms Frequently occurring 'low' & 'depressions' Frequent inundation of low lying rural and urban areas & growth centres Potential overtopping & breach of embankment system (especially during lunar phases & in monsoon)	Occasional floods, water logging having much pronounced coverage High degree of losses and damages (crops, infrastructure, homesteads, manufacturing activities ...) Non-availability of non-saline drinking water, disruption of WASH efforts Increased difficulties to find non-saline surface water in coastal plains Increased spreading of disease vector Disruption of education Crop loss & food insecurity in smallholder households Increased erosion along erosion-prone rivers/sea facing islands Erosion-induced losses and damages (infrastructure, dwellings, ...) Increased salinity ingress along the coastal plains, salinization Increased disease burden due to salinity Increased wave interaction along sea facing unprotected lands (resulting saline inundation) Increased loss of livelihoods & assets (i.e., fishing boats) of coastal fisherfolks	Continued efforts of CPP Increased flow regime to be maintained in the sea going coastal rivers [Ref: NWMP] Multi-purpose cyclone shelters (in accordance with population density) Development & extension of saline tolerant crop varieties (rice + non-rice) Enhancing capacity of drainage infrastructure along polders Greater drainage capacity in urban centers in coastal plains Relocation of manufacturing units from most vulnerable regions Improved management of water infrastructure (i.e., sluice operation, embankment management, etc.) Improved WASH efforts Academic infrastructure to be built/rebuilt above record surge danger levels (leaving adequate draft height underneath) Relocation of erodible valuable/sensitive infrastructure Searching for sustainable groundwater tables (instead of exhaustible tiny lenses), desalinization of water Artificially breaking capillary action to safeguard standing crops Choose/promote saline tolerant crops in CFPs Enhanced medicare support Refurbishment of weak embankment system (where social acceptance is high) Resuscitation of choked khals/rivulets to improve drainage Revisiting design criteria of polders Innovative EWS for coastal fisherfolks to safeguard livelihoods Promote alternative livelihoods where current livelihoods will not remain useful under climate effects Support skills enhancement training & facilitate value chain towards diversifying livelihoods Facilitate safe out-migration through policies, skills enhancement & advocacy

APPENDIX-29.VI: Key Governance Issues in Relation to Considerations for an Integrated CDE Framework

Governance Challenges in an Integrated CDE Framework

Key question in this analysis are (for each management response measure, as perceived):

- Who decides response measures?
- Who loses out?
- Who gains from such decisions?
- What are social repercussions?
- Who might be the whistle blower (in each case)?
- How to ensure her/his safety while addressing social and environmental safety?
- Will it be difficult to leave any of the perceived risks without any treatment due to inadequate/poor governance structure and practices?
- What alternatives are there to address the same issue differently?

Answers to this set of questions are narrative and cannot be quantified. However, these will allow the manager to try to find alternative measures. If the risks are too high and compok-up and/or impasse while implementing the project activities. funding, affecting long term sustainability or benefit streams in the longer run, the proponent might even abandon the idea and define the project by avoiding the potential impasse.

Monitoring and Oversight in an Integrated CDE Framework

Since the project activities, functioning and outcomes might pose risks in relation to CDE aspects, the project must consider a reiterating process of self- as well as third party periodic monitoring scheme (depending on the assessed CDE risks). A regular oversight modality must be established from the proponent's side in order to protect interests of the country as a whole. The proponent here describes the governance aspect of monitoring as well as oversight measures that will address any potential hick-up and impasse while implementing the project activities.

APPENDIX-29.VII: Glossary of Environment Related Terms

Acidification: The decrease of acid neutralizing capacity in water, or base saturation in soil, caused by natural or anthropogenic processes. Acidification is exhibited as the lowering of pH, which can adversely affect aquatic life (For more, please consult Brönmark and Hansson 1998).

Admixing: The dilution of topsoil with subsoil, spoil or waste material, with the result that topsoil quality is reduced.

Adverse: Effect Impairment of or damage to the environment, human health or safety or property.

Airshed Describes: the geographic area requiring unified management for achieving air pollution control.

Alkalinity: (1) The quality or state of being alkaline; the concentration of hydroxyl (OH) ions. (2) A measure of the ability of water to neutralize acids. It is measured by determining the amount of acid required to lower the pH of water to 4.5. In natural waters, the alkalinity is effectively the bicarbonate ion concentration plus twice the carbonate ion concentration, expressed as milligrams per liter calcium carbonate.

Alluvium (Alluvial Deposit): Material such as clay, silt, sand and gravel deposited by modern rivers and streams.

Ambient: The conditions surrounding an organism or area.

Ambient Air: The air in the surrounding area.

Ambient Sound Level: All noises that exist in an area (where the project related activities are carried out or planned, as in the EIA report). Ambient noise includes sound from other industrial noise not subject to this directive, transportation sources, animals and nature.

Ambient Noise: The noise in the environment, other than the noise from the source of interest.

Amendment (Soil): (1) An alteration of the properties of a soil, and thereby of the soil, by the addition of substances such as lime, gypsum, manure, and sawdust to make the soil more suitable for the growth of plants. (2) Any substance used for this purpose. Technically, a fertilizer is also an amendment but the term "amendment" is used most commonly for added materials other than fertilizer.

Angle of Repose: Angle between the horizontal and the maximum inclination (slope) that soil and overburden materials or rock fragments and sand particles assume through natural processes.

Anion: An ion carrying a negative charge of electricity.

Anthropogenic: Coming from or having been caused by man.

Aquifer: An underground water-bearing formation that is capable of yielding water.

Aquatic: Growing, living in or frequenting water; occurring or situated in or on water.

Aquatic Biota: Organisms that live in or frequent water.

Aquatic Ecosystems: (1) The biological community and the non-living environment functioning together as a system in water bodies. (2) Aquatic habitat for interrelated and interacting communities and populations of plants and animals.

Archaeology: The scientific discipline responsible for studying the unwritten portion of man's historic and prehistoric past.

Armouring: Channel erosion protection by covering with protection material (e.g., rip rap, gabions, etc).

Atmospheric Attenuation: The effect of sound absorption by moisture in the air.

Attenuation: A reduction in the amplitude or energy of a signal, such as might be produced by passage through a filter.

A-Weighted Sound Level: A measurement of overall Sound Pressure Level which accounts for the frequency content of the measured sound and assesses it with a frequency response similar to that of the human ear.

Backfill: (1) The operation of refilling an excavation. (2) The material placed in an excavation in the process of backfilling.

Background: An area not influenced by chemicals released from the site under evaluation or other impacts created by the activity on the site under evaluation.

Background Concentration (Environmental) : The concentration of a chemical in a defined control area during a fixed period before, during or after data gathering.

Background Noise: The noise in the environment, other than the noise from the source of interest.

Background Sound Level: All noises that exist in an area. Background noise includes sound from other industrial noise, transportation sources, animals and nature.

Backwater: Discrete, localized area and exhibiting reverse flow direction and generally lower stream velocity than main current. Substrate similar to adjacent channel with more fines.

Baghouse: Dust collection technology using central vacuum system and enclosure with individual fabric bags or cartridge filters.

Barrier Diffraction: The effect of an acoustical shadow created by building or landform interposed between a source and a receiver.

Baseline: A surveyed condition that serves as a reference point on which later surveys are coordinated or correlated (For more, please consult Beanlands and Duinker 1983). The baseline scenario includes existing environmental conditions, existing and approved projects or activities (EIA Terms of Reference).

Basic Nighttime Sound Level (BSL): The A weighted Leq sound level commonly observed to occur in the designated land-use categories with industrial presence. The BSL in the initial building block from which the PSL is determined.

Bathymetry: The measurement of water depth at various places in a body of water; also: the information derived from such measurements.

Bedrock: The solid rock that underlies soil and the regolith or that is exposed at the surface.

Benthic Invertebrates: Invertebrate organisms living at, in or in association with the bottom (benthic) substrate of lakes, ponds and streams. Examples of benthic invertebrates include aquatic insect species (such as caddisfly larvae) that spend at least part of their life stages dwelling on bottom sediments in the rivers and lakes. Many benthic invertebrates are major food sources for fish.

Benzene: The simplest aromatic hydrocarbon; formula C₆H₆. The benzene molecule is a closed ring of six carbon atoms connected by bonds that resonate between single and double bonds. Benzene and its derivatives are known as aromatic compounds. The liquid is volatile, insoluble in water but miscible in all proportions with organic solvents. Benzene has a long history of use in the chemical industry as a solvent and as a starting compound for the synthesis of a variety of other materials, and is now also used extensively in the rubber, paint, and plastic industries. The liquid is volatile and emissions are regulated as a toxic air pollutant.

Berm: A linear mound or wall of overburden materials used to retain substances or to prevent substances from entering an area.

Biodiversity: Totally of the richness of biological variation, ranging from within species genetic variation, through subspecies and species, to communities, and the pattern and dynamics of these on the landscape.

Biological Indicators: Any biological parameter used to indicate the response of individuals, populations or ecosystems to environmental stress.

Biomass: The weight of all living material in a unit area or volume at a given instant in time and can be expressed at different biological levels (e.g., population, community).

Biome: A major community of plants and animals such as the boreal forest or the tundra biome.

Biotic: The living organisms in an ecosystem.

BOD: The measure or quantity of oxygen used in aquatic environments for the biochemical oxidation of organic matter under specified conditions. An indirect measure of biologically degradable organic material.

Bottom Sediments: Those sediments that make up the bed of a body of running or still water.

Buffer: (1) An area designated to be undisturbed by an industrial activity. Buffers may preserve environmental features (e.g., river banks), provide safety (e.g., beside pipelines or buildings) or protect property (e.g., roads, property lines). (2) A transitional area between two different land uses that mitigates the effect of one land use on the other.

BWQG: Bangladesh Water Quality Guidelines. Numerical concentrations or narrative statements recommended to support and maintain a designated water use in Bangladesh. Such concentrations have legal implications. The guidelines contain recommendations for chemical, physical, radiological and biological parameters necessary to protect and enhance designated uses of water.

Calcination: The process of heating a substance to a high temperature but below the melting or fusing point, causing loss of moisture, reduction or oxidation, and dissociation into simpler

substances. The term was originally applied to the method of driving off carbon dioxide from limestone to obtain lime (calcium oxide).

CALPUFF: California Puff model, used to estimate ambient concentrations of substances in air, and deposition of those substances (e.g., acid deposition).

CO2e: CO2 equivalents. An expression of the total amount of greenhouse gases in the air, taking into account their relative contributions to global warming and climate change, as if all substances were CO2.

Calibration: Comparison of a measurement standard or instrument with another standard or instrument in order to report or eliminate by adjustment any variation (deviation) in the accuracy of the item being compared.

Candela: Unit describing the intensity of a light source in a specified direction (intensity), equal to one lumen per steradian.

Canopy: The tallest vegetation layer in an area. Overhanging cover, shelter or shade.

Carcinogen: An agent that is reactive or toxic enough to act directly to cause cancer. Metal (including iron) smelting results in releasing heavy metal carcinogens such as mercury, cadmium and lead. Leather processing leads to release of chromium related carcinogen. Electricity distribution involves the use of transformers, where the coolant liquid contains an obnoxious carcinogen called poly-chlorinated biphenol (PCB). Liquid petroleum processing may use anti-knocking substances which may have known carcinogens such as lead embedded in those substances. [Any project dealing with related activities and processes must highlight the likelihood of release of carcinogens and potential management responses.]

Carrying Capacity: The maximum population size that can be supported by the available resources .

Check Dam: Small dam constructed in a gully or other small watercourse to decrease the stream flow velocity, minimize channel scour, and promote deposition of sediment.

Chlorophyll: a Chlorophyll a is an important photosynthesizing pigment of plants and its concentration is an index of the amount of living tissue or biomass, which can be useful as an indicator of productivity (For more, please consult Moss 1967a,b).

Closure: The point after shutdown of operations when regulatory certification is received and the area is returned to the Crown.

Colluvium: A heterogeneous mixture of material that has been deposited mainly by gravitational action.

Common Species: A species widely distributed and easily found within a given area.

Community: Populations of plants or animals living and interacting with one another in a given area.

Comprehensive Sound Level: A measurement of the overall Sound Pressure Level at a location which includes the effects of all noise sources affecting the location.

Concentration: A measure of the amount of a substance present per unit volume or per unit weight of material.

Conductivity: A measure of a waterbody's capacity to conduct an electrical current. It is the

reciprocal of resistance. This measurement provides the limnologist with an estimation of the total concentration of dissolved ionic matter in the water. Measurement of conductivity provides a quick check of the alteration of total water quality due to the addition of pollutants to the water.

Confined Aquifer: An aquifer in which the potentiometric surface is above the top of the aquifer.

Conservative Approach: Approach taken to incorporate protective assumptions to ensure that risk will not be underestimated.

Containment: Technologies that reduce the mobility of a contaminant plume in the subsurface via construction of physical barriers. Also used in reducing the flow of water through contaminated media.

Consolidation: The gradual reduction in volume of a soil or semi-solid mass resulting from an increase in compressive stress. The adjustment of a saturated soil in response to increasing load involves the squeezing of water from pores and a decrease in the void ratio.

Contaminant: A general term referring to any chemical compound added to a receiving environment in excess of natural concentrations. The term includes chemicals or effects not generally regarded as "toxic," such as nutrients, colour and salts.

Contouring: The process of shaping the land surface to fit the form of the surrounding land.

Control: An area that is undisturbed or unaffected by an activity and therefore can serve as a comparison to assess the state of an area that has been disturbed or affected by an activity. Also known as a reference area. Area control sites are located further away than local control sites.

Conveyor: An electric-powered mechanical belt and roller apparatus used for moving either rock fragments or aggregates from station to station in a typical aggregate plant for crushing and screening.

Conveyor (Stacker): An electric-powered mechanical belt and roller apparatus equipped with variable height settings for use in creating stockpiles of rock fragments or aggregate products, usually as final output or conveyed from the aggregate plant.

Cover: The area of ground covered by all living (including stems and leaves) and dead (litter) plant material that is produced naturally on a site, expressed as a percentage of the total area. Bare soil is not cover. Also known as ground cover, canopy cover or aerial cover.

Criteria: A maximum and/or minimum value for a physical, chemical or biological characteristic of water, sediment or biota, which should not be exceeded to prevent specified detrimental effects from occurring to a water use including aquatic life under specified environmental condition.

Crusher: Aggregate processing equipment, jaw, cone or roll shaped, that apply a compressive force to rock and rock fragments trapped between crushing surfaces to produce different aggregate sizes.

Cumulative Effects: Individual impacts that are incremental and additive such that they must be considered collectively and over time, in order for a true measure of the impact and associated environmental costs of an activity to be assessed.

Cut-and-fill: Process of earth moving by excavating part of an area and using the excavated material for adjacent embankments or fill areas.

Cutblock: A specified area of merchantable timber with defined boundaries designated for harvest.

dB (decibel): A unit of measure of sound pressure that compresses a large range of numbers into a more meaningful scale.

DBA: The decibel (dB) sound pressure level filtered through the A filtering network to approximate human hearing response. See dB and A-weighted sound level.

dBA: A measurement of overall Sound Pressure Level which accounts for the frequency content of the measured sound and assesses it with a frequency response similar to that of the human ear.

Daytime: Defined arbitrarily, based on country preferences and regulatory guidelines. Generally referring to hours where project related activities begin (as the earliest in a day) and ends (the latest in a day).

Daytime adjustment: An adjustment that allows a 10 dBA increase above the basic sound level for nighttime, as daytime sound levels are generally about 10 dBA higher than nighttime values.

Decommissioning: The permanent closure of all or part of an industrial facility followed by removal of process equipment, buildings and other structures, and the decontamination of the surface and subsurface.

Deposit: Material left in a new position by a natural transporting agent such as water, wind, ice or gravity, or by the activity of man.

Depression: An area that is lower than the general surrounding landscape, usually less well drained than the surrounding terrain.

Detection Limit (DL): The lowest concentration at which individual measurement results for a specific analyte are statistically different from a blank (that may be zero) with a specified confidence level for a given method and representative matrix.

Development Area: Any area altered to an unnatural state. This represents all land and water areas included within activities associated with development of the oil sands leases.

Discharge: The volume of water flowing past a point in a stream or pipe for a specific time interval.

Distance Dissipation: The geometrical dissipation of sound with distance.

Disturbed Land: Land on which excavation has occurred or upon which overburden has been deposited, or both.

Ditch Block: Barrier constructed across ditches to retard water flow, to redirect water from the ditch, or to form a small catch basin. Used to reduce erosion and siltation.

Diversity: The richness of species within a given area. Diversity includes two distinct concepts, richness of species and evenness in the abundance of the species.

Drainage: The removal of excess surface water or groundwater from land by natural runoff and percolation, or by means of surface or subsurface drains.

Drainage Basin: Area tributary to or drainage to a lake, stream, reservoir or other body of water.

Dry Pit Excavation: An excavation that is above the water table.

EA: Environmental Assessment. A review of the effects that a proposed development will have on the local and regional environment. For the purposes of this report, EA refers to assessment of impacts to aquatic resources (For more, please consult Beanlands and Duinker 1983).

Ecosystem: A complex of living organisms and their environment, linked by energy flows and material cycling. An ecological community considered together with the nonliving factors of its environment as a unit.

Edaphic: (1) Of or pertaining to the soil. (2) Resulting from, or influenced by, factors inherent in the soil or other substrate rather than by climatic factors.

Edge: Where plant communities meet (often an area of high biodiversity); and where plant communities meet a disturbance.

Efficacy: The quotient of total luminous flux emitted by the source, divided by the total power input to create such.

Effluent: The discharge or outflow of water from ground or subsurface storage.

Emergent: Aquatic vascular plants that grow with the considerable portion of its vegetation above water.

Endangered Species: A species facing imminent extirpation or extinction.

End Land Use: The allowable use or uses of disturbed land following reclamation. Municipal approval or land use re-designation may be required for specific land uses.

End Pit Lake: A water body which has been created as a result of mining/extraction activities.

Energy equivalent sound level (Leq): The Leq is a single-number average, A-weighted sound level that represents cumulative acoustical energy as measured over a specified time interval. This interval should be specified in brackets following the Leq (e.g.: Leq (9) is a nine-hour Leq).

Entrainment: Voluntary or involuntary entrapment of aquatic organisms and fish within a volume of water (i.e., pumped water).

Environmental Impact Assessment: A review of the effects that a proposed development will have on the local and regional environment.

Environmental Management System: An environmental management program/process or assessment procedure developed by an operator to assess and mitigate/address risks to the environment arising from an industrial activity, operation, goods or services. An EMS promotes ongoing improvement of operations. An EMS is comprised of elements such as policy development, standard operating procedures, training, auditing, reporting/document handling, monitoring and public involvement.

Ephemeral: A phenomenon or feature that last only a short time (i.e., an ephemeral stream is only present for short periods during the year).

Equivalent Continuous Sound Level or Leq: A single number descriptor commonly used for environmental noise measurements and criteria. It is used to quantify sound which constantly varies over time, such as that commonly occurring in outdoor environments. It is defined as the average Sound Pressure Level over a specific time period that has the same acoustic energy as the actual fluctuating Sound Pressure Levels during the same time period. Time periods commonly used for Leq measurements and criteria are the daytime and nighttime periods.

Equivalent Land Capability: The ability of the land to support various land uses after reclamation is similar to the ability that existed prior to any activity being conducted on the land, but the ability to support individual land uses will not necessarily be equal after reclamation (Regulatory definition).

Erosion: The wearing away of the land surface by running water, wind, ice, other geological agents, activities of man or animals, and including such processes as gravitational creep. Erosion may be either normal or accelerated; the latter being brought about by changes in the natural cover or ground conditions, including those due to human activity.

Evaporation: The process in which a liquid is changed into a gas by molecular transfer.

Evapotranspiration: The loss of water from a given area during a specified time by evaporation from the soil surface and transpiration from the plants.

Excavation: Cutting or digging of the earth's surface which alters the original landscape by making a hole or hollow (pit).

Exposure: Contact between a substance and an individual or population. It may occur via different pathways including oral, dermal and inhalation.

Exposure Pathway: The route by which an organism comes into contact with a contaminant. In the ecological effects-based procedure, exposure pathways are restricted to organisms that come in contact through consumption of contaminated food, direct soil ingestion and dust inhalation.

Extinct Species: A species that no longer exists.

Extirpated Species: A species that no longer exists in the wild in Canada, but occurs elsewhere.

Extraction: Digging up and removing resources that are used for specific purposes.

Facility: Any operation used in exploration, processing, development and transportation of energy resources.

Fauna: The animals in a particular region or geologic period.

Fill: Depth of which material is to be placed (filled) to bring the surface to a predetermined grade. Also, the material itself.

Filterable Residue: Materials in water that pass through a standard-size filter (often 0.45 μ m). This is a measure of the "total dissolved solids" (TDS), i.e., chemicals that are dissolved in the water or that are in a particulate form smaller than the filter size. These chemicals are usually salts, such as sodium ions and potassium ions.

Fish Habitat: Any spawning grounds and nursery, rearing and food supply and migration areas on which fish depend, directly or indirectly, in order to carry out their life process.

Fish Impingement: Generally the physical entrapment of a fish on an object (e.g., a screen) caused by water velocity from which the fish cannot escape.

Fish Tissue: Generally referred to as the muscle or edible portions of a fish (i.e., muscle tissue) or the organs (i.e., liver tissue).

Fisheries Act: Federal legislation that protects fish habitat from being altered, disrupted or destroyed by chemical, physical or biological means. Destruction of the habitat could potentially undermine the economic, employment and other benefits that flow from fisheries resources.

Floodplain: The land bordering a stream, built up of sediments from overflow of the stream and subject to flooding. The lowland which borders a river, usually dry but subject to flooding. Also the portion of a river valley which has been inundated by the river during historic floods.

Fluvial (Deposit): Material that has been transported and deposited by streams and rivers.

Forage Area: The area used by an organism for hunting or gathering food.

Forage Fish: Small fish that provide food for larger fish (e.g., pearl dace, fathead minnow).

Forest: A continuous tract of trees over a large area.

Forest Fragmentation: The change in the forest landscape, from extensive and continuous forests.

Fork Length: Distance from the proximal tip of the head to the tip of the middle ray of the caudal fin of a fish. (For more, please consult Nelson and Paetz 1992)

Fragmentation: The process of reducing the size and/or connectivity of an ecosystem or habitat type.

Freeboard: Vertical distance between the maximum water surface elevation anticipated in design and the top of retaining banks or structures provided to prevent overtopping because of unforeseen conditions .

Frequency: The number of wave oscillations per second (hertz) of an acoustic pressure wave propagating through the air. The same as the pitch, or highness or lowness of a sound.

Fry: Young fish, newly hatched, after the yolk has been used up and active feeding has commenced. (For more, please consult Nelson and Paetz 1992)

Fugitive Emissions: Substances emitted from any source except those from stacks and vents. Typical sources include gaseous leakage from valves, flanges, drains, volatilization from ponds and lagoons, and open doors and windows. Typical particulate sources include bulk storage areas, open conveyors, construction areas or plant roads.

Genetic Diversity: Variation among and within species that is attributable to differences in hereditary material.

Gen-set: Generic industry term for diesel generators used in producing electric power for operating portable facilities such as aggregate crushing and screening plants and water pumps.

Geomorphic: Pertaining to natural evolution of surface soils and landscape over long periods.

Geomorphical Processes: The origin and distribution of landforms, with the emphasis on the nature of erosional processes.

Geomorphology: That branch of science that deals with the form of the earth, the general configurations of its surface and the changes that take place in the evolution of landforms.

GIS: Geographic Information System. Pertains to a type of computer software that is designed to develop, manage, analyze and display spatially referenced data.

Glacial Till (Till): Unsorted and unstratified glacial drift (generally unconsolidated) deposited directly by a glacier without subsequent reworking by water from the glacier. Consisting of a heterogeneous mixture of clay, silt, sand, gravel and boulders (i.e., drift) varying widely in size and shape.

Glaciofluvial (or Glacio-fluvial): Pertaining to the meltwater streams flowing from wasting glacier ice and especially to the deposits and landforms produced by streams; relating to the combined action of glaciers and streams.

Glaciolacustrine (or Glacio-lacustrine): Pertaining to, derived from or deposited by streams flowing from the melting ice. The deposits are stratified and may occur in the form of outwash plains, deltas, kames, eskers and kame terraces. [It relates to the formation of Bengal delta.]

Glaciomarine (of Glacio-marine): Relating to process or deposits that involve the action of glaciers and the sea or the action of glaciers in the sea. Sediments of glacial origin laid down from suspension in a marine environment in close proximity to glacier ice.

Grid Cell (Cell): A small, regular-shaped subregion of a numerical air quality/climate model.

Ground Attenuation: The effect of sound absorption by the ground separating the source and receiver.

Ground Cover: Any living or dead vegetative material producing a protective mat on or just above the soil surface.

Groundtruthing (or Ground Truthing): Conducting site visits to confirm accuracy of remotely sensed information.

Groundwater: All water under the surface of the ground.

Groundwater Level: The upper surface of groundwater or that level below which the soil is saturated with water.

Groundwater Regime: Water below the land surface in a zone of saturation.

Groundwater Velocity: The rate of water movement through openings in rock or sediment.

Grubbing: The process of clearing stumps and roots from land.

Habitat: The natural environment of an organism.

Habitat Alteration, Disruption or Destruction: A general prohibition of harmful alteration, disruption or destruction (HADD) of fish habitat. This means that any work or undertaking that results in HADD is a contravention of existing legal provision.

Habitat Fragmentation: Occurs when extensive, continuous tracts of habitat are reduced by habitat loss to dispersed and usually smaller patches of habitat. Generally reduces the total amount of available habitat and reduces remaining habitat into smaller, more isolated patches.

Habitat Suitability: The relative potential of an area to support individuals or populations of a fish species.

Hardiness: The ability to withstand severe climates, especially frost during the growing season.

Haul Road: (1) Road or roads used internally by OH trucks for transporting rock fragments from quarry open pit to limestone preparation plant site. (2) Road or roads used by contractor or customer haul trucks for transporting aggregate rock products from quarry load out area to quarry access to municipal road network.

Hazard: The potential for a substance or situation to cause harm, usually human illness or injury. The adverse impact on health that can result from exposure to a substance. The significance of

the adverse effect depends on the nature and severity of the hazard and the degree to which the effect is reversible. In some instance the substance itself is also sometimes referred to as the hazard, rather than the adverse effect which the substance can cause.

Head: The upper part of an aquatic system such as the source of a stream. The upper part of a catchment, the apex of a delta or the end of a lake opposite the outlet. Often used as Head Waters.

Herb: Any flowering plant except those developing persistent woody bases and stems above ground.

Highwall: (1) The unexcavated face of exposed overburden and mineral in a quarry or surface mine. (2) The face or bank on the hillside of a contour strip-mining excavation.

Historical Resources: Works of nature or by humans valued for their palaeontological, archaeological, prehistoric, historic, cultural, natural, scientific or aesthetic interest.

Hydraulic Conductivity: The rate at which water can pass through a soil material under unit gradient; it is the proportionality factor (K) in Darcy's law as applied to the viscous flow of water in soil. It depends on the intrinsic permeability of the medium (k) and the fluid properties (mass density ρ , viscosity η) and can be defined as $K = k\rho g/\eta$, where g is the gravitational acceleration.

Hydraulic Gradient: A measure of the force of moving groundwater through soil or rock. It is measured as the rate of change in total head per unit distance of flow in a given direction. Hydraulic gradient is commonly shown as being dimensionless, since its units are metres/meter.

Hydraulic Head: The energy per unit weight of water made up of the sum of the pressure potential (head), velocity potential (head), and elevation potential (head). The velocity head is often negligible and taken as zero for subsurface flow. Hydraulic head is often referred to as water potential.

Hydraulic Structure: Any structure designed to handle water in any way. This includes retention, conveyance, control, regulation and dissipation of the energy of water.

Hydrogeology: The science that deals with subsurface water and with related geologic aspects of surface water.

ICP (Metals): Inductively Coupled Plasma (Atomic Emission Spectroscopy). This analytical method is an U.S. EPA designated method (Method 6010). The method determines elements within samples of groundwater, aqueous samples, leachates, industrial wastes, soils, sludges, sediments and other solid wastes. Samples require chemical digestion before analysis.

Illuminance: The areal density of luminous flux incident at a point on the surface, in lumens per square meter (lm/sm, or lux).

Impermability: The condition of a rock, sediment, or soil that renders it incapable of transmitting fluids under pressure.

Increase in Sound Level: The perceived increase in loudness of a sound does not correspond directly to numerical increases in dBA values. [Typically, an increase of less than 3 dBA is barely noticeable, an increase of 5 dBA is noticeable, an increase of 10 dBA is perceived as a doubling in apparent loudness, and an increase of 20 dBA is perceived as a four-fold increase in apparent loudness.]

Infiltration: Downward water movement into the soil.

In Situ: In the natural or original position. A measurement taken in the field without removal of a sample to the laboratory.

Inorganics: (1) Not pertaining to or derived from plant or animal origins (organisms). (2) A chemical of mineral origin which does not contain (with few exceptions) carbon or carbon compounds.

In-stream Flow Needs: The assessment of the volume of water needed in watercourses to maintain ecological integrity.

Inversion: An atmospheric condition when temperatures increase with height above the ground. During inversion conditions the vertical mixing of emissions are restricted.

Kiln: An inclined and rotating cylindrical furnace, typically welded steel-plate and lined with fire bricks, in which solid materials are heated at high temperatures while moving continuously. Cement kilns are used for the pyroprocessing stage in manufacturing hydraulic cement, where calcium carbonate, through calcination, reacts with silica-bearing minerals to form a mixture of calcium silicates.

Lacustrine: Material deposited in lake water and later exposed.

Land Capability: The ability of the land to support a given land use, based on an evaluation of the physical, chemical and biological characteristics of the land, including topography, drainage, hydrology, soils and vegetation.

Landform: The various shapes of the land surface resulting from a variety of actions such as deposition or sedimentation (eskers, lacustrine basins), erosion (gullies, canyons) and earth crust movements (mountains).

Landscape: (1) All the natural features such as fields, hills, forests, water, etc., which distinguish one part of the earth's surface from another part. (2) Usually that portion of land or territory which the eye can see in a single view, including all its natural characteristics.

Landscape Diversity: The size, shape and connectivity of different ecosystems across a large area.

Leaching: The removal of soil material in solution by the downward or lateral percolation of water.

Leq: See Energy equivalent sound level.

Lethal: Causing death by direct action.

Lime: Calcium Oxide (CaO)

Limestone: Calcium Carbonate (CaCO₃)

Limestone Preparation Facility: A plant site set up for preparing blasted limestone rock fragments into limestone aggregate rock products using a grizzly feeder, jaw crusher, cone crusher and vibratory screening decks that are interconnected by conveyors and stockpiling by conveyor stacker.

Linear Corridor: Roads, seismic lines, pipelines and electrical transmission lines, or other long, narrow disturbances.

Littoral Zone: (1) Productive shallow-water zone of lakes, rivers or seas with light penetration to

the bottom; often occupied by rooted aquatic plants. (2) The bio-geographic zone between the high- and lowwater marks .

Loading Rates: The amount of deposition, determined by technical analysis, above which there is a specific deleterious ecological effect on a receptor.

Lumen: The luminous flux emitted from a luminaire with uniform luminous intensity (in candelas), within a unit solid angle (in steradian).

Luminaire: A complete lighting unit, including lamp(s) and ballast(s), with associated positioning/shielding.

Luminance: Quotient of luminous flux and projected area of source light on surface, expressed in candelas/sm.

Luminous Flux: Luminous flux is a quantitative expression of the brilliance of a source of visible light (e.g., light), which is electromagnetic energy within the wavelength range of approximately 390 nanometers (nm) to 770 nm. The standard unit of luminous flux is the lumen (lm).

m³/d: Cubic metres per day. A measure of oil production or processing rate.

m³/s: Cubic metres per second. The standard measure of water flow in rivers; i.e., the volume of water in cubic metres that passes a given point in one second.

Macrophytes: Emergent: Plants that are especially adapted to grow in shallow water (<1.0 m) with most of their photosynthetic parts above the water surface.

Submergent: Aquatic plants that grow in water between 1.0 m and 4.5 m in depth. (For more, please consult Nelson and Paetz 1992)

Management/Mitigation: An activity aimed at avoiding, controlling or reducing the severity of adverse physical, biological and/or socioeconomic impacts of a project activity.

Mature Forest: A forest greater than rotation age with moderate to high canopy closure; a multi-layered, multi-species canopy dominated by large overstory trees; some with broken tops and other decay; numerous large snags and accumulations of downed woody debris.

Mature Stand: A stand of trees for which the annual net rate of growth has peaked. A stand that has reached rotation age or has a reduced growth rate. Such stands normally have large mature or overmature trees, an abundance of large live trees with heart rot, numerous snags, stubs and high stumps, and an abundance of large downed woody debris.

Media: The physical form of the environmental sample under study (e.g., soil, water, air).

Merchantable Forest: A forest area with potential to be harvested for protection of lumber/timber or wood pulp.

Mesic: Organic materials at a stage of decomposition between that of fibric and humic materials. Peat soil material with >10% and <40% rubbed fibres. Mesic material usually is classified in the von Post scale of decomposition as class 5 or 6.

Microclimate: A local climatic condition near the ground resulting from modification of the general climate by local differences in elevation, exposure, or cover.

Microrelief: Small-scale, local differences in relief, including mounds, swales, or hollows .

Mineral Soil: A soil consisting predominantly of, and having its properties determined predominantly by, mineral matter.

Minnows: Small bodied fish, often referred to as forage fish (e.g. sticklebacks, fathead minnow).

Mitigation: (1) The process of rectifying an impact by repairing, rehabilitating or restoring the affected environment, or the process of compensating for the impact by replacing or providing substitute resources or environments. (2) Actions that lessen the severity and or duration of the effects on the environment.

Mixedwood Stands: Stands containing both deciduous and coniferous species.

Mixing Height: The depth of surface layer in which atmospheric mixing of emissions occurs.

Model Domain: The region of interest for a numerical model.

Modeling: Development of a mathematical or physical representation of a theory, event, object, process or system that accounts for all or some other known properties. Models are often used to test the extent of changes of components on the overall performance of the system.

Movement Corridor: Travel way used by wildlife for daily, seasonal, annual and/or dispersal movements from one area or habitat to another.

Multilayered Canopy: Forest stands with two or more distinct tree layers in the canopy; also called multistoried canopy.

Native Species: A species that is a part of an area's original fauna or flora.

Narrow-Band: A segment of the frequency spectrum which spans a few hertz or tenths of hertz.

Narrow-Band Sound Pressure Level: The total Sound Pressure Level of sound components in a specific narrow-band frequency segment. Narrow-band Sound Pressure Levels are used to identify the presence of tonal components in a sound.

Natural seeding (volunteer): Natural distribution of seed over an area.

Nighttime: Defined as the hours outside the daytime in any given day.

Noise: The variance after the effects of the known variables have been accounted for. Any unexplained variance exhibiting no discernible pattern in terms of any other variable, or in space and time is called random noise. Unexplained spatial variance is called spatial noise.

Noise Impact Assessment (NIA): Identifies the expected sound level emanating from a facility as measured 15 m from the nearest or most impacted permanently or seasonally occupied dwelling. It also identifies what the permissible sound level is and how it was calculated.

Non-Filterable Residue: Material in a water sample that does not pass through a standard size filter (often 0.45 mm). This is considered to represent "total suspended solids" (TSS), i.e., particulate matter suspended in the water column.

Noxious Weed: A designation weeds that have the ability to spread rapidly and cause severe crop losses and economic hardship.

Nuisance Weed: A designation for weeds that are common to the Province. In many cases they are native species. They can be found on nearly all land throughout the Province and as such are very difficult to eradicate.

Nutrients: A chemical that is an essential raw material for the growth and development of organisms.

Octave: The interval in frequency between two sounds having a frequency ratio of two.

Octave Band: A segment of the frequency spectrum which spans one octave.

Octave Band Sound Pressure Level: The total sound pressure level of sound components in a specific octave band.

1/3 Octave: The 1/3 octave band analysis provides a finer breakdown of sound distribution as a function of frequency.

Oil Sands: (1) Sand and other rock materials containing crude bitumen. (2) The crude bitumen contained in those sands and other rock materials. (3) Any other mineral substances, other than natural gas, in association with that crude bitumen or those sands and other rock materials referred to in (1) and (2).

Organic Soil: A soil composed predominantly of organic matter in contrast to a mineral soil.

Organics: Chemical compounds, naturally occurring or otherwise, which contain carbon, with the exception of carbon dioxide (CO₂) and carbonates (e.g., CaCO₃).

Overburden: Materials of any nature, consolidated or unconsolidated, that overlie a deposit of useful materials.

Overstory: A species, most often trees, that occurs within the tallest vegetation layer within a plant community.

Overwintering Habitat: Habitat used during the winter as a refuge and for feeding.

Parent Material: The unconsolidated and more or less chemically weathered mineral or organic matter from which the solum of a soil is generally developed.

Peat: A material composed almost entirely of organic matter from the partial decomposition of plants growing in wet conditions.

Peatland: A generic term including all types of peat-covered terrain.

Percolation: (1) The downward flow of water in saturated or nearly saturated soil. (2) Movement of water under hydrostatic pressure or gravity through the interstices of rock, soil, or wastes. Typically a deep movement into subsurface aquifers.

Periphyton: Periphyton refers to the community of algae, bacteria, fungi, and their secretions that grow on substrates in freshwater systems. Periphyton provides food and habitat resources for benthic invertebrates and food for herbivorous fish, especially in flowing waters. (Smith and Smith 2001)

Permissible Sound Level (PSL): The maximum sound level that a facility should not exceed at a point 15m from the nearest or most impacted dwelling unit.

pH: The negative logarithm of hydrogen ion concentration. The pH scale is generally presented from 1 (most acidic) to 14 (most alkaline). A difference of one pH unit represents a ten-fold change in hydrogen ion concentration.

Phaeophytin: A Degradation product of chlorophyll a, its concentration is an index of the amount of dead or dying plant tissue.

Physiological: Related to function in cells, organs or entire organisms, in accordance with natural processes of life.

Piezometer: An instrument for measuring pressure head in a conduit, tank, soil, etc. It usually consists of a small pipe or tube tapped into the side of the container, connected with a manometer pressure gage, mercury or water column, or other device for indicating pressure head.

Piezometric Surface: Mapped and contoured water level elevations of an aquifer. Also known as a potentiometric surface.

Pioneer Species: Plant species that initially invade a newly exposed surface.

Plant Community: An association of plants of various species found growing together. Pool Habitat Area of the stream channel featuring increased depth and reduced velocity relative to riffle and run habitat types.

Population: All individuals of a species living in defined geographical area at the same time in association with each other.

Pore Water: Water between the grains of rock or soil.

Porosity: The volume percentage of the total bulk not occupied by solid particles. The ratio of volume of voids in a soil mass to the total volume of the mass.

Profile: A vertical section of the soil through all its horizons and extending into the parent material.

Progressive Reclamation: Any interim or concurrent reclamation of disturbed land undertaken during, following or in connection with construction, development and ongoing activities or operations associated with an active disposition.

Project: Project refers to a set of activities, involving a few sequential processes to result in a number of preferred outcomes under a certain goal and a few specific objectives. A project may envisage the construction of a section of a road network, an embankment created to stop saline water from penetrating into crop lands or homesteads along the coastal zone, construction of a power plant to boost energy services, excavation of an canal that links a river with a choked river in order to resuscitate the choked river, etc.

Quarry: Any opening in, excavation in, or working of the surface or subsurface for the purpose of working, recovering, opening up or proving ammonite shell or any mineral other than coal, a coal bearing substance, oil sands, or an oil sands bearing substance, and includes any associated infrastructure (Qualifies to be a Regulatory definition).

Quicklime: Calcium oxide (CaO). Commonly used in emission control systems to remove sulphur dioxide(SO₂) and sulphur trioxide(SO₃); also used in water purification systems to remove inorganic impurities.

Reach: A specified length of a stream or channel.

Rearing Habitat: Habitat used by young for feeding and/or as refuge from predators.

Receptor: The person or organism subjected to exposure to chemicals or physical agents.

Recharge/Discharge Area: Recharge/Discharge Area are areas that either contribute (recharge) or take away (discharge) to/from the overall volume of groundwater in an aquifer.

Reclamation: Any or all of the following: (i) the removal of equipment or buildings or other structures or appurtenances; (ii) the decontamination of buildings or other structures or other appurtenances, or land or water; (iii) the stabilization, contouring, maintenance, conditioning or

reconstruction of the surface of land; (iv) any other procedure, operation or requirement specified in the available regulations.

Reclamation Certificate: A document issued by a designated Authority (say, the DOE) signifying that the conservation and reclamation terms and conditions issued have been complied with.

Reclamation Unit: A unique combination of reclamation conditions, namely surface shape, sub-base material, cover material and initial vegetation.

Reconstructed Profile: The result of selective placement of suitable soils or overburden materials on reshaped overburden, rock or bedrock.

Reforestation: The natural or artificial restocking of an area with forest trees.

Refugia: A stand of undisturbed natural vegetation retained within a mine (or quarry) development area that serves as a source of native species for revegetation.

Regeneration: The renewal of a crop tree by natural or artificial means. It may also refer to the young crop itself.

Regolith: (1) The unconsolidated mantle of weathered rock and soil material overlying solid rock. (2) Unconsolidated overburden that lies above bedrock. Includes glacial drift and colluvial and fluvial deposits that occur below the pre-mine soil but does not include soft (paralithic) weathered-in-place bedrock.

Relative Abundance: The proportional representation of a species in a sample or a community.

Relief: The difference in elevation between the high and low points of a land surface.

Remediation: The removal, reduction or neutralization of substances, wastes or hazardous material from a site so as to prevent or minimize any adverse effects on the environment now or in the future.

Representative conditions: Those conditions typical for an area and/or the nature of a complaint. Sound levels must be taken only when representative conditions exist; this may necessitate a survey of extensive duration (two or more consecutive nights).

Reproductive Success: The production of healthy offspring which live to reproduce themselves.

Residual Effects: Effects that persist after mitigation measures have been applied.

Restricted Weed: A designation in Alberta for weeds that pose a serious threat, and as such must be eradicated. Generally these weeds possess characteristics of rapid spread, and superior competition.

Revegetation: The establishment of vegetation that replaces original ground cover following land disturbance.

Richness: The total number of species in an area usually expressed as the number of species divided by the total number of individuals or the number of species per unit area.

Rill: A narrow, very shallow, intermittent watercourse having steep sides, presenting no obstacle to tilling.

Riparian Area: A geographic area containing an aquatic ecosystem and adjacent upland areas that directly affects it.

Rock Dump: Quarry area not being mined and covered with non-specification limestone or other rock from quarry activities or operations and usually having little or no vegetative cover before reclamation.

Root Zone (Rootzone): The part of the soil that is penetrated or can be penetrated by plant roots.

Run Habitat: Areas of swiftly flowing water, without surface waves, that approximate uniform flow and in which the slope of water surface is roughly parallel to the overall gradient of the stream reach.

Runoff: The portion of the total precipitation on an area that flows away through stream channels. Surface runoff does not enter the soil. Groundwater runoff or seepage flow from groundwater enters the soil before reaching the stream.

Run-on: Water that flows onto a property, or any piece of land. Includes only those waters that have not been in contact with industrial operations.

Saturation Percentage: Percent of the void volume in soil that is filled by water. Same as moisture content expressed in terms of percent.

Scale: Level of spatial resolution.

Scarification (Soil): Seedbed preparation to make a site more amenable to plant growth.

Screening: The process of filtering and removal of implausible or unlikely exposure pathways, chemicals or substances, or populations from the risk assessment process to focus the analysis on the chemicals, pathways and populations of greatest concern.

Secchi: A measurement of transparency in water using a black and white "Secchi disc".

Sediment: Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its surface of origin by air, water, gravity, or ice and has come to rest on the earth's surface either above or below sea level.

Sediment Basin (Pond): A reservoir for the confinement and retention of silt, gravel, rock, or other debris from a sediment-producing area.

Sediment Sampling: A field procedure relating to a method for determining the configuration of sediments.

Sedimentation: The process of subsidence and deposition by gravity of suspended matter carried in water; usually the result of the reduction of water velocity below the point at which it can transport the material in suspended form.

Seedbed: The soil prepared by natural or artificial means to promote the germination of seed and the growth of seedlings.

Seepage: (1) The slow flow of water into or from a soil. Seepage usually involves the lateral flow of water. (2) The emergence of water from the soil over an extensive area in contrast to a spring where it emerges from a local spot.

Sensory Disturbance: Visual, auditory, or olfactory stimulus that creates a negative response in wildlife species.

Setback Distance: The minimum distance between quarry activities or operations and adjacent land-use developments such as surface improvement, permanent dwelling, unrestricted country development, urban centre or public facility.

Shrub: A woody perennial plant differing from a tree by its low stature and by generally producing several basal shoots instead of a single trunk.

Silt Fence: A permeable fabric barrier installed on contour to filter surface water runoff. It is used to trap sediment from sheet or overland flow and prevent it from entering streams.

Slash: Debris left as a result of tree clearing. Includes materials such as logs, splinters, chips, branches and tops, uprooted stumps, and broken or uprooted trees and shrubs.

Slope: The degree of deviation of a surface from horizontal, measured in a numerical ratio, percent, or degrees. Expressed as a ratio or percentage, the first number is the vertical distance (rise) and the second is the horizontal distance (run), as 2:1 or 200 percent. Expressed in degrees, it is the angle of the slope from the horizontal plane with a 90 degree slope being vertical (maximum) and 45 degree being a 1:1 slope.

Slump: A mass of unconsolidated material that becomes detached from a hillside along a slip plane and moves downslope, often as a rotational landslide.

Sodium Adsorption Ratio (SAR): The relationship of soluble sodium to soluble calcium plus magnesium in water or the soil solution, expressed by the equation: $SAR = \frac{(\text{sodium})}{(\text{calcium} + \text{magnesium})^{1/2}}$ where the concentrations of ions, denoted by square brackets are in millimoles per litre. This relationship can be used to predict the exchangeable sodium fraction of a soil.

Soil: The unconsolidated material on the immediate surface of the earth that serves as a natural medium for the growth of land plants.

Soil Horizon: A layer of soil or soil material approximately parallel to the land surface distinguishable from adjacent layers by colour, structure, consistence, chemical, biological, and mineralogical composition.

Soil Structure: The combination or arrangement of primary soil particles into secondary particles, units or peds. The secondary units are characterized and classified on the basis of size, shape, and degree of distinctness into classes, types and grades.

Soil Survey: A general term for the systematic examination of soils in the field and in the laboratory, their description and classification, the mapping of kinds of soil, and the interpretation of soils for many uses, including their suitabilities or limitations for growing various crops, grasses and trees, or for various engineering uses and predicting their behaviour under different management systems.

Sound Level Contribution: The contribution of noise from one or more sources to the overall sound level from all sources affecting a particular location.

Sound Level Meter: An instrument designed and calibrated to respond to sound and to give objective, reproducible measurements of sound pressure levels. It normally has several features that enable its frequency response and averaging times to be changed.

Sound monitoring survey: The measurement and recording of sound levels and pertinent related information over a given time period.

Sound Power Level: A measurement of the acoustic energy of a sound source, which utilizes a logarithmic scale and which is normally calculated from Sound Pressure Level measurements near the source.

Sound Pressure Level: A physical measurement of sound, which utilizes a logarithmic scale and which quantifies the amplitude or volume of acoustic pressure waves propagating through the air.

Spawning Habitat: A particular type of area where a fish species chooses to reproduce. Preferred habitat (substrate, water flow, temperature) varies from species to species.

Species: (1) A taxonomic grouping of genetically and morphologically similar individuals. (2) A group of organisms that actually or potentially interbreed and are reproductively isolated from all other such groups.

Species Abundance: The number of individuals of a particular species within a biological community (e.g., habitat type).

Species Composition: The species found in the sampling area.

Species Distribution: Where the various species in an ecosystem are found at any given time. Species distribution varies with season.

Species Diversity: The number of different species and their abundance. Provides a measure of the variation in number of species in a region, depending on the variety of habitats and resources, and the degree of specialization of the species with respect to the habitats and resources.

Species Richness: The number of different species occupying a given area.

Spectrum: A wide range or sequence of frequencies.

Sport/Game Fish: Large fish caught for food or sport (e.g., northern pike, Arctic grayling).

Stability: (1) A measure of the atmosphere's capability to disperse emissions. Stable atmospheric conditions create poorer dispersion of plumes and increased concentrations. Unstable conditions promote dispersion and result in lower concentrations. (2) The resistance of a structure, spoil heap or a clay bank to sliding, overturning or collapsing. A structure is only as stable as its foundations and those in turn upon the soil or rock on which they are constructed. Soil stability, such as mountain slopes, spoil heaps and embankments, depend on the shearing strength of the material and that is a function of internal strength and cohesion.

Stabilization: Chemical or mechanical treatment designed to increase or maintain the stability of a mass of soil or otherwise to improve its engineering properties.

Stakeholder: Applies to people who may be potentially directly affected by the proposed Project or may have a direct affect in influencing the application decision outcomes for the proposed development.

Stand: A collection of plants having a relatively uniform composition and structure, and age in the case of forests.

Statistical Sound Level or Ln: The proportion of time a sound of interest is present at a specific level. Statistical sound levels are expressed as Ln values, which is the sound level exceeded N percent of the time.

Storativity: Storativity is the volume of water an aquifer releases from or takes into storage due to pressure change.

Stratigraphy: The succession and age of strata of rock and unconsolidated material. Also concerns the form, distribution, lithologic composition, fossil content and other properties of the strata.

Strong Acids: Acids with a high tendency to donate protons or to completely dissociate in natural waters, (e.g., H₂SO₄, HNO₃, HCl).

Subsidence: A lowering of the soil surface due to a reduction in volume through settling or other means.

Succession: The sequential development of changes within a plant community as it progresses towards a climax.

Successional Stage: A stage or recognizable condition of a forest community that occurs during its development from bare ground to climax.

Surficial Aquifer: A surficial deposit containing water considered an aquifer.

Surficial Deposit: A geologic deposit (clay, silt, sand or gravel) that has been placed above bedrock. (See also "Overburden")

Suspended Sediments: Small soil particles that remain in suspension in water for a considerable period of time.

Synergism: The cooperative action of two or more agents in association with each other such that the total effect is greater than the sum of their individual effects.

Taxonomic Group: From the system of species nomenclature; those levels above species (e.g., genus, family, order). Singular = taxon. (For more, please consult Nelson and Paetz 1992)

THC: Total Hydrocarbons include all airborne compounds containing only carbon and hydrogen.

Third-Octave: The interval in frequency between two sounds having a ratio of 2 to the one-third power, or approximately 1.26.

Third-Octave Band: A segment of the frequency spectrum which spans one-third octave.

Third-Octave Band Sound Pressure Level: The total sound pressure level of sound components in a specific one-third octave band.

TOC: Total Organic Carbon. TOC is composed of both dissolved and particulate forms. TOC is often calculated as the difference between total carbon (TC) and total inorganic carbon (TIC). TOC has a direct relationship with both biochemical and chemical oxygen demands, and varies with the composition of organic matter present in the water. Organic matter in soils, aquatic vegetation and aquatic organisms are major sources of organic carbon.

Terms of Reference (TOR): Refers to the Terms of Reference for the Project provided by Alberta Environment to provide direction for the preparation of the Environmental Impact Assessment.

Till: An unstratified, non-sorted deposit of gravel, boulders, sand and finer materials which has been transported by a glacier.

Topography: The shape of the ground surface, such as hills, mountains, or plains. Steep topography indicates steep slopes or hilly land; flat topography indicates flat land with minor undulations and gentle slopes.

Total Dissolved Solids (TDS): The total dissolved mineral constituents of water. Measured by filtering sediment from water, evaporating the water and weighing the suspended solids remaining in residue.

TSP: A measure of the total particulate matter suspended in the air. This represents all airborne particles with a mean diameter less than 30 μ m (microns) in diameter.

Turbidity: A condition of reduced transparency in water caused by suspended colloidal or particulate material. (For more, please consult Joynt and Sullivan 2003)

Uncertainty: Imperfect knowledge concerning the present or future state of the system under consideration; a component of risk resulting from imperfect knowledge of the degree of hazard or of its spatial and temporal distribution.

Unconfined Aquifer: A region of saturated ground material unbound by an impermeable or low-permeability layer such as clay. These systems allow for the draining of soil porewater and the subsequent movement of air (or water) to fill the spaces vacated by the moving water.

Understory: Any plants growing under the canopy formed by other plants, particularly herbaceous and shrub vegetation under a tree canopy. Also used in reference only to trees and other woody

species growing under a more or less continuous cover of branches and foliage formed collectively by the upper portions of adjacent trees and other woody growth.

Unusual, Unique, or Rare Species: Species that are not commonly found within a defined ecosystem or other defined habitat area. The presence of such species is used as an indicator of the specificity and fitness of the local abiotic and biotic factors to the requirements of species with particular needs.

Uptake: The process by which a chemical crosses an absorption barrier and is absorbed into the body.

Urban Hum: The more or less steady, continuous background noise in or near an urban area caused by distant road traffic and urban activity.

Valued Environmental Components (VEC): Environmental attributes or components identified as a result of a social scoping exercise as having scientific, social, cultural, economic or aesthetic value. (For more, please consult Beanlands and Duinker 1983)

Vegetation Community: See "Plant Community."

Vegetation Management: The selective removal and/or control of vegetative growth (e.g., trees, shrubs, grass, herbs and weeds) for any of the following purposes: fire control and wildfire protection, noxious weed control, safety, access, aesthetics, range improvement, ensuring the integrity of the native plant communities, and maintaining functionality of industrial/commercial facilities.

VOC: An organic compound with a low boiling point. Converts readily from the liquid phase to the gaseous phase at ambient conditions.

Waste Treatment: Any method, technique, or process, including, without limitation, neutralization and stabilization, that is designed to change the physical, chemical and/or biological character or composition of a substance.

Water Quality: A measure of the condition of water relative to the requirements of one or more species and/or any human need or purpose.

Water Table: The upper surface of groundwater or that level below which the soil is saturated with water.

Watershed: All lands enclosed by a continuous hydrologic-surface drainage divide and lying upslope from a specified point on a stream.

Wetland: Land having the water table at, near or above land surface or that is saturated for long enough periods to promote wetland or aquatic processes as indicated by hydric soils, hydrophytic vegetation and various kinds of biological activity that area adapted to the wet environment. Wetlands include peatlands and areas that are influenced by excess water but which for climatic, edaphic or biotic reasons produce little or no peat. Shallow open water, generally less than 2 m deep is also included in wetlands.

Wet Pit Excavation: An excavation that is below the water table.

Worst-Case: A semi-quantitative term referring to the maximum possible exposure, dose or risk, that can conceivably occur, whether or not this exposure, dose, or risk actually occurs is observed in a specific population. It should refer to a hypothetical situation in which everything that can plausibly happen to maximize exposure, dose, or risk does happen.

7Q10 Flow: The minimum average discharge over a period of 7 days, which has a return period of 10 years.

APPENDIX-29.VIII: Glossary of Words Related to Climate Change

Acclimatisation: The physiological adaptation to climatic variations.

Active layer: The top layer of soil or rock in permafrost that is subjected to seasonal freezing and thawing.

Adaptability: See adaptive capacity.

Adaptation Adjustment: in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory, autonomous and planned adaptation: Anticipatory adaptation - Adaptation that takes place before impacts of climate change are observed. Also referred to as proactive adaptation.

Autonomous adaptation: Adaptation that does not constitute a conscious response to climatic stimuli but is triggered by ecological changes in natural systems and by market or welfare changes in human systems. Also referred to as spontaneous adaptation.

Planned adaptation: Adaptation that is the result of a deliberate policy decision, based on an awareness that conditions have changed or are about to change and that action is required to return to, maintain, or achieve a desired state.

Adaptation assessment: The practice of identifying options to adapt to climate change and evaluating them in terms of criteria such as availability, benefits, costs, effectiveness, efficiency and feasibility.

Adaptation benefits: The avoided damage costs or the accrued benefits following the adoption and implementation of adaptation measures.

Adaptation costs: Costs of planning, preparing for, facilitating, and implementing adaptation measures, including transition costs.

Adaptive capacity (in relation to climate change impacts) : The ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.

Aerosols: A collection of air-borne solid or liquid particles, with a typical size between 0.01 and 10 µm that reside in the atmosphere for at least several hours. Aerosols may be of either natural or anthropogenic origin. Aerosols may influence climate in two ways: directly through scattering and absorbing radiation, and indirectly through acting as condensation nuclei for cloud formation or modifying the optical properties and lifetime of clouds.

Afforestation: Direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources. See also reforestation and deforestation.

Aggregate impacts: Total impacts integrated across sectors and/or regions. The aggregation of

impacts requires knowledge of (or assumptions about) the relative importance of impacts in different sectors and regions. Measures of aggregate impacts include, for example, the total number of people affected, or the total economic costs.

Albedo: The fraction of solar radiation reflected by a surface or object, often expressed as a percentage. Snow-covered surfaces have a high albedo; the albedo of soils ranges from high to low; vegetation-covered surfaces and oceans have a low albedo. The Earth's albedo varies mainly through varying cloudiness, snow, ice, leaf area, and land-cover changes.

Algae: Photosynthetic, often microscopic and planktonic, organisms occurring in marine and freshwater ecosystems.

Algal bloom : A reproductive explosion of algae in a lake, river or ocean.

Alpine: The biogeographic zone made up of slopes above the tree line characterised by the presence of rosette-forming herbaceous plants and low, shrubby, slow-growing woody plants.

Anthropogenic: Resulting from or produced by human beings.

AOGCM: See climate model.

Aquaculture: The managed cultivation of aquatic plants or animals such as salmon or shellfish held in captivity for the purpose of harvesting.

Aquifer: A stratum of permeable rock that bears water. An unconfined aquifer is recharged directly by local rainfall, rivers and lakes, and the rate of recharge will be influenced by the permeability of the overlying rocks and soils.

Aragonite: A calcium carbonate (limestone) mineral, used by shell- or skeleton-forming, calcifying organisms such as corals (warm-and cold-water corals), some macroalgae, pteropods (marine snails) and non-pteropod molluscs such as bivalves (e.g., clams, oysters), cephalopods (e.g., squids, octopuses). Aragonite is more sensitive to ocean acidification than calcite, also used by many marine organisms. See also calcite and ocean acidification.

Arbovirus: Any of various viruses transmitted by blood-sucking arthropods (e.g., mosquitoes, ticks, etc.) and including the causative agents of dengue fever, yellow fever, and some types of encephalitis.

Arid region: A land region of low rainfall, where 'low' is widely accepted to be <250 mm precipitation per year.

Atmosphere: The gaseous envelope surrounding the Earth. The dry atmosphere consists almost entirely of nitrogen and oxygen, together with trace gases including carbon dioxide and ozone.

Attribution: See Detection and attribution.

Baseline/reference: The baseline (or reference) is the state against which change is measured. It might be a 'current baseline', in which case it represents observable, present-day conditions. It might also be a 'future baseline', which is a projected future set of conditions excluding the driving factor of interest. Alternative interpretations of the reference conditions can give rise to multiple baselines.

Basin: The drainage area of a stream, river or lake.

Benthic community : The community of organisms living on or near the bottom of a water body such as a river, a lake or an ocean.

Biodiversity: The total diversity of all organisms and ecosystems at various spatial scales (from genes to entire biomes).

Biofuel: A fuel produced from organic matter or combustible oils produced by plants. Examples of biofuel include alcohol, black liquor from the paper-manufacturing process, wood, and soybean oil.

Biomass: The total mass of living organisms in a given area or volume; recently dead plant material is often included as dead biomass. The quantity of biomass is expressed as a dry weight or as the energy, carbon or nitrogen content.

Biome: Major and distinct regional element of the biosphere, typically consisting of several ecosystems (e.g., forests, rivers, ponds, swamps) within a region of similar climate. Biomes are characterised by typical communities of plants and animals.

Biosphere : The part of the Earth system comprising all ecosystems and living organisms in the atmosphere, on land (terrestrial biosphere), or in the oceans (marine biosphere), including derived dead organic matter, such as litter, soil organic matter, and oceanic detritus.

Biota: All living organisms of an area; the flora and fauna considered as a unit.

Bog: Peat-accumulating acidic wetland.

Boreal forest: Forests of pine, spruce, fir and larch stretching from the east coast of Canada westward to Alaska and continuing from Siberia westward across the entire extent of Russia to the European Plain. The climate is continental, with long, very cold winters (up to 6 months with mean temperatures below freezing), and short, cool summers (50 to 100 frost-free days). Precipitation increases during summer months, although annual precipitation is still small. Low evaporation rates can make this a humid climate. See taiga.

Breakwater: A hard engineering structure built in the sea which, by breaking waves, protects a harbour, anchorage, beach or shore area. A breakwater can be attached to the coast or lie offshore.

C3 plants: Plants that produce a three-carbon compound during photosynthesis, including most trees and agricultural crops such as rice, wheat, soybeans, potatoes and vegetables.

C4 plants: Plants, mainly of tropical origin, that produce a four-carbon compound during photosynthesis, including many grasses and the agriculturally important crops maize, sugar cane, millet and sorghum.

Calcareous organisms: A large and diverse group of organisms, many marine, that use calcite or aragonite to form shells or skeletons. See calcite, aragonite and ocean acidification.

Calcite: A calcium carbonate (limestone) mineral, used by shell- or skeleton-forming, calcifying organisms such as foraminifera, some macroalgae, lobsters, crabs, sea urchins and starfish. Calcite is less sensitive to ocean acidification than aragonite, also used by many marine organisms. See also aragonite and ocean acidification.

Capacity building: In the context of climate change, capacity building is developing the technical skills and institutional capabilities in developing countries and economies in transition to enable their participation in all aspects of adaptation to, mitigation of, and research on climate change, and in the implementation of the Kyoto Mechanisms, etc.

Carbon cycle: The term used to describe the flow of carbon (in various forms, e.g., carbon dioxide) through the atmosphere, ocean, terrestrial biosphere and lithosphere.

Carbon dioxide (CO₂): A naturally occurring gas fixed by photosynthesis into organic matter. A by-product of fossil fuel combustion and biomass burning, it is also emitted from land-use changes and other industrial processes. It is the principal anthropogenic greenhouse gas that affects the Earth's radiative balance. It is the reference gas against which other greenhouse gases are measured, thus having a Global Warming Potential of 1.

Carbon dioxide fertilisation: The stimulation of plant photosynthesis due to elevated CO₂ concentrations, leading to either enhanced productivity and/or efficiency of primary production. In general, C3 plants show a larger response to elevated CO₂ than C4 plants.

Carbon sequestration: The process of increasing the carbon content of a reservoir/pool other than the atmosphere.

Catchment: An area that collects and drains rainwater.

CDM (Clean Development Mechanism): The CDM allows greenhouse gas emission reduction projects to take place in countries that have no emission targets under the United Nations Framework Convention on Climate Change (UNFCCC) Kyoto Protocol, yet are signatories.

Chagas' disease: A parasitic disease caused by the *Trypanosoma cruzi* and transmitted by triatomine bugs in the Americas, with two clinical periods: acute (fever, swelling of the spleen, oedemas) and chronic (digestive syndrome, potentially fatal heart condition).

Cholera: A water-borne intestinal infection caused by a bacterium (*Vibrio cholerae*) that results in frequent watery stools, cramping abdominal pain, and eventual collapse from dehydration and shock.

Climate: Climate in a narrow sense is usually defined as the 'average weather', or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. These quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system. The classical period of time is 30 years, as defined by the World Meteorological Organization (WMO).

Climate change: Climate change refers to any change in climate over time, whether due to natural variability or as a result of human activity. This usage differs from that in the United Nations Framework Convention on Climate Change (UNFCCC), which defines 'climate change' as: 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods'. See also climate variability.

Climate change commitment: Due to the thermal inertia of the ocean and slow processes in the biosphere, the cryosphere and land surfaces, the climate would continue to change even if the atmospheric composition was held fixed at today's values. Past change in atmospheric composition leads to a 'committed' climate change which continues for as long as a radiative imbalance persists and until all components of the climate system have adjusted to a new state. The further change in temperature after the composition of the atmosphere is held constant is referred to as the committed warming or warming commitment. Climate change commitment includes other future changes, for example in the hydrological cycle, in extreme weather events, and in sea-level rise.

Climate model: A numerical representation of the climate system based on the physical, chemical, and biological properties of its components, their interactions and feedback processes, and accounting for all or some of its known properties. The climate system can be represented by models of varying complexity (i.e., for any one component or combination of components a hierarchy of models can be identified, differing in such aspects as the number of spatial dimensions, the extent to which physical, chemical, or biological processes are explicitly represented, or the level at which empirical parameterisations are involved. Coupled atmosphere/ocean/sea-ice General Circulation Models (AOGCMs) provide a comprehensive representation of the climate system. More complex models include active chemistry and biology. Climate models are applied, as a research tool, to study and simulate the climate, but also for operational purposes, including monthly, seasonal, and inter-annual climate predictions.

Climate prediction: A climate prediction or climate forecast is the result of an attempt to produce an estimate of the actual evolution of the climate in the future, e.g., at seasonal, interannual or long-term time scales. See also climate projection and climate (change) scenario.

Climate projection: The calculated response of the climate system to emissions or concentration scenarios of greenhouse gases and aerosols, or radiative forcing scenarios, often based on simulations by climate models. Climate projections are distinguished from climate predictions, in that the former critically depend on the emissions/concentration/radiative forcing scenario used, and therefore on highly uncertain assumptions of future socio-economic and technological development.

Climate (change) scenario : A plausible and often simplified representation of the future climate, based on an internally consistent set of climatological relationships and assumptions of radiative forcing, typically constructed for explicit use as input to climate change impact models. A 'climate change scenario' is the difference between a climate scenario and the current climate.

Climate sensitivity: The equilibrium temperature rise that would occur for a doubling of CO₂ concentration above pre-industrial levels.

Climate system: The climate system is defined by the dynamics and interactions of five major components: atmosphere, hydrosphere, cryosphere, land surface, and biosphere. Climate system dynamics are driven by both internal and external forcing, such as volcanic eruptions, solar variations, or human-induced modifications to the planetary radiative balance, for instance via anthropogenic emissions of greenhouse gases and/or land-use changes.

Climate threshold : The point at which external forcing of the climate system, such as the increasing atmospheric concentration of greenhouse gases, triggers a significant climatic or environmental event which is considered unalterable, or recoverable only on very long timescales, such as widespread bleaching of corals or a collapse of oceanic circulation systems.

Climate variability: Climate variability refers to variations in the mean state and other statistics (such as standard deviations, statistics of extremes, etc.) of the climate on all temporal and spatial scales beyond that of individual weather events. Variability may be due to natural internal processes within the climate system (internal variability), or to variations in natural or anthropogenic external forcing (external variability). See also climate change.

CO₂ fertilisation: See carbon dioxide fertilisation.

Coastal squeeze: The squeeze of coastal ecosystems (e.g., salt marshes, mangroves and mud and sand flats) between rising sea levels and naturally or artificially fixed shorelines, including hard engineering defenses (see Chapter 6).

Coccolithophores: Single-celled microscopic phytoplankton algae which construct shell-like structures from calcite (a form of calcium carbonate). See also calcite and ocean acidification.

Committed to extinction : This term describes a species with dwindling population that is in the process of inescapably becoming extinct in the absence of human intervention. See also extinction.

Communicable disease: An infectious disease caused by transmission of an infective biological agent (virus, bacterium, protozoan, or multicellular macroparasite).

Confidence: In this Report, the level of confidence in a statement is expressed using a standard terminology defined in the Introduction. See also uncertainty.

Control run : A model run carried out to provide a 'baseline' for comparison with climate-change experiments. The control run uses constant values for the radiative forcing due to greenhouse gases and anthropogenic aerosols appropriate to pre-industrial conditions.

Coral: The term 'coral' has several meanings, but is usually the common name for the Order Scleractinia, all members of which have hard limestone skeletons, and which are divided into reef-building and non-reef-building, or cold- and warm-water corals.

Coral bleaching: The paling in colour which results if a coral loses its symbiotic, energy-providing, organisms.

Coral reefs: Rock-like limestone (calcium carbonate) structures built by corals along ocean coasts (fringing reefs) or on top of shallow, submerged banks or shelves (barrier reefs, atolls), most conspicuous in tropical and sub-tropical oceans.

Cryosphere: The component of the climate system consisting of all snow and ice (including permafrost) on and beneath the surface of the Earth and ocean.

Cryptogams: An outdated but still-used term, denoting a group of diverse and taxonomically unrelated organisms, including fungi and lower plants such as algae, lichens, hornworts, liverworts, mosses and ferns.

Deforestation: Natural or anthropogenic process that converts forest land to non-forest. See afforestation and reforestation.

Dengue fever: An infectious viral disease spread by mosquitoes, often called breakbone fever because it is characterised by severe pain in the joints and back. Subsequent infections of the virus may lead to dengue haemorrhagic fever (DHF) and dengue shock syndrome (DSS), which may be fatal.

Desert: A region of very low rainfall, where 'very low' is widely accepted to be <100 mm per year.

Desertification: Land degradation in arid, semi-arid, and dry sub-humid areas resulting from various factors, including climatic variations and human activities. Further, the United Nations Convention to Combat Desertification (UNCCD) defines land degradation as a reduction or loss in arid, semi-arid, and dry sub-humid areas of the biological or economic productivity and complexity of rainfed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including those arising from human activities and habitation patterns, such as: (i) soil erosion caused by wind and/or water; (ii) deterioration of the physical, chemical, and biological or economic properties of soil; and (iii) long-term loss of natural vegetation.

Detection and attribution: Detection of change in a system (natural or human) is the process of demonstrating that the system has changed in some defined statistical sense, without providing a reason for that change. Attribution of such an observed change in a system to anthropogenic climate change is usually a two-stage process. First, the observed change in the system must be demonstrated to be associated with an observed regional climate change with a specified degree of confidence. Second, a measurable portion of the observed regional climate change, or the associated observed change in the system, must be attributed to anthropogenic climate forcing with a similar degree of confidence. Confidence in such joint attribution statements must be lower than the confidence in either of the individual attribution steps alone due to the combination of two separate statistical assessments.

Diadromous: Fish that travel between salt water and freshwater.

Discount rate: The degree to which consumption now is preferred to consumption one year hence, with prices held constant, but average incomes rising in line with GDP per capita.

Disturbance regime: Frequency, intensity, and types of disturbances, such as fires, insect or pest outbreaks, floods and droughts.

Downscaling: A method that derives local- to regional-scale (10 to 100 km) information from larger-scale models or data analyses.

Drought: The phenomenon that exists when precipitation is significantly below normal recorded levels, causing serious hydrological imbalances that often adversely affect land resources and production systems.

Dyke: A human-made wall or embankment along a shore to prevent flooding of low-lying land.

Dynamic global vegetation model (DGVM) : Models that simulate vegetation development and dynamics through space and time, as driven by climate and other environmental changes.

Ecological community: A community of plants and animals characterised by a typical assemblage of species and their abundances. See also ecosystem.

Ecological corridor: A thin strip of vegetation used by wildlife, potentially allowing movement of biotic factors between two areas.

Ecophysiological process : Individual organisms respond to environmental variability, such as climate change, through ecophysiological processes which operate continuously, generally at a microscopic or sub-organ scale. Ecophysiological mechanisms underpin individual organism's tolerance to environmental stress, and comprise a broad range of responses defining the absolute tolerance limits of individuals to environmental conditions.

Ecophysiological: responses may scale up to control species geographic ranges.

Ecosystem: The interactive system formed from all living organisms and their abiotic (physical and chemical) environment within a given area. Ecosystems cover a hierarchy of spatial scales and can comprise the entire globe, biomes at the continental scale or small, well-circumscribed systems such as a small pond.

Ecosystem approach: The ecosystem approach is a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way. An ecosystem approach is based on the application of appropriate scientific methodologies

focused on levels of biological organisation, which encompass the essential structure, processes, functions and interactions among organisms and their environment. It recognises that humans, with their cultural diversity, are an integral component of many ecosystems. The ecosystem approach requires adaptive management to deal with the complex and dynamic nature of ecosystems and the absence of complete knowledge or understanding of their functioning. Priority targets are conservation of biodiversity and of the ecosystem structure and functioning, in order to maintain ecosystem services.

Ecosystem services: Ecological processes or functions having monetary or non-monetary value to individuals or society at large. There are (i) supporting services such as productivity or biodiversity maintenance, (ii) provisioning services such as food, fibre, or fish, (iii) regulating services such as climate regulation or carbon sequestration, and (iv) cultural services such as tourism or spiritual and aesthetic appreciation.

Ecotone - Transition area between adjacent ecological communities (e.g., between forests and grasslands).

El Niño-Southern Oscillation (ENSO) : El Niño, in its original sense, is a warm-water current that periodically flows along the coast of Ecuador and Peru, disrupting the local fishery. This oceanic event is associated with a fluctuation of the inter-tropical surface pressure pattern and circulation in the Indian and Pacific Oceans, called the Southern Oscillation. This coupled atmosphere-ocean phenomenon is collectively known as El Niño-Southern Oscillation. During an El Niño event, the prevailing trade winds weaken and the equatorial countercurrent strengthens, causing warm surface waters in the Indonesian area to flow eastward to overlie the cold waters of the Peru current. This event has great impact on the wind, sea surface temperature, and precipitation patterns in the tropical Pacific. It has climatic effects throughout the Pacific region and in many other parts of the world. The opposite of an El Niño event is called La Niña.

Emissions scenario: A plausible representation of the future development of emissions of substances that are potentially radiatively active (e.g., greenhouse gases, aerosols), based on a coherent and internally consistent set of assumptions about driving forces (such as demographic and socio-economic development, technological change) and their key relationships.

Endemic: Restricted or peculiar to a locality or region. With regard to human health, endemic can refer to a disease or agent present or usually prevalent in a population or geographical area at all times.

Ensemble : A group of parallel model simulations used for climate projections. Variation of the results across the ensemble members gives an estimate of uncertainty. Ensembles made with the same model but different initial conditions only characterise the uncertainty associated with internal climate variability, whereas multi-model ensembles including simulations by several models also include the impact of model differences.

Epidemic: Occurring suddenly in incidence rates clearly in excess of normal expectancy, applied especially to infectious diseases but may also refer to any disease, injury, or other health-related event occurring in such outbreaks.

Erosion The process of removal and transport of soil and rock by weathering, mass wasting, and the action of streams, glaciers, waves, winds and underground water.

Eustatic sea-level rise: See sea-level rise.

Eutrophication: The process by which a body of water (often shallow) becomes (either naturally or by pollution) rich in dissolved nutrients, with a seasonal deficiency in dissolved oxygen.

Evaporation: The transition process from liquid to gaseous state.

Evapotranspiration: The combined process of water evaporation from the Earth's surface and transpiration from vegetation.

Externalities: Occur when a change in the production or consumption of one individual or firm affects indirectly the well-being of another individual or firm. Externalities can be positive or negative. The impacts of pollution on ecosystems, water courses or air quality represent classic cases of negative externality.

Extinction : The global disappearance of an entire species.

Extirpation : The disappearance of a species from part of its range; local extinction.

Extreme weather event : An event that is rare within its statistical reference distribution at a particular place. Definitions of 'rare' vary, but an extreme weather event would normally be as rare as or rarer than the 10th or 90th percentile. By definition, the characteristics of what is called 'extreme weather' may vary from place to place. Extreme weather events may typically include floods and droughts.

Feedback: An interaction mechanism between processes is called a feedback. When the result of an initial process triggers changes in a second process and that in turn influences the initial one. A positive feedback intensifies the original process, and a negative feedback reduces it.

Food chain : The chain of trophic relationships formed if several species feed on each other. See food web and trophic level.

Food security : A situation that exists when people have secure access to sufficient amounts of safe and nutritious food for normal growth, development and an active and healthy life. Food insecurity may be caused by the unavailability of food, insufficient purchasing power, inappropriate distribution, or inadequate use of food at the household level.

Food web: The network of trophic relationships within an ecological community involving several interconnected food chains.

Forecast : See climate prediction and climate projection.

Forest limit/line: The upper elevational or latitudinal limit beyond which natural tree regeneration cannot develop into a closed forest stand. It is typically at a lower elevation or more distant from the poles than the tree line.

Freshwater lens : A lenticular fresh groundwater body that underlies an oceanic island. It is underlain by saline water.

Functional extinction: This term defines a species which has lost its capacity to persist and to recover because its populations have declined to below a minimum size. See committed to extinction.

General Circulation Model (GCM) : See climate model.

Generalist: A species that can tolerate a wide range of environmental conditions.

Glacier: A mass of land ice flowing downhill (by internal deformation and sliding at the base) and constrained by the surrounding topography (e.g., the sides of a valley or surrounding peaks). A

glacier is maintained by accumulation of snow at high altitudes, balanced by melting at low altitudes or discharge into the sea.

Globalisation: The growing integration and interdependence of countries worldwide through the increasing volume and variety of cross-border transactions in goods and services, free international capital flows, and the more rapid and widespread diffusion of technology, information and culture.

Greenhouse effect: The process in which the absorption of infrared radiation by the atmosphere warms the Earth. In common parlance, the term 'greenhouse effect' may be used to refer either to the natural greenhouse effect, due to naturally occurring greenhouse gases, or to the enhanced (anthropogenic) greenhouse effect, which results from gases emitted as a result of human activities.

Greenhouse gas: Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. This property causes the greenhouse effect. Water vapour (H₂O), carbon dioxide (CO₂), nitrous oxide (N₂O), methane (CH₄) and ozone (O₃) are the primary greenhouse gases in the Earth's atmosphere. As well as CO₂, N₂O, and CH₄, the Kyoto Protocol deals with the greenhouse gases sulphur hexafluoride (SF₆), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs).

Gross Domestic Product: Gross Domestic Product (GDP) is the monetary value of all goods and services produced within a nation.

Gross National Product: Gross National Product (GNP) is the monetary value of all goods and services produced in a nation's economy, including income generated abroad by domestic residents, but without income generated by foreigners.

Gross primary production: The total carbon fixed by plant through photosynthesis.

Groundwater recharge The process by which external water is added to the zone of saturation of an aquifer, either directly into a formation or indirectly by way of another formation.

Groyne: A low, narrow jetty, usually extending roughly perpendicular to the shoreline, designed to protect the shore from erosion by currents, tides or waves, by trapping sand for the purpose of replenishing or making a beach.

Habitat: The locality or natural home in which a particular plant, animal, or group of closely associated organisms lives.

Hantavirus : A virus in the family Bunyaviridae that causes a type of haemorrhagic fever. It is thought that humans catch the disease mainly from infected rodents, either through direct contact with the animals or by inhaling or ingesting dust that contains aerosolised viral particles from their dried urine and other secretions. **Heat island** An urban area characterised by ambient temperatures higher than those of the surrounding non-urban area. The cause is a higher absorption of solar energy by materials of the urban fabric such as asphalt.

Herbaceous : Flowering, non-woody.

Human system : Any system in which human organisations play a major role. Often, but not always, the term is synonymous with 'society' or 'social system' e.g., agricultural system, political system, technological system, economic system; all are human systems in the sense applied in the AR4.

Hydrographic events: Events that alter the state or current of waters in oceans, rivers or lakes.

Hydrological systems: The systems involved in movement, distribution, and quality of water throughout the Earth, including both the hydrologic cycle and water resources.

Hypolimnetic : Referring to the part of a lake below the thermocline made up of water that is stagnant and of essentially uniform temperature except during the period of overturn.

Hypoxic events: Events that lead to a deficiency of oxygen.

Ice cap : A dome-shaped ice mass covering a highland area that is considerably smaller in extent than an ice sheet.

Ice sheet: A mass of land ice that is sufficiently deep to cover most of the underlying bedrock topography. An ice sheet flows outwards from a high central plateau with a small average surface slope. The margins slope steeply, and the ice is discharged through fast-flowing ice streams or outlet glaciers, in some cases into the sea or into ice shelves floating on the sea. There are only two large ice sheets in the modern world - on Greenland and Antarctica, the Antarctic ice sheet being divided into east and west by the Transantarctic Mountains; during glacial periods there were others.

Ice shelf: A floating ice sheet of considerable thickness attached to a coast (usually of great horizontal extent with a level or gently undulating surface); often a seaward extension of ice sheets. Nearly all ice shelves are in Antarctica.

(climate change) Impact assessment: The practice of identifying and evaluating, in monetary and/or non-monetary terms, the effects of climate change on natural and human systems.

(climate change) Impacts: The effects of climate change on natural and human systems. Depending on the consideration of adaptation, one can distinguish between potential impacts and residual impacts: Potential impacts: all impacts that may occur given a projected change in climate, without considering adaptation. Residual impacts: the impacts of climate change that would occur after adaptation. See also aggregate impacts, market impacts, and non-market impacts.

Indigenous peoples: No internationally accepted definition of indigenous peoples exists. Common characteristics often applied under international law, and by United Nations agencies to distinguish indigenous peoples include: residence within or attachment to geographically distinct traditional habitats, ancestral territories, and their natural resources; maintenance of cultural and social identities, and social, economic, cultural and political institutions separate from mainstream or dominant societies and cultures; descent from population groups present in a given area, most frequently before modern states or territories were created and current borders defined; and self-identification as being part of a distinct indigenous cultural group, and the desire to preserve that cultural identity.

Industrial revolution: A period of rapid industrial growth with far-reaching social and economic consequences, beginning in England during the second half of the 18th century and spreading to Europe and later to other countries including the USA. The industrial revolution marks the beginning of a strong increase in combustion of fossil fuels and related emissions of carbon dioxide. In IPCC's fourth assessment report, the term 'pre-industrial' refers, somewhat arbitrarily, to the period before 1750.

Infectious disease: Any disease caused by microbial agents that can be transmitted from one

person to another or from animals to people. This may occur by direct physical contact, by handling of an object that has picked up infective organisms, through a disease carrier, via contaminated water, or by the spread of infected droplets coughed or exhaled into the air.

Infrastructure: The basic equipment, utilities, productive enterprises, installations and services essential for the development, operation and growth of an organisation, city or nation.

Integrated assessment: An interdisciplinary process of combining, interpreting and communicating knowledge from diverse scientific disciplines so that all relevant aspects of a complex societal issue can be evaluated and considered for the benefit of decision-making.

Integrated water resources management (IWRM) : The prevailing concept for water management which, however, has not been defined unambiguously. IWRM is based on four principles that were formulated by the International Conference on Water and the Environment in Dublin, 1992: (1) fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment; (2) water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels; (3) women play a central part in the provision, management and safeguarding of water; (4) water has an economic value in all its competing uses and should be recognised as an economic good.

Invasive species and invasive alien species (IAS) : A species aggressively expanding its range and population density into a region in which it is not native, often through out-competing or otherwise dominating native species.

Irrigation water-use efficiency: Irrigation water-use efficiency is the amount of biomass or seed yield produced per unit irrigation water applied, typically about 1 tonne of dry matter per 100 mm water applied.

Isohyet: A line on a map connecting locations that receive the same amount of rainfall.

Joint attribution: Involves both attribution of observed changes to regional climate change and attribution of a measurable portion of either regional climate change or the associated observed changes in the system to anthropogenic causes, beyond natural variability. This process involves statistically linking climate-change simulations from climate models with the observed responses in the natural or managed system. Confidence in joint attribution statements must be lower than the confidence in either of the individual attribution steps alone due to the combination of two separate statistical assessments.

Keystone species: A species that has a central servicing role affecting many other organisms and whose demise is likely to result in the loss of a number of species and lead to major changes in ecosystem function.

Kyoto Protocol : The Kyoto Protocol was adopted at the Third Session of the Conference of the Parties (COP) to the UN Framework Convention on Climate Change (UNFCCC) in 1997 in Kyoto, Japan. It contains legally binding commitments, in addition to those included in the UNFCCC. Countries included in Annex B of the Protocol (most member countries of the Organisation for Economic Cooperation and Development (OECD) and those with economies in transition) agreed to reduce their anthropogenic greenhouse gas emissions (CO₂, CH₄, N₂O, HFCs, PFCs, and SF₆) by at least 5% below 1990 levels in the commitment period 2008 to 2012. The Kyoto Protocol entered into force on 16 February 2005.

La Niña: See El Niño-Southern Oscillation (ENSO).

Landslide : A mass of material that has slipped downhill by gravity, often assisted by water when the material is saturated; the rapid movement of a mass of soil, rock or debris down a slope.

Large-scale singularities: Abrupt and dramatic changes in the state of given systems, in response to gradual changes in driving forces. For example, a gradual increase in atmospheric greenhouse gas concentrations may lead to such large-scale singularities as slowdown or collapse of the thermohaline circulation or collapse of the West Antarctic ice sheet. The occurrence, magnitude, and timing of large-scale singularities are difficult to predict.

Last Glacial Maximum : The Last Glacial Maximum refers to the time of maximum extent of the ice sheets during the last glaciation, approximately 21,000 years ago.

Leaching : The removal of soil elements or applied chemicals by water movement through the soil.

Leaf area index (LAI) : The ratio between the total leaf surface area of a plant and the ground area covered by its leaves.

Legume : Plants that fix nitrogen from the air through a symbiotic relationship with bacteria in their soil and root systems (e.g., soybean, peas, beans, lucerne, clovers).

Likelihood: The likelihood of an occurrence, an outcome or a result, where this can be estimated probabilistically, is expressed in this Report using a standard terminology, defined in the Introduction. See also uncertainty and confidence.

Limnology : Study of lakes and their biota.

Littoral zone : A coastal region; the zone between high and low watermarks.

Malaria Endemic or epidemic: Parasitic disease caused by species of the genus *Plasmodium* (Protozoa) and transmitted by mosquitoes of the genus *Anopheles*; produces bouts of high fever and systemic disorders, affects about 300 million and kills approximately 2 million people worldwide every year.

Market impacts: Impacts that can be quantified in monetary terms, and directly affect Gross Domestic Product - e.g., changes in the price of agricultural inputs and/or goods. See also non-market impacts.

Meningitis : Inflammation of the meninges (part of the covering of the brain), usually caused by bacteria, viruses or fungi.

Meridional overturning circulation (MOC) : See thermohaline circulation (THC).

Microclimate: Local climate at or near the Earth's surface. See also climate. **Millennium Development Goals (MDGs)** A list of ten goals, including eradicating extreme poverty and hunger, improving maternal health, and ensuring environmental sustainability, adopted in 2000 by the UN General Assembly, i.e., 191 States, to be reached by 2015. The MDGs commit the international community to an expanded vision of development, and have been commonly accepted as a framework for measuring development progress.

Mires Peat-accumulating wetlands: See bog.

Mitigation: An anthropogenic intervention to reduce the anthropogenic forcing of the climate system; it includes strategies to reduce greenhouse gas sources and emissions and enhancing greenhouse gas sinks.

Mixed layer: The upper region of the ocean, well mixed by interaction with the overlying atmosphere.

Monsoon: A monsoon is a tropical and sub-tropical seasonal reversal in both the surface winds and associated precipitation.

Montane : The biogeographic zone made up of relatively moist, cool upland slopes below the sub-alpine zone that is characterised by the presence of mixed deciduous at lower and coniferous evergreen forests at higher elevations.

Morbidity: Rate of occurrence of disease or other health disorders within a population, taking account of the age-specific morbidity rates. Morbidity indicators include chronic disease incidence/prevalence, rates of hospitalisation, primary care consultations, disability-days (i.e., days of absence from work), and prevalence of symptoms.

Morphology: The form and structure of an organism or land-form, or any of its parts.

Mortality: Rate of occurrence of death within a population; calculation of mortality takes account of age-specific death rates, and can thus yield measures of life expectancy and the extent of premature death.

Net biome production (NBP) : Net biome production is the net ecosystem production (NEP) minus carbon losses resulting from disturbances such as fire or insect defoliation.

Net ecosystem production (NEP) : Net ecosystem production is the difference between net primary production (NPP) and heterotrophic respiration (mostly decomposition of dead organic matter) of that ecosystem over the same area (see also net biome production [NBP]).

Net primary production (NPP) : Net primary production is the gross primary production minus autotrophic respiration, i.e., the sum of metabolic processes for plant growth and maintenance, over the same area.

Nitrogen oxides (NO_x) : Any of several oxides of nitrogen.

No regrets policy: A policy that would generate net social and/or economic benefits irrespective of whether or not anthropogenic climate change occurs.

Non-linearity : A process is called 'non-linear' when there is no simple proportional relation between cause and effect.

Non-market impacts: Impacts that affect ecosystems or human welfare, but that are not easily expressed in monetary terms, e.g., an increased risk of premature death, or increases in the number of people at risk of hunger. See also market impacts.

Normalised difference vegetation index (NDVI) : A satellite-based remotely sensed measure of the 'greenness' of the vegetation cover.

North Atlantic Oscillation (NAO) : The North Atlantic Oscillation (NAO) consists of opposing variations of barometric pressure near Iceland and near the Azores. It is the dominant mode of winter climate variability in the North Atlantic region.

Ocean acidification: Increased concentrations of CO₂ in sea water causing a measurable increase in acidity (i.e., a reduction in ocean pH). This may lead to reduced calcification rates of calcifying organisms such as corals, molluscs, algae and crustacea.

Ombrotrophic bog: An acidic peat-accumulating wetland that is rainwater (instead of groundwater) fed and thus particularly poor in nutrients.

Opportunity costs: The cost of an economic activity forgone through the choice of another activity.

Ozone: The triatomic form of oxygen (O₃), a gaseous atmospheric constituent. In the troposphere, it is created both naturally and by photochemical reactions involving gases resulting from human activities (photochemical smog). In high concentrations, tropospheric ozone can be harmful to many living organisms. Tropospheric ozone acts as a greenhouse gas. In the stratosphere, ozone is created by the interaction between solar ultraviolet radiation and molecular oxygen (O₂). Depletion of stratospheric ozone, due to chemical reactions that may be enhanced by climate change, results in an increased ground-level flux of ultraviolet (UV) B radiation.

Paludification: The process of transforming land into a wetland such as a marsh, a swamp or a bog.

Particulates: Very small solid exhaust particles emitted during the combustion of fossil and biomass fuels. Particulates may consist of a wide variety of substances. Of greatest concern for health are particulates of less than or equal to 10 nm in diameter, usually designated as PM₁₀.

Peat: Peat is formed from dead plants, typically Sphagnum mosses, which are only partially decomposed due to the permanent submergence in water and the presence of conserving substances such as humic acids.

Peatland : Typically a wetland such as a mire slowly accumulating peat.

Pelagic community: The community of organisms living in the open waters of a river, a lake or an ocean (in contrast to benthic communities living on or near the bottom of a water body).

Permafrost: Perennially frozen ground that occurs where the temperature remains below 0°C for several years.

Phenology: The study of natural phenomena that recur periodically (e.g., development stages, migration) and their relation to climate and seasonal changes.

Photochemical smog: A mix of photochemical oxidant air pollutants produced by the reaction of sunlight with primary air pollutants, especially hydrocarbons.

Photosynthesis: The synthesis by plants, algae and some bacteria of sugar from sunlight, carbon dioxide and water, with oxygen as the waste product. See also carbon dioxide fertilisation, C₃ plants and C₄ plants.

Physiographic: Of, relating to, or employing a description of nature or natural phenomena.

Phytoplankton: The plant forms of plankton. Phytoplankton are the dominant plants in the sea, and are the basis of the entire marine food web. These single-celled organisms are the principal agents of photosynthetic carbon fixation in the ocean. See also zooplankton.

Plankton: Microscopic aquatic organisms that drift or swim weakly. See also phytoplankton and zooplankton.

Plant functional type (PFT) : An idealised vegetation class typically used in dynamic global vegetation models (DGVM).

Polynya: Areas of permanently unfrozen sea water resulting from warmer local water currents in otherwise sea-ice covered oceans. They are biological hotspots, since they serve as breathing holes or refuges for marine mammals such as whales and seals, and fish-hunting birds.

Population system : An ecological system (not ecosystem) determined by the dynamics of a particular vagile species that typically cuts across several ecological communities and even entire biomes. An example is migratory birds that seasonally inhabit forests as well as grasslands and visit wetlands on their migratory routes.

Potential production: Estimated crop productivity under non-limiting soil, nutrient and water conditions.

Pre-industrial: See industrial revolution.

Primary production: All forms of production accomplished by plants, also called primary producers. See GPP, NPP, NEP and NBP.

Projection : The potential evolution of a quality or set of quantities, often computed with the aid of a model. Projections are distinguished from predictions in order to emphasise that projections involve assumptions - concerning, for example, future socio-economic and technological developments, that may or may not be realised - and are therefore subject to substantial uncertainty. See also climate projection and climate prediction.

Pteropods : Planktonic, small marine snails with swimming organs resembling wings.

Pure rate of time preference: The degree to which consumption now is preferred to consumption one year later, with prices and incomes held constant, which is one component of the discount rate.

Radiative forcing: Radiative forcing is the change in the net vertical irradiance (expressed in Watts per square metre; Wm^{-2}) at the tropopause due to an internal or external change in the forcing of the climate system, such as a change in the concentration of CO₂ or the output of the Sun.

Rangeland : Unmanaged grasslands, shrublands, savannas and tundra.

Recalcitrant: Recalcitrant organic material or recalcitrant carbon stocks resist decomposition.

Reference scenario: See baseline/reference.

Reforestation: Planting of forests on lands that have previously contained forests but that have been converted to some other use. For a discussion of the term forest and related terms such as afforestation, reforestation and deforestation, see the IPCC Special Report on Land Use, Land-Use Change, and Forestry (IPCC, 2000).

Reid's paradox: This refers to the apparent contradiction between inferences of high plant migration rates as suggested in the palaeo-record (particularly after the last Ice Age), and the low potential rates of migration that can be inferred through studying the seed dispersal of the plants involved, e.g., in wind-tunnel experiments.

Reinsurance: The transfer of a portion of primary insurance risks to a secondary tier of insurers (reinsurers); essentially 'insurance for insurers'.

Relative sea-level rise : See sea-level rise.

Reservoir: A component of the climate system, other than the atmosphere, that has the capacity to store, accumulate or release a substance of concern (e.g., carbon or a greenhouse gas). Oceans, soils, and forests are examples of carbon reservoirs. The term also means an artificial or natural storage place for water, such as a lake, pond or aquifer, from which the water may be withdrawn for such purposes as irrigation or water supply.

Resilience: The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organisation, and the capacity to adapt to stress and change.

Respiration: The process whereby living organisms convert organic matter to carbon dioxide, releasing energy and consuming oxygen.

Riparian: Relating to or living or located on the bank of a natural watercourse (such as a river) or sometimes of a lake or a tidewater.

River discharge: Water flow within a river channel, for example expressed in m³/s. A synonym for streamflow.

Runoff : That part of precipitation that does not evaporate and is not transpired.

Salinisation: The accumulation of salts in soils.

Salt-water intrusion / encroachment: Displacement of fresh surface water or groundwater by the advance of salt water due to its greater density. This usually occurs in coastal and estuarine areas due to reducing land-based influence (e.g., either from reduced runoff and associated groundwater recharge, or from excessive water withdrawals from aquifers) or increasing marine influence (e.g., relative sea-level rise).

Savanna: Tropical or sub-tropical grassland or woodland biomes with scattered shrubs, individual trees or a very open canopy of trees, all characterised by a dry (arid, semi-arid or semi-humid) climate.

Scenario : A plausible and often simplified description of how the future may develop, based on a coherent and internally consistent set of assumptions about driving forces and key relationships. Scenarios may be derived from projections, but are often based on additional information from other sources, sometimes combined with a 'narrative storyline'. See also climate (change) scenario, emissions scenario and SRES.

Sea-ice biome : The biome formed by all marine organisms living within or on the floating sea ice (frozen sea water) of the polar oceans.)

Sea-level rise : An increase in the mean level of the ocean. Eustatic sea-level rise is a change in global average sea level brought about by an increase in the volume of the world ocean. Relative sea-level rise occurs where there is a local increase in the level of the ocean relative to the land, which might be due to ocean rise and/or land level subsidence. In areas subject to rapid land-level uplift, relative sea level can fall.

Sea wall : A human-made wall or embankment along a shore to prevent wave erosion.

Semi-arid regions : Regions of moderately low rainfall, which are not highly productive and are usually classified as rangelands. 'Moderately low' is widely accepted as between 100 and 250 mm precipitation per year. See also arid region.

Sensitivity: Sensitivity is the degree to which a system is affected, either adversely or beneficially, by climate variability or change. The effect may be direct (e.g., a change in crop yield in response to a change in the mean, range or variability of temperature) or indirect (e.g., damages caused by an increase in the frequency of coastal flooding due to sea-level rise).

Sequestration: See carbon sequestration.

Silviculture : Cultivation, development and care of forests.

Sink: Any process, activity, or mechanism that removes a greenhouse gas, an aerosol, or a precursor of a greenhouse gas or aerosol from the atmosphere.

Snow water equivalent : The equivalent volume/mass of water that would be produced if a particular body of snow or ice was melted.

Snowpack: A seasonal accumulation of slow-melting snow.

Social cost of carbon: The value of the climate change impacts from 1 tonne of carbon emitted today as CO₂, aggregated over time and discounted back to the present day; sometimes also expressed as value per tonne of carbon dioxide.

Socio-economic scenarios: Scenarios concerning future conditions in terms of population, Gross Domestic Product and other socio-economic factors relevant to understanding the implications of climate change. See SRES.

SRES: The storylines and associated population, GDP and emissions scenarios associated with the Special Report on Emissions Scenarios (SRES), and the resulting climate change and sea-level rise scenarios. Four families of socio-economic scenario (A1, A2, B1 and B2) represent different world futures in two distinct dimensions: a focus on economic versus environmental concerns, and global versus regional development patterns.

Stakeholder: A person or an organisation that has a legitimate interest in a project or entity, or would be affected by a particular action or policy.

Stock: See reservoir.

Stratosphere: Highly stratified region of atmosphere above the troposphere extending from about 10 km (ranging from 9 km in high latitudes to 16 km in the tropics) to about 50 km.

Streamflow: Water flow within a river channel, for example, expressed in m³/s. A synonym for river discharge.

Sub-alpine The biogeographic zone below the tree line and above the montane zone that is characterised by the presence of coniferous forest and trees.

Succulent: Succulent plants, e.g., cactuses, possessing organs that store water, thus facilitating survival during drought conditions.

Surface runoff: The water that travels over the land surface to the nearest surface stream; runoff of a drainage basin that has not passed beneath the surface since precipitation.

Sustainable development: Development that meets the cultural, social, political and economic needs of the present generation without compromising the ability of future generations to meet their own needs.

Taiga: The northernmost belt of boreal forest adjacent to the Arctic tundra.

Thermal expansion: In connection with sea-level rise, this refers to the increase in volume (and decrease in density) that results from warming water. A warming of the ocean leads to an expansion of the ocean volume and hence an increase in sea level.

Thermocline: The region in the world's ocean, typically at a depth of 1 km, where temperature decreases rapidly with depth and which marks the boundary between the surface and the ocean.

Thermohaline circulation (THC) : Large-scale, density-driven circulation in the ocean, caused by differences in temperature and salinity. In the North Atlantic, the thermohaline circulation consists of warm surface water flowing northward and cold deepwater flowing southward, resulting in a net poleward transport of heat. The surface water sinks in highly restricted regions located in high latitudes. Also called meridional overturning circulation (MOC).

Thermokarst: A ragged landscape full of shallow pits, hummocks and depressions often filled with water (ponds), which results from thawing of ground ice or permafrost. Thermokarst processes are the processes driven by warming that lead to the formation of thermokarst.

Threshold: The level of magnitude of a system process at which sudden or rapid change occurs. A point or level at which new properties emerge in an ecological, economic or other system, invalidating predictions based on mathematical relationships that apply at lower levels.

Transpiration: The evaporation of water vapour from the surfaces of leaves through stomata.

Tree line : The upper limit of tree growth in mountains or high latitudes. It is more elevated or more poleward than the forest line.

Trophic level: The position that an organism occupies in a food chain.

Trophic relationship: The ecological relationship which results when one species feeds on another.

Troposphere: The lowest part of the atmosphere from the surface to about 10 km in altitude in mid-latitudes (ranging from 9 km in high latitudes to 16 km in the tropics on average) where clouds and 'weather' phenomena occur. In the troposphere, temperatures generally decrease with height.

Tsunami: A large wave produced by a submarine earthquake, landslide or volcanic eruption.

Tundra: A treeless, level, or gently undulating plain characteristic of the Arctic and sub-Arctic regions characterised by low temperatures and short growing seasons.

Uncertainty: An expression of the degree to which a value (e.g., the future state of the climate system) is unknown. Uncertainty can result from lack of information or from disagreement about what is known or even knowable. It may have many types of sources, from quantifiable errors in the data to ambiguously defined concepts or terminology, or uncertain projections of human behaviour. Uncertainty can therefore be represented by quantitative measures (e.g., a range of values calculated by various models) or by qualitative statements (e.g., reflecting the judgment of a team of experts). See also confidence and likelihood.

Undernutrition: The temporary or chronic state resulting from intake of lower than recommended daily dietary energy and/or protein requirements, through either insufficient food intake, poor absorption, and/or poor biological use of nutrients consumed.

Ungulate: A hoofed, typically herbivorous, quadruped mammal (including ruminants, swine, camel, hippopotamus, horse, rhinoceros and elephant).

United Nations Framework Convention on Climate Change (UNFCCC) : The Convention was adopted on 9 May 1992, in New York, and signed at the 1992 Earth Summit in Rio de Janeiro by more than 150 countries and the European Community. Its ultimate objective is the 'stabilisation of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system'. It contains commitments for all Parties. Under the Convention, Parties included in Annex I aim to return greenhouse gas emissions not controlled by the Montreal Protocol to 1990 levels by the year 2000. The Convention entered in force in March 1994. See also Kyoto Protocol.

Upwelling region - A region of an ocean where cold, typically nutrient-rich waters from the bottom of the ocean surface.

Urbanisation: The conversion of land from a natural state or managed natural state (such as agriculture) to cities; a process driven by net rural-to-urban migration through which an increasing percentage of the population in any nation or region come to live in settlements that are defined as 'urban centres'.

Vagile : Able to migrate.

Vascular plants: Higher plants with vascular, i.e., sap-transporting, tissues.

Vector - A blood-sucking organism, such as an insect, that transmits a pathogen from one host to another. See also vector-borne diseases.

Vector-borne diseases: Disease that are transmitted between hosts by a vector organism (such as a mosquito or tick); e.g., malaria, dengue fever and leishmaniasis.

Vernalisation: The biological requirements of certain crops, such as winter cereals, which need periods of extreme cold temperatures before emergence and/or during early vegetative stages, in order to flower and produce seeds. By extension, the act or process of hastening the flowering and fruiting of plants by treating seeds, bulbs or seedlings with cold temperatures, so as to induce a shortening of the vegetative period.

Vulnerability: Vulnerability is the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity.

Water consumption: Amount of extracted water irretrievably lost during its use (by evaporation and goods production). Water consumption is equal to water withdrawal minus return flow.

Water productivity: The ratio of crop seed produced per unit water applied. In the case of irrigation, see irrigation water-use efficiency. For rainfed crops, water productivity is typically 1 t/100 mm.

Water stress: A country is water-stressed if the available freshwater supply relative to water withdrawals acts as an important constraint on development. Withdrawals exceeding 20% of renewable water supply have been used as an indicator of water stress. A crop is water-stressed if soil-available water, and thus actual evapotranspiration, is less than potential evapotranspiration demands.

Water-use efficiency: Carbon gain in photosynthesis per unit water lost in evapotranspiration. It can be expressed on a short-term basis as the ratio of photosynthetic carbon gain per unit transpirational water loss, or on a seasonal basis as the ratio of net primary production or agricultural yield to the amount of available water.

Welfare: An economic term used to describe the state of well-being of humans on an individual or collective basis. The constituents of well-being are commonly considered to include materials to satisfy basic needs, freedom and choice, health, good social relations, and security.

Wetland: A transitional, regularly waterlogged area of poorly drained soils, often between an aquatic and a terrestrial ecosystem, fed from rain, surface water or groundwater. Wetlands are characterised by a prevalence of vegetation adapted for life in saturated soil conditions.

Yedoma : Ancient organic material trapped in permafrost that is hardly decomposed.

Zoonoses: Diseases and infections which are naturally transmitted between vertebrate animals and people.

Zooplankton: The animal forms of plankton. They consume phytoplankton or other zooplankton.

Appendix 30

Indicator Framework

Summary

The framework of indicators has been designed and drafted by the General Economics Division (GED) with direct inputs from the planning professionals of different ministries and departments and Planning Commission. The framework intends to support these professionals, as well as the approving authority, evaluator and policy makers. The Indicator Framework upon adoption will be annexed to the DPP Manual template. It will serve as an elaboration and support to the clause 23 and clause 28 of the DPP and along with the DPP the framework will remain anchored to the Planning Commission.

This operational document took inspiration from the Constitution of the People's Republic of Bangladesh (15th Amendment, paragraph 18 A¹) and is fully aligned with key national plans and strategies. These include: the Sixth Five Year Plan (SFYP) 2011-15 (GED, 2011); the Perspective Plan of Bangladesh (2010-2021) (GED, 2010); National Plan for Disaster Management (NPDM) 2010-15 (DBM, 2010); Bangladesh Climate Change Strategy and Action Plan (BCCSAP) (MOEF, 2009); National Sustainable Development Strategy (NSDS) 2010-21 (GED, 2012); as well as relevant sector specific policies and plans. In the process of identification and selection of categories and dimensions of indicators, guidance has also been taken from:

- National Adaptation Programme of Action (NAPA) (MoEF, 2005, Revised NAPA 2009);
- MDGs for Bangladesh
- United Nations Development Assistance Framework (UNDAF) for Bangladesh 2012 - 2016: Indicators for Pro-poor growth & equity, Food Security & Nutrition and Climate Change, Environment, Disaster Risk Reduction and Response
- Preparing for low emission climate resilient development: what is in place and remaining gaps/issues

This document frames indicator dimensions under categories and provides a number of examples. The indicators are not, however, "development indicators", but rather sets of compliance and safe guard indicators for:

1. Ensure complementary actions to poverty reduction

- Inclusive development
- Increase the number of jobs, in particular green jobs, and those focused on women and socially disadvantaged groups
- Ensure participation
- Improve access to common resources to improve energy and nutrition
- Enhance social safety nets.

2. Promote a climate resilient economy, climate resilient ecosystems and a sustainable environment

- Sector, ecosystems and community based adaptation
- Sustainable land use, wetland and forest management
- Promote disaster risk reduction
- Greening industries and jobs.

3. Implementation of sectoral policies and national plans that are low emission and climate resilient

- Support market transformation towards low emission economy

¹ 15th amendment, 18A, The Constitution of the People's Republic of Bangladesh, [18A. The State shall Endeavour to protect and improve the environment and to preserve and safeguard the natural resources, bio-diversity, wetlands, forests and wild life for the present and future citizens.]

- Sustainable transport
- Increased energy coverage, enhance energy efficiency, promote renewable energy
- Low emission technology; mitigation in all sectors
- Climate proofing infrastructure.

The framework does not intend to provide exhaustive lists of indicators, rather has been structured in to the following categories and dimensions of indicators:

- Climate change integration
 - Scenarios of climate change
 - Prediction modeling
 - Early warning
 - Low carbon development
- Safety and functioning of interventions
 - Infrastructure
 - Risk reduction and management
- Enhance resilience and adaptation
 - Environment
 - Ecosystems
 - Agriculture
 - Energy
 - Transport
 - Community
- Knowledge management, capacity building and social communication
 - Knowledge management
 - Capacity building
 - Social communication.

The sets of indicators presented as examples are a mix of output and outcome indicators. The output indicators are the tangible products or deliverables of any development proposals that have the potential of bringing an outcome of climate resilience for the community and reduced adversity of poverty environment and climate nexus.

Output indicators in favour of pro-poor, environment friendly, low emissions, and disaster and climate resilient development will be characterized by: legal, policy and institutional environment through fine tuning/adjusting/amending/adopting; enhancing institutional capacity to improve performance relative to the objective; ecosystem and biodiversity functions; adaptive and resilient agriculture, fisheries, livestock and other production systems; adaptation measures for the sustenance and function of existing capital and assets; resilience of infrastructures and infrastructure for protection; low emitting energy generation, industries, transport systems and agriculture and knowledge generation, knowledge products, tools, instruments, database etc.

Outcome Indicators are to measure the "value" of changes in the output indicators. With the outputs in place, the institutional functionality will be measured as an outcome. For example, whether appropriate legal and policy regimes are in place, skilled and educated human resources are being utilized, institutions are functioning adequately, and contemporary knowledge, tools and instruments are being applied. Thus, these indicators will also measure whether policy objectives such as the

following, have been achieved: economic development; environmental integrity; reduced disaster risk; maintenance of livelihoods; better health and welfare; low carbon emission etc.

Input Indicators capture changes in the inputs like allocation for legislation, policies, strategies, plans, instruments and tools, knowledge, institutions and capacity building at all levels and direct interventions characterized by the public expenditures.

The input indicators are not included in the examples as the development proposals will include budget against these items including expenditure against direct interventions. However, the outputs from these inputs are included as output indicators. In order for measuring the value for money of the realized outputs and outcomes against input the proposal should accordingly be screened and serve various decision-making processes in pursuing pro-poor, environment friendly, low emitting, and disaster and climate resilient development including resource allocation in the ADP and through MTBF.

The framework could also be used by the IMED professionals to track environment, climate change and disaster issues with a set of outcome level indicators. Planning professionals engaged in preparing development proposals on behalf of their respective ministries, in different sectors and at all levels, will benefit from the indicator framework.

1.1 Purpose

This report provides a framework of indicators aimed at wider application in the key stages of Annual Development Programme (ADP) finalization in Bangladesh. The framework is designed to support a continual process of decision-making, to guide development planning, and to evaluate interventions.

Indicators for pro-poor, environment friendly and low emission, disaster and climate resilient development would serve to structure and facilitate the process of preparing, screening, and monitoring development proposals, as well as to make them accountable. Indicators should thus, provide concrete and meaningful information on the conditions and changes over time of the inputs into the process of development, as well as the outputs and outcomes focusing compliance of the development proposals to the environmental safety and social safeguard. A set of indicators collectively ensures functionality and sustenance of the interventions in the changing climate condition considering nexus of poverty, environment and climate change in the development process. The impacts are assumed in accordance with the vision, goals and objectives as aspired in national perspective plans.

Bangladesh is proactive in dealing with climate change and developed plans and strategies and established Climate Change Trust Fund. The vulnerability and impacts of changing climate conditions on the sectoral developments has already been anecdotal in various reports, books, articles and research findings. The annotated bibliography of climate change in Bangladesh (Uddin et al. 2009) has numerous annotations of findings. The policy makers and the professionals who drive public investment planning and implementation in Bangladesh are reasonably sensitive to the emerging climate conditions and potential impacts. The Perspective Plan (2010-2021) and the Sixth Five Year Plan (2011-15) incorporated mainstreaming climate change considerations into the development process, and BCCSAP outlines and frames development themes and action plans, while, National Plan for Disaster Management 2010-15 has integrated climate change. The climate change considerations have to factor in into the development persuasion in a systematic and consistent manner. Therefore, it is necessary to interpret national level plans/strategies into sectoral planning to ground interventions at the local and regional level.

Mainstreaming Climate Change (CC) in the public planning and development process through Annual Development Programme (ADP) and budgets would enable public sector investments to align and comply with directives of the national policies. Annual Development Programme is prepared compiling the yearly development proposals of all ministries which are prepared following the ADP guidelines and in the format of Development Project Proforma (DPP). To initiate mainstreaming in the development aspiration, it requires i) directives from the planning authority (Planning Commission) to the respective ministries to make their development proposals sensitive to climate change through ADP guidelines and incorporating clauses in the DPP that would ensure the sensitivity of the development proposals; ii) guidelines and capacity of the professionals to comply the directives in ADP guidelines and fulfilling DPP requirements; iii) the planning authority requires a tool to screen proposals to ensure such sensitivity and iv) policy makers require to appreciate the changes in the technical proposal to allocate resources and v) the Monitoring department requires to monitor and evaluate. ADP is the interpretation of the national perspective and macro policies, plans annually, reflects the political manifesto. The generic attributes of the ADP is to comply national and global commitments for example environmental integrity, gender equity, poverty reduction and others. As such several indicators are there to shape up the ADP accordingly. It may be mentioned that this framework is not for replacing Environmental Impact Assessment (EIA) mechanism neither to enhance investment for poverty reduction. This framework is to ensure integration of climate

change and consider poverty-environment-climate nexus into ADP in responding clause 23 and clause 28 of revised DPP comprehensively and ensure compliance of environmental and social safeguard.

1.2 The Framework

The framework has been conceptualized, designed and developed for operation under the overall guidance of the policy goals and objectives as set in the Perspective Plan of Bangladesh (2010-2021) to realize Vision 2021, Sixth Five Year Plan (SFYP) 2011-2015, Bangladesh Climate Change Strategy and Action Plan (BCCSAP) 2009, National Plan for Disaster Management (NPDM) 2010-2015, National Sustainable Development Strategy (NSDS) 2010-21, MDGs for Bangladesh, National Communications to UNFCCC, Multilateral Environmental Agreements (MEAs), Sectoral Policies and Strategies.

The indicator framework encompasses input, output and outcome indicators. In the context, inputs would refer to existing policy regime, public expenditures including budgetary allocations to projects, developing training modules, manuals, research and knowledge generating activities, leveraging and/or building institutions, for developing instruments (e.g. trust fund, climate fiscal framework), accountability frameworks and even this indicator framework.

Outputs relate mainly to immediate deliverables because of the nature of the inputs. They may include, for example, new legislation, policies, adjusted and fine tuned plans and strategies to consider changing conditions (e.g. climate change), training modules, manuals and materials, training programmes delivered, knowledge products (e.g. fact sheets, climate change scenarios, climate impact scenarios etc.), and the construction of physical interventions (e.g. protective walls, restoring ecosystem connectivity, implementing afforestation programmes etc.).

Outcomes measures the performance of these changes in terms of specified policy objectives, for example, positive changes in the performance of institutions, in the capacity of professionals, and in the legal and policy regime, and to what extent these changes are reflected at the ground level to meet policy objectives. Such policy objectives may include community resilience, performing ecosystems, climate compatible development, sustained livelihoods, and protected infrastructure.

It is not possible, nor is it the intention here, to portray the nature or functions of natural or physical entity precisely. However, a set of meaningful and representative indicators would facilitate the monitoring and assessment of functions of the resource bases (ecosystems, institutions, infrastructures, economic and financial functionaries, human/social capital) in the changing conditions, with or without interventions, and allow for planned interventions to be ranked in terms of policy and management objectives. The indicators can thus, provide a concrete contribution to the difficult process of communication among stakeholders in the rationalization of multi-purpose decision-making processes ensuring the compliance, in this instance, integration of climate change and considering poverty, environment and climate nexus.

The drive for developing and using an indicator framework for such complicated management processes as low emission climate resilient development and to reduce poverty whilst maintaining the environment, is in its infancy as the uncertainties and multifaceted impacts of climate change are yet to unfold. Assessment criteria as mentioned for poverty reduction and environmental degradation have however, been available for some time and development proposals around the world are being assessed using such indicators. The issues of climate change, resilience, and a low carbon path and the nexus for development are also in the process of being mainstreamed into development planning. Global, regional and national policies are increasingly acknowledging these issues and, in this regard, Bangladesh is quite progressive.

Recently a screening mechanism for environmental and social safeguards has been initiated by UNDP, UNEP and World Bank (UN 2012, UNDP 2012, World Bank 2012). UNDP has also developed guidance for professionals in low emission climate resilient development (UNDP 2011). IUCN has developed a list of

indicators to monitor climate change impacts on different sectors to improve adaptive capacity (IUCN 2011). In the given context to support the Bangladesh development process sensitive to climate change, Poverty, Environment and Climate Mainstreaming (PECM) project, implemented by the General Economics Division (GED) of the Planning Commission, Bangladesh and supported by UNDP and UNDP-UNEP PEI, has taken this initiative to develop a 'Framework of Indicators for Pro-Poor, Environment Friendly, Low Emission, and Disaster and Climate Resilient Development'.

1.3 Process of developing the framework

The General Economics Division (GED) of Planning Commission of the Government of Bangladesh with technical input and advice from National Climate Change Advisor, Boots on the Ground, UNDP has drafted a 'Framework of Indicators for Pro-Poor, Environment Friendly, Low Emission, and Disaster and Climate Resilient Development'. The main objective of developing the 'Indicator Framework' is to assist the professionals and relevant officials engaged in planning, designing, implementing and monitoring programmes to include indicators for developing and screening proposals to ensure sensitivity to climate change and Poverty-Environment-Climate-Disaster (PECD) nexus. The Initial draft was aligned with the requirements of the national Medium and Perspective Plans and considered the Development Project Proforma (DPP) and an analysis of the ADP system. The draft considered input, output and outcome indicators, with particular focus on the compliance of climate change as well as Poverty-Environment-Climate-Disaster (PECD) nexus in achieving outputs and or outcomes. It draws from the indicators of the national medium and long term plans as well as benefitted conceptually from the environmental and social safeguard dimensions of development as prescribed by UNDP (UNDP, 2012).

The initial draft has been used as input in a brainstorm session among planning professionals of the GED, Planning Commission, PECM project and UNDP Bangladesh CO. Drawing from the brainstorming session a 2nd draft was prepared. This core group decided to have Focus Group Discussions (FGDs) with all the stakeholders linked to the sector division of the Planning Commission (PC). Accordingly, 6 Focused Group Discussions (FGDs) were held consecutively on 13 June, 23 July, 25 July, 01 August, 11 November and 15 November in 2012 with the stakeholders (BCS Economic Cadre Officials, representatives from Departments/Agencies, Ministries) linked to the four Sector Divisions of Planning Commission (PC) (Annex 8). Each of these meetings were presided over by the National Project Director of PECM project, and the Chief Guest was Dr. Shamsul Alam, Member of General Economics Division (GED), Planning Commission (PC). The Proposal was provided to the FGD participants before the discussion and robust comments were received at the FGDs. The suggestions have been incorporated in the final draft for National Consultation. Through this process, the framework has been shaped by the planning professionals and an ownership has been developed for enabling them to use the document in their day to day work.

The draft proposal on the Indicator Framework was also submitted on July 2012 to the Solution Exchange e-Network to gather comments from a broad and wide audience - national and international. It receives comments and suggestions from globally renowned adaptation experts, academics, development professionals, NGO representatives, civil society members, regional policy advisers and national climate change policy advisers from Asia Pacific countries, Bhutan, Nepal and Cambodia. The comments, remarks and suggestions have improved the quality of the framework.

The final draft has been consulted nationally with wide array of stakeholders that includes government line ministries and agencies, local government representatives, NGOs, CSOs, policy makers, political leaders. Accommodating the feedback from the national consultation the draft has been finalized for adoption and complies with the revised DPP format. It may be mentioned, that Planning Division has revised the DPP/TPP format to incorporate among many pertinent issues, the issues of climate change, disaster and environment in a comprehensive manner.

Section 2 Conceptual Understanding

2.1 Climate Change

Climate Change is generally perceived as the long-term significant change in the "average weather" which includes temperature, precipitation and wind patterns of a region or the earth as a whole. According to Intergovernmental Panel on Climate Change (IPCC), Climate Change refers to a change in the state of the climate that can be identified (e.g., by using statistical test) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. These changes can be caused by dynamic processes on earth, external forces including variations in sunlight intensity and more recently by human activities (IPCC, 2007). Climate change refers to human induced increased GHG emission resulted global warming, temperature fluctuations and variability, erratic rainfall, a higher number of dry days, increased spells of heavy rain fall and sea level rise (OECD, 2003). These changes result in salinity intrusion in the country side and in increased incidence and intensity of hazards of higher magnitudes. The impacts of such changes are felt worldwide, especially by vulnerable countries like Bangladesh, at different degrees and depending on the natural setting and socio-economic conditions.

The IPCC also recognizes Bangladesh as one of the most vulnerable countries in the world to the negative impacts of climate change. The United Nations Development Programme (UNDP) has further identified Bangladesh to be the most vulnerable country in the world to tropical cyclones and the sixth most vulnerable country to floods (UNDP, 2004). Key factors contributing to its vulnerability are geographic location, low elevation, high population density, poor infrastructure, high levels of poverty and dependency on natural resources. Coastal resources upon which the most people depend are likely to be affected severally due to climate variability and change. It is predicted that for 45 cm rise of sea level may inundate 10-15% of the land by the year 2050 resulting over 35 million climate migrant from the coastal districts.

2.2 Impacts of Climate Change on Bangladesh

Bangladesh is a low lying deltaic country with a high rural population density and a predominantly agrarian economy. The impact of climate change in Bangladesh is being felt in the increasing intensity, frequency and magnitudes of hazards (MoEF 2009). Changes in the variability of the weather parameters are having, and will continue to have, a profound impact on production systems; particularly in agriculture and water resources (MoEF, 2009). It is well known however, that the impacts and implications of changes in the occurrence, prevalence and variability of the hazards will depend on the resilience of ecosystems, of the economy and of society.

Climate change impacts the very local resource bases that people are reliant on to realize their livelihoods. It also impacts the capital assets of households, including the health and safety of the people. This is likely to affect urban slum dwellers the most. Rural livelihoods are sensitive to climate change. Increased hazards from climate change are spreading across time and space and have the effect of limiting livelihoods and welfare. The impacts of climate change are reaching nearly all means of economic activities, including crops, fisheries, livestock and cottage industries and indirect impacts include the effect on the roads and high ways, flood protection infrastructure, growth centers, and

transportation (MoEF, 2009). Poor people living in marginalized lands are exposed to hazards and a state of incremental degradation that makes their livelihood more challenging. People in rural settings are more dependent on natural resources and have limited livelihood diversity and are thus, vulnerable to climatic variation. In response to climate change, drainage congestion is worsening and the millions of city slum dwellers are facing an increasing state of misery. Shelter, production system, livelihoods and the health and safety of people are being increasingly impacted by climate change.

2.3 Sustainable development, MDGs achievement and Climate change

The widely recognized definition of sustainable development as "development which meets the needs of the present without compromising the ability of future generations to meet their own needs"² is considered in the strategies for environment, climate change and disaster management in the Sixth Five Year Plan.

Economic growth can be sustained provided it is not at the expense of the environmental assets and ensures equity in the distribution of the surplus produced. Degradation of the environment is a problem throughout the world and in particular in the countries of developing economy. The distance between the rich and the poor are also ever increasing in almost all economy.

Since independence in 1971, Bangladesh has made considerable development progress and performed well-above initial expectations. It has increased its per capita income many times over, cut the poverty rate over successive years (from close to 60% in 1990 to 40% in 2005 to 31.5% in 2010³) and is now well placed to achieve the vast majority of the Millennium Development Goals (MDGs).

The MDG Progress Report 2011 (GoB 2012) indicated that out of 52 MDG targets over 70% have already been met or are on track to be achieved by 2015. This record has been driven by strong economic performance during the last decade. Since 2010, economic growth has averaged 6.5% (versus 5.9% between 2000 and 2009) and this has been accompanied by significant structural changes (Unnayan Onneshan, 2010). The industrial sector now accounts for around 30% of GDP versus 20% for agriculture. The export of excess labour has also been significant and external remittances are substantial, contributing over 10% of GDP. Economic growth has also been relatively inclusive with inequality stabilizing in the past 10 years (a Gini coefficient for consumption of 0.32 in 2010).

Depth and severity of poverty measures have declined by a greater margin; the Gap Ratio has fallen from 4.6% to 3.1%, while the Severity index has dropped from 1.3% in 2005 to 0.8 % in 2010. Poverty reduction has also been supported by a lower fertility rate and longer life expectancy, accompanied by falls in household size. Compared with the MDG base year 1990, life expectancy in Bangladesh has increased from 59 years to 68 years, and total fertility had declined twice over; family size is now approaching replacement levels⁴. Bangladesh has achieved gender parity in primary and secondary education.

2 From the Brundtland Report, United Nations. 1987. "Report of the World Commission on Environment and Development". General Assembly Resolution 42/187, 11 December 1987.

3 Household Income and Expenditure Survey (HIES) compiled and published by the Bangladesh Bureau of Statistic (BBS) <http://www.bbs.gov.bd/PageWebMenuContent.aspx?MenuKey=320>

4 See <http://www.unicef.org/infobycountry/bangladesh> and UNFPA Briefing to LCG DP Plenary, 29th November 2012.

Notwithstanding this progress, Bangladesh remains a Least Developed Country (LDC) with substantial levels of deprivation. An estimated 47 million people (BBS 2011) are living below the national poverty line, including about 25 million in extreme poverty. A significant proportion of these households live in remote areas, and these represent some of the most socially excluded and vulnerable populations. These areas include the urban slums, the Hill Tracts, coastal belt, Chars and other ecologically vulnerable areas. The poor are often disadvantaged in terms of formal ownership of assets that can be capitalised, have inadequate access to institutional finance and basic services, including quality education, healthcare, water and sanitation.

Climate Change

Based on the Second National Communications of Bangladesh, which was prepared and approved as part of the global obligation under the UNFCCC, some of the salient features of climate change and its impacts on Bangladesh are briefly mentioned below.

- SLR will reach 27cm in the coast of Bay of Bengal by 2050. One analysis indicates SLR of 5.05mm to 7.4mm/yr.
- Area inundated by 2050 with a SLR of 27cm and GCM scenario may increase by 197222sq m.
- Rise in temperature on average may be 1.6 oC by 2050.
- Aggregate precipitation may increase by 8% with respect to current average.
- Flooded area is expected to increase by 6% in 2030 and by 14% in 2050 for most of the flood season.
- Due to increase in temperature and precipitation change it may reduce output yield of Boro by 13.9% in 2050. Production of Aus and Aman crops are expected to reduce at the rate of 0.62% and 1.52% respectively.
- In the Sundarbans the areas suitable for Sundori, Gewa will decline drastically with SLR but suitable areas for Goran will increase as saline environment is more favourable for its growth.

MDG Indicators

The progress in economic growth seems to be compromising the environmental integrity of the country. Though the percentage of population under the poverty line has consistently declined the difference in income to the poor and the rich are increasing and achievement in reducing malnutrition is not up to the mark. Achievements in MDGs for Bangladesh reflect this situation. Progress on Millennium Development Goals (MDG) up to 2012 (GED 2013) showed that MDG 7: Ensuring environmental sustainability is not on track. The adoption of the NSDS (2011-2021) is expected to improve the progress of MDG 7.

Economic Growth

Relationship among climate change, poverty, economic growth and sustainable development is multidimensional and complex. It is recognized in the scientific and negotiating community that climate change induced impacts will put additional challenges to many of the Millennium Development Goals and targets in general, and poverty and hunger, and environmental sustainability in particular. Different climatic elements, such as those outlined in the previous page, will impact different sectors in various scales depending on the geographical areas.

A study was undertaken by GED in 2009 to understand the relationship between climate change and poverty, and impacts of climate change on economic growth. It estimated the probable impacts of climate change on poverty alleviation and economic growth by measuring the nature of impacts on the critical sectors of agriculture, health, water.

Assessment of impacts on economic growth is difficult to find but it appears that it could reduce 12% of GDP contribution for that particular time. Effects of cyclone are more severe than flood. The experts agreed that 60% damage of crop by a cyclone increases poverty at the same percentage affecting their resources and livelihoods, and decreases economic growth by 15% for the respective period. Thus, MDG 1 (Poverty eradication and hunger) is badly affected and pushed backward changes in flood and cyclone characteristics will affect crop agriculture very severely, which will affect poverty at the same scale. The poor will suffer mostly because they have less capacity to respond to these shocks. The economic growth of the particular sector will also be affected considerably. The experts suggested that reduction may rise up to 70-80% and impacts on economic growth could be 17%. Moreover, drought and erratic rainfall will also reduce crop production by 40% and 30% respectively, which will affect poverty moderately and economic growth at a lower scale.

Moreover, they will suffer from malnutrition due to reduction of fishing. Economic growth of fisheries sector will also be affected moderately. Pertinently, the impact of climate change on livestock and forestry affects the livelihood of the rural poor as it reduces livelihood opportunities, income and employment opportunities of the poor villagers. The results of these effects affect poverty and economic growth moderately because crop damage, disease outbreaks, loss of livelihood options, damage of infrastructure increases poverty affecting economic growth of different sectors (GED, 2009).

Climate change in the context of Bangladesh has direct bearing on the growth, environment and equity distribution. Still today the Bangladesh economy is predominantly agrarian. It is noted that contribution of agriculture sector in recent years is below 20% of the GDP but is responsible for nearly 50% of employment and food security (MoF 2012).

Climate change has direct adverse impacts on the agriculture sector including fisheries and natural resources, on which vast majority of the population depend as a source of protein and a considerable percentage of rural population depends on for their livelihood/subsistence. Climate change adversity is on natural resource base, livelihood capital assets, livelihood activities as such on productivity and growth. Climate change impacts on ecosystem functionality are profound and are degrading environment. Climate change impacts poor and rich differently, man and women differently, able and disable differently and as such are enhancing discrimination.

2.4 The Poverty Environment Climate Disaster (PECD) Nexus

Bangladesh agriculture is highly dependent on natural endowment such as temperature, rainfall, flooding, moisture etc. Climate change is changing the pattern of rainfall, with heavy downpour in short spell of time creating inundation and damaging of standing crops, increasing in numbers of dry days over the year creating agricultural droughts and creating trouble in crop calendars and thus productions. Fluctuations in minimum and maximum temperature are having negative impacts on the productivity. Agriculture sector, water resources, and other natural recourses are dependent on climate and are under stress. Bangladesh is historically a hazard prone country and the intensity, frequency and magnitude of hazards are increasing with climate change. Depending on the severity of

hazards and the resilience, disasters often hit Bangladesh and erode the capital assets of the people. The destruction and damage of infrastructure including settlement, calls for diversion of the development budget on a state level scale whilst people fall below the poverty line. This situation has the most profound impact on the large portion of the population who are dependent on the agriculture sector and natural resource collection; those who undertake day labor; and on women.

Population (individuals, households, and communities) is living in a landscape that includes natural recourse bases, physical infrastructures, financial and economic bases and the social and institutional premises. The people might have access to recourses through various entitlements. The Households are also having resources at their household's. For example they might have a homestead, house, infrastructures like latrine, food storage facility, tube well, trees, vegetable gardens, poultry, cattle, livelihood pursuing equipments like carpentry, fishing or other equipments/gears, money and relatives, not to mention the household members. People drawing from their capital and livelihood assets either through entitlement or direct possessing under take livelihood activities to generate income which allows them to wellbeing. In the Bangladesh setting, poverty is directly linked to the environment as explained the economy and the livelihoods. Climate change directly adversely impacts all sort of livelihood assets and the livelihood activities in particular for the poor as explained the bearing of the Bangladesh economy on the agriculture and the dependence of the agriculture on the climate change and the high level and engagement of the poor people in realizing their livelihoods. The disaster prone Bangladesh historically eroding the capital assets of the marginalized and putting them through the cracks below the poverty line. For example, the river bank erosion, salinity ingress.

Thus it is clear from the impacts of climate change, that there is an interrelationship between poverty, environment, climate change and disaster. These issues cannot be addressed separately, and there interdependence must be taken into account. Any poverty alleviation effort will be sensitive, in various degrees to the effects of climate change. Bangladesh being a hazard prone country historically, climate change puts disasters as risk of high order to sustainability of projects and programmes.

Environmental mainstreaming is defined as integrating poverty environment linkages into national development planning processes and their outputs, such as Millennium Development Goal (MDG) strategies, national plans and sector policies. It involves establishing the links between poverty and environment- including climate change- and identifying the policies and programmes to bring about better pro-poor environmental management. It is targeted at influencing national plans, budget processes, sector strategies and local level implementation-reflecting the need to integrate the valuable contribution of environmental management to improved livelihoods, increased economic security and income opportunities.

High population density and the lack of environmental governance have seriously reduced the minimum environment space for the wider community. The unwise use of natural resources and the existence of revenue-focused leasing policies are destroying the functionality of ecosystems that were supposed to form part of the common pool resources. For the poorer sections of the community, being denied access to these resources is having the effect of pushing them below the poverty line. In this context, and in order to better understand the bearing of the climate change and the environment on the livelihoods and food security, the Sustainable Livelihood Framework (SLF) has been customized to factor in the impacts of the climate change. The climate resilient SLF has been considered to establish a framework of indicators for Pro-poor, Environment Friendly, Low Emission, Disaster and Climate Resilient Development.

Admittedly, the future development challenges are more complex in terms of the governance and institutional development agenda. The extremely high population to land ratio is a major limiting factor. Additionally, the adverse effects of environmental degradation and climate change pose substantial downside risks. Even so, with a dynamic population, strong political leadership and a commitment to addressing the underlying governance and institutional development agenda, Bangladesh is well poised to push ahead with the implementation of Vision 2021.

2.5 The Policy Context in Bangladesh

The 15th amendment, Section 18A, of The Constitution of the People's Republic of Bangladesh - "The State shall endeavour to protect and improve the environment and to preserve and safeguard the natural resources, bio-diversity, wetlands, forests and wild life for the present and future citizens" - provides the fundamental guidance for the initiative to frame indicators. Following the national perspective and macro plans and strategies, the policy context for developing the framework has been set. These plans and strategies guide the direction and set the boundary for the framework.

Perspective Plan of Bangladesh (2010-2021): Making Vision 2021 A Reality: The policy context for this framework is overwhelmingly aligned the Government Perspective Plan 2010-2021 aimed at implementing Vision 2021. The perspective plan explicated broad development goals for the country. The key message of Perspective Plan is summarized as follows:

"The development perspective envisages to achieving, in the coming days, a prosperous progressive nation in which food and energy security shall prevail with drastic reduction of poverty and a low level of unemployment. The Perspective Plan also includes great strides in human development including health and nutrition, effective population control, progress in all levels of education, primary, secondary and tertiary in addition to commendable improvement in science and technology, along with great achievement in ICT. Infrastructure development will improve integrated multi-modal transport encompassing, railways, roads and inland water transport having connectivity with our neighbors. In other words, the development perspective implies the simultaneous fulfillment of economic and social rights of the people alongside civil and political rights. For this to happen strong links between economic growth on the one hand, and expansion of employment opportunities, reduction of poverty, expansion of democracy and empowerment, consolidation of cultural identity and protection of environment with its freshness for the next generation on the other will be established"⁵ (GED 2010).

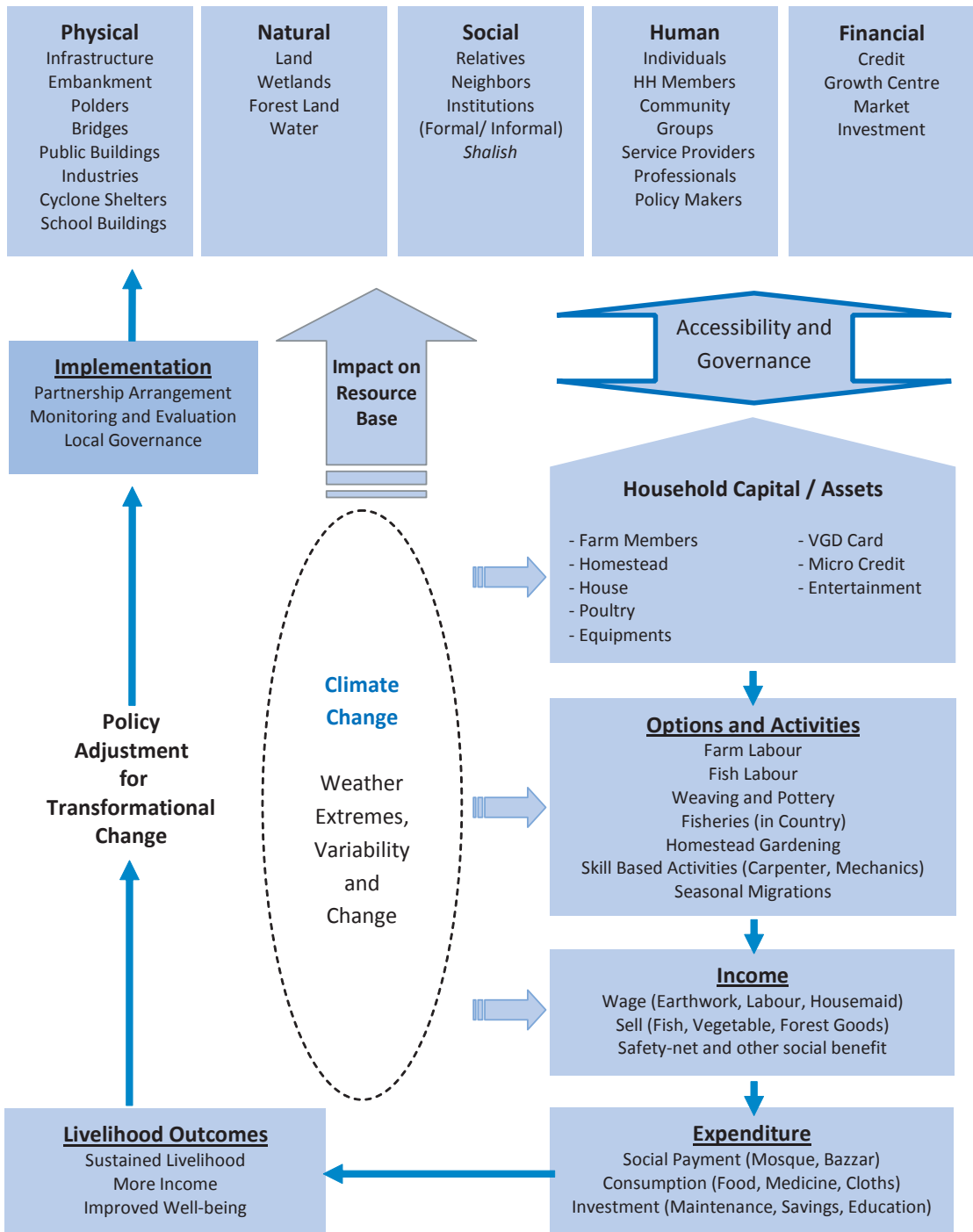
Sixth Five Year Plan (SFYP): The Sixth Five Year Plan (SFYP) 2011-2015 is the medium term macro plan in alignment with the Perspective Plan 2010-2021. The SFYP provides the strategic directions for implementing the main socio-economic targets of the Perspective Plan. It focuses on the underlying strategies, policies and institutions for achieving the major targets for economic growth, employment, human development, poverty reduction, social protection and environmental management. The required macroeconomic framework and aggregate financing strategies and resource requirements are elaborated in the Plan. The SFYP details the sectoral strategies, plans and programs, including indicative sectoral development resource allocations to ensure consistency with the overall resource envelope. For environmental matters, this involves activation of the National Environment Council and

⁵ p 1, Perspective Plan of Bangladesh FY11-FY21 (Making vision 2021 a reality), General Economics Division, Planning Commission, Government of The People's Republic of Bangladesh, 2010.

environment committees at all levels, amendment of environmental laws and regulations, strengthening of the Department of Environment, formulation and use of EIA guidelines, review of sectoral legislation and compliance enforcement, as well as the ratification of a number of international conventions and protocols on the environment. The plan also reaffirms the establishment and operation of the 'Polluters Pay Principle', provides incentives in various forms and will establish a 'National Environment Fund'. It provides a list of the environmental programmes that will be implemented over the five year period. Similarly, policies, strategies and programmes have been listed for the forestry sub-sector.

National Plan for Disaster Management: The Disaster Management vision of the Government of Bangladesh is "to reduce the risk of people, especially the poor and the disadvantaged, from the effects of natural, environmental and human induced hazards, to a manageable and acceptable humanitarian level, and to have in place an efficient emergency response system capable of handling large scale disasters." The National Plan for Disaster Management Plan 2010-2015 has been accommodated in the SFYP. A matrix of targets, outcomes and actions to realize strategic goals are included in NPDM which are of high relevance for the guiding screening process.

Figure 1: Climate Change and Livelihood Framework



Bangladesh Climate Change Strategy and Action Plan (BCCSAP): Low emission growth is one of the six thematic pillars in the Bangladesh Climate Change Strategy and Action Plan (BCCSAP, 2009) (pillar 5: low carbon development path). The BCCSAP 2009 provides a framework to build on the climate change agenda for the SFYP and accordingly a bench mark and target for the SFYP period has been included against six themes and 44 programmes of the BCCSAP 2009 (Annex 4). Poverty reduction is a national focus for Bangladesh in maintaining sustainable development that ensures equity. It is important to recognize that climate change is not something for which any quantitative benchmark in physical terms can be set. The agenda is large and involves the creation and management of knowledge, the formulation of policies, and the development of institutions. It also requires coordination and collaboration with regional and global partners.

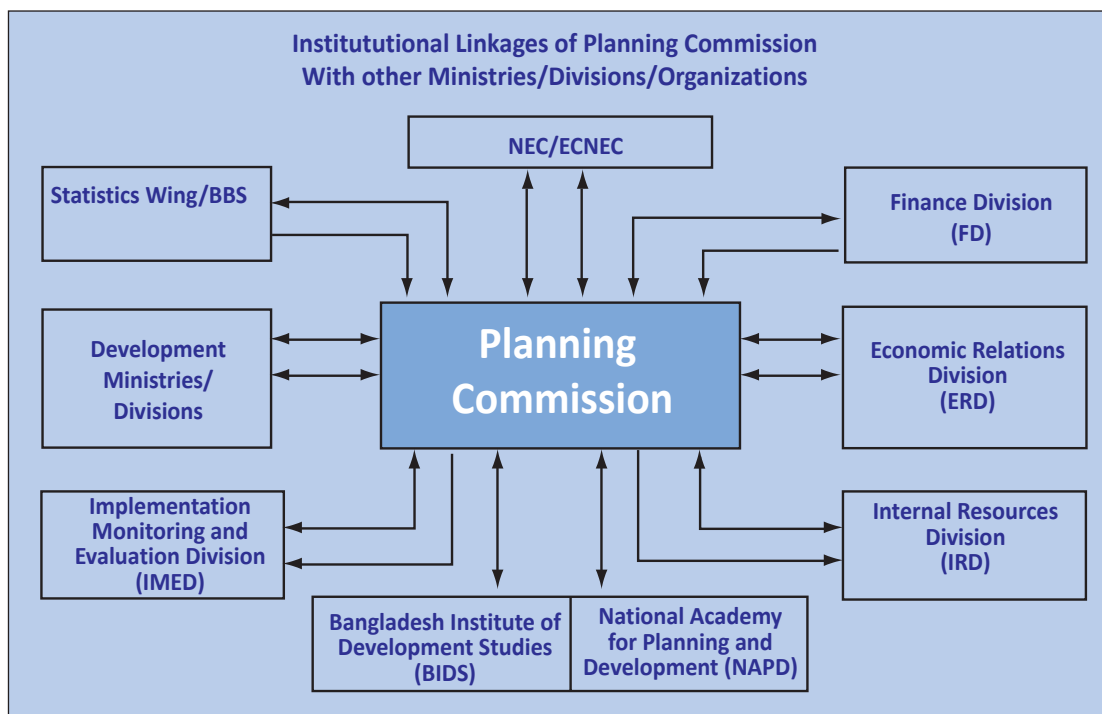
National Sustainable Development Strategy (NSDS) Revised: National Sustainable Development Strategy (NSDS) 2010-21 is based on the long term development vision of the Government, the Sixth Five Year Plan FY2011-FY2015, the Perspective Plan of Bangladesh 2010-2021 and other existing plans, policies and strategies of the Government. The objective is to recommend strategies which contribute to sustainable development of the country most and implementable by 2021. The implementation period of the NSDS has been set as 2010-2021 with the hope that the country will reach the path of sustainable development by 2021. The NSDS (2010-21) has addressed five Strategic Priority Areas along with four cross-cutting areas with a view to achieving its stated vision and facilitate addressing long-term sustainability issue of critical areas.

National Water Management Plan (NWMP) (2000-2015): The NWMP was formulated by Ministry of Water Resources in 2000 as a framework plan to guide the line departments to undertake coordinated activities in the short, medium and long term. It takes into cognizance the problems created by climate change on water resources and management. It mentions that "climate changes are expected to increase flooding, reduce drainage flows and increase water demands in the dry season" and "bring more intense rainfall". It recognized that there is a knowledge gap in "understanding the full implications of climate change and developing appropriate response." The plan outlines activities to deal with the constraints in the Agriculture sector that may be caused by either water shortage or excess of water, and "climate change and sea level rise will be factored in" when undertaking these works. Examples of climate change adaptation works are water conservation for multi-purpose use, rationalization of the many existing flood control, drainage and irrigation schemes, improved coastal protection works including Mangrove afforestation on the foreshore as well as in the country's up and catchments.

Millennium Development Goals (MDGs): Millennium Development Goals (MDGs) for Bangladesh have been a driver in designing this framework. The tenure for MDGs realization is 2015 which is near. However the indicators set in the MDGs are remaining valid to portray the wellbeing of the economy, ecosystem and the community. As such they have been taken as guidance for shaping the framework in discussion.

Multilateral Environmental Agreements (MEAs): Various Multilateral Environmental Agreements (MEAs) that Bangladesh has agreed, signed, ratified requires interpretations in terms of taking policies, plans and implementation. For example commitment under Montreal protocol or Cartagena protocol for bio safety or national communication to UNFCCC or aligning convention on biological diversity and others have been considered in shaping up the framework.

Figure 2: Institutional Linkages of Planning Commission, Source: Bangladesh Planning Commission, 2007



2.6 The National Planning Process in Bangladesh

2.6.1 Planning Process

The planning process initiates at the line agency level through vertical coordination from the grass root to the central level of the line agencies and departments. There are also suggestions and provisions to ensure participation of the community at the local level as well as horizontal coordination at the local level through coordination committee at the Upazila level participated by the representatives of the departments.

In practical terms given the changing climate regime, for continuing development aspirations considerations require to generate and provide technical support for new varieties of seeds, new patterns, new technology and techniques, capacity, education, knowledge generation and management. Infrastructure, human capital, institutions, economic and financial infrastructures and operations requires adaptation to accommodate stress conditions. Development and development interventions themselves will also need to be resilient to the changing climate. The ecosystems and infrastructure may also require adaptive interventions to function in the changing climate.

The national development process in Bangladesh is led by the Annual Development Programme (ADP) developed yearly, which itself is guided through the ADP Guidelines issued by Programming Division, Planning Commission. The directives in the Guidelines are based on national plans and strategies such as the Perspective Plan, the SFYP, the BCCSAP, the NPDM as well as the budgetary provisions and reviews such as the annual budget, the Medium Term Budget Review and the Medium-Term Budgetary Framework (MTBF), and also the sectoral plans. The indicator framework intends to guide this process to be climate change sensitive.

The Planning Process involves execution of the mandated functions of the Planning Commission through formulation of long, medium and short term plans and strategies in consultation with sectoral line Ministries and their Agencies, as well as other actors including Civil Societies, NGO's and the Private Sector.

Planning wing of the line ministries and agencies prepares the development proposals responding to the calls from the local areas through respective offices at the Upazila/ district/ divisions. The cell or the wing at the central level compile the aspirations and prepare proposals and send to the sector division at the planning commission for considerations. The planning process starts through this process.

2.6.2 Institutional Arrangements

The Planning Commission (PC), along with the sectoral line (development) Ministries, play key role and coordinating functions in national development planning process. The PC also provides secretarial support services to the National Economic Council (NEC) and its Executive Committee (ECNEC). The ECNEC is the highest body for consideration of all development activities with respect to long term national policies and objectives. The ECNEC is chaired by the Prime Minister and/or the Finance Minister (who acts as alternate Chairman) and members are comprised of the council of Ministers/Advisors.

2.6.3 Role of the General Economics Division (GED)

The General Economics Division is one of the six Divisions of the Planning Commission. This Division, similar to other Technical Divisions, provides secretariat assistance to the Planning Commission, to the Executive Committee of the National Economic Council, and to the National Economic Council in all matters related to plan preparation and formulation of economic policies⁶. The major functions of this Division are as follows:

1. Preparation of national, medium and long term guidelines and plans in accordance with social, economic and political objectives as laid down by the Government;
2. Preparation of technical frameworks for medium term plans (Five Year Plan);
3. Formulation of alternative strategies, and policies for mobilization of domestic resources and for achievement of plan objectives;
4. Undertaking of research studies on economic issues in the: fiscal and monetary fields, international economics, savings and investment, employment and income distribution;
5. Undertaking of macro and sectoral evaluation of the Five Year Plan;
6. Estimation of national income, consumption, savings and investment, domestic resources; external trade and balance of payments;
7. Preparation of the Annual Plan (Annual Economic Review);
8. Preparation of Memorandum for Bangladesh aid group meetings;
9. Preparation of briefs for meetings and negotiations with multilateral organizations such as the World Bank, IMF ADB, ESCAP, EEC, ECDC, the South Asian Forum as well as bilateral donors;
10. Provision of support to the Planning Commission for the Council Committee on Exports, Resource Committee, Inter-ministerial Committee on ADP, Foreign Exchange Allocation Committee etc;
11. Initiation and organization of seminars and professional discussions on issues relevant to economic planning and development.

⁶ Planning Commission Handbook, 1983, pg 36

In particular, GED has been assigned with the key role of developing a Results Framework to monitor the progress of the targets set in the SFYP. Developing a Results Framework involves the following actions:

- Assign overall responsibility to develop the Results Framework for the Five Year Plan to GED and the Economic Relations Division (ERD).
- Assign overall responsibility for monitoring of the Results Framework to GED, in line with its general responsibilities to institute results-based Monitoring and Evaluation (M&E). GED will act as the clearing house for the data and will ensure that adequate roles are assigned to line ministries and other relevant agencies. An existing initiative to create a network of M&E officers across line ministries will form the basis of a monitoring network for the results framework.
- Assign responsibility to ERD, in cooperation with GED, to organize an annual development forum to discuss progress on the results framework with key stakeholders, including development partners and civil society organizations.

2.6.4 Role of Planning Division

The main vision of Planning Division is to support all kinds of administrative and logistic works to fulfill the proper planning procedure of Planning Commission according to the rules and regulation of Government. It works for proper administrative support to achieve the goal of National Economic Council (NEC) and ECNEC (Executive Committee of the National Economic Council). The key functions⁷ are:

- Evaluating plan, performance and watching the progress of plan implementation on a continuous basis in order to prepare evaluation on national plans.
- Study of important economic issues and formulation of economic policies and measures.
- Evaluation of external debts and submission of reports thereon along with evaluation of national plans.
- Undertaking and promoting economic research and initiating surveys and investigations needed to support effective planning and development.
- Advice on the nature of the machinery for securing efficient execution of national plans, annual programmes and economic policies.
- Stimulating and where necessary initiating project formulation examining and tendering advice on programmes and projects with a view to determining their consistency with the national objectives.
- Reviewing the progress of implementation of approved projects, particularly aided projects; identifying the causes of delays and difficulties in the implementation of projects and proposing solutions thereof.
- Co-ordination of development activities of various Ministries/ Divisions and their agencies where such activities are inter-related or inter-dependent.
- Co-ordination of economic policies which have across the economy impact or involve more than one Ministry/Division.
- To act as the National Focal Point on New and Renewable Sources of Energy as well as perform the coordinating role on all energy related inter-ministerial matters.
- All matters relating to statistics.

⁷ Taken from Planning Commission Handbook 1983

- Conduct periodic censuses on population, agriculture, live-stock establishment and industries; conduct socio-economic and demographic surveys and collect, compile and publish current official statistics on all economic activities, namely agriculture, manufacture, foreign trade, Government statistics, and others; estimate national and social accounts, compile and analyse those statistics and publish reports thereof.
- Accord clearance to statistics generated/collected by any Government agency for national and international use.

2.7 Role of Macro Functionaries

The Economic Relations Division (ERD) and the Finance Division (FD) of the Ministry of Finance (MoF) are responsible for materializing foreign assistance and domestic resources respectively for financing development projects and programs. With respect to external funding, the role of ERD becomes crucial for the negotiation and processing aspects which are expected to be done through a process of discussion and consultation with other stakeholder Ministries/Agencies of the government. The FD is, on the other hand, responsible for allocating the government's own resources, in consultation with the programming division of PC. It also has a macro monitoring and coordinating role along with the Implementation Monitoring and Evaluation Division (IMED) of the Ministry of Planning (MoP). The Bangladesh Bureau of Statistics (BBS) and the Academy for Planning & Development (APD) provide necessary statistical and capacity building support services respectively. The Bangladesh Institute of Development Studies (BIDS) plays a think tank role for the whole planning process.

The National Economic Council (NEC) is the highest body for consideration of all issues related to economic development and functions specifically to provide overall guidance for implementing macro plans and policies of the country. The NEC has supreme authority to decide on any development activities, including projects/programmes, and may appoint any committee/sub-committee (such as ECNEC) to assist in carrying out its mandated functions. Hence, strong linkages and coordination mechanisms are needed to plan, integrate and implement any risk reduction initiatives within and between the existing institutional arrangements of the country.

Implementation Monitoring and Evaluation Division, commonly known as IMED, is the central and apex organization in Bangladesh for monitoring and evaluation of the public sector development projects included in the Annual Development Program (ADP). As per 'Allocation of Business among the Different Ministries/Divisions', IMED also deals with the matters relating to Central Procurement Technical Unit (CPTU) and The Public Procurement Act, 2006. IMED monitors and evaluates the performance of revenue and development investment by collecting and analyzing information on project and programme results from implementing organizations. Analysis of the performance of ministries and sectors against agreed targets is provided to the Executive Committee of the National Economic Council (ECNEC), to line ministries and to other concerned parties whenever necessary. Through careful analysis of programme outcomes, the IMED also seeks to explain why sector or ministry performance targets have not yet been met. This analysis is then provided to the relevant bodies to help improve performance.

As the central official statistical system in Bangladesh, Bangladesh Bureau of Statistics (BBS) is responsible for providing technical and administrative guidance in matters of all official statistical programmes. It also acts as the implementing agency of all programmes for official statistics for Bangladesh. BBS is the only national statistical institution responsible for collecting, compiling and

disseminating statistical data across all sectors of the Bangladesh economy. The statistical data produced by BBS is used to meet and provide the data-needs of users and other stakeholders, such as national level planners and other agencies of the Government. The role of the BBS - to provide necessary statistics for preparing the various national plans and policies for the overall development of the country - is very significant. The organization has a decentralized network for implementation of its activities with its head office in Dhaka. At present, there are 23 regional statistical offices and 489 Upazila offices located in the 23 greater districts of Bangladesh.

2.8 Annual Development Programme (ADP)

The ADP translates the objectives of the national plans/strategies into concrete interventions for a particular year and in line with the annual development budget from the Ministry of Finance (own resources from IRD & available ODA mobilized by ERD). The process involves a series of inter-ministerial discussion and consultation sessions followed by a number of typical planning and procedural steps.

2.9 Climate Financing

It is well established that mitigating and stabilizing greenhouse gases (GHG) in the atmosphere is the ultimate solution. During the interim period however, adaptation and climate resilient development will be essential and huge level of investment is necessary for both adaptation and mitigation. The developing and least developed countries require financial support to overcome the challenges - a fact recognized by the global community. There are a number of mechanisms, funds and facilities operational and providing support through various means and processes. However, the investment and financial flows required to overcome the climate challenge are massive, and existing funds are inadequate. Bangladesh will require USD 103.2 billion over the 7 year period from 2008 until 2015 in order to achieve all of the seven goals that were reported in the Bangladesh country paper to Rio+ 20 (MoEF 2012). According to a national assessment of investment and financial flows (I&FF) completed in October 2011 (UNFCCC 2011), approximately USD 64 billion is needed up to 2030 for Bangladesh to implement priority actions to reduce emissions of greenhouse gases from the energy sector, and to adapt to the impacts of climate change in the agriculture and water sector. Adaptation and climate resilient development including disaster risk reduction and response will also require large amounts of additional financing. In a developing country like Bangladesh, Climate finance policies for limiting GHG emission and promoting green growth will depend on the three key factors: climate science, economics of mitigation and development needs and opportunities, and the political economy both at domestic and international arenas.

2.9.1 Bangladesh Climate Change Trust Fund (BCCTF)

The uncertainty and inadequacy of finance from multilateral mechanisms, as well as complexity of accessing funds from the bilateral sources, has prompted the Government of Bangladesh to finance climate change adaptation initiatives from its own revenue income. From FY 2010-11, the government made a block budgetary allocation of BDT 7 billion (around USD 100 million) per year in the form of grants to implement projects on climate change adaptation and mitigation as identified in the BCCSAP (Khan, Huq and Samsuddoha 2012). Due to the nature of the allocation, it is not mandatory to spend the total grant within the given financial year.

2.9.2 Bangladesh Climate Change Resilience Fund (BCCRF)

In May 2010, the Government of Bangladesh established the ground-breaking Bangladesh Climate Change Resilience Fund. The Fund is an innovative mechanism for channeling grant funds to millions of Bangladeshis to build their resilience to the effects of climate change. The Fund supports implementation of Bangladesh's Climate Change Strategy and Action Plan for 2009-2018. It is managed and implemented by the Government of Bangladesh, with so far contributions from Denmark, European Union, Sweden, United Kingdom, Switzerland, Australia and United States (GoB 2013a). The World Bank provides technical support for implementation by the Government and ensures that due diligence requirements are met.

2.10 International Process to deal with Climate Change

The United Nations Framework Convention on Climate Change (UNFCCC or FCCC) is an international environmental treaty produced at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, held in Rio de Janeiro from June 3 to June 14, 1992. The objective of the treaty is to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.[1]

The treaty itself set no mandatory limits on greenhouse gas emissions for individual countries and contains no enforcement mechanisms. In that sense, it is considered to be legally non-binding. The treaty instead, provides for updates (called "protocols") that would set mandatory emission limits. The principal update is the Kyoto Protocol, which has become much better known than the UNFCCC itself.

The UNFCCC was opened for signature on May 9, 1992, after an Intergovernmental Negotiating Committee produced the text of the Framework Convention as a report following its meeting in New York from April 30 to May 9, 1992. It entered into force on March 21, 1994. As of May 2011, UNFCCC has 194 parties.

One of its first tasks was to establish national greenhouse gas inventories of greenhouse gas (GHG) emissions and removals. The inventories were used to create the 1990 benchmark levels for accession of Annex I countries to the Kyoto Protocol and for the commitment of those countries to GHG reductions. Updated inventories must be regularly submitted by Annex I countries.

The UNFCCC is also the name of the United Nations Secretariat charged with supporting the operation of the Convention, with offices in Bonn, Germany. The Secretariat, augmented through the parallel efforts of the Intergovernmental Panel on Climate Change (IPCC), aims to gain consensus through meetings and the discussion of various strategies.

The parties to the convention have met annually since 1995 in Conferences of the Parties (COP) to assess progress in dealing with climate change. In 1997, the Kyoto Protocol was concluded and established legally binding obligations for developed countries to reduce their greenhouse gas emissions.

Developing a practical set of indicators for 'Pro-poor, Environment Friendly, Low Emitting, Disaster and Climate Resilient Development' is a 'case' specific and a long-term task that needs to be continuously revised and updated/upgraded as it is being used. Such a framework will have four broad purposes in the development process:

- Screening the development proposals for ADP;
- Mainstreaming the policy objectives in to the development planning;
- Resource allocation, implementation and accountability;
- Monitoring and evaluation of the results to the support resource allocation process.

The framework intends to guide the process and has the strong potential to guide professionals in screening development proposals with a multi-dimensional lens; to measure the efficacy of development initiatives whilst also evaluating them in terms of being Pro-poor, Environment Friendly, Low Emitting, Disaster and Climate Resilient Development.

In this phase of mainstreaming poverty environment and climate change in the development process, the indicators framework may play a role in: categorizing development proposals; characterizing and describing the impacts of climate change on resource bases; defining vulnerabilities; prioritizing and ranking proposed interventions with respect to safeguards; as well as enhancing functionality in the changing conditions.

Indicators only tell a quantitative story. As such, they can be highly useful in the rational and efficient allocation of scarce resources for achieving Pro-poor, Environment Friendly, Low Emitting, Disaster and Climate Resilient Development. In a monitoring mode, indicators would allow for subsequent year-to-year developments and thus, would "measure" the performance of interventions. In a predictive mode, they could contribute to a ranking of alternative interventions by measuring the extent to which objectives are met. Such a framework of indicators should meet the following general conditions:

- Growth shall not be compromised while introducing safeguards;
- Ensuring equity and affirmative action;
- Maintaining and enhancing environment;
- Resilience to emerging climate conditions;
- Driven by low carbon development philosophy;
- Comprehensive; encompassing inputs, outputs and outcome indicators;
- Guided by constitutional obligations (15th Amendment, Paragraph 18 A)
- Aligned with the Perspective plan, SFYP, NDMP, BCCSAP and sectoral policies and plans;
- Aligned and compliant with the MEAs and treaties that Bangladesh has signed and ratified.
- The framework shall also provide guidance for the development of individual sets of indicators for specific contexts.

3.1 Specific Objectives

- Ensure complementary actions to poverty reduction

- Inclusive development
 - Increase the number of jobs, in particular green jobs, and those focused on women and socially disadvantaged groups
 - Ensure participation
 - Improve access to common resources to improve energy and nutrition
 - Enhance social safety nets.
1. Promote a climate resilient economy, climate resilient ecosystems and a sustainable environment
 - Sector, ecosystems and community based adaptation
 - Sustainable land use, wetland and forest management
 - Promote disaster risk reduction
 - Greening industries and jobs.
 2. Implementation of sectoral policies and national plans that are low emission and climate resilient
 - Support market transformation towards low emission economy
 - Sustainable transport
 - Increased energy coverage, enhance energy efficiency, more renewable energy
 - Low emission technology; mitigation in all sectors
 - Climate proofing infrastructure.

3.2 Scope of the Framework

The scope of the indicator framework encompasses current and future national development planning and implementation. Specifically, the scope is to sensitize and transform the national development process towards pro-poor environment friendly and low carbon development. The Perspective Plan 2010-2021 set and SFYP 2010-2015 have set the development aspirations towards vision 2021. The National Climate Change Strategy and Action Plan 2009 provide guidance for development that is low carbon, promotes adaptive enhancement and resilience within the community and ecosystem resilience. The National Plan for Disaster Management (NPDM) 2010-2015 guides the reduction of disaster risks and the response to emergency situations.

The legacy of development in the current global and national policy setting and practice can be seen in the prevailing wide spread poverty, the increasing inequity, social exclusion and in environmental degradation. On top of the prevailing barriers to achieve sustainable development, climate change provides added adversities. In order to reduce the inherent gaps in social development, the UN launched MDGs targeted for 2015. The achievements for Bangladesh have been quite remarkable in each of the goals, with the exception of MDG 7: Ensure Environmental Sustainability. Bangladesh has had poverty reduction and other social wellbeing interventions in place for a while now, and this is reflected in the MDG achievement. The scope therefore, is to analyze the situation in terms of the current set of prevailing legal and policy regimes and the institutional and human capacities for low emission climate resilient development whilst accommodating the existing regimes that support poverty reduction and environmental protection. To take development on to the low carbon path, as inspired in BCCSAP, various steps and actions are necessary. UNDP is moving towards Low Emission and Climate Resilient Development (LECRD) suggested guidelines in chronological steps. Bangladesh has policies, committees, technical working groups, capacity building, and knowledge products but there remains much to do. As such, a gap analysis of this matrix for Bangladesh raises 'to do' lists and an elaborate scope of work, amongst other things.

3.3 Review of Existing Indicators

Indicators and indices are used around the world and in Bangladesh in many different contexts and for many different purposes. There is however little consistency and no useful set of indicators are available for development that is pro-poor, environment friendly, low emitting, disaster and climate resilient. However indicators are being used for environment, poverty reduction, protection, and resilience in different contexts and settings, and in scattered way. Because of this, a process for environmental and social screening of the development projects has been recently initiated and supported by UNDP (UNDP 2012). A guidance note for such screening includes key questions on the climate change and environmental sensitivity as well as those on poverty reduction. This framework has benefitted from the guidance note. The focus has been on sector, ecosystem, sub national and regional and national level representative indicators or indicators that are, for example, can be used to assess climate sensitivity, environmental sustainability and socially equitable growth. For the purposes of reference, a quick analysis has been made of several indicators for resource and well-being that are currently in use; particularly those in SFYP, MDG, BCCSAP and NDMP.

MDG Indicators: A set of concrete indicators are being used to measure the progress and achievement of MDG goals. Aligning the goals of MDG, the set includes indicators on poverty, education, empowerment of women, health, maternal health, and environment which includes GHG emissions, water and sanitation and ICT (Annex 1). These selected MDG indicators are highly relevant and have been accommodated in this framework.

Sixth Five Year Plan (SYFP): Sixth Five Year Plan (SYFP) includes concrete indicators in each of the sectors covered by the Plan. Under the SFYP, a Results Framework, indicative in nature, has been developed for the first time in the history of development planning in Bangladesh. The SYFP has adopted 35 results-based specific indicators under 9 broad themes for monitoring the progress of the SFYP targets (Annex 2). The themes are macro economy, human development, water and sanitation, energy and infrastructure, gender, information communication technology, environment, urban and governance. An Implementation Review of the SYFP was conducted in 2012 based on these indicators (GED 2012).

Bangladesh Climate Change Strategy and Action Plan (BCCSAP): Bangladesh Climate Change Strategy and Action Plan (BCCSAP) does not include concrete set of indicators to measure and capture changes in line with the set strategy and the programmes. However, a matrix is provided that lists the programmes under thematic pillars. The Sixth Five Year Plan accommodates the spirit and strategic guidance, including the programmes. The programmes have guided the drawing of indicators for development that is climate resilient, low carbon, maintains ecosystem functionality in the changing climate, and generates knowledge and builds capacity. The matrix of the programmes is included (Annex 4) to provide guidance to the user of the framework.

National Plan for Disaster Management: The National Plan for Disaster Management provided a matrix that included strategic goals, expected outcomes and actions. The actions could, and should be used as a guide to identify and use specific indicators.

In order to transform the development of the country to be low emission and climate resilient, and in accordance with the steps suggested in the UNDP guidance, a gap analysis has been done in terms of what is already in place and what needs to be initiated and continued. This matrix could be used in selecting such indicators (Annex 5).

MA Indicators: The UN has produced a Millennium Ecosystem Assessment (MA) in 2005, a four-year study of the state of the world's ecosystems where a conceptual framework was developed to illustrate how ecosystems and their ecosystem services support human well-being and poverty reduction. The framework is built around the concept of ecosystem services, of which there are provisioning services (such as crops, fish, water, fiber), regulating services (such as erosion control, nutrient regulation, pollination, local and global climate regulation), cultural services (spiritual fulfillment, recreation, livelihood strategies) and supporting services (soil formation from bedrock weathering, net primary productivity, etc.). All these directly or indirectly support human economies and livelihoods (WRI 2009). Identifying and evaluating policy and management options for sustaining ecosystem services and harmonizing them with human needs is one of the benefits of using the MA. Such a framework can help public and private sector decision-makers formulate decisions that will maintain ecosystem health and help reverse current trends of ecosystem degradation.

Based primarily on the Millennium Ecosystem Service conceptual framework, the Ecosystem Service Indicators Database (ESID) was created by the World Resources Institute. It provides indicators of ecosystem services to help track and understand how ecosystems support physical, economic, and social well-being. It allows ecosystem service metrics and indicators to be readily available for policy makers and practitioners for use in policy dialogues and decisions in ecosystem assessments, and in natural resource management (WRI 2009). ESID is an online searchable database that includes metrics and indicators for each framework component and indicators for a specific area of interest can be found through the searching the database.

Structuring the Indicator Framework

Section 4

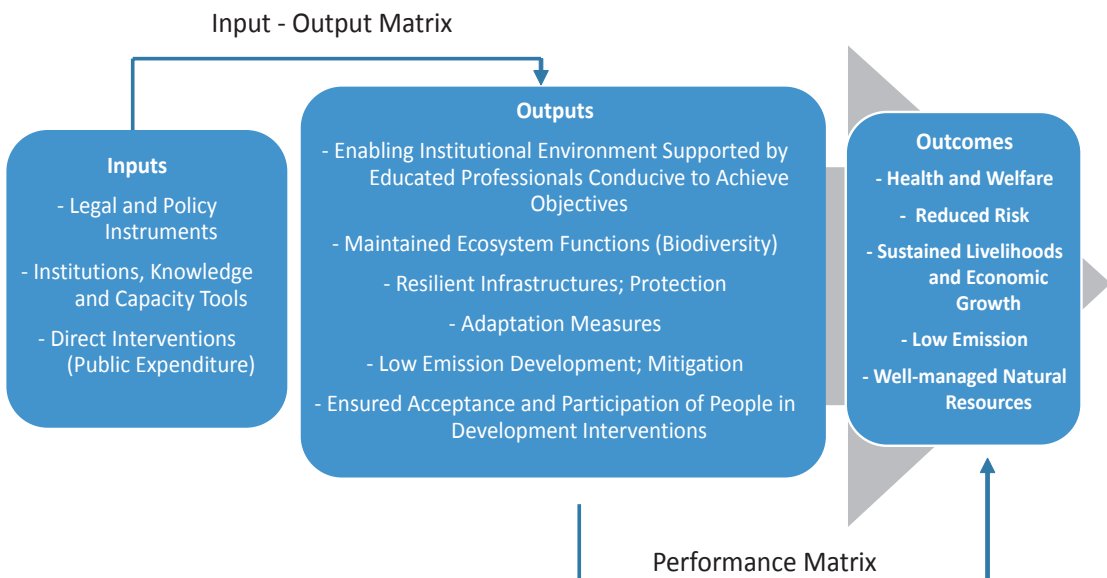
The scope of the indicator framework is to influence national development planning and implementation in a way that reduces poverty, promotes equity, supports environment and is sensitive to climate change. The framework structures indicators to support the development aspirations set in the national perspective, macro plans, and the strategies for reducing poverty, maintaining environment and addressing climate change and reducing risks.

Policy objectives of the national perspective, macro plans and strategic plans are very explicate in terms of bringing about a positive change in the wellbeing of the population, and in using a sustainable approach to do so. The indicator framework intends to support the efforts of the professionals, policy makers and practitioners in meeting goals and objectives of annual plans, the Five Year Plan, strategic plans and the Perspective Plan in materializing the declared Vision 2021. Bangladesh is an emerging economy with an inherent legacy of high population density, poorly developed infrastructure, an agro-based economy, a natural resource ----- and a hazard prone geography. As such, it is highly important to track and guide development and to factor in climate extremes and other national and international externalities. The framework accommodates input, output and outcome indicators that schematically represent the framework.

4.1 Indicator Schematics

As mentioned, the framework accommodates three types of indicators:

Figure 3: Schematic representation of the Indicator Framework



Input indicators: In principle input indicators represent different types of management inputs such as policies, strategies (SFYP, BCCSAP, NDMP and sectoral strategies for climate resilience); recurrent GoB expenditures including investments projects, and plans that focus on climate change, environment and poverty reduction.

Output Indicators: Output indicators relate mainly to immediate deliverables as a result of inputs and may include: changes to legislation and policy; conducive institutions; skilled and educated human resources, resilient infrastructures, protective infrastructures and interventions for ecosystem resilience.

Outcome indicators: Output indicators represent the objectives of Pro-poor, Environment Friendly, Low Emitting, Disaster and Climate Resilient Development Relations between these types of indicators can be visualized through two cross-reference matrices (Figure 1). The first is an "objective" input-output matrix, showing the relation between the management inputs and the outputs. The second matrix is referred to as a "performance matrix", reflecting the value of changes in the outputs in terms of policy or objectives (Outcome indicators).

4.2 Framing of Indicators

The objective is to promote poverty reduction, a climate resilient economy and ecosystems and sustainable environment, and to implement sectoral policies and a low emission and climate resilient national plan. As such, the indicators framework considers the following categories of indicators:

1. Climate change integration
2. Safety and functioning of interventions
3. Enhanced resilience adaptation and risk reduction
4. Knowledge management, capacity building and social communication.

In the next chapter, examples of indicators for each of the above-mentioned categories have been provided. Obviously, even such general structures include assumptions that relate to the special context. Because of this, the structure outlined should be considered flexible, intended to serve as examples and not as an exhaustive list. The list could be used directly considering the dimensions. Further operational indicators that take into account the specific purposes and data availability could and should, however, be used by the respective professionals and practitioners.

4.3 Applying the Indicator Framework

The indicator framework is closely related to the climate change livelihood framework. It aims to address the climate change impacts on: the resource base, household capital assets, activity and options for livelihoods and the policy adjustments and implementation for climate resilient development, along with the poverty reduction and environmental integrity.

In applying the framework, combination of input, output and outcome indicators can be used to support the multiple decision-making processes.

- **Policy:** The indicator framework could be used for tuning macro policies, including macroeconomic policy, social safety net, and other national policies, in order to maximize national development and welfare in the changing climate. All relevant sectoral policies need to be adjusted to support development in the changing climatic conditions, including biodiversity considerations in adaptive activities, poverty reduction initiatives (as a prime objective of development) that comply with all environmental guidance, and national budget allocations to make the country poverty free, climate resilient and environmentally sound.

- **Strategy:** The policy objectives of pro-poor, environment friendly LECRD has to be concretized through sectoral strategies. Climate change vulnerabilities to the sector, anticipated risks, and actions to make the sector development resilient keeping low emission, need to be identified, concretized, prioritized, scheduled and costed. The strategy must consider all existing environmental guidance and poverty reduction guidelines.

4.4 Use of the Framework

4.4.1 Resource Allocation

Resource allocation for the annual development plan should be guided by the vision and aspirations laid out in the perspective and macro plans and strategies. The political commitment is a driving force for budget allocation along with the emerging concerns and issues before the policy makers and national level planners. The indicator framework does, however, have the potential to support the resource allocation process by analyzing information on the GoB efforts into pro-poor, environmental friendly and climate sensitive development. Direct interventions are the main management inputs with equally important goals. These goals relate to establishing a policy framework that will facilitate sustainable and consistent effort into creating a development approach that is resilient to climate change, keeps emissions low, reduces poverty, increases equity and does not compromise the environment. The policy context for the framework has been set in the previous chapter and interventions shall be guided accordingly.

These sets of indicators would represent contributions to good governance in areas such as sustainable resource management, the empowerment of local communities and in public-private sector relationships. Indicators are not meant to control GoB expenditures. They aim to guide and facilitate development to be resilient to emerging and anticipated climate change and for investment that is sustainable and complementary. For budget allocations, the following combinations could be used by national policy makers:

- A set of indicators that accounts for current (baseline) loss and damage from disasters;
- A set of indicators for loss and damage estimates under climate change scenarios without action;
- A set of indicators that identifies the loss of livelihoods due to current and projected climate scenarios;
- A set of indicators to identify the cost of inaction;
- A set of indicators that represents range of potential interventions to realize highest benefit
- A set of indicators that characterizes the existing legal, policy and planning instruments and gaps;
- A set of indicators to identify the current level of investment in climate resilience, adaptation and mitigation (Climate public expenditure by sectors);
- A set of indicators for investment in legal, policy and institutional strengthening;
- A set of indicators that characterizes the visions or goals of long term national plans and policies such as the National Sustainable Development Strategy, the SFYP, Vision 2021 and the Perspective Plan;
- A set of indicators that collectively become Management Input Indicators to lead towards pro-poor, low emission environment friendly and climate resilient development.

A set of indicators that collectively become Management Input Indicators to lead towards pro-poor, low emission environment friendly and climate resilient development.

4.4.2 Screening Development Project Proforma (DPP)

All development ministries draw from their respective departments (local to central planning wings/cells) to compile sector aspirations for preparing their development proposals (programs and projects). The development proposals are sent to the respective sector divisions of the Planning Commission for screening and vetting and, when approved, are included as appropriate in the ADP.

The process is well established and includes DPP and various other forms and processes. The Planning Commission supports this process through sector divisions which have mandated responsibility for screening respective DPPs in line with national plans and strategies. This includes matters of national importance as well as multilateral environmental and other treaties and agreements.

The purpose of the indicator framework is to mainstream the emerging concepts of climate change and to integrate them into the prevailing priorities of poverty reduction and environmental sustainability.

The ministries and agencies are supporting development of the resource bases around the country in order to yield products and services for the population. This is in addition to providing shelters, treatments, mobility, food production, water and sanitation and the range of materialistic requirements. In the emerging situation, it is necessary to ensure ongoing development of the resource bases and in a way that is compatible (resilient) in the changing climatic conditions and sustains environmental and social justice. The resource bases, as per the conceptual frame, are natural, physical, human, social and financial.

On the other hand, the existing resource base will have to be adaptive in the changing conditions. In crop agriculture, for example, it will be necessary to replace existing seeds with competent seeds such as those that are saline tolerant and resistant to flood and water stress. A set of indicators will help better understand and guide development of climate change adaptation and disaster risk reduction projects.

The natural resource bases, physical infrastructure, economic and financial infrastructure, institutions, household capital assets, human capital, social capital, livelihood opportunities and even life are exposed to climate change. As such, following the climate sensitive livelihood model indicators will be necessary for measuring the changes in the resource bases.

Planning Officials, professionals in the Sector Divisions will use this framework to screen the climate, poverty and environmental sensitivity of the proposal. For screening DPP, the following combinations could be used:

- A set of indicators that have the main function of characterizing the results of interactions between the climatic parameters and ecosystems, livelihoods, communities and infrastructure (CC impacts).
- A set of indicators that characterize the safety and security of the investment, for example avoiding exposure to weather extremes or interventions for managing unavoidable exposure to sustain and maintain the function of the investment.
- A set of indicators that characterize the adaptive functions of the proposed intervention for ecosystems, livelihoods, infrastructures and community resilience that offers value for money.
- A set of indicators that assesses Mal-adaptation or Anti-Adaptation to help ensure that proposed interventions are not having adverse effects on the function of ecosystems and infrastructure elsewhere.
- A set of indicators that assess emissions as well as a reduction in emission of the proposals.

- A set of indicators that characterize the policy, strategy, law, and other instruments (e.g. the climate fiscal framework).
- A set of indicators for strengthening institutional capacity, including human development, and a set of tools for effective community mobilization.
- A set of indicators for compliance to development indicators in poverty reduction, gendered-inclusive development and environmental and social safeguards.

Depending on the sector divisions and the nature of the development proposals, different combination and specific indicator(s) may be used as exemplified in the following section.

4.4.3 Implementation Monitoring and Evaluation of Development Interventions

The monitoring and evaluation of the development projects are the responsibility of the Implementation Monitoring and Evaluation Division (IMED). The existing formats of analyzing development projects in IMED have very little scope for tracking environmental, climate change and disaster issues. The project completion report is the only format with an option for post implementation situation and results analysis. In this regard, a set of outcome level indicators could be used. Impact level indicators should be included in the development proposals and be aligned with the indicators set at, for example the SFYP and/or perspective plans. The evaluation of impact level indicators should be done through national statistics and against the target of the SFYP, and Perspective Plan. The evaluation would provide feedback to the development proposal formulation and budget allocation process. Options include:

- The existing format of the 'Project Monitoring Form' could be revised to include additional options for disaster risk reduction and climate change adaptation. This would provide scope for tracking the implication of the project components in relation to disaster and climate change.
- A separate section for providing a relevant description of Disaster Risk Reduction (DRR) and Climate Change Adaptation (CCA) could be kept for tracking and analyzing those issues.
- In the 'Project Completion Report' format, a similar option could provide scope for analyzing project contribution in relation to climate change and disaster phenomena. This section could focus on the outcome level indicators for the disaster and climate change implications of the project.

4.4.4 Developing Pro-poor, Environmental Friendly, Low Emission, Disaster and Climate Resilient Development Project Proposals

The planning professionals - in different sectors and at all levels - could benefit from the framework when preparing development proposals on behalf of their respective ministries and submitting them for inclusion in ADP. Being oriented, trained and educated on the contemporary issues of poverty reduction, environment and climate change mainstreaming and being guided by the framework, planning professionals will be in a position to prepare proposals that are aligned with the policy objective. A set of indicators for designing pro-poor, environmental friendly, climate and disaster resilient development projects may provide guidance to planning professionals addressing PECD issues in the following manner:

- A set of indicators that characterize the past disaster and climate change lessons and future implications that could help to improve project components to become more resilient.
- A set of indicators that characterize the positive and negative environmental implications of the project components on local biodiversity/ecosystems could help minimize the adverse impacts on the natural environment and could promote environmental conservation.

- A set of indicators that ensure the access to the natural resources pool for poor people or the true owner could contribute to poverty reduction and sustainable economic development.
- A set of indicators that assess the risk of the project components to existing and projected disaster and climate change phenomena.
- A set of indicators that characterize the relevant mitigation measures to reduce the impact of disaster and climate change on project components and results.
- A set of indicators for strengthening institutional capacity, including human development, and a set of tools for effective community mobilization.

An important aspect in this respect is the availability of data to support the framework. Currently, there are a few data sets on poverty and environment available in the Bangladesh Bureau of Statistics (BBS), which however needs enhancement. A climate change database will be necessary to support the environment friendly, low emission, disaster and climate resilient development. Initially, the existing data sets of the Bangladesh Meteorological Department (BMD), Bangladesh Water Development Board (BWDB), Department of Environment (DoE) and the respective agencies and institutions could be utilized with a view to upgrading and web enabling the Climate Change Database of the Department of Environment in the long term.

ADP Allocation: The line ministries prepare an annual development proposal depending on the resource allocated to the respective ministry. The Programming Division of the Planning Commission then asks the respective ministries to submit their respective priorities for ADP. Accordingly, the Programming Division prepares directives for that year's ADP and communicates this back to the ministries.

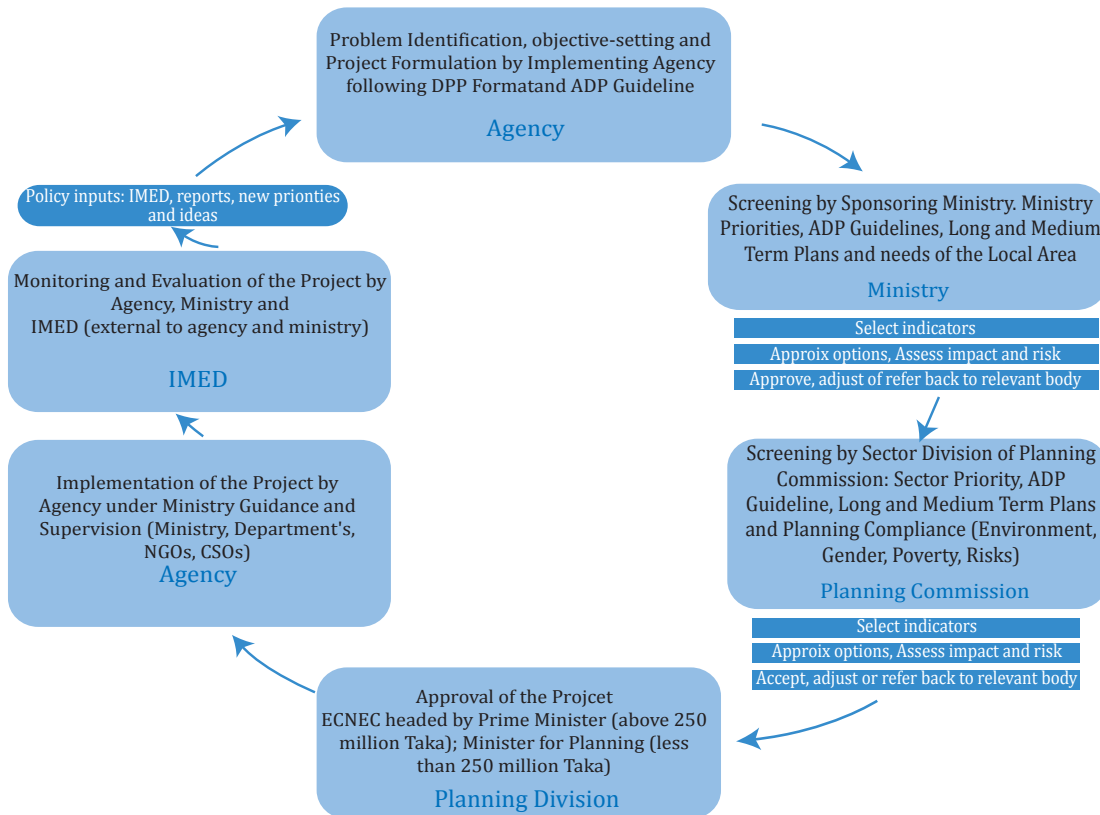
Identify problem: The ministries, through their respective agencies and in collaboration with the local level officers, identify the requirements in terms of addressing problems and harnessing opportunities. A ministry, on behalf of the sector, based on ADP allocation and guided by the ADP directives and DPP formats, prioritises the Development Proposal for that sector and for that year, and sends this to relevant Sector Division of the Planning Commission.

Section 5

Decision Making & Support System

5.1 Decision Making Cycle: ADP Allocation and Project Screening

Figure 4: The Cycle of Approval Process



Assess impact and risks: The respective sector division, upon categorizing the proposal and selecting the sets of indicators at dimension level, will be in a position to assess the proposal against: the ADP allocation; the ADP directives; DPP guidance; and finally, against the sets of indicators from this framework. Assessing the proposal and being reasonably convinced of risks and impacts will appraise the proposal.

Appraise options: The appraisal will determine the suitability of the proposal or the necessity for adjustment.

Necessary adjustments: The proposal could meet all the criteria and have the merit to be directly approved. A proposal may also require minor adjustments to be approvable or may even need to be sent back to the problem identification stage. In this case, the adjustable proposal will be referred back to the respective ministries and revised.

Decision making: Proposals that do not meet the criteria will go back to problem identification stage. A proposal that is not aligned with national policies and priorities will go back to ADP allocation stage. Proposals that meet the criteria and national policy priorities shall be approved and sent to the ministries for implementation.

Implementation: The respective ministries and agencies being guided by rules will implement the proposal and appropriate civil societies and NGOs could be engaged.

Monitoring and evaluation: IMED is mandated to monitor implementation as well as to evaluate results against the set outcome of the development aspirations. At this point, the IMED professionals could benefit from the indicator framework in the selection of dimension level indicators to evaluate the proposals/projects. For better anchoring, it will be necessary to incorporate generic questions on climate change, environment and poverty from the framework into the format used by IMED to evaluate projects/programmes.

Policy inputs: IMED, upon evaluating the results and the sustainability of the policy objectives that have been met, could then provide feedback in terms of resource allocation and adjustment of development proposals.

5.2 Indicators for Assessment of Compliance and Safeguard

Pro-poor, Environment Friendly, Low Emitting, Disaster and Climate Resilient Development are not just a set of development indicators; it is also the 'compliance indicators' to be used for ensuring the quality of the development. For example, one of the Sixth Five Year Plan development indicators is defined as the "rate of growth of agricultural GDP (constant)" (SFYP, part I. P. 243, table 9.1). To achieve this broad indicator a set of compliance indicators are required, such as, the introduction of at least six saline, drought and stagnant water tolerant crop varieties in coastal, Barind, floodplain and Haor basin regions of Bangladesh, a reduction in ground water use by 25%, an increase in fertilizer use, then it will help to make the development in agriculture sector climate resilient etc.

Furthermore, the framework intends to guide the development proposals to be sensitive to the poverty-environment- climate nexus. For example, keeping track of the population that are falling through the cracks of the poverty line losing livelihoods due to environmental degradation, losing capital assets in disasters and losing livelihoods due to climate change impacts or a combination of these adverse impacts. In other words, the framework has a focus to identify and deal the poverty environment and climate change relationship in the development process introducing this dimension in the framework.

In addition to providing indicators, the framework intends to facilitate the development of professionals and policy makers. This is particularly important for introducing and promoting safeguard indicators to ensure that development is sustainable, factors in climate change, environment and social wellbeing and in a context of poverty reduction, which is especially important for Bangladesh. While the development agents plan to achieve broad development aspirations (indicator as mentioned in SFYP), this framework provides guidance through lower level indicators. This is to ensure that proposed interventions are environment and climate sensitive, recognizes and appreciates poverty, environment and climate change nexus in the development process and contain direct or indirect elements of poverty reduction.

At the same time, devoted interventions - both soft and hard - will be required to comply with the

requirements of climate sensitive development that maintains environmental integrity. Environmental compliance is a constitutional obligation (15th Amendment, Paragraph 18 A) and is also supported by the Environment Act (1997, amended in 2010), the Climate Change Strategy and Action Plan 2009, the National Disaster Management Plan 2010, which have set the legal and policy context. The Process of Environmental Impact Assessment (EIA) has long been established and practiced. Examples of indicators aligning these requirements and strategies have been provided (non-exhaustive) to guide planners and policy makers as described in early chapters.

The compliance indicators are different in nature than the development indicators. For example, development indicator will be measured against the base line either in increase or decrease by unit, whereas as suggested here trends in rainfall scenarios will not be changed by the project interventions, rather has to be taken into consideration to ensure safety of the investment in terms of durability and functionality in the changing rainfall condition following the climate change. Similarly percentage of infrastructures protected in a changing climate hazard scenarios are complying with the evolving conditions only not changing the hazards itself.

The indicators are measured against the base line value. Baseline situations prior to the interventions and scenarios with climate change needs to be established and set targets over time for these specific and measurable indicators. It really means that in a changing condition the investment will still be protected and remain functional. On the other hand there shall be some investment to create an enabling condition for the development to sustain in the changing conditions, there could be investment in inventing various resilient varieties of seeds, and research on infrastructure design that will withstand changed climatic condition and so on. Following are few examples of indicators under different category and dimension in no way these are exhaustive list, reader may wish to pick from selected MDG indicators, SFYP indicators, UNDAF indicators, developing indicators that portray implementation of the BCCSAP programmes and action agenda in National Plan for Disaster Management even developing indicators to generate process and knowledge to filling gaps in the preparation for low emission climate resilient development. Main quest is to drive the development planning process and implementation ensuring safeguard and make the development sensitive to changing conditions. The compliance has to be ensured by the professionals at different levels of the government, private sector, NGOs and the community. This framework is to assist the professionals in doing so. Examples of indicators to ensure environmental and social safeguards for development in the changing climatic conditions are given below:

Table 1: Indicators to ensure Environmental and Social Safeguards for Development in the Changing Climatic Conditions

Category	Dimension	Measurable Indicator (examples)
Climate change integration	Scenarios of climate change ⁸	<ul style="list-style-type: none"> • Trends in rainfall for last 60 years; scenarios of rainfall in next 30 years • Degree of temperature prevailing in 2030, 2050, 2070 (min and max, over seasons) • Scenarios of flood inundation by depth in 2030, 2050, 2070 • Scenarios of agricultural drought • Soil and water salinity scenarios
	Prediction modeling	<ul style="list-style-type: none"> • Cyclone & storm surges, flood and drought prediction maps (scenarios) • % of area of crop loss scenarios due to flash flood • % of area of crop loss scenarios due to flood • % of area of crop loss scenarios due to drought, cold spell, access rain
	Early warning	<ul style="list-style-type: none"> • Cyclone and storm warning lead time increased compared to baseline • Number of people receiving warnings through cell broadcast (cell phone) technology
	Low carbon development	<ul style="list-style-type: none"> • Number of sectors GHG inventories done • Number of GHG co-efficient established • Number of sectoral mitigation opportunities identified
Safety of the interventions in the changing climate	Infrastructure	<ul style="list-style-type: none"> • % of coastal polders withstand predicted storm wave heights under SLR scenarios • % of coastal polders protected from over toping against predicted storm surges scenarios • % of cyclone shelters, schools, public buildings etc protected from flood inundation in a predicted flood scenarios in the climate change scenarios • % of Upazila risk zones for infrastructure delineated e.g. (above 25 years flood return period depth) • % of Public buildings that can withstand cyclone wind speed (e.g. 240 km/hour) • % of vulnerable population in a targeted area provided with climate resilient habitats • Number of climate resilient design (e.g. fishing boat that withstand sea turbulence) • % of vulnerable population provided with climate resilient buildings in different landscape and hazard prone areas

⁸ Measurable indicators of this dimension shall be location specific as far as possible and over the seasons (rain fall, dry days, consecutive rainy days), minimum, maximum (temperature), extend, depth, duration (flood) and intensity and extent, duration (salinity)

Category	Dimension	Measurable Indicator (examples)
	Risk reduction and management	<ul style="list-style-type: none"> • Value of damage and loss in the targeted location due to disaster • % of area under effective flood protection • % of embankment repaired and maintained • % of embankment upgraded to a height beyond predicted flood depth • % of Upazila disaster risk management plan's implemented • % of local disaster risk management plans development and implemented • % of area under improved natural drainage • Percentage of households with safe drinking water in the coastal zone • Percentage of households in coastal zone with a sanitary latrine
Enhance resilience / adaptation	Environment	<ul style="list-style-type: none"> • % of protected areas, Community Conservation Areas (CCA) and Ecologically Critical Areas (ECA) increased • Percentage of marine protected areas increased • % of area of urban wetlands protected • Land zoning map developed considering changed conditions
	Ecosystem	<ul style="list-style-type: none"> • Area (ha) of productive forest cover (70% tree density) increased • Area (ha) of assisted regeneration of natural forest • Area of wetland sanctuaries established • Mileage of connecting canals excavated • Area with wetland and river system connectivity established • % of area Jalmohals under co-management • Area (ha) of swamp forest in Haor basin regenerated and afforested
	Agriculture	<ul style="list-style-type: none"> • % of area under adaptive agricultural practices e.g. drip irrigation, mulching and diversification • Area (ha) with saline tolerant rice • Area (ha) with drought resistant variety • Area of fish sanctuary established • Area of co-managed wetlands

Category	Dimension	Measurable Indicator (examples)
	Energy	<ul style="list-style-type: none"> • MW of electricity generation from wind, solar and biomass and micro-hydropower • MW of electricity saved through energy efficiency • Energy efficient appliances and technologies • Tons of CO₂ & other GHGs reduced from energy efficiency, efficient appliances, renewable energy generation and agricultural practices and other sectors • Number of improved cooking stoves provided to Households
	Community	<ul style="list-style-type: none"> • % of vulnerable people in the targeted community benefitted from enhancing community resilience through creating assets like Killa, raised platform for safety of tube well, village protection cum roads, community seed bank • % of disable/disadvantaged/ethnic community in a targeted community enhanced resilience through building and protecting assets • Number of community tour operators trained and engaged in eco-tourism in protected areas and ECA's • Number of community health assistants trained, certified and engaged in controlling water and vector borne diseases • Number of community groups organized, registered, trained and engaged in wetland co management
	Poverty-Environment-climate nexus	<ul style="list-style-type: none"> • % of ultra poor population in the targeted area supported developing threshold asset base⁹ to survive. • Number of jobs created in NR sector • Number of fisher's boat upgraded to function in the rough sea against SLR • Days of work created to support land less during weather anomalies like continuous spell of heavy shower, long standing flood, droughts, salinities, crop loss etc. • Number of entrepreneur in sustainable NR • Number of Communities engaged in NRM co-management • Number of HH's livelihood asset protected • Number of home stead protected

9 In the base line , the thresh hold asset base for an individual or households need to be defined

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Other Related Resources

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Implementation Monitoring and Evaluation Division (IMED), Dhaka

Matrix of Disaster Risk Management (DRM) Variables

Politics of Climate Change - Loss and damage from climate change: After adaptation

Millennium Development Goals (MDGs) Indicators

Vulnerability: A generally applicable conceptual framework for climate change research

Adaptation to Environmental Change: Contributions of a Resilience Framework

Bangladesh Climate Public Expenditure and Institutional Review (CPEIR)

Environmental and Social Screening Procedure for UNDP Projects, Guidance Note. UNDP 2012.

Proposal for a Framework of Indicators for ICZM, Abu Md. Kamal Uddin and Rob Koudstaal, 2003

Annex 1: Selected MDG indicators

Some selected indicators from Millennium Development Goals (MDG) are given below:

- Poverty headcount ratio
- Poverty Gap Ratio
- Prevalence of child malnutrition (percentage of children under 5)
- Population below minimum level of dietary energy consumption (percentage)
- Net enrolment ratio in primary education
- Cohort reaching grade 5 (percentage)
- Adult literacy rate
- Ratio of girls to boys in primary and secondary education (percentage)
- Ratio of girls to boys in tertiary education (percentage)
- Ratio of literate females to males (percentage of ages between 20 -24)
- Share of women employed in the non- agricultural sector (percentage)
- Under 5 mortality rate (per 1000)
- Infant mortality rate (per 1000 live births)
- Immunization, measles (percentage of children under 12 months)
- Maternal mortality ratio (modeled estimate, per 100,000 live births)
- Births attended by skilled health staff (percentage of total)
- Contraceptive prevalence rate (percentage of women ages 15-49)
- Deaths of malaria per 100,000 population
- Incidence of tuberculosis (100,000 people)
- Tuberculosis cases detected under DOTS (percent)
- Productive forest area (%) (70% tree density)
- Consumption of ozone depleting CFCs (per capita metric tons)
- Proportion of terrestrial and marine areas protected
- CO₂ emissions (metric tons per capita)
- Proportion of urban population with access to safe drinking water
- Proportion of rural population with access to safe drinking water
- Proportion of urban population with access to sanitary latrines
- Proportion of rural population with access to sanitary latrines
- Proportion of households with access to secure tenure
- Youth unemployment rate (percentage of total labor force between the ages of 15-24)
- Fixed line and mobile telephones (per 100 people)
- Internet users (per 100 people)

Annex 2: Indicators included in SFYP

Indicators from Sixth Five Year Plan (SFYP) are given below:

I. Income and Poverty

- Attaining average real GDP growth rate of 7.3 percent per year over the period of the Plan.
- Reduction in the head-count poverty ratio by 10 percentage points.
- Creating good jobs for the large pool of under-employed and new labor force entrants by increasing the share of employment in the industrial sector from 17 percent to 25 percent.
- Increasing the contribution of factor productivity in economic growth to 10 percent.

II. Human Resource Development (Education, Health and Population)

- Achieving 100 percent net enrollment rate for primary education.
- Increasing enrollment rate in 12th class to 60 percent.
- Percentage of cohort reaching grade 5 to be increased to 100 from current 55 percent.
- Under 5 mortality rate to be reduced to 50 per 1000 live birth.
- Infant mortality rate to be reduced to 31 per 1000 live birth.
- Maternal mortality ratio to be reduced to 147 per 100,000 live births.
- Immunization, measles (percent of children under 12 months) to be increased to 100 percent.
- Births attended by skilled health staff to be increased to 50 percent.
- Reduction of total fertility rate to 2.0.
- Increasing contraceptive prevalence rate to 65 percent.

III. Water and Sanitation

- Safe and fresh drinking water to be made available for all urban population.
- Proportion of rural population with access to safe drinking water to be increased to 96.5 percent.
- Surface water source for drinking purpose will be increased to 50 percent.
- Proportion of urban population with access to sanitary latrines to be increased to 100 percent.
- Proportion of rural population with access to sanitary latrines to be raised to 90 percent.

IV. Energy and Infrastructure

- Generation of electricity to be increased to 15,000 MW by FY15 such that the target of 20,000 MW electricity generated by FY21 is attained.
- Electricity coverage to be increased to 65 percent.
- One million poor households shall get access to sustained energy.
- Five percent of energy generation shall be from renewable sources preferably in the remote villages and off-shore islands with wind, solar and bio and micro-hydro.
- 1 million urban households are equipped with solar panels as supplementary source.
- To increase energy efficiency by 10 percent.
- Energy efficient appliances and technologies will be increased by 200 percent compared to 2010.
- Specialized institute such as SEDA will be made operational to promote renewable energy.
- Improve inter-modal transport system to substantially reduce transport cost.
- Gender Equality and Empowerment
- Female to male ratio in tertiary education to be raised from current 32 percent to 60 percent.
- The ratio of literate female to male for age group 20-24 to be raised to 100 percent from the current 85 percent.

VI. Environment Sustainability

- To increase productive forest coverage by 2 percent.
- Natural forest assisted regeneration in 200,000 hectares.
- Territorial coverage of protected area increased to 5 percent, including Community Conservation Area (CCA) and Ecologically Critical Area (ECA).
- To attain WHO standards of air quality in Dhaka and other large cities.
- To treat all urban waste water by FY15 to clean river waters.
- ETP installed and operational in all relevant industrial units with effective monitoring mechanisms.
- Urban wetlands are restored and protected in line with Wetland Conservation Act.
- Clean Water Act enacted.
- At least 10 percent of the wetland in peak dry season is protected as aquatic sanctuary.
- Jolmahal leasing system phased out in favor of pro-poor community based management.
- Regeneration and afforestation of 25,000 hectares of fresh water swamp forest in haor basin.
- At least 7 climate resilient sustainable cities/towns piloted in 7 divisions.
- 500 meter wide permanent green belt established and protected along the coast.
- Eco-tourism promoted at least in 15 protected areas and ECAs.
- Comprehensive marine resources management plan developed.
- Land zoning for sustainable land/water use.
- Environment and Climate Change is integrated into project design, budgetary allocations and implementation process.

Annex 3: United Nations Development Assistance Framework for Bangladesh 2012 - 2016: Indicators for Pro-poor growth & equity, Food Security & Nutrition and Climate Change, Environment, Disaster Risk Reduction and Response

- Pro-poor growth & equity
- Per Capita GDP growth at constant prices
- Labour force participation rate, disaggregated by gender
- Percentage of poorest quintile in national consumption
- Percentage of GDP accounted for by public educational & health spending
- Percentage of trained individuals who are employed or self-employed (disaggregated by sex)
- Proportion of workers going overseas via official channels
- National strategy for social safety net graduation prepared
- National policy drafted that promotes community based management of productive common pool resources
- Government of Bangladesh Joint Cooperative Strategy fully implemented
- Number of new Aid for Trade initiatives by the Government of Bangladesh in target districts or underserved sectors
- Income of participating households
- Percentage of households with increased incomes in the targeted areas such as the Chittagong Hill Tracts and Chars lands (disaggregated by head of household)
- Number of Micro, Small and Medium Enterprises (MSMEs) in targeted lagging regions assisted to access markets, and financial and technological services
- Food Security and nutrition
- Percentage of population able to meet minimum daily energy requirements of 2122kcal
- Percentage of underweight children under five years of age, sex
- Percentage of the population with poor or borderline diet diversity score by age group, sex of household head and socio-economic status
- Anaemia prevalence of pregnant women
- National policies, guidelines and tools on food security, food safety and nutrition are updated, disseminated and implemented within the expected time frame and 20 percent of targeted Upazilas provide facility and community based quality nutrition services
- Recovery rates of severely and moderately malnourished children and pregnant & lactating women in respective treatment programs
- Proportion of target children and women taking micro nutrient supplements as recommended
- Composite indicator: increase in major crops yields (MT/Ha) as a percentage - (CIP result framework)
- Percentage of disaster affected vulnerable households, including displaced households, receiving an adequate & appropriate food, nutrition and agriculture inputs assistance as part of emergency response
- Proportion of targeted households following appropriate basic nutrition, hygiene and sanitation practices* by beneficiary category
- Percentage of children aged 6-23 months receiving complementary food with at least the minimum dietary diversity
- Climate Change, Environment, Disaster Risk Reduction and Response
- Environment, climate and disaster vulnerability index
- Community Asset Score for disaster risk and reduction.

- Amount of resources budgeted by the Government for disaster risk reduction and climate change adaptation against sectoral policies and plans
- Number of Unions in disaster-prone areas with developed community based risk reduction & climate change adaptation action plans
- Number of rural communities with disaster/climate resilient habitats and community assets
- Number of disaster rescue and evacuation volunteers
- Number of district DMCs with a resourced disaster response plan
- Percentage of targeted communities, local and national authorities who are aware of the impact of climate change on their respective communities and/or sectors
- Number of Government policies, strategies or plans approved in support of sustainable management of natural resources
- Energy generated from renewable sources
- Percentage reduction in ozone-depleting substances/greenhouse gases
- Number of communities implementing a sustainable natural resource management plan
- Area covered under effective pollution abatement practices
- Number of Government investment projects incorporating Poverty Environment and Climate Change Indicators in the project design and implementation
- Number of Upazila administrations that have a proper monitoring and regulatory mechanism
- Number of plans, strategies and policies drafted in favour of low emission green growth
- Percentage of rural households in targeted communities with access to renewable energy sources and technologies
- Amount in national budget allocated to energy efficient construction and appliances.

Annex 4: List of Programmes of Bangladesh Climate Change Strategy and Action Plan (BCCSAP)

List of programmes under different themes of BCCSAP are given below:

Food security, social protection and health

- Institutional capacity for research on climate resilient cultivars and dissemination
- Adaptation against drought, salinity resistance and heat
- Adaptation in fisheries sector
- Adaptation in livestock sector
- Adaptation in health sector
- Water and sanitation programs for climate-vulnerable areas
- Livelihood protection in ecologically fragile areas
- Livelihood protection of vulnerable socio-economic groups

Comprehensive disaster management

- Improvement of cyclone and storm surge warning
- Awareness raising and public dissemination
- Risk management against loss of income and property

Infrastructure

- Repair and maintenance of existing flood embankments
- Repair and maintenance of existing cyclone shelters
- Repair and maintenance of existing coastal polders
- Urban drainage needs assessment
- Adaptation against Floods and constructing new embankments and flood shelters
- Adaptation against tropical cyclones and storm surges through land use planning
- Planning & Design of river training and bank erosion mitigation works
- Resuscitation of rivers and khals through dredging
- Earthquake resilient structure and land slide protected structure have to be constructed and retrofitted

Research and knowledge management

- National Centre for research, knowledge management and training on disaster and climate change
- Climate change modeling and their impacts
- Preparatory studies for adaptation against SLR
- Research on the climate change adaptation for knowledge and technology generation

Low carbon development

- Renewable energy development
- Management of urban waste
- Afforestation and reforestation
- Rapid expansion of energy saving devices
- Improving energy efficiency in transport sector

Capacity building

- Revision of sectoral policies for climate resilience
- Mainstreaming CC in national, sectoral and spatial development programs and policies
- Strengthening human resource capacity
- Gender considerations in CC
- Strengthening institutional capacity
- Mainstreaming CC in media

Annex 5: Expected outcomes and action agenda in National Plan for Disaster Management (NPDM)

Expected Outcomes	Action Agenda for 2010-2015
<ul style="list-style-type: none"> Local and national development plans are developed on the basis of the updated hazard maps and anticipated climate change induced hazards. 	<ul style="list-style-type: none"> Conduct Hazard Risk Analysis and produce updated hazard maps. Conduct climate change modeling, cyclone and storm surge modeling, flood and drought modeling and produce anticipated hazards maps.
<ul style="list-style-type: none"> Scientific analysis, including climate change impacts, is guiding all hazards risk assessment processes. Hazard risk information is readily available in a user-friendly format to key stakeholders and development planners. Research gaps are influencing government, donor and private sector priorities. Disaster Management stakeholders are updated with climate change and climate variability impact knowledge. 	<ul style="list-style-type: none"> Capacitate the Climate Change Cell (CCC) within DoE Develop scenario and prediction models to determine climate change and climate variability impacts. Conduct research to determine climate change and climate variability impacts for Bangladesh. Strengthen existing knowledge and information accessibility on impact prediction and adaptation to climate change. Identify adaptation options through action research. Establish a climate change information library, database and knowledge information network. Incorporate climate change and climate variability impact information in the design of disaster risk reduction programmes. Design and implement capacity building programmes to improve the understanding of climate change impacts among the DM stakeholders.
<ul style="list-style-type: none"> A heightened level of preparedness to the earthquake and tsunami risks. 	<ul style="list-style-type: none"> Conduct earthquake and tsunami vulnerability assessment and prepare: <ul style="list-style-type: none"> Earthquake vulnerability and risk maps for mega cities Tsunami vulnerability maps for all the coastal districts Map out critical vulnerable infrastructure and communities within the high risk zones. Introduce Contingency Planning for Non Seasonal Disaster Risks in city corporations response plans. Develop and implement an extensive education and awareness programme on earthquake and tsunami risks. Use of earthquake risk maps in urban planning and development. Update and ensure compliance of the Bangladesh National Building Code. Review and revise building safety codes on evacuation of people with emphasis on persons with disabilities.

Expected Outcomes	Action Agenda for 2010-2015
	<ul style="list-style-type: none"> • Develop and implement retrofitting programmes for vulnerable critical infrastructure. • Develop and disseminate an Earthquake Risk Reduction Plan. • Develop and disseminate a Tsunami Risk Reduction Plan. • Implement earthquake and tsunami risk reduction plans.
<ul style="list-style-type: none"> • Reduce the incidence of disasters in the manufacturing industry. • Bangladesh Fire Service and Civil Defence is better equipped with latest fire-fighting technology, including training. • Reduce the incidence of launch capsizes. • Reduce the casualties in road accidents. • Enhance nuclear and radiation safety. • Reduce the risk to biological hazards, e. g. Bird Flu, SARS, Ebola, Anthrax, etc. • Reduce the landslide hazard risks. 	<ul style="list-style-type: none"> • Develop guidelines and risk reduction plans for chemical and technological hazards. • Establish and regularly update an information database and network on industrial safety measures. • Identify hazardous installations and promote employee and community preparedness. • Develop and implement a strategy to strengthen the Bangladesh Fire Service and Civil Defence (BFS & CD). • Develop guidelines for road and water safety. • Develop and implement nuclear and radiological risk reduction and emergency response plans. • Develop bio-containment policy, risk reduction plans and facilities (according to Bio Safety Levels) to deal with biological hazards. • Develop and Implement a broad-based and cooperative landslide risk reduction programme comprising review and revision of relevant policy and legislation, field-based studies of landslides, mapping, laboratory investigations of soil properties, computer modelling of slope stability and movement, and studies of the impacts of groundwater on the stability of potentially unstable slopes.
<ul style="list-style-type: none"> • Erosion prediction information used in the local level response and recovery plans, and policy decisions. 	<ul style="list-style-type: none"> • Identify organizations conducting erosion predictions, and assess the utility of the generated information. • Identify resource requirements and probable source of funding to further capacity strengthening and information generation on a continuous basis. • Disseminate the information for utilization in development planning and resettlement of vulnerable communities.
<ul style="list-style-type: none"> • Building disaster resilient community elements including population, infrastructure, utility services, life and livelihood support systems. 	<ul style="list-style-type: none"> • Develop guidelines and templates for inclusion of Disaster Risk Reduction (DRR) and Climate Change Adaption (CCA) in sectoral policies and plans. • Include DRR and CCA in policies and development plans of various relevant sectors as described in section 2.1 and section 2.2 of the Action Matrix.

Expected Outcomes	Action Agenda for 2010-2015
	<ul style="list-style-type: none"> • Include DRR and CCA perspectives at primary, secondary and tertiary levels of educations as described in section 3.2 of the Action Matrix. • Promote action research in relevant sectors. • Risk based design of projects and ancillary structure. • Design and implement Social Safety Net Programmes as described in section 4.5 (of the Action Matrix) to ensure food security of the most vulnerable. • Identifying and converting existing public buildings into multi-purpose disaster shelters. • Promote food security as an important factor in ensuring the resilience of communities to hazards. • Establish a dependable national food security system. • Develop and implement a School Safety Programme, including a national school safety plan and school building-level emergency response plans. • Harmonize and coordinate all land-use related policies and legislation, as well as promote effective protection and enhancement of land quality, with the aim of ensuring sustainable utilisation of the land for optimal production that fosters socio-economic development and maintains land quality for long-term productivity.

Annex 6: Preparing for low emission climate resilient development: what is in place and remaining gaps/issues

LECRD Guidelines	Completed / in place	Remaining gaps / issues
Step 1: develop a multi-stakeholder planning process		
Establish high level Low Emission Climate Resilient Development (LECRDS) steering committee	<ul style="list-style-type: none"> National Steering Committee on Climate Change. Members include Government, development partners CSOs, private sector and academia CC Secretariat to support the Committee Regular meetings take place 	<ul style="list-style-type: none"> Sensitize committee members to adopt LECRDS
Identify and create multi-stakeholder policy and technical working groups	<ul style="list-style-type: none"> Climate change unit of MoEF acting as the technical committee for BCCTF Management committee for BCCRF in place Climate change Cell, DoE operational, a total of 63 focal points in different ministries, agencies, academic institutes UNDP managed CDMP allocated resources to 12 ministries to mainstream DRR&CCA into their respective domain UNDP/UNEP managed PECM under PC housed at GED, PC established working groups for water, rural development, agriculture and energy sectors for screening tools development and mainstreaming 	<ul style="list-style-type: none"> Consolidate, streamline and formalize existing working groups Nurture and promote formation of working groups and centering focal points in all key ministries Internalize working groups for mainstreaming in all ministries Internalize working groups formed in PC
Identify technical capacity needs and implement training	<ul style="list-style-type: none"> NCSA identified capacity needs Sporadic TNA by different projects/programmes for the government and CSO 	<ul style="list-style-type: none"> Yet to implement training
Put in place communications and awareness-raising strategy	<ul style="list-style-type: none"> SNC is about to be completed BCCSP NCSA Different projects/programmes 	<ul style="list-style-type: none"> National operational communication strategy yet to develop and implement

LECRD Guidelines	Completed / in place	Remaining gaps / issues
Step 2: Prepare Climate Change Profiles and Vulnerability Scenarios		
<i>Develop climate scenarios (2050/2075/ 2100) to national and sub-national levels</i>	<ul style="list-style-type: none"> • SNC • CCC, DoE • Impact modeling at the sub-national level under preparation (CDMP) 	<ul style="list-style-type: none"> • The uncertainty is very high. Only one RCM used, more models to be employed • Social and financial impacts yet to be analyzed
<i>Establish business as usual (BAU) scenarios for GHG emissions and GHG emission inventories</i>	<ul style="list-style-type: none"> • GHG inventory (year; SNC) 	<ul style="list-style-type: none"> • SNC submitted
<i>Project scenarios for future emissions based on existing and alternative development scenarios</i>	<ul style="list-style-type: none"> • SNC 	
<i>Assess current and future vulnerabilities of ecosystems and social and economic systems and related risks for development scenarios</i>	<ul style="list-style-type: none"> • VA (SNC), CDMP (study ongoing for local level flood, drought, salinity scenarios) 	<ul style="list-style-type: none"> • Specific and focused studies on: <ul style="list-style-type: none"> – ECA, Sundarbans, swamps, forests , Wetland ecosystem – Agro biodiversity – Infrastructures – Livelihoods, communities
<i>Produce current and future vulnerability maps</i>	<ul style="list-style-type: none"> • SNC • CDMP (study ongoing for local level flood, drought, salinity scenarios) 	
Step 3: Identify Strategic Options Leading to Low-Emission Climate-Resilient Development Trajectories		
<i>Review climate profiles and vulnerability scenarios</i>	<ul style="list-style-type: none"> • NC, BCCSAP, NAPA, CCC knowledge products 	
<i>Determine emission reduction targets and identify the related opportunities and options to achieve them</i>	<ul style="list-style-type: none"> • Mitigation opportunities in SNC 	<ul style="list-style-type: none"> • Develop and implement NAMA and put in place MRV
<i>Develop different low-emission climate-resilient development scenarios for main sectors of a given region (e.g. energy, industry, transportation, agriculture, forestry and natural resources, water etc.)</i>	<ul style="list-style-type: none"> • UNDP is preparing a programme focused on green growth (low emission and resilient development) for energy, industry and environment sector 	<ul style="list-style-type: none"> • Need to develop the same for Agriculture, forestry, wetlands, water, transport and infrastructures

Assess the impact of the different scenarios on the predicted vulnerability of given region

- SNC

Based on future emission scenarios and vulnerability, define comprehensive low-emission climate-resilient development objectives and identify the priority adaptation and mitigation options

- National CC Strategy and Action Plan on CC (2009)
- NAPA (2005)
- UN REDD+ is in the preparatory stage
- Renewable energy policy is undergoing revision
- NAP
- NAMA
- Development of area based, community based and sector based profiles and employment of CCA/DRR options to reduce vulnerability

Step 4: Identify Policies and Financing Options to Implement Priority Climate Change Actions

Perform technical and social feasibility and cost-benefit analysis of priority options

- CCC study results
- PPCR pilot study results
- Consolidate the available results
- Fill the gaps for other sectors

Analyze barriers to implementation of mitigation and adaptation options and identify those that can be addressed

- BRESL project (UNDP)
- Lessons learned from CDMP I and other implemented adaptation projects
- Consolidate available results, develop profiles and compile best practices in adaptation and mitigation options for implementation. Screen and list existing barriers and means to overcome

Evaluate existing policies and local and national financing opportunities for priority options

- BCCTF, BCCRF and operational modalities in place
- Emergence of Department of Climate Change and technical capacity development

Identify required investment and financial flows, and make recommendations by sector for short, medium, and long-term scenarios

- Capacity development for the policy makers, a global programme by UNDP Headquarters for the 20 Least Developed Country's (LDC's) has recently conducted a study "Assessment of investment and financial flow (I&FF)" for the water, energy and agriculture sector
- Climate fiscal framework / public expenditure review (ToR prepared, consultants to be recruited)

Identify public policy and innovative financing instruments to secure investments and financial flows for low-emission climate-resilient development options

- BCCTF,
- BCCRF
- Direct access to AF (resubmitted for accreditation of NIE)
- Access to global funds via MIEs
- REDD+
- Clean Development Mechanism (CDM)
- Orientation of Climate Change Unit (CCU), Climate Change Cell (CCC) and Department of Climate Change, MoEF
- Planning Commission
- Finance ministry (External Resources Division, Internal Resources Division)

Step 5 : Prepare Low-Emission Climate-Resilient Development Roadmap

<i>Roadmap prepared (short-/medium-/and long-term priorities, associated public policies and financing strategies, and institutional and operational framework for implementation and monitoring and evaluation), clearly outlining sectoral pathways</i>	<ul style="list-style-type: none"> • NAPA, NDMP, CDS, BCCSAP 	<ul style="list-style-type: none"> • Prioritized short/medium/long term sectoral, community based, ecosystem and economy plan and road map yet to prepare
<i>LECRDS steering committee reviews and approves draft roadmap</i>	<ul style="list-style-type: none"> • Yet to develop 	<ul style="list-style-type: none"> • Yet to develop
<i>Climate coordination committee facilitates multi-sectoral, multi-stakeholder, multi-level review and validation</i>	<ul style="list-style-type: none"> • Yet to develop 	<ul style="list-style-type: none"> • Yet to develop
<i>Finalized LECRDS roadmap in agreed upon sectors is made available widely and specifically presented to key public and private financial actors</i>	<ul style="list-style-type: none"> • Yet to develop 	<ul style="list-style-type: none"> • Yet to develop

Annex 7: Environmental Vulnerability Index (Indicators)

No.	Indicators	Types	Aspects	Sub-Indices						
				CC	D		AF	W	CCD	
1	HIGH WINDS	Weather & Climate	Hazards	CC	D				CCD	
2	DRY PERIODS	Weather & Climate	Hazards	CC	D		AF	W	CCD	
3	WET PERIODS	Weather & Climate	Hazards	CC	D		AF	W	CCD	
4	HOT PERIODS	Weather & Climate	Hazards	CC	D				CCD	
5	COLD PERIODS	Weather & Climate	Hazards		D				CCD	
6	SST	Weather & Climate	Hazards	CC			AF			CBD
7	VOLCANOES	Geology	Hazards		D					
8	EARTHQUAKES	Geology	Hazards		D					
9	TSUNAMIS	Geology	Hazards		D					
10	SLIDES	Geology	Hazards		D					
11	LAND AREA	Geography	Resistance	CC						CBD
12	DISPERSION	Geography	Resistance	CC						CBD
13	ISOLATION	Geography	Resistance							CBD
14	RELIEF	Geography	Resistance	CC					CCD	CBD
15	LOWLANDS	Geography	Resistance	CC					CCD	CBD
16	BORDERS	Geography	Resistance							CBD
17	IMBALANCE	Resources & Services	Damage							CBD
18	OPENNESS	Resources & Services	Hazards							CBD
19	MIGRATIONS	Resources & Services	Resistance							CBD
20	ENDEMIC	Resources & Services	Resistance							CBD
21	INTRODUCTIONS	Resources & Services	Damage	CC						CBD
22	ENDANGERED	Resources & Services	Damage							CBD
23	EXTINCTIONS	Resources & Services	Damage							CBD
24	VEGETATION	Resources & Services	Damage					W	CCD	CBD
25	LOSS OF COVER	Resources & Services	Hazards					W	CCD	CBD
26	FRAGMENTATION	Resources & Services	Damage							CBD
27	DEGRADATION	Resources & Services	Damage					W	CCD	
28	RESERVES	Resources & Services	Hazards					W		CBD
29	MPA's	Resources & Services	Hazards							CBD

No.	Indicators	Types	Aspects	Sub-Indices								
30	FARMING	Resources & Services	Hazards									
31	FERTILISERS	Resources & Services	Hazards			HH		W				
32	PESTICIDES	Resources & Services	Hazards			HH		W				
33	BIOTECH	Resources & Services	Hazards									
34	FISHERIES	Resources & Services	Hazards									
35	FISHING EFFORT	Resources & Services	Hazards									
36	WATER	Resources & Services	Hazards	CC		HH		W	CCD			
37	AIR	Resources & Services	Hazards			HH						
38	WASTE	Resources & Services	Hazards									
39	TREATMENT	Resources & Services	Hazards			HH						
40	INDUSTRY	Resources & Services	Hazards									
41	SPILLS	Resources & Services	Hazards									
42	MINING	Resources & Services	Hazards									
43	SANITATION	Resources & Services	Hazards			HH						
44	VEHICLES	Resources & Services	Hazards									
45	POPULATION	Human populations	Damage	CC	D			W				
46	GROWTH	Human populations	Hazards					W				
47	TOURISTS	Human populations	Hazards									
48	COASTAL	Human populations	Damage									
49	AGREEMENTS	Human populations	Hazards	CC	D							
50	CONFLICTS	Human populations	Damage									

CC = Climate Change; D=Exposure to natural disasters; HH=Human health; AF=Agriculture & Fisheries; W = water; CCD=Desertification; CBD=Biodiversity.

Annex 8: Participant List of the Focus Group Discussions (FGDs) held in Planning Commission

List of Participants from the six FGDs are given below:

First Focus Group Discussion (FGD), 13 June, 2012

1. Dr. Shamsul Alam, Member, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
2. S.M. Nasim Uddin, National Project Director, PECM Project and Joint Chief, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
3. Md. Eakub Ali, Joint Chief, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
4. Md. Hasanur Rahman, Director General, Implementation, Monitoring and Evaluation Division (IMED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
5. Md. Zahid Hossain, Director General, Implementation, Monitoring and Evaluation Division (IMED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
6. Abu Mostafa Kamal Uddin, Climate Change Specialist, United Nations Development Programme (UNDP), Sher-E-Bangla Nagar, Dhaka
7. Abida Sultana, Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
8. Sheikh Moinul Islam Moin, Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
9. A.S.M Nazmul Haque Shemul, Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
10. Tanbeen Hasan, Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
11. Sima Rani Dhar, Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka

Second Focus Group Discussion (FGD), 23 July, 2012

10. Biksah Kishor Das, Joint Secretary, Ministry of Women and Children Affairs, Bangladesh Secretariat, Dhaka
11. Md. Sadequr Rahman, Monitoring and Evaluation Officer, Department of Agriculture Extension, Dhaka
12. Anowara Sharmeen, Senior Production Economist, Department of Agriculture Extension, Dhaka
13. Md. Salahuddin Ahmed, Senior Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
14. Md. Abul Kalam, Research Officer, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
15. Md. Mohsin Ali Khandokar, Joint Chief, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
16. Jannatul Ferdous, Assistant Research Officer, Department of Women Affairs, Dhaka
17. Abu Mostafa Kamal Uddin, Climate Change Specialist, United Nations Development Programme (UNDP), Sher-E-Bangla Nagar, Dhaka
18. S.M. Khalilur Rahman, Agricultural Economics and Rural Sociology Division, Bangladesh Agricultural Research Council, Dhaka
19. Md. Abdul Quader, Superintendent Engineer, Local Government and Engineering Department, Sher-E-Bangla Nagar, Dhaka
20. Dr. Md. Rafiqul Islam Mondol, Director General, Bangladesh Agricultural Research Institute, Gazipur

21. Biksah Kishor Das, Joint Secretary, Ministry of Women and Children Affairs, Bangladesh Secretariat, Dhaka
22. Md. Sadequr Rahman, Monitoring and Evaluation Officer, Department of Agriculture Extension, Dhaka
23. Anowara Sharmeen, Senior Production Economist, Department of Agriculture Extension, Dhaka
24. Md. Salahuddin Ahmed, Senior Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E- Bangla Nagar, Dhaka
25. Md. Abul Kalam, Research Officer, General Economics Division (GED), Planning Commission, Sher-E- Bangla Nagar, Dhaka
26. Md. Mohsin Ali Khandokar, Joint Chief, General Economics Division (GED), Planning Commission, Sher-E- Bangla Nagar, Dhaka
27. Jannatul Ferdous, Assistant Research Officer, Department of Women Affairs, Dhaka
28. Abu Mostafa Kamal Uddin, Climate Change Specialist, United Nations Development Programme (UNDP), Sher-E-Bangla Nagar, Dhaka
29. Abida Sultana, Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E- Bangla Nagar, Dhaka
30. Sheikh Moinul Islam Moin, Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E- Bangla Nagar, Dhaka

Third Focus Group Discussion (FGD), 25 July, 2012

31. Dr. Shamsul Alam, Member, General Economics Division (GED), Planning Commission, Sher-E- Bangla Nagar, Dhaka
32. S.M. Nasim Uddin, National Project Director, PECM Project and Joint Chief, General Economics Division (GED), Planning Commission, Sher-E- Bangla Nagar, Dhaka
33. Md. Masud Rana Chowdhury, Senior Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E- Bangla Nagar, Dhaka
34. Dr. Md. Rafiqul Islam, Project Director, DCRMLP, Department of Livestock, Farmgate, Dhaka
35. Md. Manjurul Anwar, Joint Chief, Irrigation Wing, Agriculture Division, Planning Commission, Sher-E- Bangla Nagar, Dhaka
36. Dr. Md. Nurul Amin Chowdhury, Assistant Director, Directorate of Primary Education, Dhaka
37. Saiful Alam Hamidi, Joint Chief, Agriculture Division, Planning Commission, Sher-E- Bangla Nagar, Dhaka
38. Dr. A.G. Mustafa, Chairman, Bangladesh Council of Scientific and Industrial Research, Dhaka
39. Prof. Dr. Md. Sirajul Haque, Director, Directorate General of Health Services, Dhaka
40. Q.S.I. Hashem, Director, Department of Environment, Sher-e-Bangla Nagar, Dhaka
41. Nurul Haque Majumdar, Joint Chief (Planning), Ministry of Education, Bangladesh Secretariat, Dhaka
42. Sarker Abul Kalam Ajad, Director, Bangladesh Computer Council, Sher-e-Bangla Nagar, Dhaka
43. Md. Ziaul Haque, Deputy Director, Department of Environment, Sher-e-Bangla Nagar, Dhaka
44. Selina Akhter, Deputy Chief, Ministry of Environment, Bangladesh Secretariat, Dhaka
45. Abdullahil Azad, Chief Engineer, Education Engineering Department, Shikkha Bhaban, Dhaka

46. Abu Mostafa Kamal Uddin, Climate Change Specialist, United Nations Development Programme (UNDP), Sher-E-Bangla Nagar, Dhaka
47. Md. Salahuddin Ahmed, Senior Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E- Bangla Nagar, Dhaka
48. Abida Sultana, Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
49. Sheikh Moinul Islam Moin, Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E- Bangla Nagar, Dhaka

Fourth Focus Group Discussion (FGD), 01 August, 2012

50. Dr. Shamsul Alam, Member, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
51. S.M. Nasim Uddin, National Project Director, PECM Project and Joint Chief, General Economics Division (GED), Planning Commission, Sher-E- Bangla Nagar, Dhaka
52. Manobendra Bhowmik, Director General, Bangladesh Petroleum Institute, Uttara Model Town, Dhaka
53. Md. Saidur Rahman, Chief Mechanical Engineer (Development), Bangladesh Railway, Dhaka
54. Md. Anowarul Hoque, CPLO, Bangladesh Railway, Dhaka
55. Syed Md. Wazed Ali, Director General, Directorate of Land, Dhaka
56. Md. Ehasanul Hoque, Chairman, Bangladesh Parjatan Corporation, Dhaka
57. Md. Khalilur Rahman Khan, Joint Chief, Planning Commission, Sher-E- Bangla Nagar, Dhaka
58. Md. Abdur Rouf Miah, Director, Power Cell, Power Division, Ministry of Power, Energy and Mineral, Dhaka
59. Md. Moniruzzaman, Additional Director, Bridge Division, Mohakhali, Dhaka
60. Md. Mostafizur Rahman, General Manager (ESD), Petro Bangla, Dhaka
61. S.K. Abdur Rouf, Deputy Secretary, Planning Division, Planning Commission, Sher-E- Bangla Nagar, Dhaka
62. Anjan Kr. Biswas, Deputy Chief, Ministry of Railways, Bangladesh Secretariat, Dhaka
63. Md. Monwar Hossain Khan, Senior Assistant Chief, Power Division, Planning Commission, Sher-E- Bangla Nagar, Dhaka
64. Begum Mahmuda, Controller, Rural Electrification Board, Nikunja, Khilkhet, Dhaka
65. Md. Abul Kalam, Research Officer, General Economics Division (GED), Planning Commission, Sher-E- Bangla Nagar, Dhaka
66. Abu Mostafa Kamal Uddin, Climate Change Specialist, United Nations Development Programme (UNDP), Sher-E-Bangla Nagar, Dhaka
67. Abida Sultana, Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
68. Sheikh Moinul Islam Moin, Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E- Bangla Nagar, Dhaka

Fifth Focus Group Discussion (FGD), 14 November, 2012

69. Dr. Shamsul Alam, Member, GED, Planning Commission, Sher-E-Bangla Nagar, Dhaka
70. Md Rezaul Karim, National Project Director, PECM Project and Joint Chief, GED, Planning Commission, Dhaka
71. Engr. Rowshan Ara Begum, Superintendent of Engineer, Roads and Highways Department, Dhaka
72. Md. Aminul Haque, Director (Production and Engineering), Bangladesh Sugar & Food Industries Corporation (BSFIC), Chini Shilpa Bhaban, 3, Dilkusha C/A, Dhaka
73. Md. Ayub Ali, Chief (Planning and Implementation), Bangladesh hand Loam Board, BTMC Bhaban (4th Floor), 7-9 Kawran Bazar, Dhaka
74. Md. Abdur Razzaque, Joint Secretary, Bangladesh Textile Mills Corporation. BTMC Bhaban. 7-9, Kawran Bazar C/A, Dhaka
75. Ekhlash Uddin, Senior General Manager, Bangladesh Chemical Industries Corporation, BCIC Bhaban, 30-31, Dilkusha, C/A, Dhaka
76. Md. Tofazzal Hossain, Director, Department of Jute, Ministry of Textiles and Jute, Karim Chamber (1st & 2nd floor), 99, Motijheel Commercial Area, Dhaka
77. Zahir Khan, Joint Chief, Planning Commission, Sher-E-Bangla Nagar, Dhaka
78. Md. Saifur Rahman, Senior Engineer, Department of Public Health Engineering (DPHE), DPHE Bhaban, 14, Shaheed Captain Mansur Ali Sarani, Kakrail, Dhaka
79. Mst. Aspia Aktar, Deputy Chief, Planning Commission, Sher-E-Bangla Nagar, Dhaka
80. Hamida Idris, Deputy Chief, Planning Commission, Sher-E-Bangla Nagar, Dhaka
81. Rezaul Azam Faruqui, Deputy Chief, Planning Commission, Sher-E-Bangla Nagar, Dhaka
82. Md. Abdus Samad, Chairman, Rajshahi Development Authority, Rakshahi
83. S.S. Kibria, General Manager (M), Bangladesh Export Processing Zones Authority (BEPZA), BEPZA Complex, House: 19/D, Road: 6, Dhanmondi, Dhaka
84. Abu Mostafa Kamal Uddin, Climate Change Expert, United Nations Development Programme (UNDP), Sher-E-Bangla Nagar, Dhaka
85. Abida Sultana, Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka

Sixth Focus Group Discussion (FGD), 21 November, 2012

86. Dr. Shamsul Alam, Member, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
87. Md. Rezaul Karim, National Project Director, PECM Project and Joint Chief, General Economics Division (GED), Planning Commission, Dhaka
88. Engr. Rowshan Ara Begum, Superintendent of Engineer, Roads and Highways Department, Dhaka
89. Ms. Azizun Nahar, Deputy Economic Adviser, Ministry of Finance, Bangladesh Secretariat, Dhaka
90. Md. Mokelsur Rahman, Deputy Chief, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka

91. Ms. Shahnun Nesa, Deputy Secretary, Statistics Division, Ministry of Planning, Dhaka
92. Slama Hasneyen, Deputy Director, Bangladesh Bureau of Statistics, Sher-E-Bangla Nagar, Dhaka
93. O.N. Siddiqua Khanam, Joint Secretary, Planning Division, Planning Commission, Sher-E-Bangla Nagar, Dhaka
94. Shibly Nazir, Joint Secretary, Economic Relation Division (ERD), Planning Commission, Sher-E-Bangla Nagar, Dhaka
95. Mr. Khandaker Nuruzzaman, Division Chief, Programming Division, Planning Commission, Sher-E-Bangla Nagar, Dhaka
96. Md. Mustafizur Rahman Sarker, Deputy General Manager, Bangladesh Bank, Motijheel, Dhaka
97. Mr. Shafiquzzaman, Deputy Secretary, Planning Division, Planning Commission, Sher-E-Bangla Nagar, Dhaka
98. Ms. Rahnuma Salam, Deputy Director, Implementation Monitoring Evaluation Division (IMED), Planning Commission, Sher-E-Bangla Nagar, Dhaka
99. Dr. Fazle Rabbi Sadeque, Project Coordinator, Palli Karma-Sahayak Foundation (PKSF), PKSF Bhaban, E-4/B, Agargaon Administrative Area, Sher-e-Bangla Nagar, Dhaka
100. Abu Mostafa Kamal Uddin, Climate Change Expert, United Nations Development Programme (UNDP), Sher-E-Bangla Nagar, Dhaka
101. Abida Sultana, Assistant Chief, General Economics Division (GED), Planning Commission, Sher-E-Bangla Nagar, Dhaka



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