Rashed Al Mahmud Titumir
Tanjila Afrin
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Natural Resource Degradation and Human-Nature Wellbeing

Cases of Biodiversity Resources, Water Resources, and Climate Change

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Preface and Acknowledgements

The natural resource bank is gradually being drawn down. This book scrutinises the underlying causes of the degradation of natural resources. In this regard, it develops a new framework of sustainability in the case of the usage and management of natural resources by incorporating the idea of human sociality. Human sociality implies that humans are social beings, who behave in a reciprocal manner. As nature provides numerous benefits to human beings, they are naturally inclined to conserve and protect nature in return. Therefore, nature and human beings have a mutually beneficial relationship. This relationship, however, becomes distorted in a market economy.

The alternative framework emphasises the revitalisation of the symbiotic relations in order to progress toward a sustainable transformative pathway that can ensure the well-being of both nature and human beings by ensuring sustainable governance of natural resources. The framework thus entails that the well-being of human beings and nature must go side by side because one without the other is certainly not a viable option. Simultaneously, it considers the necessity of recognising political economy factors to pinpoint the root causes of natural resource degradation. Overall, the necessary condition is the revitalisation of mutual relations between human beings and nature while the sufficient condition is captured in terms of the nature of institutions and political settlement.

Specifically, the book examines biodiversity resources, water resources and climate change—the three most pressing issues in the realm of the current natural resource governance regime in the context of a developing country. It demonstrates, through theoretical and empirical analyses, that natural resources have been exploited beyond sustainable limits due to the commodification process, the existence of fragile institutions and unequal power-sharing arrangements. This results in the dissipation of natural resource rent, leading to the degradation of biodiversity resources, depletion and inequitable distribution of water resources, climate change as well as unsustainable development of the economy. Such degradation also steers intergenerational injustice because the younger generation of today is likely to suffer more in the future than their older counterparts.

The book relates to the COVID-19 pandemic, as there is a direct link between the pandemic and the destruction of nature. The 2030 Agenda for Sustainable Development with its biodiversity, water, climate change and other environment-related goals and targets is even more important today in the face of the pandemic, which has reinforced the need to protect biodiversity, ensure water security and halt climate change. In the light of the pandemic and its effects, accordingly, the book scrutinises the challenges of governing biodiversity, water and climate change.

Overall, the book offers important insights for academics and researchers specifically interested in the field of development studies who wish to gain a deeper understanding of sustainable natural resource governance, specifically in the context of developing countries. For policymakers and policy advocates, the book serves as a groundwork by providing pertinent contents in outlining the justification for policy objectives concerning biodiversity, water resources and climate change.

The authors would like to thank *Unnayan Onneshan*—an independent research think tank in Bangladesh—for providing support to conduct several research projects down the years to help build the foundation to plan and write this book. A significant amount of data for empirical analysis in this book was also collected under several research projects of this organisation. In line with that, the authors express gratitude to the researchers, Jayanta Kumar Basak, Mohammed Abdul Baten, Md Humayain Kabir, Tahera Akter, among others as well as the respondents who participated in those research. In addition, the authors would like to thank Azmol Hossain, Coordinator, and Mamun-ur-Rashid, Community Researcher, who also provided their support in conducting the studies.

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The authors are solely responsible for any errors, inadequacies and omissions that may still remain in the book even after a thorough review and proofreading. The authors will certainly address those in the next edition.

Dhaka, Bangladesh
December 2022

Rashed Al Mahmud Titumir
Tanjila Afrin
Mohammad Saeed Islam

Contents

1 Setting the Context 1
1.1 Introduction 1
1.2 Biodiversity Resources 3
1.3 Water Resources 6
1.4 Climate Change 13
1.5 Biodiversity, Water and Climate Change: The Case of Bangladesh 16
1.6 Scope and Approach of the Book 24
1.7 Organisation of Chapters 28
References 29

2 Managing Natural Resources Sustainably: Market and Non-market Approaches 37
2.1 Introduction 37
2.2 Market-Centric Approach: Neo-classical Economics and New Institutional Economics 39
2.3 Political Economy Approach: Power, Political Settlement and Distribution 48
2.4 The Complementarity of Human and Nature Well-Being: A New Approach 53
2.4.1 Agents 56
2.4.2 Means 57
2.4.3 Outcomes 57
2.4.4 Institutions 58
2.4.5 Power and Political Settlement 58
2.4.6 Human Sociality 59
2.5 Concluding Remarks 65
References 65

3 Biodiversity Resources: Degradation, Restoration and Sustainable Conservation 75
3.1 Introduction 75

3.2 State of Biodiversity Resources in Bangladesh 78
3.2.1 Forest Biodiversity 79
3.2.2 Coastal and Marine Biodiversity 82
3.2.3 Wetlands Biodiversity 85
3.2.4 Agricultural Biodiversity 87
3.3 Biodiversity Degradation of the Sundarbans: A Micro-case Study 88
3.4 Biodiversity Under Market: Commodification and Institutions 94
3.5 Political Economy of Biodiversity: Accumulation and Distribution 99
3.6 An Alternative Framework 101
3.6.1 Proposition 1: Pricing and Rent 102
3.6.2 Proposition 2: Rent, Institutions and Regulation 104
3.6.3 Proposition 3: Power, Political Settlement and Primitive Accumulation 105
3.6.4 Proposition 4: Collaboration and Well-Being 107
3.7 Missing Institutions: Property Rights Instability and Marginalisation of Local People 107
3.8 Power, Politics and Degeneration of Biodiversity Resources 111
3.9 Pricing, Rent and Extraction of Forest Resources 118
3.9.1 Commercialisation and Unequal Rent Distribution 121
3.9.2 Loss of Forest Revenue: Evidence of Rent Dissipation 127
3.10 Traditional Knowledge and Cooperation for Sustainable Management of Biodiversity Resources 128
3.11 Concluding Remarks 134
References 136

4 Water Resources: Provision, Distribution and Sustainable Production 147
4.1 Introduction 147
4.2 State of Water Resources in Bangladesh 150
4.2.1 Groundwater Resources 151
4.2.2 Transboundary Rivers 155
4.2.3 Wetland Resources 163
4.2.4 Marine Resources 168
4.3 Water Under Market: Scarcity, Pricing and Institutions 175
4.4 Politico Economy of Commodification, Exchange and Accumulation 178
4.5 An Alternative Framework 179
4.5.1 Proposition 1: Provisioning and Access 179
4.5.2 Proposition 2: Property Rights and Benefits Sharing 182
4.5.3 Proposition 3: Power and Bargaining 184
4.5.4 Proposition 4: Technology, Scale and Resources 186
4.5.5 Proposition 5: Human–Nature Mutuality 187

4.6 Provisioning and Access: A Case Study of Groundwater 187
4.6.1 Financialisation and Rent Dissipation: Case of Dhaka City 194
4.6.2 COVID-19, WASH Practice and Groundwater 197
4.7 Unstable Institutions and Power Politics: The Case of Wetlands 198
4.7.1 The Pre-British Period 198
4.7.2 The British Colonial Period 200
4.7.3 The Pakistan Period 201
4.7.4 The Bangladesh Period 201
4.8 Power and Unequal Exchange: The Case of Transboundary Water 209
4.8.1 Ganges Treaty and Indus Treaty: A Comparison 218
4.9 Technology, Institutions and Revenue: The Case of Marine Resources 230
4.10 Social Norms, Cooperation and Human Sociality in Water Governance 236
4.11 Concluding Remarks 238
References 239

5 Climate Change: Equity and Sustainability 255
5.1 Introduction 255
5.2 State of Climate Change 258
5.3 Climate Change in Bangladesh 263
5.4 Market Correction of Climate Crisis 269
5.5 Ecological Rift, Ecological Debt and Unequal Exchange 273
5.6 An Alternative Framework 274
5.6.1 Proposition 1: Externality and Distribution 276
5.6.2 Proposition 2: Capital Deficiency and Non-functioning Market Solutions 277
5.6.3 Proposition 3: Institutions and Carrying Capacity 279
5.6.4 Proposition 4: Material Balance and Sustainability 280
5.7 Unequal Rate of Pollution and Distribution of Burdens 282
5.7.1 Climate Change, Agriculture and Food Security: Burden for Bangladesh I 289
5.7.2 Frequency and Intensity of Natural Disasters: Burden for Bangladesh II 293
5.7.3 Decreasing Carrying Capacity and Displacement: Burden for Bangladesh III 302
5.8 International Co-operation in Financing and Technology Transfer 312
5.9 Institutional Fragility at the National Level: Methane Emission and Energy Transformation 325
5.10 Material Balance, Resilience and Sustainability 327

5.11 Concluding Remarks 328
References 329

6 Conclusions: Sustainable Transformative Pathways 341
6.1 Introduction 341
6.2 Sustainable Transformative Pathways: Necessary and Sufficient Conditions 341
6.3 Bending the Curve of Degradation of Biodiversity Resources 344
6.4 Equalising the Curve for Water Resources 347
6.5 Flattening the Curve of Climate Crisis 349
6.6 Natural Resources, Sustainable Development Goals and COVID-19 Pandemic 352
References 354

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Abbreviations

AEZs	Agro-Ecological Zones
AR	Assessment Report
ATC	Average Total Cost
BADC	Bangladesh Agricultural Development Corporation
BARC	Bangladesh Agricultural Research Council
BBS	Bangladesh Bureau of Statistics
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BCM	Billion Cubic Meter
BCR	Benefit Cost Ratio
BFD	Bangladesh Forest Department
BIGD	BRAC Institute of Governance and Development
BLC	Boat License Certificate
BMD	Bangladesh Meteorological Department
BoB	Bay of Bengal
BPDB	Bangladesh Power Development Board
BWP	Bangladesh Water Partnership
CBA	Cost Benefit Analysis
CBD	Convention on Biological Diversity
CDC	Centre for Disease Controls and Prevention
CDM	Comprehensive Disaster Management
CDMP II	Comprehensive Disaster Management Programme II
CEDMHA	Center for Excellence in Disaster Management and Humanitarian Assistance
CEGIS	Centre for Environmental and Geographic Information Services
CMAAS	Community-based Mangrove Agro Aqua Silvi
COP	Conference of the Parties
CPI	Climate Policy Initiative
CRI	Climate Risk Index
CS	Commercial Shrimp
DDM	Department of Disaster Management
DMB	Disaster Management Bureau

DoE	Department of Environment
DoF	Department of Fisheries
DPHE	Department of Public Health and Engineering
DPSIR	Driving forces-Pressures-State-Impacts-and-Response
DSSAT	Decision Support System for Agro-technology Transfer
DWASA	Dhaka Water Supply and Sewerage Authority
ECA	Ecologically Critical Area
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EJF	Environmental Justice Foundation
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FD	Forest Department
FPP	Forest People's Programme
FSF	First Start Finance
GBF	Global Biodiversity Framework
GCF	Green Climate Fund
GCM	General Circulation Model
GCRI	Global Climate Risk Index
GDP	Gross Domestic Product
GED	General Economic Division
GHGs	Green House Gases
GI	Geographical Indication
GMB	Ganges-Brahmaputra-Meghna
GoB	Government of Bangladesh
GoN	Government of Netherlands
HBS	Heinrich Boll Stiftung
HRAs	High-Risk Areas
IBNET	International Benchmarking Network for Water and Sanitation Utilities
IBRD	International Bank for Reconstruction and Development
ICZM	Integrated Coastal Zone Management
IDMC	Internal Displacement Monitoring Centre
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IPLCs	Indigenous Peoples and Local Communities
IRP	International Resource Panel
IRSWR	Internal Renewable Surface Water Resources
IUCN	International Union for Conservation of Nature
IWM	Institute of Water Modelling
IWRM	Integrated Water Resources Management
JMP	Joint Monitoring Programme
LPI	Living Planet Index
LPL	Lower Poverty Line
LUC	Land Use Change

LUCF	Land Use Change and Forestry
MC	Marginal Cost
MCM	Million Cubic Meter
MEA	Millennium Ecosystem Assessment
MEB	Multiple Evidence Base
MoDMR	Ministry of Disaster Management and Relief
MoEF	Ministry of Environment and Forest
MoF	Ministry of Finance
MoFA	Ministry of Foreign Affairs
MoUs	Memoranda of Understanding
MoWR	Ministry of Water Resources
MR	Marginal Revenue
NAPA	National Adaptation Programmes of Action
NB	Net Benefit
NIE	New Institutional Economics
NOAA	National Ocean and Atmospheric Administration
NPV	Net Present Value
NTFPs	Non-Timber Forest Products
ODA	Official Development Assistance
OECD	Organisation for Economic Cooperation and Development
PA	Protected Area
PES	Payments for Ecosystem Services
PPGIS	Public Participation Geographic Information System
PVB	Present Value of Benefits
PVC	Present Value of Costs
RF	Reserve Forest
RGR	Rechargeable Groundwater Resources
RSLR	Relative Sea Level Rise
SCBD	Secretariat of the Convention on Biological Diversity
SDGs	Sustainable Development Goals
SLR	Sea Level Rise
SMRC	SAARC Meteorological Research Centre
SRDI	Soil Resource Development Institute
SRF	Sundarbans Reserve Forest
TEV	Total Economic Value
TIB	Transparency International Bangladesh
TK	Traditional Knowledge
TRWR	Total Renewable Water Resources
TWAP	Transboundary Waters Assessment Programme
UN	United Nations
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change

UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WARPO	Water Resources Planning Organisation
WASH	Water, Sanitation and Hygiene
WB	World Bank
WC	Working Circle
WHO	World Health Organization
WMO	World Meteorological Organisation
WRIS	Water Resources Information System
WWAP	World Water Assessment Programme
WWF	World Wide Fund for Nature
YPSA	Youth Power in Social Action

List of Figures

Fig. 1.1 Annual forest area net change, by decade and region, 1990–2020. *Source* FAO (2020a) 5
Fig. 1.2 Status of marine species. *Source* IUCN (2018) 6
Fig. 1.3 Number of large dams commissioned each decade. *Source* Compiled by the authors from Gleick (2014), McCully (2007) 10
Fig. 1.4 Percentage of fish stocks within biologically sustainable levels. *Source* FAO (2020c) 13
Fig. 1.5 Change in global surface temperature (decadal average) relative to 1850–1900. *Data Source* IPCC (2021) 14
Fig. 1.6 Change in global surface temperature (annual average) as observed and simulated using human and natural and only natural factors. *Data Source* IPCC (2021) 14
Fig. 1.7 Global mean sea-level change relative to 1900. *Data Source* IPCC (2021) 15
Fig. 1.8 Impacts of climate change. *Source* Prepared by the authors 16
Fig. 1.9 Extent of forest area and rate of depletion in Bangladesh (1990–2015). *Source* Authors' calculation based on data from FAO (2015) 20
Fig. 1.10 Direct impact and long-term implications of climate change in Bangladesh. *Source* Prepared by the authors 24
Fig. 1.11 Scope, approach and chapters of the book in summary. *Source* Prepared by the authors *Note* **a** Secondary and primary data have been used across different chapters. However, secondary data has been more used for the conceptual and theoretical part, and primary data has been more used in empirical evidence part as denoted by black-coloured bold right brace; **b** detail justification for the micro-case studies has been described in the relevant chapters 26

Fig. 1.12 Bringing 'mind shift' to ensure sustainable resource governance. *Source* Prepared by the authors. *Note* The structure of the diagram adapted from Silvius et al. (2012) 27
Fig. 2.1 Categories and types of rights. *Source* Prepared by the authors based on Schlager and Ostrom (1992) 46
Fig. 2.2 Social relations of production and elements of the model. *Source* Prepared by the authors 55
Fig. 2.3 Price effect if natural resources are turned into marketable goods. *Source* Prepared by the authors 61
Fig. 2.4 Institutional vulnerability and destruction of resources. *Source* Prepared by the authors 62
Fig. 2.5 Economics of power in natural resource governance in a transitional economy. *Source* Prepared by the authors 63
Fig. 2.6 Rational choice versus social cooperation. *Source* Prepared by the authors 64
Fig. 3.1 Taxonomy of biodiversity of Bangladesh. *Source* Prepared by the authors 78
Fig. 3.2 **a** Percentage of forest of total land area of Bangladesh (1930–2014); **b** net rate of deforestation (1930–2014). *Source* Prepared by the authors based on data collected from Reddy et al. (2016) 80
Fig. 3.3 State of forest ecosystem biodiversity of Bangladesh. *Source* Prepared by the authors 83
Fig. 3.4 State of coastal and marine ecosystem biodiversity of Bangladesh. *Source* Prepared by the authors 86
Fig. 3.5 Faunal species available in the wetlands of Bangladesh. *Source* Prepared by the authors based on Rahman (1995), MoEF (2001), DoE (2010) 86
Fig. 3.6 State of wetland ecosystem biodiversity of Bangladesh. *Source* Prepared by the authors 88
Fig. 3.7 Resource system of the Sundarbans. *Source* Adapted from the data reservoir of *Unnayan Onneshan* as cited in Titumir and Afrin (2017) 91
Fig. 3.8 Political economy factors inducing biodiversity resources degradation. *Source* Prepared by the authors 100
Fig. 3.9 Economic rent or profit and loss of consumer surplus. *Source* Prepared by the authors 103
Fig. 3.10 Loss of revenue and additional exploitation. *Source* Prepared by the authors 105
Fig. 3.11 Natural resource rent capture through horizontal and vertical collusion. *Source* Prepared by the authors 106
Fig. 3.12 Property rights structure of the Sundarbans. *Source* Prepared by the authors 109

Fig. 3.13 Density of population in the districts encompassing the Sundarbans (in number). *Source* Authors' calculation based on population census of (2001) and (2011) by BBS 109
Fig. 3.14 Bagda shrimp cultivated areas adjacent to the Sundarbans (in hectares). *Source* Hussain (2014) 110
Fig. 3.15 Factories near the Sundarbans. *Source* The Daily Star (2018) ... 114
Fig. 3.16 Declining trend in honey collection from the Sundarbans (in quintal). *Source* BFD (2018a) 120
Fig. 3.17 Annual tourists visiting the Sundarbans. *Source* Mahmood et al. (2021) 120
Fig. 3.18 SRF actors under value chain analysis. *Source* Prepared by the authors based on of BFD (2010) 122
Fig. 3.19 SRF products under value chain analysis. *Source* Prepared by the authors based on BFD (2010) 123
Fig. 3.20 Simplified and typical SRF marketing system and value chain of the actors. *Source* Prepared by the authors 123
Fig. 3.21 Annual income level of SRF actors (%). *Source* Prepared by the authors based on BFD (2010) 126
Fig. 3.22 Inequality based on occupational pattern in terms of products. *Source* Prepared by the authors based on BFD (2010) 127
Fig. 3.23 Nominal and real forest revenue earned by the FD. *Source* Author's calculation based on data obtained from BFD (2018b) 129
Fig. 3.24 Revenue growth in real term (year-to-year basis). *Source* Author's calculation based on data obtained from BFD (2018b) 129
Fig. 3.25 Traditional rules and practices followed by IPLCs occupational groups at a glance. *Source* Prepared by the authors 130
Fig. 4.1 Water resources in Bangladesh under stock and flow analysis. *Source* Prepared by the authors 151
Fig. 4.2 Increase in groundwater withdrawal (Mm^3/d) and lowering of groundwater table (m) in Dhaka city from 1970 to 2014. *Source* Hassan and Zahid (2017), Zahid (2015) 153
Fig. 4.3 Trend of installation of deep tube wells and bore wells in Dhaka city. *Source* DWASA (2020) 154
Fig. 4.4 Projection of groundwater depletion in Dhaka city. *Source* *Unnayan Onneshan* (2011) 155
Fig. 4.5 Projected gap in required production and total production capacity of DWASA (in million litres per day-MLD). *Source* DWASA and IWM (2014) 155
Fig. 4.6 Distribution of population in the Brahmaputra basin. *Source* Prepared by the authors based on IUCN (2014b) 160

Fig. 4.7 Contribution of Transboundary Rivers in supplying water to Bangladesh (in BCM). *Source* Prepared by the authors based on Ahmed (2013) 162
Fig. 4.8 Impacts of water diversion upstream in Bangladesh. *Source* Baten and Titumir (2016) 162
Fig. 4.9 Vulnerability of the wetland (haor) ecosystem. *Source* Prepared by the authors 169
Fig. 4.10 Production of Hilsha fish from 2009–10 to 2018–19 (DoF, 2019) 173
Fig. 4.11 Fish production in Bangladesh in last 10 years (in lakh MT). *Source* DoF (2019) 174
Fig. 4.12 Trend in export of fish and fish products (Amount in MT). *Source* GED (2020) 174
Fig. 4.13 Dynamics of pricing mechanism in access to water. *Source* Prepared by the authors 181
Fig. 4.14 Power and institutional vulnerability. *Source* Prepared by the authors 183
Fig. 4.15 Technical inefficiency and economic benefit. *Source* Prepared by the authors 186
Fig. 4.16 Trends in drinking water coverage by wealth quintile from 1995 to 2020. *Source* WHO/UNICEF (2021) 193
Fig. 4.17 Trends of revenue collections, growth and dues. *Source* DWASA (2005, 2010, 2014, 2017, 2020) 195
Fig. 4.18 Trends of non-revenue water and revenue collection ratio. *Source* DWASA (2005, 2010, 2014, 2017, 2020) 196
Fig. 4.19 Trends of dues and bills receivable. *Source* DWASA (2005, 2010, 2014, 2017, 2020) 197
Fig. 4.20 Marine fisheries production trend from 1983–84 to 2018–19 (in MT). *Source* DoF (2019) 232
Fig. 4.21 Projected marine fisheries production in 2020–21 and 2024–25 (in '000 MT). *Source* GED (2020) 233
Fig. 5.1 Trend in global (land and ocean) temperature anomalies (C) compared to 1901–2000. *Source* NOAA (2021a) 258
Fig. 5.2 Change in sea level, 1880–2020. *Source* Lindsey (2021) 259
Fig. 5.3 Impacts of climate change: an extended view. *Source* Author's interpretation 261
Fig. 5.4 Capacity of mosquitoes (*Aedes aegypti*) to transmit dengue fever worldwide from 1950 to 2014. *Source* Elflein (2017) 262
Fig. 5.5 Bangladesh's efforts to meet the challenge of climate change. *Source* Prepared by the authors 269
Fig. 5.6 Role of technology in reduction of pollution. *Source* Prepared by the authors 278
Fig. 5.7 Degradation of carrying capacity. *Source* Prepared by the authors 279

Fig. 5.8 Interactions among states, firms and households in utilising nature. *Source* Prepared by the authors 281
Fig. 5.9 Global energy-related CO_2 emission, 1990–2020 (in Gt CO_2). *Source* IEA (2020) 282
Fig. 5.10 Share of total GHGs emission of the top emitting countries and G20 member countries (excluding LUC), 2011–2020. *Source* UNEP (2020) 283
Fig. 5.11 Largest producers of CO_2 emissions worldwide in 2019, by share of emissions. *Source* US Energy Information Administration 2019 (Tiseo, 2021) 284
Fig. 5.12 Share of cumulative CO_2 emissions (production-based emission from fossil fuel combustion and cement) over the period 1751 to 2017. *Source* Oxford Martin School (Ritche, 2019) 285
Fig. 5.13 Countries with highest per capita emission of CO_2 (in metric tonnes), 2019. *Source* World Bank and Bloomberg Opinion 2021 (Fickling, 2021) 285
Fig. 5.14 Fossil fuel financing from the world's 60 largest banks was higher in 2020 than in 2016 and 2017. *Source* Rainforest Action Network et al. (2021), The Guardian (2021) 286
Fig. 5.15 Total GHGs emission by Bangladesh (in Mt). *Source* Climate Watch (2021) 287
Fig. 5.16 Per capita emissions of GHGs by Bangladesh. *Source* Oxford Martin School (Ritchie & Roser, 2020). *Note* Data available up to 2019 in case of CO_2 only; measured based on data from Global Carbon Project, Gapminder, UN, & Climate Watch 288
Fig. 5.17 Per capita GHGs* emissions by Bangladesh in contrast to the major economies (in tonnes of CO_2e**). *Source* Oxford Martin School (Ritchie & Roser, 2020). *Note* *Here GHGs include carbon dioxide, methane, nitrous oxide, and F-gases; **CO_2e denotes CO_2 equivalent which means, "…having the same warming effect as CO_2 over a period of 100 years"; measured based on data from Climate Watch 288
Fig. 5.18 Percentage of average reduction of rice yield due to increases in maximum temperature. *Source* Titumir and Basak's calculation based on DSSAT model simulation 291
Fig. 5.19 Percentage of average reduction of rice yield for minimum temperature. *Source* Titumir and Basak's calculation based on DSSAT model simulation 293
Fig. 5.20 Percentage of yield reduction for maximum and minimum temperature. *Source* Titumir and Basak's calculation based on DSSAT model simulation 295

Fig. 5.21 Demand–production gap (million tonnes) of rice under scenarios A and B in 2050. *Source* Titumir and Basak's calculation based on FAOSTAT and World Bank data 299
Fig. 5.22 Demand–production gap (million tonnes) of rice under scenarios C, D and E in 2070. *Source* Titumir and Basak's calculation based on FAOSTAT and World Bank data 300
Fig. 5.23 Demand–production gap (million tonnes) of rice under scenarios C, D and E in 2100. *Source* Titumir and Basak's calculation based on FAOSTAT and World Bank data 300
Fig. 5.24 Percentage of total land area affected by floods from 1954 to 2019. *Source* FFWC (2019) 302
Fig. 5.25 Types of disasters in two different periods. *Source* Ali (n.d.) . . . 308
Fig. 5.26 Four ways by which climate change causes displacement of people. *Source* Prepared by the authors 309
Fig. 5.27 **a** New displacements by natural disasters in Bangladesh, 2008–2019 and **b** new displacements by violence and conflict in Bangladesh, 2008–2019. *Source* IDMC (2021) 310
Fig. 5.28 Projection on displacement by flood. *Source* Titumir et al. (2012) 311
Fig. 5.29 Projection on displacement by cyclones. *Source* Titumir et al. (2012) 311
Fig. 5.30 Projection on displacement on the whole. *Source* Titumir et al. (2012) 312
Fig. 5.31 Climate change negotiation groups. *Source* Prepared by the authors 321
Fig. 5.32 Total global climate finance flows between 2013 and 2018 (in billion $). *Source* CPI (2019) 321
Fig. 5.33 Status of GCF supporting adaptation and mitigation (2003–2020, in million $). *Source* Climate Funds Update 2021 (ODA & HBS, 2021) 322
Fig. 5.34 Estimated climate finance by instrument via bilateral and multilateral channels, 2017–18 and 2015–16 (annual averages) (in billion $). *Source* Oxfam (2020) 323
Fig. 5.35 Breakdown of global climate finance flows by public and private actors, 2013–2018 (two-year average, in billion $). *Source* CPI (2019) 324
Fig. 5.36 Destination region of climate finance (in billion $, 2017–2018 annual average). *Source* CPI (2019) 324
Fig. 5.37 Methane emission in Bangladesh. *Source* World Development Indicators (2021) 325

Fig. 5.38 **a** Renewable power capacities in world in 2018 (in gigawatts) **b** renewable power capacities in Bangladesh in 2021 (as a share of total installed capacity). *Source* REN21 (2019), BPDB (2021) 326
Fig. 6.1 Sustainable transformative pathways. *Source* Prepared by the authors 342
Fig. 6.2 Bending the curve of biodiversity resource degradation. *Source* Prepared by the authors 345
Fig. 6.3 Equalising the curve for water resources. *Source* Prepared by the authors 349
Fig. 6.4 Flattening the curve of climate crisis. *Source* Prepared by the authors 351

List of Tables

Table 1.1 Trend in biodiversity based on LPI 2016 3
Table 1.2 Declining trend in biodiversity across different regions from 1970 to 2016 3
Table 1.3 Percentage of threatened species 4
Table 1.4 Top 10 countries with the greatest percentage of people living without access to basic water services 7
Table 1.5 Access to water (free from contamination) among countries based on economic status 8
Table 1.6 Unequal consumption of water in some selected countries 8
Table 1.7 Region-wise large dams and their capacities 9
Table 1.8 Rate of change in the area of natural wetlands in different regions during the twentieth and early twenty-first centuries 11
Table 1.9 List of major global concerns related to the marine resources 12
Table 1.10 Status of wildlife faunal species in Bangladesh 18
Table 1.11 Extinct and threatened faunal species in Bangladesh 19
Table 1.12 Number of threatened species in major vascular plant groups according to the 'Encyclopedia of flora and fauna of Bangladesh' 20
Table 1.13 Average rate of annual groundwater decline in Dhaka during 1970–2000 as per the estimate of Bangladesh Water Development Board 21
Table 1.14 Decreasing number of inland rivers of Bangladesh 21
Table 1.15 Projections for changes in temperature, precipitation and sea-level rise for Bangladesh based on GCM (General Circulation Model) 23
Table 2.1 Five types of service flow to the economy by natural resource system 42
Table 2.2 Typology of goods 43
Table 2.3 Property rights regimes and associated rights and duties 44

Table 2.4 Classification of theories (under two approaches) regarding natural resources 54
Table 3.1 Area of forests under the forest department 80
Table 3.2 Changes in land use (in hectare) pattern over time in *Chakaria* Sundarbans 82
Table 3.3 Coastal and marine biodiversity resources of Bangladesh 84
Table 3.4 Faunal species of St. Martin's island 84
Table 3.5 Vulnerable marine biodiverse species 85
Table 3.6 Growing stock of the Sundarbans according to different inventories 93
Table 3.7 Floral species that became extinct in the Sundarbans 93
Table 3.8 Important concepts under political economy approach regarding biodiversity 101
Table 3.9 Underlying gaps in approaches regarding biodiversity 102
Table 3.10 Conservation of resources through collaboration and cooperation under strong institutional (formal and informal) set-up 108
Table 3.11 Policy instruments for forest resources during British period 112
Table 3.12 Policy instruments for the forestry sector and the Sundarbans in the post-Independence period 113
Table 3.13 Triple jeopardises of 'Rampal Power Plant Project' 115
Table 3.14 Local stakeholders of the Sundarbans 116
Table 3.15 Irregularities in resource collection and management 117
Table 3.16 Major NTFPs of the Sundarbans, their use and monetary value 119
Table 3.17 Sundarbans' non-timber and aquatic resources extraction calendar 123
Table 3.18 Value additions and returns for SRF products (in %) 124
Table 3.19 Amount of major resources and respective revenue earnings from the Sundarbans during 2001–02 and 2014–15 128
Table 3.20 Economic return of CMAAS culture 132
Table 3.21 Value of CBA measures of CMAAS and CS culture 133
Table 3.22 Ecological comparison between CMAAS and CS cultures 133
Table 3.23 Resource rights over the Sundarbans 135
Table 4.1 Declining trend in groundwater level across different regions of Bangladesh 152
Table 4.2 Regional estimates of usable recharge and groundwater demand 153
Table 4.3 GBM basin area, population and water distribution 158
Table 4.4 Salient features of the Ganges 159
Table 4.5 Water availability accounts at Ganges basin 159
Table 4.6 *Haor* areas of Bangladesh 165
Table 4.7 State of biodiversity resources of *haors* 166

Table 4.8 Sectorwise inland fish production in Bangladesh, 2018–19 ... 168
Table 4.9 Status and future potential of marine-based economic sectors of Bangladesh in brief ... 171
Table 4.10 Standing stock (in tonnes) of demersal fish, pelagic fish and shrimp of the Bay of Bengal during the1970s and 1980s ... 173
Table 4.11 Underlying gaps in approaches regarding water ... 180
Table 4.12 Dynamic governance of international water regime ... 185
Table 4.13 Stakeholders' authority over resource and institutions nexus in the water resources management ... 188
Table 4.14 State of drinking water coverage ... 189
Table 4.15 Types of access point of drinking water ... 191
Table 4.16 Access to water based on socio-economic status ... 192
Table 4.17 Prices of water in the informal settlements ... 195
Table 4.18 Different management regimes and the institutional arrangements ... 205
Table 4.19 Revenue earnings from *Jalmahals* in different periods based on available data ... 210
Table 4.20 Major phases of the Ganges water dispute ... 211
Table 4.21 Assessments on the navigability of the Hooghly ... 212
Table 4.22 Average flows of the Ganges at Hardinge bridge in Bangladesh before the Ganges treaty (flow figures in cusec) ... 214
Table 4.23 Reduction in average annual monsoon flow and average fall in water (in July) at different stations under Meghna River system ... 217
Table 4.24 Comparison of hydroelectricity potentiality among the co-riparian countries of GBM basin ... 218
Table 4.25 Resolution under Ganges treaty for January–May ... 219
Table 4.26 Discharge data of the Ganges in the post-treaty period ... 220
Table 4.27 Comparison of the legal institutional framework of The Ganges Treaty (1996) and the Indus Treaty 1960 ... 222
Table 4.28 Major fishing grounds of Bangladesh and major commercial fish species found in respective areas ... 232
Table 4.29 Different tiers of fishing in marine area of Bangladesh ... 232
Table 4.30 Total number of boats and gears operating for marine fishery capture ... 234
Table 5.1 Trend in temperature in Bangladesh based on various studies ... 264
Table 5.2 Observed Relative Sea-Level Rise (RSLR) along Bangladesh coastline ... 265
Table 5.3 Critical vulnerable areas and most affected sectors due to climate change in Bangladesh ... 266
Table 5.4 Some adaptation measures for climate change in Bangladesh ... 268

Table 5.5 Underlying gaps of theories regarding climate change 275
Table 5.6 Payoff matrix of the different movements of agents 277
Table 5.7 Shares of global emissions by the industrialised, developing and top 20 countries 283
Table 5.8 Long-term Climate Risk Index (CRI) (from 1999 to 2018 annual average) 287
Table 5.9 Percentage change of *boro* rice yield under various maximum temperature scenarios 290
Table 5.10 Percentage change of *boro* rice yield under various minimum temperature scenarios 292
Table 5.11 Percentage change of *boro* rice yield under various maximum and minimum temperature scenarios 294
Table 5.12 Percentage of change in rice yield under various CO_2 concentrations 296
Table 5.13 Percentage of change in rice yield under various climatic scenarios 297
Table 5.14 Percentage of deprived population from rice under different climate scenarios 299
Table 5.15 Comparison of agricultural losses resulting from recent cyclones 301
Table 5.16 Bangladesh's position in World Risk Report 2020 301
Table 5.17 Impacts and loss resulting from recent catastrophic floods 303
Table 5.18 Normal floods and extreme floods during different time spans 303
Table 5.19 Types of various major cyclones hitting Bangladesh over the years 304
Table 5.20 Chronology of major drought in Bangladesh and their impacts 306
Table 5.21 Soil salinity during last four decades (1973–2009) in coastal areas of Bangladesh. *Source* SRDI (2010) 307
Table 5.22 Intensity of loss occurred by disasters 308
Table 5.23 UN climate Conference of the Parties (COPs) 314
Table 5.24 Differences in assessments regarding climate-specific assistance by developed countries in 2017–18 322
Table 6.1 SDGs that are directly addressed in the book. *Source* Prepared by the authors 353

List of Maps

Map 3.1 Location of the Sundarbans. *Source* IUCN as cited in Rahman et al. (2010a) 89
Map 3.2 Mangrove forest change of the Sundarbans from 1776 to 2010. *Source* CEGIS 2016 92
Map 3.3 Decadal changes of forest cover in a part of Khulna administrative range of the Sundarbans (2000–2020). *Source Unnayan Onneshan* (2020) 94
Map 3.4 Ecological value mapping of **a** fish and **b** crabs in a part of Khulna administrative range of the Sundarbans (2000–2020). *Source Unnayan Onneshan* (2020) 95
Map 4.1 Ganges–Brahmaputra–Meghna (GBM) basin. *Source* Khandu et al. (2016) 156
Map 4.2 Location of *haor* region in Bangladesh. *Source* CEGIS (2012) 164
Map 4.3 Bangladesh's maritime entitlements. *Source* Chowdhury (2017) 170

Chapter 1
Setting the Context

1.1 Introduction

The worldwide concerns for deforestation, degraded soil, polluted air, declined water, endangered species and climate change are all well-meaning. Yet the causes, effects and solutions warrant meticulous scrutiny. The concerns have heightened in the face of the COVID-19 pandemic, as there is a direct linkage between nature's destruction and the outbreak of disease. It is imperative to protect nature by halting natural resource degradation to prevent future pandemics. In this backdrop, the book focuses on natural resource governance mechanisms illustrated with cases of biodiversity, water resources and climate change to identify the underlying causes of resource degradation, especially in the context of developing countries. It also attempts to bring forth a new understanding regarding the usage, management and conservation of natural resources in a sustainable manner.

The broad concerns that arise in the contemporary era are to (a) conserve nature in all its forms and functions and (b) create an equitable home and achieve a high standard of living for people on this planet without destabilising critical planetary processes (O'Neill et al., 2018; WWF, 2016). These dual challenges are also delineated in the United Nations' 2030 agenda for sustainable development. The Sustainable Development Goals (SDGs)—17 in total—under the agenda include several goals (Goals 6, 13, 14 and 15) which focus on nature and the environment directly (Elder & Olsen, 2019; Scharlemann et al., 2020), while other goals have indirect environmental implications as well.

However, specific targets to protect climate and biodiversity (under Goals 13, 14 and 15) are completely off track (Nature, 2020). Despite a temporary drop in carbon dioxide emissions due to the pandemic, the world is still heading for a temperature rise of more than 3 °C this century. This goes far beyond the Paris Agreement goals of keeping global warming below 2 °C and aiming for 1.5 °C (UNEP, 2020). Simultaneously, around 25% of biodiverse species on an average are threatened indicating that around 1 million species have already faced extinction (IPBES, 2019). Ensuring access to clean water (under Goal 6) also remains a major challenge. The

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goal itself recognises that managing water sustainably goes beyond simply providing clean water to address broader issues such as water quality and watershed management, water scarcity and usage efficiency and restoration of water-related ecosystems (Dahan & Kashiwase, 2016). Essentially, the problems in the realm of biodiversity, water or climate are more acute in the context of developing countries due to the context-specific dynamics of resource governance. Moreover, there is also a paucity of studies in understanding the dynamics in that specific context. The book, accordingly, draws on the empirical evidence of a developing country—in this case Bangladesh—to highlight the complexity of issues.

The mainstream theories and policy options under the neoliberal regime primarily follow the market-centric approach to deal with the problems of natural resource degradation. The approach clearly suggests that the market is the best possible mechanism to allocate and distribute resources efficiently through a voluntary exchange, based on Pareto optimality arguments (Arrow et al., 1996; Freeman III et al., 2014; Pearce, 1991; Pearce et al., 1989; Stavins, 1989, 2011; Tietenberg, 1990; Zhang, 2013).

The assumption of voluntary exchange, however, does not always fit well with the real world, and the arguments on efficiency are not viable. The heterogeneity of ownership of natural resources causes the scope of inefficient consumption and overexploitation, which results in 'market failure' (see Chap. 2 for details). Thus, the continuous degradation of natural resources could not be stopped. Moreover, the market-centric approach ignores the factors related to political economy, which are the key forces that cause the failure of market mechanisms in transitional economies (Broad, 1995; Clark & York, 2012) and politics, in particular, can affect the exploitation of natural resources (Collier, 2010; López & Toman, 2006). Recent literatures recognise that a solution can be arrived at through the revitalisation of mutual relationships between human beings and nature (Díaz et al., 2015; Gu & Subramanian, 2012; Ichikawa, 2012). It is, however, yet to examine the actual implications of this understanding in resource governance regime in general and in developing countries in particular.

The book tries to contribute to this arena of resources governance regime by formulating a new framework pivoted around the concept of 'human sociality'. The framework puts together variables such as institutions, power, political settlement along with human sociality into the alternative resource governance framework that helps understand the pitfalls in the mainstream governance framework to ensure a sustained relationship between human beings and nature. Overall, the book firstly scrutinises the market-centric perspectives and, secondly, combines political economy questions and human sociality that are usually overlooked in the discussions of the current governance framework. It ultimately develops an alternative framework to examine the reasons behind the degradation of natural resources and to offer viable and sustainable solutions to the problem.

The empirical analysis of the book demonstrates that in developing countries—as evident in Bangladesh—natural resources have been exploited beyond the sustainable limit due to structural rigidities, embedded in and reproduced by fragile institutions and unequal power-sharing arrangements under a market-centric economy. These

countries are also bearing a larger share of the burden emerging from climate change as compared to developed countries due to the factors pertaining to the international political economy. Therefore, in order to reverse the condition, it is important to recognise the inherent values of nature going beyond its narrow conceptualisation through a market-centric lens. This would ultimately ensure the well-being of nature and human beings simultaneously.

1.2 Biodiversity Resources

The loss of biodiversity, both at the regional and global levels, is quite evident. The Living Planet Index (LPI) of 2020 shows that between 1970 and 2016, the planet lost 68% of its biodiversity (WWF, 2020). Previous assessments also showed a persistent downward trend across different periods of time (e.g., LPI of 2018: 60% between 1970 and 2014, LPI of 2016: 58% between 1970 and 2012 and LPI of 2014: 52% between 1970 and 2010) (WWF, 2014, 2016, 2018). It implies that the rate of loss has also increased over the years. Moreover, the trend of biodiversity populations under various ecosystems exhibits a decline, and the greatest losses can be observed in the freshwater environment, followed by the terrestrial ecosystem (Table 1.1).

Additionally, the degrading trend in biodiversity varies from one region to the other (Table 1.2). The highest rate of degradation (94%) has been observed in Latin America and the Caribbean. The Asia Pacific region is in the third position, losing almost half of its total biodiversity over the same timeframe. Thus, differences are acute in the abundance of biodiversity resources across regions, with the largest decline being in tropical areas.

Table 1.1 Trend in biodiversity based on LPI 2016

Types of LPI	Trend in population (between 1970 and 2012) (%)	Annual decline (%)
Terrestrial	− 38	1.1
Freshwater	− 81	3.9
Marine	− 36	1.0

Source WWF (2016)

Table 1.2 Declining trend in biodiversity across different regions from 1970 to 2016

Species name	Percentage
North America	− 33
Europe and Central Asia	− 24
Latin America and Caribbean	− 94
Africa	− 65
Asia Pacific	− 45

Source WWF (2020)