Integration of the Ecosystem Approach in Legal and Policy Framework for the Sustainable Conservation of Mangrove Forest in Bangladesh: A Case Study of the Sundarbans Ecosystem

Sheikh Noor Mohammad

LL.B (Honours) and LL.M, University of Dhaka, Bangladesh

MA in Public Policy and Governance, North South University, Bangladesh

MSc in Environmental Science, University of Greenwich, UK

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Dedicated to Mohammad Ali Sheikh, my mentor who taught me '... if you love Bangladesh, first love Her soil and nature ...'.

ABSTRACT

Mangrove's role in maintenance of global ecological integrity and the provision of human wellbeing in coastal areas and beyond is well recognised. Increased human exploitation and climatic interventions make mangroves the world's most vulnerable tropical ecosystem. The Sundarbans, the mangrove forest of Bangladesh having economic, social, environmental and international significance, is gradually showing signs of substantial deterioration. Despite a century-old forest management plan and a web of policies and legislation, depletion of forest resources has continued unabated, illustrating gaps in the legal regimes and management approaches governing or applied to the Sundarbans. As law and policy helps to bring substantial changes in the behaviour of ecosystem-dependent communities or equip ecosystem managers with emerging concepts of natural resource management, the globally agreed conservation principles must be recognised in the legal framework as an overarching policy goal for making those principles enforceable on the ground. Therefore, it is crucial to re-examine the legal and policy frameworks of Bangladesh regulating the Sundarbans in light of the international legal framework to ensure sustainable conservation of the Sundarbans and maintenance of Bangladesh's ecological balance.

In this context, this thesis focuses on promotion of a conservation–development–climate-resilient approach for the protection of the ecosystem, environment and dependents of the Sundarbans. In doing so, this thesis reviews the legal framework governing mangrove management to identify the gaps therein. It examines the relevance of the ecosystem approach, considering the local geo-ecological condition and socio-economic reality. This thesis argues for the application of the ecosystem approach and integration of its principles in the legal and policy frameworks for ensuring ecologically sustainable development in the Sundarbans. Subsequently, the thesis analyses the Sundarbans' biodiversity–environment–climate change policy, legal and institutional frameworks to evaluate the status of the ecosystem approach's principles. It then identifies areas that require modification to incorporate those principles into the policy and legal framework. Finally, it offers certain recommendations for law and policy responses to applying the principles of the ecosystem approach in achieving sustainable conservation of the Sundarbans.

This thesis demonstrates the significance of integrating six dominant principles of the ecosystem approach in addressing the different challenges permeated within the Sundarbans for maintaining its ecological integrity. However, implementing these requires unambiguous conservation priorities, responsive policies, dynamic legislation and a supportive institutional framework. Thus, this thesis suggests setting clear conservation priorities, substantial policy and legislative reform, strengthening of institutional frameworks and allocation of an adequate budget to meaningfully align the ecosystem approach principles and integrate them into management of the Sundarbans. The development of a value-based marketing and trading system is found to be an effective vehicle in promoting environmental justice among the Sundarbans resource users. The suggested legal and policy recommendations for reform provide information for researchers and policymakers in reconsidering the legal frameworks regulating the Sundarbans for making the Sundarbans's conservation–development paradigm inclusive, equitable and adaptive.

THESIS DECLARATION

I certify that the work in this thesis entitled 'Integration of the Ecosystem Approach in Legal and Policy Framework for the Sustainable Conservation of Mangrove Forest in Bangladesh: A Case Study of the Sundarbans Ecosystem' has not previously been submitted for a degree nor has it been submitted as part of the requirements for a degree to any other university or institution other than Macquarie University.

I also certify that the thesis is an original piece of research and has been written by me. The sources of information and the extent to which the work of others have been utilised in this research work are appropriately acknowledged.

Sheikh Noor Mohammad

5 April 2019

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During the fieldtrip in Bangladesh, I interviewed local and national environmental experts: academics, environment activists, government officials, local government representatives and members of the local business community, including Professor Ainun Nishat, Dr Saleemul Huq, Dr Atiq Rahman, Syeda Rizwana Hasan, Professor A K Fazlul Hoque, Professor Abdullah Harun Chowdhury, Professor Anu Muhammad, Professor Mohammad Nazmuzzaman Bhuian, Ishtiaq Uddin Ahmad, Dr S M Munjurul Hannan Khan, Hafizul Islam Khan, Mowdudur Rahman and Journalist Iftekher Mahmud, who are striving to maintain Bangladesh's ecological and environmental integrity. Countess thanks to those national heroes for providing their expert opinions, thought-provoking ideas and information in support of my research.

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LIST OF PUBLICATIONS AND CONFERENCE PRESENTATIONS ARISING FROM THE THESIS

Journal articles

Alam, Shawkat and Sheikh Noor Mohammad, 'Applying the Ecosystem Approach to the Sundarbans of Bangladesh: Possibilities and Challenges' (2018) 27(2) *RECIEL* 115–129.

Alam, Shawkat and Sheikh Noor Mohammad, 'The Precautionary Principle in Biodiversity and Natural Resource Management in Bangladesh: Institutional and Policy Challenges for a Sustainable Future' (2018) 48(3–4) *Environmental Policy and Law* 187–203.

Alam, Shawkat and Sheikh Noor Mohammad, 'The Ecosystem Approach and Environmental Justice Nexus in Natural Resource Management' (2019) *Chinese Journal of Environmental Law (CJEL)* [in press].

Conference presentations

Mohammad, Sheikh Noor, 'Promoting Environmental Justice in Biodiversity Conservation: An Assessment of Ecosystem Approach' (Paper presented at the Law and Society Association of Australia and New Zealand (LSAANZ) Conference, University of Otago, Dunedin, New Zealand, 6–9 December 2017).

LIST OF ABBREVIATIONS

ABS	Access and Benefit Sharing
ACB	ASEAN Centre for Biodiversity
ACTO	Amazon Cooperation Treaty Organization
ADB	Asian Development Bank
AIG	Alternative Income Generation
AMNet	ASEAN Mangroves Network
AMSs	ASEAN Member States
ASCC	ASEAN Socio-Cultural Community
ASEAN	Association of Southeast Asian Nations
BCCSAP	*Bangladesh Climate Change Strategy and Action Plan 2009*
BEDS	Bangladesh Environment and Development Society
BFRI	Bangladesh Forest Research Institute
BIWTA	Bangladesh Inland Water Transport Authority
BLC	Boat Loading Certificate
BNH	Bangladesh National Herbarium
BWDB	Bangladesh Water Development Board
CBD	*Convention on Biological Diversity 1992*
CCT	Climate Change Trust
CECC	Centre for Coastal Environmental Conservation
CHM	Clearing House Mechanism
CITES	*Convention on International Trade in Endangered Species of Wild Fauna and Flora 1973*
CMC	Co-management Committee
CMO	Co-management Organisation
COP	Conferences of Parties
CPG	Community Patrol Group
CSO	Civil Society Organisation
DAE	Department of Agriculture Extension
DC	District Committee
DFO	Divisional Forest Officer

DoE	Department of Environment
DoF	Department of Fisheries
ECA	Ecologically Critical Area
ECA 1995	*Environment Conservation Act 1995*
ECC	Environmental Clearance Certificate
ECR 1997	*Environmental Conservation Rules 1997*
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FD	Forest Department
FDC	Forest-dependent Community
FFF	Forest-Fish-Fruit
FYP	Five Year Plan
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographical Information System
ICDP	Integrated Conservation and Development Project
ICTPs	International Convention, Treaties and Protocols
IEL	International Environmental Law
IFMP	Integrated Forest Management Plan
IPAC	Integrated Protected Area Co-management
IPCC	Intergovernmental Panel on Climate Change
IRMP	Integrated Resources Management Plans for the Sundarbans
ISME	International Society for Mangrove Ecosystems
ITPGRFA	*International Treaty on Plant Genetic Resources for Food and Agriculture 2004*
ITTA	*International Tropical Timber Agreement 2006*
ITTO	International Tropical Timber Organisation
IUCN	International Union for the Conservation of Nature and Natural Resources
LGIs	Local Government Institutions
MoEFCC	Ministry of Environment, Forest and Climate Change

MOU	Memorandum Of Understanding
NAPA	*National Adaptation Programme of Action 2004*
NBSAP	*National Biodiversity Strategy and Action Plan 2016-2021*
NC	National Committee
NGO	Non-government Organisation
NSP	Nishorgo Support Project
NSDS	*National Sustainable Development Strategy 2010-2021*
NTFP	Non-Timber Forest Product
PF	People's Forum
RAB	Rapid Action Battalion
Ramsar Convention	*Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971*
REDD+	Reducing Emissions from Deforestation and Forests Degradation
RIMS	Resource Information Management System
SAARC	South Asian Association for Regional Co-operation
SBCP	Sundarbans Biodiversity Conservation Project
SDG	Sustainable Development Goal
SEA	Strategic Environmental Assessment
SEALS	Sundarban Environmental and Livelihood Security Project
SIA	Socio-economic Impact Assessment
SIZ	Sundarbans Impact Zone
SMART	Spatial Monitoring and Reporting Tool
TIB	Transparency International Bangladesh
TFEU	*Treaty on the Functioning of the European Union*
UC	Upazilla Committee
UCC	Union Coordination Committee
UN	United Nations
UNCCD	*United Nations Convention to Combat Desertification 1994*
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNEP	United Nations Environmental Programme

UNFCCC	*United Nations Framework Convention on Climate Change 1992*
USAID	United States Agency for International Development
VCF	Village Conservation Forum
VCG	Village Conservation Group
WHC	World Heritage Centre
WNCC	Wildlife and Nature Conservation Circle

LIST OF INTERNATIONAL INSTRUMENTS

Cartagena Protocol on Biosafety to the Convention on Biological Diversity 2000

Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters 1998

Convention on Biological Diversity 1992

Convention Concerning the Protection of the World Cultural and Natural Heritage 1972

Convention on International Trade in Endangered Species of Wild Fauna and Flora 1973

Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971

International Treaty on Plant Genetic Resources for Food and Agriculture 2001

Johannesburg Declaration on Sustainable Development 2002

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits 2010

The Paris Agreement to the United Nations Framework Convention on Climate Change 2015

United Nations Convention to Combat Desertification 1994

United Nations Convention on the Conservation of Migratory Species of Wild Animals 1979

United Nations Convention on the Law of the Sea 1982

United Nations Framework Convention on Climate Change 1992

Vienna Convention on the Law of Treaties 1969

LIST OF REGIONAL AGREEMENTS AND REGULATIONS

Agreement on the Establishment of the ASEAN Centre for Biodiversity 2005

Amazon Cooperation Treaty 1978

ASEAN Agreement on Transboundary Haze Pollution 2002

ASEAN Socio-Cultural Community Blueprint 2025

Association of Southeast Asian Nations Charter 2007

Charter of the South Asian Association for Regional Cooperation (SAARC) 1985

Declaration Constituting an Agreement Establishing the Association of South-East Asian Nations (ASEAN) 1967

EU Biodiversity Strategy 2020

EU Bird Directive 2009/147/EC

European Union Forest Action Plan 2006

EU Habitats Directive 92/43/EEC of 21 May 1992

EU Marine Strategy Framework Directive 2008/56/EC

EU Water Framework Directive 2000

FAO Mangrove Forest Management Guidelines 1994

FAO Technical Guidelines for a Ecosystem Approach to Responsible Fisheries 2003

FAO Technical Guidelines on Marine Protected Areas and Fisheries 2011

Guidelines for the Conservation and Sustainable Use of Biodiversity in Tropical Timber Production Forests 2009

International Society for Mangrove Ecosystems Charter for Mangroves 1991

International Tropical Timber Agreement 2006

ISME Principles for a Code of Conduct for the Management and Sustainable Use of Mangrove Ecosystems 2004

ITTO/IUCN Guidelines for the Conservation and Sustainable Use of Biodiversity in Tropical Timber Production Forests 2009

The Treaty on European Union and the Treaty on the Functioning of the European Union 2012/C 326/01

LIST OF BANGLADESHI NATIONAL POLICIES

Bangladesh Agriculture Policy 2013

Bangladesh Climate Change Strategy and Action Plan 2009

Bangladesh Coastal Zone Policy 2005

Bangladesh Draft Environment Policy 2013

Bangladesh Draft Forest Policy 2016

Bangladesh Fisheries Policies 1998

Bangladesh Forestry Master Plan 2017-2036

Bangladesh Forest Policy 1994

Bangladesh Industrial Policy 2016

Bangladesh Land Use Policy 2001

Bangladesh National Adaptation Programme of Action 2009

Bangladesh National Sustainable Development Strategy 2010-2021

Bangladesh Tiger Action Plan 2009

Bangladesh Tourism Policy 2010

Bangladesh Water Policy 2012

Bangladesh Wetland Policy 1998

Compensation Policy for Causalities Caused by Wildlife 2010

Environment Policy 1992

Integrated Resources Management Plans for the Sundarbans (2010-2020)

National Adaptation Programme of Action 2004

National Biodiversity Strategy and Action Plan 2004

National Biodiversity Strategy and Action Plan 2016-2021

National Perspective Plan of Bangladesh 2010-2021

National Sustainable Development Strategy 2010-21

The Seventh Five Year Plan (FY2015/16-FY2019/20)

The Sundarbans Tourism Policy 2014

The Vision 2021

LIST OF BANGLADESHI NATIONAL LEGISLATION

Bangladesh Biological Diversity Act 2017

Bangladesh Secretariat Instructions 2014

Bangladesh Wildlife (Conservation and Security) Act 2012

Canals Closure Regulation 1989

Constitution of the People's Republic of Bangladesh 1972

Ecologically Critical Areas Management Rules 2016

Environmental Conservation Act 1995

Environmental Conservation Rules 1997

Environment Court Act 2010

Forest Act 1927

Inland Shipping Ordinance 1976

Moratorium on Tree Felling 1989

National River Protection Commission Act 2013

Protected Areas Management Rules 2017

Protection and Conservation of Fish Act 1950

Protection and Conservation of Fish Rules 1985

Sundarbans Forest Transit Rule 1959

Territorial Water and Maritime Zone Act 1974

Water Act 2013

LIST OF MANGROVE-RICH COUNTRY'S STATUTES AND REGULATIONS

Indian Biological Diversity Act 2002

India's National Policy on Biodiversity 2008

Mexican General Law on Climate Change 2012

Norway Act relating to the Management of Biological, Geological and Landscape Diversity 2009

National Environment Action Plan of the Maldives 2016-2025

South Africa's National Environmental Management Protected Areas Act 2003

Swiss Federal Act on the Protection of Nature and Cultural Heritage 1966

The Constitution of Colombia 1991

The Constitution of Republic of Ecuador 2008

The Constitution of Tunisian Republic 1959

The Philippines Department of Environment and Natural Resources prescribed Guidelines on the Establishment and Management of Buffer Zones for Protected Areas, Memorandum Circular No 16 of 1993

The Republic of the Congo's Wildlife Law 2008

Vietnam's Biodiversity Law 2008

LIST OF CASES

Bangladesh

Bangladesh v Hasina (2008) 60 DLR (AD) 90

Chaudhury and Kendra v Bangladesh (2008) WP 7977

Dr. Mohiuddin Farooque v Bangladesh (1996) IX BSCR (AD) 27, (1997) 17 BLD (AD) 1

M. Farooque v Bangladesh (1997) WP 948

M. Farooque v Bangladesh (1997) 49 DLR (AD) 1

Zahida Ahmed (Liza) v Syed Noor Uddin Ahmed and Another (2009) 38 CLC (HCD)

Others

Brazilian Federal Loans Case (France v. Brazil) (1929) PCIJ (serial A) No 21 (July 12)

Metro Manila Development Authority v. Concerned Residents of Manila Bay, G.R. Nos. 171947–48, (Dec. 18, 2008), 574 SCRA 661

Oposa v. Factoran, G.R. No. 101083, (July 30, 1993), 224 SCRA 792

Peter Sweetman, Ireland, Attorney General and the Minister for the Environment, Heritage and Local Government and Others v An Bord Pleanála, C-258/11 (April 11, 2013), 3 CMLR 16

Saramaka People V. Suriname (Preliminary Objections, Merits, Reparations, and Costs), Judgment November 28 2007 IACHR, Case 12.338 of the Twelve Saramaka Clans, Suriname. March 02, 2006

Southern Bluefin Tuna Cases (Australia v Japan, New Zealand v Japan) (Requests for Provincial Measures), 27 August 1999, 38 ILM 1624 (1999)

Subhash Kumar v. State of Bihar and others, AIR 420 India SCR (1) 5 Judgement, 1991 (January 9)

Wildlife and Environment Society of South Africa v. MEC for Economic Affairs, Environment and Tourism, Eastern Cape Provincial Government and Others (Costs with pained regret), 6 SA 123 (E), 2005 (April 28)

Winterstein and Others v. France (Merits), Judgement, 2013, ECHR, Section Fifth, Appl no 27013/07 (October 17)

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Chapter 1:
Sustainable Conservation of the Sundarbans Ecosystem: An Overview*

1.1 Introduction

Mangroves offer a wide array of ecosystem services that support human wellbeing. Ahmad and Glaser[1] and Spalding et al[2] estimated the annual economic value of mangrove ecosystem services at US$2,000–9,000 per hectare. Unlike other mangroves, the Sundarbans of Bangladesh, the largest single block of halophytic mangrove forest in the world, provides wideranging ecosystem services to over 3.5 million forest-dependent communities (FDCs).[3] It contributes three per cent of the Bangladeshi Gross Domestic Product (GDP) from the overall forestry sector contribution of five per cent.[4] The annual economic value of the Sundarbans's ecosystem services is estimated at US$43 million.[5] As a shore stabiliser, it plays substantial role in protecting the coastal zone from the pervasive effects of climate change. By delivering widespread benefits, the ecosystem helps in accelerating the economy of Bangladesh.[6] The Sundarbans has great ecological importance. The ecosystem provides habitats for over 448 aquatic and terrestrial species—334 species of plants, 41 mammal species, 339 species of birds, 58 reptile species, 10 amphibian species, 240 species of insects and more than 200 fish species.[7] In recognition of its 'outstanding universal value' and biological diversity, the Sundarbans was designated a 'Ramsar Site' under the Ramsar Convention in 1992, and the United Nations

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* Parts of this chapter have been published as Shawkat Alam and Sheikh Noor Mohammad, 'Applying the Ecosystem Approach to the Sundarbans of Bangladesh: Possibilities and Challenges' (2018) 27(2) *RECIEL* 115-129.

[1] Nesar Ahmad and Marion Glaser, 'Coastal Aquaculture, Mangrove Deforestation and Blue Carbon Emissions: Is REDD+ a Solution?' (2016) 66 *Marine Policy* 58, 60.

[2] Mark Spalding, Mami Kainuma and Lorna Collins, *World Atlas of Mangroves* (Earthscan, 2nd ed, 2010) 29.

[3] Md Shams Uddin et al, 'Climate Change Impacts on the Sundarbans Mangrove Ecosystem Services and Dependent Livelihoods in Bangladesh' (2013) 2(2) *Asian Journal of Conservation Biology* 152.

[4] Saiful Islam Khan, 'Protecting the Protectors: Lessons for Adaptation Strategies of Mangrove Forests from Bangladesh' (2009) 6(38) *IOP Conference Series: Earth and Environmental Science* 1.

[5] Md Shams Uddin, *Economic Valuation of Sundarbans Mangrove Ecosystems - Bangladesh* (LAP LAMBERT Academic Publishing, 2013) 38.

[6] Michael Getzner and Muhammad Shariful Islam, 'Natural Resources, Livelihoods, and Reserve Management: A Case Study from Sundarbans Mangrove Forests, Bangladesh' (2013) 8(1) *Int. J. Sus. Dev. Plann.* 76.

[7] Mohammad Zakir Hussain, *Bangladesh Sundarban Delta Vision 2050: A First Step in its Formulation—Document 2: A Compilation of Background Information* (IUCN, 2014) 42.

Educational, Scientific and Cultural Organization (UNESCO) declared the three wildlife sanctuaries of the forest a 'World Heritage Site' in 1997.

Despite the significant role of mangroves in the ecology and wellbeing of coastal areas and beyond, these ecosystems have been subjected to severe degradation due to massive human and climatic interventions. Such vulnerability makes mangroves one of the world's most threatened ecosystems. There is a general consensus that the original estimates of mangrove cover were over 200,000 square kilometres, of which more than 50,000 square kilometres have been lost over the past half century.[8] According to Donato et al's estimations,[9] due to human exploitation some 3.6 million hectares of mangroves were lost between 1980 and 2005 at the rate of one per cent per year, a rate twice than that of terrestrial rainforests.[10] Another study showed that the world lost 192,000 hectares (474,000 acres) of mangroves from 2001 to 2012, a total loss of 1.38 per cent since 2000 (or 0.13 per cent annually).[11] Alongi[12] forecasts a further 10–15 per cent decline of global mangroves by 2100 through climate change, while Duke et al predicts[13] that all mangroves could be lost in the next 100 years. Over 100 million people live within 10 kilometres of significant mangrove areas, and this number is predicted to increase by around 120 million by 2020.[14] The loss of mangroves may have direct impacts on FDC's food security and on national economies.

Recently, a wide range of forest degradation has taken place in developing countries. Bangladesh is no exception. Due to the increased dependency on the country's biological resources coupled with rural poverty and unemployment, these resources have been depleted at an alarming rate which threatens the subsistence of millions of FDCs.[15]

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[8] Anjan Kumer Dev Roy, *An Investigation into the Adequacy of Existing and Alternative Property Rights Regimes to Achieve Sustainable Management of the Sundarbans Mangrove Forest in Bangladesh* (PhD Thesis, University of Southern Queensland, 2012) 22.

[9] Daniel C Donato et al, 'Mangroves among the Most Carbon-rich Forests in the Tropics' (2011) 4(5) *Nature Geoscience* 293.

[10] Nathan Thomas et al, 'Distribution and Drivers of Global Mangrove Forest Change, 1996–2010' (2017) 12(6) *PLoS ONE* 2.

[11] Asa Strong and Susan Minnemeyer, 'Satellite Data Reveals State of the World's Mangrove Forests' (2015) <https://www.wri.org/blog/2015/02/satellite-data-reveals-state-world-s-mangrove-forests>.

[12] Daniel M Alongi, 'Mangrove Forests: Resilience, Protection from Tsunamis, and Responses to Global Climate Change' (2008) 76(1) *Estuarine, Coastal and Shelf Science* 1.

[13] Norman C Duke et al, 'A World Without Mangroves?' (2007) 317(5834) *Science* 41.

[14] Jan-Willem van Bochove, Emma Sullivan and Takehiro Nakamura (eds), *The Importance of Mangroves to People: A Call to Action* (UNEP World Conservation Monitoring Centre, 2014) 70.

[15] Rakibul Hasan, 'Deteriorating Forestry and the Tale of Adivasis in Bangladesh: Whom to Blame?' (2014) 6 *Environmental Values* 7.

According to the Ministry of Environment, Forest and Climate Change (MoEFCC),[16] about 17 per cent of the total area of Bangladesh is covered by forests,[17] although this figure is disputed and is estimated to be only 7.7 per cent.[18] The rate of biodiversity degradation is severe in the Sundarbans, which comprises 40 per cent of the country's forest cover.[19] One study showed a 50 per cent reduction in the Sundarbans's tree density in the last 20 years.[20] Due to continuous deterioration, the Sundarbans is under threat in terms of both its ecosystem functions and economic outputs.

Anthropogenic pressures such as overexploitation, dam construction, agricultural encroachment, shrimp farming, illegal felling, poaching of wildlife and oil spills have caused substantial damage to the Sundarbans ecosystem.[21] For example, 97.34 square kilometres of mangrove have been lost due to unplanned shrimp farming which impacts on the environment and socio-economic arrangement of the southern part of Bangladesh.[22] It has also been observed that the Sundarbans's ecosystem is undergoing a change, from freshwater in monsoon months and slightly saline in winter months (the situation for the past 50 years back) to saline in monsoon months and high salinity for the rest of the year. This situation is due to the significant reduction of the Ganges' freshwater flows into the sea-dominated delta Sundarbans since the construction of the Farakka dam in India in 1974.[23] Due to this increased salinisation, the vegetation cover, canopy cover and species variation in the southwestern Sundarbans has been reduced, but has remained intact in the

[16] Before 14 May 2018, the name of the Ministry was Ministry of Environment and Forests. See Staff Correspondent, 'Government Changes Name of the Ministry of Environment', *bdnews24.com* (Dhaka, Bangladesh), 14 May 2018 <https://bdnews24.com/bangladesh/2018/05/14/government-changes-name-of-the-ministry-of-environment>.

[17] Ministry of Environment and Forests, *Land and Forest Area* (Ministry of Environment and Forests, 2005).

[18] Anjan Kumer Dev Roy, Khorshed Alam and Jeff Gow, 'Community Perceptions of State Forest Ownership and Management: A Case Study of the Sundarbans Mangrove Forest in Bangladesh' (2013) 117 *Journal of Environmental Management* 141.

[19] Anjan Kumer Dev Roy, Khorshed Alam and Jeff Gow, 'A Review of the Role of Property Rights and Forest Policies in the Management of the Sundarbans Mangrove Forest in Bangladesh' (2012) 15 *Forest Policy and Economics* 47.

[20] Dewan Muhammad Humayun Kabir and Jakir Hossain, *Resuscitating the Sundarbans: Customary Use of Biodiversity and Traditional Cultural Practices in* Bangladesh (Unnayan Onneshan – The Innovators, 2008) 9.

[21] Saiful Karim, 'Proposed REDD+ Project for the Sundarbans: Legal and Institutional Issues' (2013) 1 *International Journal of Rural Law and Policy* 4; T K Roy and S T Hossain, 'Role of Sundarbans in Protecting Climate Vulnerable Coastal People of Bangladesh' (2015) 1(1) *Climate Change* 40.

[22] Tanzim Afroz and Shawkat Alam, 'Sustainable Shrimp Farming in Bangladesh: A Quest for an Integrated Coastal Zone Management' (2013) 71 *Ocean & Coastal Management* 276.

[23] Shahriar Md Wahid, Mukand S Babel and Abdur Rahman Bhuiyan, 'Hydrologic Monitoring and Analysis in the Sundarbans Mangrove Ecosystem, Bangladesh' (2007) 332(3) *Journal of Hydrology* 381.

south-eastern part of the Sundarbans which receives some amount of freshwater during the monsoon from the upstream river.

The negative natural events, especially cyclone and sea level rise, further aggravate the deterioration of Sundarbans.[24] For example, Cyclone Sidr in 2007 and Cyclone Aila in 2009 damaged 30 per cent and 10 per cent of the Sundarbans respectively.[25] According to Karim and Mimura, in the last century the rate of sea level rise along the Bangladesh coast (5.93 mm yr−1) was conspicuously higher than the global average (1.0–2.0 mm yr−1).[26] Such an alarming rate of sea level rise gradually increases salinity, resulting in changes in habitat pattern. It is predicated that 84 per cent of the Sundarbans might be flooded by 2050 due to a 32 cm sea level rise, leading to significant decline in biodiversity and dislocation of FDCs.[27] Further, if sea level rise reaches 88 cm by 2100, the total area of the Sundarbans might be lost.[28]

The intensity of human-induced ecosystem degradation poses considerable threats to the survival of the diverse flora and fauna that makes the Sundarbans delta a high priority for conservation. Six major animal species once found in the Sundarbans have gone extinct this century.[29] According to the International Union for Conservation of Nature (IUCN) Red List of Bangladesh (2015), 17 mammal species in Bangladesh are recorded as 'critically endangered', 12 as 'endangered', nine as 'vulnerable' and nine as 'near threatened'. Many of their habitats are located in the Sundarbans.[30] For example, the Bengal tiger (*Panthera tigris tigris*) and smooth-coated otter (*Lutrogale perspicillata*) are listed as 'critically endangered', the capped langur (*Trachypithecus pileatus*) and small-clawed otter (*Aonyx cinerea*) are listed as 'endangered', the rhesus macaque (*Macaca*

[24] Mohammed Mahabubur Rahman et al, 'A Brief Review on Pollution and Ecotoxicologic Effects on Sundarbans Mangrove Ecosystem in Bangladesh' (2009) 1(4) *International Journal of Environmental Engineering* 369; Mohammed M Rahman, M Motiur Rahman and Kazi S Islam, 'The Causes of Deterioration of Sundarban Mangrove Forest Ecosystem of Bangladesh: Conservation and Sustainable Management Issues' (2010) 3(2) *AACL Bioflux* 80, 84.
[25] Md Nazmus Sadath and Max Krott, 'Identifying Policy Change — Analytical Program Analysis: An Example of Two Decades of Forest Policy in Bangladesh' (2012) 25 *Forest Policy and Economics* 95.
[26] Mohammed Fazlul Karim and Nobuo Mimura, 'Impacts of Climate Change and Sea-level Rise on Cyclonic Storm Surge Floods in Bangladesh' (2008) 18(3) *Global Environmental Change* 490.
[27] Ainun Nishat et al, 'Loss and Damage - The Case of Sea Level Rise in Bangladesh' (Report, International Centre for Climate Change and Development, 2013) 10.
[28] CEGIS (Centre for Environment and Geographic Information Services), 'Impacts of Sea Level Rise in Land-use Suitability and Adaptation Options' (Report, Centre for Environmental and Geographic Information Services, 2006).
[29] IUCN, *World Heritage Nomination – IUCN Technical Evaluation of the Sundarbans Wildlife Sanctuaries of Bangladesh* (IUCN, 1997) <http://whc.unesco.org/document/154300>.
[30] IUCN, *Red List of Bangladesh, Volume 2: Mammals* (IUCN Bangladesh Country Office, 2015) 38.

mulatta) is listed as 'vulnerable' and the Irrawaddy dolphin (*Orcaella brevirostris*) is listed as 'near threatened'.[31] The population of endangered flora Sundari (*Heritiera fomes*) is affected by top dying disease.[32] The human and climatic interventions impact on economic lives by reducing income opportunity and food security and influence social lives with increased poverty and unemployment. In this context, protection of the Sundarbans is a pressing need for Bangladesh in maintaining the country's ecological balance, ensuring livelihood security of FDCs and supporting the local economy. But achieving sustainable conservation of the Sundarbans largely depends on ensuring conservation and sustainable use of biological resources and promotion of environmental justice among the Sundarbans FDCs (examined in Section 2.4 of Chapter 2).

For establishing environmental justice in global biodiversity, environment and natural resource management, different mechanisms are being developed at the local and international level. Among them the most notable, as mentioned at the XII World Forestry Congress, are 'sustainable forest management', the 'ecosystem approach', 'ecosystem service approach' and 'systemic forest management'. All of the globally agreed approaches have common objectives to manage the planet's natural resources sustainably through ensuring environmental justice, although their universality, effectiveness and practicability are debated in the literature. Amid the contemporarily developed conservation approaches, the ecosystem approach brings a fundamental shift in the conservation paradigm by recognising human–nature relations for achieving ecosystem sustainability. It helps bridge the divide between conservation and rational use of biodiversity and encompasses the tenets of environmental justice for promoting justice for both people and nature. The basic features of environmental justice—distributive justice, procedural justice, justice-as-recognition, intergenerational equity, precautionary principle—are reflected within the six principles of the ecosystem approach, namely, integration of entire ecosystem components, conservation and sustainable use, access and equitable benefit sharing, decentralisation of ecosystem management, adaptive management and inter-sectoral coordination.[33] For example, the notion of distributive justice is enclosed in the ecosystem approach's access and equitable benefit sharing

[31] Ibid.
[32] Swapan Kumar Sarker et al, 'Are We Failing to Protect Threatened Mangroves in the Sundarbans World Heritage Ecosystem?' (2016) 6 *Scientific Reports* 1.
[33] Elaborately discussed in Section 2.4 of Chapter 2.

principle, while the key element of precautionary principle is embedded in the adaptive management principle.

Nevertheless, environmental justice cannot be established without vibrant and dynamic approaches to put global commitments into practice. Effective state mechanisms such as policy, legislative and institutional frameworks are the instruments through which not only environmental justice, but conservation and sustainable management of natural resources is ensured and distributed across society. While a plethora of research has been conducted on the analysis of climate change impact on the Sundarbans and dependent livelihoods, there has been no comprehensive investigation of the legal regimes regulating the Sundarbans which are fundamental to its sustainable management. Despite several policies and legislation, the Sundarbans has experienced substantial decline in species diversity and ecosystem functions. Thus, questions have arisen as to whether the existing regulating framework is sufficient to protect the Sundarbans; whether the current legal framework pays adequate attention in introducing the conservation principles recognised by International Convention, Treaties and Protocols (ICTPs); and whether an integrated approach such as the ecosystem approach needs to be incorporated into the policy instruments to protect the Sundarbans from multifarious challenges. Against this backdrop, the current mangrove conservation policy and strategy needs to be examined in light of the conservation principles and strategies established in the international legal framework.

1.2 Aims and Objectives of the Research

This research provides an understanding and way to move beyond the traditional concept of ecosystem conservation and development in Bangladesh. It aims to ensure an ecosystem-responsive and climate-resilient regulatory framework for the sustainable conservation of Sundarbans. To achieve this aim, some objectives are set: first, investigate the viability of the ecosystem approach for Sundarbans conservation; second, assess the reflection of the principles of the ecosystem approach in the legal instruments regulating the Sundarbans; third, identify the shortcomings of the legal, policy and institutional framework regulating/influencing the Sundarbans; and, lastly, conduct an in-depth analysis of biodiversity-related international legal regimes along with the relevant policies of some mangrove-enclosed countries to demonstrate Bangladesh's status in mangrove

management in the international and inter-state domain. In this endeavour, this research employed empirical data through interviewing policymakers and environmental experts working in this field to produce a realistic output. Thus, this research contributes not only to the renovation of ecosystem conservation policy and legal framework of Bangladesh but generates legal scholarship on, and new pathways for, the sustainable management of mangrove ecosystems in other mangrove-rich countries.

1.3 Research Question

This research focuses on the matrix of ecosystem conservation and conservation–development–climate resilience approaches in sustainable management of the Sundarbans of Bangladesh. To do so, it addresses the questions of how can the principles of the ecosystem approach be integrated into the legal, policy and institutional frameworks of Bangladesh to ensure sustainable conservation of the Sundarbans? To address this main research question, the following sub-questions are addressed:

1) Is the ecosystem approach relevant for sustainable conservation of the Sundarbans?
2) Are the legal, policy and regulatory frameworks of Bangladesh adequate to achieve sustainable mangrove conservation?
3) How, and to what extent, have the principles of the ecosystem approach been integrated into the international legal regimes for sustainable management of natural resources?
4) How, and to what extent, have the principles of the ecosystem approach been integrated in the policy, legislative and institutional frameworks regulating/influencing the Sundarbans in achieving sustainable conservation of the Sundarbans?
5) What challenges does Bangladesh face in regard to applying the ecosystem approach principles in management of the Sundarbans?

1.4 Conceptual Framework of the Research

The main focus of this study is to ensure an ecosystem-responsive regulatory framework for the conservation of the Sundarbans. A review of the literature indicates that the previously tested conservation approaches, such as single species approach and

community-based approach, largely failed to protect the integrity of the Sundarbans.[34] To reduce the gaps in managing policies and legislation, the ecosystem approach emerged as a strategy for the integrated management of land, water and living resources that promotes livelihoods, conservation and sustainable use of resources.[35] It is widely recommended as the best way to promote synergy between conservation of biodiversity and management of ecosystem services.[36]

The ecosystem-based conservation programme has shown great potential in Malaysian Sabah's indigenous and community-conserved areas in protection and sustainable use of ecosystem services and developing new economic opportunities arising from shared governance. Vaz and Agama[37] argued for the legislation-supportive collaboration between state and community managers as key to the ecosystem approach's success in Sabah. Its success is also evidenced in the Brazilian Amazonian conservation programmes that aimed to reduce illegal logging. Ros-Tonen et al's investigative work identified a considerable decline in illegal logging due to effective organisation of traditional resource users' partnerships based on equitable benefit-sharing arrangements and supportive policies.[38] The ecosystem-based conservation initiative has helped to reduce the deterioration of mangrove resources in the Soc Trang Commune of Vietnam's Mekong Delta via introducing participatory management planning and benefit-sharing mechanisms.[39] Such examples indicate the ecosystem approach's growing prominence in natural resource management. Following the ecosystem approach's worldwide application, this research endeavours to integrate the ecosystem approach principles into the legal framework regulating the Sundarbans for their multidimensional application in conservation and management of the ecosystem.

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[34] A Z M M Rashid, *Legal Framework for Community Participation in Governance: The Role of Co-Management in the Forest Protected Areas Management of Bangladesh* (PhD Thesis, University of Western Sydney, 2012) 3, 41, 236; Rahman, Rahman and Islam, above n 24, 86.

[35] CBD, 'Biodiversity in EIA and SEA' (Background Documents to CBD Decision VIII/28: Voluntary Guidelines on Biodiversity Inclusive Impact Assessment, Commission for Environmental Assessment, Netherlands, 2006).

[36] Justine Vaz and Agnes Lee Agama, 'Seeking Synergy Between Community and State-based Governance for Biodiversity Conservation: The Role of Indigenous and Community-conserved Areas in Sabah, Malaysian Borneo' (2013) 54(2) *Asia Pacific Viewpoint* 155.

[37] Ibid 155.

[38] Mirjam A F Ros-Tonen et al, 'Forest-related Partnerships in Brazilian Amazonia: There is More to Sustainable Forest Management than Reduced Impact Logging' (2008) 256(7) *Forest Ecology and Management* 1482.

[39] Donald J Macintosh, M M Epps and O Abrenilla, 'Ecosystem Approaches to Coastal Resources Management: The Case for Investing in Mangrove Ecosystems' in *Food for All Investing in Food Security in Asia and the Pacific—Issues, Innovations, and Practices* (Asian Development Bank, 2011) 150.

The ecosystem approach was endorsed by the *Convention on Biological Diversity 1992* (CBD) as 'a strategy for the integrated management of land, water and living resources that promotes conservation and sustainable use in an equitable way'.[40] According to Maltby,[41] it is an integrated process for achieving the triple objectives of the CBD: conservation, sustainable use and equitable sharing of ecosystem-driven benefits. The ecosystem approach emerged with some basic philosophies derived from international environmental theories (environmental justice, distributive justice, intergenerational equity and the precautionary principle) and gradually transformed into soft-law principles through the consensus-based activity of CBD Conference of the Parties (COP).[42]

Environmental justice includes equity in distribution of environmental risks and benefits, meaningful participation in environmental decision-making processes, recognition of indigenous and local knowledge, respect for cultural diversity and the capabilities of communities to function and flourish in society.[43] The ecosystem approach encompasses the basic notions of environmental justice theory, such as benefit sharing, participatory practices, valuing the traditional knowledge of indigenous and local communities, recognition of human–nature interaction with a view to protect the environment, preserve biodiversity and achieve sustainable development.[44] The basic tenet of distributive justice is to devise equitable distribution of benefits and burdens among communities which is incorporated in the ecosystem approach via the benefit-sharing mechanism.[45] The spirit of intergenerational equity is conceived within the ecosystem approach by enabling sustainable use of resources. Additionally, to address the scientific uncertainty and

[40] Jeffrey A Sayer and Stewart Maginnis, 'New Challenges for Forest Management' in Jeffrey A Sayer and Stewart Maginnis (eds), *Forestry in Landscapes: Ecosystem Approaches to* Sustainability (Earthscan, 2005) 3, 4.
[41] Edward Maltby, 'Ecosystem Approach: From Principle to Practice' (Paper presented at the International Conference on Ecosystem Service and Sustainable Watershed Management in North China, Beijing, PR China, 23–25 August 2000) 50.
[42] C Max Finlayson et al, 'The Ramsar Convention and Ecosystem-based Approaches to The Wise Use and Sustainable Development of Wetlands' (2011) 14(3–4) *Journal of International Wildlife Law & Policy* 176.
[43] David Scholosberg, *Defining Environmental Justice: Theories, Movements, and Nature* (Oxford University Press, 2007) 4.
[44] Vito De Lucia, 'Competing Narratives and Complex Genealogies: The Ecosystem Approach in International Environmental Law' (2015) *Journal of Environmental Law* 91, 92.
[45] Chris Armstrong, *Global Distributive Justice: An Introduction* (Cambridge University Press, 2012) 16; Nicholas Rescher, *Fairness: Theory and Practice of Distributive Justice* (Transaction Publishers, 2002) 60.

complexity in ecosystem conservation, the ecosystem approach advocates adaptive management and, thereby, includes the notion of precautionary principle.[46]

The ecosystem approach entails some unique features, such as integration of ecosystem morphology, conservation and sustainable use, participatory conservation, equitable benefit sharing and adaptive management, which differentiate it from other conservation approaches (eg, single species approach, biosphere reserve and community-based approach). De Lucia[47] observed that the ecosystem approach provides a policy framework for biodiversity to fisheries, from international water resources to oceans, from climate change adaptation to disaster management and, subsequently, emerged as a 'new paradigm' in environmental management. However, a group of scholars saw difficulties in the implementation of some of its principles, such as involving cross-sectoral stakeholders[48] and tackling the complex interaction and potential conflicts,[49] because all need transdisciplinary and interdisciplinary initiatives[50] and observed that all 12 principles may be difficult to implement in every site.[51] Conversely, Mistry et al opined that it is too early to understand the potential effects and differences of the ecosystem approach.[52] Successful application of ecosystem-based conservation initiatives largely depend on supportive policies and laws, strong institutions and available scientific information on ecosystem. As a developing country, facilitating those processes is a challenge for Bangladesh. Nevertheless, considering the recent degradation rate coupled with increased climatic effects, the ecosystem-based conservation initiative could be a viable tool to manage the Sundarbans in a holistic way.

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[46] CBD Decision VII/11 Annex I, Annotations to the Rationale of Principle 9.
[47] De Lucia, above n 44, 92.
[48] Charlie M Shackleton et al, 'Reflecting on The Next Generation of Models for Community-based Natural Resources Management' (2010) 37(1) *Environmental Conservation* 1; Mark S Reed, 'Stakeholder Participation for Environmental Management: A Literature Review' (2008) 141(10) *Biological Conservation* 2417.
[49] Kirsty Blackstock et al, 'Linking Process to Outcomes - Internal and External Criteria for A Stakeholder Involvement in River Basin Management Planning' (2012) 77 *Ecological Economics* 113.
[50] Willem Janssen and Peter Goldsworthy, 'Multidisciplinary Research for Natural Resource Management: Conceptual and Practical Implications' (1996) 51(3) *Agricultural Systems* 259.
[51] Eric Fee et al, 'Stuck in The Clouds: Bringing the CBD's Ecosystem Approach for Conservation Management down to Earth in Canada and Germany' (2009) 17(4) *Journal for Nature Conservation* 212.
[52] Jayalaxshmi Mistry et al, 'Using a Systems Viability Approach to Evaluate Integrated Conservation and Development Projects: Assessing the Impact of the North Rupununi Adaptive Management Process, Guyana' (2010) 176(3) *Geographical Journal* 241.

1.5 Role of National Policies and Laws in Sundarbans Conservation

Sustainable ecosystem conservation largely requires responsive policies and legislation. According to Soloviy and Cubbage, state forest policy is one of the most important tools in determining successful ecosystem developments through absorption of internationally recognised principles considering the general state policy, resources and socio-economic aspects of the state.[53] Better public policy provides a basis for plans, prescriptions and frameworks to create a suitable environment and maintain dynamic growth of the sector. The government's position and pledges on a particular issue are reflected in policies.[54]

Pragmatic forest policies require gradual adjustment to the changing needs of people and circumstances and absorption of internationally endorsed dominant principles. Natural resource management paradigms have undergone a revolution during the last 50 years due to the increasing demand on resources and growing awareness of the effects of urbanisation and industrial growth. This development process has been initiated under different names, such as nature conservation in the 1960s, sustainability in the 1970s, integrated conservation and development in the 1980s, community-based conservation in the 1990s and the ecosystem approach in the 2000s. The common component of all concepts is to find a balance between the ecological and socio-economic perspectives. However, forest policy formulation is always a challenge for developing countries. Besides ensuring sustainable use of resources, poverty reduction and economic growth are considerable factors in policy development. Many developing countries have adopted national forest policies to secure the livelihoods of FDCs, keep the economy stable and achieve sustainable management of forests. The integration of economic and human dimensions in forest conservation to achieve sustainability has received strong policy support and unprecedented focus in the literature in the last few decades.[55]

The conservation literature revealed that mangrove degradation has intensified in many countries due to high-level policy failures. For example, state-level aquaculture policy

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[53] Ihor P Soloviy and Frederick W Cubbage, 'Forest Policy in Aroused Society: Ukrainian Post-Orange Revolution Challenges' (2007) 10(1–2) *Forest Policy and Economics* 68.

[54] Stephen Dovers, *Environment and Sustainability Policy: Creation, Implementation, Evaluation* (Federation Press, 2005) 12.

[55] David Pearce, Francis E Putz and Jerome K Vanclay, 'Sustainable Forestry in the Tropics: Panacea or Folly?' (2003) 172 *Forest Ecology and Management* 244.

resulted in massive mangrove losses in the Philippines during the 1950s.[56] In the name of development, conversion of forest land to agriculture and industrial use is increasingly evident across the world, resulting in irreversible damage to ecosystems. The construction of a 50-kilometre cemented road inside the Brazilian Amazon rainforest contributed to forest degradation a thousand times higher than that of the previous year.[57] Spalding et al suggested establishing a clear conservation and management regime for mangrove management worldwide.[58] Like other countries, Bangladesh has adopted conservation policies that promise to maintain conservation values in mangrove-protected areas. The *Environment Policy 1992* and *Forest Policy 1994* are the major policy documents regulating the Sundarbans, and set out the goals and planned activities to protect the forest from human and climatic interventions.[59] There are cross-sectoral policies, such as the *Fisheries Policy 1998*, *Wetland Policy 1998* and *Coastal Zone Policy 2005*, which have had implications for the management of the Sundarbans and its associated areas.

Adequate laws are necessary to implement the government policies on the ground. Acts, ordinances, regulations or rules are the vital legislative tools in ecosystem conservation. Legislative measures relate to bans, commands, rights and regulations and prescribe certain standards of behaviour and impose penalties for failure to comply.[60] Aminuzzaman observed some timely initiatives both in the form of enacting new laws and modifying existing laws to reinforce conservation policies.[61] As part of this endeavour, the *Environmental Conservation Act 1995* (ECA 1995), *Environmental Conservation Rules 1997* (ECR 1997) and *Environment Court Act 2010* were enacted, while some prominent legislation, such as the *Forest Act 1927* and *Wildlife Act 1974* (renamed the *Wildlife (Protection and Safety) Act 2012*), were revised in 2000 and 2012 in recognition of the increasing pressure of a growing population on natural resources and the changing dimensions in natural resource conservation at an international level (detailed analysis of policies and laws regulating the Sundarbans is undertaken in Chapter 4). To value

[56] Spalding, Kainuma and Collins, above n 2, 124.
[57] David Kaimowitz and Arild Angelsen, *Economic Models of Tropical Deforestation: A Review* (Center for International Forestry Research, 1998) 139.
[58] Spalding, Kainuma and Collins, above n 2, xvi.
[59] Salahuddin M Aminuzzaman, 'Environment Policy of Bangladesh: A Case Study of an Ambitious Policy with Implementation Snag' (Paper presented at the South Asia Climate Change Forum, Monash Sustainability Institute, Monash University, 5–9 July 2010) 4.
[60] Tanzim Afroz, *Climate-development Integrated Approach in Coastal Management of Bangladesh: Legal and Policy Responses* (PhD Thesis, Macquarie University, 2014) 3.
[61] Aminuzzaman, above n 59, 6.

traditional resource users' proprietary and permissive rights over natural resources, different mechanisms such as licenses, permits, leases and profits á prendre have been practiced globally.[62] A licensing or permit system was introduced in Bangladesh to control unsustainable activities in the Sundarbans, yet the illegal felling of timbers and poaching of wildlife has continued unabated. This indicates the failure of Sundarbans conservation policies in establishing appropriate legal framework when necessary and limited application of existing regulatory framework. For instance, current conservation policy does not have any standard for controlling aquaculture or protection of water quality from oil spillage from commercial vessels.[63]

It is evident that Bangladesh's forest policy has undergone a gradual change towards a participatory and integrated conservation dimension, but much of the policy pledges are evident in the processes but not in practice.[64] The dubious conservation policy and exclusionary management system intensifies hostility between the Forest Department (FD) and FDCs[65] and breeds insecurity among marginalised FDCs,[66] which has led to unsustainable practices that undermine the successes of many conservation initiatives.[67] The Asian Development Bank's (ADB's) analysis revealed the gaps in policy, institutional mandates and inter-state departments coordination mechanisms that impede effective application of policies.[68] Nevertheless, the national legal framework plays a dominant role in the implementation of ICTP principles within the territory of a nation.

1.6 Sundarbans Conservation and its Recognition in International Legal Regime

The Sundarbans is a place of international significance and has received considerable international recognition. Due to its ecological importance, it is recognised as a Ramsar Site and World Heritage Site. As a designated international Heritage Site, conservation of

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[62] Gerry Bates, *Environmental Law in Australia* (LexisNexis Australia, 8th ed, 2013) 62–63.
[63] UNEP, 'The Sundarbans, Bangladesh' (Report, UNEP, 2011).
[64] Mahbubul Alam, 'Evolution of Forest Policies in Bangladesh: A Critical Analysis' (2009) 2(2) *International Journal of Social Forestry* 161.
[65] Roy, Alam and Gow, above n 19, 51.
[66] Kabir and Hossain, above n 20, 10.
[67] Saiful Islam, Mizanur Rahman and Sourav Chakma, 'Plant Diversity and Forest Structure of the Three Protected Areas (Wildlife Sanctuaries) of Bangladesh Sundarbans: Current Status and Management Strategies' in Ibrahim Faridah-Hanum, Abdul Latiff Khalid Rehman Hakeem and Munir Ozturk (eds), *Mangrove Ecosystems of Asia: Status, Challenges and Management Strategies* (Springer, 2014) 127.
[68] Asian Development Bank (ADB), 'Country Environment Analysis: Bangladesh' (Report, ADB, 2004) 40.

the Sundarbans is now under the purview of ICTPs to which Bangladesh is a signatory. For the purpose of this research, the following key international legal regimes that have direct implications on the Sundarbans are assessed. A more detailed analysis of these international instruments in line with the case study is undertaken in Chapter 3:

- *Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971*[69] (Ramsar Convention)
- *Convention Concerning the Protection of the World Cultural and Natural Heritage 1972*[70] (World Heritage Convention)
- *Convention on International Trade in Endangered Species of Wild Fauna and Flora 1973*[71] (CITES)
- *Convention on Biological Diversity 1992*[72] (CBD)
- *United Nations Framework Convention on Climate Change 1992*[73] (UNFCCC)

To reduce the loss of wetlands that facilitate diverse ecological functions and habitats for waterfowl and to ensure their sustainable conservation, the Ramsar Convention was adopted in 1971. The convention imposes a number of responsibilities to the Contracting Parties such as preparing a list of wetlands, formulation of conservation plans and implementation of programmes for the conservation and wise use of listed wetlands.[74] Bangladesh acceded to the convention in 1992 after the listing of the Sundarbans in the Ramsar's List of Wetlands. A number of policy steps were taken to meet the convention's obligations. In 1992, 596,000 hectares of the Sundarbans was declared a Ramsar Site, which was later extended to 601,700 hectares[75] and the name of the site changed to 'Sundarbans Reserved Forest'. The central theme of the convention is that 'wise use' of

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[69] *Convention on Wetlands of International Importance especially as Waterfowl Habitat*, opened for signature 2 February 1971, 996 UNTS 245 (entered into force 21 December 1975) ('Ramsar Convention').
[70] *Convention Concerning the Protection of the World Cultural and Natural Heritage*, opened for signature 16 November 1972, 1037 UNTS 151, 27 UST 37, 11 ILM 1358 (entered into force 17 December 1975) ('World Heritage Convention').
[71] *Convention on International Trade in Endangered Species of Wild Fauna and Flora*, opened for signature 3 March 1973, 993 UNTS 243 (entered into force 1 July 1975) ('CITES').
[72] *Convention on Biological Diversity*, opened for signature 5 June 1992, 1760 UNTS 79, 31 ILM 818 (entered into force 29 December 1993) ('CBD').
[73] *United Nations Framework Convention on Climate Change*, opened for signature 9 May 1992, 1771 UNTS 107, 31 ILM 849 (entered into force 21 March 1994) ('UNFCCC').
[74] Ramsar Convention art 3.
[75] Ramsar Secretariat, *Bangladesh Enlarges Sundarbans Ramsar Site* (2003) <https://www.ramsar.org/news/bangladesh-enlarges-sundarbans-ramsar-site>.

resources of great economic, cultural, scientific and recreational value, as stated in the Preamble, art 2.6 and art 3.1, is crucial for developing countries[76] like Bangladesh.

The World Heritage Convention is the premier global legal instrument for the protection of items of cultural or natural heritage that are of outstanding interest for sharing with current and future generations.[77] It recognises that the primary duty of identification and protection of cultural and natural heritage, as part of world heritage, belongs to the concerned states.[78] The convention's supervising authority, UNESCO, declared the three wildlife sanctuaries of the Sundarbans, an area of 139,500 hectares, a World Heritage Site in 1997 for their outstanding universal value. As a signatory, Bangladesh has inserted the notion of intergenerational equity with the provision for ecologically critical areas (ECAs) in the ECA 1995 for the preservation of natural and cultural heritage. Accordingly, the Sundarbans was declared as an ECA. Article 18A of the Constitution of Bangladesh pledges to preserve biodiversity, while arts 23 and 24 provide for the protection of the state's cultural and natural heritage.[79]

The CBD's mandates—reduction of potential threats to biodiversity, environment and human health[80]—is crucial for the sustainable conservation of the Sundarbans. The Convention imposes obligation on the Contracting Parties to develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity and integrate such notions, as much as possible, into sectoral plans, programmes and policies.[81] As part of the CBD, biodiversity conservation has been recognised in the Bangladesh's *Forest Policy 1994*, *Environment Policy 1992* and *National Biodiversity Strategy and Action Plan 2016-2012* (NBSAP).[82] Prevention of mangrove ecosystem loss is possible by linking conservation, sustainable use and equitable sharing of benefits with traditional knowledge of mangrove dependence and access and benefit sharing (ABS).

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[76] Geoffrey Vernon Townsend Matthews, *The Ramsar Convention on Wetlands: Its History and Development* (Ramsar Convention Bureau, Switzerland, 1993) 6.
[77] World Heritage Convention, Preamble.
[78] Ibid art 4.
[79] *The Constitution of the People's Republic of Bangladesh* (1972) arts 18A, 23, 24.
[80] Robert Höft, 'Convention on Biological Diversity' in *Encyclopedia of Life Sciences* (eLS) (John Wiley & Sons Ltd, 2008) 1.
[81] CBD arts 6 (a)–(b).
[82] *The National Biodiversity Strategy and Action Plan for Bangladesh 2004*, vi.

CITES provides a framework for collaboration among nations to protect certain species of fauna and flora against overexploitation through commercial trade. Parties to CITES are expected to enforce the treaty's provisions through domestic legislation.[83] As a signatory, Bangladesh has enacted the *Wildlife (Protection and Safety) Act 2012* prohibiting trading in endangered animals and goods produced with their bones and skins. The Sundarbans is a habitat for over 448 species of flora and fauna including globally endangered species like the Bengal Tiger and Ganges River Dolphin. Bangladesh has recently been used as a transit point for illegal wildlife trade in South Asia.[84] Illegal trading or poaching of wildlife is one of the major causes for species decline in the Sundarbans,[85] thus CITES has implications for sustainable conservation of the ecosystem.

The UNFCCC is an international environmental treaty adopted to

> stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system that should be achieved within a time-frame sufficient to allow the ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.[86]

The CBD works closely with the UNFCCC to ensure climate change mitigation and adaptation activities contribute to biodiversity conservation.[87] The Sundarbans's ecological system is highly complex as a result of an intimate interplay of climate change and ecological and socio-economic factors.[88] The people and ecosystems of the coastal zone, including the Sundarbans, are vulnerable to climate change. Thus, Bangladesh has demonstrated proactivity in incorporation the UNFCCC's provisions into the regulatory framework.[89] The *National Adaptation Programme of Action 2004* (NAPA) and *Bangladesh Climate Change Strategy and Action Plan 2009* (BCCSAP) have been devised

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[83] CITES art XIV.
[84] Tapan Kumer Day and Md Golam Rabbi, *Guide Book on Wildlife Law Enforcement in Bangladesh* (Bangladesh Forest Department, 2015) 13.
[85] Shardul Agrawala et al, *Development and Climate Change in Bangladesh: Focus on Coastal Flooding and the Sundarbans* (OECD Publication, 2003) 49.
[86] UNFCCC art 2.
[87] Höft, above n 80, 1.
[88] *Integrated Resources Management Plans for the Sundarbans (2010-2020)* (IRMP for the Sundarbans) 129.
[89] Mahbubul Alam, A Z M Manzoor Rashid and Yasusfi Furukawa, 'Policy Implications and Implementation of Environmental ICTPs in Developing States: Examples from Bangladesh' (2008) 1(26) *Electronic Green Journal* 5.

to build country's capacity and resilience to meet the potential challenges of climate change.

As a member of the international community, Bangladesh is party to many biodiversity and environment-related ICTPs. However, the country's haphazard commitment to compliance with its ICTP's obligations is revealed in ADB's Country Environmental Analysis Report.[90] As one of the world's most environmentally vulnerable countries, Bangladesh must translate its international commitment into national policy for maintaining the integrity of its ecosystem and environment. It is apparent that environmental deterioration in one region affects others. Conservation of nature at the local level supports regional and global nature conservation. Currently, the ecosystem management focus has shifted from management for species-specific objectives to an integrated ecosystem approach that promotes intergenerational equity and the precautionary principle in resource uses for sustained production of multiple outputs.[91] It is recognised that domestic and international law are inter-related and interdependent. National law influences international law and vice versa. Thus, international legal instrument–led principles have substantial influence on the national ecosystem conservation policies that regulate the Sundarbans.

1.7 Statement of the Problem

The Sundarbans has a long history of management. However, management regimes have been used by their respective administrators to fulfil their interests while ignoring conservation value. Resource exploitive practices started in the sixteenth century and continued in different forms until 1971.[92] After the independence of Bangladesh in 1971, some substantive actions were taken by the government for the protection of the Sundarbans. For example, the Wildlife (Preservation) Order 1973 redefined the Sundarbans as a 'reserve forest' with wildlife sanctuary status from which extraction of resources was prohibited. Bangladesh also signed major global biodiversity conventions.

At the policy level, the progress of Bangladesh in meeting environmental challenges is to some extent noteworthy as the country has adopted the *Environmental Policy 1992*, *Forest*

[90] Asian Development Bank, above n 68, 30.
[91] Rahman, Rahman and Islam, above n 24, 86.
[92] Karim, above n 21, 1.

Policy 1994 and BCCSAP 2009 in line with the principles of ICTPs. But gaps remain in the policy regimes regarding the property rights of FDCs and their effective involvement in policy planning and management to enable fair benefit distribution mechanisms and livelihood security of FDCs which are fundamental to facilitating environmental justice and enabling sustainable management of the Sundarbans. Likewise, several biodiversity conservation programmes have been undertaken[93] in collaboration with development partners for conservation of the Sundarbans. Though the common goal of those projects was to secure the Sundarbans's integrity, many researchers questioned the success of many of these conservation initiatives.[94] For instance, the Sundarbans Biodiversity Conservation Project (SBCP) was commenced to ensure sustainability through introducing participatory conservation, but the project failed to achieve its stated goals due to the unrealistic design and implementation failure.[95]

The recent effort to establish a thermal power plant at Rampal, 14 kilometres from the World Heritage Site areas and four kilometres from the ECA borderline amid local and international concerns, further exemplifies the gap between policy and implementation in governance mechanism.[96] Transparency International Bangladesh's (TIB's) report revealed that, due to environmental concern, coal-fired thermal power plants are not permissible within 15–25 kilometres of the outline of reserve forests, national parks and public settlements globally. This type of power plant is not allowed within 25 kilometres of a reserve forest in India.[97] Despite declaring the Pashur River a wildlife sanctuary for

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[93] The collaborative Sundarbans conservation projects are: the Sundarbans Wildlife Management Plan (1978, WorldWide Fund for Nature), Integrated Development of the Sundarbans (1984, FAO), Sundarbans Forest Inventory Project (1985, ODA), Wildlife Management Plan for the Sundarbans Reserved Forest (1994, UNDP/FAO), Conservation Management Plan of the Wildlife Sanctuaries in the Sundarbans Forests (1997, World Bank), Sundarbans Biodiversity Conservation Project (SBCP) (1999, ADB/GEF), Integrated Protected Area Co-management Project (2008, USAID), the Sundarbans Tiger Project (2008, Wildlife Trust/IUCN), Sundarbans Environment and Livelihoods Security (SEALS) Project (2011, EuropeAID). See Floris Deodatus and Zahir Uddin Ahmed, 'Sundarbans Biodiversity Conservation Project – Directives for Wildlife Management Planning (Report No 1643/3158, Asian Development Bank-Bangladesh, 2002).

[94] Anjan Kumer Dev Roy and Jeff Gow, 'Attitudes Towards Current and Alternative Management of the Sundarbans Mangrove Forest, Bangladesh to Achieve Sustainability' (2015) 58(2) *Journal of Environmental Planning and Management* 214; Roy and Hossain, above n 21, 44.

[95] ADB, 'Project Completion Report Bangladesh: Sundarbans Biodiversity Conservation Project' (Report, ADB, 2008); Zakir Hossain and Kushal Roy, *Deserting the Sundarbans: Local People's Perspective on ADB-GEF-Netherlands Funded Sundarbans Biodiversity Conservation Project* (Unnayan Onneshan – The Innovators, 2007) 7.

[96] A K M Wahiduzzaman, 'Menace at the Mangrove', *The Dhaka Tribune* (Dhaka, Bangladesh), 27 December 2014 <http://www.dhakatribune.com/long-form/2014/dec/27/intoxicating-sundarbans>.

[97] Transparency International Bangladesh, *Rampal and Matarbari Power Projects: Governance Challenges in Environmental Impact Assessment and Land Acquisition* (2015) <http://www.ti-bangladesh.org/beta3/images/2015/es_ffs_coal_15_en.pdf>.

the protection of endangered aquatic mammals, the environmental impact assessment (EIA) report justifies the project by citing the EIA Guideline for Industries 1997 and the project obtaining an Environmental Clearance Certificate (ECC) from the Department of Environment (DoE) in compliance with the ECA 1995. Arguably, this ignores the risks of imminent impacts on the environment and ecosystem of the Sundarbans.[98] Hossain stated that, as per the ECA 1995, approving the project is contrary to the Ramsar Convention since there is a likelihood of pollution that may hamper the integrity of the Sundarbans's wetlands.[99] In many countries, there are additional protections for public environment reporting for assessing the ecological viability of any development program from stakeholders' perspectives.[100] The absence of a public environment report, important for endorsing any mega project having substantial impact on the local community, environment and ecosystem around the project area, is clear in the policies applied in approving the Rampal project.

Because of policy and management failure, forest clearing has become increasingly severe in developing countries[101] including Bangladesh. Recent mangrove studies revealed that the many conservation programmes lack effectiveness largely due to two reasons: policy gaps and implementation failure. Current legal frameworks and conservation approaches have largely failed to protect the Sundarbans from continued deterioration. There is no recognised policy study that examines the adequacy of the regulatory framework for the conservation of the Sundarbans. Although researchers have blamed poor implementation,[102] it is evident that there are shortcomings in policies which allow for the continuation of activities that result in rapid reduction in mangrove resources. There has been no in-depth investigation into the effectiveness of mangrove conservation policies, laws and conservation approaches.

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[98] Ibid.

[99] Syed Emran Hossain, 'The Issue of Rampal Power Station: Not Worthy of a Summary Rejection', *Think Legal Bangladesh* (2013) <http://thinklegalbangladesh.com/home/uploads/article/890472218_1484647331.pdf>.

[100] David Farrier, Rosemary Lyster and Linda Pearson, *The Environmental Law Handbook*: *Planning and Land Use in NSW* (Redfern Legal Centre Publishing, 3rd ed, 1999) 529.

[101] Menaka Panta, Kyehyun Kima and Chudamani Joshi, 'Temporal Mapping of Deforestation and Forest Degradation in Nepal: Applications to Forest Conservation' (2008) 256(9) *Forest Ecology and Management* 1587, 1588.

[102] M S Iftekhar and M R Islam, 'Managing Mangroves in Bangladesh: A Strategy Analysis' (2004) 10(1) *Journal of Coastal Conservation* 139.

Addressing the multifarious challenges posed by excessive human exploitation and climate change effects requires responsive policies, protective legislation, viable planning and adaptive institutional frameworks. Facilitating these requires adoption of an integrated approach to guide sustainable promotion and protection of a complex ecosystem. Analysing the contribution of the Sundarbans to the local economy and potential challenges of this, a group of scholars recommended adopting an integrated management approach to maintain a balance between resource exploration and the ecological integrity of the Sundarbans for its continued growth.[103] The CBD advocated ecosystem approach promises to 'protect the environment, maintain healthy ecosystems, preserve biological diversity and achieve sustainable development', and as a signatory to this convention, Bangladesh is obliged to implement its principles into ecosystem conservation drives.

Since endorsement by the CBD in 2000, the ecosystem approach is increasingly used in conservation literature and in conservation policies and practices. Various scholars[104] have suggested integrating the ecosystem approach's notions into all sorts of development policies, including conservation of mangrove ecosystem resources and climate change adaptation to make those conservation–development initiatives viable. Surprisingly, no study has yet examined the rationales of the ecosystem approach's inclusion at the policy level, even after over a decade since its emergence. It is evident that major mangrove-regulating legal frameworks were enacted before the ecosystem approach's global endorsement. At this juncture, there is an urgent need for a re-evaluation of the biodiversity–environment–climate change legal, policy and institutional frameworks of Bangladesh to identify their gaps and limitations and recommend ways to address these. This aims to provide the mangrove regulatory frameworks of Bangladesh with an appropriate shape by incorporating the ecosystem approach principles with a view to promote the sustainable conservation of the Sundarbans ecosystem.

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[103] Hanneke Van Lavieren et al, *Securing the Future of Mangroves: A Policy Brief* (UNU-INWEH, UNESCO-MAB, 2010) 4; M Shahadat Hossain et al, 'Opportunities and Strategies for Ocean and River Resources Management' (2014) 11 <http://www.plancomm.gov.bd/wp-content/uploads/2015/02/19_Strategy-for-Ocean-and-River-Resources-Management.pdf>; Roy and Hossain, above n 21, 44.

[104] Celia A Harvey et al, 'Climate Smart Landscapes: Opportunities and Challenges for Integrating Adaptation and Mitigation in Tropical Agriculture' (2014) 7(2) *Conservation Letters* 77; Jeffrey Sayer et al, 'Ten Principles for a Landscape Approach to Reconciling Agriculture, Conservation, and Other Competing Land Uses' (2013) 110(21) *Proceedings of the National Academy of Science* 8349; Marieke Sandker, Manuel Ruiz-Perez and Bruce M Campbell, 'Trade-Offs Between Biodiversity Conservation and Economic Development in Five Tropical Forest Landscapes' (2012) 50(4) *Environmental Management* 633; Rahman, Rahman and Islam, above n 24, 86.

1.8 Research Methodology

This study uses doctrinal legal methodology based on the normative character of the research problem. According to Chynoweth, doctrinal research is concerned with the design of legal guidelines through clarifying ambiguities within related rules, placing them in a logical and coherent structure and describing their relationship to other rules.[105] This study is a critical appraisal of the policies and legislative frameworks concerning the Sundarbans of Bangladesh. The research methodology of this study is qualitative in its approach. In Cresswell's view,[106] the qualitative approach is best suited for detailed and complex analysis of a given issue and problems that cannot easily be quantified. Since the research is not concerned with quantifying its results through statistical analysis, it adopted a qualitative approach. The justification of a qualitative research design is self-evident in the research question. The problem explored in this research cannot be addressed by a quantitative and inflexible or fixed-design strategy because of the nature of real-world problems.[107] A qualitative strategy is more appropriate and flexible because it is a process of selecting and gauging materials by taking into account hierarchy and authority along with social context and interpretation.[108] Thus, the method of this thesis comprises a literature review, law and policy analysis and synthesis of findings.

1.8.1 Techniques of Data Extraction

To address the research questions, the study consults both primary and secondary sources directly related to biodiversity conservation, climate change and sustainable development. Data, in this research, have mainly been collected from desktop studies verified during field visits. The combination of both methods helped to generate ideas on the research theme and validate data. Primary data were collected through reviewing a wide range of national, regional and international normative instruments (conventions, policies, strategies, etc.), policy documents dealing with conservation status, protection scenario (access, rights, responsibilities, ownership of traditional resource users, etc.) and

[105] Paul Chynoweth, 'Legal Research' in Andrew Knight and Les Ruddock (eds), *Advanced Research Methods in the Built Environment* (Wiley-Blackwell, 2008) 29.
[106] John W Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (Sage Publications Ltd, 2013) 211.
[107] Christopher James McGrath, *How to Evaluate the Effectiveness of An Environmental Legal System* (PhD Thesis, Queensland University of Technology, 2007) 20.
[108] Ian Dobinson and Francis Johns, 'Qualitative Legal Research' in Mike McConville and Wing Hong Chui (eds), *Research Methods for Law* (Edinburgh University Press, 2007) 22.

development issues (alternative livelihood options). It also included interviews of some selective persons with five categories. Table 1.1 shows the profile of the persons interviewed during field investigation.

Table 1.1: Profile of the Persons Interviewed during Fieldtrip

Category	Portfolio of the Person Interviewed	Total Number
Category-1	Policymaking level (persons involved in the Sundarbans's mangrove policymaking)	8
Category-2	Policy implementation level (persons engaged in policy implementation/management level)	10
Category-3	Policy prescription/research level (persons engaged in mangrove research)	5
Category-4	Environment activists (NGOs, civil societies and journalists contributing to the protection of Sundarbans and associated livelihoods)	7
Category-5	Business community (operating businesses based on Sundarbans-associated resources)	4

Standardised sets of semi-structured questionnaires were used for interviewing each group (see Appendix A). The profile of the person interviewed is presented in Appendix B. Before field visits, an ethical clearance was obtained from the Faculty of Arts Human Research Ethics Committee of Macquarie University (see Appendix C). To provide good insight about the research topic, secondary data was gathered through desk study. It was used in the reanalysis of previously collected and analysed data. Secondary data were extracted from international policy documents and enactments, country-based studies and local research publications, government documents (statistics, legislation and policy documents), academic research (journal articles and books), conference papers, working papers and research reports, and websites. The results of the literature review are presented in different chapters on a topic-by-topic basis.

1.8.2 Method of Assessment

The method of assessment in this study was developed following the model used by Afroz,[109] Huq et al,[110] Kramer[111] and Lacity and Janson.[112] Afroz used this assessment

[109] Afroz, above n 60, 12–13.
[110] Nazmul Huq et al, '"Climate Proofing" Water Resources Development Policy: The Evidence from Bangladesh' in Walter Leal Filho (ed), *Climate Change and the Sustainable Use of Water Resources, Climate Change* Management (Springer, 2012) 389.
[111] Arnoldo Matus Kramer, 'Adaptation to Climate Change in Poverty Reduction Strategies' (Occasional Paper No 2007/34, UNDP Human Development Report Office, 2007) 5.

method to examine the climate–development integrated approach in policy documents. Huq et al used such a subjective approach of assessment to evaluate the climate proofing performances in water development policy in Bangladesh. Kramer describes this assessment method as a subjective qualitative framework analysis. A qualitative approach entails information acquisition and data analysis. Lacity and Janson illustrate how to analyse text data generated by a qualitative framework. Though the assessment modes of those four works are to some extent different from one another, they are used in this thesis as a basis for comparison to reach a solution.

It must be noted that although the ecosystem approach has perceived 12 principles, implementation of all 12 principles in a single ecosystem-based conservation programme is difficult in developing countries like Bangladesh. Thus, six important principles of the ecosystem approach as articulated by the Malawi Principles (and elaborated by its supporting CBD Guidelines on the Ecosystem Approach) has been used in this research to evaluate the performance of domestic law and policy of implementing the ecosystem approach in natural resource management. Specifically, these principles include the — integration of entire ecosystem components (Malawi Principles 1 and 5), conservation and sustainable use (Malawi Principle 10), access and equitable benefit sharing (Malawi Principle 4), decentralisation of ecosystem management (Malawi Principle 2), adaptive management (Malawi Principle 9) and inter-sectoral coordination (Malawi Principle 12). The remaining six Malawi principles—recognising objectives as society's choice; consideration of the extended impacts or externalities; recognising and respecting ecosystem limits; operating ecosystem at an appropriate scale, spatially and temporally; managing the ecosystem for the long term considering lagged effects; and bringing all knowledge to bear—are not considered because those are to some extent overlapping or somehow interlinked[113] with other six principles selected in this research. For example, consideration of the extended impacts or externalities (Malawi Principle 3); recognising and respecting ecosystem limits (Malawi Principle 6); and operating ecosystem at an appropriate scale, spatially and temporally (Malawi Principle 7) are covered within the realm of 'conservation and sustainable use' (Malawi Principle 10), and the principles of

[112] Mary C Lacity and Marius A Janson, 'Understanding Qualitative Data: A Framework of Text Analysis Methods' (1994) 11(2) *Journal of Management Information Systems* 137.
[113] Horst Korn, Rainer Schliep and Jutta Stadler (eds), 'Report of the International Workshop on the "Further Development of the Ecosystem Approach" at the International Academy for Nature Conservation Isle of Vilm, Germany, October 9-11, 2002' (Bundesamt für Naturschutz, 2003) 53.

recognising objectives as society's choice (Malawi Principle 1) and bringing all knowledge to bear (Malawi Principle 11) are entailed within 'decentralisation of ecosystem management' (Malawi Principle 2) and 'inter-sectoral coordination' (Malawi Principle 12) respectively.[114] A subjective qualitative assessment framework has been designed (see below) to investigate the reflection of ecosystem approach principles in the policy and legislative documents.

Firstly, in searching the status of six principles of the ecosystem approach in the policy and legislative frameworks regulating the Sundarbans, the following four categories have been selected. The basis for choosing these categories is that the causal link provides some sort of relationship between the ecosystem approach principles and the impetus of their alignment in policy development. Without establishing a causal link, the policy assessment remains superficial. Once a link is established between the principles of the ecosystem approach and the objectives of policy documents, the issue of their integration in policy and legal frameworks arises, which follows the development of mechanisms to implement ecosystem:

1) **issues:** i) possible description of functional components of ecosystem in ecosystem conservation, management and development; ii) adoption of synergistic strategy for conservation and sustainable use of ecosystem resources; iii) facilitating access and benefit-sharing strategies to avoid conflicts within sectors or stakeholders; iv) decentralisation of ecosystem management for ensuring stakeholder's participation in policy planning and management; v) process of mainstreaming adaptive management to address the complexity and challenges affecting biodiversity, environment and resource users; and vi) level of strategic interventions in policies, programmes and institutional mandates supporting interdepartmental, interdisciplinary and inter-sectoral cooperation and coordination
2) **causal link:** analysis of link among ecosystem conservation, climate change and development

[114] Secretariat of the Convention on Biological Diversity, *The Ecosystem Approach: CBD Guidelines* (Secretariat of the Convention on Biological Diversity, 2004) ('CBD Guidelines on Ecosystem Approach') 8–31. English Nature's report suggests a framework comprising 'seven areas of coherence' to make the EA workable. See Dan Laffoley et al, 'The Ecosystem Approach: Coherent Actions for Marine and Coastal Environments' (Report of English Nature to the UK Government, 2004) 21. Implementation of all 12 principles together is difficult and faces many challenges. See Kerry Waylen et al, 'The Need to Disentangle Key Concepts from Ecosystem-Approach Jargon' (2014) 28(5) *Conservation Biology* 1215, 1218.

3) **responses:** policy, legislation and programmes responses to meet those challenges

4) **process:** approaches are used to apply the ecosystem approach's principles in ecosystem management.

Secondly, the above four categories are given a score according to each document's merit:

- 0 = not mentioned
- 1 = identified but not elaborated
- 2 = proper identification or elaboration of the concept
- 3 = synchronisation with other ecosystem encompassing sectoral policies
- 4 = good practice.

Finally, although the assessment does not intend to be scientifically precise, it is a good indication[115] of the level of developing ecosystem-development focused policies and actions. The scores against each document are interpreted using the following method:

- 0–4 = little or no progress in the integration of the ecosystem approach's principle in policy or legislation
- 5–8 = the policy or legislation demonstrates a growing level of understanding of the value of the ecosystem approach
- 9–12 = refers to an intermediate stage where tools are developed to put the policy/legislation provisions in practice to meet the requirements of the ecosystem approach.

It is difficult to realise the implementation/enforcement challenges of policy and legislation from desktop analysis. The real challenges/limitations of the application of policies and laws can accurately be recognised through interacting with local stakeholders involved in the Sundarbans-related policy formation, implementation and management levels. Empirical data acquisition procedure, therefore, included respondents' responses (via interviews) addressing some of the challenges in a real-world scenario which may not be identified in desktop-based assessment. Thus, for reality check and maintaining accuracy of the findings and collection of empirical data was crucial for this research. This dual-tracked data examination process helped to maintain reliability of the data.

[115] Huq et al, above n 110, 394.

Figure 1.1 shows the roadmap of the thesis as to which research sub-questions are answered in each chapter and which methodology is used. The findings of the five research sub-questions helped to answer the main research question (see Section 1.3).

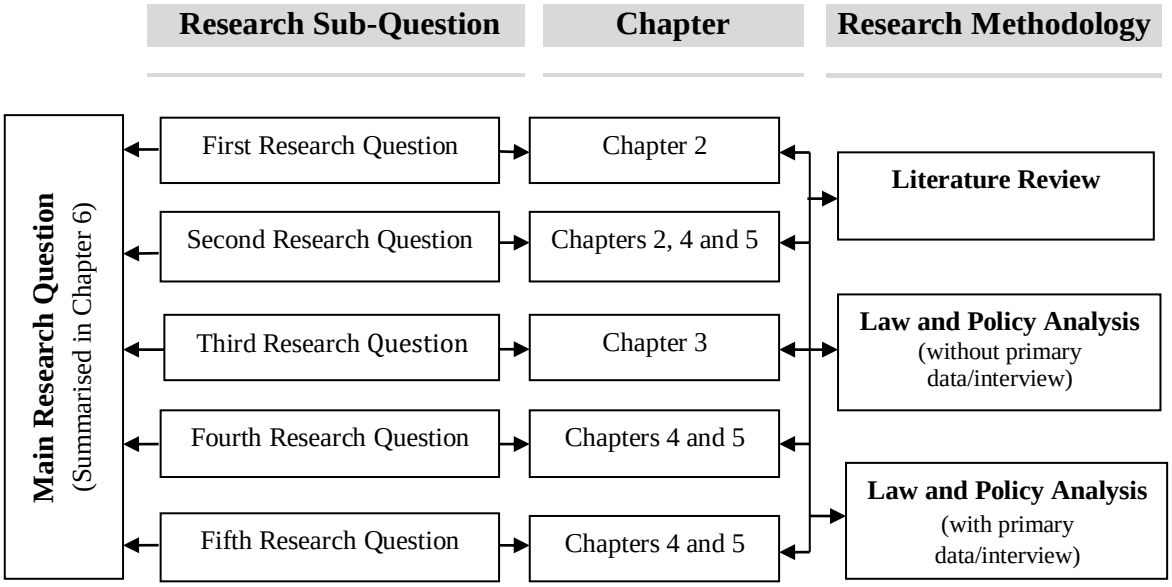

Figure 1.1: Research Methodology

To achieve the aims and objectives of this research, the research methods were applied to achieve an overview of several issues: first, testing the relevance of the ecosystem approach in conservation of the Sundarbans through evaluation of national policies and legislation, assessment of socio-economic dynamics and geo-ecological reality of the case area by extracting literature and interpreting the expert opinions (Chapter 2); second, identification of gaps in mangrove regulatory frameworks via literature review and crosschecking with the data collected from interviews (Chapters 2, 4 and 5); third, exploring the reflection of ecosystem approach principles within the biodiversity-related international legal frameworks via assessment of international policy documents and enactments (Chapter 3); fourth, investigation of the status of ecosystem approach principles in the legal frameworks through desktop assessment and primary data generated from interviews (Chapters 4 and 5); fifth, identification of the challenges in integration of the ecosystem approach principles in the policies and legislation (Chapters 4 and 5); lastly, provision of some recommendations for integrating the principles of the ecosystem approach in Bangladesh's legal frameworks to ensure sustainable conservation of the Sundarbans (Chapter 6).

1.9 Research Limitations

The ecosystem approach is a relatively new framework in the area of ecosystem conservation. There is not yet a strong empirical databank illustrating concrete examples of the ecosystem approach in action or a set of common indicators for assessing the conservation compatibility of this initiative. Thus, the available theory and evidence on the ecosystem-based conservation initiatives found in the conservation literature provides more of a conceptual guidance than a clear description of a set end-point. Some research, conducted in other ecological fields, including marine fisheries management, in which the effectiveness of the ecosystem approach is assessed are analysed to identify the best practices but may not provide appropriate guidance on what an ecosystem approach practically looks like in the field of mangrove management.

As previously mentioned, there is no separate policy that could extensively guide the Sundarbans. The ecosystem is currently regulated by several forest and environment-related policies and legislation. The multifarious human activities around the Sundarbans are managed by a cluster of sectoral policies with diverse purposes, including those related to fishery, aquaculture, land use planning and environment—these are beyond the scope of this research. However, as this research is a legal study, those areas are touched as required to address the research questions.

The third limitation of this research is the enormity of the key issues—ecosystem-based management, biodiversity conservation, development and climate change. As a concept, development demands a multidisciplinary study covering environmental science, economic, social science, politics, law and other aspects of knowledge relevant to studying ecosystem management. In the present thesis, only the relevance of the ecosystem approach and the extent to which the legal frameworks of Bangladesh introduced its principles in addressing ecosystem conservation–climate change–development in the Sundarbans are considered. Thus, all-inclusive answers to legal queries on the Sundarbans's conservation may not be provided.

The Sundarbans is a nature school and, due to mangrove's mysterious character, an important research theme to conservationists. Mangroves protect dependent communities from natural disasters by absorbing shocks and waves. Some important areas of research

such as climatic impact analysis on the Sundarbans or its dependent communities and the Sundarbans's inherent strategy for mitigation of and adaptation to climatic challenges are not be covered in this study. But climate change–focused legislative frameworks that have direct implications for the Sundarbans are assessed in answering the research questions.

1.10 Thesis Structure

The thesis comprises six chapters. Chapter 1 has provided an overview of the project. Starting with the background of the study, this chapter has focused on the aims and objectives of the research and research questions. It briefly narrated the conceptual framework, followed by the status of the Sundarbans's recognition in international legal regimes and the role of national legal instruments in the conservation of mangrove ecosystems, facilitating environmental justice and promotion of ecologically sustainable development in Bangladesh. Thereafter, it described how the present research fits with the problem and the gaps it fills. It then provided the methodology used to address the research questions and the limitations and structure of the thesis.

Chapter 2 sets up the conceptual framework of the thesis examining the ecosystem approach. It is an enquiry on the justification of the CBD-endorsed ecosystem approach in nature conservation, establishing environmental justice and promotion of sustainable development. Thus, the chapter deals with some foundational issues relating to mangrove conservation. The philosophical and theoretical basis of the ecosystem approach, the trends of paradigm shifts towards the ecosystem approach in global natural resources management and sustainable development and the debates on the ecosystem approach's application in complex ecosystem conservation are examined. Finally, the chapter investigates the relevance of the ecosystem approach in the conservation of the Sundarbans's ecosystem, facilitating environmental justice and ensuring ecologically sustainable development in Bangladesh.

Chapter 3 examines the biodiversity-related international legal instruments with a view to assess the reflection of ecosystem approach principles in international legal framework. It also explores the conservation strategies, guidelines and institutional initiatives suggested/provided by global, regional and intergovernmental frameworks for

mainstreaming the ecosystem approach for sustainable conservation and management of mangrove resources.

Chapter 4 analyses the policies regulating/influencing the Sundarbans to identify the extent of ecosystem approach principles' reflection in those instruments. It is evident that ecosystem, environment and climate change are cross-cutting issues that require multi-sectoral agencies to be dealt with effectively. The chapter examines the ecosystem approach principles' notions in the climate change legal framework and the national development plans of Bangladesh. The legislation for the implementation of the policies are also investigated with a view to assessing the status of ecosystem approach principles and identifying the challenges encountered in case of those principles' integration in legal frameworks and their implementation in the management of the Sundarbans's ecosystem.

Chapter 5 examines the current status (structure, responsibilities and capacities) of core institutions regulating the Sundarbans in applying the biodiversity–environment–climate change–related policies and legislation for the promotion of the ecosystem approach in management of the Sundarbans. Similarly, it assesses the roles and responsibilities of cross-sectoral state institutions and non-state actors in the implementation of policy guidelines and legislative provisions.

Chapter 6 presents research findings and several recommendations to integrate the ecosystem approach principles effectively into the legal frameworks of Bangladesh. It also identifies issues for further research and policy development as a way forward for the protection of the Sundarbans.

1.11 Conclusion

This research focuses on the relevant policy, legislative and institutional frameworks governing the Sundarbans. It examines the extent to which the ecosystem approach principles have been incorporated into the legal and policy frameworks of Bangladesh and their implementation challenges. It also critically examines the international legal instruments and mangrove management policies and legislation of other countries to gain an understanding of the best practices in this field. It argues that the Sundarbans is a complex ecosystem in terms of species diversity, subsistence provider, natural disaster protector and drivers of local economy, and that its conservation and management strategy

must adopt an integrated approach maintaining synergy between ecosystem conservation, resource management, livelihood improvement and climate change adaptation goals as a whole, rather than emphasising any particular sector. The ecosystem approach, which encompasses the tenets of environmental justice and sustainable development, can preserve the multidimensional features of the Sundarbans in a holistic way and promote ecologically sustainable development in Bangladesh.

The success of an integrated resource management initiative largely depends on the country-specific geo-ecological reality, socio-economic context, institutional capacity and strength of regulatory framework. Successful implementation of ecosystem approach principles is not possible unless those are strongly reflected in the legal and policy frameworks. Thus, this research argues for the placement of the ecosystem approach principles in relevant Bangladeshi legal frameworks and provides some suggestions for reform to enable the current legal, policy and institutional frameworks to become responsive, inclusive and capable of implementing the ecosystem approach in the conservation and management of the Sundarbans.

Chapter 2:
Ecosystem Approach: Genesis, Theoretical Basis and Relevance for Bangladesh*

2.1 Introduction

This chapter explores the genesis and theoretical basis for the ecosystem approach and its integration in international legal instruments, academic literature and state practices. It also investigates the relevance of the ecosystem approach in sustainable conservation of the Sundarbans. Some substantive arguments for adopting the ecosystem approach principles into the legal frameworks of Bangladesh are also demonstrated.

2.2 Ecosystem Approach: A Paradigm Shift

Historically, conservation strategies have focused on efforts to reserve places for nature and separate humans from other species.[1] This conservation model, particularly based on the United States' idea of a national park and the British concept of an intensively managed nature reserve, dominated twentieth-century conservation thinking. Conservationists and scholars termed this centralised mode of natural resource protection 'fortress conservation' or the 'fences and fines approach'.[2] This concept reflects the view that humans are external to the natural ecosystem, rather than a part of it, and that the best way to protect natural resources is to segregate human communities from the natural

* Parts of this chapter have been published as Shawkat Alam and Sheikh Noor Mohammad, 'Applying the Ecosystem Approach to the Sundarbans of Bangladesh: Possibilities and Challenges' (2018) 27(2) *RECIEL* 115–129 and as Shawkat Alam and Sheikh Noor Mohammad, 'The Precautionary Principle in Biodiversity and Natural Resource Management: Institutional and Policy Challenges for a Sustainable Future' (2018) 48(3–4) *Environmental Policy and Law* 187–203. Parts of this chapter have also been accepted for publication as Shawkat Alam and Sheikh Noor Mohammad, 'The Ecosystem Approach and Environmental Justice Nexus in Natural Resource Management' (2019) *Chinese Journal of Environmental Law* [in press].

[1] Richard H Grove, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1860* (Cambridge University Press 1996) 19.

[2] Roderick P Neumann, *Imposing Wilderness: Struggles over Livelihood and Nature Preservation in Africa* (University of California Press 1998) 4.

environment.[3] On the basis of 'fortress conservation', protected areas have been established with the exclusion of people from ecosystem management.

This human-excluded protectionist conservation approach was influential from the 1890s with the creation of national parks from colonial game reserves in sub-Saharan Africa and other colonial territories until the end of colonial rule in the 1960s.[4] But this conservation narrative no longer enjoys hegemony due to massive community conflicts over resource allocation and consecutive deprivation of indigenous communities' usufruct rights.[5] By the 1980s, it had been challenged by the 'community-based conservation' paradigm which stated the need to not exclude local people, either physically from protected areas or politically from conservation policy processes.

The core vision of the community conservation paradigm was to ensure the participation of multiple groups involved in and around protected areas. This approach gained impetus as an alternative strategy for the protection and sustainable use of natural resources against continued degradation in protected areas including national parks, wildlife sanctuaries and game reserves. It accentuated both the distributive and procedural issues—distribution of benefits and participation in decision-making. The integration of local needs into protected area planning was agreed to at the 3rd and 4th World Congress on National Parks and Protected Areas in 1982 and 1992 respectively.[6] Supporting such integration, the President of the IUCN in 1992 claimed that 'if local people do not support protected areas, then protected areas cannot last'.[7]

Between the 1980s and 1990s, globally conservation drives began to link to local development needs through 'integrated conservation and development projects' (ICDPs)

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[3] Estelle Victoria Jones et al, 'A Comparative Analysis of the Three Marine Governance Systems for Implementing the Convention on Biological Diversity (CBD)' (2016) 66 *Marine Policy* 30, 34.
[4] Jon Hutton, William M Adams and James C Murombedzi, 'Back to the Barriers? Changing Narratives in Biodiversity Conservation' (2005) 30(2) *Forum for Development Studies* 342.
[5] William Adams and David Hulme, 'Conservation and Communities: Changing Narratives, Policies and Practices in African Conservation' in David Hulme and Marshall Murphree (eds), *African Wildlife and Livelihoods: The Promise and Performance of Community Conservation* (James Currey, 2001) 9.
[6] Jeffrey A McNeely (ed), *Parks for Life: Report of the IVth World Congress on National Parks and Protected Areas* (IUCN, 1992).
[7] William M Adams et al, 'Biodiversity Conservation and the Eradication of Poverty' (2004) 306 *Science* 1146.

and ‘community-based natural resource management’.[8] Until the 1990s, human-inclusive conservation initiatives were limited to protected areas. Since then, ICDPs have been attempted globally on the conjecture that providing rural communities with alternative income opportunities would reduce poverty and improve conservation outcome.[9] However, in most of the cases they have achieved little; viable development has not been noticeable and biodiversity has not been efficiently preserved.[10] It is documented in the relevant researches that the top-down conservation agenda with inequitable distribution of benefits to local people, lack of understanding of landscapes dynamics, non-recognition of trade-offs between conservation and development, and less emphasis on policy renovation and institutional capacity enhancement are the main reasons for the failure of ICDPs.

Generally, the development process involved changes in indigenous land use into economically profitable land uses which in most cases affected the ecosystem. It has been realised that robust development is not possible without valuing the synergies between biodiversity, ecosystem services and development into policies and projects. Conservation scientists started thinking that protected areas were too small to meet the requirements of either ecosystem conservation or human welfare–oriented development. All of this insisted on reconsideration of the protected area paradigm. Proponents of this view emphasised that adopting a cohesive approach can strike a balance between conservation and development in and outside the ecosystem boundaries. This was reflected in the 5th World Parks Congress in 2003 which commenced with the theme ‘benefits beyond boundaries.’[11]

However, continuing environmental degradation, an unprecedented rate of species extinction and growing resource demands have meant that dedicated protected areas would not generate enough impact to secure ecosystem conservation or development enabling human welfare. The limits of the traditional conservation approach have required

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[8] Edmund Barrow and Marshall Murphree, ‘Community Conservation from Concept to Practice: A Practical Framework’ in David Hulme and Marshall Murphree (eds), *African Wildlife and Livelihoods: The Promise and Performance of Community Conservation* (James Currey, 2001) 24.

[9] M A Sanjayan, Sushan Shen and Malcom Jansen, *Experiences with Integrated Conservation and Development Projects in Asia* (World Bank, 1997) 1.

[10] Claire Kremen, Adina M Merenlender and Dennis D Murphy, ‘Ecological Monitoring: A Vital Need for Integrated Conservation and Development Programs in the Tropics’ (1994) 8(2) *Conservation Biology* 388; Thomas O McShane and Michael P Wells, ‘Integrated Conservation and Development?’ in Thomas O McShane and Michael P Wells (eds), *Getting Biodiversity Projects Work: Towards More Effective Conservation* (Colombia University Press, 2004) 4.

[11] Anne Marie DeRose, ‘Fifth IUCN World Parks Congress’ (2003) 5(1) *Special Buletion on Global Processes’* 1 <http://pdf.wri.org/wpc_specialbulletin.pdf>.

management interventions that seek to maintain ecosystem integrity.[12] The flaws of traditional conservation approaches—such as the refusal to recognise the role that both people and wildlife play in supporting ecosystem functions, failure to involve multiple interest groups in management, inappropriate division of costs and benefits arising from ecosystems and inadequate links between nature and culture—have instigated the need for a comprehensive approach. This approach requires an integration of ecological, economic and social factors with both the conservation and exploitation of ecosystem resources. From the early 1990s onwards, it was possible to discern a paradigm shift from a conservation approach that prioritised protected areas towards a broader vision of conservation which integrates biodiversity conservation and production sectors, including agriculture, forestry and fisheries.

At this juncture, the 1992 Rio Earth Summit gave rise to the CBD, which promoted resource management that would be both sustainable and equitable. The CBD aims to 'integrate … the conservation and sustainable use of biodiversity into relevant sectoral or cross-sectoral plans, programmes and policies'.[13] Accordingly, the CBD endorsed an ecosystem approach as a framework to enable the convention's triple mandates: conservation, sustainable use and the equitable sharing of benefits arising from genetic resources. The widely used definition of the ecosystem approach is provided by the CBD:

> 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. Application of the ecosystem approach will help to reach a balance of the three objectives of the Convention. An ecosystem approach is based on the application of appropriate scientific methodologies focused on levels of biological organization, which encompasses the essential structures, processes, functions and interactions among organisms and their environment.[14]

Initially, the ecosystem approach was recognised to manage biological resources. Over time, it has been documented as an important tool for supporting sustainable development and poverty alleviation, particularly with its inclusion in the Plan of Implementation of the 2002 Johannesburg Declaration on Sustainable Development.[15] Nevertheless, the ecosystem approach does not impede other concurrent conservation approaches such as

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[12] Carsten H Richter, Jianchu Xu and Bruce A Wilcox, 'Opportunities and Challenges of the Ecosystem Approach' (2015) 67 *Futures* 40.
[13] CBD, art 6(b).
[14] CBD, 'Decision V/6, Ecosystem Approach', UN Doc UNEP/CBD/COP/5/23 (22 June 2000) [A].
[15] CBD Guidelines on Ecosystem Approach, Forward 2.

sustainable forest management, biosphere reserve and protected areas management. Rather, it emphasises integrating those in line with the principles of the ecosystem approach. Since then, the approach has been widely used, from natural resources management to climate change adaptation.

It is claimed that the ecosystem approach has been adopted to address the shortcomings of previous conservation approaches with extensive debate among hundreds of technical experts, academics, non-government organisation (NGO) activists and policy analysts at international workshops in Malawi, Germany, Scotland, London, Costa Rica and Norway. But it has faced strong opposition in terms of its vision, principles and implementation mechanisms. Following a series of meetings of the CBD parties, 12 principles, known as 'the Malawi Principles' (see Appendix D), and five operating guidelines (see Appendix E) were formally endorsed in 2000 by the 5th CBD COP, held in Nairobi (Decision V/6). These principles and guidelines subsequently operated as a guide for the implementation of the ecosystem approach.

The foundation of the ecosystem approach is laid out in the CBD; over time it becomes a strategic approach to implementing the specific objectives set forth into numerous international instruments on the biodiversity, marine and coastal environment, including the Ramsar Convention,[16] the CITES,[17] the *United Nations Convention on the Conservation of Migratory Species of Wild Animals*,[18] the *United Nations Convention on the Law of the Sea 1982*,[19] and the World Summit on Sustainable Development 2002,[20] and the process is still ongoing.[21] The adoption of the ecosystem approach as a guiding principle has progressed through United Nations agencies such as the United Nations Development Programme (UNDP), Food and Agriculture Organization of the United Nations (FAO) and UNESCO that are involved in sectoral development activities

[16] *Convention on Wetlands of International Importance especially as Waterfowl Habitat*, opened for signature 2 February 1971, 996 UNTS 245 (entered into force 21 December 1975) ('Ramsar Convention').
[17] *Convention on International Trade in Endangered Species of Wild Fauna and Flora*, opened for signature 3 March 1973, 993 UNTS 243 (entered into force 1 July 1975) ('CITES').
[18] *United Nations Convention on the Conservation of Migratory Species of Wild Animals*, opened for signature 23 June 1979, 19 I.L.M. 15, 1651 U.N.T.S. 28395 (entered into force 11 January 1983) ('CMS').
[19] *United Nations Convention on the Law of the Sea 1982*, opened for signature 10 December 1982, 1833 UNTS 3 (entered into force 16 November 1994) ('UNCLOS').
[20] World Summit on Sustainable Development 2002, Report of World Summit on Sustainable Development, Plan of Implementation,45th Sess., I 67(b), U.N. Doc A/CONF.199/20 (2002).
[21] Serge M Garcia and Kevern L Cochrane, 'Ecosystem Approach to Fisheries: A Review of Implementation Guidelines' (2005) 62 *ICES Journal of Marine Science* 311.

including biodiversity conservation. A number of international development funding agencies including the Global Environment Facility (GEF), World Bank, European Commission and USAID also support a range of programmes for integrating the objectives of the CBD and adopting the ecosystem approach.[22] Many researchers termed the ecosystem approach as a 'paradigm shift' from single species approach to an integrated approach in the management of natural environment and its constituent resources.[23] Some critical factors work as catalysts to the evolution of the ecosystem approach (see below).

The need for an integrated approach became stronger for conserving the ecosystem in a balanced way. After long experimentation, the mode for implementation of wideranging ecosystem conservation has been framed considering the structure and function of the ecosystem involved; the social, cultural and institutional norms of the society to which the resource belongs; and understanding of the relationship between humans and their environment. Meanwhile, the CBD developed the ecosystem approach, emphasising the integration of the entire ecosystem (i.e., land, water and resources) against the long-embedded single species approach. A similar assertion for integrated management is reflected in the Millennium Ecosystem Assessment (2005) and the IPCC Fourth Assessment Report (2007).[24]

Globally, development-induced interventions deprived indigenous communities' of the enjoyment of their usufruct rights over forestlands. Most of the conservation approaches evolved in the twentieth century paid less attention to recognising the traditional knowledge as integral to achieving global goals on sustainable development.[25] But the right to customary use of biodiversity is protected in art 8(j) of the CBD, which states inter alia,

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[22] Volkmar Hartje, Axel Klaphake and Rainer Schliep, *The International Debate on the Ecosystem Approach - Critical Review: International Actors Obstacles and Challenges* (Bundesamt für Naturschutz, 2003) 20.

[23] David Waltner-Toews, James J Kay and Nina-Marie E Lister, *The Ecosystem Approach: Complexity, Uncertainty, and Managing for Sustainability* (Columbia University Press, 2008) 390; John H Hartig, Michael A Zarull and Neely L Law, 'An Ecosystem Approach to Great Lakes Management: Practical Steps' (1998) 24(3) *Journal of Great Lakes Research* 739; Sue Kidd, Andy Plater and Chris Frid (eds), *The Ecosystem Approach to Marine Planning and Management* (Earthscan, 2011) 79.

[24] IPCC, 'Climate Change 2007: The Physical Science Basis: Summary for Policymakers' (IPCC WGI Fourth Assessment Report, 2007) 674; Millennium Ecosystem Assessment, *Ecosystems and Human Well-being: Synthesis* (Island Press, 2005) 20, 92, 131.

[25] Marie Claire Cordonier Segger and Freedom-Kai Phillips, 'Indigenous Traditional Knowledge for Sustainable Development: The Biodiversity Convention and Plant Treaty Regimes' (2015) 20 *Journal of Forestry Research* 430, 431.

> each contracting Party shall, as far as possible and as appropriate … respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity[26]

It is also integrated into the CBD's framework for implementation (i.e. the ecosystem approach), where the emphasis is on developing an appropriate mechanism to document knowledge based on indigenous and local practices. This reflects an increasing recognition of indigenous communities' contribution towards maintaining the biodiversity and embeds notions of 'distributional injustice' for marginalised groups into international environmental legal instruments.

Consequently, the eco-centric protectionist paradigm was replaced by a concept that considered that without improving the livelihoods of ecosystem resource users, viable conservation cannot be possible.[27] The intrinsic tie between biodiversity conservation/environmental protection and development received attention in the Rio Earth Summit and was the key strategy behind the development of international policy instruments like the Stockholm Declaration[28] and the 'Brundtland Report'.[29] The CBD encourages states to address biodiversity conservation and development together. It also presented the ecosystem approach to put this conservation–development agenda into practice. Accordingly, this agenda has been incorporated in international policy framework. Between the 1992 Rio Earth Summit and the 2002 Johannesburg World Summit on Sustainable Development, the 'sustainable development' paradigm emerged and was extended to make explicit reference to justice, equity and elimination of poverty. It was agreed that biodiversity conservation must be integrated into strategies for economic development and are essential elements of sustainable livelihoods at local scale.[30] This was reaffirmed at the 12th COP to the CBD in Decision XII/5 on Biodiversity

[26] CBD art 8(j) In-situ Conservation 6.
[27] Koen Kusters et al, 'Balancing Development and Conservation? An Assessment of Livelihood and Environmental Outcomes of Nontimber Product Trade in Asia, Africa, and Latin America' (2006) 11(2) *Ecology and Society* 20.
[28] Stockholm Declaration of the United Nations Conference on the Human Environment, 16 June 1972, UN Doc. A/CONF.48/14 (1973).
[29] GH Brundtland, 'Our Common Future - Call for Action' (1987) 14(4) *Environmental Conservation* 291-294.
[30] Adams et al, above n 7, 1146.

for poverty eradication and sustainable development and the 2014 Gangwon Declaration on Biodiversity for Sustainable Development.[31]

The conservation–development interaction is reflected in the United Nations (UN) Sustainable Development Goals (SDGs) in two biodiversity-related standalone goals (on marine and terrestrial biodiversity). To make development sustainable, the 2012 United Nations Conference on Sustainable Development acknowledged a 'green economy in the context of sustainable development and poverty alleviation' as one of its main themes which enables economic growth linking environmental quality and social inclusiveness.[32] The conservation–development notion has now been widely considered in biodiversity conservation and development arena since its inclusion in the ecosystem approach.

As the ecosystem approach evolved, ecologists became concerned with the question of how the CBD's triple objectives could be brought together in the real world, with different stakeholders possessing competing interests in resource management. The approach proposes that sectoral institutions work under an umbrella framework to avoid inter-agency conflicts in the implementation of a project. For example, the Intergovernmental Panel on Forests and the UN Forum on Forests recommended the coordination of forest policy with other sectoral policies to achieve the long-term goal of ecosystem management.[33] Under the ecosystem approach, ecosystem management aims to be integrated, cross-sectoral, science-based, decentralised and adaptive, with the 12 Malawi Principles reflecting these goals. Some scholars including Fee et al suggest that it may not be feasible to implement the Malawi Principles at every site,[34] and Maltby argues that the

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[31] Gangwon Declaration on Biodiversity for Sustainable Development, the twelfth meeting of the Conference of the Parties to the Convention on Biological Diversity, COP12/MOP7/MOP1, Pyeongchang, Korea, 2014.

[32] Shawkat Alam and Jona Razzaque, 'Sustainable Development versus Green Economy: The Way Forward?' in Shawkat Alam et al (eds), *International Environmental Law and the Global South* (Cambridge University Press, 2015) 610.

[33] IPF (Intergovernmental Panel on Forests), 'Report of the Ad Hoc Intergovernmental Panel on Forests on its Fourth Session under United Nations Commission on Sustainable Development', UN Doc E/CN.17/1997/12 (20 March 1997); UNFF (United Nations Forum on Forests), 'Report of the Secretary-General on National Forest Programmes under Economic and Social Council of the UN', UN Doc E/CN.18/2002/4 (2 August 2001).

[34] Charlie M Shackleton et al, 'Reflecting on the Next Generation of Models for Community-based Natural Resources Management' (2010) 37(1) *Environmental Conservation* 1; Eric Fee et al, 'Stuck in the Clouds: Bringing the CBD's Ecosystem Approach for Conservation Management Down to Earth in Canada and Germany' (2009) 17(4) *Journal for Nature Conservation* 212; Kirsty Blackstock et al, 'Linking Process to Outcomes - Internal and External Criteria for a Stakeholder Involvement in River Basin Management Planning' (2012) 77 *Ecological Economics* 113.

principles are merely a compilation of contemporary resource management approaches.[35] Conversely, Waylen et al claims that the principles connect the latest concepts about how to manage ecological processes with the need to integrate different forms of knowledge in management.[36] The present thesis argues that Waylen et al's view is more tenable on the grounds discussed in Section 2.3 which differentiate the ecosystem approach from other conservation approaches.

2.3 Features of Ecosystem Approach

The ecosystem approach is a landmark strategy of the CBD and other biodiversity-related conventions. It has evolved with the investigation of multidimensional notions of environmental principles and sustainable development, gradually became an essential element of international environmental law (IEL)[37] and appeared as a 'new paradigm' in environmental management by providing a policy framework for diverse areas of natural resource management.[38] Its groundbreaking features are discussed in the following sections.

2.3.1 Integration of Entire Ecosystem Components

The ecosystem approach aims to formulate, review and implement a regulatory framework with a monitoring and assessment system, and utilises codes of practices and other regulatory instruments to avoid using ecosystems beyond their permissible limits (Malawi Principles 6 and 7). If the current monitoring system fails to obtain appropriate responses from the ecosystem, a more appropriately scaled (spatial or temporal, short-term or long-term) monitoring programme should be devised by using adaptive management (Principles 8 and 9). The ecosystem approach also encourages the integration of all functional ecosystem components, including ecological structures, processes and biophysical attributes (hydrological system, pollination system, habitat and food web) and functions (ecosystem service) in undertaking any conservation programme (Principle 5).

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[35] Edward Maltby, 'Ecosystem Approach: From Principle to Practice' (Paper presented at the International Conference on Ecosystem Service and Sustainable Watershed Management in North China, Beijing, PR China, 23–25 August 2000).

[36] Kerry Waylen et al, 'The Need to Disentangle Key Concepts from Ecosystem-Approach Jargon' (2014) 28(5) *Conservation Biology* 1215, 1218.

[37] C Max Finlayson et al, 'The Ramsar Convention and Ecosystem-based Approaches to the Wise Use and Sustainable Development of Wetlands' (2011) 14(3–4) *Journal of International Wildlife Law & Policy* 176.

[38] Vito De Lucia, 'Competing Narratives and Complex Genealogies: The Ecosystem Approach in International Environmental Law' (2015) 27 *Journal of Environmental Law* 91, 92.

The ecosystem approach is designed to conserve total ecosystem to reach a balance between ecological and socio-economic needs. To maintain equilibrium between the 'socio-economic needs of humanity on ecosystem' and 'natural phenomena and environmental change', Fee et al urged implementation of the ecosystem approach for the broader acceptance of its principles.[39] Noting the intensity of climatic impact on ecosystems, Hannah et al argues that future conservation targets should be to maintain functioning landscapes by protecting the whole ecosystem instead of conserving single species or protected areas.[40] The above analysis reveals that the magnitude of biodiversity loss, coupled with a need to address large-scale problems, lead resource managers to increasingly focus on ecosystem-oriented management.

2.3.2 Conservation and Sustainable Use

Two competing narratives have prompted the conservation–development nexus within the ecosystem approach: anthropocentrism and its imbrication with capitalism, and eco-centrism and its counter-hegemonic narratives premised on the intrinsic value of nature. The proponents of anthropocentrism place humanity in the centre and focus on the monetary value of ecosystem services and society's moral, aesthetic and scientific engagement with ecosystems, whereas followers of eco-centrism emphasises the quantifying of 'ecological risks' and blames the conservation–development narratives for the rapid deterioration of ecosystems.[41] It is argued that the environment and development cannot be advanced disjointedly with global acceptance of 'sustainable development'. Brunnée and Toope observed that anthropocentrism may not be an impediment to sustainable development so long as human concerns are pursued within ecological limits.[42] This global trend is acknowledged in the ecosystem approach by promoting 'sustainable use', which recognises that 'humans, with their cultural diversity, are an integral component of many ecosystems', while acknowledging a balance between conservation and extraction (Principles 1 and 10).

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[39] Fee et al, above n 34, 213.
[40] Lee Hannah, Guy F Midgley and D Millar, 'Climate Change-integrated Conservation Strategies' (2002) 11(6) *Global Ecology and Biogeography* 485.
[41] Thomas Dietz and Paul C Stern, 'Science, Values, and Biodiversity' (1998) 48(6) *BioScience* 441.
[42] Jutta Brunnée and Stephen J Toope, 'Environmental Security and Freshwater Resources: A Case for International Ecosystem Law' (1994) 5 *Yearbook of International Environmental Law* 41.

2.3.3 Access and Equitable Benefit Sharing

As discussed in the Global Biodiversity Outlook 3, the international community's failure to reducing the rate of biodiversity loss depends on addressing its underlying causes, including the failure to develop an effective benefit-sharing mechanism.[43] To this end, the CBD COP attempts to promote benefit sharing through its procedural requirements and through promoting their adoption in the domestic regulatory frameworks of its parties to ensure that any benefits from conservation initiatives are received by local communities. In accordance with Malawi Principle 4, equitable distribution of ecosystem benefits is advised to ensure those who control use of the land maintain natural ecosystems.[44] Its need is further emphasised in the Operational Guidance 2, titled 'enhance benefit sharing',[45] thereby promoting distributive justice among key stakeholders. However, the effective application of a benefit-sharing mechanism requires a range of measures, including capacity building, especially at the level of local communities managing biological diversity in ecosystems; proper valuation of ecosystem goods and services resources; and the removal of perverse incentives that devalue ecosystem resources and replacing those with local incentives where appropriate.[46]

Another key aspect of benefit sharing is the positive rewards this practice provides to local communities for sharing their traditional knowledge. Under CBD art 1, benefit sharing embodies an inter-state approach to achieving sustainable development and equity.[47] It also envisages a qualitatively different concept of benefit sharing as a state-to-community contribution for attaining such a target.[48] CBD art 8(j) calls on parties to

> encourage the equitable sharing of the benefits arising from the utilization of the knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity.[49]

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[43] Secretariat of the Convention on Biological Diversity, 'Global Biodiversity Outlook 3' (Secretariat of the Convention on Biological Diversity, 2010) 9.
[44] CBD Guidelines on Ecosystem Approach, 14 (Rationale of Principle 4).
[45] Ibid 32 (Operational Guidance for Application of the Ecosystem Approach).
[46] Ibid.
[47] Francesco Francioni, 'Equity in International Law' in Rüdiger Wolfrum (ed), *Max Planck Encyclopedia of Public International Law* (Oxford University Press, 2010) 632.
[48] Elisa Morgera and Elsa Tsioumani, 'The Evolution of Benefit-sharing: Linking Biodiversity and Community Livelihoods' (2010) 19(2) *RECIEL* 162.
[49] CBD art 8 (j).

In this case, benefit sharing envisions the establishment of a more equitable relationship between the community and the state on the basis of national legislation. Interestingly, the implications of art 8(j) have been discussed mostly in the context of the use of genetic resources and associated traditional knowledge, and the state's contribution to indigenous and local communities' livelihoods. It is evident that significant developments under the CBD related to the conservation and sustainable use of biodiversity have made recourse to the concept of benefit sharing without any connection to access to the genetic resources. These developments embody specific applications of state-to-community benefit sharing in achieving sustainable conservation of biodiversity.

Benefit sharing, under a state-to-community regime, can be seen as a substantive tool for reinforcing the general principles of public participation in environmental decision-making, and for ensuring, in particular, indigenous communities' participation in ecosystem management.[50] Morgera and Tsioumani have found explicit references to benefit sharing in the CBD COP decisions that go further than art 8(j) in expecting states to involve communities in the governance of biodiversity and to share revenues derived from conservation.[51] There are few examples of national legislation that provide for the participation of communities in the conservation and sustainable use of biodiversity and for their direct benefit from that participation. In the Philippines, the application of buffer zone management in protected areas provides regulated benefits to local communities, which help them to avoid encroachment of the protected area by development.[52] In the Republic of the Congo, local communities must be involved in the protected area planning process and must benefit from revenues generated by protected areas.[53] In Vietnam, households lawfully living in conservation zones have the right to benefit from profits earned from ecosystem services.[54] In South Africa, the authority may enter into an agreement with local communities around a protected area, which can provide for

[50] Gregory F Maggio, 'Recognizing the Vital Role of Local Communities in International Legal Instruments for Conserving Biodiversity' (1997) 16 *UCLA Journal of Environmental Law and Policy* 181.
[51] Morgera and Tsioumani, above n 39, 162.
[52] *The Philippines Department of Environment and Natural Resources prescribed Guidelines on the Establishment and Management of Buffer Zones for Protected Areas, Memorandum Circular No 16* (1993) ss 3–6.
[53] *The Republic of the Congo's Wildlife Law 2008* (Law No 37-2008) ss 20–22.
[54] *Vietnam's Biodiversity Law 2008* (Law No 20/2008/HQ12) ss 28–31.

delegation of powers, benefit sharing, development of local management capacity and knowledge exchange.[55]

2.3.4 Decentralisation of Ecosystem Management

The ecosystem approach places significant value on the rights and interests of indigenous people and local communities by promoting the decentralisation of resource management. This requires an enabling regulatory framework that would allow stakeholders the opportunity to be involved in environmental conservation and resource management and to assume the responsibility and the capacity to carry out appropriate management decisions and actions.

The ecosystem approach entails a consensus-building process through which stakeholders' knowledge and contribution will be properly reflected. This process is underscored by Principle 2 of the Malawi Principles, which promotes a highly decentralised governance model where decisions are devolved to the local level. The rationale of Principle 2 is that the closer management is to the ecosystem, the greater the opportunity to generate local responsibility, a sense of community ownership and use of local knowledge. Increasing local participation facilitates the decision-making process being informed by highly specialised knowledge and the subsequent development of effective ecosystem management strategies. The ecosystem approach, via Principle 11, suggests undertaking any initiative as to the valuation of traditional knowledge in line with CBD art 8(j), which articulates the intention to:

> respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices.[56]

Thus, the ecosystem approach emphasises the development of appropriate mechanisms so that all pertinent information is shared among all stakeholders. Further, as most problems of biodiversity management are complex, greater emphasis is placed on enhancing coordination to solve complex ecosystem management problems (Principle 12). However,

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[55] *South Africa's National Environmental Management Protected Areas Act 2003* (Law No 57 of 2003) s 42.
[56] CBD art 8(j).

implementing these measures and strategies demands considerable investment of time and resources if the capacity of the parties involved is to be improved.

2.3.5 Adaptive Management

Traditional management approaches based on a static understanding of ecosystems fail to address complex policy problems where multiple factors contribute to a decline in social, environmental and economic performance.[57] Considering this, the necessity for inclusive decision-making with strong links between managers and stakeholders, and the familiarity with the latest scientific knowledge on the part of both, is crucial. The ecosystem approach emphasises adaptive management for achieving a balance between the values of expertise and scientific knowledge on the one hand, and social consensus and civic empowerment on the other.

Adaptive management is important for effective ecosystem management. It allows ecosystem managers to learn from mistakes and incorporate new knowledge in future decision-making processes to avoid previous setbacks. According to Grumbine and Tarlock, adaptive management has the goal of making practitioners responsive to change through learning.[58] The ecosystem approach is best suited to the adoption of such a flexible process in circumstances where long-term, goal-oriented development programmes will be devised to address intergenerational equity, while also simultaneously taking into account immediate and critical needs. The ecosystem approach calls for enhanced scientific information on ecosystems to improve the basis for management.

The need for adaptive management is particularly acute in the context of climate change, with the ecosystem approach being the most appropriate for addressing its wideranging impacts. Noting the intensity of increasing climate impacts on ecosystems, Hannah et al argues that future conservation targets should be directed at maintaining functioning landscapes by protecting the whole ecosystem instead of conserving a single species or protected areas.[59]

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[57] Crawford Stanley Holling, 'Surprise for Science, Resilience for Ecosystems, and Incentives for People' (1996) 6(3) *Ecological Applications* 733.
[58] Dan A Tarlock, 'Ecosystems' in Daniel Bodansky, Jutta Brunnée and Ellen Hey (eds), *Oxford Handbook of International Environmental Law* (Oxford University Press 2007) 581; R Edward Grumbine, 'Reflections on What is Ecosystem Management?' (1997) 11 *Conservation Biology* 44.
[59] Hannah, Midgley and Millar, above n 40, 485.

2.3.6 Inter-Sectoral Coordination

As ecosystem and resource management policy problems involve various stakeholders and supporting sectors (including agriculture, land, water resources, fisheries and extractive industries), inter-sectoral coordination is key. The ecosystem approach aims to promote coordination among state and non-state actors by increasing the communication and participation of non-state actors throughout the decision-making process and promoting the use of bodies such as inter-ministerial committees and networks of governments, civil society and private sector for sharing information and project implementation.

The uniqueness of the ecosystem approach in relation to inter-sectoral coordination is revealed in a report by the James Hutton Institute,[60] which is based on a review of 24 ecosystem management projects across the United Kingdom. The report notes the potential application of increased coordination in natural resource management in the country. However, these efforts were hampered by several challenges, including the need to generate trust between partners to ensure the participation of all stakeholders and the development of realistic benefit-sharing mechanisms. Taylor et al argues that the ecosystem approach sharply differs from previous management paradigms, especially in the event of recognition of human interaction with the nature.[61] Knight and Meffe[62] claimed that the ecosystem approach has led to change in agency attitude through encouraging partnerships, contrasting sharply with the linear command-and-control approach that encouraged hierarchical decision-making. In light of the above positive narratives and potential components of the ecosystem approach, the next section examines the relevance of those features/principles in the conservation and management paradigm of the Sundarbans's ecosystem.

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[60] Kerry Waylen, Kirsty Blackstock and Kristy Holstead, 'Exploring Experiences of the Ecosystem Approach' (Report, The James Hutton Institute, 2013).
[61] William W Taylor et al, 'Educating Fisheries Professionals Using a Watershed Approach to Emphasize the Ecosystem Paradigm' (1995) 20(9) *Fisheries* 6.
[62] Richard L Knight and Gary K Meffe, 'Ecosystem Management – Agency Liberation from Command and Control' (1997) 25(3) *Wildlife Society Bulletin* 676, 677.

2.4 Relevance of the Ecosystem Approach in the Conservation of the Sundarbans's Ecosystem

The Sundarbans is a biologically rich ecosystem which provides for the welfare of humanity. Declared a reserved forest in the 1870s, the Sundarbans constitutes 52 per cent of the forestland of Bangladesh and contributes 41 per cent of total forest revenue.[63] Since being gazetted as a reserved forest, there has been no settlement inside the Sundarbans and the forestland has not been subject to encroachment. But the dependency of the population living around the forest has been an important aspect of the Sundarbans. The impact of climate change on the Sundarbans has gradually become evident. Thus, integrated conservation approaches are required for the survival of millions of FDCs and the long-term ecological sustainability of Bangladesh. As a party to the CBD, Bangladesh has an obligation to incorporate the principles of the ecosystem approach into its regulatory instruments for ensuring the Sundarbans's sustainability.

This thesis will now turn to determining the relevancy of the CBD and its ecosystem approach towards the management of the Sundarbans in Bangladesh.

2.4.1 Integration of Entire Ecosystem Components

The Sundarbans is a unique ecosystem with multidimensional biophysical attributes.[64] To preserve the rich mangrove wetland resources, the Government of Bangladesh has undertaken different policy initiatives.[65] The Integrated Forest Management Plan (IFMP) for the Sundarbans Reserve Forest 1998 was developed to ensure timber and non-timber

[63] IRMP for the Sundarbans, 4.

[64] The hydrology of the Sundarbans is quite complex. It is the creation of a tidal estuary where the balance of salinity, which arises from the sea, is naturally maintained through its dilution by the flow of freshwater from the Ganges-Brahmaputra induced inland rivers. The physiological structure of this mangrove wetland is susceptible to freshwater flow. Since the construction of Farakka barrage in India in 1974, the Ganges' freshwater flow into the Sundarbans delta has dropped drastically, resulting in gradual intrusion of salinity which severely affects species' growth. See Swapan Kumar Sarker et al, 'Are We Failing to Protect Threatened Mangroves in the Sundarbans World Heritage Ecosystem?' (2016) 6 *Scientific Reports* 1.

[65] For example, extraction of vegetation or wildlife is prohibited in the UNESCO-declared World Heritage areas of the Sundarbans. See also Michael Getzner and Muhammad Shariful Islam, 'Natural Resources, Livelihoods, and Reserve Management: A Case Study from Sundarbans Mangrove Forests, Bangladesh' (2013) 8(1) *Int. J. Sus. Dev. Plann* 76. The DoE declared a 10-km wide area surrounding the northern and eastern boundaries of the Sundarbans Reserved Forest outside the World Heritage zone as an ECA in 2010, aiming to provide sustainable conservation of the Sundarbans Reserved Forest. For more discussion see Md Shams Uddin et al, 'Climate Change Impacts on the Sundarbans Mangrove Ecosystem Services and Dependent Livelihoods in Bangladesh' (2013) 2(2) *Asian Journal of Conservation Biology* 154. A moratorium on timber extraction has been imposed in 2007. Extraction of NTFPs and fishing in 18 streams inside the Sundarbans (but not outside the three wildlife sanctuaries) has been restricted.

forest products (NTFP) are being maintained; however, a systematic monitoring framework has not yet been developed to ensure that resources are used within their sustainable limits.[66] The basis of the IFMP does not adequately consider the unique biophysical attributes of the Sundarbans or the ecosystem services that it provides, which form the basis of different economic and social activities in the surrounding communities. For example, due to lack of consideration of the complex hydrological structures of the Sundarbans in the SBCP, no discernible strategy for improving aquatic species conservation was evidenced.[67] Thus, to protect the biophysical features of the Sundarbans from the impact of climate change, reforms to the current methods of environmental management for the area are needed.

In relation to adaptive management and creating stronger decision-making processes informed by continued monitoring, Bangladesh's conservation policy still does not include this important goal as a strategic objective in any of its conservation projects. Critically, the CBD COP has advocated the use of adaptive management as a goal in and of itself, as expressed through Malawi Principle 9. In the IRMP for the Sundarbans, there is an emphasis on considering the entire ecosystem in conservation planning in Goal 1: 'protect, restore, sustain and enhance the biodiversity of the Sundarbans Reserve Forest and its interface landscape'.[68] However, the pledge to establish an effective monitoring system is not strongly mentioned elsewhere in the IRMP. There remains ample scope for the IRMP to incorporate adaptive management planning within its strategic objectives, by promoting stronger monitoring and feedback with a view to creating more informed decision-making within the context of the uncertainty created by anthropogenic climate change.

2.4.2 Conservation and Sustainable Use

The Sundarbans contains around 44 per cent of the global mangrove floral species.[69] Sundari (*Heritiera fomes*), the dominant species of the Sundarbans, is considered

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[66] J A Canonizado and M A Hossain, *Integrated Forest Management Plan for the Sundarbans Reserved Forest (Final Draft)* (Mandala Agricultural Development Corporation and Forest Department, Ministry of Environment and Forest, Bangladesh, 1998) 7-8.

[67] Jakir Hossain and Kushal Roy, *Deserting the Sundarbans: Local People's Perspective on ADB-GEF-Netherlands Funded Sundarbans Biodiversity Conservation Project* (Unnayan Onneshan – The Innovators, 2007) 34.

[68] IRMP for the Sundarbans, vi.

[69] A Karim, 'Vegetation' in Zakir Hussain and Gayatri Acharya (eds), *Mangroves of the Sundarbans - Volume 2: Bangladesh* (IUCN, 1994) 43.

threatened due to top dying diseases. Threats are also evident in the survival of faunal species. At least six spectacular mammal species, including the Javanese rhinoceros (*Rhinoceros sondaicus*), are now locally extinct. Due to habitat shrinkage, the Bengal tiger (*Panthera tigirs*) is listed in the CITES as endangered, while the Ganges water dolphin (*Platanista gangetica*), saltwater crocodile (*Crocodylus porosus*), and rock python (*Python morulus*) appear to be limited.[70] Human interventions in the form of excessive resource exploitation, illegal trapping and lack of appropriate regulations for resource management have contributed to such wildlife population degradation.[71] The ecosystem approach acknowledges the importance of human uses of biological resources, but emphasises striking a balance between conservation and extraction (Principles 1 and 10).

Since its insertion in 2011 under 'Fundamental Principles of State Policy' of the Constitution of Bangladesh, biodiversity conservation and sustainable use of resources is an obligation of the entire Bangladeshi Government in any development related projects. Under the heading of 'protection and improvement of environment and biodiversity', art 18A of the Constitution states that '[t]he state shall endeavor to protect and improve the environment and preserve and safeguard the natural resources, biodiversity, wetlands, forests and wild life for the present and future citizens'.[72] Pursuant to this constitutional obligation, and in the light of the CBD's Aichi Biodiversity Targets, the NBSAP emphasises the incorporation of biodiversity conservation and sustainable use issues in the sectoral and cross-sectoral policies of all the government's various development ministries.[73]

Accordingly, the Government of Bangladesh has undertaken some conservation initiatives through a single-species approach. However, this conservation strategy largely fails to address the systemic deterioration of habitats which support species in the Sundarbans and fails to address the economic factors driving this deterioration. As the communities surrounding the Sundarbans are highly dependent on forest products, a holistic management mechanism that will maintain a balance between the conservation values of the ecosystem approach and use of biological diversity within and outside the protected

[70] IRMP for the Sundarbans, 43.
[71] S M A Rashid, A Khan and A W Akonda, 'Fauna' in Zakir Hussain and Gayatri Acharya (eds), *Mangroves of the Sundarbans - Volume 2: Bangladesh* (IUCN, 1994) 115.
[72] *The Constitution of the People's Republic of Bangladesh* (1972) art 18A.
[73] NBSAP 40.

areas needs to be implemented (Principle 10). Likewise, the integrated conservation and sustainable use objectives should be incorporated into the relevant regulatory instruments with appropriate spatial and temporal scales (space, time and quality) (Principle 7). In support of the principle of 'sustainable use', provisions were inserted into the *Bangladesh Biological Diversity Act 2017* requiring the control or reduction of any excessive extraction of ecosystem resources that could lead to degradation of the biodiversity of a particular area. Sustainable use has also been stated in the vision statement of the IRMP for the Sundarbans. However, the IRMP fails to translate this vision statement into tangible rights and responsibilities for the key stakeholders who continue to use the Sundarbans for its ecosystem services.

2.4.3 Access and Equitable Benefit Sharing

The inclusion of benefit sharing in the Malawi Principles places an increased obligation on states such as Bangladesh to ensure that this relationship is fostered through the legislative frameworks governing conservation of vulnerable areas such as the Sundarbans. However, the IRMP for the Sundarbans and the *Wetland Policy 1998* remain silent on the benefit-sharing mechanisms available for local communities in circumstances where they share their traditional knowledge or undertake efforts to preserve biological diversity within the Sundarbans. The economic valuation of the services provided by the major ecosystems such as the Sundarbans, the wetlands and the hill forests has been assessed in the NBSAP, with the contribution marked equivalent to 9.2–33.3 per cent of GDP, indicating the significant contribution of the ecosystem to the wellbeing of the country's citizens. The NBSAP is a guiding framework for biodiversity conservation and ensuring sustainable use of the components of ecosystems along with the fair and equitable sharing of benefits accruing from the utilisation of genetic resources.[74]

The *Forest Act 1927* acknowledges the usage rights of the FDCs with the inclusion of ss 28A and 28B ('social forestry programme') in the *Forest (Amendment) Act 2000*. However, the recognition of such usage rights has so far not been practiced in a sustainable manner in the case of the Sundarbans FDCs.[75] Offering a potential means of addressing this omission, the recently enacted *Bangladesh Biological Diversity Act 2017* is

[74] Ibid xiv–xv.
[75] The *Forest Act 1927* (Bangladesh) is amended by the *Forest (Amendment) Act 2000* ss 28A, 28B.

intended to ensure Bangladesh's status in achieving the CBD's triple objectives of conservation, sustainable use of ecological resources, and access to and benefit sharing from ecosystem services. Section 30 of this Act, in accordance with the tenets of the ecosystem approach, provides for the benefits arising from ecosystem services to be distributed among local communities and for the recognition of indigenous communities' local knowledge and innovative ideas.[76]

According to the FAO[77] and UNEP,[78] the Sundarbans FDCs comprise 3.5 million people. Of these, five local communities—*Bawalis* (wood cutters), *Mawalis* (honey collectors), *Golpata sangrahakari* (Nypa collectors), *Jele* (fishermen) and *Chunery* (snail and oyster collectors)—along with one indigenous *Munda* community are directly dependent on the Sundarbans.[79] Eighteen per cent of the Sundarbans Impact Zone (SIZ)–encircled households' direct dependency is identified by Iftekhar and Islam.[80] These households are suffering from income inequality income.[81] Alternative livelihood generation is recognised as an effective strategy for reducing FDCs' reliance on the forest. The Sundarbans plays a vital role in maintaining social stability. Various formal and informal industries such as newsprint mills, hardboard mills, shrimp and frozen sea food, and tourism have been developed around the Sundarbans based on its ecosystem resources. These industries are the largest employment sectors in the southwestern belt of Bangladesh. As a result, the economic security of the communities surrounding the Sundarbans has an important impact on the sustainable use of its ecosystem.

Similarly, by providing food security and income opportunities, the Sundarbans plays a crucial role in the reduction of poverty and inequality, in preserving traditional landscapes and empowering local knowledge, all of which influences the FDCs' levels of health and education, helps restore their cultural ties with nature and assists the cohesion of community life. However, the resource users' interest in forest management should be

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[76] *Bangladesh Biological Diversity Act 2017* preamble, s 30.
[77] FAO, 'Integrated Resource Management Plan of the Sundarbans Reserved Forest' (Report No DP/BGD/84/056 for the IRDP of the Sundarbans Reserved Forest, 1998).
[78] UNEP, 'The Sundarbans, Bangladesh' (Report, UNEP, 2011).
[79] Dewan Muhammad Humayun Kabir and Jakir Hossain, *Resuscitating the Sundarbans: Customary Use of Biodiversity and Traditional Cultural Practices in Bangladesh* (Unnayan Onneshan – The Innovators, 2008).
[80] M S Iftekhar and M R Islam, 'Degeneration of Bangladesh's Sundarbans Mangroves: A Management Issue' (2004) 6(2) *The International Forestry Review* 123, 124.
[81] Bangladesh Institute of Development Studies, 'A Study of the Principal Marketed Value Chains Derived from the Sundarbans Reserved Forest' (Report, Integrated Protected Area Co-management Project - IPAC, 2010).

considered at the policy level. A certain portion of the revenue derived from the forest can be used for the amelioration of the livelihoods and living conditions of local communities, something that has occurred with varying degrees of success in many other mangrove-encircled nations including Costa Rica,[82] Kenya,[83] Malaysia[84] and Tanzania.[85]

To maintain a balance between resource extraction and the availability of ecosystem resources, the government has banned the felling of all living trees and limited the harvesting seasons in the Sundarbans. The fishing zone has been limited following its declaration by the government as a fish sanctuary. Under the existing law, the subsistence of the Sundarbans's FDCs is limited to seasonal resources extraction only. There is a likelihood of switching livelihoods, owing to the reduction of income opportunity for the remaining period. This may cause a shortage of skilled labour for the harvesting of forest resources, resulting in a reduction in forest sustainability. The introduction of safety net programmes could help to redress the miseries of the traditional harvesters during off-season. In addition, ecotourism is emphasised in the *Forest Policy 1994*[86] and *Tourism Policy 2010*,[87] and remains a viable alternative to resource extraction. From 2000–2010, a total revenue of BDT26.36 million (around US$321,595) was earned from Sundarbans tourism.[88] However, for equitable benefit sharing to occur, the benefits associated with increased tourism revenue must be shared with the Sundarbans resource users' in line with the ecosystem approach principles (Principles 2 and 5).

Any ecosystem conservation plan must be designed with the relevant stakeholders' input, which is the core vision of the ecosystem approach (Principle 1). Benefit sharing can be seen as a substantive tool for reinforcing general principles of public participation in environmental decision-making, and particularly for ensuring indigenous communities'

[82] Bernardo Trejos and Lan-Hung Nora Chiang, 'Local Economic Linkages to Community-based Tourism in Rural Costa Rica' (2009) 30 *Singapore Journal of Tropical Geography* 373.
[83] Jairus N Koki, 'Contribution of Ecotourism towards Sustainable Livelihood of the Communities Living on Wasini Island, Kwale County, Kenya' (2017) 5 *Journal of Tourism and Hospitality Management* 106.
[84] Puvaneswaran Kunasekaran et al, 'Measuring Sustainable Indigenous Tourism Indicators: A Case of Mah Meri Ethnic Group in Carey Island, Malaysia' (2017) 9(7) *Sustainability* 1256.
[85] Makame Kitwana Makame and Emmanuel Kwesi Boon, 'Sustainable Tourism and Benefit-Sharing in Zanzibar: The Case of Kiwengwa-Pongwe Forest Reserve' (2008) 24(2) *Journal of Human Ecology* 93, 94.
[86] *Forest Policy 1994* art 23.
[87] *Tourism Policy 2010* art 3(2)(2).
[88] T K Roy and S T Hossain, 'Role of Sundarbans in Protecting Climate Vulnerable Coastal People of Bangladesh' (2015) 1(1) *Climate Change* 42.

participation in ecosystem management.[89] Until the resource users' traditional knowledge has been properly evaluated and benefit-sharing mechanisms have been introduced, the unlawful practices of resource exploitation cannot be realistically addressed (Principles 4 and 11). The IRMP has devised the participatory and equitable resource management commitments through Goals 2 and 4.[90] Almost eight years after the adoption of the IRMP, which envisages a 10-year plan for reform throughout the period 2010–2020, significant steps appear not to have been taken to implement the IRMP's goals at the Sundarbans management level for the benefit of the FDCs.

2.4.4 Decentralisation of Ecosystem Management

The Sundarbans is currently under the sole management of the FD. Conservation practice is based on a top-down approach in which upper-level FD managers make managerial and technical decisions with the approval of the MoEFCC. The FD then forwards these decisions to their field offices for execution. At the field level, there are two main offices for regulating the Sundarbans: the Divisional Forest Office (East) with its headquarters in the Bagerhat district, and the Divisional Forest Office (West) with its headquarters in the Khulna district. One level down, there are four Range Offices—Chandpai, Sarankhola, Khulna and Burigoalini—and 72 patrol posts/camps inside the Sundarbans. Overall, a total of 1,167 staff work in different categories.[91]

According to FD estimates, around 45,000 people work in the forest in each day during the peak harvesting season. More than 10,000 fishermen set up fishing camps for three to four months in the winter. The FDCs catch fish and crabs year-round.[92] It is difficult to safeguard the diverse forest resources with the limited state-funded manpower. Under the present management structure, field officials have no opportunity to incorporate local communities' customary knowledge in designing conservation strategies. One initiative had been pursued in the 1990s, during a time when the mode of decentralisation of the Sundarbans's management structure was examined to create space for local stakeholders'

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[89] Maggio, above n 50, 181.
[90] IRMP for the Sundarbans, Goals 2 and 4.
[91] Sundarban West Forest Division, 'Sundarbans: The World Heritage Site' (Divisional Forest Office, Sundarban West Forest Division, 2010).
[92] Anjan Kumer Dev Roy, *An Investigation into the Adequacy of Existing and Alternative Property Rights Regimes to Achieve Sustainable Management of the Sundarbans Mangrove Forest in Bangladesh* (PhD Thesis, University of Southern Queensland, 2012) 46.

involvement. To achieve this, an integrated Sundarbans management plan was initiated in 1995 under the SBCP, however, the project failed to achieve its stated aims.[93]

Recently, three Co-Management Committees (CMCs) have been formed in the Mongla, Sarankola and Koyra sub-districts to initiate co-management activities in the SIZs. However, more than half of the members of the committees are from the FD and other government bodies, which limit access to local and specialised knowledge that would otherwise be available to inform the decision-making process. The selection of FDC members is highly biased, with elite dominance.[94] Despite currently inserting several promising policy provisions for stakeholders' involvement via the formation of the Wildlife Advisory Board at the national level and a Conservation Council at protected areas, a study by Muhammed et al[95] regarding the effectiveness of the committees paints an overall negative picture in promoting beneficial ecological outcomes in Bangladesh.

Historical analyses of management practices of the Sundarbans reveal that no past policy has provided for appropriate property rights for the local FDCs. The FDCs have never been part of the process for developing conservation strategies for the area, other than by being subject to strictly controlled 'access' and 'withdrawal' rights for harvesting. Overexploitation of the Sundarbans's resources continues. The forest now covers only half the area it covered in the late Mughal and early British periods (1526–1878). Nevertheless, the FD fails to comprehend the significance of FDCs' potential rule-making, monitoring and enforcement role in conservation. The FDCs' involvement in management-related decision-making is a prerequisite for ameliorating most of the threats experienced by the Sundarbans over a long period of time. The institutional capacity and staff shortage in the FD and Department of Fisheries (DoF), the two bodies responsible for monitoring the applicability of permissible limits within the Sundarbans wetland resources, is a common concern. To address this issue, the ecosystem approach emphasises decentralising the management system to the lowest level to connect relevant resource users directly with ecosystem management (Principle 2).

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[93] Hossain and Roy, above n 67, 7.
[94] Roy, above n 92, 264.
[95] Nur Muhammed, Masao Koike and Farhana Haque, 'Forest Policy and Sustainable Forest Management in Bangladesh: An Analysis from National and International Perspectives' (2008) 36(2) *New Forests* 201, 215.

As part of the decentralisation of mangrove management, the IRMP emphasises activating co-management approaches in Goal 4: 'support and improve community-based co-management approaches for the activities taking place in the Sundarbans and its surrounding landscape'.[96] Accordingly, stakeholder-centric CMCs have been established in SIZs, although there are concerns regarding the representation of genuine FDCs in those committees. Meaningful involvement of the Sundarbans resource users in management processes, in line with the spirit of the ecosystem approach, is sorely needed for meaningfully applying the community-based approaches to the Sundarbans management.

2.4.5 Adaptive Management

Recently, the Sundarbans experienced cyclones Sidr and Aila, with their severity indicating that predicted climate change impacts are already occurring. It is acknowledged that the Sundarbans are able to tolerate some level of climate change.[97] Nevertheless, due to mangrove forest and wetland's relatively high sensitivity to increasing temperatures and excessive salinity intrusion, important changes in the Sundarbans are occurring, including shifts in forests and wetlands boundaries, changes in biophysical composition (vegetation cover, canopy cover and species variation), variations in net productivity, the dying back of forests and loss of biodiversity. The effects of climate change are expected to be substantial for the Sundarbans coastal population. To protect them from natural disasters, Bangladesh can implement adaptation programmes to reduce climate-induced vulnerability. Adaptation to climate change would involve increasing the adaptive capacity of the local community and ecosystem. As the Sundarbans provide ecosystem services to nearly 3.5 million people, the area has great implications for climate change adaptation of local communities. By quantifying the economics of harvest, developing appropriate value chains and designing climate-resilient alternative income-generating sectors (e.g., ecotourism, bee-keeping, fish feed production, crab fattening and horticulture), the Sundarbans can ensure climate resilience and resulting economic benefits for the local community.

Mapping the climate vulnerability of the Sundarbans and introducing climate change adaptation programmes are a mammoth task that would be challenging for the FDCs to

[96] IRMP for the Sundarbans, vi.
[97] Ibid 130.

implement in isolation. Multidisciplinary cooperation is necessary to institutionalise adaptation initiatives. In this respect, allowing all stakeholders, disciplines and sectors into natural resource management has been identified as a key measure to promote stronger environmental governance under Principle 12 of the Malawi Principles. Moreover, to ensure equity within the various managers of resources and to reduce market distortions of ecosystem goods, the ecosystem approach advocates the development of appropriate value chain systems (Principle 4). Though climate change adaptation is mentioned in the *Forest Policy 1994*,[98] and in Goal 5 of the IRMP for the Sundarbans,[99] the importance of multidisciplinary consultation has not been adequately articulated. The development of adaptive management strategies is mentioned in the IRMP as a long-term policy goal, with the IRMP envisaging that 'the effects anticipated to result from climate change will be recognized, and mitigation and adaptive management strategies developed and implemented in order to ensure the maintenance of ecosystem goods and services'.[100] It is evident that some policy goals have been inserted in the IRMP to address the climate impact on the Sundarbans, but specific law is needed to give effect to the policy goals.

2.4.6 Inter-Sectoral Coordination

In the Sundarbans region, aside from the FD, other government agencies have direct and indirect responsibilities in and around the Sundarbans, including the DoF, DoE, the Department of Agriculture, Department of Water Resource Management and Department of Land. The success of any development initiative in this area depends on the integrated actions by, and cooperation between, those agencies. However, coordination between these agencies and among local, state and not-state actors working in the Sundarbans region is lacking. For instance, the lack of coordination among the state agencies involved in the Sundarbans was visible in the SBCP. During the implementation stages of the project, increased salinity was identified as one of the reasons for the decline in the Sundarbans's ecosystem health. Water salinity is controlled by the Department of Water Resource Management and was not included in the project documents.[101]

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[98] *Forest Policy 1994*, art 2.
[99] IRMP for the Sundarbans, vi.
[100] Ibid v.
[101] Hossain and Roy, above n 67, 36.

The ecosystem approach encourages the creation of inter-ministerial bodies or an umbrella framework that would include government officials, representatives from local government, law enforcement agencies, NGOs, local stakeholders and experts in the field, with a view to sharing information and experience (Malawi Principle 12). The importance of enhancing such cross-sectoral coordination can be found in the vision statement of the IRMP: 'the [Forest Department] will involve local people in the SRF [Sundarbans Reserved Forest] co-management, and other relevant agencies such as the Department of Fisheries and the Department of Environment will be consulted, whenever required'.[102] However, no attempt appears to have been made as yet to establish an inter-ministerial body for addressing the coordination challenges that hinder development interventions in the region. There is an opportunity to create a central platform for coordinating the role of state and non-state agencies to ensure the smooth operation of ecosystem-based conservation initiatives.

It is evident that the lifecycle of the Sundarbans depends on multiple factors spread outside the geographic boundary of the forest. These can be divided into four categories: climatic (rainfall, temperature, evaporation, wind and cyclone), hydrological (tidal regime and tidal inundation), edaphic (soil salinity, nutrient status) and biotic (human and other living organisms). These factors interact with each other and influence the development of ecosystem. The Sundarbans is also vulnerable to exogenous changes such as sea level rise, geologic subsidence and inter-country conflict. Changes in any of the factors affect the functioning of the ecosystem. Thus, all these factors should be taken into consideration during conservation planning. The existing legal framework regulating the Sundarbans pays less attention to these issues.[103] The ecosystem approach requires concurrent endurance of biological, social, economic, environmental functionality of the ecosystem. As the Sundarbans's formation is very complex, its biodiversity incredibly rich and the birth rate of dependent population awfully high, incorporation of the principles of the ecosystem approach is crucial for conserving this ecosystem in a sustainable manner.

After perusing the positive narratives and some potential challenges mentioned in Section 2.3, this study reveals that the ecosystem approach brings some remarkable changes in ecosystem management in terms of promoting integration, equity and interconnectedness

[102] IRMP for the Sundarbans, v.
[103] Iftekhar and Islam, above n 80, 131–132.

between human and ecosystem since its philosophical base is deeply rooted into the dominant environmental theories.

2.5 Philosophical and Theoretical Basis of Ecosystem Approach

The ecosystem approach emerged as a holistic approach encompassing the tenets of environmental justice aiming at protecting the environment from irretrievable damage due to overexploitation and pollution. The theoretical basis of the ecosystem approach and its linkage with the theory of environmental justice are assessed in this section in light of its integration in international instruments, academic literature and state practices.

2.5.1 Theory of Environmental Justice

Environmental justice is the fair treatment and meaningful involvement of all people irrespective of race, colour, nation origin or income with respect to the development and the enforcement of environmental policies and laws. The concept of 'environmental justice' emerged from the existence of inequality in the distribution of environmental 'bads' in the United States during the 1990s. Scholars saw the unequal distribution of environmental 'bads', such as the overexposure of Afro-Americans and Hispanics to toxic waste,[104] as yet another reflection of social injustice.[105] According to Schlosberg, the justification for environmental justice's emergence lies on two distinct points: first, as an outcome of social movements' focusing on the fair distribution of environmental benefits and burdens; and second, its interdisciplinary scope including social science literature including theories of environment, theories of justice, environmental policies, governance, development, sustainability and political ecology.[106] More specifically, environmental justice theory includes equitable distribution of environmental risks and benefits, meaningful participation in environmental decision-making processes, recognition of indigenous and local knowledge, respect for cultural diversity and the capabilities of communities to function and flourish in society.

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[104] Julian Agyeman, Robert D Bullard and Bob Evans, 'Joined-up Thinking: Bringing Together Sustainability, Environmental Justice and Equity' in Julian Agyeman, Robert D Bullard and Bob Evans (eds), *Just Sustainabilities: Development in An Unequal World* (MIT Press, 2003) 1; Julie Sze and Jonathan K London, 'Environmental Justice at the Crossroads: A Critical Introduction to the "State of the Field" ' (2008) 2 *Sociology Compass* 1331, 1334.

[105] David Scholosberg, *Defining Environmental Justice: Theories, Movements, and Nature* (Oxford University Press, 2007) 2.

[106] Ibid.

2.5.2 Integration of Environmental Justice in International Environmental Law

The praxis of environmental justice gradually began sprouting roots and wings in IEL and public policy discourse with mass debate at international forums and fast-growing academic literature. The field now finds itself at a crossroads as it expands its jurisdiction, including natural resource management and human health concerns, as a course for addressing environmental inequality.[107] In the view of natural resource management, the concept of environmental justice has emerged as a mechanism of accountability for the protection of rights and the prevention of wrongs related to the disparate impacts of growth on vulnerable communities in society. These include rising pollution and degradation of ecosystem services, and inequitable access to and benefits from the use of natural assets.[108] The first snapshot of the essential nature of environmental justice in managing global natural resources was envisioned in the 1992 Rio Declaration. The declaration emphasised the meaningful involvement of all people irrespective of race, colour or income for the development and enforcement of environmental policies and laws, along with effective access to judicial and administrative proceedings for redress and remedy.[109]

The notion of environmental justice quickly expanded to include the distribution of a range of environmental goods including climate justice, indigenous rights, labour rights, nature conservation, transportation, water, food and energy justice.[110] Today, the frontiers of environmental justice movements are driving a shift in policy orientation towards legal regimes that recognise ecosystem services and natural assets as public goods, empower systems of accountability and expand public access to remedies as foundations of sustainable development. It was widely considered in the determination of the post-2015 development agenda and the UN Conference on Sustainable Development as a viable means to sustain development addressing two converging threats to humanity—rising

[107] Giovanna Di Chiro, 'Environmental Justice from the Grassroots: Reflections of History, Gender and Expertise' in Daniel J Faber (ed), *The Struggle for Ecological Democracy: Environmental Justice Movements in the United States* (Guilford Press, 1998) 104; Sze and London, above n 104, 1334.
[108] UNDP (United Nations Development Programme), 'Environmental Justice: Comparative Experiences in Legal Empowerment' (Report, United Nations Development Programme, 2014) 5.
[109] *Rio Declaration on Environment and Development*, United Nations Conference on Environment and Development, UN Doc A/Conf.151/5/Rev. 1, 31 ILM. 876, 879 (1992), Principle 10 ('Rio Declaration').
[110] UNDP, above n 108, 2; Gordon Walker, 'Beyond Distribution and Proximity: Exploring the Multiple Spatialities of Environmental Justice' (2009) 41 *Antipode* 614, 618.

inequality and the complex risks from environmental change.[111] It is acknowledged that equitable distribution and effective governance of natural resources can be of great benefit to achieving the goals of reducing poverty, inequality and halting the decline in ecosystem functioning and resource security.[112]

2.5.3 Key Elements of Environmental Justice

Justice is a contested notion in biodiversity conservation, as it is elsewhere. Notions of justice—from access rights, to deliberative processes shaping decision-making, to the sharing of economic benefits—permeate debates regarding environmental issues and are infused with tensions arising from centuries of colonial exploitation, economic inequalities and the challenges of aligning different ways of valuing nature. The environmental justice movement has emphasised a procedural sense of justice, claiming representational space in the political arena and the right to 'speak for ourselves'.[113] According to Vincent, the only area of justice theory that is related to environment is distributive justice.[114] Conversely, Schlosberg[115] observes that 'recognition' of diverse cultural identities in a critical pluralism is a pre-condition for entry into the distributional system and ought to be considered a third dimension of environmental justice.[116] Sen proposes 'sustainable freedom' in choosing the best way to meet their needs and pursue their aspirations, as long as they ensure that future generations will enjoy at least the same degree of freedom.[117]

By the prescription of sustainable freedom, Sen indirectly connects the notion of 'intergenerational equity' necessary for attaining sustainability of natural resources in terms of 'protection of liberties and freedom of choice, respect for legal entitlements, and the guaranteeing of uncensored and equal distribution of benefits and perils',[118] thus

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[111] UNDP-UNEP, 'Breaking Down the Silos – Integrating Environmental Sustainability in the Post-2015 Agenda' (Report of the Thematic Consultation on Environmental Sustainability in the Post 2015 Agenda, 2013) iii.
[112] Rob Nixon, *Slow Violence and Environmentalism of the Poor* (Harvard University Press, 2011) 149.
[113] Luke W Cole and Sheila R Foster, *From the Ground Up: Environmental Racism and the Rise of the Environmental Justice Movement* (New York University Press, 2001) 27.
[114] Andrew Vincent, 'Is Environmental Justice A Misnomer?' in David Boucher and Paul Kelly (eds), *Social Justice: From Hume to* Walzer (Routledge, 1998) 137.
[115] David Schlosberg, 'Reconceiving Environmental Justice: Global Movements and Political Theories' (2004) 13 *Environmental Politics* 517, 532.
[116] Scholosberg, above n 105, 21.
[117] Amartya Sen, 'The Ends and Means of Sustainability' (2013) 14 *Journal of Human Development and Capabilities* 6.
[118] Amartya Sen, *The Idea of Justice* (Harvard University Press, 2009) 230.

aligned as a pillar of environmental justice.[119] Morello-Frosch and Rachel, Myers and Raffensperger, Sze and Whiteside add the 'precautionary principle' as another element of environmental justice to address the disproportionate urban pollution induced hazards on health of the disempowered populations.[120] Different scholars emphasise distinct elements of environmental justice. However, whatever approach is adopted, five theoretical dimensions of justice—'distributive justice', 'procedural justice', 'justice-as-recognition', 'intergenerational equity' and 'precautionary principle'—are commonly identified and associated with environmental justice around the world. Sustainable conservation of biodiversity largely depends on effectively addressing of these basic notions.

2.5.3.1 Distributive Justice

The genesis of distributive justice stems from the 1960s backlash against racism, poverty, distribution of wealth and inequalities deepened with the remnants of colonial rule. Since then, distributive justice has expanded to feature prominently as a distinct element of environmental justice, with Vincent even identifying it as the sole area of justice theory applicable to the environment.[121] As natural resources are limited, the question of how these resources should be distributed equitably frequently arises. To address the issue, the concept of distributive justice was first presented by Rawls,[122] followed by Armstrong and Cohen, focusing on equity in the allocation of environmental benefits, such as resources, opportunities and freedom,[123] as well as costs or burdens, including risks and limits to freedom among the members of a society.[124] Over the last three decades, variants of distributive theory have dominated the literature on justice. Some of this work distinguishes between the object of distribution (goods or rights) and basis for distribution

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[119] André Silveira and Paul Pritchard, *The Multiple Meanings of Justice in the Context of the Transition to a Low Carbon Economy: Working Paper by the Cambridge Institute for Sustainability Leadership* (2016) <https://www.cisl.cam.ac.uk/publications/publication-pdfs/justice-in-the-transition-to-a-low-carbon-economy.pdf>.

[120] Julie Sze, *Noxious New York: The Racial Politics of Urban Health and Environmental Justice* (MIT Press, 2007) 102; Kerry H Whiteside, *Precautionary Politics: Principle and Practice in Confronting Environmental Risk* (MIT Press, 2006) 1; Rachel A Morello-Frosch, 'Discrimination and the Political Economy of Environmental Inequality' (2002) 20 *Environment and Planning C: Government & Policy* 491; Nancy J Myers and Carolyn Raffensperger (eds), *Precautionary Tools for Reshaping Environmental Policy* (MIT Press, 2006) 93.

[121] Vincent, above n 114, 137.

[122] John Rawls, *A Theory of Justice* (Harvard University Press, 1971) 242.

[123] Chris Armstrong, *Global Distributive Justice: An Introduction* (Cambridge University Press, 2012) 16; Ronald L Cohen, 'Distributive Justice: Theory and Research' (1987) 1(1) *Social Justice Research* 19.

[124] Brian Barry, *A Treatise on Social Justice, Volume 1: Theories of Justice* (University of California Press, 1991) 294; Harry Brighouse, *Justice* (Cambridge Polity Press, 2004) 68.

(need or entitlement).[125] Meanwhile, other philosophers contend there are inter-relationships between distributive justice and the other five discussed below. For example, Maiese considers that distributive justice is not a neutral exercise because sometimes a fair procedure might result in an unfair distribution,[126] while Jamieson argues that biodiversity conservation raises a range of intra and/or intergenerational distribution concerns highlighting the importance of distributive justice.[127]

Beretta,[128] analysing the Organisation for Economic Co-operation and Development (OECD),[129] the United Kingdom Environment Agency[130] and Pye et al's[131] studies, identified four environmental inequalities that result from maldistribution of process and sharing of environmental benefits and burdens. Firstly, exposure and access inequalities: the unequal distribution of environmental quality between individuals and groups, whether negatively (exposure to environmental hazard) or positively (access to environmental amenities). This category includes the issue of vulnerability to ecological disasters—latent inequalities in terms of exposure and sensitivity—and the risk of cumulative impacts from social and environmental inequalities. Secondly, policy effect inequalities: the disproportionate effect of environmental policies, that is, the inequitable distribution not of environmental good or bad but of the income effects such as regulatory policies among individuals and social groups. Thirdly, impact inequalities: the unfair environmental impact is highlighted by the fact that some individuals and social groups inflict greater damage on the environment than others. Some environmental justice scholars suggest labelling this type of environmental inequalities as 'ecological inequalities'. Lastly, policymaking inequalities: the inequitable access to environmental policymaking, that is, the unequal involvement and empowerment of individuals and groups in decisions regarding their immediate environment.

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[125] Piers Blaikie and Joshua Muldavin, 'Environmental Justice? The Story of Two Projects' (2014) 54 *Geoforum* 226, 228; Philip Schofield, *Utility and Democracy: The Political Thought of Jeremy Bentham* (Oxford University Press, 2006) 175.

[126] Michelle Maiese, 'Distributive Justice' in Guy Burgess and Heidi Burgess (eds), *Beyond Intractability* (Conflict Research Consortium, University of Colorado, 2003).

[127] Dale Jamieson, *Global Environmental Justice* (Royal Institute of Philosophy Supplement 36, 1994) 199.

[128] Ilaria Beretta, 'Some Highlights on the Concept of Environmental Justice and its Use' (2012) 17 *e-cadernos CES* 146.

[129] Organisation for Economic Co-operation and Development, *The Social Dimension of Environmental Policy: Policy Brief* (OECD, 2006) 2.

[130] Carolyn Stephens, Ruth Willis and Gordon Walker, *Addressing Environmental Inequalities: Cumulative Environmental Impacts: Science Report* (UK Environment Agency, 2007) 9.

[131] Steve Pye et al, *Addressing the Social Dimensions of Environmental Policy – A Study on the Linkages Between Environmental and Social Sustainability in Europe* (European Commission, 2008) 14.

However, it is evident that distributive justice is central to environmental justice concerns and access to distributive justice at the ecosystem level is usually endorsed by law giving substantive rights to the community members to share environmental benefits (ie, ecosystem services) and to prevent or mitigate environmental burdens (i.e., air, water and land pollution, biological diversity).

2.5.3.2 Procedural Justice

Procedural justice is widely accepted as an integral tenet of environmental justice. According to Martin et al, procedural justice relates to the ways in which decisions, including distribution of environmental benefits and burdens are made, and who is involved and who has influence in those decisions.[132] Mentioning it as an essential element of environmental justice, Walker argues that justice involves not only fair distributive outcomes, but fair procedures by which those distributive outcomes are reached.[133] Procedural justice in biodiversity conservation entails at least three elements: access to environmental information, entitlement to participate in environmental decision-making, and the ability to review procedures before the court or tribunal to challenge decision-making or impairment of substantive or procedural rights. The availability of and access to environmental information are important preconditions for effective participation in environmental policymaking and decision-making, and to have access to justice through the courts which is recognised in Principle 10 of the Rio Declaration,[134] later implemented by the *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters 1998*[135] and the *UNEP Guidelines for the Development of National Legislation on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*.[136] Access to meaningful

[132] Adrian Martin, Shawn McGuire and Sian Sullivan, 'Global Environmental Justice and Biodiversity Conservation' (2013) 179(2) *The Geographical Journal* 123.
[133] Gordon Walker, *Environmental Justice: Concepts, Evidence and Politics* (Routledge, 2012) 47.
[134] Rio Declaration, Principle 10.
[135] *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*, signed 25 June 1998, 2161 UNTS 447 arts 1, 4, 5.
[136] *United Nations Environment Programme Guidelines for the Development of National Legislation on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters 1-7* (2010).

involvement raises both procedural and substantive goals: participation in decision-making (procedural) and influencing decisions (substantive).[137]

2.5.3.3 Justice-as-Recognition

Justice-as-recognition is concerned with who is given respect and who is and is not valued, therefore, extending beyond substantive and procedural rights to afford recognition of different social groups and communities, and of the natural environment and components of it. According to de Jonge, recognition is concerned with seeking equality between diverse ways of valuing community opinions.[138] Martin et al argues that justice-as-recognition complements other dimensions of environmental justice and provides the most promising conceptual approach to resolving tensions between social and ecological values.[139] A significant aspect of justice-as-recognition involves recognising the important points of intersection between formal governance and informal systems utilised by indigenous and marginalised communities in most countries.[140] Recognition of these governance regimes is equally important until they are convincingly aligned to the formal legal and judicial system.

Environmental justice is not always confined to economic inequalities, rather it is linked to illegal display of politics and power which raises the identity-based arguments for recognition. The United States environmental justice movement initially focused on issues of distribution of toxic waste, but this was not confined to identifying inequality of distribution. Fraser argues that misrecognition is an injury to the social status of individuals or communities.[141] For example, the decision to dispose Taiwan's nuclear waste on the indigenous community–endowed Orchid Island worked injustice by treating the Yami as a backward indigenous group. Similar disrespect is also observed in the decision to locate a commercial hazardous waste landfill in an African-American community in North Carolina involving racist targeting of location and an assumption that

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[137] Stephen Davies, 'In Name or Nature? Implementing International Environmental Procedural Rights in the Post-Aarhus Environment: A Finnish Example' (2007) 9 *Environmental Law Review* 192.
[138] Bram de Jonge, 'What is Fair and Equitable Benefit-sharing?' (2011) 24 *Journal of Agricultural and Environmental Ethics* 142.
[139] Martin, McGuire and Sian Sullivan, above n 132, 122.
[140] UNDP, above n 108, 11.
[141] Nancy Fraser, 'Social Justice in the Age of Identity Politics: Redistribution, Recognition, and Participation' in Grethe B Peterson (ed), *The Tanner Lectures on Human Values* (University of Utah Press, 1998) 3, 7.

the community would not object.[142] Thus, it is realised that the production of injustice was claimed to be rooted in the institutional racism and classism that denied just decision-making about dump site locations.

This trend of environmental injustice is prevalent in biodiversity conservation settings where status hierarchies bias the distribution and procedures used for different identity groups. Thus, the concept of justice-as-recognition is an integral element of environmental justice for enabling equal opportunity to participate, share environmental burdens and benefits, and avoid harms irrespective of diverse classes of societies.

2.5.3.4 Intergenerational Equity

Environmental justice entails intergenerational equity.[143] Intergenerational equity requires using natural resources sustainably to avoid irreversible damage to the environment. The importance of intergenerational equity was first emphasised in the 1972 Stockholm Declaration, followed by the 1992 Rio Declaration, the CBD and other international environmental instruments. Its need for inclusion in development programs is augmented with the recent considerable impacts of climate change. Climate change creates an additional facet for considering intergenerational equity as a part of addressing environmental injustice: injustice between present and future generations. Because of the extensive timeframe over which the results of climate change will occur, there is disparity between the past and current generations who have been responsible for greenhouse gas emissions and the future generation who will live with the consequences.[144] In her theory of intergenerational equity, Weiss identifies inequities in terms of the quality of the natural environment which future generations would inherit, conservation of options and their access to natural and cultural resources.[145] These principles establish distributional justice, focusing on the distribution, and right to claim for distribution, to the present generation of humans, while not compromising the ability to distribute environmental goods to future

[142] Walker, above n 133, 78–83.
[143] Justice Brian J Preston S C, 'The Effectiveness of the Law in Providing Access to Environmental Justice: An Introduction', in Paul Martin et al (eds), *The Search for Environmental Justice: The IUCN Academy of Environmental Law Series* (IUCN, 2015) 9.
[144] Achala Chandani, 'Distributive Justice and Sustainability as a Viable Foundation for the Future Climate Regime' (2007) 2 *Carbon and Climate Law Review* 152.
[145] Edith Brown Weiss, 'Climate Change, Intergenerational Equity and International Law' (2008) 9 *Vermont Journal of International Law* 623.

generations.[146] This has wideranging implications, considering that long-term biophysical processes and dynamics unfold over more than one generation.[147]

Blaikie and Muldavin observe that intergenerational conceptions of justice imply regulations governing long-term social processes underpinning the maintenance of soil fertility and forest quality at various spatial scales.[148] This intergenerational equity is synonymous to Sen and Nussbaum's proposed distribution of capabilities approach where lack of opportunity to select and combine functioning is considered unjust in enabling the ability to transform primary goods into functioning.[149] Through the long battle in literature and research field, the intergenerational dimension has become a distinctive feature of environmental justice.[150] The integration of its tenets into policy is a crucial requirement for establishing overall environmental justice.

2.5.3.5 Precautionary Principle

Since 1992, by its inclusion in Principle 15 of the Rio Declaration, the notion of the precautionary principle has become one of the highest profile principles in IEL. Currently, the precautionary principle is included in more than 60 multilateral environmental instruments and is being addressed by scholars and international tribunals in a wide array of international environmental justice decision-making contexts.[151] The precautionary principle involves a more cautious view that prioritises the protection of human and environmental health in the presence of scientific uncertainty of the impacts of proposed development actions. It also seeks to shift the burden of hazard assessment, monitoring and data generation activities onto those who propose to undertake potentially harmful

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[146] Scholosberg, above n 105, 112–113.
[147] Thomas Sikor and Peter Newell, 'Globalizing Environmental Justice?' (2014) 54 *Geoforum* 151, 154.
[148] Blaikie and Muldavin, above n 125, 229.
[149] Sen, above n 118, 230; Martha Craven Nussbaum, *Women and Human Development: The Capabilities Approach* (Cambridge University Press, 2000) 4.
[150] Silveira and Pritchard, above n 119, 13.
[151] For example, the precautionary principle has also been averted to in international jurisprudence, most notably in the Southern Bluefin Tuna Cases (*Australia v Japan, New Zealand v Japan*) (Requests for Provincial Measures), 27 August 1999, 38 ILM 1624 (1999) [77]; see also Arie Trouwborst, 'The Precautionary Principle and The Ecosystem Approach in International Law: Differences, Similarities and Linkages' (2009) 18(1) *RECIEL* 26, 27; Caroline E Foster, *Science and the Precautionary Principle in International Courts and Tribunals* (Cambridge University Press, 2011) 77; Elizabeth Fisher, Judith Jones and René von Schomberg (eds), *Implementing the Precautionary Principle*: *Perspectives and Prospects* (Edward Elgar, 2006) 1; Joakim Zander, *The Application of the Precautionary Principle in Practice: Comparative Dimensions* (Cambridge University Press, 2010) 2–3.

activities or chemical production.[152] The notion of the precautionary principle has also been used to justify the development and implementation of innovative policies at the international, national and local levels to address a range of environmental problems, including water pollution, global warming and climate change–induced disasters and thus has become a common tool in promoting environmental justice.[153]

2.5.4 Relationship Between the Ecosystem Approach and Environmental Justice

As previously discussed, environmental justice includes five main dimensions—'distributive justice', 'procedural justice', 'justice-as-recognition', 'intergenerational equity' and the 'precautionary principle'—as a course of eliminating inequality engrained within conservation society and enabling sustainability in the planet's natural resource management. This section critically analyses the ecosystem approach's principles to unearth the status of environmental justice's integration, thereby establishing the linkages between the premises of environmental justice and the ecosystem approach.

2.5.4.1 Distributive Justice

The ecosystem approach aims for the benefit derived from the array of functions provided by biodiversity to be maintained for human environmental security and sustainability. Adoption of a benefit-sharing mechanism is reflected under Principle 4 of the Malawi Principles and the CBD Guidelines on the Ecosystem Approach as

> …. where those who control use of the land do not receive benefits from maintaining natural ecosystems and processes, they are likely to initiate unsustainable land use practices from which they will benefit directly in the short term. To counter this, more equitable sharing of benefits is advised.[154]

The equitable distribution of ecosystem functions generated benefits assists stakeholders in their production and management. A range of parameters is epitomised to facilitate benefit sharing that includes rights to access ecosystem resources, defining of ecosystem generated benefit distribution procedures, valuation of ecosystem services, provisioning

[152] David Kriebel et al, 'The Precautionary Principle in Environmental Health Science' (2001) 109 *Environmental Health Perspectives* 871.
[153] Carolyn Raffensperger and Joel Tickner (eds), *Protecting Public Health and the Environment: Implementing the Precautionary Principle* (Island Press, 1999) 3; Rachel Morello-Frosch, Manuel Pastor and James Sadd, 'Integrating Environmental Justice and the Precautionary Principle in Research and Policy Making: The Case of Ambient Air Toxics Exposures and Health Risks among School Children in Los Angles' (2002) 584 *ANNALS AAPSS* 47, 51.
[154] CBD Guidelines on Ecosystem Approach, 4 (Rationale of Principle).

for alternative sources of livelihoods, efforts on developing strong marketing and trading networks, and resource users' inclusion in monitoring and surveillance. By assimilating the notion of benefit sharing, the ecosystem approach absorbs the philosophy of distributive justice.

This participatory mechanism is inserted into national legislation with varied modes for reduction of inequalities in terms of distribution of ecosystem-driven benefits among the communities. In the Philippines, Republic of the Congo, Vietnam and South Africa, local communities are involved in protected areas management as a process of distribution of multiple benefits through delegation of powers, enhancement of management capacity and knowledge exchange that helps them avoid encroachment on protected areas.[155] Meanwhile, in Europe, France's forceful removal of Roma people from their houses on nature reserves was found by the European Court of Human Rights to violate their right to a private and family life.[156] A primary driver behind this decision was the lack of proportionality in France's actions keeping in mind the totality of the nature reserve's use and the lack of consultation with the community, illustrating the distinct overlap between human rights, distributive justice and the ecosystem approach.[157] Thus, distributive injustice is not only caused by laws that provide for inequitable distribution of environmental benefits and burdens, but by inequitable application or non-application of laws or procedures that provide for equitable distribution.[158] It can take many forms beyond the plight of marginalised indigenous or racial communities and this must factor into the ecosystem approach. For example, an analysis of air pollution in Italy found that age and gender were the sharpest dividing lines in exposure to harmful chemicals, rather than race or ethnicity, demonstrating the need for comprehensive distributive justice programmes.[159]

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[155] *Vietnam's Biodiversity Law 2008* (Law No 20/2008/HQ12) ss 28–31; *South Africa's National Environmental Management Protected Areas Act 2003* (Law No 57 of 2003) s 42; *The Philippines Department of Environment and Natural Resources prescribed Guidelines on the Establishment and Management of Buffer Zones for Protected Areas, Memorandum Circular No 16* (1993) ss 3–6; *The Republic of the Congo's Wildlife Law 2008* (Law No 37-2008) ss 20–22.

[156] *Winterstein and Others v. France* (Merits), Judgement, 2013, ECHR, Section Fifth, Appl no 27013/07 (October 17).

[157] James Harrison, 'Significant International Environmental Law Cases: 2012-14' (2014) 26 *Journal of Environmental Law* 519, 526.

[158] Justice Preston, above n 143, 3.

[159] Anna Rita Germani, Piergiusseppe Morone and Giuseppina Testa, 'Environmental Justice and Air Pollution: A Case Study on Italian Provinces' (2014) 106 *Ecological Economics* 69, 78.

2.5.4.2 Procedural Justice

It is recognised that appropriate representation empowers traditional resource users and helps to resolve conflict within the society. The ecosystem approach engrosses the concept of procedural justice through valuing the rights of all stakeholders including indigenous and local communities living on the land. To ensure access to procedural justice, the approach further serves to decentralise management systems to the lowest level via Principle 2 on the plea that the closer management is to the ecosystem, the greater the responsibility, ownership and use of local knowledge. This concept is referred to as the principle of subsidiarity. However, institutionalisation of equity in ecosystem decision-making with stakeholders' effective participation requires a supportive regulatory framework to encourage stakeholders to be involved in ecosystem projects: from planning to evaluation of management decisions. Procedural justice can also be achieved, for example, through access to justice via the legal system. The South African Supreme Court has rendered the *locus standi* requirements for environmental action considerably lower than it was previously under the common law to facilitate procedural justice for environmental violations through the courts.[160] Costs are also not often imposed on plaintiffs seeking to bring action for genuine belief in environmental harm (i.e., they are not frivolous or vexatious) in recognition of some plaintiff's difficulty in paying despite reasonable cases.[161] Besides, the emergence of collective organisation inspired by Wangari Maathai helps enhance access of the poor to forest, land and water resources in Kenya and across Africa, leading to achieving goals of procedural equity and sustainability.[162]

Relevant ecosystem information is critical to involving the traditional communities in decision-making processes and arriving at effective management strategies. Thus, the ecosystem approach emphasises developing an appropriate mechanism so pertinent information is shared with all stakeholders. The Forest Process Agreement between the Government of Newfoundland and Labrador and the Innu Nation is an example of enabling procedural justice among indigenous communities in global forest management. The ecosystem-based forest management enables the right to the procedural justice of the

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[160] Michelle Toxopeus and Louis J Kotze, 'Promoting Environmental Justice Through Civil-based Instruments in South Africa' (2017) 13 *Law, Environment & Development Journal* 47, 69.

[161] *Wildlife and Environment Society of South Africa v. MEC for Economic Affairs, Environment and Tourism, Eastern Cape Provincial Government and Others* (Costs with pained regret), 6 SA 123 (E), 2005 (April 28).

[162] UNDP, above n 108, 19.

Canadian Labrador-encircled aboriginal community Innu with the signing of the Forest Process Agreement where the Innu community members are termed 'Forest Guardians'. This agreement facilitates effective communication, information sharing and dispute resolution, leading to improved planning, management practices and monitoring of harvesting blocks with effective participation by the indigenous peoples under a co-management framework. Under the Innu communities' supervision, a set of harvesting guidelines and an ecological and cultural protected areas network has been formulated which helps resolve competing goals and conflicts in situations of considerable complexity to promote sustainable forestry.[163]

As most problems of biodiversity management are complex and inter-sectorally connected, the ecosystem approach emboldens involvement of multidimensional expertise in ecosystem management, harmonious co-existence among state and non-state actors, and increasing inter-sectoral collaboration at different levels such as ministries and management agencies engaged in execution of conservation initiatives via Principle 12. The implications of the ecosystem approach are revealed in Knight and Meffe and Waylen et al's studies, with documentation of few procedural challenges, such as building trust between partners, ensuring participation of all stakeholders and developing realistic benefit sharing mechanisms.[164] Despite identification of potential challenges, it is evident the ecosystem approach brings some remarkable changes in ecosystem management in terms of promoting integration, equity and interconnectedness between the humans and ecosystems.

2.5.4.3 Justice-as-Recognition

Recognition in biodiversity conservation is vital as biodiversity conflicts often stem from feelings of injustice derived from both privilege and oppression.[165] The core vision of the ecosystem approach is to value humanity, including indigenous and local communities. The approach suggests that ecosystems will be managed on society's choice and for the benefits of people (Principle 1). Principle 11 of the ecosystem approach suggests

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[163] Larry Innes and Len Moores, *The Ecosystem Approach in Practice: Developing Sustainable Forestry in Central Labrador, Canada* (2003) <http://www.fao.org/docrep/ARTICLE/WFC/XII/0717-C1.HTM>.
[164] Knight and Meffe, above n 53, 677; Waylen, Blackstock and Holstead, above n 60, 3.
[165] Susan Clayton, Elisabeth Kals and Irina Feygina, 'Justice and Environmental Sustainability' in Clara Sabbagh and Manfred Schmitt (eds), *Handbook of Social Justice Theory and Research* (Springer, 2016) 369.

undertaking any initiative to value traditional rights, cultures and knowledge systems in consonance with CBD art 8(j), which articulates full respect for the marginalised sections of the society.[166]

To mainstream recognition, the Malawi Principles and the CBD Guidelines on the Ecosystem Approach prescribes a web of measures such as sharing relevant information including indigenous and local knowledge and integrating those into decision-making (Principle 11); use of traditional knowledge and practices to enable better understanding of ecosystem change and developing appropriate adaptation plans (Principle 9); involvement of all stakeholders (including indigenous people, the poor and women) in setting management goals, defining problems and designing conservation or development programmes (Principle 1); and, above all, prominently emphasising institutional arrangements (Principle 2) for making those recognition procedures functional.

Many countries have included a right to a healthy environment in their constitution or domestic laws, offering one formal mechanism for recognition of pertinent environmental rights in a holistic manner.[167] In India, Pakistan, Nepal and Bangladesh, the right to live, as expressed in their respective constitutions, has been interpreted by superior courts, as in the case of *Subhash Kumar v State of Bihar*, to necessitate a right of enjoyment of pollution-free air and water.[168] The rights of the Saramaka indigenous people—who were deprived of the logging and mining concessions on Saramaka territory conducted by the government of Suriname without effective consultation with them—were upheld by the Inter-American Court of Human Rights in the case of *Saramaka People v. Suriname*. Recognising the Saramaka indigenous people's traditional rights to their resources, the court outlined three safeguards: effective consultations, including prior and informed consent, sharing benefits from resource development initiatives; effective use of socio-EIAs; and mitigation measures to follow to avoid inflicting future social and environmental injustices.[169]

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[166] CBD art 8(j).

[167] See, *The Constitution of Colombia 1991* art 79; *The Constitution of Republic of Ecuador 2008* art 1; *The Constitution of Tunisian Republic 1959* art 45; *Mexican General Law on Climate Change 2012* s 2.

[168] *Subhash Kumar v. State of Bihar and others*, AIR 420 India SCR (1) 5 Judgement, 1991 (January 9).

[169] *Saramaka People V. Suriname* (Preliminary Objections, Merits, Reparations, and Costs), Judgment November 28 2007 IACHR, Case 12.338 of the Twelve Saramaka Clans (LOS), Suriname. March 02, 2006. See also Marcos A Orellana, 'Saramaka People V. Suriname: Judgment (Preliminary Objections, Merits, Reparations, and Costs)' (2008) 102 *American Journal of International Law* 841.

The significance of the ecosystem approach in establishing social justice in terms of recognition of traditional resource users' customary rights has also been documented in the Indonesian Papua province, where conflicts due to non-recognition of their customary rights results in a massive deterioration of natural resources. After application of the ecosystem approach, the innovative decentralisation process has been initiated which escalated the scope of the local community's participation and recognition of their investment in natural resource management and, subsequently, the long-embedded tensions and insecurity engrained among them has been resolved.[170]

Meanwhile, a similar shift towards justice-as-recognition is evident in the Nagoya Protocol's treatment of indigenous people's rights. Indigenous peoples often bare the greatest cost with conserving biological resources while often retaining the lowest level of input in decision-making processes. The incorporation of the *UN Declaration on the Rights of Indigenous Peoples* within the protocol represented a significant step in recognising the importance of indigenous peoples in the decision-making processes around biological resources.[171] This recognition itself provides a sense of environmental justice due to indigenous people's important place within the wider ecosystem of a landscape. This highlights how international instruments have attempted to integrate justice and the ecosystem approach through recognition.

2.5.4.4 Intergenerational Equity

Environment and development can no longer be approached separately, as the concept of 'sustainable development' has implied since the early 1970s. Two competing narratives—anthropocentrism and eco-centrism—have stimulated the inclusion of a conservation–development nexus in the ecosystem approach. In anthropocentrism, humanity is placed at the centre and the focus is on the economic value of ecosystem services and human's diverse interaction with ecosystems, whereas in eco-centrism the emphasis is on measuring 'ecological risks' and convicting the conservation–development narratives for ecosystem deterioration.[172] In this paradox, a group of scholars argued that anthropocentrism may not be an obstacle to sustainable development so long as human

[170] Gill Shepherd (ed), *The Ecosystem Approach: Learning from Experiences* (IUCN, 2008) 187.
[171] Kimberly R Marion Suiseeya, 'Negotiating the Nagoya Protocol: Indigenous Demands for Justice' (2014) 14 *Global Environmental Politics* 102.
[172] Dietz and Stern, above n 41, 441.

interference is pursued within ecological limits.[173] Such human-inclusive conservation ideas have started gaining ground by the recognition of humanity's interaction with ecosystems in the principles of the CBD-promoted ecosystem approach. The implication of intergenerational equity is accentuated in Principle 7 of the ecosystem approach as 'concepts of stewardship, intergenerational equity and sustainable yield need to be applied to considerations of the temporal scale'.[174] Realising future generations' rights to ecosystem resources, the basic notion of intergenerational equity, the ecosystem approach postulates the 'sustainable use' mechanism to limit the irrational use of ecosystem services to achieve balance between ecological sustainability and human wellbeing.

Different tools are being adopted by states for realising the notion of 'sustainable use' of ecosystem resources. Unique in this space is the Philippines. In the case of *Oposa v. Factoran*, the Philippines Supreme Court recognised a group of minors' standing to launch a class action lawsuit against members of the previous generation for deforestation and the loss of their right to a healthy and balanced environment resulting from it.[175] The minors' success has inspired future groups to bring other claims based on intergenerational equity which were determined in the case of *Metro. Manila Dev. Auth. v. Concerned Residents of Manila Bay*.[176] Other than this innovative approach, the most notable are regulations on resource harvesting, focus on silvicultural research, provisioning of alternative income generation (AIG) opportunities, monitoring mechanisms, capacity building of ecosystem managers, clearing house mechanisms (CHMs) for sharing of information, building public-private partnerships and controlling extraneous actions on environment and ecosystems.

Besides, as ecological integrity and human wellbeing depends on proper functioning and resilience of ecosystems, alignment of potential ecosystem attributes in ecosystem conservation and development programmes are crucial. The ecosystem approach is designed to conserve total ecosystems to reach a balance between ecological and socio-economic needs. To maintain equilibrium between the 'socio-economic needs of humanity on ecosystem' and 'natural phenomena and environmental change', Eric Fee et al and

[173] Brunnée and Toope, above n 42, 42.
[174] CBD Guidelines on Ecosystem Approach, 21 (Implementation Guidelines of Principle 7).
[175] *Oposa v. Factoran*, G.R. No. 101083, (July 30, 1993), 224 SCRA 792.
[176] *Metro Manila Development Authority v. Concerned Residents of Manila Bay*, G.R. Nos. 171947–48, (Dec. 18, 2008), 574 SCRA 661.

Hannah et al urge adopting an ecosystem-based approach.[177] For ensuring sustainability of an ecosystem, the ecosystem approach also prescribes considering certain features, such as inclusion of biodiversity, environment and climate change in natural development plans, identification of causes and effects of biodiversity loss, adoption of environmental impact mitigation measures and risk/vulnerability assessment–based conservation priorities, valuation of socio-economic importance of ecosystem services and strong monitoring.

2.5.4.5 Precautionary Principle

In the environmental realm, the precautionary principle and the ecosystem approach are often mentioned in one breadth. Both concepts are part of the same trends that consider the 'basic features of sustainable use'. Two insights account for the precautionary principle's rationale: the vulnerability of the environment to anthropogenic impact[178] and uncertainty about the magnitude and probability of environmental impact.[179] While the ecosystem approach calls for three issues: the holistic management of human activities, valuing available knowledge on ecosystems, and satisfying human needs in a way that does not compromise the integrity of ecosystems. The rationale of the ecosystem approach and the precautionary principle consists of the magnitude of damage inflicted on ecosystems resulting from human actions and the complexity of ecological relationships. The similarity is marked in their purposes, as the ecosystem approach aims to maintain the integrity of ecosystems, whereas the precautionary principle extends beyond ecosystem protection to other aspects of environmental protection. Scientific information is a prerequisite for the application of both concepts. In the course of applying the precautionary principle, conclusive scientific evidence is required to assess environmental impacts, monitor effects of precautionary measures and produce new information in the light of which action taken can be adapted.

Ecosystem science continually develops complex questions that demand adaptive mechanisms to address emerging issues. Adaptive management, an integral component of the ecosystem approach, is premised on an ongoing learning process: responding to changing circumstances, generating new knowledge and reducing uncertainties, thereby

[177] Fee et al, above n 34, 212, 213; Hannah, Midgley and Millar, above n 40, 485, 489.
[178] William C G Burns, 'Potential Causes of Action for Climate Change Impacts Under the United Nations Fish Stocks Agreement' (2007) 7(2) *Sustainable Development Law and Policy* 34, 37.
[179] Jonathan B Wiener, 'Precaution' in Daniel Bodansky, Jutta Brunnée and Ellen Hey (eds), *The Oxford Handbook of International Environmental Law* (Oxford University Press, 2007) 597.

allowing management to cater for change.[180] Therefore, legal scholars find close connections between the ecosystem approach and the precautionary principle in light of adaptive management. Despite debates as to the nature, interconnectedness and application of both concepts in academic literature, it is evident that the precautionary principle is regarded as an integral component of applying the ecosystem approach, whereas the ecosystem approach should be taken into account in the application of the precautionary principle.

This connotation is portrayed in an example: the management of protected areas, which has long been observed as a typical show of precaution and is now considered an essential course of action under the ecosystem approach. The *EU Habitats Directive* offers an example of an instrument that attempts to take an ecosystem approach without the corresponding adaptive management integral to precautionary principle.[181] Under art 6, parties are required to establish the necessary conservation measures and management plans for designated sites based on the ecological requirements of the natural habitat types. Further, parties must take appropriate steps to avoid the deterioration of habitats over time. While the terms environmental justice or the ecosystem approach are not explicitly invoked, there is a clear line between the ecosystem approach and the approach adopted in the *Habitats Directive* (Council Directive 92/43/EEC) due to their focus on developing standards based on the specific requirements for each area.[182] The invocation of 'natural habitat types', however, exposes the lack of dynamism to climate or environmental change over time. This caused a significant issue in the *Galway Bypass Case*[183] in front of the European Commission of Justice in 2013. The commission in that case found measures taken to protect habitats must be in congruence with helping to sustain the natural habitat of plant or animal species that were the reason for the designation of the site as a whole. Due to the failure for the directive to be dynamic, it has been recommended that the provision be reformed.[184] Therefore, the inherent synergy between the ecosystem approach

[180] Dan A Tarlock, 'Ecosystems' in Daniel Bodansky, Jutta Brunnée and Ellen Hey (eds), *Oxford Handbook of International Environmental Law* (Oxford University Press, 2007) 581.
[181] EC Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Flora and Fauna, *Official Journal of the European Communities* (1992) L 206/7.
[182] Frederik H Kistenkas, 'Innovating European Nature Conservation Services by Introducing Ecosystems Services' (2014) 23 *GAIA* 88, 89.
[183] *Peter Sweetman, Ireland, Attorney General and the Minister for the Environment, Heritage and Local Government and Others v An Bord Pleanála*, C-258/11 (April 11, 2013), 3 CMLR 16 ('Galway Bypass Case').
[184] Kistenkas, above n 182, 92.

and the precautionary principle offers a potential way of rectifying the current lack of dynamism identified in the *Habitats Directive* by authors such as Ebbeson[185] and McGillivray.[186]

Ecosystem processes and functions are variable; their level of uncertainty is high and becomes higher with the interaction of social, economic and cultural features of peripheral landscapes. Thus, the ecosystem approach suggests designing appropriate methodologies and practices to monitor the changes and adjust to the unexpected events emerged as predators to natural resource uses. Adaptive management is the medium, prescribed by the ecosystem approach, through which ecosystem management can dynamically cope with uneven circumstances. In promoting equity within ecosystem communities through adaptive management, the ecosystem approach prescribes a series of measures to follow which includes integration of risk/vulnerability assessment procedure, adoption of risk/vulnerability mitigation procedure, focusing on researching threat mitigation and adaptation, alignment of innovative models for institutional rearrangement, and introduction of long-term monitoring mechanisms.

Environmental justice demands addressing multiple factors whether institutional, political, socio-economic or regulatory that inhibits equal justice for all. Attaining distributional justice, procedural justice, justice-as-recognition, intergenerational equity and precautionary principle can meaningfully realise environmental justice. The ecosystem approach, which is strongly founded on basic notions of environmental justice, appears to be a viable framework for ensuring ecologically sustainable development in the society where both nature and human can coexist.

2.6 Conclusion

This chapter has examined the genesis, philosophical and theoretical basis of the ecosystem approach, the trend of paradigm shift towards an integrated dimension in global natural resource management. It was shown that the ecosystem approach encompasses not only the potential tenets of environmental justice, but a mechanism for bridging the gap

[185] Jonas Ebbesson, 'The Rule of Law in Governance of Complex Socio-ecological Changes' (2010) 20 *Global Environmental Change* 414, 419.
[186] Donald McGillivray, 'Mitigation, Compensation and Conservation: Screening for Appropriate Assessment Under the EU Habitats Directive' (2011) 8 *Journal of European Environmental & Planning Law* 329.

between conservation and development by mainstreaming conservation and utilisation of natural resources and by which it has established itself as one of the pillars for supporting sustainable development. Because of its entirety, the ecosystem approach has been widely accepted as a common framework for conserving or managing diverse areas of natural resource management such as biodiversity, fisheries, international water resources, oceans, climate adaptation and disaster management. Scholars and researchers also advocate for integrating the ecosystem approach principles into development policies to make those conservation–development initiatives environmentally sustainable.

The relevance of the ecosystem approach in the conservation of the Sundarbans was also investigated in this chapter. It was shown that despite adopting/promulgating several conservation plans, policies and legislation, deterioration of the Sundarbans's biophysical attributes, decline in vegetation cover and species diversity, and exacerbation of dependent communities' vulnerabilities have not been halted. This situation demands reconsidering the current conservation and management approach and adopting a holistic or integrated resource management approach which has the inherent diversity of simultaneously promoting equity within FDCs in terms of ensuring access to resource management, fair distribution of ecosystem-generated benefits, alternative livelihoods, maintaining a balance between resource conservation and exploration and enfolding flexibility in addressing ensuing challenges on the complex ecosystem. Since the ecosystem approach encloses similar attributes within its principles such as decentralisation of ecosystem management, conservation and sustainable use, access and equitable benefit sharing, adaptive management, maintenance of potential ecosystem components including structure and functions, this research argues for integrating those ecosystem approach principles into the legal and institutional frameworks regulating the Sundarbans. This could bring substantial changes in the Sundarbans conservation and management paradigm by way of facilitating environmental justice both for the ecosystem and ecosystem resource user groups, maintaining the ecosystem's sustainable growth, and ensuring the ecological and environmental integrity of Bangladesh. The next chapter analyses the international legal frameworks that promote the ecosystem approach principles for the conservation of global natural resources.

Chapter 3:
Ecosystem Approach in the International Legal Framework

3.1 Introduction

This chapter examines the international legal frameworks that promote the ecosystem approach for protection, management, restoration and sustainable use of a mangrove ecosystem. It also analyses regional legal frameworks that have developed cooperating mechanisms to implement the ecosystem approach for conserving and managing mangrove resources. Finally, this chapter explores the contribution of other intergovernmental institutional initiatives that recognise the ecosystem approach for the conservation and rational utilisation of mangrove resources.

There are a significant number of international environmental instruments that deal with environmental issues such as biodiversity and climate change. For the sake of investigating the integration of ecosystem approach principles into international legal frameworks, five key and intertwined global biodiversity-related conventions—the Ramsar Convention, the World Heritage Convention, the CITES, the CBD and the UNFCCC—were selected in this research. The reasons behind this selection are: firstly, all the international frameworks have a shared goal of conservation of biodiversity through ensuring their sustainable use and effective management; secondly, these conventions have accepted and/or promoted the principles of the ecosystem approach and endorsed guidelines for their implementation at global, regional and national levels to meet their mutually reinforcing objectives; lastly, the ecosystem approach-espousing guidelines embedded in those instruments and the best state practices following those guidelines have a significant impact on the Sundarbans ecosystem.

Cooperation between regimes is likely to be facilitated by a shared framework of principles and policy objectives. Achieving this in the biodiversity context entails recognition of sources of tension and routes to synergy.[1] Since substantive synergies among the biodiversity-linked conventions are evident, several mechanisms have been

[1] Rosie Cooney, 'CITES and the CBD: Tensions and Synergies' (2001) 10(3) *RECIEL* 259, 267.

established to promote greater cooperation in the implementation of those conventions at the international level.[2] A memorandum of understanding (MOU) was signed between the CITES and CBD Secretariats in 1996 for extending cooperation among them and encouraging consistency in national strategies, plans or programmes under the CBD and CITES.[3] The CBD[4], UNFCCC[5] and the *United Nations Convention to Combat Desertification 1994* (UNCCD)[6] established a Joint Liaison Group that identifies several synergistic areas of collaboration.[7] The Ramsar Convention[8] collaborates the CBD, World Heritage Convention[9] and CITES[10] on biodiversity issues through forming a Biodiversity Liaison Group in 2002 and urges the Contracting Parties to work with the Joint Liaison Group of the CBD, the UNFCCC and the UNCCD for achieving the shared goals via application of the ecosystem approach's principles and wise use guidelines.[11] The importance of intra-conventional collaboration with respect to the conservation and sustainable use of biodiversity at the global, regional and national level through the application of the ecosystem approach is also recognised in the CBD *Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets*.[12]

As a complement to global initiatives, regional approaches can help countries that face common problems to take effective action in attaining shared goals, thus bridging national

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[2] UNEP-WCMC, 'Promoting Synergies within the Cluster of Biodiversity-related Multilateral Environmental Agreements' (Report, UNEP World Conservation Monitoring Centre, 2012).
[3] Cooney, above n 1.
[4] *Convention on Biological Diversity*, opened for signature 5 June 1992, 1760 UNTS 79, 31 ILM 818 (entered into force 29 December 1993) ('CBD').
[5] *United Nations Framework Convention on Climate Change*, opened for signature 9 May 1992, 1771 UNTS 107, 31 ILM 849 (entered into force 21 March 1994) ('UNFCCC').
[6] *United Nations Convention to Combat Desertification 1994*, opened for signature 17 June 1994 (entered into force December 1996) ('UNCCD').
[7] UNCCD, *Synergies Among the Sister Conventions* (2018) <http://www2.unccd.int/unccd-cbd-and-unfccc-joint-liaison-group>.
[8] *Convention on Wetlands of International Importance especially as Waterfowl Habitat*, opened for signature 2 February 1971, 996 UNTS 245 (entered into force 21 December 1975) ('Ramsar Convention').
[9] *Convention Concerning the Protection of the World Cultural and Natural Heritage*, opened for signature 16 November 1972, 1037 UNTS 151, 27 UST 37, 11 ILM 1358 (entered into force 17 December 1975) ('World Heritage Convention').
[10] *Convention on International Trade in Endangered Species of Wild Fauna and Flora*, opened for signature 3 March 1973, 993 UNTS 243 (entered into force 1 July 1975) ('CITES').
[11] Ramsar Convention Secretariat, *Partnerships with Other Conventions* (2014) <http://www.ramsar.org/about/partnerships-with-other-conventions>; CBD-COP4, *Cooperation between the Convention of Wetlands and Convention between Biological Diversity* UNEP/CBD/COP/4/Inf.8/Inf.8 27 March 1998, II5c.
[12] CBD-COP10, *Decision X/2: The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets* UNEP/CBD/COP/DEC/X/2 (29 October 2010) Preamble, [5]; CBD Secretariat, *Aichi Biodiversity Targets*, Strategic Goal B: Reduce the Direct Pressures on Biodiversity and Promote Sustainable Use, Target 6 <https://www.cbd.int/sp/targets/>.

and global efforts. Ecosystems seldom transcend national boundaries and each country's management has an impact on its region's forest resources. Many national systems lack the technological advances and economic and political weight that might be mobilised at regional level. Similarly, agreements on a global level are sometimes hindered due to variations among countries in terms of forest types, economic base and institutional strength. Regional approaches can sometimes bridge these gaps, making substantive action to reach consensus.[13] An example of a successful regional initiative is the *ASEAN Agreement on Transboundary Haze Pollution 2002*, by which the Association of Southeast Asian Nations (ASEAN) states agreed to take measures to control activities relating to forest fires that often causes transboundary haze pollution in the Asia and Pacific. From these considerations, among a good number of regional blocs, the ASEAN, European Union (EU), Amazon Cooperation Treaty Organization (ACTO) and South Asian Association for Regional Co-operation (SAARC) have been chosen in this research for analysing the role of these regional frameworks in integrating the ecosystem approach principles in policy formulation of member states in general and at a regional level in particular.

Some intergovernmental forums are also contributing to the global and regional scale for promoting the global agenda of sustainable development by promoting sustainable use of biological resources. Among numerous intergovernmental entities working with such a mandate, the FAO, IUCN, International Tropical Timber Organization (ITTO) and International Society for Mangrove Ecosystems (ISME) have been selected in this research based on their longstanding contributions in the area of forest management, mangrove ecosystem restoration, supporting sustainable use and bio-trading, and promoting the ecosystem approach in managing these resources.

As a normative rule of contemporary international law, international environmental regimes have significant impact on the regional and national law. The implementation of obligations induced by international agreements generally depends on a regional forum or individual states' constitutional, legislative framework and judicial processes to give them

[13] R Michael Martin, *Regional Approaches: Bridging National and Global Efforts* (2004) <http://www.fao.org/docrep/007/y5841e/y5841e02.htm>.

genuine domestic effect.[14] In this context, international law allows a wide range of discretion to the states in deciding how they will give national effects to their international obligations. Most of the international environmental treaties imply 'soft' obligations to achieve their objectives. Thus, there is generous scopes for domestic compliance and the usual practice of states responding to such obligation is to seek minimum acceptable standards, rather than stringent requirements for national implementation of obligations.[15] The customary rule is that a state cannot plead its internal law as a justification for its failure to perform a treaty or to avoid its international responsibility.[16] Though there are two discreet views in international realm as to whether international law is superior to national law or the application of international law is subject to the will of states to internalise through their own constitutional, legislative and judicial processes to be utilised in practice.[17] It is a precedent that international law is superior to national law in international tribunals. However, there are many respects in which national laws or municipal laws, as an evidence of state practice, are invoked by the international bodies.[18]

There are various state approaches to the implementation of international law; some dictated by entrenched constitutional requirements, others requiring conformity to legislative and judicial requirements.[19] Theoretically, two approaches are observed: the monist approach to international law that requires customary and treaty laws are automatically part of national law, and the dualist view that requires custom and treaties become part of national law only after the state has consented to the asserted rule. The monist and dualist approaches are reflected respectively in the doctrines of incorporation and transformation under which the international law is 'automatically' part of national law, subject to contrary statutes or judicial precedents, or requires 'transformation' by implementing legislation.[20] In common law countries, the general rule is that rights and obligations arising from the treaties have to be transformed into national law by an Act of

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[14] Gillian Doreen Triggs, *International Law: Contemporary Principles and Practices* (LexisNexis Butterworths, Australia, 2006) 105.
[15] Ibid 117.
[16] *Vienna Convention on the Law of Treaties*, opened for signature 23 May 1969, 1155 UNTS 331 (entered into force 27 January 1980) art 27.
[17] Martin Dixon, *Textbook on International Law* (Oxford University Press, 6th ed, 2005) 81.
[18] Ian Brownile, *Principles of Public International Law: Contemporary Principles and Practices* (Oxford University Press, 6th ed, 2003) 39; *Brazilian Federal Loans Case (France v. Brazil)* (1929) PCIJ (serial A) No 21 (July 12) 124–125.
[19] Triggs, above n 14, 118.
[20] Ibid 119.

Parliament before they can create any right or obligation enforceable in national courts.[21] The doctrine of parliamentary sovereignty is established there, though it may be presumed that the parliament does not intend to legislate contrary to international obligations.[22]

As in other common law countries, Bangladesh follows the dualistic approach in regard to the ratification and incorporation of international treaties within domestic law.[23] There is no express constitutional provision as to the application of international law in the national courts of Bangladesh. Article 145A of the Constitution of Bangladesh provides the status of international treaties as - 'all treaties with foreign countries shall be submitted to the president, who shall cause them to be laid before Parliament'.[24] Despite ratification by the state, Bangladeshi courts cannot enforce international principles, treaties or conventions until they are incorporated in municipal legislation.[25] However, the courts do utilise the international principles and covenants as an aid in the interpretation of provisions of pt III of the Constitution. If there is no clear provision in the domestic laws in any particular case, the national courts may take the provisions of international law as guidelines. The Supreme Court of Bangladesh has referred to these non-binding international instruments in various cases, such as *Zahida Ahmed (Liza) v Syed Noor Uddin Ahmed and another*,[26] *Bangladesh v Hasina*,[27] and *Dr. Mohiuddin Farooque v Bangladesh*,[28] where the right to life protected under the Constitution was conferred by reference to the resolution of World Health Organization.[29] Thus, it is evident that unless the principles of IEL have been included in domestic legal instruments, those cannot be implemented directly in the domestic arena.

As in many countries, the judiciary of Bangladesh plays a vital role in the application of internationally agreed legal principles in the domestic legal system. The remedies which are available to the judiciary when providing an award in cases involving environmental disputes are primarily injunctions or orders for declarative relief. The court can also award

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[21] Dixon, above n 17, 90.
[22] Ibid.
[23] M Z Ashraful, 'Status of Treaty under the Constitution of SAARC Countries: An Approach towards Bangladesh and India Perspective' (2014) 5(2) *Mediterranean Journal of Social Sciences-MCSE* 129, 131.
[24] *Constitution of the People's Republic of Bangladesh 1972* art 145A.
[25] *Chaudhury and Kendra v Bangladesh* (2008) WP 7977.
[26] *Zahida Ahmed (Liza) v Syed Noor Uddin Ahmed and Another* (2009) 38 CLC (HCD).
[27] *Bangladesh v Hasina* 60 DLR (AD) (2008) 90.
[28] *Dr. Mohiuddin Farooque v Bangladesh* (FAP 20 Case) (1996) IX BSCR (AD) 27; (1997) 17 BLD (AD) 1.
[29] Dinah Shelton, *International Law and Domestic Legal System: Incorporation, Transformation, and Persuasion* (Oxford University Press, 2011) 112.

civil damages or impose criminal fines. In a case, the High Court Division of the Supreme Court of Bangladesh, without mentioning any of the principles of IEL, granted injunction on the state authority to prevent them from filling up a public lake.[30] The constitutional urge to conform to the principles of IEL within the domestic sphere was visible in the Flood Action Programme Case[31], where the principle of sustainable development was applied indirectly. In this case, Dr Farooque challenged the validity of a government-led flood action programme claiming that the project would affect more than a million people by way of displacement; create ecological imbalance through destruction of natural habitat of fishes, flora and fauna; and impact on human health by worsening drainage, sanitation and water supplies. Accepting the contentions of the Appellant, the Appellate Division held that any encroachment to fundamental rights including the right to healthy environment is amenable to judicial scrutiny under art 102 of the Constitution.[32] In this way, the judiciary plays a complementary role in the development of IEL through interpreting the constitutional provisions and the national laws in light of the principles/provisions of IEL.[33]

The process of regional multi-governmental agreements' application within the domestic sphere generally follows the same as those applied in IEL. The goals of international conventions are usually implemented at the regional and national levels. At the national level, the implementation of the conventions' objectives requires a framework that includes policy, legislation, administrative systems, monitoring, and enforcement mechanisms. The CBD, CITES, UNFCCC and other conventions emphasise development of National Biodiversity Strategies and Action Plans to provide an opportunity for countries to develop systems. A review of policy and legislative instruments is considered beneficial to identify overlaps, gaps and synergies. Sharing best practices and the lessons (success and failure) from Southeast Asian, South Asian, European and Amazonian countries can potentially help each other for further improvement of policies, strategies, programmes or projects on sustainable mangrove management.

Although national action is the backbone of efforts to improve biodiversity management, many biodiversity issues such as forest fires, diseases, trading of forest products demands

[30] *M. Farooque v Bangladesh* (1997) WP 948.
[31] *M. Farooque v. Bangladesh* (1994) Writ Petition No. 998 ('Flood Action Programme Case').
[32] *M. Farooque v Bangladesh* (1997) 49 DLR (AD) 1.
[33] Triggs, above n 14, 121.

cross-national boundaries measures. A regional approach in this context is considered more advantageous to the national and global arrangements. Countries in a regional forum can create synergies by disseminating information and expertise through research networks and sharing best practices for updating member states' management actions. For example, strong regional commitment is reflected in the *ASEAN Agreement on Transboundary Haze Pollution 2002* by coordination of national actions for preventing and monitoring transboundary haze pollution through exchange of information, consultation, research and monitoring as well as sharing environmentally sound policies, best practices and technologies to strengthen national capacity in assessment, mitigation and management of land and/or forest fires.[34] Whereas some issues, including international trade, climate change, transboundary forest and watershed management, are more likely to have common interests and cannot be addressed sufficiently at a regional level because the problems themselves are global and therefore need broad commitment.

Generally, intergovernmental processes operate by consensus. At a global level, states find agreement on broad principles, such as the desirability of sustainable management of all types of forest, but not on the specifics of implementation. Thus, it is difficult for all states to reach consensus on the entire specific actions at global level that are essential for sustainable management of biodiversity. This is especially true if those actions require a large financial commitment. In this case, countries with similar environmental conditions are more likely to adopt common approaches to develop policy and management strategies. Although the aforementioned global, regional and intergovernmental instruments/frameworks are agreed to promote conservation of biodiversity and its sustainable use with the application of the ecosystem approach, combined efforts are crucial for implementing this commitment across jurisdictions (national, regional or international).

The following section examines the status of six principles of the ecosystem approach: integration of entire ecosystem components, conservation and sustainable use, access and equitable benefits sharing, decentralisation of management actions, mainstreaming adaptive management and inter-sectoral coordination in five international legal frameworks (the Ramsar Convention, World Heritage Convention, CBD, CITES and

[34] *ASEAN Agreement on Transboundary Haze Pollution*, opened for signature 10 June 2002 (entered into force 25 November 2003) preamble.

UNFCCC), four regional frameworks (the ASEAN, SAARC, EU and ACTO) and four intergovernmental institutional frameworks (the FAO, IUCN, ITTO and ISME).

3.2 Integration of Entire Ecosystem Components

The elements of an ecosystem are interconnected. To manage them as a whole, rather than as a series of disconnected parts, and to ensure its viable and continued growth, the ecosystem approach emphasises to integrate the entire functional ecosystem components including ecological structures, processes and functions while undertaking any conservation and development initiative on that ecosystem.

3.2.1 International Frameworks

The Ramsar Convention demonstrates a 'wise use approach' in handling all wetlands and implicitly promotes the ecosystem approach to manage those resources.[35] But the concept of 'wise use' was not defined in the convention text, which was developed in subsequent resolutions of the conference of the parties. The initial guidelines for the implementation of wise use were approved at COP5, 1993 recognising the multiple benefits and values of wetlands. These guidelines were revised at COP9, 2005 through adoption of conceptual frameworks on wise use of wetlands and the maintenance of their ecological character. The concept of 'wise use' was defined as 'the maintenance of their ecological character, achieved through the implementation of ecosystem approaches, within the context of sustainable development'. Likewise, the 'ecological character' of wetlands was defined as 'the combination of the ecosystem components, processes and benefits/services that characterize the wetland at a given point in time'.[36] So, the integration of the entire ecosystem components is thematically connected in the Ramsar Convention with the clarification of 'wise use' and 'ecological character' of wetlands for achieving conservation and sustainable utilisation of wetland resources.

The World Heritage Convention links conservation of global natural and cultural heritage. Since natural World Heritage Sites form part of larger and complex mosaic of composite

[35] C Max Finlayson et al, 'The Ramsar Convention and Ecosystem-Based Approaches to the Wise Use and Sustainable Development of Wetlands' (2011) 14(3–4) *Journal of International Wildlife Law & Policy* 179.
[36] *The Ramsar Convention on Wetlands*, 10th Meeting of the Conference of the Contracting Parties to the Convention on Wetlands, Kampala, Uganda, 8–15 November 2005, Res. IX.1 Annex A: A Conceptual Framework for the Wise Use of Wetlands and the Maintenance of Their Ecological Character.

ecosystems with multiple uses, it is acknowledged that the convention-focused programmes have significant effect not only on maintaining site integrity but on the conservation of biological diversity and promoting sustainable livelihoods within the extended landscape of the sites. The convention text does not clearly mention the notions of the ecosystem approach, but the World Heritage Centre (WHC)[37] recognises the need for its principles' integration into all stages of planning and management of World Heritage Sites in its *Natural Heritage Strategy*.[38]

The main objective of the CBD is to conserve biological diversity. It defines 'biological diversity' as the variability among living organisms from all sources: terrestrial, marine and other aquatic ecosystems and the ecological complexes upon which those are formed including diversity within species, between species and of ecosystems.[39] Thus, the importance of integration of entire ecosystem components is clearly stated within the convention text which is strengthened with its inclusion into the convention's operational framework, the ecosystem approach. The CBD COP2 (Jakarta, 1995) adopted Decision II/8, asserting that the conservation and sustainable use of biodiversity components should be addressed in a holistic manner, taking into account the three levels of biodiversity—gene, species and ecosystem—and fully considering socio-economic and cultural factors. The CBD COP2 mentioned that the ecosystem approach should be the primary framework of action to be taken in the implementation of the CBD's objectives. Therefore, it is apparent that the integration of entire ecosystem components together with the socio-economic and cultural consideration is reflected with the pledges of the convention.

As the CITES concentrates mainly on the regulation of international trade in endangered and threatened wild fauna and flora, the integration of entire ecosystem components is not explicitly mentioned anywhere in the convention text. In terms of approach, even though the instrument refers to the role of species in its ecosystem, it is not generally viewed as taking an ecosystem approach to management. The said notion of the ecosystem approach is indirectly mentioned in UNFCCC's commitment as 'all parties shall promote sustainable management, and promote and cooperate in the conservation and

[37] The World Heritage Centre (WHC), established in 1992, is the Secretariat to the United Nations Convention Concerning the Protection of the World Cultural and Natural Heritage 1972. It is based in Paris at UNESCO Headquarters.
[38] *The World Heritage Centre's Natural Heritage Strategy* (UNESCO World Heritage Centre, 2006) 6.
[39] CBD art 2.

enhancement, as appropriate, of sinks and reservoirs of all greenhouse gases, including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems'.[40] The COP17 to the UNFCCC adopted the Paris Agreement, in which the integration of entire ecosystem components is stated in the preambular paragraphs as 'noting the importance of ensuring the integrity of all ecosystems, including oceans and the protection of biodiversity'.[41] Climate change emerges as one of the major threats to biodiversity, and some of the actions proposed to mitigate climate change potentially imply dangers for biodiversity. Thus, the global community emphasises applying the ecosystem approach to address the synergistic mission of the UNFCCC with other biodiversity-related regimes.[42]

3.2.2 Regional Frameworks

The ASEAN region is blessed with immense coral reef and mangrove resources which are the base for many of the ASEAN Member States' (AMSs) impressive economic growth. However, a general decline in ASEAN's natural resources has been observed over the last 20 years.[43] Considering the radical shift in the international environmental realm and the increasing threats to the regional environment, the AMSs have taken numerous steps to maintain equilibrium between securing prosperity and conservation of biodiversity.[44] Though ASEAN evolved as a regional forum in the *Declaration Constituting an Agreement Establishing the Association of South-East Asian Nations (ASEAN) 1967*,[45] it adopted the ASEAN Charter in 2007, in which the commitment of safeguarding the region's environment and biodiversity is articulated as, '*to promote sustainable development so as to ensure the protection of the region's environment, the sustainability of its natural resources, the preservation of its cultural heritage and the high quality of life of its people*'.[46] Since conservation of natural resources, cultural heritage and improvement of life have been taken into consideration, it is assumed that the ASEAN Charter

[40] UNFCCC art 4.1(d).
[41] United Nations Framework Convention on Climate Change (UNFCCC), *FCCC/CP/2015/L.9/Rev.1 (21st Conference of the Parties): Adoption of the Paris Agreement (UNFCCC, 2015)* Preamble.
[42] Frédéric Jacquemont and Alejandro Caparrós, 'The Convention on Biological Diversity and the Climate Change Convention 10 Years After Rio: Towards a Synergy of the Two Regimes?' (2002) 11(2) *RECIEL* 169, 180.
[43] Biodiversity Information Sharing Service, 'ASEAN Biodiversity Outlook' (2011) <http://chm.Aseanbiodiversity.org/index.php?option=com_content&view=article&id=146&Itemid=232>.
[44] Ibid.
[45] *Declaration constituting an Agreement establishing the Association of South-East Asian Nations (ASEAN)*, opened for signature 8 August 1967, 1331 UNTS 235 (entered into force 8 August 1967).
[46] *The ASEAN Charter*, signed 20 November 2007 (entered into force 15 December 2008) art 9.

welcomes the integration of ecosystem's functional components within its scope of conservation and development drives.

The SAARC region is home to 14 per cent of world's mangroves and has biologically rich ecosystems including the Gulf of Mannar, the Isles of Maldives and the Sundarbans.[47] However, the number of threatened species has been increasing due to fragmentation of habitat resulting from urbanisation and consumerism pressures, illegal trade of animals, disasters and episodic events. Most member states have formulated National Biodiversity Action Plans, but due to non-integration of entire ecosystem components in national realm, harmonisation of conservation and use of ecosystem resources is absent. Collaborative action was felt to facilitate more detailed assessments, delineation of protected areas, revival of traditional conservation knowledge and curbing of bio-piracy.[48] Accordingly, the SAARC Convention on Cooperation on Environment[49] was signed, aiming to promote closer cooperation among the parties for the preservation and management of the environment.[50] It is evident that with the adoption of this instrument, SAARC recognises the integrality of considering the ecosystem as a whole for protecting it from further degradation.

The ecosystem approach is not expressly mentioned in the European treaties governing the establishment and functioning of the EU. Yet there is a clear duty under the *Treaty on the Functioning of the EU* (TFEU) to integrate environmental protection in EU policies to promote sustainable development.[51] The EU Policy on the Environment is set out in art 191 of the TFEU inter alia, '*shall contribute to pursuit of preserving, protecting and improving the quality of the environment, protecting human health, prudent and rational utilization of natural resources ... and in particular combating climate change*'.[52] The multiannual environmental action programmes set the framework for future action in all areas of environment policy. Sustainable development is an overarching objective which is

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[47] United Nations Environment Programme and Development Alternatives, *South Asia Environment Outlook 2009* (UNEP, SAARC and DA, 2009) 30.
[48] Ibid 42.
[49] *SAARC Convention on Cooperation on Environment, opened for signature 29 April* 2010 (entered into force 23 October 2013).
[50] Ibid, Preamble.
[51] Ronán Long, 'EU Law and The Ecosystems Approach: Making It Work in Practice' (2010) <https://www.iho.int/mtg_docs/com_wg/ABLOS/ABLOS_Conf6/S3P3-P.pdf>.
[52] European Union, *Consolidated versions of the Treaty on European Union, the Treaty on the Functioning of the European Union and Charter of Fundamental Rights 2012* art 191.

committed to a 'high level of protection and improvement of the quality of the environment' (*Treaty on European Union* art 3). Thus, it can be assumed that consideration of entire environmental components is manifested within the broad EU Environment Policy.

To protect the Amazonian biological wealth (the largest rain forest, home to 20 per cent of all species of fauna and flora in the world, 20 per cent of all fresh water reserves and more than 420 distinct indigenous communities)[53] and harmonise regional policies to foster its conservation and sustainable use, the ACTO was formed in the Amazon basin by eight countries—Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname and Venezuela. The common goal of the ACTO is mentioned in the Preamble of the Amazon Cooperation Treaty inter alia, '*to achieve overall development of ... Amazonian territories, it is necessary to maintain a balance between economic growth and conservation of the environment ..., cooperation among the Contracting Parties shall facilitate fulfilment of these responsibilities ...*'.[54] Since the socio-economic development and conservation and sustainable use of natural resources are given prominence in enhancing regional cooperation, it is assumed that consideration of all the functional components of ecosystem, including species, genetic, habitats and human beings, are engrained into ACTO's commitment.

3.2.3 Other Frameworks

The FAO emphasises considering the entire ecosystem components in designing management plans or conservation projects, as reflected in the FAO Mangrove Forest Management Guidelines. The guidelines underline inter alia,

> *Mangrove forest management depends on sciences and skills of geology, pedology, climatology, hydrology, botany, ecology, silviculture, forest technology and economics ... that should be set out in a working plan or an operational plan and implemented over space and time in a logical sequence to achieve desired objectives.*[55]

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[53] UNEP, ACTO and Research Center of Universidad del Pacífico (CIUP), *Environmental Outlook in Amazonia, Geo Amazonia* (2009) <http://wedocs.unep.org/bitstream/handle/20.500.11822/9421/-Environment_Outlook_in_Amazonia_%E2%80%93_GEO_Amazonia-2009GEO_Amazonia_2009_1.pdf. pdf ?sequence= 4&isAllowed=y>.

[54] *Amazon Cooperation Treaty*, signed 3 July 1978, UNTS I-19194 (entered into force 2 February 1980), Preamble, [4]–[5].

[55] FAO, *Mangrove Forest Management Guidelines* (FAO Forestry Department, 1994) 148.

The FAO further incorporates the consideration of inclusive ecosystem components (eg, species and habitat types) into fisheries management with a greater diversity of management measures.[56]

The ecosystem approach for both biodiversity conservation and sustainable development has always remained quintessential to the IUCN's work and policy advice. As the ecosystem approach is a newly agreed global approach for natural resources management, to fill the conceptual gap of its application in the field, the IUCN's Commission on Ecosystem Management produces important documents and promises to continue designing further guidance for the ecosystem approach.[57] Despite considering one component of ecosystem in conservation projects, IUCN emphasises adopting the ecosystem approach-prescribed multifunctional components to make any programme truly sustainable.[58] The IUCN believes that conservation strategies must strive to achieve the complementary key goals of maintaining biodiversity, promoting ecosystem values and enhancing resilience.[59] Thus, it is evident that the IUCN generally promotes the consideration of the ecosystem as a whole not only for yielding better economic return but for ensuring sustainability of the ecosystem.

Conversely, the ITTO supports diversification of international trade in tropical timber from legally harvested forests products and promotes sustainable practices of conservation and management of mangrove resources that combine environmental protection and social equity. Consideration of entire ecosystem components at all stages of preparation and implementation of forest management plans is given a prominent place in the ITTO-IUCN Guidelines.[60] To activate it at ecosystem level, the ITTO emphasises ensuring management planners and other legitimate stakeholders' access to the best available information on species and habitats of conservation concern and on the impacts that different practices have on biodiversity conservation.

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[56] FAO, *FAO Technical Guidelines for an Ecosystem Approach to Responsible Fisheries: The Ecosystem Approach to Fisheries* (FAO, 2003) 64.
[57] Gill Shepherd (ed), *The Ecosystem Approach: Learning from Experience* (IUCN, 2008) X; Richard D Smith and Edward Maltby, *Using the Ecosystem Approach to Implement the Convention on Biological Diversity: Key Issues and Case Studies* (IUCN, 2003) ii.
[58] Elizabeth McLeod and Rodney V Salm, *Managing Mangroves for Resilience to Climate Change* (IUCN, 2006) 23.
[59] Ibid 32.
[60] ITTO/IUCN, *Guidelines for the Conservation and Sustainable Use of Biodiversity in Tropical Timber Production Forests*, ITTO Policy Development Series No 17 (ITTO-IUCN, 2009), Guideline 24.

The ISME promotes sustainable development at global level through encouraging conservation and wise use of mangroves and disseminating best practices. The implementation of the ecosystem approach is strongly recommended in the ISME Mangrove Code as '*adopting the ecosystem approach to the conservation of mangroves and associated watersheds and coastal ecosystems, including transboundary areas*'.[61] Emphasising the multiple-use of mangrove resources, the ISME inspires states to consider the ecosystem as a whole in designing management operation strategy with in-depth understanding of the composition, structure and ecology of the forest and its environment.[62]

3.2.4 Evaluation of Integration of Entire Ecosystem Components in International, Regional and Other Frameworks

Though not clearly mentioned as to the insertion of entire ecosystem components in any operational drive, all of the international conventions mentioned above acknowledge its significance for achieving their aims and also for sustainable conservation and utilisation of the ecosystem. The CBD is the prime global instrument that promotes the notion of cross-sectoral and integrated consideration of ecosystem components within its provisions and has initiated subsequent actions against the long-embedded sectoral ecosystem conservation paradigm. To promote such holistic conservation paradigm as a common agenda, the CBD COP is working with other global biodiversity conventions through building joint liaison groups. The Ramsar Convention deals with wider components of ecosystems, including species and dependent livelihoods, while the CITES and World Heritage Convention concentrate on the protection of specific ecosystem components such as endangered species or the natural and cultural heritage bestowed living species. The UNFCCC emerged as a cross-cutting component of ecosystem, since climate change has a common bearing on environment and ecosystem in multidimensional forms. It is apparent that the Ramsar Convention, World Heritage Convention, CITES and UNFCCC do not endorse a specific approach to operationalise such notions as the CBD does, however, those instruments welcome the ecosystem approach as a viable operational framework to achieve their common agenda of conservation of global biological resources.

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[61] Donald J Macintosh and Elizabeth C Ashton, *Principles for a Code of Conduct for the Management and Sustainable Use of Mangrove Ecosystems* (World Bank, ISME, Center Aarhus, 2004) ('ISME Mangrove Code') Principle 1.2b.
[62] Ibid Principle 9.3.

Similarly, some challenges associated with implementing the coordinated approach in ecosystem management have been identified by the COPs to the Conventions and by the Joint Liaison Groups to the Conventions. For example, under an integrated approach identifying and designating peatlands; preparing inventories to assist monitoring and assessment of climate change impact on ecosystem; examining the potential of peatlands to increase resilience of socio-economic systems rather focusing solely on peatland carbon sequestration capacity requires available funding and technologies.[63] The CITES COP17 also directed the parties to include food security and livelihoods via Decisions 17.41 and 17.42 to conserve and manage the ecosystem resources and wildlife in an integrated way.[64] The World Heritage Committee, by the Decision 41 COM 5C, also urged the States Parties to integrate the environmental, social and economic aspects while respecting the Outstanding Universal Value of World Heritage properties for better protection of the world's cultural and natural heritage.[65]

Likewise, the said Conventions prescribe a set of mechanisms such as establishing national inventory on biodiversity, wetlands and places of international importance; introducing EIA and strategic environmental assessment (SEA) for assessing impacts on environment and ecosystem; setting biodiversity, environment, climate change and SDG as national agendas for maintaining the entirety in biological resource conservation and management. For instance, the UNFCCC COP24 urges the state parties to integrate climate change issue during developing and implementing their relevant national plans and strategies to minimise loss and damage and reduce disaster risks (Decision 10/CP.24).[66]

Similar recognition of the integration of the ecosystem approach's total ecosystem components is explicitly or indirectly reflected in the ASEAN, SAARC, EU and ACTO

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[63] Ramsar COP13 Resolution XIII.14 on Promoting Conservation, Restoration and Sustainable Management of Coastal Blue-carbon Ecosystems; Dubai, United Arab Emirates, 29 October 2018, para 1(d) <https://www.ramsar.org/sites/default/files/documents/library/xiii.14_blue_carbon_e.pdf>; Ramsar COP13 Resolution XIII.3 on Governance of the Convention; Dubai, United Arab Emirates, 29 October 2018, s. 16 <https://www.ramsar.org/sites/default/files/documents/library/xiii.3governancee.pdf >.

[64] CITES COP17: Decisions 17.41 and 17.42 on Food Security and Livelihoods; September – October 2016, Johannesburg, South Africa, sec 13 <https://www.cites.org/sites/default/files/eng/dec/valid17/E17-Dec.pdf>.

[65] UNESCO-WHC 41st Session: Decision WHC/17/41.COM/5C on Item 5C: World Heritage Convention and Sustainable Development; Krakow, Poland, 2 – 12 July 2017, para 4 <https://whc.unesco.org/archive/2017/whc17-41com-18-en.pdf>.

[66] UNFCCC COP 24: Decision 10/CP.24 (FCCC/CP/2018/10/Add.1) on Report of the Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts; Katowice, Poland, 2 – 15 December 2018, para 10(b) <https://unfccc.int/sites/default/files/resource/cp2018_10_add1_advance.pdf>.

frameworks and is also exercised within regional and member states' domestic jurisdiction. To maintain equilibrium between securing prosperity of humanity and conservation of biodiversity, the AMSs and EU focuses more on holistic consideration of ecosystem components in their regional policy and practices than the SAARC and ACTO. Though the SAARC and ACTO are endowed with a rich share of global biological treasures, their commitment relating to integrated actions for conserving ecosystems has so far remained rhetoric. Likewise, the FAO, IUCN, ITTO and ISME strongly adhere to adopting the ecosystem approach's holistic ecosystem consideration notions in designing policies and putting those into practice. Compared to the ITTO and ISME, the FAO and IUCN are comprehensive in pursuing integration of the multidimensional components of the ecosystem approach into their own policy prescriptions and inclusion in the policy and legislation of their member states.

3.3 Conservation and Sustainable Use

The integration of conservation and development is emphasised in the ecosystem approach to ensure sustainability in ecosystem functioning and resilience in natural resource management. To achieve such aims, the ecosystem approach advocates for the incorporation of sustainable use mechanisms, thereby limiting irrational use of ecosystem-generated services while enabling scope for their regeneration and maintenance of natural balance.

3.3.1 International Frameworks

The Ramsar Convention places human needs at the centre of wetland management based on the multiple functions that the ecosystem performs and the multiple uses that are made of these functions. The convention uses the term 'wise use' for making an appropriate balance between the conservation and utilisation of natural resources. The wise use concept was redefined in the Ramsar COP3 as '*their [wetland resources] sustainable utilization for the benefit of humankind in a way compatible with the maintenance of the natural properties of the ecosystem*'. It further defined 'sustainable utilization' as '*human use of a wetland so that it may yield the greatest continuous benefit to present generations*

while maintaining its potential to meet the needs and aspirations of future generations'.[67] Thus, the convention recognises the diverse values of wetlands for providing ecological, social and economic benefits for the humanity[68] and later acknowledges the ecosystem approach through subsequent guidelines in the Ramsar Toolkit for maintenance of ecological character of wetlands which are critical to continued provisioning of ecosystem services.

The sustainable use concept is included in the World Heritage Convention Operational Guidelines for the implementation of World Heritage Convention's commitment. It is mentioned that World Heritage properties can support a variety of uses that are ecologically and culturally sustainable and which may contribute to the quality of life of communities. However, the state party and its partners must ensure that such use does not impact on the Outstanding Universal Value of the property.[69] It is obvious that the preservation of Heritage Sites is the priority of the convention, however, sustainable utilisation of resources is emphasised where the subsistence of ecosystem-dependent livelihoods are entrenched.

Sustainable use of ecosystem components is mentioned throughout the CBD text. The convention promotes a balancing mechanism in the use of ecosystem resources through using the term 'Sustainable use' as described in the text as, '*the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations*'.[70] It provides general guidelines for 'incentive-driven conservation' for the state parties to ensure sustainable use of biological resources at the national, regional and international levels. The CBD-endorsed *Cartagena Protocol*[71] helps to ensure sound use and transfer of living genetically modified organisms resulting from

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[67] *The Ramsar Convention on Wetlands*, The 3rd Meeting of the Conference of the Contracting Parties to the Convention on Wetlands, Regina, Can., 27 June – 5 May 1987, Recomm. 3.3: Wise Use of Wetlands, at annex.

[68] Brian Rotich, Esther Mwangi and Sreven Lawry, *Where Land Meets the Sea: A Global Review of the Governance and Tenure Dimensions of Coastal Mangrove Forests* (CIFOR, Bogor, Indonesia and USAID Tenure and Global Climate Change Program, Washington, DC, 2016) 5.

[69] UNESCO World Heritage Centre, *Operational Guidelines for the Implementation of the World Heritage Convention* (UNESCO World Heritage Centre, 2016) [119].

[70] CBD art 2.

[71] *Cartagena Protocol on Biosafety to the Convention on Biological Diversity*, opened for signature 29 January 2000, 2226 UNTS 208, 39 ILM 1027 (entered into force 11 September 2003) ('Cartagena Protocol').

modern biotechnology that likely have adverse effects on the conservation and sustainable use of biodiversity. The CBD COP further adopted the Addis Ababa Principles on Sustainable Use of Biodiversity via Decision VII/12, which provides a governance framework for sustainable use of biodiversity. It is apparent that continuous efforts are being made to achieve the CBD's goal of conservation and sustainable use of biodiversity.

The CITES was originally designed to minimise international trade which was viewed as a major threat to many wild species. As such, it had no mechanism to deal with the concept of sustainable extractive use of species, although the concept was strongly contested. This is despite the fact that trade in Appendix II species requires assurance on the part of the exporting country that such trade has no detrimental effect on the species concerned. The spirit of the conservation and sustainable use principle is reflected in the CITES's Preamble with recognising the need to protect wild flora, fauna and the natural ecosystems in the context of inter- and intra-generational equity. However, the CITES has steadily moved from being a prohibitive approach to restrict illegal trade towards being a more sustainable use approach to facilitate sustainable trade.[72] The reasons are demonstrated in following example. The listing of the African elephant (*Loxodonta Africana*) from Appendix II to Appendix I at CITES COP7 (1989) for restraining trade of ivory and conservation of elephant initially brought moderate success, but the levels of poaching gradually increased due to the demand for ivory in Asian markets remaining stable. The Appendix I listing resulted in a total trade ban not only on ivory but on the commercial sale of other derivatives such as hides and leather products, which seriously affected incomes of communities. Thus, the long-term goal of a ban on the trade of ivory largely failed.[73] The CITES member states, particularly the developing countries of southern Africa such as Namibia, South Africa, Botswana and Zimbabwe, thus expressly recognise sustainable extractive use of species as a potential means for their protection.

Consequently, a number of flexible decisions regarding sustainable use/trade of species were taken by the CITES COP.[74] This indicates the move of the CITES towards

[72] Michael J Hickey, 'Acceptance of Sustainable Use within the CITES Community' (1999) 23 *Vermont Law Review* 861.

[73] Max Abensperg-Traun, 'CITES, Sustainable Use of Wild Species and Incentive-driven Conservation in Developing Countries, with an Emphasis on Southern Africa' (2009) 142 *Biological Conservation* 948, 953–954.

[74] For example, 'Conditional approval of one-off sale of 60 tons of raw ivory' by Botswana, Namibia and South Africa were set out in Res. Conf. 10.10 (rev. COP12, 2002); 'Recognition of the benefits of trade in

commercial trade in recognition of its prospects for the conservation of species and/or the development of local people.[75] In support of the CITES's current standpoint, innovative mechanisms relying on use and providing incentives to conserve species have progressively been developed.[76] Since the CITES has no enforcement mechanism, it delegates such authority to member states to ensure sustainability in conservation and use or trade of wildlife species as espoused under the ecosystem approach. However, the success of the CITES-promoted conservation and sustainable use or trade of wildlife species largely depends on individual states' political will and effective functioning of legal and regulatory machineries.

The sustainable use mechanism is not well articulated in the UNFCCC text. However, the state parties are urged to protect against the adverse effects of climate change for the benefit of present and future generations on the basis of equity via art 3. Article 2 sets an objective to stabilise the greenhouse gas concentrations at a level to ensure food production is uninterrupted and to enable economic development to proceed in a sustainable manner.[77] It is comprehended that sustainable use of ecosystem resources has been ingrained in the UNFCCC's theme.

3.3.2 Regional Frameworks

Conservation and sustainable use of biological resources are crucial to sustaining the economic development and social stability in the ASEAN region. The ASEAN Centre for Biodiversity (ACB) was established in 2005 to assist the AMSs to implement such agenda through policy support and database management and to demonstrate a platform for

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wildlife' was supplemented with a paragraph linking CITES by Res. Conf. 8.3 (rev. COP13, 2004); 'Establishment of a Working Group to develop a process to evaluate CITES impacts on the livelihoods of the poor' and 'Approval of the one-off sale of raw ivory to Japan and China' by COP14 (2007). CITES Res. Conf. 14.2, 2007 reaffirms CITES's support for sustainable use not only as a strategy to achieve biodiversity conservation but of poverty alleviation goals. Sustainable use of species is also recognised in the CITES Strategic Plan 2008-2013 in conformity with the UN's 2015 goal of enabling a significant contribution to the economic concerns of developing countries.

[75] CITES Resolution Conf. 8.3 on Recognition of the Benefits of Trade; Resolution Conf. 9.20 (Rev); Resolution Conf. 11.16; Decision 11.1, Annex 1: Strategic Plan through 2005.

[76] IUCN, 'Trade Measures in Multilateral Environmental Agreements: A Report by IUCN – the World Conservation Union of the Effectiveness of Trade Measures Contained in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (Report prepared for the Economics, Trade and Environment Unit, UNDP, 2001) 21.

[77] UNFCCC arts 2, 3.

sharing its implementation experiences within the AMSs.[78] Such commitment is reinstated in the ASEAN Socio-Cultural Community (ASCC) Blueprint 2025 inter alia, to '*promote sustainable use of ecosystems and natural resources through environmental education, community engagement and public outreach*'.[79] The integrality of this mechanism is also portrayed in the ASEAN Cooperation in Forestry as, '*enhance sustainable forest management for the continuous production of forest goods and services in a balanced way … as well as optimize their utilization, compatible with social and ecological sustainability*'.[80] The ASEAN Mangroves Network (AMNet) is developing to bring a better livelihood and environment for coastal populations through sustainable use of mangrove resources.[81]

Sustainable use mechanism is not noticeable in the SAARC framework, although its reflection is visualised in the vision statement of SAARC Forestry Centre as '*protection, conservation and prudent use of forest resources by adopting sustainable forest management paradigm … to contribute towards sustainable development and conservation of global environment*'.[82] The notion of sustainable use has been integrated in member states' domestic regulations. India's *National Policy on Biodiversity 2008* aims at providing frameworks for developing detailed programmes for the conservation and sustainable use of biodiversity. The provisions to control excessive extraction of ecosystem resources are inserted in the *Bangladesh Biological Diversity Act 2017*. The *National Environment Action Plan of the Maldives 2016-2025* outlines policies and action plans to protect the fragile marine ecosystem through integrated reef resources management. Bhutan adopts a strict conservation and sustainable use policy for maintaining at least 60 per cent of its land area under closed forests to sustain climatic equilibrium and prevention of soil erosion. Regional cooperation is crucial in ensuring sustainable use principle in transboundary biodiversity. Since the Sundarbans is encircled by Bangladesh and India, a MOU for the Conservation of the Sundarbans and a Protocol

[78] *Agreement on the Establishment of the ASEAN Centre for Biodiversity*, signed on 12 September 2005 (enter into force 23 July 2009) ('ACB Agreement') art 2.
[79] *ASEAN Socio-Cultural Community Blueprint 2025* (ASEAN Secretariat, March 2016) art 16 C.1.vii.
[80] *Strategic Plan of Action for ASEAN Co-operation in Forestry (2016-2025)* s. 1.3.
[81] Lukas Giessena and Muhammad Alif K Sahideb, 'Blocking, Attracting, Imposing, and Aligning: The Utility of ASEAN Forest and Environmental Regime Policies for Strong Member States' (2017) 67 *Land Use Policy* 19.
[82] 'Proceedings of Meeting of Heads of Institutes/Centres of Forestry Research Related to "Sustainable Forest Management, Climate Change related to Forestry and Mountain Ecosystems in the SAARC Region"' (SAARC Forestry Centre, Thimphu, Bhutan, 10–11 October 2012), 5 <http://www.sfc.org.bt/images/research.pdf>.

on Conservation of Sundarbans Bengal Tiger has been signed between the two countries.[83] Bangladesh has joined the 'Strengthening Regional Cooperation on Wildlife Conservation project' with India, Nepal and Bhutan to strengthen national capacities for promoting conservation and sustainable use of biodiversity and to conjointly tackle the cross-border trafficking of wild animals through smart patrolling.[84]

Sustainable use component is echoed in the *EU Biodiversity Strategy 2020*[85] and the EU Water Framework Directive (WFD).[86] Methodological linkages between the ecosystem approach and the WFD, including consideration of benefits, costs and trade-offs that occur in each case, demonstrated its potential to act in a complementary way to facilitate the directive's implementation.[87] The EU Marine Strategy Framework Directive (2008/56/EC) emphasises applying the sustainable use concept to the management of human activities and the maintenance of ecological integrity for waters, habitats and resources within estuarine, coastal and offshore systems.[88] It is evident that EU legislation sets a foundation for the implementation of sustainable use mechanisms in delivering the objectives of the WFD and EU Marine Strategy Framework Directive. Though not manifested in the texts, sustainable use concept is embedded in the objectives of the EU Bird Directive[89] (which aims at the protection of wild birds in the EU through controlling their use) and the EU Habitats Directive[90] (emphasises ensuring protection of natural habitats for wild fauna and flora and improvement of the quality of environment).

The ecosystem approach's conservation and sustainable use notion is engrained in the Amazon Cooperation Treaty as '*to promote the harmonious development of their [Contracting Parties] respective Amazonian territories in such a way that produces equitable and mutually beneficial results and achieve … the conservation and rational*

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[83] Ministry of Environment and Forests, 'Bangladesh - Rio+20: National Report on Sustainable Development' (Report, Government of Bangladesh, 2012) 39.
[84] Ibid, 40.
[85] *EU Biodiversity Strategy for 2020* (EUR-Lex - 52011DC0244 - EN - EUR-Lex - Europa EU).
[86] European Parliament Council Directive 2000/60/EC Establishing a Framework for Community Action in the Field of Water Policy. *Official Journal of the European Union* (2000) L327:1–72.
[87] Ibid, 693.
[88] Ángel Borja et al, 'Marine Management – Towards an Integrated Implementation of the European Marine Strategy Framework and the Water Framework Directives' (2010) 60(12) *Marine Pollution Bulletin* 2175.
[89] EU Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the Conservation of Birds, *Official Journal of the European Union* (2010) L 20/7, Preamble, [7].
[90] EC Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Flora and Fauna, *Official Journal of the European Communities* (1992) L 206/7, Preamble, [7].

utilization of the natural resources of those territories'.[91] The GEF Marine Project implemented along the Chilean Coast is a manifestation of successful implementation of the ecosystem approach, where conservation commitment to marine and coastal resources and economic development based on sustainable uses of these resources has been achieved.

3.3.3 Other Frameworks

The FAO guidelines on the ecosystem approach to fisheries support sustainable use of aquatic resources for effective delivery of food, economic wealth and recreation and suggest developing appropriate tools for economic valuation of ecosystem goods and services to ensure their wise use.[92] The FAO prepared a strategic framework that identifies priorities for supporting the forest sector, including the valuation of non-market goods and services, and establishment of community-based enterprises for revenue generation. The sustainable use tool is recognised in the IUCN's 18th Session of General Assembly as, '*the ethical, wise and sustainable use of some wildlife can provide an alternative or supplementary means of productive land use, and can be consistent with and encourage conservation, where such use is in accordance with appropriate safeguards*'.[93] To ensure any uses of wild living resources are equitable and ecologically sustainable, the IUCN established the Sustainable Use Initiative which incorporates regionally-structured Specialist Groups of the Species Survival Commission.[94]

The sustainable use principle is laid down in *International Tropical Timber Agreement 2006* art 1 as '*encouragement of reforestation and forest management, sustainable utilization and conservation of the tropical forest and its genetic resources*'.[95] The sustainable conservation of mangroves was also prominent in the ITTO Strategic Action Plan 2013-2018. The ITTO co-hosted a side event at the CBD COP11 to launch a policy brief on mangroves titled '*Securing the future of mangroves*' where concerns of future possibilities of sustainable use of mangrove were portrayed. The ITTO in collaboration with the IUCN also jointly publishes Guidelines for the conservation and sustainable use of native animal and plant species in tropical timber production forests.

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[91] *Amazon Cooperation Treaty* art 1.
[92] FAO Technical Guidelines for an Ecosystem Approach to Responsible Fisheries, above n 56, 87, 89.
[93] IUCN, *IUCN Policy Statement on Sustainable Use of Wild Living Resources* (IUCN, 2000) 2.
[94] Ibid, 3.
[95] International Tropical Timber Organization, *ITTO Mangrove Workplan 2002-2006* (ITTO, 2002) 1.

The fundamental objective of mangrove management, as set in the ISME Mangrove Code, is '*to promote conservation, and where necessary restoration or rehabilitation and sustainable use of mangrove ecosystems and their associated habitats to benefit local to global populations*'.[96] Principle 3 of the Mangrove Code specifically suggests inserting the provisions of sustainable use in national frameworks to ensure protection for mangrove-associated biodiversity.[97] The said notion is embedded in the ISME Charter for Mangroves as '*the sustainable use of mangrove ecosystems would provide a better use of the resource*'.[98] Principle 5 of the charter recognises the sustainable utilisation mechanism practiced by traditional mangrove users to improve their quality of life.[99]

3.3.4 Evaluation of Conservation and Sustainable Use in International, Regional and Other Frameworks

The ecosystem approach's sustainable use of ecosystem resources is a dynamic concept within which welfare for both the human and ecosystems is engrained. Historically, the biodiversity conservation paradigm has been evolved with prohibitive approaches in the use of ecosystem resources. But due to the competing demand of human being's interests over ecosystem resources and recognition of rights of humanity over biodiversity, the concept of sustainable use of ecosystem services has received global recognition. As part of this trend, the importance of incorporating a balancing mechanism between conservation and use of ecosystem services is recognised in all five global conventions. The Ramsar Convention and CBD use the term 'wise use' and 'sustainable use', while the CITES and World Heritage Convention promote rational utilisation of ecosystem resources conducive to natural regeneration of species and ecosystems and/or the development of local people. However, for ensuring sustainable use of ecosystem resources, the CBD-prescribed 'incentive-driven mechanism' and CITES (in regard to ensuring sustainable extractive use of species) delegated enforcement authority to member states. For instance, the CITES COP17 took resolution (CITES COP17 Decision 17.14) on access to available funding to explore the potential for scaled-up financial resources in

[96] ISME Mangrove Code, Principle 1.
[97] Ibid Principle 3.
[98] *The ISME Charter for Mangroves* (ISME, November 1991) Preamble, [C].
[99] Ibid Principle 5.

order to ensure the conservation and sustainable use of wildlife.[100] In order to address the challenges relating to the availability of external funds, the CITES COP17 directed the CITES secretariat to extend collaboration with the World Bank and other financial institutions, and cooperation agencies, which generally contributes to the sustainable use of wild fauna and flora.[101]

While the Ramsar COP13 via Resolution XIII.20 stresses for better promotion of the conservation and wise use of intertidal and associated coastal wetlands for biodiversity and ecosystem services, and reconsidering the mudflat conversion at priority sites for biodiversity as a precautionary approach until full assessments are undertaken to assure the maintenance of its ecological services.[102] The World Heritage Committee, by the Decision 41 COM 5C (WHC/17/41.COM/5C), calls on States Parties of the World Heritage Convention to develop appropriate methodologies and tools, and to support capacity-building programs for integrating heritage conservation into sustainable development frameworks and mainstreaming the conservation and sustainable use mechanism in conservation and management of World Heritage properties.[103]

The actual implementation of the conservation and sustainable use mechanism largely depends on strong political commitment of the government, effective enforcement of law and proper functioning of state machineries of member states, all of which are mammoth tasks for developing countries. The UNFCCC COP24 further complemented several approaches, such as community-based adaptation, ecosystem-based adaptation, and livelihood diversification to adaptation planning, and also the sustainable use tools for continual production of food and supporting sustainable economic development through stabilisation of greenhouse gas concentrations (Decision 9/CP.24).[104]

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[100] CITES COP17: Decision 17.14 on Access to Funding; September – October 2016, Johannesburg, South Africa, sec 7 <https://www.cites.org/sites/default/files/eng/dec/valid17/E17-Dec.pdf>.
[101] Ibid.
[102] Ramsar COP13 Resolution XIII.20 on Promoting the Conservation and Wise Use of Intertidal Wetlands and Ecologically-associated Habitats; Dubai, United Arab Emirates, 29 October 2018, para 46 <https://www.ramsar.org/sites/default/files/documents/library/xiii.20intertidalwetlandse.pdf>.
[103] UNESCO-WHC 41st Session: Decision WHC/17/41.COM/5C on Item 5C: World Heritage Convention and Sustainable Development; Krakow, Poland 2 – 12 July 2017, para 9 <https://whc.unesco.org/archive/2017/whc17-41com-18-en.pdf>.
[104] UNFCCC COP 24: Decision 9/CP.24 (FCCC/CP/2018/10/Add.1) on Report of the Adaptation Committee; Katowice, Poland, 2 – 15 December 2018, para 10 <https://unfccc.int/sites/default/files/resource/cp2018_10_add1_advance.pdf>.

The concept is considered key to sustaining harmonious development, social stability and conservation of environment in the ASEAN, Amazonian and SAARC regions. The ASEAN has demonstrated some vital initiatives such as the declaration of ASEAN's long-term vision via the ASCC and formation of different regional networks like the ACB, AMNet and ASEAN Cooperation in Forestry to coordinate the implementation of sustainable use mechanism within AMSs. Such a notion is epitomised strongly as ensuring the quality of lives and environment in the EU policies and practices. It is noticeable that the ASEAN and EU's initiatives contribute more in promoting the global agenda of sustainable use of resources at regional level than the SAARC and the ACTO.

To make ecosystem use sustainable, the FAO emphasises on analysing the valuation of non-market goods and services and establishment of community-based enterprises for revenue generation. The FAO also emphasises improvement of governance mechanisms to reflect intergenerational, intra-generational, cross-sectoral and cross-cultural equity for getting tangible outcomes from the utilisation of this mechanism. As a pioneer of the sustainable use tool, the IUCN supports ethical and wise use of some wildlife as alternative or supplementary means of productive land use. The IUCN further underscores constant improvement of management regimes via adaptive mechanism so that the monitoring and assessment mechanism can dynamically be adjusted with the changing circumstances. The ITTO and ISME have also developed a series of internationally agreed policy documents for achieving the conservation, sustainable use and trade of tropical forest resources. Nevertheless, both recognise the sustainable utilisation of mangrove or tropical timber resources by the traditional users for ensuring their welfare.

3.4 Access and Equitable Benefit Sharing

According to the ecosystem approach, the equitable sharing of ecosystem services benefits entails fair distribution of genetic resources and appropriate transfer of related technologies among the ecosystem user groups that can be ensured by enabling access to genetic resources and by facilitating appropriate funding.

3.4.1 International Frameworks

Although the benefit-sharing tool has not been inserted in the Ramsar Convention text, the Ramsar Guidelines (developed in COP4, 1990 and COP5, 1993) emphasise the multiple

values of wetlands, such as sediment and erosion control, maintenance of water quality, support for fisheries and agriculture for the benefits of human being and biodiversity. In this sense, the convention promotes integrated approaches for managing ecosystems to ensure fair and equitable outcomes from environmental management. It has adopted many management approaches for the wise use of wetlands; most notable are the Integrated River Basin Management, Integrated Water Resources Management and Integrated Coastal Zone Management. All promote the notion of equitable benefit sharing and rational use of ecosystem assets for their long-term sustainability.

The World Heritage Convention emphasises prioritising actions in and around Heritage Sites that integrate an ecosystem approach to conservation, including actions contributing to sustainable livelihoods, which directly or indirectly assist site conservation.[105] The notion of equitable benefit sharing has resonated in the consideration of improvement of livelihoods of those living around Heritage Sites. The World Heritage Convention is currently exploring approaches to recognise resource industries, especially fishing, forestry, agriculture and tourism, operating within Heritage Sites endowed with larger ecosystems as sustainable engines for recurrent generation of goods and promotion of sustainable livelihoods, thereby helping to establish the mechanism for equitable sharing of benefits derived from Heritage Site resource industries.[106]

ABS in a fair and equitable way arising from biodiversity and genetic resources is mentioned in art 15 of the CBD. According to the CBD, benefit sharing obligations are applicable to all those cases where access is provided for 'commercial and other utilization of genetic resources'. The applicability of benefit sharing remained imprecise in the convention text. Thus, the CBD adopted the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits in 2010, which has provided significant legal clarity in respect to benefit sharing obligations and utilisation of genetic resources. The protocol promotes the traditional knowledge of indigenous communities associated with genetic resources and the benefits derived from the use of such knowledge. Thus, the ABS notion has been annexed to the CBD.

[105] *The World Heritage Centre's Natural Heritage Strategy*, above n 38, 6.
[106] Ibid 11.

The provision for ABS is not present in the CITES. However, trade with genetic resources takes place. In the Vilm Workshop on 'Promoting CITES-CBD Cooperation and Synergy', it was emphasised that both conventions need tools and strategies to achieve ABS.[107] Apart from recognition in the Preamble that species have economic value, the CITES does not incorporate social and economic considerations of conservation action. But international efforts are ongoing to establish mutual a supportive mechanism between the CBD and CITES concerning ABS. The ecosystem approach's equitable benefit sharing can be compared to the consideration of cost-effectiveness so mentioned in art 4 of the UNFCCC text inter alia, '*... climate change should be cost-effective so as to ensure global benefits at the lowest possible cost*'.[108] Nevertheless, it is crucial to ensure the economic and non-economic values of biodiversity in climate change–related activities and incentives.[109] International reflection on economic valuation of biodiversity is at an incipient stage, although it demonstrates the efficacy of ecosystem protection towards climate change adaptation and mitigation.[110] The convention also calls for including climate change considerations into programmes with appropriate methods (e.g., EIA) for minimising the adverse effects on economy, public health and environment.

3.4.2 Regional Frameworks

The echo of ABS is reflected in the Preamble of the ASEAN Charter as 'resolved to ensure sustainable development for the benefit of present and future generations and to place the well-being, livelihoods and the welfare of the peoples at the centre of ASEAN community'.[111] The ABS mechanism is embedded as a mandate of ACB as stated in the ACB Agreement, 'The purpose of this centre is to facilitate cooperation and coordination among the ASEAN … on fair and equitable sharing of benefits arising from the use of biological diversity'.[112] The Ratification and Implementation of the Nagoya Protocol on Access and Benefit Sharing in ASEAN Countries project is implementing a viable benefit-

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[107] The International Academy for Nature Conservation (INA), *Expert Workshop Promoting CITES-CBD Cooperation and Synergy*, International Academy for Nature Conservation, Isle of Vilm, Germany 20-24 April 2004.
[108] UNFCCC art 4.
[109] CBD Secretariat, 'Connecting Biodiversity and Climate Change Mitigation and Adaptation: Report of the 2nd Ad Hoc Technical Expert Group on Biodiversity and Climate Change, Technical Series No 41' (CBD Secretariat, 2009) 8–14.
[110] *CBD Decision 10/2, The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets*, UNEP/CBD/COP/10/27 (20 January 2011) paras 7, 17(e).
[111] *The ASEAN Charter* Preamble.
[112] ACB Agreement art 2.

sharing tool in building a sense of ownership. In Vietnam, the project provides not only benefit to the Dao ethnic group in Sapa, Lao Cai province but provides them with better understanding of their ownership of traditional knowledge. Sapa Napro, a local company, which has started using the medicinal plants and Dao's traditional knowledge in processing its products has, in return, begun supporting conservation efforts to ensure sustainable harvesting of these plants.[113] The project supports the Myanmar's Ministry of Education's Biotechnology Research Department to incorporate the benefit-sharing mechanisms, including information on access to genetic resources, traditional knowledge associated with genetic resources, and the monitoring and utilisation of genetic resources in formal agreements with foreign research institutions. This new system helps institutions dealing with Myanmar's genetic resources to conserve indigenous biological resources and prevent their misappropriation.[114]

The ABS mechanism is not clearly mentioned in the SAARC Charter, however, it promotes regional cooperation for promoting the welfare and improving the quality of life of people in the region.[115] India and Bangladesh, within the SAARC community, have enacted regulations relating to ABS. India passed the *Biological Diversity Act 2002*, which aims to 'provide for conservation of biological diversity, sustainable use of its components and equitable sharing of benefits out of use of biological resources and for matters connected therewith or incidental thereto'.[116] Ensuring the equitable distribution of ecosystem-generated benefits within local communities along with recognition of their local knowledge and innovative ideas is emphasised in the *Bangladesh Biological Diversity Act 2017*.[117] Following India, Pakistan, Nepal and Sri Lanka have drafted Bills relating to access and equitable benefit sharing.[118]

The EU has yet to introduce comprehensive legislation addressing the principle of access to biological resources and related traditional knowledge and benefit sharing. The 1998

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[113] UNEP, *Genetic Resources for the Benefit of All* (2016) <https://www.unenvironment.org/news-and-stories/story/genetic-resources-benefit-all-0>.
[114] Ibid.
[115] *Charter of the South Asian Association for Regional Cooperation (SAARC)*, adopted on 8 December 1985, Preamble, art 1(a).
[116] *Indian Biological Diversity Act 2002* preamble.
[117] *Bangladesh Biological Diversity Act 2017* s 30.
[118] Kanchana Kariyawasam, 'Access to Biological Resources and Benefit-sharing: Exploring a Regional Mechanism to Implement the Convention of Biological Diversity (CBD) in SAARC Countries' (2007) 29(8) *European Intellectual Property Review* 325.

EU Biodiversity Strategy and the Directive 98/44/EC on the legal protection of biotechnological innovations noted the need to promote appropriate frameworks for ABS for the community. The 2001 EU Biodiversity Action Plan for Economic and Development Cooperation emphasises strengthening capacity building in developing countries to enable them to share the benefits from utilisation of genetic resources. The EU 2020 Biodiversity Strategy proposes legislation to implement the Nagoya Protocol so that the EU can ratify it as soon as possible.[119] Some EU member states have enacted legislation for promoting benefit-sharing schemes. For example, the Norwegian *Nature Diversity Act 2009* contains a number of provisions pertinent to ABS.[120] To promote the ABS, Switzerland amended the *Federal Act on the Protection of Nature and Cultural Heritage 1966*.[121]

The ACTO adopted a regional Amazon Strategy on Biodiversity aimed at achieving sustainable utilisation of ecosystem resources through installing viable network of bio-prospecting and developing proper market mechanism to grasp economic benefits from Amazonian bio-products. The Tarapoto system has been developed for creating a set of Criteria and Indicators for Amazon forest sustainability. The ACTO's Strategic Plan includes a BioTrade[122] programme to build enabling conditions for BioTrade, create markets for BioTrade products and encourage exchanging good practices on equitable sharing of environmental, social and economic benefits among participants.

3.4.3 Other Frameworks

The *International Treaty on Plant Genetic Resources for Food and Agriculture 2004* (ITPGRFA) was adopted with the efforts from the FAO to support an ABS mechanism. The ITPGRFA establishes a multilateral system to facilitate access to plant genetic resources and to share equitable benefits derived from their use.[123] The FAO and its Commission on Genetic Resources for Food and Agriculture (GRFA) periodically revisit

[119] *EU Biodiversity Strategy for 2020*, above n 85, Target 6.
[120] *Norway Act relating to the Management of Biological, Geological and Landscape Diversity 2009* s 57.
[121] *Swiss Federal Act on the Protection of Nature and Cultural Heritage 1966* (amended in 21 March 2014) art 1(d).
[122] UNCTAD, *BioTrade Principles and Criteria* (United Nations Conference on Trade and Development, 2007).
[123] *International Treaty on Plant Genetic Resources for Food and Agriculture*, opened for signature November 2001 (entered into force on 29 June 2004).

the issue of ABS for GRFA.[124] For example, the Commission on GRFA adopted Resolution 1/2009 stressing the special nature of agricultural biodiversity and inviting the CBD COP to allow for differential treatment of different sectoral genetic resources, of different activities and of different purposes for which activities are carried out.[125]

IUCN prepared an Explanatory Guide that explains the possible options for developing ABS strategies, key components of ABS legislative measures and ABS institutions.[126] It promotes the ABS mechanism to ensure social equity. It believes that without establishing long-term economic security through practicing the fair distribution of benefits and costs of conservation among different social groups, social equity cannot be ensured since social groups have differential needs, rights to and responsibilities over resources and they experience the real impacts of conservation and development interventions.[127] Thus, the IUCN embraces socio-economic and cultural equity concerns via integrating benefit sharing component in its policies, programmes and projects at the national, regional and global levels.

Equitable sharing of the costs and benefits of biodiversity conservation is set in the ITTO's Guidelines as, '*to promote the conservation and sustainable use of native animal and plant species ... through the equitable sharing of the costs and benefits of biodiversity conservation and sustainable use in tropical production forests*'.[128] The ISME encourages taking similar measures to ensure the ABS deriving from mangrove resources use is in line with the pledges enshrined in art 8 of the CBD (which obliges the parties to encourage the equitable sharing of benefits arising from the utilisation of indigenous and local people's knowledge, innovations and practices).[129]

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[124] FAO Commission on Genetic Resources for Food and Agriculture, *ABS Elements: Elements to Facilitate Domestic Implementation of Access and Benefit-Sharing for Different Subsectors of Genetic Resources for Food and Agriculture* (FAO Commission on Genetic Resources for Food and Agriculture, 2016) 1.
[125] FAO Commission on Genetic Resources for Food and Agriculture, *Cross-sectoral Matters* (2002) <http://www.fao.org/nr/cgrfa/cross-sectorial/abs/en/>.
[126] Thomas Greiber et al, *An Explanatory Guide to the Nagoya Protocol on Access and Benefit-sharing* (IUCN, 2012) xvii.
[127] IUCN, *Policy on Social Equity in Conservation and Sustainable Use of Natural Resources* (IUCN, 2000) 2.
[128] The ITTO/IUCN, above n 60, 16.
[129] ISME Mangrove Code, Principles 3.1j, 9.2e.

3.4.4 Evaluation of Access and Equitable Benefit Sharing in International, Regional and Other Frameworks

The notions of equitable sharing of ecosystem-generated benefits are strongly engrained in the aforementioned international regimes within their own portfolio. The Ramsar Convention and World Heritage Convention mostly connect the theme with involving the ecosystem users in resource distribution for improving their quality of life. The CBD introduces the Nagoya Protocol for promotion of an equitable sharing mechanism. The progressive development of an ABS mechanism is also documented in the CBD COP resolutions. The provisions of equitable benefit sharing are not explicitly mentioned in the original texts of the CITES and UNFCCC, but its reflection is evident within the objectives of the UNFCCC pursuant to the non-economic values of biodiversity in climate change–related activities that potentially affect economy, public health and the environment. Since all the international instruments are gradually extending their focus for achieving the UN SDGs,[130] which aim to reduce inequality and discrimination from society by 2030, it is expected that strong commitments for mainstreaming the notion of access and equitable benefit sharing will soon be integrated into those instruments by their succeeding COPs. The initiatives for integration of the ABS notions has been evident in the subsequent COPs to the Conventions. For instance, the CITES COP17 via Decision 17.36 directs the parties to generate economic incentives for the conservation of wildlife and improvement of livelihoods of indigenous and local communities in order to ensure legal and sustainable trade of wildlife.[131] Similarly, for overcoming difficulties (in allocating financial and in-kind resources), the CITES COP17 encourages the State Parties to develop intergovernmental and non-governmental organisations and public and private donors/investors.[132]

While the Ramsar COP13 (Resolution XIII.17) stresses for the integrated assessment and valuation of wetland services following the Guidance for Valuing the Benefits Derived from Wetland Ecosystem Services (Ramsar Technical Report No.3/Technical Series No.27 of the CBD) for equitable distribution and sharing of wetland generated benefits

[130] United Nations General Assembly, *Transforming Our World: The 2030 Agenda for Sustainable Development*, A/RES/70/1 (21 October 2015).
[131] CITES COP17: Decision 17.36 on Livelihoods; September – October 2016, Johannesburg, South Africa, sec 12 <https://www.cites.org/sites/default/files/eng/dec/valid17/E17-Dec.pdf>.
[132] Ibid, CITES COP17: Decision 17.38 on Livelihoods.

among the vulnerable wetland resource users.[133] The World Heritage Committee urges all State Parties (in conflicts of interests with local interest groups) to refrain from any action that would cause damage to cultural and natural heritage, and to take possible measures like developing of a mechanism/agreement for proportional sharing of benefits generated from World Heritage sites with local communities (including indigenous and tribal community) to protect such heritage from illicit trafficking of cultural objects and illegal wildlife trade (WHC/18/42.COM/7).[134] In order to achieve a greater balance between finance for mitigation and adaptation, recognising the importance of adaptation finance and the need for public and grant-based resources for adaptation, the UNFCCC COP24 appeals developed country Parties to continue their efforts to channel a substantial share of public climate funds to adaptation activities (Decision 3/CP.24).[135] Similarly, the UNFCCC COP24 requests Parties to enhance their enabling environments and policy frameworks to facilitate the mobilization and effective deployment of climate finance.[136]

The provisions for an ABS are not strongly entrenched in the regional frameworks of the ASEAN, SAARC and EU. The ACTO is advanced in this regard, having adopted the Amazon Strategy on Biodiversity which recognises traditional knowledge for establishing a possible network of BioTrade to fairly economic benefits from Amazonian bio-products. The EU has not yet ratified the Nagoya Protocol. Since patents of native genetic resources are concerned, both developed and developing countries are taking time to enact healthy legislation on ABS. Some of the nations in these regional forums, including India, Bangladesh, Norway and Switzerland, have incorporated the ABS mechanisms into their domestic legislation. Like the CBD, the FAO-patronised ITPGRFA presents a multilateral system to facilitate the ABS arising out of the use of plant genetic resources in an equitable manner. The IUCN promotes the ABS mechanism to ensure long-term economic security and social equity while, the ITTO and ISME encourage developing mechanisms to recognise the knowledge, innovations and practices of indigenous people, and thus

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[133] Ramsar COP13 Resolution XIII.17 on Rapidly Assessing Wetland Ecosystem Services; Dubai, United Arab Emirates, 29 October 2018, para 2 <https://www.ramsar.org/sites/default/files/documents/library/xiii.17rapid_assessment_ecosystem_servicese.pdf>.

[134] UNESCO-WHC 42nd Session: Decision WHC/18/42.COM/7 on Item 7: State of Conservation of World Heritage Properties; Manama, Bahrain, 24 June – 4 July 2018, paras 17, 20 <https://whc.unesco.org/archive/2018/whc18-42com-18-en.pdf>.

[135] UNFCCC COP24: Decision 3/CP.24 (FCCC/CP/2018/10/Add.1) on Long-term Climate Finance; Katowice, Poland, 2 – 15 December 2018, para 4 <https://unfccc.int/sites/default/files/resource/cp2018_10_add1_advance.pdf>.

[136] Ibid, para 7.

ensure their coherent use of the ABS. It is evident that efforts on endorsement and enforcement of ABS-related international obligations within most of the regional and other multilateral entities' legal policy and practices are in nascent stage. Therefore, substantial efforts are required to correctly place the ABS mechanism in a regional framework.

3.5 Decentralisation of Ecosystem Management

The CBD promotes rights, interests and choices of ecosystem user groups through enabling management conditions where they have access to and scope for participation in decision-making and decision implementation with respect to the ecosystem. The ecosystem approach encourages the process of decentralising management actions that can value such rights of ecosystem user groups.

3.5.1 International Frameworks

Participatory practices in wetland management are not well addressed in the Ramsar Convention text. The Ramsar Secretariat incorporated it in the Strategic Plan 2009-2015 as '*... contracting Parties develop, adopt and use the necessary and appropriate instruments and measures, with the participation of the local indigenous and non-indigenous population and making use of traditional knowledge ...*'.[137] According to the Ramsar Guidelines for Strengthening Local Communities' and Indigenous Peoples' Participation in Wetland Management, these communities are to ensure access to wetland resources for the maintenance of their livelihoods security and cultural heritage.[138] Inclusive participation of local and national populations in the protection of Heritage heritages is set as one of the objectives in the World Heritage Convention's Operational Guidelines.[139] It encourages the states parties to ensure wider participation of stakeholders: site managers, local governments, local interested partners' in the identification and management of World Heritage property.[140]

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[137] David Pritchard (ed), *Ramsar Handbooks for the Wise Use of Wetlands, Handbook 7, Participatory Skills: Establishing and Strengthening Local Communities' and Indigenous People's Participation in the Management of Wetlands* (Ramsar Convention Secretariat, 4th ed, 2010).
[138] *Guidelines for Establishing and Strengthening Local Communities' and Indigenous People's Participation in the Management of Wetlands*, Ramsar Resolution VII.8, COP7 Report, 1999.
[139] UNESCO World Heritage Centre, above n 69, [211], Objectives.
[140] Gonzalo Oviedo and Tatjana Puschkarsky, 'World Heritage and Rights-based Approaches to Nature Conservation' (2012) 18(3) *International Journal of Heritage Studies* 285, 286.

The spirit of decentralised actions of managing ecosystem resources while providing ample access to ecosystem user groups', including women, is reflected in the CBD text. Recognising women's role in the Preamble, the CBD affirms the need for ensuring their meaningful participation at all levels of biodiversity conservation. Article 8(j) recognises the need of indigenous communities' involvement in biodiversity management for its long-term sustainability. Article 14(1) urges state parties to introduce appropriate procedures for public participation in assessing environmental impact of any proposed projects that are likely to have significant adverse effects on biodiversity.

There is no explicit provision in the CITES text relating to connecting local actors to achieving the Convention's objectives except in the Preamble, where it is stated '*peoples and States are and should be the best protectors of their own wild fauna and flora*'.[141] Article IV of the CITES requires monitoring of exports of CITES-listed species to ensure the species' role in its ecosystem. Without involvement of the local stakeholders, proper monitoring is not possible. Thus, it is assumed that the notions of participatory management are dormant within the CITES. The CITES COP adopted several resolutions outlining measures to promote participatory enforcement. For example, Res. Conf. 15.2 encourages state parties to consider the needs of indigenous and local communities when adopting trade policies concerning wild fauna and flora.[142]

The importance of multi-stakeholders' participation in assessment and monitoring of climate change and adoption of mitigation and adaptation programme are recognised in the UNFCCC. Articles 4(i) and 6 urge state parties to formulate regulations for promoting public awareness on climate change and encourage wider participation, including of NGOs, in this process and cooperation in exchanging best practices. The Subsidiary Body for Scientific and Technical Advice of the UNFCCC underlines adopting a community-centred and gender-sensitive governance mechanism for governing natural resources to ensure transparency, empowerment and accountability at a local level.[143]

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[141] CITES Preamble.
[142] CITES Resolution Conf. 15.2 on Wildlife Trade Policy Reviews.
[143] UNFCCC, *SBSTA/2017/3 Synthesis Report on 'Adaptation Planning, Implementation and Evaluation Addressing Ecosystems and Areas such as Water Resources' for the 46th Session* (Bonn 8–18 May 2017) Annex 1, 22.

3.5.2 Regional Frameworks

The essence of participatory management is reflected in art 1 of the ASEAN Charter as, 'to promote a people-oriented ASEAN in which all sectors of society are encouraged to participate in, and benefit from, the process of ASEAN integration and community building'.[144] The ASEAN further emphasises the need for cross-sectoral engagement, which is echoed in the ASCC Blueprint 2025 inter alia,

> to promote equitable opportunities, participation and effective engagement of women, children, youths, the elderly/older persons, persons with disabilities, people living in remote and border areas, and vulnerable groups in the development and implementation of ASEAN policies and programmes.[145]

Local people's participation through local government institutions is emphasised in the ASEAN regional framework for empowering them.[146] The Green Coast programme implemented in the 2004 tsunami-affected areas in Indonesia, Sri Lanka, India, Thailand and Malaysia is a glaring example of it. The community's active participation in this rehabilitation effort not only helped restore the damaged coastal ecosystems of the tsunami-affected areas but enhanced their resilience to climate change.[147]

The importance of ensuring participatory ecosystem management resonates in the SAARC Forestry Centre's mandate as 'promotion of participatory forestry for improvement of rural livelihoods, and local forest management'.[148] The ecosystem approach's decentralising principle has been incorporated in some of the SAARC nation's national legal frameworks in different lens. For example, an increasing trend of decentralisation of forest management responsibilities to local government and local communities is evident from the Joint Forest Management Programmes in India, and from the transfer of forest lands to local user groups in Bangladesh, Bhutan and Nepal.[149] Sri Lanka's Biodiversity Conservation Action Plan forms a broad framework for biodiversity conservation with scope of wider stakeholder participation. The 'Wana Senasuna' forest hermitage

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[144] *The ASEAN Charter* art 1, [13].
[145] *ASEAN Socio-Cultural Community Blueprint 2025*, above n 79, art 13, B.2.i.
[146] Ibid art 9, A.2.iii.
[147] A Colls, Neville Ash and Ninni Ikkala Nyman, *Ecosystem-based Adaptation: A Natural Response to Climate Change* (IUCN, 2009) 7.
[148] 'Proceedings of Meeting of Heads of Institutes/Centres of Forestry Research Related To "Sustainable Forest Management, Climate Change related to Forestry and Mountain Ecosystems in the SAARC Region"' (SAARC Forestry Centre, Thimphu, Bhutan, 10–11 October 2012) 5 <http://www.sfc.org.bt/images/research.pdf>.
[149] Ibid 41.

programme is such an initiative by Sri Lanka to involve the Buddhist clergy and devotees for protecting the forests with cultural values.[150] Local community-based organisations' effective participation has helped to restore mangrove ecosystems in the coastal areas of Sindh and Balochistan in Pakistan through community-developed strategic mangrove management plans and climate-resilient environmental, social or development initiatives.[151]

Application of the ecosystem approach's participatory approach in the EU is proving to be a powerful mechanism for conserving wetlands compared to the traditional species and protected areas approach, which is reflected in the synthesis report of 11 wetland conservation projects implemented along Central and West Asia and the Mediterranean region. During implementation of the ecosystem approach provided framework for the case studies, there were concerns as to how it would be applied against the traditional 'sectoral, state-owned' system of wetland conservation.[152] However, it is found that the balance of conservation and development, the emphasis on maintaining ecosystem functionality and on participatory approaches are all pertinent to the conservation of wetlands.

Though not clearly mentioned in the Amazon Cooperation Treaty, the Amazonian Strategic Cooperation Agenda pursues inclusion of indigenous communities in the management of resources to protect their traditional knowledge.[153] The ecosystem approach's participatory mechanism is observed in the Andean Moore Project where the indigenous communities were offered to participate in resource management. The Andean culture communities along with other interest groups overwhelmingly participated in the initiative, quitting their long-embedded traditional management. Such adaptive and participatory actions showcase the ecosystem approach's success.[154] The effectiveness of coordinating conservation and participation mechanisms against the prevailing sectoral

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[150] United Nations Environment Programme and Development Alternatives, above n 47, 42.
[151] Amjad A Shah and Kamaruzaman Jusoff, 'Mangrove Conservation through Community Participation in Pakistan: The Case of Sonmiani Bay' (2007) 4(1) *International Journal of Systems Applications, Engineering & Development* 78.
[152] Mike Moser (ed), *Towards a Community of Practice of Wetland Project Managers: Lessons Learned from Central and West Asia and the Mediterranean* (Conservation of Iranian Wetlands Project and Ramsar Regional Centre for Central and West Asia, 2011) 88.
[153] *Amazonian Strategic Cooperation Agenda 2010* (Approved at the X Meeting of the TCA's Ministers of Foreign Affairs, Brasilia).
[154] Angela Andrade Pérez (ed), *Applying the Ecosystem Approach in Latin America* (IUCN, 2008) 8–9.

approaches to water resource management has also helped to promote conservation and sustainable development in the Paraguay-Panama Wetland System which located across six countries of the South Cone.[155]

3.5.3 Other Frameworks

The FAO guidelines underline decentralising decision-making at the lower levels of administration through creation of institutions and improvement of governance capacity at lower governance levels.[156] It assists non-government actors with funding and capacity building so that they can participate in forest policy formulation and implementation processes. The IUCN also promotes the ecosystem approach's flexible management structures to ensure mass participation in ecosystem management and to adjust with changing circumstances.[157] The ITTO espoused the decentralised management mechanism as a tool for achieving sustainable use of biological resources. Principle 5 of the ITTO Guideline for the Conservation and Sustainable Use of Biodiversity states that a '*decentralized management and improved institutional arrangements and governance can assist the achievement of biodiversity conservation and sustainable use goals in tropical production forests …*'.[158] The ITTO believes that effective biodiversity conservation requires the resolution of longstanding issues related to forest tenure, access rights to natural resources and improved local governance.[159] Thus, it emphasises involving local people in the creation, design, negotiation and implementation of legal forest governance mechanisms, community and small-scale forestry, and joint forest management agreements in ways that can provide incentives to conserve biodiversity, in making arrangements between communities and private enterprises that can favour sustainable biodiversity conservation.

The ISME Mangrove Code emphasises the active engagement of real mangrove resource users for managing mangroves sustainably.[160] Multi-stakeholders' representation is also echoed in the Charter for Mangroves.[161] The ISME recognises that conservation policies

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[155] Ibid.
[156] FAO Technical Guidelines for an Ecosystem Approach to Responsible Fisheries, above n 56.
[157] Angela Andrade Pérez et al, *Principles and Guidelines for Integrating Ecosystem-based Approaches to Adaptation in Project and Policy Design* (IUCN-CEM, CATIE, 2012) 2.
[158] ITTO/IUCN, above n 60, Principle 5.
[159] Ibid 34.
[160] ISME Mangrove Code, Principle 1.2d.
[161] *The ISME Charter for Mangroves* art 24.

cannot succeed unless addressing the problems quiescent with the people and production. In practice, the ISME promotes the theme 'Policy, People and Productivity', which is noticed in the SFD–ISME Collaborative Project implemented in Sabah, Malaysia. The project has so far shown success in the regeneration of mangroves in Sabah, previously ruined by oil palm extraction and shrimp cultivation, where conservation awareness and stakeholder engagement play a dominant role.[162]

3.5.4 Evaluation of Decentralisation of Ecosystem Management in International, Regional and Other Frameworks

All five international legal frameworks explicitly mention the importance of communities' involvement at decision-making, monitoring, evaluation and management of ecosystem resources for ensuring equity and breeding a sense of ownership that are fundamental to achieving the sustainability of ecosystems. Several challenges are also espoused in the conventions' COP resolutions for ensuring meaningful participation of communities in resource management such as recognition of community representation in policy and legislation, institutional arrangement for connecting communities, creating space for shared management, and arrangement of incentives such as training for communities to shoulder responsibilities. For example, the CITES COP17 (Decisions 17.26, 17.27, 17.28, 17.29 and 17.30) decided to involve rural communities and young groups in the CITES processes to avoid potential conflict of interest among local communities in conservation, management, use and trading of wildlife and ecosystem resources.[163] The Ramsar COP13 emphasises utilising women's traditional knowledge in the conservation, management and sustainable use of wetland resources and urges to pay special attention to them considering their vulnerability to inadequate water facilities.[164]

The World Heritage Committee also encourages States Parties to support the participation of site managers to future fora and other capacity building opportunities in order to enable them to provide appropriate information with regard to the management of respective sites

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[162] Joseph Tangah et al, *Rehabilitation of Mangroves in Sabah − The SFD-ISME Collaboration (2011−2014)* (Sabah Forestry Department (SFD), International Society for Mangrove Ecosystems (ISME) and Tokio Marine & Nichido Fire Insurance Co Ltd, 2015) 7.

[163] CITES COP17: Decisions 17.26 and 17.27 on Young Engagement and Decisions 17.28, 17.29 and 17.30 on Engagement of Rural Communities; September – October 2016, Johannesburg, South Africa, sec 17 <https://www.cites.org/sites/default/files/eng/dec/valid17/E17-Dec.pdf>.

[164] Ramsar COP13 Resolution XIII.18 on Gender and Wetlands; Dubai, United Arab Emirates, 29 October 2018, paras 6, 12 <https://www.ramsar.org/sites/default/files/documents/library/xiii.18gendere.pdf>.

(WHC/18/42.COM/7).[165] In order to share experience, best practices and lessons learned on mitigation and adaptation to address the climate change in an integrated way, the UNFCCC COP24 requests the State Parties to engage the indigenous peoples and local communities into all relevant activities operating under the convention.[166] The UNFCCC COP24 also recommends to integrate the non-state actors, including civil society, the private sector, financial institutions, and local communities in the process to formulate and implement national adaptation plans.[167]

The ASEAN emphasises the local community's representation through local government institutions, while the EU and SAARC frameworks recommend it for empowering communities living with nature. The ACTO supports such a notion to ensure indigenous communities' customary knowledge in resource management. The FAO, IUCN and ITTO all pursue decentralisation of resource management to the lowest appropriate level to foster greater efficiency, effectiveness, equity and ownership as well as to enable local community groups, NGOs and civil societies to be key actors in adaptation planning. In support of participatory practices, the ISME promotes the theme 'Policy, People and Productivity' to address the perennial problem of people and production which generally helps to regenerate ecosystems, particularly in the ASEAN region.

3.6 Adaptive Management

The ecosystem approach emphasises espousing adaptive management provisions in the regulatory framework and service providing mechanism for quick adaption to the radical shifts in ecosystem management, such as climate change, emergence of new technology and adoption of innovative conservation model or best practices.

[165] UNESCO-WHC 42nd Session: Decision WHC/18/42.COM/7 on Item 7: State of Conservation of World Heritage Properties; Manama, Bahrain, 24 June – 4 July 2018, para 4 <https://whc.unesco.org/archive/2018/whc18-42com-18-en.pdf>.

[166] UNFCCC COP24: Decision 2/CP.24 (FCCC/CP/2018/10/Add.1) on Local Communities and Indigenous Peoples Platform; Katowice, Poland, 2 – 15 December 2018, para 16 <https://unfccc.int/sites/default/files/resource/cp2018_10_add1_advance.pdf>.

[167] UNFCCC COP24: Decision 8/CP.24 (FCCC/CP/2018/10/Add.1) on National Adaptation Plans; Katowice, Poland, 2 – 15 December 2018, para 12 <https://unfccc.int/sites/default/files/resource/cp2018_10_add1_advance.pdf>.

3.6.1 International Frameworks

The adaptive management strategy is not included in the Ramsar Convention text. The Ramsar Secretariat incorporated it in the later Ramsar Handbook 8 for categorisation of wetlands by complexity, changing conditions and uncertainty. The strategy is widely felt to bring flexibility in wetland management to change the existing plans with the emergence of new information.[168] Such a strategy is also included in the Ramsar Handbook 7, where participatory practices are utilised from project design to monitoring of projects in the process of 'learning-by-doing' for assessing the continual progress. The World Heritage Convention helps parties to develop adaptation measures by mobilising technical and financial resources to address the emerging management challenges at the World Heritage Sites.[169] It inspires state parties to make use of regional and global networks of Heritage Sites and urges managers to set up monitoring systems to monitor the progress of threat mitigation.

The term adaptive management is not mentioned in the CBD text. Nevertheless, the CBD COP emphasises the use of adaptive management practices in Decision V/6 (Malawi, 2000). The CITES contains no explicit reference to adaptive management in its treaty text. The approach is encompassed in the subsequent resolutions of CITES COP, especially in the non-detriment findings that are important for trade in Appendix II–listed species. The Resolution Conf. 16.7 on non-detriment findings urges that a vital consideration for ensuring trade viability would be the implementation of adaptive management, including monitoring.[170]

The notion of adaptive management is listed in the UNFCCC by the precautionary principle. The convention advised the parties to take precautionary measures to anticipate, prevent or minimise the causes of climate change and mitigate its adverse effects. The parties are also urged, through art 3(3), to adopt cost-effective policies to deal with climate change, where there are threats of irreversible harm to the environment and lack of full scientific certainty. Article 4(g) of the treaty emphasises conducting scientific and

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[168] Ramsar Convention Secretariat, *Water-related Guidance: An Integrated Framework for the Convention's Water-related Guidance. Ramsar Handbooks for the Wise Use of Wetlands* (Ramsar Convention Secretariat, 4th ed, 2010) vol 8.
[169] *The World Heritage Centre's Natural Heritage Strategy*, above n 38, 5.
[170] CITES, 16th Meeting of the Conf. of the Parties, Bangkok, Thailand, 3–14 March 2013, Non-Detriment Findings: a, Res. Conf. 16.7.

technical research; systematic observation and development of data archives related to climate change; and generating new knowledge of causes, effects and magnitude of climate change and the socio-economic consequences apprehended. The Subsidiary Body of Scientific and Technological Advice of UNFCCC also acknowledges adaptive management as integral to responding to the uncertainty of future climate impacts.[171]

3.6.2 Regional Frameworks

The ASEAN adopted a range of adaptive measures within its regional framework to respond to the emerging challenges on the people and environment. Some strategic approaches, including access to information, people-to-people interaction within and outside the ASEAN, strengthening the capacity of the ASEAN civil service and exchange of best practices, are included in the ASCC Blueprint 2025 for building an adaptive ASEAN community.[172] The establishment of ASEAN Forestry Extension, Education and Training and the Biodiversity and Climate Change Project are other examples of initiatives taken by the ASEAN to enhance adaptive management. The theme of adaptive management is embedded in AMSs' national legislation. For example, Malaysia incorporated several provisions in related laws, such as ensuring access to indigenous people, preparation of sustainable harvest plan, prohibition of illegal logging, EIAs for converting forest lands into non-forest uses, and preparation of national forest inventories to retain and enhance forest cover and other vegetation.[173]

The SAARC Environment Action Plan 1997 emphasises enhancing environmental management capabilities of the region where environment protection is considered as the axis and human wellbeing is its ultimate goal.[174] To cope with climate change–induced environmental problems, the SAARC member states endorse a range of mechanism including assessment of environment and updating of national environment action plans.[175] There is also emphasis on strengthening mechanisms for exchanging information and appropriate technologies to record and monitor meteorological data on climate change

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[171] UNFCCC, above n 143, 20.
[172] *ASEAN Socio-Cultural Community Blueprint 2025*, above n 79, art 21 E.1.
[173] Abdul Haseeb Ansari, *Legal and Policy Framework for Ecosystem-based Adaptation to Climate Change in Malaysia: A Reform Oriented Study* (2014) <http://irep.iium.edu.my/37829/2/haseeb_paper.pdf>.
[174] *SAARC Environment Action Plan 1997*, adopted in the 3rd Meeting of the SAARC Environment Ministers, Malé, 15–16 October 1997, art 5.
[175] Ibid art 6.

and sea level rise.[176] To provide climate resilient livelihood to coastal communities, Bangladesh has undertaken a 'Community-Based Adaptation to Climate Change through Coastal Afforestation' (CBACC-CF) project by which an innovative land-use model based on the Forest, Fish, Fruit model (FFF) has been developed. The FFF-based adaptation practices, focused on developing partnerships, are successful in providing recurrent AIG and triggering shared learning and joint problem-solving, enabling better understanding and response to climate change that leads to increased adaptive capacity of poor coastal communities.[177]

In response to the multifarious demands on forests and issue related to climate change, the EU adopted the Forestry Strategy 2013[178], aiming to support the conservation of forests biodiversity on the principles of sustainable forest management. The 4th Ministerial Conference for the Protection of Forests in Europe tried to integrate sustainable forest management with the ecosystem approach to enhance better adaptive orientation in natural resource management.[179] The ecosystem approach's adaptive management appears as a key feature in the European Common Fisheries Policy where the precautionary principle has been included to minimise the impact of fishing activities on marine ecosystems.[180] To protect the marine and coastal environment from ensuing challenges, the coastal countries of the Baltic Sea adopted the Helsinki Commission Baltic Sea Action Plan that covers a series of actions, including an adaptive implementation based on scientific assessments.[181]

Though not explicitly mentioned in the ACTO's Framework, the ecosystem approach's adaptive management is evident in the policy and practices within the Amazonian nations. Brazil incorporated the ecosystem approach into the *National Adaption Plan for Climate Change* to harness biodiversity and ecosystem services as part of a strategy to help people

[176] Ibid arts 7–9.
[177] Paramesh Nandy and Ranju Ahmed, 'Navigating Mangrove Resilience through the Ecosystem based Adaptation: Lessons from Bangladesh' in Donald J Macintosh, R Mahindapala and M Markopoulos (eds), *Sharing Lessons on Mangrove Restoration* (Mangroves for the Future, Thailand and IUCN, 2012) 247–251.
[178] European Commission, *A New EU Forest Strategy: For Forests and the Forest-based Sector*. In COM (2013) 659 final (European Commission, 2013).
[179] Ministerial Conference on the Protection of Forests in Europe, *Sustainable Forest Management and the Ecosystem Approach* (WARSAW, 2005).
[180] Robin Churchill and Daniel Owen, *The EC Common Fisheries Policy* (Oxford University Press, 2010) 76.
[181] Hermanni Backera et al, 'HELCOM Baltic Sea Action Plan – A Regional Programme of Measures for the Marine Environment based on the Ecosystem Approach' (2010) 60(5) *Marine Pollution Bulletin* 642, 647–648.

adapt to climate change.[182] The approach was applied in most of the projects in the Chocó-Manabi Conservation Corridor (located on the Columbia–Ecuador boarder and the Chiquitano Forest in Bolivia, Paraguay and Brazil) where it has shown success in sustainable conservation of biological resources with arrays of functioning such as defining priorities for maintaining ecological integrity, planning in multiple and spatial scale, promoting stakeholders' participation and enabling cultural diversity as adaptive management strategy.

3.6.3 Other Frameworks

The ecosystem approach is applied to specific elements in FAO's works including achieving sustainable crop production, supporting sustainable use of fisheries resources, providing technical and policy support to retention of forest resources.[183] This exemplifies the FAO's commitment on adaptive management's application in agriculture, fishery and forestry. As part of the promotion of adaptive management, the IUCN presented an Ecosystem-based Adaptation Guideline to help people adapt to climate variability and the impacts of climate change.[184] It also focuses on developing monitoring systems to enable multi-stakeholder reflection learning and adoption of new management decisions.[185]

The ITTO integrates the adaptive management notions in the Guidelines as,

> biodiversity conservation and sustainable use in the complex ecological, social and economic settings … requires skills in adaptive management based on sound data and knowledge of forest conditions derived from monitoring and communication with all stakeholders.[186]

The ITTO Action Plan also requires introducing adaptive management into state policy and practices. It suggests a range of measures including a monitoring mechanism for operationalising adaptive management in biodiversity conservation.[187] The ITTO has undertaken a collaborative initiative with the CBD for enhancing biodiversity conservation in tropical forests with four objectives: enhancing local capacity for biodiversity

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[182] Max Kasparek et al (eds), *Committed to Biodiversity: Germany's International Cooperation in Support of the Convention on Biological Diversity for Sustainable Development* (BMZ and BMUB, 2014) 43.
[183] FAO, *Biodiversity: Ecosystem Approach* (2018) <http://webcache.googleusercontent.com/search?q=cache:CCFom0434LYJ:www.fao.org/biodiversity/cross-sectoral-issues/ecosystem-approach/en/+&cd=1&hl=en&ct=clnk&gl=au>.
[184] Colls, Ash and Nyman, above n 147, 1.
[185] Pérez et al, above n 157, 2.
[186] ITTO/IUCN, above n 60, Guideline 17.
[187] ITTO/CBD, *Collaborative Initiative for Tropical Forest Biodiversity* (2018) <http://www.itto.int/cbd/>.

conservation in production forests and rehabilitation of degraded forests, improving the management of protected forest areas and transboundary conservation, safeguarding forest biodiversity through Reducing Emissions from Deforestation and Forests Degradation (REDD+) projects, and improving the welfare of indigenous and local communities through the conservation and sustainable use of biodiversity.

The ISME, in its Mangrove Code, adopted some principles such as the precautionary approach, mitigation measures and monitoring mechanism.[188] All these measures are similar to the ecosystem approach's adaptive management. The Charter for Mangroves urges establishing specific statutory measures such as EIAs at the local and landscape or regional levels to monitor the status of mangrove ecosystems and current practices and to enable early detection of adverse effects. It encourages avoiding activities (e.g., industry, urban development, agriculture and aquaculture) within intertidal areas that involve loss of mangrove ecosystem and associated habitats integrity, adopting strict protection measures for mangroves and associated habitats (e.g., greenbelts and buffer zones) where natural phenomena (such as cyclones/tidal surges and erosion) have significant adverse effects on the coastline to protect the mangrove wetland ecosystems from climatic and man-made development intervention.[189]

3.6.4 Evaluation of Adaptive Management in International, Regional and Other Frameworks

Adaptive management is not in the original text of the Ramsar Convention, World Heritage Convention, CITES or CBD, but it is placed dominantly in the UNFCCC via the precautionary principle. However, as threats to ecosystems (climatic or human induced) are a common concern, all of those instruments were adopted for some kind of protection of natural ecosystems and safeguarding ecosystem-dependent communities, and the reflection of adaptive management's notions are progressively being included in global documents. For example, the Ramsar COP13 emphasises restoration and rehabilitation of peatlands as a cost-effective tool with cross-cutting benefits for climate-change mitigation and adaptation, disaster risk reduction, biodiversity conservation, water regulation, and

[188] ISME Mangrove Code, Principles 1.2a, 1.2e, 1.2f, 2.
[189] *The ISME Charter for Mangroves* arts 20–21.

support to the SDG.[190] Some challenges are already highlighted in the recent resolutions such as establishment of effective networking for technology transfer; establishment of a national clearing house for sharing knowledge and best practices;[191] development of monitoring and supervision mechanism at national and regional level,[192] enhancement of vulnerability/risk assessment procedure; strengthening capacity and expertise of national focal points and persons involved in biodiversity management, wildlife trade monitoring, climate change adaptation and mitigation; and monitoring and reporting of the UN SDGs implementation. These appear as huge challenge for developing countries because of the financial demands and technological assistance.

In order to overcome such challenges through adaptive management process, the Joint Liaison Groups of several international environmental conventions have prescribed some strategies. The CITES COP17 took decisions to provide financial and in-kind resources to State Parties for capacity-building of persons involved in wildlife and ecosystem management (Decisions 17.31, 17.32, 17.33 and 17.34).[193] In addition, the World Heritage Committee has encouraged all stakeholders under the World Heritage Convention – to evaluate the state of properties listed under the World Heritage in Danger (Decision WHC/18/42.COM/7).[194] It also accentuates to engage in the Reactive Monitoring process for better understanding of the implications and benefits of those properties. This decision also has the added benefit of requiring stakeholders to develop appropriate information material with a view to overcome the negative perceptions of the List of World Heritage in Danger.[195] In order to implement the National Adaptation Plan under the Green Climate Fund, the Least Developed Countries Fund and the Special Climate Change Fund and to identify adaptation actions integral to securing lives and livelihoods, the UNFCCC COP24

[190] Ramsar COP13 Resolution XIII.12 on Guidance on Identifying Peatlands as Wetlands of International Importance (Ramsar Sites) for Global Climate Change Regulation as an Additional Argument to Existing Ramsar Criteria; Dubai, United Arab Emirates, 29 October 2018, para 7 <https://www.ramsar.org/sites/default/files/documents/library/xiii.13_peatland_restoration_e.pdf>.

[191] CBD COP14: Decision 14.24 on Capacity-building and Technical and Scientific Cooperation; 17 – 29 November 2018, Sharm El-Sheikh, Egypt, sec 10 <https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-24-en.pdf>.

[192] CBD COP14: Decision 14.7 on Sustainable Wildlife Management; 17 – 29 November 2018, Sharm El-Sheikh, Egypt, para 9(b) <https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-07-en.pdf>.

[193] CITES COP17: Decisions 17.31, 17.32, 17.33 and 17.34 on Capacity Building; September – October 2016, Johannesburg, South Africa, sec 10 <https://www.cites.org/sites/default/files/eng/dec/valid17/E17-Dec.pdf>.

[194] UNESCO-WHC 42nd Session: Decision WHC/18/42.COM/7 on Item 7: State of Conservation of World Heritage Properties; Manama, Bahrain, 24 June – 4 July 2018, paras 5-10 <https://whc.unesco.org/archive/2018/whc18-42com-18-en.pdf>.

[195] Ibid.

urges the State Parties to undertake monitoring and evaluation of their adaptation actions at the national and local level (Decision 8/CP.24).[196]

The ASEAN and SAARC adopted a range of adaptive measures in line with global prescription. The EU prescribes multiple adaptive measures to minimise impact on marine ecosystems in line with the spirit of the precautionary principle. The reflection of embracing adaptive management is not clearly visible in the ACTO framework, however, the notion is practiced within the national frameworks of some Amazonian states. The FAO and IUCN recommend enhancing capacity building of the relevant stakeholders to adapt with the potential implications of changing climate and also increasing monitoring mechanism to welcome multi-stakeholder reflection and new management decisions. The ITTO and ISME suggests a range of adaptive measures including EIA where development activities are planned in and around natural ecosystems and strict protection measures for mangroves and associated habitats where natural phenomena is a common chapter.

3.7 Inter-Sectoral Coordination

The ecosystem approach encourages adopting the mechanisms of inter-sectoral and inter-agency cooperation and coordination among state departments/agencies, NGOs and civil societies involved into the governance and management process for sustainable management of a complex ecosystem.

3.7.1 International Frameworks

The push for inter-sectoral coordination is absent in the Ramsar Convention text. Thus, the Convention's wise use commitments largely failed to restore naturally functioning wetlands across the world.[197] The need for governments and society to work cross-sectorally was included in the Changwon Declaration on Human Well-Being and Wetlands (COP10, 2008).[198] The Convention's Scientific and Technical Review Panel urged inter-sectoral collaborative planning and management responses for addressing the

[196] UNFCCC COP24: Decision 8/CP.24 (FCCC/CP/2018/10/Add.1) on Long-term Climate Finance; Katowice, Poland, 2 – 15 December 2018, paras 6, 8 <https://unfccc.int/sites/default/files/resource/cp2018_10_add1_advance.pdf>.
[197] Finlayson et al, above n 35, 195.
[198] *The Ramsar Convention on Wetlands*, The 10th Meeting of the COP to the Convention on Wetlands, Changwon, South Korea, 28 October – 4 November 2008, Res. X.3: The Changwon Declaration on Human Well-Being and Wetlands.

imminent threats to ecosystem. Accordingly, the Ramsar Parties adopted the National Wetland Policy specifying the multi-sectoral agency's role in policy implementation. Ramsar Handbooks 3 and 7 focus on integration of cross-sectoral policies that directly or indirectly affect wetlands. The convention also encourages enhancing collaboration among multi-sectoral professional entities to promote effective application of wise use within key sectors (Ramsar Handbook 4).

The World Heritage Convention emboldens state parties to strengthen coordination among the expected stakeholders involved or desiring to be involved in Heritage Sites for better management of the property. It encourages networking and developing educational activities related to World Heritage with the participation of schools, universities and museums.[199] Coordination among diverse governance sectors is not rightly reflected in the CBD text. But the coordination of natural resource management linked policies is emphasised in the COP meetings to ensure that conservation interests are integrated with utilisation interests.[200] The CBD COP5 also calls for increased inter-agency coordination at a range of levels for sharing information and experience.

As per the CITES's requirement, each state party is entrusted to designate one or more management authorities competent to grant permits for exporting any species and one or more scientific authorities to provide expert opinion on the viability of exporting that species. Every member state of the CITES is entrusted to use its own regulatory machineries such as wildlife, forestry, fisheries, customs or police to minimise illegal trading of wild flora and fauna. Coordination among those state agencies is crucial for achieving the objective of CITES. Inter-state and inter-sectoral coordination is integrated in the UNFCCC with respect to the development, application and diffusion with transfer of technologies, practices and processes that reduce or prevent anthropogenic emissions of greenhouse gases in all relevant sectors, including energy, transport, industry, agriculture, forestry and waste management (art 4(c)). Increased cooperation and coordination is also pursued for adaptation to climate change and developing integrated plans for coastal zone management, water resources and agriculture, and for the protection and rehabilitation of areas affected by drought, desertification and floods (art 4(e)).

[199] UNESCO World Heritage Centre, above n 69, [111(d)].
[200] CBD, Conference of the Parties 5, Decision V/6 'Ecosystem Approach'.

3.7.2 Regional Frameworks

The AMSs emphasise enhancing cross-sectoral collaboration during the planning and implementing of responses to climate change. The ASEAN also established the ASEAN Wildlife Law Enforcement Network in 2005 for tackling the transboundary illegal trading of endangered species in a coordinated manner. Greater collaboration and coordination among the ASEAN countries for the preservation of the ASEAN's shared natural heritage is sought in the ASEAN Declaration on Heritage Parks 2003.[201] The need for multi-sectoral engagement is reflected in the ASCC Blueprint 2025 as,

> *focuses on multi-sectoral and multi-stakeholder engagements, including academia, local governments organizations, social enterprises, government-non-governmental-civil society organization (GO-NGO/CSO) engagement ... to enhance commitment, participation and social responsibility of ASEAN peoples*.[202]

An ecosystem approach-centric multi-stakeholder platform, with the coordination among relevant groups and a supportive legislative framework, has been successful in the restoration of mangroves in Thailand.[203] State and non-state cooperation was found to be an effective tonic in restoring and managing mangrove resources in the mangrove-encircled Philippines archipelago (Manila Bay, Bais Bay and Banacon Island), which was largely destroyed to make space for fish ponds, residential housing and urban infrastructure while under the exclusive control of state authority.[204]

The SAARC considers that for ensuring efficient environmental governance, coordination among institutions is an important component. The forum established the SAARC Agricultural Information Centre to foster regional multi-sectoral cooperation in the areas of agriculture, forestry, fishery and transfer of related technology. To implement the SAARC Environment Action Plan 1997, an integrated programme of action was designed with particular emphasis on coordination of sectoral activities for addressing regional environmental concerns.[205] The success of joint forest management in India; community

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[201] *ASEAN Declaration on Heritage Parks 2003* (2003) <http://environment.asean.org/asean-declaration-on-heritage-parks/>.
[202] *ASEAN Socio-Cultural Community Blueprint 2025*, above n 79, arts 7, 8.
[203] Nguyen Tien Hai, 'Mangrove Forest Management: Lessons from Thailand' on *Agroforestry World* (29 September 2015) <http://blog.worldagroforestry.org/index.php/2015/09/29/mangrove-forest-management-lessons-from-thailand/>.
[204] Bradley B Walters, *Local Mangrove Forest Management: Successful Conservation or Efficient Resource Exploitation?* (2003) <http://www.fao.org/docrep/ARTICLE/WFC/XII/0032-C1.HTM>.
[205] *SAARC Environment Action Plan 1997*, art 5.

forestry in Nepal; and irrigation user groups in India, Pakistan and Sri Lanka substantiate that social capital, participatory process and multi-sectoral coordination are crucial to environmental protection.[206]

Inter-sectoral coordination appears as key element of modern forest policy planning in Europe. The EU Community Biodiversity Strategy emphasises integrating environmental concerns and sustainable development issue with other sectoral policies. The EU Forest Action Plan sets out four main objectives including fostering communication to increase cooperation among various sectors to optimise the multifunctional role of the EU's forests.[207] Partnership-based conservation initiatives have been successful in 24 United Kingdom projects incorporating the 12 Malawi Principles.[208] The need for inter-sectoral involvement is present in the national legislation of several EU member states. For example, the Norwegian Biodiversity Policy and Action Plan 2001 makes use of the Principle 1 of the Malawi Principles as a background to, and Principle 12 (involving all relevant sectors) as the main operative principle, for biodiversity management.[209]

The Amazonian Strategic Cooperation Agenda incorporates coordination mechanism as a cross-cutting view to address the mandates of Amazon Cooperation Treaty to '*promote coordination of plans and programmes of member countries for the development of Amazonian populations, paying particular attention to vulnerable populations, indigenous peoples and other tribal communities*'.[210] The inter-sectoral coordination theme has demonstrated excellence in designing a sustainable development strategy for the Guantiva-La-Rusia-Iguaque conservation corridor in the Eastern Mountain Range of Colombia. The strategy facilitates cooperation and coordination between public, private and third sectors at local, regional and national levels to articulate their interests in regional natural resources development.[211]

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[206] United Nations Environment Programme and Development Alternatives, above n 47, 148.
[207] *European Union Forest Action Plan* 2006.
[208] Kerry Waylen, Kirsty Blackstock and Kristy Holstead, 'Exploring Experiences of the Ecosystem Approach' (Report, The James Hutton Institute, 2013).
[209] Horst Korn, Rainer Schliep and Jutta Stadler (eds), 'Report of the International Workshop on the "Further Development of the Ecosystem Approach" at the International Academy for Nature Conservation Isle of Vilm, Germany, October 9-11, 2002' (Bundesamt für Naturschutz, 2003) 56.
[210] *Amazonian Strategic Cooperation Agenda 2010*, 16.
[211] Pérez, above n 157, 35.

3.7.3 Other Frameworks

The FAO focuses on developing integration mechanism that enable policy networks among different sectors related to agriculture, forestry and water to adapt the desired changes in policy outcomes.[212] It facilitates access to key stakeholders in the consultations to ensure inter-sectoral coordination, while supporting in the design of policies to address social protection concerns across sectors. It also acknowledges the role of partnerships to ensure not only internal policy coherence, but external coherence of country support.[213] The FAO Guidelines on Marine Protected Areas and Fisheries Governance urges adoption of the best practices on inter-sectoral collaboration for sustainable natural resource management.[214] While the IUCN promotes coordination and cooperation across multiple levels and sectors to avoid conflicting priorities and mandates, it emphasises involvement of multi-stakeholders to generate an ownership-based policy and management system for long-term sustainability of ecosystems and resilience to changing climatic conditions.[215]

Inter-sectoral collaboration is acknowledged in the Preamble of International Tropical Timber Agreement 2006 as '*recognizing the importance of collaboration among members, international organizations, the private sector and civil society, including indigenous and local communities, and other stakeholders in promoting sustainable forest management*'.[216] The ISME's policy document also recognises the need for synchronised policy framework and developing mechanism for inter-sectoral coordination at the local, national and transboundary levels to support mangrove management. To this effect, the ISME recommended states review existing policies, laws and institutions dealing with mangroves.[217] The emphasis of cross-sectoral coordination is further emphasised in the ISME's Mangrove Code as '*facilitate coordination between the various agencies most likely to be involved, these include departments and agencies for forestry, fisheries, water and navigation, environment, land use planning and tourism*'.[218] The Matang Mangrove Forest Reserve in Malaysia is an example of coordinated management where inter-agency

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[212] FAO, *Cross-sectoral Policy Impacts Between Forestry and Other Sectors* (FAO Forestry Policy 142, 2009) 3.
[213] FAO, *FAO Social Protection Framework – Promoting Rural Development for All* (FAO, 2017) 59.
[214] FAO, *FAO Technical Guidelines on Marine Protected Areas and Fisheries* (FAO, 2011) 145.
[215] Pérez et al, above n 157, 2.
[216] *International Tropical Timber Agreement 2006*, adopted on 27 January 2006 United Nations, Treaty Series, vol. 2797, I-49197 Doc. TD/TIMBER.3/12 (entered into force 7 December 2011) Preamble, para l.
[217] ISME Mangrove Code, Principle 3.1.
[218] Ibid Principle 3.1f.

stakeholder consultation and licensing practices have been established. The licensing of charcoal kilns and wood harvesting is conducted by the Forestry Department, fish cage licensing by the Fisheries Department and preservation of a bird sanctuary and archaeological sites agreed in consultation with the Wildlife Department and National Museum. All challenges are resolved in consultation with different agencies concerned (state, district representatives and community leaders).[219]

3.7.4 Evaluation of Inter-Sectoral Coordination in International, Regional and Other Frameworks

The thrust for the implementation of inter-sectoral cooperation and coordination at the policy, governance and implementation levels is accentuated in the aforementioned conventions through their succeeding COP decisions. Since protection, conservation of ecosystem, climate change adaption and mitigation are cross-sectoral (and in some cases transboundary) issues, it is not possible for state institutions to address those alone. Therefore, combined efforts are sought by the global instruments for arresting the ensuing threats on environment and ecosystem.

Coordination and intersectoral cooperation has been expressed through international environmental instruments through several ways. For example, due to difficulties in annotations of specimens produced from synthetic or cultured DNA, the CITES COP17 via Decisions 16.13 and 16.16 considered guidance on non-detriment findings in collaboration with the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.[220] In addition, a decision was taken to work with the Liaison Group of Biodiversity-related Conventions for exploring options to strengthen cooperation, collaboration and synergies between the CITES's Strategic Vision and the Strategic Plan for Biodiversity 2011-2020, its Aichi Targets and the 2030 Agenda for Sustainable Development and its SDGs (Decisions 17.55 and 17.56).[221]

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[219] Ibid 26.

[220] CITES COP17: Decisions 16.13 and 16.16 on the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES); September – October 2016, Johannesburg, South Africa, sec 15 <https://www.cites.org/sites/default/files/eng/dec/valid17/E17-Dec.pdf>.

[221] CITES COP17: Decisions 17.55 and 17.56 on Cooperation with Other Biodiversity-related Conventions; September – October 2016, Johannesburg, South Africa, sec 17 <https://www.cites.org/sites/default/files/eng/dec/valid17/E17-Dec.pdf>.

In addition, Ramsar COP13 via Resolution XIII.7 urges State Parties to establish mechanisms to enhance effective coordination among relevant sectoral authorities at national level to support the mainstreaming of wetland ecosystem functions and ecosystem services. The Resolution also requires State Parties to strengthen collaboration with global and regional bodies, including the UNEP, UNDP, FAO, World Health Organization, UN Economic Commission for Europe, ITTO and GEF to enhance the wise use of wetlands.[222] Ramsar COP13 further emphasises enhancing cooperation with Multilateral Environmental Agreements like the UNFCCC, the UNCCD, the CBD and the CMS to increase the synergies in relation to climate change adaptation and mitigation, nature and especially wetland based solutions.[223]

A set of potential mechanism has been espoused from the international framework–induced guidelines and resolutions including establishment of a national clearing housing mechanism or central database and communication platform for sharing information, expertise and knowledge;[224] harmonisation of sectoral policies and monitoring tools; national council for monitoring the environment, climate change adaptation, community awareness on wildlife trade and trafficking;[225] and monitoring progression of the UN SDGs. Additionally, the global instruments emphasise the involvement of NGOs, civil societies and multidisciplinary experts in monitoring and coordination councils to work under the spirit of public-private partnerships for effective implementation of global environmental and development principles with minimum resource use.[226] Following the Decision 41 COM 7 (WHC/17/41.COM/18),[227] the World Heritage Committee also urges the States Parties to develop more effective coordination of civil society organisations at the regional and international levels, increased involvement of non-State actors in the

[222] Ramsar COP13 Resolution XIII.7 on Enhancing the Convention's Visibility and Synergies with Other Multilateral Environmental Agreements and Other International Institutions; Dubai, United Arab Emirates, 29 October 2018, para 28 <https://www.ramsar.org/sites/default/files/documents/library/xiii.7_synergies _e. pdf>.
[223] Ibid, para 35.
[224] CBD COP14: Decision 14.24 on Capacity-building and Technical and Scientific Cooperation; 17 – 29 November 2018, Sharm El-Sheikh, Egypt, para 10 <https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-24 -en.pdf>.
[225] CITES COP17: Decision 17.86 on Community Awareness on Wildlife Trafficking; September – October 2016, Johannesburg, South Africa, sec 23 <https://www.cites.org/eng/dec/valid17/81837>.
[226] CBD COP14: Decision 14.5 on Biodiversity and Climate Change; 17-29 November 2018, Sharm El-Sheikh, Egypt, para 17(g) <https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-05-en.pdf>.
[227] UNESCO-WHC 41st Session: Decision WHC/17/41.COM/18 on Item 7: State of Conservation of the Properties Inscribed on the World Heritage List; Krakow, Poland, 2 – 12 July 2017, paras 25, 40 <https://whc.unesco.org/en/decisions/6940>.

conservation of World Heritage sites and increased provision of input from relevant stakeholders concerning heritage related debate at the global level.[228] Recognising the lack of adequate information and coordination as major barriers to address climate change impact on the heritage properties, the World Heritage Centre encourages State Parties to disseminate information on the effects of climate change on World Heritage sites (Decision WHC/29 COM 7B.a).[229] The World Heritage Centre further emphasises developing a framework for improved coordination among relevant stakeholders in order to mobilize political support for activities against climate change and also for securing the livelihood of Least Developed Countries.[230]

In order to gain potential benefits of integrating adaptation, sustainable development and disaster risk reduction under the UNFCCC, coordination of sectoral policies and collaboration with actors, both state and non-state, operating across multiple sectors and scales, from local to global has been identified as a prerequisite.[231] The UNFCCC COP24 also stresses for strengthening coordination among the state and non-state actors in sharing financial, technical and technological expertises for adaptation planning and collection of climate data for current, short and long-term risks relating to climate change (Decision 9/CP.24).[232] The Biodiversity Liaison Group established relationship between the Secretariats of biodiversity-related Conventions including, the Ramsar Convention, the World Heritage Convention, the CITES, the UNFCCC with a view to achieving synergies on cross-cutting activities and undertaking coordinated efforts in implementation of common objectives (CBD COP8 Decision VIII/16).[233]

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[228] UNESCO-WHC 42nd Session: Decision WHC/18/42.COM/7 on Item 7: State of Conservation of World Heritage Properties; Manama, Bahrain, 24 June – 4 July 2018, para 23 <https://whc.unesco.org/archive/2018/whc18-42com-18-en.pdf>.

[229] UNESCO-WHC 29th Session: Decision WHC-05/29.COM/22 on Item 7B: General Issues: Threats to World Heritage Properties; Durban, South Africa 10 – 17 July 2005, para 11 <http://whc.unesco.org/archive/2005/whc05-29com-22e.pdf>.

[230] Ibid.

[231] United Nations Climate Change Secretariat, 'Opportunities and Options for Integrating Climate Change Adaptation with the Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction 2015–2030' (Technical Paper of the United Nations Climate Change Secretariat for the FCCC/TP/2016/6) 21.

[232] UNFCCC COP24: Decision 9/CP.24 (FCCC/CP/2018/10/Add.1) on Report of the Adaptation Committee; Katowice, Poland, 2 – 15 December 2018, para 11 <https://unfccc.int/sites/default/files/resource/cp2018_10_add1_advance.pdf>.

[233] CBD COP8: Decision VIII/16 on Cooperation with Other Conventions and International Organizations and Initiatives; Curitiba, Brazil, 20 – 31 March 2006, para 11 <https://www.cbd.int/doc/decisions/cop-08/cop-08-dec-17-en.pdf>.

In this context, the ASEAN and SAARC focus on multi-sectoral and multi-stakeholder engagements, including dialogue with academia, local governments, government organisations and NGOs in designing management plan, monitoring and environmental auditing, while the EU prescribes partnership-based initiatives to ensure that ecosystem conservation be designed, managed and monitored in a coordinated way. The ACTO emphasises integration of cross-sectoral policies and coordination of relevant actors and sectors' role for sustainable conservation of Amazonian resources. The need for coordinated policy and an effective mechanism for inter-sectoral coordination at local, national and transboundary levels to support ecosystem management is deeply rooted in the ITTO and ISME's policy guidelines. A similar idea is reiterated in the FAO policy networks with acknowledgement of the critical role of partnerships, particularly in the inter-sectoral area of social protection to ensure coherence not only in internal policy but in external country support. The IUCN emphasise development of a cross-sectoral policy coordination mechanism to avoid conflicting priorities and to adapt the desired changes in policy outcomes.

3.8 Conclusion

Globally, the natural resource management paradigm is slowly transforming from the single-species approach to the integrated approach due to the increased human and climate change interventions. The growing recognition of the values of wetlands has also led to the adoption of dynamic conservation and management efforts for providing social and economic benefits for the human being. The multiple uses of biological resources necessitating their sustainable utilisation are embedded in international biodiversity-related instruments: the Ramsar Convention, World Heritage Convention, CITES, CBD and UNFCCC. Although each of these legal regimes has a specific agenda, all have a shared goal—protection, conservation and sustainable use of biological resources. The COPs to the conventions have consecutively been developing or revising their implementation tools and strategies and emphasising adoption of the ecosystem approach principles to optimally achieve their common objectives (discussed in Sections 3.2.4, 3.3.4, 3.4.4, 3.5.4, 3.6.4, 3.7.4).

Coordinated efforts for the implementation of globally agreed biodiversity conservation commitments are also marked at a regional level. The ACTO, ASEAN, SAARC and EU

regional frameworks have been established in the Amazon, Southeast Asia, South Asia and European regions for addressing the challenges associated with transboundary ecosystems through enhancing greater collaboration and sharing best practices. Although region-specific priorities are apparent in those regional frameworks and their conservation projects/programmes, each regional forum is constantly pursuing integration of the ecosystem approach principles in national policy instruments and sharing best practices to implement the *Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets* in a collaborative way.

As regional forums, the EU and ASEAN have distinctively developed legal frameworks for conservation and sustainable utilisation of coastal, terrestrial and marine biodiversity, while the Amazon-based ACTO, despite its long history, has only recently developed a legal framework and undertaken large-scale projects/programmes for the conservation and sustainable use of Amazonian resources. The SAARC has lagged behind in developing an ecosystem-focused legal framework. However, the need for ecosystem approach principles are acknowledged, are moderately inserted in member states' domestic regulatory framework and are being practiced in marine, coastal, mangrove ecosystem conservation drives across the SAARC region.

Some intergovernmental organisations have been conspicuously contributing to the conservation and sustainable use of ecosystem resources through promoting the ecosystem approach around the world. The FAO and IUCN are prominent in the formulation of the ecosystem approach-based policy and guidelines, and for assisting ecosystem-oriented conservation projects/programmes either through financial or technical support. The ITTO and ISME also have generated mangrove management guidelines recognising the potential of the ecosystem approach's six dominant components in helping to implement projects for conservation and sustainable use of mangroves resources.

This research has revealed that, due to a change in the global biodiversity conservation and development paradigm, the ecosystem approach principles have been recognised in international, regional and other institutional frameworks with varying degrees. All the instruments urge member states to integrate those ecosystem approach principles into their domestic policy and legal frameworks to ensure sustainable conservation of biodiversity, wetlands and resources of outstanding universal value; sustainable extractive use of

species; maintenance of environmental and ecological integrity; establishment of equity among ecosystem-dependent communities; and achievement of sustainable development. Some challenges regarding effective implementation of those ecosystem approach principles for achieving the conventions' objectives at the national and regional levels are also stated—establishment of an effective networking for technology transfer; establishment of a national clearing housing mechanism for sharing information, expertise and knowledge; recognition of communities' representation in policy and legislation; strengthening capacity and expertise of national focal points and persons involved in biodiversity management, wildlife trade monitoring, climate change adaptation and mitigation; harmonisation of sectoral policies and monitoring tools; strong political commitment of the government; effective enforcement of law and proper functioning of state machineries; a national council for monitoring the environment, climate change adaptation, wildlife trade and trafficking; and monitoring progression of the UN SDGs (discussed in Sections 3.3.4, 3.4.4, 3.5.4, 3.6.4 and 3.7.4).

Similarly, international, regional and other institutional frameworks have prescribed a set of mechanisms or strategies for effective implementation of those principles into member states' own jurisdictions to overcome the challenges—establishing a national inventory on biodiversity, wetlands and places of international importance; introducing EIAs and SEAs for assessing impact on environment and ecosystem; setting biodiversity, the environment, climate change and SDGs as national agendas; building public-private partnerships with NGOs, civil societies and multidisciplinary experts for strengthening monitoring and coordination (discussed in Sections 3.2.4, 3.6.4 and 3.7.4). All these initiatives indicate the international legal instruments' commitments to protect global biological resources, secure ecosystem-dependent communities' livelihoods and promote sustainable development. The next chapter critically examines the status of ecosystem approach principles in the Bangladeshi legal and policy frameworks regulating the Sundarbans and how the potential challenges in implementing the ecosystem approach principles identified in the international legal instruments have occurred in practice in Bangladesh.

Chapter 4:
Ecosystem Approach in Legal and Policy Framework of Bangladesh*

4.1 Introduction

Biodiversity, environment and climate change are cross-cutting issues regulated by a series of sectoral policies that have direct or indirect influence on the Sundarbans. Considering their relative influences on the Sundarbans, this chapter analyses the status of the ecosystem approach's components in the national development plans, environment, climate change and natural resource management policies of Bangladesh. The chapter also investigates the legislation governing the Sundarbans to assess the extent to which the national policy adopted the ecosystem approach principles have been integrated into those legislative instruments and to identify the challenges therein. The law and policy analysis methodology is used throughout the analysis process to answer the research question posed in Section 1.3 and create a platform for exploring the challenges Bangladesh faces in applying the ecosystem approach principles in management of the Sundarbans.

Pursuant to the global commitment to sustainable development through securing biodiversity and improving environmental standards, the Government of Bangladesh has expressed the notion of conservation and sustainable use of biodiversity in 2011 as one of the Fundamental Principles of State Policy.[1] Pursuant to this constitutional obligation, and in light of the CBD's Aichi Biodiversity Targets, the revised National Biodiversity Strategy and Action Plan (NBSAP) emphasises the integration of biodiversity conservation and sustainable use in national development plans and sectoral policies.[2] Despite the state's commitment to promote environmentally sound development notions in

*Parts of this chapter have been published as Shawkat Alam and Sheikh Noor Mohammad, 'Applying the Ecosystem Approach to the Sundarbans of Bangladesh: Possibilities and Challenges' (2018) 27(2) *RECIEL* 115–129 and as Shawkat Alam and Sheikh Noor Mohammad, 'The Precautionary Principle in Biodiversity and Natural Resource Management: Institutional and Policy Challenges for a Sustainable Future' (2018) 48(3–4) *Environmental Policy and Law* 187–203.

[1] Under the heading of 'protection and improvement of environment and biodiversity', the Constitution of Bangladesh 1972 art 18A states that 'the state shall endeavour to protect and improve the environment and preserve and safeguard the natural resources, biodiversity, wetlands, forests and wildlife for the present and future citizens'.

[2] The National Biodiversity Strategy and Action Plan (NBSAP) 40.

policies, and practices through development programmes, development-led natural resources degradation is becoming increasingly evident, indicating gaps or inconsistencies in policies and management approaches.[3] Roy and Hossain and Van Lavieren et al highlight the supportive legal framework as a prerequisite for the sustainable management of the Sundarbans and maintain the generation of socio-economic and environmental benefits for humanity.[4]

4.2 Law and Policymaking Process in Bangladesh

Bangladesh follows the procedure similar to the Westminster system in enactment of legislation. The Parliament is the sovereign law-making body entrusted to make laws[5] following the basic provisions laid down in arts 80 and 82 of the Constitution of Bangladesh.[6] For policymaking, the Cabinet in Bangladesh is the ultimate authority that approves any policy without adequate debate in the Parliament. Most policies, including the Five-Year Plans (FYPs) formulated at ministry level, are not discussed in the Parliament, so it is unsurprising that such policies have little public understanding.[7]

While the line ministries are entrusted to develop sectoral policies and draft legislative Bills, the Planning Commission is empowered to set the broad development plans of Bangladesh. It translates the ideas, aspirations and commitment of the government into the FYPs, Perspective Plan and annual development plan. The commission is responsible for the approval of development projects, conducting economic and technical appraisal of projects and mobilisation of resources for project implementation in consultation with the Finance Division and Economic Relations Division. The administrative ministries and executing agencies develop project proposals for final approval by the Executive Committee of the National Economic Council after necessary scrutiny and endorsement by

[3] Menaka Panta, Kyehyun Kima and Chudamani Joshi, 'Temporal Mapping of Deforestation and Forest Degradation in Nepal: Applications to Forest Conservation' (2008) 256(9) *Forest Ecology and Management* 1587, 1588.
[4] Hanneke Van Lavieren et al, *Securing the Future of Mangroves: A Policy Brief* (UNU-INWEH, UNESCO-MAB 2010) 4; T K Roy and S T Hossain, 'Role of Sundarbans in Protecting Climate Vulnerable Coastal People of Bangladesh' (2015) 1(1) *Climate Change* 44.
[5] Constitution of Bangladesh art 65.
[6] Constitution of Bangladesh arts 80, 82. As per the Secretariat Instructions 2014, a ministry or division is responsible for formulation of government policies within its jurisdiction. See Bangladesh Secretariat Instructions 2014; Gavin Murphy, 'How Legislation is Drafted and Enacted in Bangladesh' (2006) 27(3) *Statute Law Review* 133, 136.
[7] Murphy, above n 6, 137.

the commission.[8] Once the project is approved, the relevant department/agency starts implementing the project. The monitoring and evaluation of development projects implemented under different ministries is done by the Implementation, Monitoring and Evaluation Division.

Conservation of biodiversity, protection of the environment and addressing climate change are the core issues on which the sustainability of the Sundarbans depends. The MoEFCC is working as the focal ministry for addressing those issues. Generally, the MoEFCC is responsible for formulating policies, legislative Bills and development projects related to the environment, forests and climate change. However, as the environment, forest and climate change are cross-cutting issues, other ministries and state agencies have an important role in the formulation of plans related to conservation of natural resources and adaptation to climate change in line with their respective organisational portfolios. The MoEFCC with its subsidiary bodies—the FD, DoE and Climate Change Trust (CCT)—coordinates on issues with other ministries.

4.3 Methods of Data Analysis

The data assessment procedure set out in Section 1.8 was applied in searching the status of six selected principles of the ecosystem approach (integration of entire ecosystem components, conservation and sustainable use, access and equitable benefits sharing, decentralisation of ecosystem management, adaptive management and inter-sectoral coordination) in the Bangladeshi legal and policy frameworks regulating the Sundarbans. Since assessing the effectiveness of law and policy based solely on a desktop assessment is difficult, the findings of a desktop analysis of legal frameworks were crosschecked against expert opinions collected from the field. This dual-track law and policy assessment protocol led to a realistic answering of the research question.

[8] Jaglul Ahmed Chowdhury, 'Planning Commission as a Think-Tank', *The Financial Express* (Dhaka, Bangladesh), 13 April 2013 <http://thefinancialexpress.com.bd/epaper/2013/04/13/files/fe%2013%20april%202013.pdf>.

4.4 Integration of Principles of the Ecosystem Approach in Bangladeshi National Legal and Policy Frameworks

This section analyses the integration of the ecosystem approach's principles in the following national development plans, policies and legislation regulating/influencing the Sundarbans. The policies and legislation are clustered in two categories: Sundarbans-related major policies or legislation, and other policies or legislation not directly related to the Sundarbans but that have indirect influence on it. The criteria for assessing each ecosystem principle's status in the respective national policy or legislation are set following the implementation guidelines endorsed by the Secretariat of the CBD.[9]

National policies regulating/influencing the Sundarbans include:

- National Development Plans:
  - *The Vision 2021*
  - *National Perspective Plan of Bangladesh 2010-2021* (Perspective Plan)
  - *The Seventh Five Year Plan (FY2015/16-FY2019/2020)* (The 7th FYP)
  - *National Sustainable Development Strategy 2010-2021* (NSDS)
- Sundarbans-related major policies
  - *National Biodiversity Strategy and Action Plan 2016-2021* (NBSAP)
  - *Bangladesh Climate Change Strategy and Action Plan 2009* (BCCSAP)
  - *Environmental Policy 1992 [Draft Environment Policy 2013]*
  - *National Forest Policy 1994 [Draft Forest Policy 2016]*
  - *Integrated Resources Management Plans for the Sundarbans (2010-2020)* (IRMP for the Sundarbans)
  - *Bangladesh Tiger Action Plan 2009* (BTAP)
  - *Sundarbans Tourism Policy 2014*
  - *Compensation Policy for Causalities Caused by Wildlife 2010* (CCW)

Other policies that indirectly influence the Sundarbans are:

- *Water Policy 2012*
- *Fisheries Policy 1998*

[9] CBD Guidelines on Ecosystem Approach, 1–50.

- *Coastal Zone Policy 2005*
- *Wetland Policy 1998*
- *Land Use Policy 2001*
- *Tourism Policy 2010*
- *Industrial Policy 2016*
- *Agriculture Policy 2013*

National legislation regulating/influencing the Sundarbans include:

- Sundarbans-related major legislation
  - *Forest Act 1927*
  - *Bangladesh Wildlife (Conservation and Security) Act 2012* (Wildlife (C&S) Act)
  - *Bangladesh Biological Diversity Act 2017*
  - *Environmental Conservation Act (ECA) 1995*
  - *Environmental Conservation Rules (ECR) 1997*
  - *Protected Areas Management Rules 2017*
  - *Ecologically Critical Areas (ECA) Management Rules 2016*
  - *Sundarbans Forest Transit Rule 1959*
  - *Canals Closure Regulation 1989*
  - *Moratorium on Tree Felling 1989*
- Other legislation that indirectly influences the Sundarbans
  - *Protection and Conservation of Fish Act 1950*
  - *Protection and Conservation of Fish Rules 1985*
  - *Water Act 2013*
  - *Territorial Water and Maritime Zone Act 1974*
  - *Inland Shipping Ordinance 1976*
  - *National River Protection Commission Act 2013* (NRPC)

4.4.1 Integration of Entire Ecosystem Components

Ecological integrity and human wellbeing depends on proper functioning and resilience of natural ecosystems. To ensure natural functioning and sustainability of an ecosystem, alignment of potential ecosystem attributes in any ecosystem conservation and

development programme are crucial. In this section, the following features, taken from the CBD Guidelines on the Ecosystem Approach,[10] are used to examine the 'integration of entire ecosystem components' into the Bangladeshi policies and laws regulating/influencing the Sundarbans:

- inclusion of biodiversity, environment and climate change issue in natural resource management sectors
- identification of causes and effects of biodiversity loss (species and habitat level)
- environmental impact mitigation measures
- importance on scientific, technical and problem-solving skills
- risk/vulnerability assessment–based conservation priority setting
- socio-economic importance of ecosystem services
- stress on monitoring and supervision.

4.4.1.1 Integration of Entire Ecosystem Components in National Policy Frameworks

4.4.1.1.1 National Development Plans

For the protection of the country's environment, the broad vision of *the Vision 2021*[11] is manifested in Goal 7(k) provisioning several measures including enhancement of adaptive capacity to face natural calamities, reduction of industrial and vehicular air pollution, disposal of waste in a scientific manner, retention of forests and waterbodies, and prevention of river erosion.[12] Since the commitment to protect the nation's air, forests and waterbodies, pollution control and climate change initiatives are visible, and it is apparent that the notion of entire ecosystem components is present in *the Vision 2021*. To make *the Vision 2021* a reality, the Perspective Plan of Bangladesh has been formulated and calls for environmentally sound development actions for the maintenance of ecological balance and development sustainability while pursuing socio-economic development.[13]

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[10] Ibid.
[11] *The Vision 2021*, a political manifesto of the Bangladesh Awami League party, consists of eight basic objectives aimed at being a middle-income country with high HDI status by 2021. See 'The Vision 2021 of Bangladesh Awami League' on *bdfact* (12 December 2008) <http://bdfact.blogspot.com.au/2008/12/vision-2021-of-bangladesh-awami-league.html>.
[12] Ibid Goal 7(k).
[13] Perspective Plan ch 11.1.

The 7th FYP contains some new strategies for achieving the socio-economic targets set in *the Vision 2021* and Perspective Plan of Bangladesh.[14] Recognising the imperative of a sustainable development agenda under the current socio-economic and environmental reality of Bangladesh, a roadmap for development was designed linking use of land, water, agriculture, forest and energy and adaption for climate change under three broad goals—'sustainable production and consumption', 'environmental sustainability and disaster management' and 'international cooperation and partnership for sustainable development'—for ensuring the quality of life of citizens and protecting environmental health.[15] The NSDS emphasises undertaking appropriate responses to deterioration in a number of areas such as water resources, forestry, wetland, land and soil, coastal and marine resources, natural disasters and climate change.[16] The underlying priorities for managing multiple components of ecosystem indicate the 7th FYP and NSDS's considerable attention to the ecosystem approach's principle for holistic ecosystem consideration in national development frameworks.

4.4.1.1.2 Sundarbans-Related Major National Policies

The NBSAP sets 20 national targets for achieving Bangladesh's biological sustainability in which mainstreaming biodiversity conservation into national development plans and sector-specific plans such as agriculture, fisheries, forestry, tourism and inclusion of all functional attributes and types of ecosystem (species and gene, mangrove, wetland, coastal and marine ecosystem) into biodiversity conservation programmes received prominence.[17] The *Environmental Policy 1992* sets some common goals, targets and required actions for related development sectors including agriculture, industry, health, energy, water, land, forest and fisheries to facilitate the conservation and sustainable use of all potential components of natural resources.[18] A similar commitment for the inclusion of environment and ecosystem components in development and sectoral policies was included in the *Draft Environment Policy 2013*, though it is not yet finalised.[19]

[14] The 7th FYP.
[15] Ibid 483.
[16] NSDS 116.
[17] NBSAP iv, 4, 21.
[18] *Environment Policy 1992* ss 3.8.3, 3.8.4, 3.10.1.
[19] *The Draft Environmental Policy of Bangladesh 2013*.

The *Forest Policy 1994* proposed integrating the functional components of ecosystem, such as forest, water and wildlife, in an integrated management plan for the Sundarbans to ensure conservation and sustainable use of its resources.[20] However, the rapid loss of forest ecosystems, emerging environmental issues at the national and international level, a perceptible shift to participatory forestry and co-management necessitated revisiting the priorities of the country's forestry sector. Thus, the government has drafted the *Forest Policy 2016*, but it has not yet been approved. The draft policy contains broad promises to contemplate multiple components of forest biodiversity including protected areas, mangrove forests and wetlands for maintaining ecological balance.[21]

The reflection of integration of entire ecosystem components is embedded in Goal 1 and the vision statement of the IRMP for the Sundarbans which urges undertaking necessary initiatives to secure the habitats (wetlands, sanctuaries and surrounding landscapes) for regeneration of wildlife, fish and essential ecological services and also to ensure its terrestrial and aquatic ecosystems are well adapted to climate change.[22] Although not directly mentioned, the spirit of conservation of ecosystem's potential components is envisioned in the *Sundarbans Tourism Policy 2014* via setting criteria for the ecotourism concerned for the preservation of values and culture of the traditional communities living around the Sundarbans to avoid disturbance to the wildlife and traditional communities.[23] Conservation of life and the habitat of wildlife are given priority in the CCW 2010 (despite injury caused by them) over the community people due to their importance in maintaining ecological balance.[24] The echo of the notion of integration of entire ecosystem components is tuned in the BTAP 2009 with the recognition of the Bangladesh tiger's prominence, as a predator, in regulating the number and distribution of its prey, which in turn impacts on the structure, composition and regeneration of the entire Sundarbans's biodiversity.

The notion of integration of entire ecosystem components is not clearly reflected in the BCCSAP 2009. However, its notions are envisaged with the BCCSAP's emphases on structural solution to climate change, enhancing capacity and resilience to meet climate

[20] *Forest Policy 1994*.
[21] *The Draft Forest Policy 2016*, preamble.
[22] IRMP for the Sundarbans, vi.
[23] *The Sundarbans Tourism Policy 2014*.
[24] CCW 2010 sub-ss 3(d)–(f).

change–driven challenges by mangrove afforestation across the coast and development of monitoring system to evaluate changes in all sensitive ecosystems.[25] Being a part of Bangladesh's overall development strategy, the climate change issue is being integrated into all sectors and processes for socio-economic and ecosystem development.

4.4.1.1.3 Other Policies that Indirectly Influence the Sundarbans

Apart from the policies covered in the previous section, there are other policies that have indirect implications for the country's natural resources and the Sundarbans. The assessment of those policy provisions relating to the ecosystem principle of 'integration of entire ecosystem components' are presented in Table 4.1.

Table 4.1: Related Components of Policies that Indirectly Influence the Sundarbans

Policy	Related Components
Water Policy 2012	Preservation of environment and biodiversity including wetlands, mangrove forest, endangered species and maintaining water quality to minimise environmental damages (salinisation and water pollution).[26]
Fisheries Policy 1998	Maintenance of ecological balance, conservation of biodiversity, improvement of fishing communities' livelihood and ensuring amenities for public health are set as important objectives. The policy emphasises taking proper care during implementation of development projects such as flood control, irrigation, drainage, agriculture, industries, road and urban development to conserve fish habitats.[27]
Coastal Zone Policy 2005	Considering the diverse ecological and economic values of coastal ecosystems including the Sundarbans, the policy includes all aquatic and coastal resources including inland fisheries and shrimp, marine fisheries, mangrove forests for sustainable management of both biotic and abiotic resources.[28]
Wetland Policy 1998	Integration of wetland functions in natural resources management and economic development decision-making for the maintenance of wetlands biodiversity and conservation of varied network of

[25] M Khalequzzaman, *National Environment Policy: Promises Need to Follow with Action* (2013) <http://opinion.bdnews24.com/2013/10/07/national-environment-policy-promises-need-to-follow-with-action/>.
[26] *Water Policy 2012* 2.
[27] *Fisheries Policy 1998* arts 2, 5.1.
[28] *Coastal Zone Policy 2005* art 4.4.

Policy	Related Components
	freshwater and saltwater wetlands including mangroves and tidal mudflats.
Tourism Policy 2010	Development of the Sundarbans-centric ecosystem hotspot for provision of alternative income generating prospects for forest-dependent communities and keeping the integrity of the ecosystem, local culture and heritage intact.[29]
Land Use Policy 2001	The modalities of land zoning for integrated planning and management of land resources are premised with emphasis on conservation of natural forests and prevention of land pollution.[30]
Agriculture Policy 2013	Target is set to achieve sustainable sectoral growth through the increased productivity of agriculture by using modern technology in the subsectors (i.e., crops, horticulture, livestock, fisheries and forestry).[31]
Industrial Policy 2016	To achieve sustainable economic growth by industrial development, the focus is on environmentally sound industrial management (i.e., minimisation of sectoral impact on ecosystem and environment).[32]

4.4.1.2 Integration of Entire Ecosystem Components in National Legislative Frameworks

This section examines the status of integration of entire ecosystem components in national biodiversity, environment and climate change–related legislation that directly or indirectly regulates or influences the Sundarbans.

4.4.1.2.1 Sundarbans-Related Major Legislation

The *Forest Act 1927*, *Wildlife (C&S) Act 2012* and *Bangladesh Biological Diversity Act 2017* are the major legislation for regulating Bangladesh's biodiversity and forest resources including the Sundarbans where the need for holistic consideration of ecosystem's functional components in biodiversity conservation is embedded both in content and spirit. The *Forest Act 1927*, applicable to all types of forests, extraction of forest resources and the transit of forest produce, contains major functional components of

[29] *Tourism Policy 2010* art 3.2.2.
[30] *Land Use Policy 2001* arts 2b, 2g, 2h.
[31] *Agriculture Policy 2013* art 1.5.
[32] *Industrial Policy 2016* ch 14.

ecosystem such as flora, fauna and forest produce (s 2). The *Wildlife (C&S) Act 2012* contains provisions for the conservation of basic components of ecosystem like biodiversity, forest, wetland and wildlife.[33] The integration of possible ecosystem components including terrestrial, aquatic and marine species of flora, fauna and nutrients and their species, genetic and ecosystem diversity are contained in the *Bangladesh Biological Diversity Act 2017* ss 2(11) and 2(13).

The notion of integration of an ecosystem's components is reflected in the ECA 1995 and the ECR 1997, enacted for the conservation of environment, improvement of environmental standards and controlling of environmental pollution.[34] In the ECA 1995, 'ecosystem' includes the interdependent and balanced complex association of all components of environment which can support and influence the growth of all living organisms (s 2). The ECR 1997, designed to provide a procedural base for executing the commitment set forth in the ECA 1995, includes all types of ecosystems such as forest sanctuary, wetland, mangrove and the biodiversity of the relevant area in the case of declaration of an ECA.[35] Under the *Environment Court Act 2010*, environmental pollution related offences (as enunciated in the ECA 1995 and the ECR 1997) are tried.

As per the *Protected Areas Management Rules 2017*, the issue of integration of potential components of ecosystems into a protected area's Annual Development Plan is entrusted to the CMCs. Apart from the conservation of forest resources, protection of fisheries, socio-cultural values of FDCs, minimisation of human-induced threats (e.g., pollution, illegal extraction and poaching, and encroachment), identification of corridors, climate-sensitive AIG for FDCs and agro-forestry or afforestation programmes are set as priorities for any conservation programme in and around protected areas.[36] The consideration of multiple attributes of ecosystems such as identification of threats to wild species, control of threats to the environment, preservation of FDCs' socio-cultural values and mechanisms for reduction of dependence on ecosystem resources are made mandatory in

[33] Wildlife (C&S) Act 2012 preamble.
[34] ECA 1995 preamble.
[35] ECR 1997 Rule 3.
[36] Government of Bangladesh Gazette Notification No SRO No 314 Ain/2017 Ministry of Environment and Forests, 8 November 2017 published 12 November 2017 (Protected Areas Management Rules 2017), Rule 10.

the *ECA Management Rules 2016* in designing any development plan in the ECAs.[37] Since the Sundarbans is a protected area and ECA, implementation of said provisions is crucial for holistic conservation of its biodiversity.

Some target specific Rules/Executive Orders are issued to address matters relating to the protection of Sundarbans. Those are the Sundarbans *Forest Transit Rule 1959*, *Canals Closure Regulation 1989* and *Moratorium on Tree Felling 1989*. The *Sundarbans Forest Transit Rule 1959* is framed to establish permit and revenue procedures for collecting permissible forest resources from the Sundarbans, while the *Canals Closure Regulation 1989* is designed to protect aquatic biodiversity and continue species regeneration. Under these, a permanent fishing ban was placed on 18 canals located outside the Sundarbans Wildlife Sanctuaries.[38] The *Moratorium on Tree Felling 1989* was issued to protect plant biodiversity.[39] The spirit of the ecosystem approach is entrenched in these documents' objectives.

4.4.1.2.2 Other Legislation that Indirectly Influences the Sundarbans

The following legislation is not directly relevant to the management of Sundarbans but do have some influence on the conservation and protection of forest resources. The portions of these laws relating to the ecosystem principle of 'integration of entire ecosystem components' are presented in Table 4.2. The notion of the holistic consideration of ecosystem components is explicitly or impliedly evident in these legal instruments.

Table 4.2: Related Components of Legislation that Indirectly Influences the Sundarbans

Legislation	Related Components
PCF Act 1950	The notion of potential components of ecosystem pertinent to development and management of fishery resources is embedded within the definition of 'Fish' covering all cartilaginous, bony fishes, prawn, shrimp, amphibians, tortoise, turtles, crustacean, molluscs and frogs (s 6.2.2), and 'fishing habitats' covers any water body, natural

[37] Government of Bangladesh Gazette Notification No SRO No 291 Ain/2016 Ministry of Environment and Forests, 22 September 2016 published 25 September 2016 (ECA Management Rules 2016), Rule 18.
[38] Sundarbans Divisional Forest Office, Office Memo 5087/18-1, Issued on 11 May 1989 (Canal Closure Regulation 1989).
[39] Government of Bangladesh Gazette Notification No Sha-2/MOEF192/90/580 of 1989 (Moratorium on Tree Felling).

Legislation	Related Components
	or artificial where activities for growing fish or for conservation, breeding, exploitation of fish or of living organisms are undertaken (s 6.2.3).
PCF Rules 1985	Contains all the elements engrained in the *PCF Act 1950* with some specification of zone and timescale-wise catching of some fish species (Rule 7). Consideration of diverse components of ecosystem and human livelihood security including plant, animal, fish, biodiversity and environment are also included.
Water Act 2013	The Act is circulated for the integrated development, conservation and use of water resources and the habitats for aquatic biodiversity including estuary, aquifer, flood-plain, wetland, coast, river and canal (s 2).
Territorial Water and Maritime Zone Act 1974	Empowers the government to establish conservation zones in the sea adjacent to territorial waters and takes measures to maintain the productivity and protection of living marine resources from indiscriminate exploitation or destruction (s 6).
Inland Shipping Ordinance 1976	To protect the inland water from pollution, the Ordinance includes possible impacts of illegally plying of any ship on or around inland waterways by way of operating without having legal requirements or polluting the waterways by discharging oily mixture and sewage into inland water that are detrimental to public health, biodiversity and wildlife (s 60A).
NRPC Act 2013	Planned emphases on protection of rivers from multiple threats such as illegal occupation, pollution by discharging industrial effluents, oily mixture and sewage, obstructing normal water flow and ensuring diverse use of river for socio-economic development (preamble).

Note: PCF = Protection and Conservation of Fish. NRPC = National River Protection Commission.

4.4.1.3 Evaluation of Integration of Entire Ecosystem Components in National Legal and Policy Frameworks

In light of the above analysis, it is found that the integration of all functional ecosystem components, a dominant principle of the ecosystem approach, is not adequately taken into consideration in the national policies and legislation that have general implications for the Sundarbans. The national development plans have commitments in mainstreaming the

holistic consideration of ecosystem components (concerns for environment, biodiversity and climate change) into sectoral policies and laws. For example, the 7th FYP and the NSDS provides considerable attention to maintenance of diverse components of ecosystem including forestry, wetlands, coastal and marine resources, natural disaster and climate change for the maintenance of ecosystem integrity (discussed in Section 4.4.1.1). In response to the national development plan, some regulatory regimes adopted after 2000 have included ecosystem conservation and climate change–related issues as common goals or interlinked instruments for achieving ecologically sound development in Bangladesh. For instance, the NBSAP, IRMP for the Sundarbans and *Water Policy 2012* contains provisions for integrating the ecosystem as a whole in undertaking any conservation and development initiatives (discussed in Section 4.4.1.1).

Some other policies and laws promulgated before the adoption of current national development plans (*the Vision 2021*, Perspective Plan, the 7th FYP and NSDS) have been upgraded/amended to include the holistic consideration of ecosystem components (climate change, biodiversity and environmental issues) to be compatible with national and international obligations. *The Wildlife (C&S) Act 2012* which focuses more on ensuring entirety in wildlife conservation and management, is an example by which the *Bangladesh Wild Life (Preservation) Order 1973* has been repealed. A few responses are evident in the newly formatted statutes for the execution of policy-enshrined commitment at the ground level. Based on this development, the related policies have been scored (the scoring system illustrated in Section 1.8.2) and are presented in Table 4.3.

Table 4.3: Status of Integration of Entire Ecosystem Components in National Policy Frameworks

Policy	Category				Total Score
	Issue	*Causal Links*	*Responses*	*Process*	
National Development Plans					
The Vision 2021	1	1	1	0	3
Perspective Plan	1	2	2	1	6
The 7th FYP	1	3	2	1	7
NSDS	2	3	3	2	10
Sundarbans-Related Major Policies					
NBSAP	2	3	3	2	10

Policy	Category				Total Score
	Issue	*Causal Links*	*Responses*	*Process*	
Environmental Policy 1992	2	2	3	3	10
Forest Policy 1994	2	3	3	3	11
IRMP for the Sundarbans	2	2	1	3	8
BTAP 2009	1	1	1	1	4
Sundarbans Tourism Policy 2014	1	2	0	1	4
CCW 2010	1	1	0	0	2
BCCSAP 2009	2	2	2	2	8
Other Policies					
Water Policy 2012	1	1	3	1	6
Fisheries Policy 1998	2	2	2	2	8
Coastal Zone Policy 2005	2	1	1	1	5
Wetland Policy 1998	2	2	1	1	6
Land Use Policy 2001	1	1	0	0	2
Tourism Policy 2010	1	1	2	1	5
Industrial Policy 2016	1	0	0	0	1
Agriculture Policy 2013	2	2	1	1	6

Note: Perspective Plan = *National Perspective Plan of Bangladesh 2010-2021*, The 7th FYP = *The Seventh Five Year Plan (FY2015/16-FY2019/2020)*, NSDS = *National Sustainable Development Strategy 2010-2021*, NBSAP = *National Biodiversity Strategy and Action Plan 2016-2012*, IRMP for the Sundarbans = *Integrated Resources Management Plans for the Sundarbans (2010-2020)*, BTAP = *Bangladesh Tiger Action Plan 2009*, CCW = *Compensation Policy for Causalities Caused by Wildlife 2010*, BCCSAP = *Bangladesh Climate Change Strategy and Action Plan 2009.*

The scores against each policy document indicate that the consideration of entire ecosystem components in natural resource conservation of Bangladesh, including the Sundarbans, is still in a nascent stage (discussed in Section 4.4.1.1). Amid the national development plans, the NSDS (Scored 10) elaborately focuses on the issue, while considerable attention is noted in a few Sundarbans-related major and associated policies such as the *Environmental Policy 1992* (Scored 10), *Forest Policy 1994* (Scored 10), IRMP for the Sundarbans (Scored 8), BCCSAP 2009 (Scored 8) and *Fisheries Policy 1998* (Scored 8).

Generally, the policy objectives become operational by their integration into legislation. Table 4.4 presents the overall score of the 'integration of entire ecosystem components' for major and associated legislation regulating the Sundarbans. It is evident that the

Wildlife (C&S) Act 2012, *Protected Areas Management Rules 2017* [Scored 7], *Bangladesh Biological Diversity Act 2017* [Scored 8], ECA 1995 [Scored 11], ECR 1997 [Scored 10], PCF Act 1950 [Scored 8] and PCF Rules 1985 [Scored 8] scored better than other enactments due to inserting policy commitments into their texts.

Table 4.4: Status of Integration of Entire Ecosystem Components in National Legislative Frameworks

Act/Ordinance/Rule	Category				Total Score
	Issue	*Causal Links*	*Responses*	*Process*	
Sundarbans-Related Major Legislation					
Forest Act 1927	2	0	2	2	6
Wildlife (C&S) Act 2012	3	0	2	2	7
Bangladesh Biological Diversity Act 2017	3	1	2	2	8
ECA 1995	3	2	3	3	11
ECR 1997	2	2	3	3	10
Protected Areas Management Rules 2017	2	2	2	1	7
ECA Management Rules 2016	2	2	1	1	6
Sundarbans Forest Transit Rule 1959	1	1	2	1	5
Canals Closure Regulation 1989	1	1	2	1	5
Moratorium on Tree Felling 1989	1	1	2	1	5
Other Legislation					
PCF Act 1950	2	2	2	2	8
PCF Rules 1985	2	2	2	2	8
Water Act 2013	2	1	2	1	6
Territorial Water and Maritime Zone Act 1974	1	1	0	0	2
Inland Shipping Ordinance 1976	1	0	1	0	2
NRPC Act 2013	1	1	0	0	2

Note: Wildlife (C&S) Act 2012 = *Wildlife (Conservation and Security) Act 2012*, ECA 1995 = *Environmental Conservation Act 1995*, ECR = *Environmental Conservation Rules 1997*, ECA = Ecologically Critical Areas, PCF = Protection and Conservation of Fish, NRPC = National River Protection Commission.

A similar line of reasoning is reflected in expert opinions. Most of experts opine that the concerns for climate change, biodiversity decline and environmental deterioration have received much attention among policymakers and FD officials involved in the Sundarbans's management in recent times, but the holistic conservation commitment that is espoused through the ecosystem approach has, so far, not been realistically integrated in developing policies, legislation and action plans.[40] Development programmes are still being designed and implemented to focus on a particular species or ecosystem. Reasons for 'integration of entire ecosystem components' in national legislation and its implementation through conservation programmes were summarised by one environment expert as follows:

> As a conservation parameter, the integration of entire ecosystem components is just like an orchestra. If any potential component (micro-organism, mammal groups, and plant groups) is left outside of conservation programme, the total conservation process becomes incomplete just like the entirety of a tune; if interrupts at any stage, the total music becomes a mess. Unfortunately, in the Sundarbans context, most of the ecosystem conservation programmes initiated so far has overlooked this holistic integration component which in many cases resulted in negligible outputs, simply because of lack of clear understanding or given less attention from the authority concerned ignoring the comparative utility of the issue. If considerable attention in case of designing of the project document is given, the conservation outputs of the same conservation programme could be doubled or much more exemplary.[41]

It is apparent that inadequate understanding of the ecosystem approach principles, lack of technical expertise and less focus on ecosystem vulnerability assessment has impeded the insertion of the principle of 'integration of entire ecosystem components' into legislative instruments.

4.4.2 Conservation and Sustainable Use

To ensure ecological sustainability and human wellbeing, the ecosystem approach advocates adopting the principle of 'conservation and sustainable use'. For achieving such targets, different tools are adopted by the states in consideration of the local reality. In this section, in mapping the conservation and sustainable use principle's reflection in guiding

[40] Summary of the Interviews with PP2, PP3, PI8, PM6, PM7, EC1, EC5, EC6, EC7 (face to face, 9–29 January 2017).
[41] Interview with EC6 (face to face, 14 January 2017).

policies and regulatory mechanism managing the Sundarbans, the following features, adopted from the CBD Guidelines on the Ecosystem Approach,[42] are considered:

- regulatory mechanisms on resources harvesting
- access of resource user groups to decision-making and management
- provisions on conservation-linked AIG opportunities
- emphasis on monitoring mechanism
- focus on silvicultural research
- capacity building of ecosystem managers
- CHM for sharing of information
- efforts on building public private partnership
- controlling of extraneous actions on environment and ecosystem.

4.4.2.1 Conservation and Sustainable Use in National Policy Frameworks

4.4.2.1.1 National Development Plans

Conservation and sustainable use of natural resources resonates in *the Vision 2021*. Specific emphasis is on formulation of an integrated regional water policy with India, Nepal and Bhutan to ensure rational use of transboundary water resources that have profound influence on the sustainable management of the Sundarbans.[43] It is recognised in the Perspective Plan that the country's environmental balance is disturbed due to overexploitation of resources; pollution of air, water and land by industrial effluents; and deforestation. To maintain environmental health, the plan emphasises adopting sustainable use of ecosystem resources and environmentally sound development practices.[44] The importance of conservation and sustainable use is echoed in the 7th FYP. To achieve sustainable economic growth, the plan advocates a development approach that is resilient to disaster and climate change, entails sustainable use of natural resources and manages the inevitable urbanisation transition.[45] The NSDS identifies environmental sustainability and social equity as important vehicles for ensuring sustained economic growth. For maintaining environmental sustainability, the strategy focuses more on sustainable use of

[42] CBD Guidelines on Ecosystem Approach, 1–50.
[43] *The Vision 2021*, Goal 7(k), 7(l).
[44] Perspective Plan 79.
[45] The 7th FYP xxxvi.

natural resources through setting several strategies such as the continuation of moratorium on felling in natural forests, conservation of the Sundarbans's biodiversity, rehabilitation or restoration of endangered species and degraded ecosystems, adoption of co-management in managing wetlands and forests and capacity enhancement of ecosystem managers.[46]

4.4.2.1.2 Sundarbans-Related Major National Policies

The conservation and sustainable use of the country's biodiversity is a key objective in the NBSAP. The policy identifies several important aspects such as raising awareness, documentation of traditional knowledge, technology transfer and resource mobilisation to achieve such targets.[47] It also stresses establishing a biodiversity cell in development ministries for mainstreaming the conservation and sustainable use paradigm within the development policies and programmes of natural resource managing ministries.[48]

The *Environment Policy 1992* art 3.1 promotes environmentally sound initiatives in the production sector to protect the environment and ensure sustainable use of natural resources. Setting the mechanism of sustainable use of ecosystem resources as basic principle, the *Draft Environment Policy 2013* emphasises inclusion of climate change adaptation in development programs for the protection of the nation's environmental and natural resources (air, water, forest, fisheries, mangrove, wetland and agriculture).[49] The *Forest Policy 1994* also encourages ensuring conservation and effective use of forestry resources by installing sound management (which is targeted to bring 20 per cent of state territory under forest cover through afforestation programs) and multiple uses of the Sundarbans and other forests resources. To address the emerging challenges associated with biodiversity, the *Draft Forest Policy 2016*, in its policy statement 3, suggests adopting a mechanism for securing balance between the uses of the country's forest resources as revenue earning assets and their conservation.

[46] NSDS 116, 120.
[47] NBSAP iv.
[48] Natural resource–managing ministries of Bangladesh include the Ministry of Agriculture; Ministry of Fisheries and Livestock; Ministry of Land; Ministry of Local Government, Rural Development and Co-operatives; Ministry of Water Resources; and Ministry of Industry.
[49] *Draft Environmental Policy 2013*, 4.

Sustainable use of biological resources is stated in the vision statement of the IRMP for the Sundarbans.[50] A range of policy measures, including establishment of Spatial Monitoring and Reporting Tool (SMART) patrolling and restrictions on harvesting resources, are prescribed for ensuring rational use of the Sundarbans's resources. This notion resonates in the cluster policies regulating the Sundarbans. The *Sundarbans Tourism Policy 2014* allows controlled access for enjoyment of Sundarbans's wildlife, but sets responsibilities for tourists and tour operators for preservation of the Sundarbans's resources. The CCW 2010 is formulated to provide incentives to wildlife victims for conservation of biodiversity and reduction of human–wildlife conflicts.[51] The BTAP 2009 s 2.5 focuses more on raising awareness and research on the Sundarbans, enforcement of law, introducing SMART patrolling and strengthening transboundary cooperation with India, both for the conservation of the Sundarbans's resources and protection of the tiger population.

One of the policy objectives of the BCCSAP 2009 is to create a suitable environment for securing the country's socio-economic development and human wellbeing through sustainable use of available natural resources.[52] As part of that effort, intensive plantation of mangrove across the shoreline under the coastal 'green belt' project is set as a strategy to mitigate climatic impact on people and the environment.

4.4.2.1.3 Other Policies that Indirectly Influence the Sundarbans

The notion of the ecosystem approach's conservation and sustainable use principle has been explicitly or impliedly ventilated in other natural resource managing policies that influence the Sundarbans. The assessed portions of those policies relating to the conservation and sustainable use principle are presented in Table 4.5.

Table 4.5: Related Components of Policies that Indirectly Influence the Sundarbans

Policy	Related Components
Water Policy 2012	The sustainable use of water and associated natural resources is set as an objective for the availability, improved water resources management and protection of the environment. Some priority actions

[50] IRMP for the Sundarbans, vi.
[51] CCW 2010 preamble.
[52] BCCSAP 2009 18.

Policy	Related Components
	are prescribed such as attention to fisheries and wildlife in water resource planning, preservation of swamps and water bodies for production of aquatic resources, and confinement of brackish aquaculture to designated zones.[53]
Fisheries Policy 1998	Focuses on keeping the harvesting of inland and marine fish at a maximum sustainable level for continued production of fish resources (art 8).
Coastal Zone Policy 2005	Sustainable conservation of aquatic and terrestrial ecosystems is set as policy goals for maintaining ecological balance. Special emphasis is placed on sustainable use of resources from ecologically critical areas, Heritage Sites including the Sundarbans and marine reserves (art 4.4). To avoid environmental damage, environmentally sustainable and socially responsive shrimp farming are suggested (art 8).
Wetland Policy 1998	Conservation and sustainable use of wetland resources is emphasised for sustainment of their ecological and socio-economic functions which are crucial for the development of Bangladesh.
Tourism Policy 2010	Mainstreaming ecotourism in natural ecosystems sites as a means of alternative livelihood of the resource users for lessening their reliance on ecosystem goods (art 2).
Land Use Policy 2001	Transfer of classification of declared forests, wetlands or any natural reserve without prior approval is prohibited for the preservation of natural ecosystems (art 3.4). Extension of natural forests including the Sundarbans through coastal plantation, social forestry and sustainable use of lands is encouraged to provide for a healthy environment (arts 7, 9).
Agriculture Policy 2013	Focuses on increased crop production through diversification of agricultural activities and adopting sustainable agricultural production system to ensure food and nutritional security for all and boosting of rural livelihoods (art 2.1).
Industrial Policy 2016	Promotes environmentally sound industrial management to achieve sustainable economic growth (ch 14).

[53] *Water Policy 2012* 4, 12.

4.4.2.2 Conservation and Sustainable Use in National Legislative Frameworks

The principle of conservation and sustainable use is included to varying degrees and nature in the major legislation regulating the Sundarbans and in other regulations influencing the natural reserve. These are discussed below.

4.4.2.2.1 Sundarbans-Related Major Legislation

To ensure conservation and sustainable use of forest resources, the *Forest Act 1927* includes provisions for declaring any forestland or wasteland as reserve forest and protected areas, controlling access to reserve forests or protected areas for resource exploitation. The concept of participatory forest generation and management was also inserted in 2000 with 'village forests' (s 28) and 'social forestry' (s 28A) for strengthening conservation and sustainable use mechanisms. Similarly, a series of measures were introduced in the Wildlife (C&S) Act 2012 for enabling sustainable conservation and use of biodiversity. The Act empowers the government to declare any state forest or part thereof or any wetland or marine zone as a sanctuary, establish a safari park in any state-owned forest for in situ conservation of wild animals, declare any public or private area outside the boundaries of protected forests as a buffer zone, and control traditional communities' access to a sanctuary or protected areas for resource extraction.[54]

Setting conservation of the environment as a prime objective, the ECA 1995 concentrates on improvement of environmental quality through controlling pollution, while the ECR 1997 contains the procedures for application of the ECA 1995. Declaration of an area as an ECA, determination of compensation or corrective measures for causing injury to ecosystem, restrictions on vehicles emitting smoke harmful for environment, or obtaining an ECC from the DoE for the setting up of any industrial unit are the major measures aligned for the protection of the environment from human and development intervention.[55] The execution of sustainable use commitments entrenched in the ECA 1995 and ECR 1997 are to be regulated by the *Environment Court Act 2010*.

To ensure conservation and sustainable use of the resources in protected areas and ECAs, stakeholder-centric management structures have been introduced in Bangladesh with the

[54] Wildlife (C&S) Act 2012 ss 13, 14, 17, 19, 20.
[55] ECA 1995 ss 5–7, 12.

Protected Areas Management Rules 2017 and *ECA Management Rules 2016*. Under the former, for managing protected areas in a collaborative way, provisions for establishment of multi-stakeholders representative co-management organisations (CMOs)[56] are inserted with defined managerial and monitoring responsibilities and procedures for distribution of protected areas–generated revenue to the CMOs.[57] To reduce FDC's dependence on protected area resources, the Rules encourage the CMCs to develop AIGs (Rule 10(o)); empowers the FD to select buffer zones or corridors around protected areas (Rule 21) and allows the Deputy Commissioners to lease out *Khas* (state-owned) land contiguous to protected areas to the CMCs for developing AIGs (Rule 24). Local stakeholders' inclusive multi-level CMCs received a legal base with the proclamation of the ECA Management Rules 2016 for local communities to manage ECAs.[58] To protect the biological resources of ECAs, several protection measures were implemented, including controlling pollution, preservation of FDCs' socio-cultural values and promotion of AIG activities (Rule 18).

The commitment to conservation and sustainable use of the Sundarbans's resources is present in several other ways in other Sundarbans-centric regulations. For example, the *Sundarbans Forest Transit Rule 1959* focuses on bringing the extraction system of permissible resources under a standard procedure, while the *Canals Closure Regulation 1989* and *Moratorium on Tree Felling 1989* concentrate on imposition of restrictions on fishing from 18 canals outside the Sundarbans and felling of trees from the Sundarbans respectively.

4.4.2.2.2 Other Legislation that Indirectly Influences the Sundarbans

Considering their varying influences on the Sundarbans, the following legislation are noted for the elements of conservation and sustainable use principle present therein. Assessed portions of those enactments relating to conservation and sustainable use are presented in Table 4.6.

[56] Co-management Organizations (CMOs) under the *Protected Areas Management Rules 2017* includes Co-Management Council, Co-Management Committee (CMCs), Village Conservation Forum (VCF), People's Forum (PF) and Community Patrol Group (CPG).
[57] *Protected Areas Management Rules 2017*, Rules 5, 6, 10, 15, 17, 18, 19, 25, 26, 27.
[58] Co-management structures under the ECA Management Rules 2016 [Rules 4, 6, 7, 9, 10, 12, 13, 14, 23] includes Union Coordination Committee, Upazilla Committee, Village Conservation Group, District Committee and National Committee.

Table 4.6: Related Components of Legislation that Indirectly Influences the Sundarbans

Legislation	Related Components
PCF Act 1950	For the conservation and sustainable use of fishery resources, the Act empowers the government to take actions in the form of regulations including use of fixed engines and current net (mesh size 4.5 cm or less) for catching fish, construction of temporary or permanent structures in natural waterbodies to harvest fish, harvesting fish using poisons, control of water pollution by industrial effluents and limiting fish harvesting seasons (s 8).
PCF Rules 1985	Makes similar commitments to the PCF Act 1950 with defining zone-wise and timescale-wise catching periods for some fish species (Rule 7).
Water Act 2013	Emphasises conservation of all forms of waterways (ie, estuary, aquifer, flood-plain, wetland and coast) and entails provisions for imposition of restrictions for ensuring sustainable use of water resources (s 2).
Territorial Water and Maritime Zone Act 1974	Maintenance of productivity and shelter of aquatic resources from indiscriminate use via establishing conservation zones in the sea contiguous to territorial water (s 6).
Inland Shipping Ordinance 1976	Controlling the possible impacts/threats of illegally operated inland ships to public health and aquatic wildlife (s 60A).
NRPC Act 2013	Empowering the National River Protection Commission to take diverse measures against illegal occupants or polluters of rivers and ensuring sustainable use of river-generated resources for boosting socio-economic development (preamble).

Note: PCF = Protection and Conservation of Fish, NRPC = National River Protection Commission.

4.4.2.3 Evaluation of Conservation and Sustainable Use in National Legal and Policy Frameworks

The previous analysis indicates that the conservation and sustainable use of biodiversity, the most dominant principle of the ecosystem approach, has received generous attention in national development plans and major policies regulating or influencing the Sundarbans.

Recognising the interconnectedness of the triple cross-cutting issues (climate change, environmental degradation and ecosystem decline) with development, most national development plans integrate those issues as a common concern in achieving environmentally sound development in Bangladesh. Conservation and sustainable use has received considerable focus in the majority of policies and laws regulating or impacting on the Sundarbans. However, shortcomings are evident in some of the policies enacted before 2000. The varied statuses of the principle of conservation and sustainable use in national policies are presented in Table 4.7.

Table 4.7: Status of Conservation and Sustainable Use in National Policy Frameworks

Policy	Category				Total Score
	Issue	*Causal Links*	*Responses*	*Process*	
National Development Plans					
The Vision 2021	2	1	1	1	5
Perspective Plan	2	2	2	2	8
The 7th FYP	2	2	2	2	8
NSDS	2	3	3	2	10
Sundarbans-Related Major Policies					
NBSAP	2	2	2	2	8
Environmental Policy 1992	2	2	3	3	10
Forest Policy 1994	2	2	3	3	10
IRMP for the Sundarbans	2	2	3	3	10
BTAP 2009	2	0	0	1	3
Sundarbans Tourism Policy 2014	2	0	0	1	3
CCW 2010	1	0	0	1	2
BCCSAP 2009	2	3	3	2	9
Other Policies					
Water Policy 2012	2	2	2	2	8
Fisheries Policy 1998	2	2	2	2	8
Coastal Zone Policy 2005	2	2	2	2	8
Wetland Policy 1998	2	1	2	1	6
Land Use Policy 2001	2	0	1	1	4
Tourism Policy 2010	2	0	1	1	4
Industrial Policy 2016	2	0	1	1	4

Policy	Category				Total Score
	Issue	*Causal Links*	*Responses*	*Process*	
Agriculture Policy 2013	2	2	2	1	7

Note: Note: Perspective Plan = *National Perspective Plan of Bangladesh 2010-2021*, The 7th FYP = *The Seventh Five Year Plan (FY2015/16-FY2019/2020)*, NSDS = *National Sustainable Development Strategy 2010-2021*, NBSAP = *National Biodiversity Strategy and Action Plan 2016-2012*, IRMP for the Sundarbans = *Integrated Resources Management Plans for the Sundarbans (2010-2020)*, BTAP = *Bangladesh Tiger Action Plan 2009*, CCW = *Compensation Policy for Causalities Caused by Wildlife 2010*, BCCSAP = *Bangladesh Climate Change Strategy and Action Plan 2009.*

The policy scores (the scoring system illustrated in Section 1.8.2) shown in Table 4.7 reveal that the focus of biodiversity conservation and its rational use in the natural resource management sectors in Bangladesh is still in an intermediate stage. This matter receives a high a focus in national development plans—the NSDS (Scored 10), Perspective Plan (Scored 8) and the 7th FYP (Scored 8). Substantial attention to the issue is evidenced in its integration into several major policies regulating the Sundarbans such as the *Environmental Policy 1992* (Scored 10), *Forest Policy 1994* (Scored 10), IRMP for the Sundarbans (Scored 8) and BCCSAP 2009 (Scored 9). The features of conservation and sustainable use principle are widely entrenched in other natural resource policies that have an indirect influence on the Sundarbans such as the *Water Policy 2012*, *Fisheries Policy 1998*, *Coastal Zone Policy 2005* and *Agriculture Policy 2013* (discussed in Section 4.4.2.2).

The status of the conservation and sustainable use principle in related legislative frameworks are presented in Table 4.8. Sensible attention is espoused in the *Wildlife (C&S) Act 2012* (Scored 7), *Protected Areas Management Rules 2017* (Scored 7), *ECA Management Rules 2016* (Scored 7), *Bangladesh Biological Diversity Act 2017* (Scored 8), ECA 1995 (Scored 10), ECR 1997 (Scored 10), PCF Act 1950 (Scored 8), PCF Rules 1985 (Scored 8) and *Water Act 2013* (Scored 7).

Table 4.8: Status of Conservation and Sustainable Use in National Legislative Frameworks

Act/Ordinance/Rule	Category				Total Score
	Issue	*Causal Links*	*Responses*	*Process*	
Sundarbans-Related Major Legislation					
Forest Act 1927	2	1	2	2	7

Act/Ordinance/Rule	Category				Total Score
	Issue	*Causal Links*	*Responses*	*Process*	
Wildlife (C&S) Act 2012	3	0	2	2	7
Bangladesh Biological Diversity Act 2017	3	1	2	2	8
ECA 1995	2	2	3	3	10
ECR 1997	2	2	3	3	10
Protected Areas Management Rules 2017	2	2	2	1	7
ECA Management Rules 2016	2	2	2	1	7
Sundarbans Forest Transit Rule 1959	1	1	2	1	5
Canals Closure Regulation 1989	1	1	2	1	5
Moratorium on Tree Felling 1989	1	1	2	1	5
Other Legislation					
PCF Act 1950	2	2	2	2	8
PCF Rules 1985	2	2	2	2	8
Water Act 2013	2	2	2	2	8
Territorial Water and Maritime Zone Act 1974	2	0	0	1	3
Inland Shipping Ordinance 1976	1	0	1	1	3
NRPC Act 2013	1	0	1	1	3

Note: Wildlife (C&S) Act = *Wildlife (Conservation and Security) Act 2012*, ECA 1995 = *Environmental Conservation Act 1995*, ECR = *Environmental Conservation Rules 1997*, ECA = Ecologically Critical Areas, PCF = Protection and Conservation of Fish, NRPC = National River Protection Commission.

During crosschecking of the above results with the field data, it was found that there is a growing level of awareness among resource users as to the notion of conservation and sustainable use of natural resources (as opposed to the long-practiced maximum utilisation approach). Experts in natural resource policy are of the view that, despite massive dependency on ecosystem resources, the alarming rate of resource decline and recurrent natural disasters have obligated policymakers and resource users to be more attentive to the indiscriminate use of natural resources. Subsequently, the sustainable use component has been inserted into most policies and laws regulating natural resource in the form of

regulations (ban or limiting harvesting) to maintain the country's ecological integrity.[59] However, some experts express their concerns about the practicability of this principle's success at the ecosystem level,[60] for example:

> The Sundarbans-centric policy development or legislative upgradation should be based not on single sided assessment (development perspective), rather those needs to be determined considering the integrated or dual sided assessment (development perspective and ecological perspectives). As for example, in case of issuance of ECC for the Rampal Power Plant project, the state authority mostly considered the economic or development perspective of the project, but this sort of economic output whether undermined the long-term ecological integrity of the ecosystem that has not been passably scrutinised. Due to this project, the number of the vessels plying inside the Sundarbans water channels will obstruct to the genetic transformation or species migration process which may hinder to the ecological succession of the Sundarbans ecosystem. The toxic effluents to be discharged from the power plant or from hundreds of industries that are being planned to establish around the Sundarbans landscape zone also possibly going to destroy the ecological balance of the Sundarbans. If those issues are not taken into consideration, the applicability of the notion of EA's 'conservation and sustainable use' principle becomes meaningless.[61]

As a remedy, aside from focusing on setting proper conservation priorities, experts suggest identification and minimisation of gaps in the enforcement and monitoring level,[62] for example:

> … for effective application of this ['conservation and sustainable use'] principle, the ecological aspect should be given priority over the aspirations of different local and international competing interest groups. Strict provisions have already been inserted in the legislation regulating the Sundarbans (ECA, EIA), but the questions lie on those provisions' compliance. In terms of enforcement of laws, the economic consideration is getting more weightage that should be overturned. Strong commitment and awakened organisational responsibility from all the concerned actors and no compromise mode at the political level [like strict provision by the China for the protection of Panda (*Ailuropoda melanoleuca*) or Indian approach in conservation of tigers] regarding maintenance of the Sundarbans integrity against the faulty promises of the consultants, can only ensure the enforcement of state regulations by which the effectivity of conservation and sustainable use tool can inevitably be visible.[63]

From the above analysis, some challenges are identified—such as contradictory priority setting, lack of strong commitment and understanding among the policymakers, weak monitoring and enforcement mechanisms—which largely restrain the legislative

[59] Summary of the Interviews with PM2, PM3, PM4, PM6, PI3, PI4 (face to face, 8–29 January 2017).
[60] Summary of the Interviews with PM7, PI1, PP1, PP2, PP3, PP4, PP5, EC1, EC2, EC4, EC5, EC6 (face to face, 8–29 January 2017).
[61] Interview with EC1 (face to face, 12 January 2017).
[62] Summary of the Interviews with PP1, PP3, PP5, EC2, EC5, EC6, EC7 (face to face, 14–25 January 2017).
[63] Interview with EC7 (face to face, 14 January 2017).

provisions relating to conservation and sustainable use from becoming fully functional at the Sundarbans ecosystem level.

4.4.3 Access and Equitable Benefit Sharing

The ecosystem approach seeks that benefit derived from the array of functions provided by biodiversity are maintained for human environmental security and sustainability. The equitable distribution of ecosystem-generated benefits assists stakeholders in their production and management. However, as per the CBD Guidelines on the Ecosystem Approach,[64] ABS requires facilitation of the following aspects:

- access right to ecosystem resources
- defining of ecosystem-generated income distribution procedure
- practicing sustainable use mechanism
- valuation of ecosystem services
- provisioning for alternative sources of livelihoods
- efforts on developing strong marketing and trading network
- resource user's involvement in monitoring and surveillance.

4.4.3.1 Access and Equitable Benefit Sharing in National Policy Frameworks

4.4.3.1.1 National Development Plans

Equitable sharing of ecosystem-generated benefits among resource users is not clearly mentioned in *the Vision 2021*, while the Perspective Plan portrays a roadmap for creating an equitable society through reduction of poverty and inequality in the distribution of income and wealth.[65] The same commitment is reflected in the 7th FYP. As part of achieving such targets, the plan emphasises building national capacities on identification of products and adoption of suitable processes for sharing of benefits arising from their use and accelerating their productive growth for food security with minimum environmental impact.[66] According to the NSDS, the 7th FYP–projected ecosystem growth cannot be sustainable if inequality increases with growth.[67] It is recognised in the

[64] CBD Guidelines on Ecosystem Approach, 1–50.
[65] Perspective Plan 8, 79, 87, 92.
[66] The 7th FYP 473.
[67] NSDS 48.

NSDS that, despite boosting the national economy, uncoordinated development activities including coastal shrimp aquaculture, salt production and industrial development in the coastal belt have led to natural resources decline, environment degradation and even intensification of social conflicts over land tenure and user rights around the Sundarbans (mainly due to unplanned shrimp culture). As a suitable remedy, the strategy suggests managing the coastal resources in a manner that can secure ABS for poor communities.[68]

4.4.3.1.2 Sundarbans-Related Major National Policies

The NBSAP emphasises a range of tools for ensuring inclusive development with equitable distribution of benefits among the resources users including the valuation of ecosystem services and their integration into national accounting system, recognition of poor women's traditional skills in maintaining the household-based AIG sources and ratification of the Nagaya Protocol on ABS to adopt globally agreed ABS mechanisms.[69] The concept of ABS arising out from natural resources is not mentioned in the *Environmental Policy 1992*. But a strong commitment to access to the disadvantageous community and equitable sharing of benefits in the use of natural resources and valuation of environmental services are included as strategic visions in the *Draft Environment Policy 2013*.[70] The notion of equitable distribution of forestry sector–generated benefits among the people, especially whose livelihood depends on forest and trees, is reflected in the *Forest Policy 1994*. But such commitments remained purely as policy until 2000, particularly for the Sundarbans FDCs. They were widely introduced in the *Draft Forest Policy 2016* by the way of maintenance of efficient markets for NTFPs, ensuring fair distribution of ecosystem benefits among resource users (art 4.6.2).

To ensure equitable sharing of benefits and responsibilities of managing the Sundarbans among stakeholders, the IRMP for the Sundarbans emphasises introduction of co-management.[71] The notions of distributive justice in the name of access to and fair distribution of resources are indirectly stated in the BTAP 2009, *Sundarbans Tourism Policy 2014* and CCW 2010 for improving the standard of living of the Sundarbans's resource users, but this is absent in the BCCSAP 2009.

[68] Ibid 124.
[69] NBSAP s 4.1.2.
[70] *The Draft Environmental Policy 2013* 4, 16.
[71] IRMP for the Sundarbans, vi, x.

4.4.3.1.3 Other Policies that Indirectly Influence the Sundarbans

The notion of equitable sharing of benefits principle has received some attention in other natural resource managing policies which influence the protection of the Sundarbans and its FDCs. The assessed portions of those enactments concerning equitable benefit sharing are presented in Table 4.9.

Table 4.9: Related Components of Policies that Indirectly Influence the Sundarbans

Policy	Related Components
Water Policy 2012	As water resources are an essential element for survival of human and biodiversity, the Policy focuses on efficient management and use of this resource so that it can be equitably distributed to all sections of society.[72]
Fisheries Policy 1998	For equitable distribution of protein to all, the Policy emphasises multiple processes of production of fishery resources, encourages forming fish cooperatives and arrangement of training and micro-credit facilities to the youth and women to be involved into fishing production (art 6).
Coastal Zone Policy 2005	Focuses on proper distribution of economic and ecosystem-driven benefits to the poorest and socially disadvantaged communities living in remote rural areas and at the risk of adverse ecological processes (cyclone-prone coastal regions and river erosion affected areas).[73]
Wetland Policy 1998	Concentrates on ensuring access to the underprivileged rural poor, youth and women who mainly depend on wetland resources and distribution of benefits from wetland resources to create their ownership of it.
Tourism Policy 2010	Promotes cultural tourism for preservation of indigenous communities' traditional culture as an alternative source of income and ensuring fair distribution of benefits arose from tourism (art 3.1.6).
Land Use Policy 2001	Suggests uses of coastal land reclaimed from the seabed and riverbed to ensure housing rights for the victims of flood, riverbank erosion and the underprivileged section (art 10).
Agriculture Policy 2013	Focuses on ensuring fair price of agricultural commodities through

[72] *Water Policy 2012* 4, 7.
[73] *Coastal Zone Policy 2005* art 4.5.

Policy	Related Components
	improved marketing system and to distribute it to rural communities entirely dependent on agriculture and agriculture-related subsectors including fisheries, livestock and forestry (art 2.1).
Industrial Policy 2016	Nothing relating to access and benefit-sharing mechanisms is mentioned.

4.4.3.2 Access and Equitable Benefit Sharing in National Legislative Frameworks

In line with the relevant national policies, the spirit of the access and equitable benefit sharing principle is integrated to varying degrees in the major and associated legislation regulating the Sundarbans.

4.4.3.2.1 Sundarbans-Related Major Legislation

Under the *Forest Act 1927* sub-s 28A 4(ii), the government is empowered to frame necessary provisions guaranteeing the participants of the social forestry programme to an equitable share of benefits and obligations. The notion of an ABS mechanism is dormant in the *Wildlife (C&S) Act 2012* within the concept of co-management. The right to distribution of equitable benefits derived from the genetic resources to local communities is engrained in the *Bangladesh Biological Diversity Act 2017*. Under s 30, the local community possessing innovative knowledge on genetic resources or any research that contributes significantly to the biological development can be rewarded with a patent or financial compensation by the national committee. The ECA 1995 and ECR 1997 overlook the issue of ABS to ecosystem resources user groups, although they emphasise protection of the environment from pollution.

The ABS mechanism is strongly embedded in the *Protected Areas Management Rules 2017* and *ECA Management Rules 2016*. In the former, different provisions are inserted in terms of allocation of responsibilities to various CMOs (Co-Management Council, CMC, Village Conservation Forum (VCF), People's Forum (PF) and Community Patrol Group (CPG) and procedure for distribution of the protected areas–generated revenue to CMOs.[74] Similarly, the *ECA Management Rules 2016* defines responsibilities of the co-management structures (Union Coordination Committee (UCC), Upazilla Committee (UC), Village

[74] *Protected Areas Management Rules 2017* Rules 5, 6, 10, 15, 18, 19, 25, 26, 27.

Conservation Group (VCG), District Committee (DC) and National Committee (NC) for managing the ECA with local communities and sharing the ECA-derived benefits to them.[75] Both Rules greatly influence the Sundarbans FDCs since the forest is a protected area and ECA. However, the issue of ABS derived from the Sundarbans's resources is not recognised in the *Sundarbans Forest Transit Rule 1959*, *Canals Closure Regulation 1989* or *Moratorium on Tree Felling 1989* because these legal instruments were enacted for restraining the access of the Sundarbans FDCs to prevent extraction of several ecosystem resources of the Sundarbans.

4.4.3.2.2 Other Legislation that Indirectly Influences the Sundarbans

The notion of equitable benefit sharing has not received considerable attention in enactments that have varying influences on the Sundarbans and its FDCs. The principle's notion is not cited anywhere in the PCF Act 1950 or PCF Rules 1985. The proper distribution of water resources is incorporated in the *Water Act 2013* sub-s 15(2)(d), but it lacks detailed elaboration in line with an ABS mechanism. ABS from aquatic and marine resources is not included in the *Territorial Water and Maritime Zone Act 1974*, *Inland Shipping Ordinance 1976* or NRPC Act 2013.

4.4.3.3 Evaluation of Access and Equitable Benefit Sharing in National Legal and Policy Frameworks

The ABS mechanism, one of the core principles of the ecosystem approach, is not widely recognised in the national development plans or major and associated policy and legal frameworks regulating the Sundarbans. It was found that most national development plans are attuned to the alleviation of poverty and reduction of income inequality among the common people, and ABS derived from the ecosystem services has not received robust attention. One of the reasons for this may be non-ratification of the Nagoya Protocol on Access and Benefits Sharing.[76] The statues of integration of an ABS mechanism into natural resource managing policies are presented in Table 4.10.

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[75] *ECA Management Rules 2016* Rules 4, 6, 7, 9, 10, 12, 13, 14, 23.

[76] *The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity*, opened for signature from 2 February 2011 UN Doc UNEP/CBD/COP/10/27 (entered into force 12 October 2014) ('Nagoya Protocol on Access and Benefit Sharing').

Table 4.10: Status of Access and Equitable Benefit Sharing in National Policy Frameworks

Policy	Category				Total Score
	Issue	*Causal Links*	*Responses*	*Process*	
National Development Plans					
The Vision 2021	0	0	0	0	0
Perspective Plan	1	0	0	1	2
The 7th FYP	1	1	1	2	5
NSDS	2	1	1	2	6
Sundarbans-Related Major Policies					
NBSAP	1	0	1	1	3
Environmental Policy 1992	1	0	0	1	2
Forest Policy 1994	1	0	1	1	2
IRMP for the Sundarbans	2	0	2	2	6
BTAP 2009	1	0	1	1	3
Sundarbans Tourism Policy 2014	1	0	1	1	3
CCW 2010	1	0	1	1	3
BCCSAP 2009	0	0	0	0	0
Other Policies					
Water Policy 2012	2	0	1	1	4
Fisheries Policy 1998	2	0	2	1	5
Coastal Zone Policy 2005	1	0	1	1	3
Wetland Policy 1998	1	0	0	1	2
Land Use Policy 2001	1	0	0	1	2
Tourism Policy 2010	2	0	1	1	4
Industrial Policy 2016	0	0	0	0	0
Agriculture Policy 2013	2	0	1	1	4

Note: Perspective Plan = *National Perspective Plan of Bangladesh 2010-2021*, The 7th FYP = *The Seventh Five Year Plan (FY2015/16-FY2019/2020)*, NSDS = *National Sustainable Development Strategy 2010-2021*, NBSAP = *National Biodiversity Strategy and Action Plan 2016-2012*, IRMP for the Sundarbans = *Integrated Resources Management Plans for the Sundarbans (2010-2020)*, BTAP = *Bangladesh Tiger Action Plan 2009*, CCW = *Compensation Policy for Causalities Caused by Wildlife 2010*, BCCSAP = *Bangladesh Climate Change Strategy and Action Plan 2009.*

Table 4.10 shows the ABS mechanism's incoherent status within Bangladesh's natural resource management policies. Though the NSDS (Scored 6) and the 7th FYP (Scored 5)

moderately focus (the scoring system illustrated in Section 1.8.2) on the issue, its integration into Sundarbans-related major and associated policies is insignificant. Some notable exceptions include the IRMP for the Sundarbans (Scored 6), *Fisheries Policy 1998* (Scored 5), *Water Policy 2012* (Scored 4), *Tourism Policy 2010* (Scored 4) and *Agriculture Policy 2013* (Scored 4). The status of an ABS mechanism in legislation is similar, as shown in Table 4.11. The *Bangladesh Biological Diversity Act 2017* (Scored 8), *Protected Areas Management Rules 2017* (Scored 7) and *ECA Management Rules 2016* (Scored 5) are the few enactments in which the access and equitable benefit sharing principle has received substantial attention.

Table 4.11: Status of Access and Equitable Benefit Sharing in National Legislative Frameworks

Act/Ordinance/Rule	**Category**				**Total Score**
	Issue	*Causal Links*	*Responses*	*Process*	
Sundarbans-Related Major Legislation					
Forest Act 1927	1	0	1	1	3
Wildlife (C&S) Act 2012	1	0	1	1	3
Bangladesh Biological Diversity Act 2017	3	1	2	2	8
ECA 1995	0	0	0	0	0
ECR 1997	0	0	0	0	0
Protected Areas Management Rules 2017	2	2	2	1	7
ECA Management Rules 2016	2	1	1	1	5
Sundarbans Forest Transit Rule 1959	0	0	0	0	0
Canals Closure Regulation 1989	0	0	0	0	0
Moratorium on Tree Felling 1989	0	0	0	0	0
Other Legislation					
PCF Act 1950	0	0	0	0	0
PCF Rules 1985	0	0	0	0	0
Water Act 2013	1	0	1	1	3
Territorial Water and Maritime Zone Act 1974	0	0	0	0	0
Inland Shipping Ordinance 1976	0	0	0	0	0

NRPC Act 2013	0	0	0	0	0

Note: Wildlife (C&S) Act = *Wildlife (Conservation and Security) Act 2012*, ECA 1995 = *Environmental Conservation Act 1995*, ECR = *Environmental Conservation Rules 1997*, ECA = Ecologically Critical Areas, PCF = Protection and Conservation of Fish, NRPC = National River Protection Commission.

During crosschecking of the above results with information collected from expert consultations, it was revealed that the concept of ABS has not received adequate focus in natural resources legislation or in practice. Experts cited lack of awareness among policymakers, resource users and business communities regarding the notion of ABS, although all experts reiterated establishing distributional justice within poor FDCs.[77] Some restrictions are imposed on harvesting of ecosystem goods without considering adequate alternatives which led resource users to be involved in unlawful extraction. Most interviewees emphasised recognising resource users' role, ensuring equitable access to resource management, valuation of ecosystem services and providing safety nets for lean seasons for mainstreaming ABS mechanism at ecosystem level.[78] Aside from mentioning several reasons for non-implementation of an ABS mechanism, an environmental activist (with a long history of working for the protection of resource user communities' rights) stated the core reason for establishing equity among resource harvester communities as follows:

> Equitable sharing of benefits (fair price) from the harvested products can realistically be established when the harvesters can be organised and built their own cooperative markets or mechanism to carry their products to the nearest market or to share the primary tools needed for resource collection (loans, boats and nets) by themselves. Under the co-management structure, it can be provided by the Forest Department by arrangement of proper incentives from the revenue earned by the Department from their available sources like issuance of permits/BLCs for harvesting, issuance of pass for visiting the forest for eco-tourism as part of their contribution in co-management activities which can help to motivate the resource harvesters to be involved into the co-management structures. So far, no revenue (Forest Department collected) is distributed among the members of the Sundarbans CMCs which should be arranged immediately not only for encouraging the real resource harvesters to be a part of collaborative conservation effort but for ensuring equitable sharing of the Sundarbans conservation and protection benefits among the resource harvesters' community. Change of mindset is important for bringing the community into the management system.[79]

[77] Summary of the Interviews with EC1, EC3, EC5, EC6, EC7, PP2, PP3, PP4, PP5, PI9, PI10, PM3, PM6, PM7 (face to face, 10–24 January 2017).
[78] Summary of the Interviews with EC6, EC7, PP4, PP5, BC1, BC2, BC3 (face to face, 10–29 January 2017).
[79] Summary of the Interview with PP5 (face to face, 10 January 2017).

4.4.4 Decentralisation of Ecosystem Management

As an ecosystem is a functional unit, it ought to be managed at any scale depending on the problem or issue being addressed. The problem-solving actions or issue-handling decisions, according to the ecosystem approach, are to be taken at the appropriate level so that real stakeholders have a voice. To implement this notion, the ecosystem approach emphasises delegation of decision-making rights and managerial responsibilities to the appropriate level. The basic philosophies of the principle of decentralisation of ecosystem management are: ecosystems to be managed by the resource users, ecosystem resource handling decisions to be taken valuing their opinions and needs, and the ecosystem-derived rights and responsibilities to be shared equitably between resource managers and resource users. In this section, the following features, adopted from the CBD Guidelines on the Ecosystem Approach,[80] are considered in mapping the status of decentralisation of ecosystem management in the legal frameworks regulating the Sundarbans:

- ensuring resource users' representation in resource-handling decision-making, management, monitoring and supervision platforms/committees
- allocation of shared responsibilities to CMOs
- appropriate incentives to encourage long-term participation (e.g., training and tools for sharing of income)

4.4.4.1 Decentralisation of Ecosystem Management in National Policy Frameworks

4.4.4.1.1 National Development Plans

Decentralisation of authority to the local government institutions (LGIs) for ensuring citizens' participation in development programmes is stated in *the Vision 2021*.[81] Recognising the state's critical condition in biodiversity conservation, the Perspective Plan underscores decentralisation of forest management with enabling scope of social and agro-forestry as stated inter alia, '[t]he government may seriously consider withdrawing forest management from the Forest Department and turn the forests into participatory social forestry areas for more efficient and productive management, and to sustain an ecological

[80] CBD Guidelines on Ecosystem Approach, 1–50.
[81] *The Vision 2021*, Goal 2.

balance'.[82] To make the nation's development participatory and sustainable, the 7th FYP sets several objectives such as promotion of community-based resource management and adaptation.[83] To attain such objectives, the Plan emphasises strengthening institutional capacity, efficient resource mobilisation and involvement of the private sector in natural resource management. Citizen-centric ecosystem management is strongly adhered to in the NSDS with the assertion of people's integration in all forest development activities, social forestry programme and coastal afforestation programme; LGI's involvement in natural resource management; and recognition of ethnic communities' customary knowledge and technologies in natural resource management for creating an authentic sense of ownership of resources.[84]

4.4.4.1.2 Sundarbans-Related Major National Policies

The NBSAP recognises increased participation of relevant stakeholders including women, indigenous communities, NGOs, civil societies and business communities as vehicles for bringing sustainability in natural resource management in Bangladesh.[85] The inclusive participation of citizens in all spheres of environmental management is targeted in the *Environmental Policy 1992* (arts 1.1 and 3.13). The importance of community involvement in natural resource management is reflected in the *Draft Environment Policy 2013*.[86] The *Forest Policy 1994* considers the local community's integration as key to successful implementation of forestry development projects, prevention of encroachment of forestlands, illegal tree felling and poaching of wildlife. In promoting decentralised governance, the *Draft Forest Policy 2016* (arts 4.7, 10–12) emphasises equitable representation of marginal communities in forestry sector decision-making, afforestation and monitoring of forest landscapes. Engagement of multidimensional actors (private sector, civil societies and NGOs) in design and implementation of biodiversity conservation and climate change adaptation programmes through introducing co-management systems is also highlighted in the draft policy (arts 3.2, 4.1.7).

[82] Perspective Plan 52.
[83] The 7th FYP 434.
[84] NSDS 112, 121.
[85] NBSAP s 4.2.
[86] *The Draft Environmental Policy 2013* arts 3.9.8, 3.10.10, 3.17.4.

As part of the decentralisation of management decisions, the IRMP for the Sundarbans emphasises an active co-management approach (Goal 4).[87] The stakeholders' role has been identified as key to sustainably managing the Sundarbans's biological resources in some target-specific policies. For example, the *Sundarbans Tourism Policy 2014*'s emphasis on defining stakeholder's responsibilities in Sundarbans tourism operation; the CCW 2010's (art 3(c)) focus on the local community's integration in wildlife conservation for protecting wildlife from being victims to the wildlife victims and the BTAP 2009's (art 2.5) commitment to involvement of state and non-state actors in protection of tiger population are worth mentioning. The BCCSAP 2009 also recognises the need for an integrated approach involving different ministries and state agencies, civil society and the business sector to tackle climate change.[88]

4.4.4.1.3 Other Policies that Indirectly Influence the Sundarbans

Like the major policies regulating the Sundarbans, the reflection of decentralisation of ecosystem management principle has received wide attention in other policies that indirectly influence the Sundarbans. Segments of those policies relating to participatory and inclusive ecosystem management are presented in Table 4.12.

Table 4.12: Related Components of Policies that Indirectly Influence the Sundarbans

Policy	Related Components
Water Policy 2012	Inclusive participation (public agencies, business sector, and local community) is set as an objective for ensuring uninterrupted water supply to all segments of society.[89]
Fisheries Policy 1998	Encourages developing fish farmers' cooperatives and connecting private sectors and non-government organisations (NGOs) in poverty alleviation and employment generation through cultivation, processing and management of fish and fishery products (arts 9.7.7, 9.12).
Coastal Zone Policy 2005	Adopts several policy measures to empower the coastal communities including ensuring equal participation of relevant stakeholders in coastal development; cooperation among state agencies, local government institutions (LGIs) and NGOs; and co-management procedures to bring the decision-making power to a local level

[87] IRMP for the Sundarbans, vi.
[88] BCCSAP 2009 19.
[89] *The Water Policy 2012* 3.

Policy	Related Components
	(art 4.6).
Wetland Policy 1998	Emphasises adopting participatory protection measures for preserving the country's wetlands and wetland species which provides food, nutrition, water and fuel for millions of people.
Tourism Policy 2010	Robust involvement of LGIs, local communities, private entrepreneurs and expatriate Bangladeshis desired to build environmentally sustainable and economically viable tourism industry (arts 2, 5.3).
Land Use Policy 2001	Citizens' engagement is hailed in the planning stage of housing, industrial and infrastructural development programs to avoid using of agricultural land, forests and wetlands for securing the country's ecological balance (art 18).
Agriculture Policy 2013	A series of actions are adopted to address the needs of the target population such as encouraging public, private and voluntary initiatives in extension services; shifting the centrally controlled agriculture extension decision-making process to the lowest level in which farmers, researchers and extension workers can work together as peers; and recognition of locally developed approaches (art 5).
Industrial Policy 2016	Emboldens business associations, NGOs and other organisations to take an active part in environment protection activities (art 14.9).

4.4.4.2 Decentralisation of Ecosystem Management in National Legislative Frameworks

This section analyses the status of the decentralisation of ecosystem management principle in the major and associated legislation regulating/influencing the Sundarbans.

4.4.4.2.1 Sundarbans-Related Major Legislation

Participatory management mechanism was first inserted into the forestry sector legislation of Bangladesh through amending the *Forest Act 1927* in 2000, by which the village forestry and social forestry programme were included with a procedure for delegation of the management, production and sharing of forestry benefits to community groups (s 28). The FD, ethnic and local community inclusive co-management system is ingrained in the *Wildlife (C&S) Act 2012* for sustainable use and management of natural resources of the sanctuaries, protected areas and buffer zones (s 21). The local community's involvement in the conservation and sustainable use of biodiversity is recognised in the *Bangladesh*

Biological Diversity Act 2017 through formation of the 'Biodiversity Management and Monitoring Committee' at the city corporation, district, municipality, upazila and union levels. Recognition of local community–owned knowledge on genetic resources and research that contributes significantly to biological development are promised by way of reward with a patent or monetary compensation (ss 13–27). But local people's involvement in addressing the threats to the environment and ecosystem is not enunciated anywhere in the ECA 1995 or ECR 1997.

To make the single agency (FD) Sundarbans's management participatory, provisions for a resource users'–centric co-management system are inserted in the *Protected Areas Management Rules 2017* and *ECA Management Rules 2016*. Multi-tiered CMOs (Co-Management Council, CMC, VCF, PF and CPG) under the *Protected Areas Management Rules 2017* and multi-level CMCs (UCC, UC, VCG, DC and NC) under the ECA Management Rules 2016 are familiarised in the Sundarbans's management with specification of their rights, roles and responsibilities.[90] The notion of participatory ecosystem management has started to take root in the context of the Sundarbans with these enactments.

Resources users' access to harvesting of the Sundarbans's resources has been regulated by imposing permits under the *Sundarbans Forest Transit Rule 1959* and, in some cases, banning the exploitation of several resources, such as extraction of fishes from 18 canals located outside the Sundarbans Wildlife Sanctuaries under the *Canals Closure Regulation 1989* and felling of trees from the Sundarbans under the *Moratorium on Tree Felling 1989*. These control mechanisms force the resource collectors to adopt illegal means for collecting resources that they have exploited legally for centuries.[91]

4.4.4.2.2 Other Legislation that Indirectly Influences the Sundarbans

People's participation in the management and execution of fishery resources is not mentioned in the PCF Act 1950 or PCF Rules 1985. The representation of water resources professionals and NGOs are ensured in the twin controlling bodies, the National Water Resources Council and Executive Committee, entrusted to monitor proper management of

[90] *Protected Areas Management Rules 2017* Rules 5, 6, 10, 15, 17, 18, 19, 25, 26, 27; *ECA Management Rules 2016* Rules 4, 6, 7, 9, 10, 12, 13, 14, 23.
[91] Abu Nasar Mohammad Abdullah, *Livelihood Strategies of People Surrounding the Sundarbans Mangrove Forest* (PhD Thesis, Charles Darwin University, 2014) 331.

water resources under the *Water Act 2013*, but wider participation in water-related decision-making is not specified (ss 4, 9). Citizens' participation in river management and the management of living marine resources is not articulated in the *Inland Shipping Ordinance 1976*, NRPC Act 2013 or *Territorial Water and Maritime Zone Act 1974*.

4.4.4.3 Evaluation of Decentralisation of Ecosystem Management in National Legal and Policy Frameworks

The ecosystem approach focuses on decentralisation of management structure so that resource users can be meaningfully involved in the decision-making process and play an increased role in managing the ecosystem. This people-centric ecosystem governance mechanism is echoed in the national development plans. The reflection of citizens' involvement is visible in a number of Sundarbans-related major policies and legislation to varying degrees. But it is inconsistent or absent in policies enacted before 2000.

The policy scores (the scoring system illustrated in Section 1.8.2) documented in Table 4.13 show that the participatory management mechanism in Bangladesh's biodiversity, climate change and environment fields is gaining prominence. The strong commitment to mainstreaming these issues is embedded in national development plans, including the NSDS (Scored 10), the 7th FYP (Scored 8) and Perspective Plan (Scored 7). Substantial attention is given to these issues in several national policies directly or indirectly influencing the Sundarbans, such as the *Environment Policy 1992*, *Forest Policy 1994*, IRMP for the Sundarbans, *Tourism Policy 2014*, *Industrial Policy 2016*, *Coastal Zone Policy 2005* and *Agriculture Policy 2013*.

Table 4.13: Status of Decentralisation of Ecosystem Management in National Policy Frameworks

Policy	Category				Total Score
	Issue	*Causal Links*	*Responses*	*Process*	
National Development Plans					
The Vision 2021	2	1	1	1	5
Perspective Plan	2	1	2	2	7
The 7th FYP	2	2	2	2	8
NSDS	2	3	3	2	10
Sundarbans-Related Major Policies					

Policy	Category				Total Score
	Issue	*Causal Links*	*Responses*	*Process*	
NBSAP	3	2	2	2	9
Environmental Policy 1992	2	2	2	2	8
Forest Policy 1994	3	2	2	2	9
IRMP for the Sundarbans	2	2	2	2	8
BTAP 2009	2	0	0	2	4
Sundarbans Tourism Policy 2014	2	0	0	2	4
CCW 2010	2	0	0	2	4
BCCSAP 2009	1	1	1	1	4
Other Policies					
Water Policy 2012	2	1	1	1	5
Fisheries Policy 1998	2	0	0	1	3
Coastal Zone Policy 2005	2	2	2	2	6
Wetland Policy 1998	2	0	1	2	5
Land Use Policy 2001	2	1	1	1	5
Tourism Policy 2010	2	1	1	2	6
Industrial Policy 2016	2	2	1	1	6
Agriculture Policy 2013	2	2	2	2	8

Note: Perspective Plan = *National Perspective Plan of Bangladesh 2010-2021*, The 7th FYP = *The Seventh Five Year Plan (FY2015/16-FY2019/2020)*, NSDS = *National Sustainable Development Strategy 2010-2021*, NBSAP = *National Biodiversity Strategy and Action Plan 2016-2012*, IRMP for the Sundarbans = *Integrated Resources Management Plans for the Sundarbans (2010-2020)*, BTAP = *Bangladesh Tiger Action Plan 2009*, CCW = *Compensation Policy for Causalities Caused by Wildlife 2010*, BCCSAP = *Bangladesh Climate Change Strategy and Action Plan 2009*.

The status of community-centric ecosystem management and resources handling is not strongly inflected into any related legislation. This is consistent with the importance given to it in associated policy documents. Table 4.14 presents the overall score of participatory management in the legislation regulating or influencing the Sundarbans. Except for the *Forest Act 1927* (Scored 6), *Wildlife (C&S) Act 2012* (Scored 8), *Bangladesh Biological Diversity Act 2017* (Scored 8), *Protected Areas Management Rules 2017* (Scored 7), *ECA Management Rules 2016* (Scored 6) and *Water Act 2013* (Scored 6), the issue is absent in other legislation.

Table 4.14: Status of Decentralisation of Ecosystem Management in National Legislative Frameworks

Act/Ordinance/Rule	Category				Total Score
	Issue	*Causal Links*	*Responses*	*Process*	
Sundarbans-Related Major Legislation					
Forest Act 1927	1	1	2	2	6
Wildlife (C&S) Act 2012	2	2	2	2	8
Bangladesh Biological Diversity Act 2017	2	2	2	2	8
ECA 1995	0	0	0	0	0
ECR 1997	0	0	0	0	0
Protected Areas Management Rules 2017	2	2	2	1	7
ECA Management Rules 2016	2	2	1	1	6
Sundarbans Forest Transit Rule 1959	1	0	0	0	1
Canals Closure Regulation 1989	1	0	0	0	1
Moratorium on Tree Felling 1989	1	0	0	0	1
Other Legislation					
PCF Act 1950	0	0	0	0	0
PCF Rules 1985	0	0	0	0	0
Water Act 2013	2	0	2	2	6
Territorial Water and Maritime Zone Act 1974	0	0	0	0	0
Inland Shipping Ordinance 1976	0	0	0	0	0
NRPC Act 2013	0	0	0	0	0

Note: Wildlife (C&S) Act = *Wildlife (Conservation and Security) Act 2012*, ECA 1995 = *Environmental Conservation Act 1995*, ECR = *Environmental Conservation Rules 1997*, ECA = Ecologically Critical Areas, PCF = Protection and Conservation of Fish, NRPC = National River Protection Commission.

The mixed perception regarding the present state of participatory ecosystem management was identified by the interviewed experts. Most interviewees considered that the participatory ecosystem management component was included in policies as a prerequisite for attracting funds from donors. Implementation of the concept in natural resource management against the command-and-control management structure is not an easy task. It was revealed that unless the inclusive ecosystem management is centrally recognised as

a viable mechanism for ensuring conservation and sustainable use, insertion of the concept into policy will remain rhetoric. For example, participatory forest management has been recognised in the *Forest Policy 1994* (art 1). Following the policy's enshrined commitment, the Forest Act was amended in 2000 to include the provision of 'village forests' and 'social forestry' (s 28) for connecting communities in the forestry sector for development and management matters. But the implementation of participatory management concept in management of the Sundarbans was overlooked until 2000 (examined in Sections 4.4.4.1 and 4.4.4.2).

Nevertheless, some recent structural reforms in ecosystem management have been observed. Under the *Protected Areas Management Rules 2017* and *ECA Management Rules 2016*, the multi-tiered co-management structures and CMCs have been constituted for managing protected areas and ECAs including the Sundarbans in collaboration with the FD where representatives of resource users are included. Local resource users' inclusive SMART patrolling has recently been introduced in the Sundarbans on a pilot basis to reduce illegal harvesting of forest produces and poaching of wildlife. Inclusion of biodiversity/environment experts and NGOs with experience in ecosystem conservation on the National Environment Council is another step in mainstreaming the participatory practices in the natural resource management sector. However, most respondents opined that the local community's meaningful involvement in the process of natural resource management decision-making and implementation remains small until supported by adequate legal provisions and proper arrangement of capacity-building programmes (e.g., training) for stakeholders.[92]

4.4.5 Adaptive Management

As the ecosystem processes and functions are complex and variable, their level of uncertainty is high which becomes intensified with the interface of socio-economic and cultural attributes of an ecosystem-encircled landscape. Thus, the ecosystem approach suggests designing appropriate methodologies and practices to monitor and adapt to changes and unexpected events. Adaptive management is the medium prescribed by the ecosystem approach through which ecosystem management can dynamically cope with

[92] Summary of the Interviews with PM4, PM5, PM6, PM7, PI1, PI2, PI10, PP2, PP5, EC1, EC6, EC7 (face to face 11–25 January 2017).

uneven circumstances. In this section, the following features of adaptive management, adopted from the CBD Guidelines on the Ecosystem Approach,[93] are considered for analysing the principle's reflection in the policies and legislation governing the Sundarbans:

- integration of risk/vulnerability assessment procedure
- adoption of risk/vulnerability mitigation procedure
- focus on research and experimentation on threat mitigation and adaptation
- alignment of innovative models/mechanism to institutional structure
- emphasis on technical and technological capacity enhancement
- introduction of long-term supervision and monitoring mechanism.

4.4.5.1 Adaptive Management in National Policy Frameworks

4.4.5.1.1 National Development Plans

The Vision 2021 entails several adaptive measures to protect the country's environment from the adverse effects of climate change such as reduction of industrial and vehicular air pollution, retention of forests and water bodies, and prevention of river erosion. It emphasises enhancement of adaptive capacity to face natural calamities.[94] The Perspective Plan focuses more on mitigation, preparedness, response and recovery for facing climate change–induced disasters and also sets some targets, including 20 per cent productive forest cover by 2021, controlling overexploitation and protection of the Sundarbans for maintaining the country's ecological balance.[95] All these strategies are encapsulated to sustain economic development, maintain ecological integrity and address climate change issues in an integrated fashion.

As part of pursuing a sustainable development process in Bangladesh through conservation of natural resources and adaptation to climate change,[96] the 7th FYP emphasises keeping the Sundarbans intact by carrying out several programmes including allocation of appropriate property rights to local community, seeking out AIGs to lessen pressure on the Sundarbans, avoiding the use of the Sundarbans water channel for

[93] CBD Guidelines on Ecosystem Approach, 1–50.
[94] *The Vision 2021*, Goal 7(k).
[95] Perspective Plan 11, 52.
[96] The 7th FYP xlii.

transporting goods and an afforestation programme around the Sundarbans.[97] To improve the DoE's environment monitoring capacity, the plan proposes a range of programmes such as recruitment of multidisciplinary professionals to the DoE; establishment of Biodiversity Cell, Chemical Management Cell and 3R Cell (Reduce, Reuse and Recycle) in the DoE; and launching of a capacity enhancement programmes on review and monitoring of EIA and ETP. To ensure accountability in environmental decision-making, the plan suggests introducing public consultation on EIA of Red Category projects; modernising the MoEFCC and DoE's websites; and strengthening the role of National Environmental Committee and the Parliamentary Committee on Environment, Forest and Climate Change.[98]

The NSDS intends to establish two institutions: the 'Sustainable Development Monitoring Council' for providing guidance to ensure sustainable development, with a 'Sustainable Development Board' to provide technical advice in monitoring the implementation process of NSDS-set strategic priorities. The list of indicators for monitoring such processes are control of pollution, expansion of forest coverage to 25 per cent of land area, preservation of wetlands, declaration of more terrestrial and marine reserves, and developing tools for climate change adaptation.[99] As per the NSDS's requirement, the government has established an inter-ministerial Sustainable Development Implementation and Monitoring Committee at the Prime Minister's Office comprised of Secretaries from 20 key ministries/divisions headed by a Principal Coordinator (Senior Secretary to the government) to facilitate the implementation of the UN SDGs.[100]

4.4.5.1.2 Sundarbans-Related Major National Policies

To achieve the national biodiversity targets and address environment vulnerabilities, the need to introduce adaptive management at the individual, institutional and systemic levels is documented in the NBSAP.[101] Accordingly, the NBSAP emphasises enhancing the capacity of protected areas and ECAs managers, establishing biodiversity cells in relevant ministries/departments, strengthening enforcement drives against pollution, developing

[97] Ibid 470–471.
[98] Ibid 466–467.
[99] NSDS 141–143.
[100] General Economics Division of Bangladesh Planning Commission, *Bangladesh Development Journey with SDGs* (General Economics Division, Bangladesh Planning Commission, 2017) 8.
[101] NBSAP 54.

effective policies and implementing functional legislation. It also recommends other adaptive management tools such as upgrading systems for monitoring genetic diversity; forming community groups in the protected areas and ECAs, arranging training on use of the Geographical Information System (GIS); remote sensing in natural resource management; and developing adaptation plans, risk management strategies and CHM.[102]

The *Environment Policy 1992* introduces several adaptive management measures including EIA for new industries and corrective measures for polluting industries to protect the environment from deterioration (art 3.2). The policy stresses adoption of environment-resilient land use policy to prevent land erosion, preserve soil fertility and compress the risks of climatic change (art 3.6). As the current policy was adopted long before the adoption of the *Vision 2021*, Perspective Plan, the 7th FYP and NSDS, to make it compatible with national and international situation, the government plans to revise it. The *Draft Environment Policy 2013* also includes several adaptation mechanisms such as the precautionary principle, polluter pays principle, EIA and effluent treatment plant in industries for combating pollution; fixation of emission tax to control air pollution; eco-region-wise land zoning; extension of protected areas; ecosystem-based conservation of mangrove, wetland and protected areas; and a GIS-based decision support system for natural resource management.[103]

The *Forest Policy 1994* promotes several measures for protection of forest biodiversity that includes ecotourism as a viable AIG for FDCs, modern technology-based resource extraction for efficient use of forest resources, settlement of indigenous people's ownership to avoid grabbing of forestlands and establishment of a Social Forestry Wing for bringing 20 per cent of the land under forest cover through afforestation. More specific modes of adaptive management are prescribed in the *Draft Forest Policy 2016* including continuing the ban on clear felling in state forests, silvicultural operations to support regeneration of forest resources, establishment of a crime control unit in the FD to deter wildlife poaching and trafficking, upgradation of a Resources Information Management

[102] Ibid 76.
[103] *The Draft Environmental Policy 2013* 4.

System for documentation of forest data and introducing modern technologies (i.e. SMART patrolling) for protection of forests.[104]

Development of climate change mitigation and adaptation strategies are mentioned in the IRMP for the Sundarbans as a long-term policy goal for the maintenance of ecosystem services.[105] Several adaptive measures are included in some policies designed for the protection of the Sundarbans's resources. The *Sundarbans Tourism Policy 2014* sets a range of measures for sustainable tourism operation such as fixation of fees for tourists to visit wildlife sanctuaries, permissions for travelling and overnight staying in designated areas, ban on carrying arms, traps or other equipment for fishing and hunting inside the Sundarbans. The CCW 2010 prescribes some adaptive measures in the form of providing incentives to wildlife victims aimed at creating sympathy to endangered wildlife such as tigers (art 7). An array of adaptive measures are documented in the BTAP 2009 that includes activating SMART objectives to address threats to the tiger and adoption of a tiger tracking and monitoring system (art 2.3).

To address the impacts of climate change on the environment and economy, a series of adaptive measures are proposed in the BCCSAP 2009 in the form of structural reorganisation. The National Environmental Committee, headed by the Prime Minister, and National Steering Committee on Climate Change, headed by the Minister of MoEFCC, were established. Five technical working groups were constituted on adaptation, mitigation, technology transfer, financing and public awareness. A Climate Change Unit was formed within the MoEFCC for mainstreaming the climate change issue in national development planning.[106] In partnership with civil society and NGOs, a mangrove plantation programme was launched along the coast as a key adaptation–mitigation strategy in the coastal 'greenbelt'. The Bangladesh Climate Change Fund was established to focus on building adaption capacity.

4.4.5.1.3 Other Policies that Indirectly Influence the Sundarbans

The annotated provisions related to the principle of adaptive management of policies indirectly influencing the Sundarbans and its FDCs are presented in Table 4.15.

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[104] *The Draft Forest Policy 2016* Policy Statements 7, 12, 28, art 4.5.4.
[105] IRMP for the Sundarbans, vi.
[106] Khalequzzaman, above n 25.

Table 4.15: Related Components of Policies that Indirectly Influence the Sundarbans

Policy	Related Components
Water Policy 2012	Adaptive provisions suggested for sustainable use of water resources—multiple uses of river waters (irrigation, fisheries and forestry); de-silting the watercourses to maintain navigation channels; adhering to an EIA process for water resources development projects; enforcement of 'polluter pay' principle for actions causing harm to environment; removal of illegal encroachments on watercourses; developing a central database on hydrology, water quality and ecosystem.[107]
Fisheries Policy 1998	Several adaptive measures prescribed for the protection of fish and aquatic resources such as conversion of part or the whole jalmohals as fish sanctuaries, conservation of fish breeding grounds, control of capturing banned size of Hilsha and other fish, ban on use of monofilament nets in catching fish, integrated prawn and fish culture with rice crop in coastal brackish waterbodies, ban on discharge/dumping of hazardous waste in waterways and cancellation or renewal of licenses for fishing vessels (arts 5, 7, 8, 11, 12).
Coastal Zone Policy 2005	To protect the aquatic and terrestrial ecosystem resources from human and climatic interventions, some precautionary measures are adopted including zoning regulations for new industries considering availability of water and scope of discharging effluents, imposition of 'green tax' for the non-compliant industrial units to clean up pollutants, establishing monitoring mechanism to control discharge of bilge water and oil-spill from ships, and enhancing technology and institutional capacity for accurate prediction and monitoring of climatic risks (art 4.8).
Wetland Policy 1998	Proposes measures to prevent unsustainable practices that cause damage to wetland functions and values.
Tourism Policy 2010	To maintain Bangladesh's tourism hotspots, some policy measures are recommended such as development of eco-friendly infrastructure and introducing Tourism Satellite Account system to ensure tourist security (arts 4, 5.8).
Land Use Policy 2001	Underscores establishing of industries in designated zone and effective preventive measures against discharge of dangerous substances that

[107] *The Water Policy 2012* 7, 8, 15.

Policy	Related Components
	might contaminate land and environment (art 17.23).
Agriculture Policy 2013	Contains a series of adaptive measures to promote eco-friendly agricultural practice such as enhancing adaptive research in collaboration with research institutes and universities; promotion of Integrated Pest Management and Integrated Crop Management for sustainable management of land, water and ecosystem; developing cooperatives marketing by agro producers to ensure fair price; actions against the use of agricultural land for non-agricultural purposes; and conservation of soil, water, genetic resources and life systems of plants and animals (arts 5.9, 7.3, 8.1, 10.2, 13).
Industrial Policy 2016	Some precautionary measures introduced to avoid environmental damage including conducting environmental impact assessment for industry, introducing 3 R Strategy in industrial development, averting selection of cultivable lands for industrial set up and installation of ETP in industrial units (art 14).

4.4.5.2 Adaptive Management in National Legislative Frameworks

This section analyses the reflection of the ecosystem approach's principle of adaptive management in major and associated legislation regulating the Sundarbans.

4.4.5.2.1 Sundarbans-Related Major Legislation

Adaptive management is not overtly entrenched in the *Forest Act 1927*, but the Act empowers the government to make rules to prohibit or restrict land clearing, use of pesticides and harvest on steep stopes that may pose threat to natural resources (s 38c) and places a ban on obstructing river channels for transit of forest-produce (sub-ss 41(2)(b)–(f)). The spirit of adaptive management is outlined in the *Wildlife (C&S) Act 2012* by imposing prohibitions on certain acts. For example, hunting any wild animal without license or wilfully destroying any plant mentioned in sch IV; any activity disturbing wildlife or use of chemicals/weapons which may destroy wildlife habitat; dumping of any materials detrimental to wildlife; diverting, stopping or polluting watercourses are barred

in wildlife sanctuary (ss 6(1), 14). The Act empowers the government to prohibit any activity harmful to the environment within two kilometres of the border of a sanctuary.[108]

The notion of adaptive management is aligned in the *Bangladesh Biological Diversity Act 2017* with the commitment of reduction of excessive resources extraction (s 31(3)). Section 33 does not support any activity likely to have a negative impact on a vulnerable ecosystem or Ramsar-declared wetland like the Sundarbans. The Act also prefers conduction of an EIA connecting to the local community before approving any development project with the likelihood of degradation of the biodiversity of that area (s 31(5)).

The ECA 1995 integrates the precautionary principle and polluter pays principle to improve environmental standards and control and mitigate environmental pollution. For in situ conservation, the Act empowers the government to declare any area an ECA and to impose a ban on the felling or harvesting of forest products or any activity that may destroy or alter an ecosystem habitat (s 5). Determination of compensation or corrective measures for causing harm to an ecosystem (s 7), imposing restrictions on vehicles emission (s 6) or manufacture or sale of environment polluting articles (s 6A) and an ECC for establishment of any industry from the DoE (s 12) are other precautionary measures listed in the ECA 1995. In the ECR 1997, the general EIA guidelines for industries are annexed. As per the EIA Guidelines for Industries 1997, industries are to carry out an initial environmental examination, EIA, installation of ETPs and framing of an environmental management plan (EMP) for obtaining an ECC (Rule 7). The EIA is made mandatory for red category industries (Rule 7(6)).

To protect the integrity of protected areas and ECAs, several precautionary measures are inserted in the *Protected Areas Management Rules 2017* and the *ECA Management Rules 2016*. The former conceives some adaptive measures such as declaration of any area adjacent to protected areas as a buffer zone or corridor (Rule 21) and the lease out of protected areas surrounded *Khas* (state-owned) land to CMCs for developing AIG activities (Rule 24). The *ECA Management Rules 2016* imposes a ban on changing the classification of ECAs-notified land (Rule 19). In consideration of any development programme in and around ECAs, the Rules set some criteria for assessment which include

[108] Wildlife (C&S) Act 2012 ss 6(1), 14(1)–(2), 16.

any activity detrimental to survival of species, threatening the livelihoods and socio-religious values of FDCs and risk of degrading the environment of sanctuaries or habitats for wildlife (Rule 18). The *Sundarbans Forest Transit Rule 1959*, *Canals Closure Regulation 1989* and *Moratorium on Tree Felling 1989* also prescribes several adaptive measures including standardisation of the Sundarbans's resources extraction system, imposing a ban on the catching of fish from 18 canals located outside the Sundarbans Wildlife Sanctuaries and felling of trees from the Sundarbans.

4.4.5.2.2 Other Legislation that Indirectly Influences the Sundarbans

The notion of the ecosystem approach principle of adaptive management is contained in other regulations that indirectly influence the Sundarbans. The segments of these policies relating to adaptive management are presented in Table 4.16.

Table 4.16: Related Components of Legislation that Indirectly Influences the Sundarbans

Legislation	Related Components
PCF Act 1950	A range of protection measures are enclosed for conservation of fish and aquatic resources including catching fish with fixed engines, current net, unauthorized trap, gear or explosives; limiting harvesting season and size of catchable fish; construction of temporary or permanent structure in waterbodies to harvest fish; destroying fish by poisoning or pollution of water with industrial effluents (s 8).
PCF Rules 1985	Contains commitments embedded in the PCF Act 1950 with some specifications such as zone-wise and timescale-wise catching of fish species (Rule 7).
Water Act 2013	To ensure sustainable use of waterways and protection of water resources including aquatic biodiversity and their habitats, some adaptive measures are inserted. These are declaration of Water Stress Areas, regulation for obstruction to normal flow of water course, protection of flood control embankment and controlling of water pollution.[109]

[109] *Water Act 2013* ss 17, 19, 20, 21, 23, 28.

Legislation	Related Components
Territorial Water and Maritime Zone Act 1974	Entails some forms of precautionary principle such as ban on use of non-mechanically propelled vessels in economic zone causing threat to aquatic resources (s 5), establishment of conservation zones contiguous to territorial water and control of indiscriminate exploitation of marine resources (s 6), restriction on exploration of resources in continental shelf without license (s 7(3)) and control of marine pollution (s 8).
Inland Shipping Ordinance 1976	Inserts a range of regulatory measures to protect inland water from pollution such as control of plying any ship in inland waterways without registration and pollution prevention certificate and prohibiting discharge of oily mixture and sewage in inland water harmful to public health or aquatic species (s 60A).
NRPC Act 2013	Empowers the National River Protection Commission to recommend any preventive measure corresponding to removal of an illegal structure built in a riverbank impeding normal water flow, freeing riverbeds and coastal belt from illegal occupation, controlling river water pollution and excavation of dead rivers (s 12).

Note: PCF = Protection and Conservation of Fish. NRPC = National River Protection Commission.

4.4.5.3 Evaluation of Adaptive Management in National Legal and Policy Frameworks

Implementation of the ecosystem approach in ecosystem management requires a flexible planning system to respond to the inevitable changes and uncertainties. Apart from scientific uncertainties, considerations of other issues such as biophysical, socio-economic and political uncertainty and climate variation are crucial to effective application of the ecosystem approach. Thus, the ecosystem approach presents adaptive management to translate science-based and circumstantial uncertainties into practical tools. To preserve the deteriorating biodiversity and adapt with the pervasive impact of climate change, adaptive management has been embedded in diverse modes in Bangladeshi national policies and legislation related to the environment and natural resource management.

During the law and policy analysis, the manifestation of the precautionary measures is found in the national development plans. The statuses of adaptive management measures

in the policy documents are presented Table 4.17. The strong commitment to mainstreaming this issue is entrenched in the NSDS (Scored 8) and the 7th FYP (Scored 8) (the scoring system illustrated in Section 1.8.2). Moderate attention is evident in the major policies regulating the Sundarbans. Of these, the *Environmental Policy 1992* and *Forest Policy 1994* scored 7, and the NBSAP and BCCSAP 2009 scored 8. The notion of adaptive management has also received wide attention in the *Water Policy 2012*, *Fisheries Policy 1998*, *Coastal Zone Policy 2005*, *Agriculture Policy 2013*, *Industrial Policy 2016*, *Coastal Zone Policy 2005* and *Agriculture Policy 2013*.

Table 4.17: Status of Adaptive Management in National Policy Frameworks

Policy	Category				Total Score
	Issue	*Causal Links*	*Responses*	*Process*	
National Development Plans					
The Vision 2021	1	1	1	1	4
Perspective Plan	1	2	1	1	5
The 7th FYP	2	2	2	2	8
NSDS	2	2	2	2	8
Sundarbans-Related Major Policies					
NBSAP	2	2	2	2	8
Environmental Policy 1992	2	2	2	1	7
Forest Policy 1994	2	2	2	1	7
IRMP for the Sundarbans	2	2	1	1	6
BTAP 2009	2	2	1	1	6
Sundarbans Tourism Policy 2014	2	2	1	1	6
CCW 2010	1	1	1	1	4
BCCSAP 2009	2	2	2	2	8
Other Policies					
Water Policy 2012	2	2	2	2	8
Fisheries Policy 1998	2	2	2	2	8
Coastal Zone Policy 2005	2	2	2	2	8
Wetland Policy 1998	1	1	1	1	4
Land Use Policy 2001	1	1	1	1	4
Tourism Policy 2010	1	1	1	1	4
Industrial Policy 2016	2	1	2	1	6
Agriculture Policy 2013	2	2	2	2	8

Note: Perspective Plan = *National Perspective Plan of Bangladesh 2010-2021*, The 7th FYP = *The Seventh Five Year Plan (FY2015/16-FY2019/2020)*, NSDS = *National Sustainable Development Strategy 2010-2021*, NBSAP = *National Biodiversity Strategy and Action Plan 2016-2012*, IRMP for the Sundarbans = *Integrated Resources Management Plans for the Sundarbans (2010-2020)*, BTAP = *Bangladesh Tiger Action Plan 2009*, CCW = *Compensation Policy for Causalities Caused by Wildlife 2010*, BCCSAP = *Bangladesh Climate Change Strategy and Action Plan 2009.*

The reflection of adaptive management in the form of the precautionary measures in related legislation is clear and is presented in Table 4.18. Most legislation has incorporated some forms of adaptive measures including provisions for issuance of rules; formation of national and local level management or monitoring committee; banning or limiting harvesting of ecosystem produces; EIA for assessing risk of industrial development; mandatory installation of ETP in existing industrial units; and declaration of protected areas, ECAs and sanctuaries.

Table 4.18: Status of Adaptive Management in National Legislative Frameworks

Act/Ordinance/Rule	Category				Total Score
	Issue	*Causal Links*	*Responses*	*Process*	
Sundarbans-Related Major Legislation					
Forest Act 1927	2	2	2	2	8
Wildlife (C&S) Act 2012	2	2	2	2	8
Bangladesh Biological Diversity Act 2017	2	2	2	2	8
ECA 1995	2	2	2	2	8
ECR 1997	2	2	2	2	8
Protected Areas Management Rules 2017	2	2	2	1	7
ECA Management Rules 2016	2	2	1	1	6
Sundarbans Forest Transit Rule 1959	1	1	1	1	4
Canals Closure Regulation 1989	1	1	1	1	4
Moratorium on Tree Felling 1989	2	2	1	1	6
Other Legislation					
PCF Act 1950	2	2	2	2	8
PCF Rules 1985	2	1	1	2	6
Water Act 2013	2	2	2	1	7
Territorial Water and Maritime Zone	2	2	1	1	6

Act 1974					
Inland Shipping Ordinance 1976	1	1	1	1	4
NRPC Act 2013	2	2	1	1	6

Note: Wildlife (C&S) Act = *Wildlife (Conservation and Security) Act 2012*, ECA 1995 = *Environmental Conservation Act 1995*, ECR = *Environmental Conservation Rules 1997*, ECA = Ecologically Critical Areas, PCF = Protection and Conservation of Fish, NRPC = National River Protection Commission.

During crosschecking of desk-based outcomes with the field data, it was observed that the notion of adaptive management has received wide attention among policymakers, resulting in its integration into related policies and legislation. But interviewed experts expressed dismay at its enforcement. Many interviewees stated that despite imposing bans or limitations on harvesting of the Sundarbans's resources or regulating industrial pollution, illegal resource extraction and industrial pollution have not been significantly controlled. This indicates gaps in risk assessment, risk management and monitoring. In this context, two respondents summarised the dormant gaps in the proper execution of state regulations as follows:

> Supervision and monitoring mechanism of Forest Department is in question. Because in many cases, the resource harvesters, having taken pass/permit for harvesting fishes extracted large amount of firewood and carrying those in their fishing boats while coming back after collecting fishes. This is a common practice and local forest staff overlook it as a result of a lack of resources to patrol or indirectly supports it for some percentage of benefits from them, which result in the gradual degradation of natural resources of the Sundarbans. Only the strong enforcement can protect the Sundarbans from these kinds of perceived irregularities and malpractices continuing over the years. In case of motivating the local forest staff for discharging their duties in the spirit of conservation and protection, more incentives need to be introduced such as risk allowance for the forest guards.[110]

This has disastrous consequences for the environment and ecosystems. It has also been realised that in most cases restrictions have been imposed without adequate consideration of socio-economic reality or relevant stakeholders who are the real bearer of costs and benefits of such regulatory actions. The experts agreed that adaptive measures have had a considerable role in redressing damage to the environment and ecosystem through controlling some industrial pollutants via adopting mitigation measures. Nevertheless, both the research findings and expert opinions stressed the need for improvement of monitoring and enforcement mechanisms and enhancement of technical capacity of risk assessment entities for expected outcomes.

[110] Summary of the Interviews with PI9 and EC1 (face to face 12 and 18 January 2017).

4.4.6 Inter-Sectoral Coordination

Sustainable ecosystem management depends on the integrated efforts of natural resource management sectors such as forestry, fisheries, agriculture and water management that have an effect on biodiversity. Considering the increasing threats to biodiversity and the environment, the ecosystem approach calls for better inter-sectoral cooperation and coordination at a range of levels and actors—inter-state departments and between state and non-state actors—to tackle those diverse challenges in an integrated way. In this section, the inter-sectoral cooperation and coordination principle's status in national development plans and the Sundarbans's management is examined in terms of the following features, taken from the CBD Guidelines on the Ecosystem Approach:[111]

- identification of common conservation priorities
- harmonisation of policies, institutional mandates and monitoring tools of natural resource management sectors
- mechanism for synchronisation of activities among national and local governments and state and non-state actors
- establishment of common conservation fund
- inclusion of multidisciplinary professionals/experts in national and local level committees
- creation of central information database and communication platform.

4.4.6.1 Inter-Sectoral Coordination in National Policy Frameworks

4.4.6.1.1 National Development Plans

Inter-sectoral coordination is not mentioned in *the Vision 2021*. Since uncoordinated actions of different institutions often impede effective implementation of development programmes, the Perspective Plan proposes developing an intergovernmental platform to synchronise their activities.[112] Gaps in cross-sectoral coordination are noted in the 7th FYP as an obstacle to proper implementation of government policies and development programmes in natural resource managing sectors (climate change adaptation, water,

[111] CBD Guidelines on Ecosystem Approach, 1–50.
[112] Perspective Plan 67.

forestry, land and fisheries).[113] To ensure better coordination among different state agencies, focal points are designated in each ministry/department. The Ministry of Planning oversees the integration process of national agenda (i.e. biodiversity conservation, environmental management and climate change adaptation) in the national development plan.[114] The MoEFCC is the focal ministry for the protection of the nation's biodiversity, environment and climate change adaptation, and its insufficient coordination capacity is well recognised. Thus, some areas prioritised in the 7th FYP for strengthening collaboration among natural resource managing sectors and actors: institutional capacity building of the MoEFCC, DoE and FD; identification and pilot demonstration of Common Pool Resources in ECAs; and increased representation of NGOs/CBOs in national and local environment committees.[115] Recognising inter-sectoral and inter-agency collaboration as a vehicle for avoiding overlap and delays in implementation of development projects, the NSDS suggests establishment of a 'Sustainable Development Monitoring Council' to ensure coordination among all ministries, departments, agencies and development of partnership between public and private entities.[116]

4.4.6.1.2 Sundarbans-Related Major National Policies

Coordination among stakeholders and sectoral programme implementing agencies along with active monitoring and reporting are identified as important determinants in implementation of 20 strategic targets set forth in the NBSAP.[117] The plan emphasises establishing a CHM not only to facilitate technical and scientific cooperation among sectoral agencies but to work as web-based portal for citizens to orient themselves with the status of biodiversity management initiatives including national biodiversity assessment report, ECA's management status, capacity-building programmes, the thematic and cross-cutting issues of the CBD, related Conventions (e.g., the Ramsar Convention, the CITES and the UNFCCC).[118] It is expected that this CHM will provide transparency to citizens or allow citizens to participate in these activities.

[113] The 7th FYP 466.
[114] Ibid 442.
[115] Ibid 470.
[116] NSDS 137.
[117] Ibid s 8.
[118] Ibid 91.

The need for inter-ministerial and inter-sectoral coordination is indicated in the *Environmental Policy 1992* to minimise obstacles on the biological species' regeneration process and protection of their habitats (art 3.5). The notion is not precisely mentioned in the *Forest Policy 1994*, but it has opened an avenue for state–non-state cooperation through the promotion of social forestry. In the *Draft Forest Policy 2016*, inter-sectoral coordination and information sharing is considered crucial in efficient implementation of policy commitments (Policy Statement 10). Augmentation of coordination with law enforcement agencies, including the Coast Guard, police and Bangladesh Border Guards, is also stated as necessary for better protection of the Sundarbans (art 4.5.2).

The IRMP for the Sundarbans underlines increased communication and coordination with relevant state agencies like the DoF and DoE and building public-private partnership to better manage the Sundarbans.[119] The CCW 2010 indirectly concedes to sectoral cooperation in fixing compensation for wildlife victims and creating awareness of cruelty to wildlife. Coordination among the FD, tour operators, law enforcement agencies, Deputy Commissioners, Bangladesh Inland Water Transport Authority (BIWTA) and Department of Sea Transportation is accentuated in the *Sundarbans Tourism Policy 2014* for safe tourism operation in the Sundarbans. Cross-ministry awareness is felt in the BTAP 2009 to set tiger conservation as national conservation priority. Besides the FD's effort, the Plan accentuates intensifying collaboration among other state departments, local communities and NGOs to address tiger conservation challenges. Since tigers roam both in the Sundarbans of Bangladesh and its contiguous Indian Sundarbans, transboundary coordination with India is expected to protect tigers from illegal trade and poaching.[120]

To address the climate change adaptation issue in an integrated way, the BCCSAP 2009 recommends increased communication and coordination among state agencies, local government, private sector, NGOs, civil societies and international actors. The Climate Change Unit of the MoEFCC is entrusted to facilitate the related activities with the Climate Change Focal Points of these agencies.[121]

[119] IRMP for the Sundarbans, v.
[120] BTAP 2009 ss 2.1, 2.5.
[121] BCCSAP 2009 24.

4.4.6.1.3 Other Policies that Indirectly Influence the Sundarbans

This section analyses inter-sectoral cooperation and coordination reflected in sectoral policies that indirectly influence the Sundarbans. The policy provisions embodying inter-sectional coordination and collaboration are presented in Table 4.19.

Table 4.19: Related Components of Policies that Indirectly Influence the Sundarbans

Policy	Related Components
Water Policy 2012	Coordination of policies and programs of public agency with those of private bodies involved in water resources management is emphasised to build synergy and avoid conflict.[122]
Fisheries Policy 1998	Enhanced coordination among fishing communities, fishery research institutes and private agencies involved in harvesting, processing and exporting fish along with extensive collaboration among state agencies entrusted to execute the policies are emphasised for sustainable conservation of marine, wetland and aquatic biodiversity (art 12).
Coastal Zone Policy 2005	Identifies multi-sectoral coordination as a vital element for activation of integrated coastal zone management. Some institutional arrangements are prescribed such as Inter-ministerial Technical Committee and Program Steering Committee to coordinate with state and non-state actors. The former committee, comprising of representatives from universities, NGOs and civil society, is responsible for the removal of gaps in planning and implementation and resolving inter-organisational conflicts (art 5.4).
Wetland Policy 1998	Underlines multi-sectoral coordination (state agencies, LGIs, NGOs, civil societies, business communities and people in general) to restore and protect the country's network of wetlands.
Tourism Policy 2010	Collaboration with the MoEFCC, district administration, LGIs, private tourism groups is emphasized for building ecotourism network in all natural reserves including the Sundarbans (art 3.2.2).
Land Use Policy 2001	Promotes inclusive collaboration among the public and private agencies involved in land development and LGIs entrusted for approval and implementation of land use plan (art 3).
Agriculture Policy	Cooperation among the Department of Agricultural Extension, LGIs at

[122] *The Water Policy 2012* 9.

Policy	Related Components
2013	the Union and Upazila level involved in providing extension services; NGOs and private sector engaged in production and marketing of agro-products; and research institutes affianced in developing climate resilient varieties is emphasised in planning and monitoring of the agriculture system in Bangladesh (art 5.4).
Industrial Policy 2016	Coordination among relevant development ministries/departments and private entrepreneurs to set up environment friendly industry is heavily emphasised for achieving sustainable economic growth (arts 14, 15).

4.4.6.2 Inter-Sectoral Coordination in National Legislative Frameworks

Similarly, in the national policy framework the spirit of inter-sectoral cooperation and coordination is manifested to varying degrees in major and other natural resource management legislation regulating the Sundarbans. These are analysed below.

4.4.6.2.1 Sundarbans-Related Major Legislation

The notion of inter-sectoral cooperation and coordination is not mentioned in the *Forest Act 1927*. Although not generally stated in the *Wildlife (C&S) Act 2012*, in the case of seizure of illegally extracted forest products, cooperation from relevant stakeholders including purchasers of forest products, members of CMCs, law enforcement agencies, representatives of the Public Works Department and the Department of Agricultural Extension (DAE), LGIs, village defence party and union land assistant officer is sought (s 33.3). In the *Bangladesh Biological Diversity Act 2017*, the coordination of the Technical Committee and all other 'Biodiversity Management and Monitoring Committees' formed at the city corporation, district, municipality, upazila and union levels is entrusted to the NC of Biodiversity (s 10).

The *ECA 1995* empowers the Director General of the DoE to coordinate the activities of the authorities involved in improving environmental standards and control of environmental pollution (s 4), while no provision as to coordination among relevant sectors is contained in the *ECR 1997*. For proper execution of the Environmental Court's decision or in case of a seizure or inspection, the Environment Court or investigating officer may request any authority for assistance (s 7A). So coordination issues among the

courts, law enforcement agencies or other authorities is indirectly scheduled in the implementation process of the commitments set forth in the ECA 1995 and ECR 1997.

Since multi-tiers CMOs (Co-Management Council, CMC, VCF, PF and CPG) under the *Protected Areas Management Rules 2017* and CMCs (UCC, UC, VCG, DC and NC) under the *ECA Management Rules 2016* are introduced for managing the protected areas and ECAs including the Sundarbans in a collaborative way, it is generally assumed that coordination and communication within the CMOs and with other relevant state and non-state actors is embedded in these legal instruments. However, it needs to be clearly defined in the legislation, else the concept of inter-sectoral or inter-department collaboration will remain merely rhetoric. The coordination and monitoring of CMOs' activities under the *Protected Areas Management Rules 2017* is entrusted to the FD (Rule 22), while those activities under the *ECA Management Rules 2016* are assigned to the NC and District Committees (Rules 4 and 7). However, the notion of inter-sectoral cooperation and coordination is not cited anywhere within the *Sundarbans Forest Transit Rule 1959*, *Canals Closure Regulation 1989* or *Moratorium on Tree Felling 1989*.

4.4.6.2.2 Other Legislation that Indirectly Influences the Sundarbans

The segments related to the inter-sectoral cooperation and coordination in legislation indirectly influencing the Sundarbans are presented in Table 4.20.

Table 4.20: Related Components of Legislation that Indirectly Influences the Sundarbans

Legislation	Related Components
PCF Act 1950	No related provision is found.
PCF Rules 1985	No related provision is found.
Water Act 2013	Empowers the Executive Committee to coordinate activities related to distribution and use of water resources and to resolve the inter-sectoral disputes thereof (s 10).
Territorial Water and Maritime Zone Act 1974	No related provision is found.
Inland Shipping Ordinance 1976	No related provision is found.
NRPC Act 2013	No related provision is found.

Note: PCF = Protection and Conservation of Fish. NRPC = National River Protection Commission.

4.4.6.3 Evaluation of Inter-Sectoral Coordination in National Legal and Policy Frameworks

Sectoral structure, competing priorities, fragmented responsibilities and sector-specific policies are often cited as major obstacles for the implementation of the ecosystem approach in ecosystem management. To remove such impediments, harmonisation of policies and institutional mandates are required, which can be feasible through strengthening inter-sectoral coordination and cooperation, rather than far-reaching institutional changes.[123] In Bangladesh, the integration of issues of biodiversity, environment and climate change in planning, budgetary allocation and implementation through development projects is prioritised in national development plans like the Perspective Plan, the 7th FYP and NSDS which requires strong coordination and cooperation across sectors. During the law and policy analysis, the thrust for inter-sectoral coordination and collaboration was found in most of the national development plans. For example, the NSDS proposed establishment of a National Sustainable Development Council for coordination and monitoring of UN SDGs, and the 7th FYP emphasises constituting a national clearing house for strengthening inter-sectoral and inter-state department collaboration, coordination and information sharing. The national development plans place much emphasis on formation, reorganisation and strengthening of institutional frameworks for enhancing coordination across the state and non-state sectors and actors which is needed to achieve the national conservation and development goals (discussed in detail in Chapter 5).

The policy scores (the scoring system illustrated in Section 1.8.2) in terms of cross-sectoral coordination is presented in Table 4.21. Except for *the Vision 2021*, the strong adherence to mainstreaming the issue is evident in the Perspective Plan, the 7th FYP and NSDS with an average score of 5. Moderate attention to the promotion of inter-sectoral coordination is apparent in several major policies including the NBSAP, BCCSAP, IRMP for the Sundarbans and BTAP.

[123] Richard D Smith and Edward Maltby, *Using the Ecosystem Approach to Implement the Convention on Biological Diversity: Key Issues and Case Studies* (IUCN, 2003) 43.

Table 4.21: Status of Inter-Sectoral Coordination in National Policy Frameworks

Policy	Category				Total Score
	Issue	*Causal Links*	*Responses*	*Process*	
National Development Plans					
The Vision 2021	0	0	0	0	0
Perspective Plan	2	1	1	1	5
The 7th FYP	2	2	1	1	6
NSDS	1	2	1	1	5
Sundarbans-Related Major Policies					
NBSAP	2	2	1	2	7
Environmental Policy 1992	2	1	1	1	5
Forest Policy 1994	1	1	1	1	4
IRMP for the Sundarbans	2	2	1	1	6
BTAP 2009	2	2	1	1	6
Sundarbans Tourism Policy 2014	1	1	0	1	3
CCW 2010	2	1	1	1	5
BCCSAP 2009	2	2	1	1	6
Other Policies					
Water Policy 2012	1	1	1	1	4
Fisheries Policy 1998	2	1	1	1	5
Coastal Zone Policy 2005	2	2	1	1	6
Wetland Policy 1998	1	1	1	1	4
Land Use Policy 2001	2	1	1	1	5
Tourism Policy 2010	1	1	1	1	4
Industrial Policy 2016	1	1	1	1	4
Agriculture Policy 2013	2	2	1	1	6

Note: Perspective Plan = *National Perspective Plan of Bangladesh 2010-2021,* The 7th FYP = *The Seventh Five Year Plan (FY2015/16-FY2019/2020),* NSDS = *National Sustainable Development Strategy 2010-2021,* NBSAP = *National Biodiversity Strategy and Action Plan 2016-2012,* IRMP for the Sundarbans = *Integrated Resources Management Plans for the Sundarbans (2010-2020),* BTAP = *Bangladesh Tiger Action Plan 2009,* CCW = *Compensation Policy for Causalities Caused by Wildlife 2010,* BCCSAP = *Bangladesh Climate Change Strategy and Action Plan 2009.*

Despite giving moderate attention to integrating inter-sectoral coordination into policies and national development plans regulating/influencing the Sundarbans, these policy commitments are not reflected in the corresponding legislation. Table 4.22 presents the overall picture of inter-sectoral coordination within the legislation. The *Bangladesh*

Biological Diversity Act 2017, ECA 1995, *Protected Areas Management Rules 2017*, *ECA Management Rules 2016* and *Water Act 2013* include inter-sectoral coordination for achieving the common goals of conservation and development, but the notion is largely absent in other legislation.

Table 4.22: Status of Inter-Sectoral Coordination in National Legislative Frameworks

Act/Ordinance/Rule	Category				Total Score
	Issue	*Causal Links*	*Responses*	*Process*	
Sundarbans-Related Major Legislation					
Forest Act 1927	0	0	0	0	0
Wildlife (C&S) Act 2012	1	1	0	1	3
Bangladesh Biological Diversity Act 2017	2	1	1	1	5
ECA 1995	1	1	1	1	4
ECR 1997	0	0	0	0	0
Protected Areas Management Rules 2017	2	1	1	1	5
ECA Management Rules 2016	1	1	1	1	4
Sundarbans Forest Transit Rule 1959	0	0	0	0	0
Canals Closure Regulation 1989	0	0	0	0	0
Moratorium on Tree Felling 1989	0	0	0	0	0
Other Legislation					
PCF Act 1950	0	0	0	0	0
PCF Rules 1985	0	0	0	0	0
Water Act 2013	1	1	1	1	4
Territorial Water and Maritime Zone Act 1974	0	0	0	0	0
Inland Shipping Ordinance 1976	0	0	0	0	0
NRPC Act 2013	0	0	0	0	0

Note: Wildlife (C&S) Act = *Wildlife (Conservation and Security) Act 2012*, ECA 1995 = *Environmental Conservation Act 1995*, ECR = *Environmental Conservation Rules 1997*, ECA = Ecologically Critical Areas, PCF = Protection and Conservation of Fish, NRPC = National River Protection Commission.

During crosschecking of desk-based outcomes with the field data to examine the reasons for such lack of coordination, it was revealed in the responses of some interviewed policymakers that they are well-informed of the need of inter-sectoral coordination.[124] Adoption of new policy or enactment of new legislation is not an issue in this regard:

> There are enough policies and laws in regulating the forestry sector of Bangladesh. Increasing numbers of policy and legislation is not a solution. What is required right now is to update those policies and to bring necessary amendments into the existing legislation. But that should be done on periodic evaluation of existing policies and legislation following the local needs, national demands and international commitment.[125]

They also mentioned the status of inter-sectoral coordination in policies and formation of several coordination committees at the national and local level in some sectors following the directions given by Rules and Executive Orders. It is apparent that the Ecologically Critical Area Management Council and Protected Areas Co-management Council at the local level and NC for Implementation and Monitoring of UN SDGs and National Environment Council at the national level have been established, but there are still gaps in sectoral coordination among the natural resource managing sectors. Some interesting reasons for the non-application of coordination mechanisms in the context of the Sundarbans were given by one expert:

> The coordination gap of the Forest Department with other state and non-state agencies operating businesses around the Sundarbans is evident. For example, the ship plying inside the Sundarbans water channels is regulated by other state agencies (Ministry of Shipping, BIWTA) where the FD should have a role. But the state agency over the years kept themselves outside such dealing … may be not interested to share its authority to other state agencies which results in frequent capsize of cargo vessels inside the Sundarbans waterways causing substantial damage to the Sundarbans ecosystem and environment. However, because of the geo-ecological position of the forest and competing interests of other state departments, intensive coordination is a big issue where the FD should have dominant role in case of protection of the natural reserve.[126]

Besides the coordination gaps between inter-state departments, and at the transboundary level, which is crucial for addressing the challenges of Sundarbans, is also apparent:

> Since the Sundarbans is covered by Bangladesh and India, there is an issue of transboundary cooperation and collaboration between the two countries regarding joint efforts in conservation of the ecosystem. From that perspective, a Protocol and a MOU was signed between Bangladesh and India regarding the conservation of the Sundarbans

[124] Summary of the Interviews with PM1, PM2, PM3, PM7, PM8 (face to face, 8–29 January 2017).
[125] Summary of the Interviews with PM6, PP1, PP4, PP5, EC1, EC2, EC3, EC4, EC6, EC7, BC3 (face to face, 8–29 January 2017).
[126] Summary of the Interview with EC1 (face to face, 12 January 2017).

> and its flagship species (i.e., tigers) and for joint patrolling against wildlife trafficking. But the Protocol and MOU enshrined pledges remained in paper. No initiative has so far been taken to translate those bilateral commitments into programme for execution at down level. So, coordination at the highest [state] level is needed for the implementation of bilateral policy conceived commitments in mitigating the transboundary challenges on the Sundarbans.[127]

Interviews with experts revealed a number of issues—overlapping policies, contradictory priorities, conflicts of interest and a tendency to ignore local community and non-state actors—that restrain policymakers from strengthening coordination across related sectors.

4.5 Assessment of Ecosystem Approach in Bangladeshi Legal and Policy Frameworks

This section summarises the overall status of the ecosystem approach's six investigated principles in Bangladesh's national policy and legislation relating to biodiversity, the environment and natural resource management and the challenges associated with their implementation. This is achieved by applying the framework of analysis described in Section 1.8 with the results presented in Sections 4.4.1–4.4.6. It is evident that all of the aforementioned policies and legislation have directly or indirectly influence the conservation and management of the Sundarbans. The overall status of the integration of the ecosystem approach's six components in Bangladesh's legal regime is presented in Tables 4.23 and 4.24.

Of the six components of the ecosystem approach, conservation and sustainable use has been given the most attention in national development plans and policies regulating the Sundarbans. This has been carried into corresponding legislation either through new formulation or amendments to existing legislation. Declining natural resources, climate change–induced natural disasters and visible atmospheric changes work as motivators for the growing recognition of this component. However, the integration and implementation of shifting conservation and sustainable use from its current intermediate stage to an advanced stage requires mass awareness building, effective engagement of resources users in management through amending/upgrading existing policies and legislation, strong enforcement of laws and vigorous commitment of authorities (both bureaucratic and political) involved in natural resource management.

[127] Summary of the Interviews with PP1, PP5 (face to face, 10 and 13 January 2017).

Table 4.23: Status of the Ecosystem Approach's Principles in the Policy Frameworks of Bangladesh

Policy	Category-wise Score*					
	Integration of Entire Ecosystem Components	*Conservation and Sustainable Use*	*Access and Equitable Benefit Sharing*	*Decentralisation of Ecosystem Management*	*Adaptive Management*	*Inter-Sectoral Coordination*
National Development Plans						
The Vision 2021	3	5	0	5	4	0
Perspective Plan	6	8	2	7	5	5
The 7th FYP	7	8	5	8	8	6
NSDS	10	10	6	10	8	5
Sundarbans-Related Major Policies						
NBSAP	10	8	3	9	8	7
Environmental Policy 1992	10	10	2	8	7	5
Forest Policy 1994	11	10	2	9	7	4
IRMP for the Sundarbans	8	10	6	8	6	6
BTAP 2009	4	3	3	4	6	6
Sundarbans Tourism Policy 2014	4	3	3	4	6	3
CCW 2010	0	2	3	4	4	5
BCCSAP 2009	8	9	0	4	8	6
Other Policies						
Water Policy 2012	6	8	4	5	8	4

Policy	Category-wise Score*					
	Integration of Entire Ecosystem Components	*Conservation and Sustainable Use*	*Access and Equitable Benefit Sharing*	*Decentralisation of Ecosystem Management*	*Adaptive Management*	*Inter-Sectoral Coordination*
Fisheries Policy 1998	8	8	5	3	8	5
Coastal Zone Policy 2005	5	8	3	6	8	6
Wetland Policy 1998	6	6	2	5	4	4
Land Use Policy 2001	2	4	2	5	4	5
Tourism Policy 2010	5	4	4	6	4	4
Industrial Policy 2016	0	4	0	6	6	4
Agriculture Policy 2013	6	7	4	8	8	6

* *The scoring system is illustrated in Section 1.8.2*

Note: Perspective Plan = *National Perspective Plan of Bangladesh 2010-2021*, The 7th FYP = *The Seventh Five Year Plan (FY2015/16-FY2019/2020)*, NSDS = *National Sustainable Development Strategy 2010-2021*, NBSAP = *National Biodiversity Strategy and Action Plan 2016-2012*, IRMP for the Sundarbans = *Integrated Resources Management Plans for the Sundarbans (2010-2020)*, BTAP = *Bangladesh Tiger Action Plan 2009*, CCW = *Compensation Policy for Causalities Caused by Wildlife 2010*, BCCSAP = *Bangladesh Climate Change Strategy and Action Plan 2009.*

Adaptive management follows conservation and sustainable use in attention received in the national policies and legislative instruments. Almost all policies regulating/influencing the Sundarbans include some forms of control or protection measures for sustainable management of the environment and natural resources. The policy-induced commitments have been transmitted to the legislation in diverse forms (banning or limiting harvesting of ecosystem goods, pollution controlling procedure, and adaptation and mitigation tools). Despite integrating adaptive management into the regulatory regime, gaps remain in their implementation as stated in interviews with policy implementers. To achieve and assess the benefits of adaptive management, some measures suggested by interviewed experts include adequate public consultation before imposing any restriction, providing AIG opportunities for resource users, strong enforcement of legislation against industrial polluters and illegal resource harvesters, capacity building of the persons or institutions involved in environment risk assessment or Socio-economic Impact Assessment (SIA), strengthening monitoring mechanisms and periodic evaluation of policies and legislation.

Table 4.24: Status of the Ecosystem Approach's Principles in the Legislative Frameworks of Bangladesh

Act/Ordinance/Rule	Category-wise Score*					
	Integration of Entire Ecosystem Components	*Conservation and Sustainable Use*	*Access and Equitable Benefit Sharing*	*Decentralisation of Ecosystem Management*	*Adaptive Management*	*Inter-Sectoral Coordination*
Sundarbans-Related Major Legislation						
Forest Act 1927	6	7	3	6	8	0
Wildlife (C&S) Act 2012	7	7	3	8	8	3
Bangladesh Biological Diversity Act 2017	8	8	8	8	8	5
ECA 1995	11	10	0	0	8	4
ECR 1997	10	10	0	0	8	0
Protected Areas Management Rules 2017	7	7	7	7	7	5
ECA Management Rules 2016	6	7	5	6	6	4
Sundarbans Forest Transit Rule 1959	5	5	0	1	4	0
Canals Closure Regulation 1989	5	5	0	1	4	0
Moratorium on Tree Felling 1989	5	5	0	1	6	0
Other Legislation						
PCF Act 1950	8	8	0	0	8	0
PCF Rules 1985	8	8	0	0	6	0
Water Act 2013	6	8	3	6	7	4

Act/Ordinance/Rule	Category-wise Score*					
	Integration of Entire Ecosystem Components	*Conservation and Sustainable Use*	*Access and Equitable Benefit Sharing*	*Decentralisation of Ecosystem Management*	*Adaptive Management*	*Inter-Sectoral Coordination*
Territorial Water and Maritime Zone Act 1974	0	3	0	0	6	0
Inland Shipping Ordinance 1976	2	3	0	0	4	0
NRPC Act 2013	0	3	0	0	6	3

* *The scoring system is illustrated in Section 1.8.2*

Note: Wildlife (C&S) Act = *Wildlife (Conservation and Security) Act 2012*, ECA 1995 = *Environmental Conservation Act 1995*, ECR = *Environmental Conservation Rules 1997*, ECA = Ecologically Critical Areas, PCF = Protection and Conservation of Fish, NRPC = National River Protection Commission.

Integration of entire ecosystem components and decentralisation of ecosystem management have received moderate attention in terms of incorporation into national policies. The average scores of both components shown in Table 4.23 indicate their inclusion in national policies with the aim of sustainable management of the environment and ecosystem. But the scores of both components shown in Table 4.24 show weak integration in related legislation, revealing gaps in understanding of the concepts. Despite recognising the necessity of both the components in national policies, they have not been properly translated into legislation. Major challenges identified from the literature and expert interviews are lack of understanding of the nature and extent of the ecosystem approach, perennial command-and-control-based management, lack of political and bureaucratic commitment, anti-reform attitude for non-integration or integration, and inadequate formulation and implementation of legislative tools.

Access and equitable benefits sharing and inter-sectoral coordination—the crucial components for ensuring environmental justice—have received little attention in national development plans and policies regulating/influencing the Sundarbans compared to other components (see Table 4.23). Even their status in national legislation (see Table 4.24) shows policymaker's negative perception of these components. The literature reveals the non-ratification of the Nagoya Protocol on Access and Benefit Sharing as a major reason for this, while interviewed experts mentioned other issues—lack of political and bureaucratic will in recognising traditional resource users' inherent rights, reluctance in considering propriety rights, no proper valuation of ecosystem services, and an absence of value-based marketing or trading system—that suppress the ABS mechanism in natural resource management.

In Bangladesh, lack of inter-sectoral coordination is a major issue commonly stated in project completion reports. In this context, coordination of sectoral policies, programmes and institutional mandates of the ministries/departments contributing to the natural resource managing sectors is crucial. Recognition of the ecosystem approach's inter-sectoral coordination is evident in national policies but is not incorporated into related legislation. Overlapping policies, lack of synergy in sectoral priorities and competing interests among sectors hinders cross-sectoral coordination. It was also identified that where policy scores higher than legislation, in some cases it is a deliberative choice in policy design to allow flexibility for the government. This way, the controlling

ministry/department can form a coordination council or committee by issuing an executive order where there is minimum sectoral coordination and collaboration in corresponding legislation. Executive orders can fill gaps quicker than other legislative tools in terms of intensification of coordination and collaboration across natural resource management sectors and between relevant actors.

4.6 Conclusion

The chapter examined the extent of the ecosystem approach principle's integration in the national development plans, policy and legal frameworks of Bangladesh regulating/influencing the Sundarbans. In doing so, it also identified the challenges to this. Based on law and policy analysis methods, the relevant national policies and legislation were analysed, and the desktop assessment crosschecked against expert opinions and graded using the analysis model developed for this research. It was generally revealed that the integration of the six investigated ecosystem approach components (entire ecosystem components, conservation and sustainable use, access and equitable benefit sharing, decentralisation of ecosystem management, adaptive management and inter-sectoral coordination) into the policies and laws governing the Sundarbans is its early stages.

The significance of the ecosystem approach principles for the Sundarbans's management is well recognised in national development plans and integrated into policies to varying degrees. Of the six the ecosystem approach principles, conservation and sustainable use, adaptive management mechanism, integration of entire ecosystem components, and, to some extent, decentralisation of ecosystem management, have received considerably more attention. The growing recognition of the ecosystem approach in local level natural resource management and its potential link with ecosystem conservation, climate change and development priorities has led to the integration of its dominant principles in the laws, development plans and programmes that allows those components to functional at the ground level.

The mixed status is apparent in the transmission of policy promises into the legislative framework. Conservation and sustainable use, adaptive management mechanism, and integration of entire ecosystem components have received similar attention in legislation as in policy, while the legislation gives less importance to decentralisation of ecosystem

management. Access and equitable benefit sharing and inter-sectoral coordination (the other two principles crucial for enabling sustainable conservation) are paid little attention in policies and legislation. This indicates the lack of understanding on those principles among those involved in policy dynamics.

It is recognised that the integration of globally agreed principles into national policies and legislation is a significant development towards a perceived outcome, but those remain decorative until implemented in a local context. Desktop analysis and expert consultations revealed local understanding about the ecosystem approach, gaps in policy and legislation and hurdles in implementation of the ecosystem approach principles. Challenges to ensuring conservation and sustainable use were identified as lack of mass awareness about the ecosystem approach, ignorance and/or inadequate capacity of resources users in participating co-management, weak enforcement of laws and lack of commitment of authorities involved in natural resource management. Further, inadequate public consultation in imposing any restriction, insufficient provisioning of AIGs for resource users, weak enforcement of legislation against industrial polluters, insufficient capacity of individual or institutions engaged in environment risk assessment or SIA, ineffective monitoring mechanisms, and reluctance in reforming policy and legislation are obstacles obstructing the implementation and benefits of adaptive management.

The lack of understanding of the ecosystem approach, reluctance in promoting shared responsibility or activating co-management structures and a lack of political and bureaucratic will in policy and legislative reforms impede integration of entire ecosystem components and decentralisation of ecosystem management in legal platforms. The notion of inter-sectoral coordination remains underemphasised due to overlapping policies, lack of synergies in sectoral priorities and competing interests among sectors engaged in natural resource management. The activation of ABS mechanisms in natural resource management has stalled owing to non-ratification of the Nagoya Protocol on Access and Benefit Sharing coupled with a lack of strong political will in recognition of traditional resource users' rights. Reluctance in considering the patents or propriety rights, lack of proper valuation of ecosystem services, absence of value-based marketing and trading systems also contribute to this problem.

It is evident that policy and legislative reform is a dynamic process usually proceeded by a combination of national urgency and international commitment. Despite being a signatory of the CBD and other related global legal instruments, Bangladesh has so far shown moderate progress in integration of the principles of the ecosystem approach into its policy and legislative frameworks. The previous analysis revealed that more robust impetus is needed for the ecosystem approach principles to be fully integrated into the policy and legal network regulating the Sundarbans. Institutional barriers are also obstructing successful implementation of the ecosystem approach principles and these are highlighted in Chapter 5.

Chapter 5:
Institutional Framework for Implementation of Ecosystem Approach in the Sundarbans

5.1 Introduction

This chapter examines the current status of institutional frameworks regulating the Sundarbans in the national development plans, policies and legislation concerning the promotion of the ecosystem approach for sustainable management of the Sundarbans. In this assessment, in addition to the responsibilities of core state institutions in implementation of policy guidelines, the role of cross-sectoral state agencies and the non-state actors are considered. The chapter identifies gaps within the institutional mechanism that need to be addressed for effective implementation of the ecosystem approach principles in the Sundarbans's management. This chapter addresses two research sub-questions on the extent to which the ecosystem approach principles influence the institutional frameworks governing the Sundarbans and identifying the challenges that Bangladesh faces in implementing the ecosystem approach principles in the Sundarbans's management. The findings of this chapter together with those of Chapter 4 address the research question posed in Section 1.3.

5.2 Role of Institutional Framework in Sustainable Ecosystem Management

Policies contain a broad range of state commitments that have intended or unintended impacts on natural resource management. Some policies are imposed from above, demanding compliance, while others intend to influence decision-making by promoting or discouraging certain actions. Statutes define authorities and responsibilities, mandating standards of programmes for institutions to implement the policies. Good policies and laws bring no benefit to communities unless they are properly implemented. Therefore, the institutional framework should be designed to encompass the mechanisms of adaptive management to anticipate changes in society and the environment and thereby execute

policy and legislative pledges in collaboration with state and non-state actors for sustaining the environment and natural resources.

Policy implementation refers to the mechanisms, resources and relationships that link policies to programmes. It includes both technical and relational aspects—not only specifying the institutions responsible for implementation but ensuring that the institutions have the capacity for implementation and that the relations between institutions are conducive for collaboration.[1] For implementation, understanding the nature of policy is equally important. In many cases, it is observed that policies, once adopted, are not implemented as envisioned and do not achieve the intended results.[2] A strong and flexible institutional framework is a prerequisite for supporting the implementation of intertwined sectoral policy guidelines at a national and local level that respond to local needs and challenges.[3] The comprehensive nature of biodiversity, environment and climate change influences sector-based management and demands transformative changes in legal and institutional frameworks. This transformation process needs to be driven by a collegial body comprising the best available expertise in science, policy, management and law, underscored by strong political will to effect such changes in the entrenched system of natural resource management.[4]

The role of an institutional framework in ensuring good governance is highlighted in the World Economic and Social Survey 2014/2015.[5] The survey report stresses some prerequisites for strengthening institutional mechanism including leadership that possesses a clear vision of the desired outcomes and the potential policy pathways for achievement; policy coherence and coordination within government for development policy; decentralisation of governance structure for engaging communities; partnerships with non-state actors; and effective monitoring and evaluation systems for increasing accountability,

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[1] Karen Hardee et al, *Linking Health Policy with Health Systems and Health Outcomes: A Conceptual Framework* (Futures Group, USAID, 2012) 2.

[2] Anita Bhuyan, Anne Jorgensen and Suneeta Sharma, *Taking the Pulse of Policy: The Policy Implementation Assessment Tool* (USAID, 2010) 1.

[3] Lal Kurukulasuriya, 'National Legal and Institutional Frameworks for Implementing the Paris Agreement Provisions on Adaptation to Climate Change' (2016), 1 <https://law.nus.edu.sg/apcel/cca/NationalLegalInstitutionalFrameworksImplementingParisAgreementProvisionsAdaptationClimateChange_LalKurukulasuriya.pdf>.

[4] Ibid.

[5] UN Department of Economic and Social Affairs, 'World Economic and Social Survey 2013: Sustainable Development Challenges' (United Nations, 2013).

tracking progress and efficient use of resources across the sectors.[6] The need for building effective and accountable institutions is also emphasised in the UN SDG 16 for ensuring sustainable development.[7] Some indicators are universally endorsed as bringing effectiveness in institutional frameworks including decision-making processes to be responsive, inclusive, participatory and representative; ensuring access to information; enabling access to justice; and promoting non-discriminatory policy in application and enforcement of laws.

In developing countries like Bangladesh, policies are often well formulated—sometimes with donor assistance—but are not properly implemented because of interference by influential interest groups and a weak institutional framework.[8] For example, the *Forest Policy 1994*, despite being fairly rich in content, is not always supported by necessary actions for implementation due to the institutional weakness of state agencies.[9] A similar result is evident in Mozambique, Senegal and Tanzania, where policies are poorly implemented owing to weak enforcement mechanisms, thus the emphasis on policy implementation through strengthening institutions, rather than on developing new policies.[10]

Political goals are set in accordance with prevailing discourses, but there have always been some discrepancies between publicly stated policies and the reality.[11] In many cases, environmental politics revolve around popular discourse which becomes the environmental symbol of that time. In Bangladesh, there have been several claims of policy changes in forest sector over the past two decades. For instance, with the inclusion of participatory management in the *Forest Policy 1994*, significant policy changes in the forest sector have been documented at the national political level. A substantive change in

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[6] UN DESA, 'Economic and Social Survey 2014/2015' (Report, United Nations Department of Economic and Social Affairs, 2016) ix.

[7] United Nations General Assembly, *Transforming Our World: The 2030 Agenda for Sustainable Development*, A/RES/70/1 (21 October 2015) ('UN General Assembly Guidelines on Implementation of Sustainable Development') Goal 16.

[8] ADB, 'Country Environmental Analysis: Bangladesh' (Asian Development Bank, 2004) 41; Junaid K Choudhury and Md Abdullah Abraham Hossain, *Bangladesh Forestry Outlook Study: Asia-Pacific Forestry Sector Outlook Study II* (FAO, 2011) 22.

[9] ADB, above n 8, 41; Mahbubul Alam, 'Evolution of Forest Policies in Bangladesh: A Critical Analysis' (2009) 2(2) *International Journal of Social Forestry* 161.

[10] Julius Mugwagwa, Daniel Edwards and Sylvia de Haan, 'Assessing the Implementation and Influence of Policies That Support Research and Innovation Systems for Health: The Cases of Mozambique, Senegal, and Tanzania' (2015) 13 *Health Research Policy and Systems* 21.

[11] Md Nazmus Sadath and Max Krott, 'Identifying Policy Change — Analytical Program Analysis: An Example of Two Decades of Forest Policy in Bangladesh' (2012) 25 *Forest Policy and Economics* 93.

policy implies changes in the policy-implementing instruments or changes in the groups of actors implementing the policies.[12] Such a participatory approach remained symbolic until 2000. The first substantive change in regulatory framework was experienced in that year when the participatory programme gained legal foundation with the inclusion of 'Social Forestry' or 'Village Forest' via the *Forest Amendment Act of 2000*, followed by the establishment of a Social Forestry Wing constituting three social forestry circles with 13 social forestry divisions in 2001, and the enactment of *Social Forestry Rules 2004* setting modalities of social forestry programme such as rights, benefit sharing and participant selection. The substantive change in the policy sector led to implementation through subsequent changes in legislation and developing new institutions. Another realistic change in institutional frameworks is the designation of focal points within a ministry or cluster of ministries playing a role in coordination of policy implementation.

5.3 General Overview of the Institutional Frameworks for Management of the Sundarbans

Currently, the FD is responsible for the management of the Sundarbans. Its conservation practice follows a top-down approach where upper level FD officials make major decisions with the approval of the MoEFCC. Those decisions are forwarded to the FD's field offices for execution. At the field level, Forest Division is the basic forest administration unit, first established in 1879, with its headquarters in Khulna.[13] In 1875, a large portion of mangrove forest was declared reserved forest under the *Government Forests' Act 1865*. The remaining portions were declared reserve forest in the following years and placed under the FD's oversight. In 1993, the Khulna Forest Circle was created to manage the forest. In the Khulna Forest Circle, there are two divisions—Sundarbans East Forest Division with its headquarters in Bagerhat, and Sundarbans West Forest Division with its headquarters in Khulna—under which there are four Range Offices—Chandpai, Sarankhola, Khulna and Burigoalini. A Divisional Forest Officer (DFO) with a number of support staff operates each division. The basic unit of management is a compartment. Under four ranges in two forest divisions, the Sundarbans is delineated into 55 compartments. Each division controls two Forest Ranges which are overseen by an

[12] Ibid 94.
[13] Laskar Muqsudur Rahman, 'Development Initiatives of the Sundarbans of Bangladesh' (2015) 79(1–2) *The Malaysian Forester* 81.

Assistant Conservator of Forests.[14] In 2002, a Wildlife and Nature Conservation Circle (WNCC) was established under which the Khulna Wildlife Management and Nature Conservation Division was created for the management of the Sundarbans's wildlife. The organogram of the Sundarbans's administration and management[15] is shown in Figure 5.1.

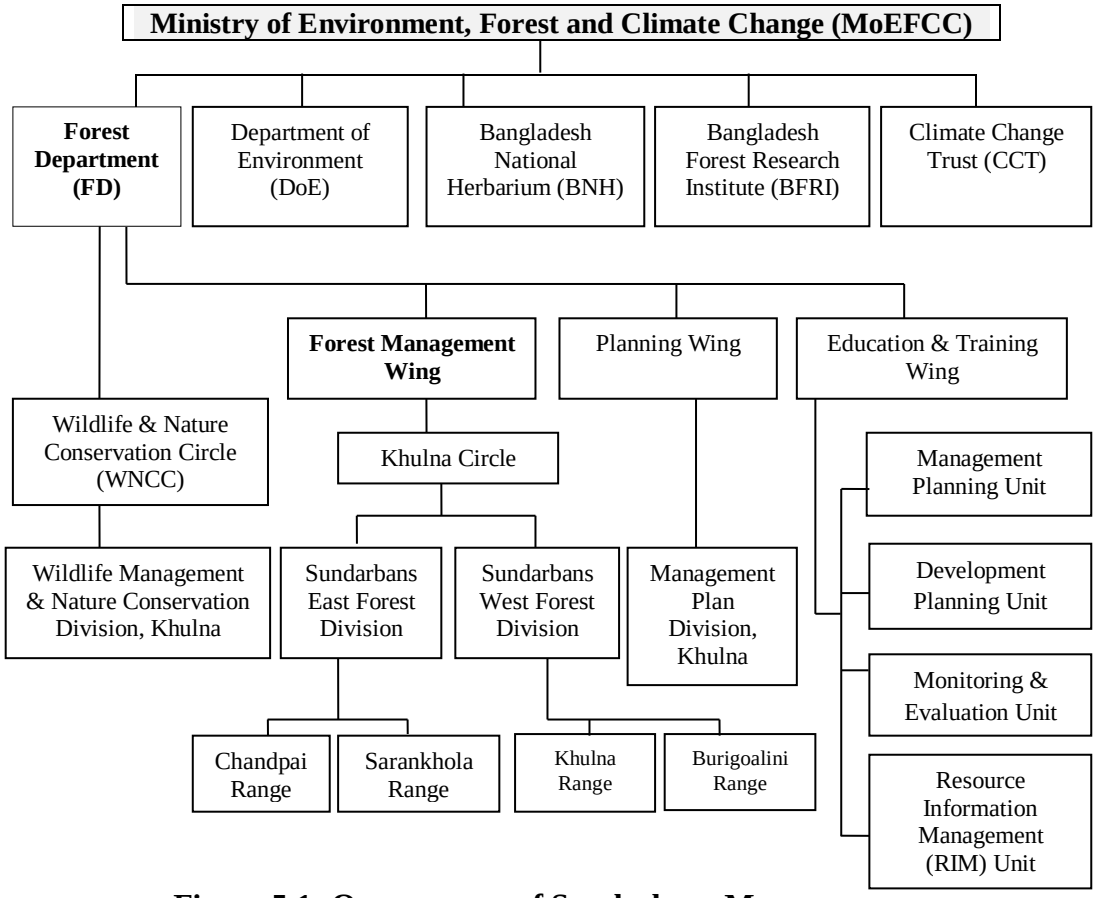

Figure 5.1: Organogram of Sundarbans Management

A number of administrative units were set up under the control of the FD for managing the Sundarbans - the Planning Wing for planning, monitoring and evaluation of sub-sectoral development programmes; and the Education and Training Wing for arranging capacity-building programmes for the foresters. Apart from the FD, some other institutions, run under the MoEFCC, contribute to the Sundarbans's management including the Bangladesh

[14] IRMP for the Sundarbans, 271–272.
[15] Annotated from the Organogram Structures of the Ministry of Environment, Forest and Climate Change of Bangladesh and Bangladesh Forest Department <https://moef.gov.bd/site/organogram/2cbb5fe9-f2b2-48c8-a466-740f0614ee72/Organogram>;<http://www.bforest.gov.bd/site/page/ac1b4adc-82ee-48eb-9150-ade7058a642c/->.

Forest Research Institute (BFRI) for research on mangroves;[16] the Bangladesh National Herbarium (BNH) for the preservation of the Sundarbans's taxonomic database and information dissemination to research community;[17] the DoE for environmental monitoring and enforcement;[18] and the CCT for enhancing the adaptive capacity and climate-resilient livelihoods of FDCs of the Sundarbans through implementing climate change adaptation projects.[19]

Additionally, since biodiversity, environment and climate change are cross-sectoral issues, the role of other state institutions including the Ministry of Agriculture, Ministry of Fisheries and Livestock, Ministry of Water Resources, Ministry of Energy and Mineral Resources, Ministry of Shipping, Ministry of Industry, law enforcement agencies, LGIs and non-state actors such as NGOs, civil society, business communities and the media are crucial for managing the forest resources in an integrated manner. The MoEFCC, being the National Focal Ministry for addressing biodiversity, environment and climate change issues, has responsibility for working with other state departments to ensure that those issues are aligned with their development programmes; coordinate the implementation process across state and non-state actors involved in synergistic activities; and monitor the impact of development programmes.

5.4 Data Assessment Criteria

The status of the ecosystem approach's six investigated principles—integration of entire ecosystem components, conservation and sustainable use, access and equitable benefit sharing, decentralisation of ecosystem management, adaptive management and inter-sectoral coordination—in the Sundarbans's linked policies and legislation were examined in Chapter 4. It was revealed that the notions of ecosystem approach principles have been

[16] Anjan Kumer Dev Roy, *An Investigation into the Adequacy of Existing and Alternative Property Rights Regimes to Achieve Sustainable Management of the Sundarbans Mangrove Forest in Bangladesh* (PhD Thesis, University of Southern Queensland, 2012) 42.
[17] Mohammad Sayedur Rahman et al, 'An Annotated Checklist of the Vascular Plants of Sundarban Mangrove Forest of Bangladesh' (2015) 22(1) *Bangladesh J. Plant Taxon.* 17.
[18] The DoE declared a 10-kilometre periphery of the Sundarbans as ecologically critical area (ECA) in 1999. See Iftekhar Mahmud and Sumal Sarafat, '186 Industrial Projects around Sundarbans', *The Daily Prothom Alo* (Dhaka, Bangladesh), 12 July 2017 <http://en.prothomalo.com/bangladesh/news/153543/186-industrial-projects-around-Sundarbans>.
[19] Md Didarul Ahsan, 'Bangladesh Climate Change Trust: Latest Scenario of Activities and Developments', *The Guardian* (Dhaka, Bangladesh), 23 July 2014 <http://www.theguardianbd.com/bangladesh-climate-change-trust-latest-scenario-of-activities-and-developments/>.

introduced in the policies and legislation regulating the Sundarbans to varying degrees. In this chapter, the legal frameworks delegating responsibilities to the relevant institutions for implementation of the ecosystem approach principles through their mandates, mechanisms and programmes are analysed based on secondary sources such as institutional mandates, research reports and internet documents. Component-wise criteria for assessment of performances of the relevant institutions in implementation of national policies and legislation in the Sundarbans's management are set following the CBD Guidelines on the Ecosystem Approach and the UN SDG 16 implementation standards provided by the UN General Assembly Guidelines for Implementation of Sustainable Development.[20]

5.4.1 Data Presentation Procedure

The findings of desktop analysis were crosschecked against data collected from expert interviews. State and non-state institutions' status in implementing the ecosystem approach principles in the Sundarbans's scenario are presented with two dimensions: ideal role and current position. The ideal roles of institutions are further classified into three categories: 'major', 'moderate' and 'minor/not determined', while current position is classified in four categories: 'strong', 'moderate', 'weak' and 'minor/not determined' (see Table 5.5 in Section 5.11). Ideal role of an institution is illustrated by analysing the intuition's current mandates using desktop analysis. Current position of an institution is interpreted based on literature view and expert opinions. Based on the results from this dual track analysis, the state and non-state institution's strength, limitation and challenges in implementation of the ecosystem approach principles in the Sundarbans ecosystem are revealed.

5.5 Implementation of Integration of Entire Ecosystem Components

5.5.1 Criteria for Assessment of Institutional Performance

Maintenance of ecological integrity and human wellbeing requires smooth functioning and resilience of ecosystems. Ecosystem functioning and resilience relies on dynamic relationship and physio-chemical interactions between species and their abiotic environment. Thus, during initiation of any ecosystem development programme,

[20] CBD Guidelines on Ecosystem Approach, 1–50; UN General Assembly Guidelines on Implementation of Sustainable Development.

consideration of possible ecosystem components (i.e., ecosystem structure, functions, socio-economic dimensions, human and climatic sensitivity) are of great significance for the preservation of biodiversity, rather than simply protection of species. To measure the performance of institutions in implementation of integration of entire ecosystem components, the following aspects, annotated from the CBD Guidelines on the Ecosystem Approach and the UN General Assembly Guidelines for implementation of UN SDG 16,[21] have been selected:

- setting up conservation priorities
- knowledge on ecosystem morphology
- undertaking environmental impact mitigation
- scientific, technical and problem-solving capacity
- monitoring and assessment.

The justifications for selection these criteria for assessing are discussed below.

5.5.1.1 Setting Up Conservation Priorities

Priority setting is a major component in designing any ecosystem development programme. This should be determined not by donors' prescriptions but on locally realised threats and needs, else the continuity of programme outcomes may be compromised. Identification and assessment of threats are essential prerequisites for proper documentation of conservation priorities of an institution.

5.5.1.2 Knowledge on Ecosystem Morphology

As per Principle 5 of the Malawi Principles and its Operational Guidance 1,[22] conservation programmes are usually set for the improvement of target species, but the consideration of associated species on which those species depend is equally important. Alignment of the potential biophysical attributes (food webs, nutrients and hydrological system) needed for the sustenance of species is crucial. Research and inventory management are the vital elements in case of pre-assessment of essential ecosystem attributes.

[21] CBD Guidelines on Ecosystem Approach, 1–50; UN General Assembly Guidelines on Implementation of Sustainable Development Goals.
[22] CBD Guidelines on Ecosystem Approach, 16, 32.

5.5.1.3 Undertaking Environmental Impact Mitigation

Development interventions usually affect the composition, structure and function of biodiversity. An inclusive EMP is required for avoidance or mitigation of the adverse impacts of projects.[23] Where prevention is not possible, the EMP should identify ways to keep the negative impact on ecosystem minimum. Compensation or offset (conservation of biodiversity elsewhere) are usually viewed as a last resort. EMP should include the long-term goals of conservation of ecosystem components (disturbance to wildlife; impact on territorial air, soil and water; possibility of dislocation of local communities; and alternative livelihoods for displaced communities) and a detailed plan of actions to achieve the stated goals.

5.5.1.4 Scientific, Technical and Problem-solving Capacity

Scientific and technical expertise of the personnel contributing to the project design, implementation and monitoring stage is a prerequisite for successful launching of an ecosystem conservation initiative. Multidisciplinary expertise in the programme team is crucial. Arrangement of capacity enhancement programmes can help to equip project contributors with required skills.

5.5.1.5 Monitoring and Assessment

Ecosystem succession is a dynamic process. Timebound action plans or experiments can produce some outputs, but noticeable outcomes depend on their post-project monitoring and enforcement of project-generated outputs/new knowledge. Periodic upgrading of monitoring and enforcement systems can determine the strength of an ecosystem management institution.

[23] Edilegnaw Wale and Asmare Yalew, 'On Biodiversity Impact Assessment: The Rationale, Conceptual Challenges and Implications for Future EIA' (2010) 28(1) *Impact Assessment and Project Appraisal* 3.

5.5.2 Status of Institutions in Implementation of Integration of Entire Ecosystem Components

5.5.2.1 State Institutions

5.5.2.1.1 Forest Department

Integration of all possible components of ecosystem (structure, function and dependent livelihoods) and potential concerns on ecosystem and environment (e.g., climate vulnerabilities and environmental pollution) into development projects are more of a planning issue to be dealt with in the project design, initial assessment and approval stage. In the context of the Sundarbans, the Management Plan Division, Khulna initially chalks out the development priorities which are forwarded to FD's Planning Wing. The Planning Wing is responsible for processing of development proposals and submitting them to the MoEFCC for approval. The right alignment of the Sundarbans's essential attributes into projects depends on the institutional strength of the FD's planning units, Forest Management Wing's field units (i.e., the Khulna Circle) and WNCC's field units (i.e., the Wildlife Management and Conservation Division, Sundarbans East Forest Division and Sundarbans West Forest Division).

Conservation projects designed and implemented by agencies are largely in response to threats to biodiversity.[24] In this context, identification and prioritisation of threats to specific conservation targets (species, habitats and ecosystem) concerning the Sundarbans is integral and conducted by the FD. The department has not yet conducted any risk assessment alone. Most risk assessments for the Sundarbans are conducted with the assistance of donors (ADB, EU and World Bank) or multinational funding agencies (USAID, GIZ and GEF). Due to donor dependency, the FD conservation priorities are usually formed around donors' preferences, rather than local needs. This theme was expressed in interviews:

> Forest Department's subservient role in setting of conservation priorities and ranking of threats is considered as bottlenecks in the conservation of Sundarbans. Due to inadequate expertise, finance and technology, the Forest Department is too much dependent on donor agencies in this context. This trend sometimes put the donor's choices on local interests resulting stumbling block in monitoring of the vibrant

[24] Madhu Rao, Arlyne Johnson and Nora Bynum, 'Assessing Threats in Conservation Planning and Management: Synthesis' (2007) 1 *Lessons in Conservation* 46, 47.

> outcomes after the termination of projects. Capacity building of the Forest Department workforces in ecosystem risk assessment is integral to show upper hand in setting conservation priorities.[25]

Available information on ecosystem resources, adequate knowledge on ecosystem structure and functional processes are important in planning a conservation programme. The FD's Resource Information Management Wing is assigned storage and supply of vegetation data and wildlife inventory for processing of Sundarbans's development programmes. But due to the FD's insufficient focus on research, weak inventory management and dependency on external consultants, possible ecosystem attributes are sometimes incorrectly aligned in projects' targets, goals and objectives resulting in poor conservation outcomes. For example, due to a lack of understanding of the geo-ecological processes, especially the hydrology of the Sundarbans, at the project design stage of the SBCP, no considerable impact was made on aquatic species conservation.[26] Based on that experience, consideration of entire ecosystem components in conservation planning was inserted into the IRMP for the Sundarbans as 'protect, restore, sustain and enhance the biodiversity of the SRF and its interface landscape'.[27]

Evidence suggests that many conservation initiatives remained unimplemented or failed to achieve stated objectives in part because of insufficient consideration of socio-economic dynamics.[28] Examples of contributing factors that lead to failures to implement conservation projects include poor understanding of socio-economic constraints and prospects that shape implementation,[29] outside agendas conflicting with local needs,[30] and insufficient training and incentives for researchers to turn regional conservation designs into actions on the ground.[31] Therefore, SIA is treated as a vital part of a conservation project. In the context of the Sundarbans, the FD is entrusted to conduct an SIA of any

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[25] Summary of the Interviews with EC, PP, PI (face to face, 10–22 January 2017).

[26] Jakir Hossain and Kushal Roy, *Deserting the Sundarbans: Local People's Perspective on ADB-GEF-Netherlands Funded Sundarbans Biodiversity Conservation Project* (Unnayan Onneshan – The Innovators, 2007) 34.

[27] IRMP for the Sundarbans, Goal 1, vi.

[28] Andrew T Knight et al, 'Knowing but Not Doing: Selecting Priority Conservation Areas and the Research–Implementation Gap' (2008) 22 *Conservation Biology* 610; Kerrie A Wilson et al, 'Conserving Biodiversity Efficiently: What To Do, Where, and When' (2007) 5 *PLoS Biol* 223; Natalie C Ban et al, 'A Social–ecological Approach to Conservation Planning: Embedding Social Considerations' (2013) 11(4) *Frontiers in Ecology and the Environment* 194.

[29] Richard M Cowling and Angelika Wilhelm-Rechmann, 'Social Assessment as a Key to Conservation Success' (2007) 41 *Oryx* 135.

[30] K M A Chan et al, 'When Agendas Collide: Human Welfare and Biological Conservation' (2007) 21 *Conservation Biology* 59; Robert J Smith et al, 'Let the Locals Lead' (2009) 462 *Nature* 280.

[31] Knight et al, above n 28, 610.

project. In some cases, due to the incapacity of judging the socio-economic aspects of projects, FD-produced SIAs proved insufficient resulting in demotivating communities not carrying out desired actions. For example, the SBCP was expected to promote alternative livelihoods but failed to support such opportunities, and even impacted negatively on some FDCs' livelihoods. Shrimp farming, promoted as an alternative livelihood, accelerated forest degradation and shrank agricultural lands on which locals depend on for food throughout the year. Moreover, the micro-credit disbursed by the NGOs to promote aquaculture proved unproductive in the SBCP area. The micro-credit holders, having incapacity to set up aquaculture farming, mostly failed to repay the loan and became the worst sufferers of the SBCP.[32]

Any development programme generally contains some form of infrastructure development or restructuring components that can significantly influence the surrounding environment. EIA is a common tool used to assess the impending environmental hazards of any project. Developing an environmental impact mitigation plan is integral to redress the anticipated effects of a development programme on the environment. In many countries, EIA's elements are practiced in a substandard way.[33] Biodiversity is often overshadowed in most EIA works.[34] In Bangladesh, the DoE is responsible for the EMP and EIA of any development project where the FD has no role. For example, the DoE approved the EIA of the Rampal Power Plant Project without consulting the FD and ignored the potential risks of damage to the Sundarbans. Another example is the DoE's issuance of the ECCs and site clearances for 190 industrial units within the Sundarbans ECA.[35] It is evident that the FD is the custodian of the Sundarbans, while the DoE determines what parts of the SIZ are ECAs. But in terms of assessment of EIA, EMP and issuance of ECC and site clearance of projects adjacent to ECAs, the DoE enjoys exclusive authority. This policy restrains the FD from input into EMPs assessing the ratio of project-induced vulnerability on ecosystem composition and functions for projects, including inside the Sundarbans.[36]

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[32] Hossain and Roy, above n 26, 34.
[33] William A Ross, Angus Morrison-Saunders and Ross Marshall, 'Common Sense in Environmental Impact Assessment: It is Not as Common as it Should be' (2006) 24 *Impact Assessment and Project Appraisal* 3.
[34] Helen Byron and Jo Treweek, 'Editorial, Special Issue on Biodiversity and Impact Assessment' (2005) 23(1) *Impact Assessment and Project Appraisal* 4.
[35] Staff Correspondent, 'Licence to Harm Sundarbans', *The Daily Star* (Dhaka, Bangladesh), 6 April 2018 <http://www.thedailystar.net/frontpage/licence-harm-sundarbans-1558918>.
[36] Summary of the Interviews with EC, PP, PI (face to face, 10–22 January 2017).

Biodiversity in developing countries is inextricably linked to development. The maintenance of ecosystem attributes, concerns of ecosystem dependents and informed problem-solving skills on issues like climatic events are prerequisites for project planning and requires scientific and technical expertise.[37] As a lead state agency for designing Sundarbans's development projects, the FD's technical capacity is in question and is reflected in some project completion reports. For example, the poor technical know-how and weak assessment of socio-economic implications of the state agency was documented as reasons for the failure of the ADB–GEF-funded SBCP.[38] Lack of skills in bio-monitoring, climate change adaptation, liaison with local communities and coordination with other contributors were identified in the EU–ZSL-funded Sundarbans Environmental and Livelihoods Security (SEALS) project.[39] As a remedy, the ADB suggested enhancing the FD's expertise in gauging the implementing agency's project execution capacity and the corresponding indicators listed for monitoring project progress.[40]

Ecosystem conservation projects are designed with the assumption that project interventions will lead to conservation of key ecosystem resources. Monitoring and evaluation are the primary tools to measure whether a project is meeting its targets.[41] This requires two kinds of indicators: implementation performance indicators (project inputs and outputs) and project impact indicators (project impact on biodiversity). Identification of overriding factors (social, economic and political) that constrain project performance is also critical. Since monitoring allows managers to identify changes and trends over time, defining the spatial and temporal scales of project monitoring activities at the ecosystem or species level is important. The FD's Monitoring and Evaluation Unit coordinates project monitoring activities during and beyond the project timeframe with concerned field units (i.e., the Khulna Circle and Khulna Wildlife Management and Nature Conservation Division). But the weakness of the FD's Monitoring and Evaluation Unit in monitoring of development projects was revealed in an independent assessment report conducted on the SBCP:

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[37] Mary K Seely et al, 'Creative Problem Solving in Support of Biodiversity Conservation' (2003) 54 *Journal of Arid Environments* 155.
[38] ADB, 'Project Completion Report Bangladesh: Sundarbans Biodiversity Conservation Project' (Report, ADB, 2008) 15–16.
[39] Adam Barlow, 'Sundarbans Reserved Forest: Protection Status: Target State' (Report, European Union and Zoological Society of London, 2010) <https://www.researchgate.net/publication/313649854_Sundarbans_Reserved_Forest_Protection_status_Target_state_report>.
[40] ADB, above n 38, 15–16.
[41] World Bank, *Guidelines for Monitoring and Evaluation for Biodiversity Projects* (World Bank, 1998) 15.

> The project [SBCP] left the monitoring of reserved forest mechanism to highly corrupt wings of the Forest Department. It merely created a temporary financial inflow into FD, leading to grossly wasteful expenditure and unprecedented hierarchies of corruption right down to the hamlet-level. The project exacerbated conflicts between the FD officials and local communities. In fact, the SBCP prevented local people from entering the jungle for their livelihoods and allowed outside encroachers to smuggle forest resources more freely.[42]

The issue of incapacity and non-transparency of the FD's Monitoring and Evaluation Unit was stated in expert's opinions. Owing to the department's limitations, some conservation projects failed to achieve desired targets, while others ended with successful outcomes only on paper.[43] Strengthening the monitoring and execution mechanism of the FD is essential in guiding communities to implement the desired actions and correctly articulate the project performance at the ground level.

5.5.2.1.2 Department of Environment

The DoE has the authority to assess possible project-induced risks on the structure and processes of the biodiversity and environment of the project area. But its approval of EIAs and ECCs of some Sundarbans-encircled development projects has been criticised on the basis of ignorance of their potential impacts on the biodiversity and environment of that area.[44] It is evident that the DoE has failed to fulfil its institutional role in maintaining the ecological and environmental integrity of the Sundarbans's ECA.

5.5.2.1.3 Local Government Institutions

LGIs have no role in designing Sundarbans-related conservation projects. They can help implementing the projects within their jurisdiction. So integration of ecosystem structure, components and functions into the conservation project is not their area of concern.

5.5.2.1.4 Cross-Sectoral Institutions

As per the given national priorities, conservation of ecosystem, management of environment and adaptation to climate change are considerable factors in designing cross-sectoral development projects. To integrate those national priorities in cross-sectoral

[42] Hossain and Roy, above n 26, 8.
[43] Summary of the Interviews with EC, PP (face to face, 10–22 January 2017).
[44] A. H. Chowdhury, 'Environmental Impact of Coal Based Power Plant of Rampal on the Sundarbans (World Largest Mangrove Forest) and Surrounding Areas' (2017) 2 *MOJ Ecology and Environmental Science* 14.

projects, different state agencies undertake development programmes where components of biodiversity and environment are evident. But due to inadequate supervision and coordination from the MoEFCC, reflection of those national priorities in sectoral development projects remains minimal.[45] Therefore, in the 7th FYP, the emphasis was on capacity building of the MoEFCC, DoE and FD to effectively deal with those triple issues. The plan prioritises identification of Common Pool Resources in ECAs for that require management by the local community.[46] Climate Change Focal Points have been appointed in different ministries for mainstreaming the climate change issue in development projects.[47] The Climate Change Cell of the MoEFCC was entrusted to facilitate the activities of Climate Change Focal Points across these sectors.[48] It is evident that efforts are ongoing for integration of ecosystem and environment-linked concerns in cross-sectoral development projects for the integrated management of the Sundarbans.

5.5.2.2 Non-State Actors

Among non-state actors, NGOs have a role to integrate possible ecosystem components and concerns in their self-operated projects and contributions to state run projects through providing opinions. But some representatives of LGIs and environmental experts emphasised monitoring NGO-led programmes to make them accountable and streamlined. Business communities have opportunities to contribute to setting programme objectives by providing suggestions from their organisational point of view. The media's role is equally important in raising awareness of project components that pose potential long-term risks for ecosystem structure, function and components.

5.6 Implementation of Conservation and Sustainable Use

5.6.1 Criteria for Assessment of Institutional Performance

The ecosystem approach is considered a strategic framework for achieving sustainable development through an appropriate balance between conservation and sustainable use of

[45] The 7th FYP 466.
[46] Ibid 470.
[47] M Khalequzzaman, *National Environment Policy: Promises Need to Follow with Action* (2013) <http://opinion.bdnews24.com/2013/10/07/national-environment-policy-promises-need-to-follow-with-action/>.
[48] BCCSAP 2009 18.

ecosystem resources.[49] To ensure sustainable ecosystem conservation and its rational use, different institutional mechanisms have been developed by different states. However, for assessing the performance of the relevant institutions in implementation of conservation and sustainable use notion in the Sundarbans, the following criteria have been selected:[50]

- mechanism for regulation of harvesting
- provisioning on conservation-linked alternative livelihoods
- focus on conservation research and scientific capacity
- pollution/threat control capacity
- monitoring and enforcement capacity.

Justifications for selecting these criteria are discussed below:

5.6.1.1 Regulation of Harvesting

To maintain the flow of ecosystem services, imposing restriction on access or use, or limiting seasons or quantity, are common mechanisms used by ecosystem managing institutions. In taking any prohibitive or restrictive measure, the executing agencies should follow certain criteria such as adequate stakeholder consultation, assessment of cost effectiveness of proposed actions and arrangement of sufficient alternatives for making those harvesting regulations effective. To take any justifiable restrictive measures, convincing relevant stakeholders, necessary information, expertise and efforts are essential prerequisites for any ecosystem managing institution.

5.6.1.2 Conservation-Linked Alternative Livelihoods

After issuance of any moratorium/limitation on harvesting of ecosystem goods or services, a sense of insecurity might be intensified among ecosystem-dependent communities. Climate variations also impact on ecosystem resources abundance which put pressure on FDCs' subsistence. Thus, the chances of their engagement in illegal extraction increases which may challenge the sustainable use mechanism. The ecosystem management agency

[49] Richard D Smith and Edward Maltby, *Using the Ecosystem Approach to Implement the Convention on Biological Diversity: Key Issues and Case Studies* (IUCN, 2003) 10.
[50] Annotated from the CBD Guidelines on Ecosystem Approach and the UN General Assembly Guidelines on Implementation of Sustainable Development UN General Assembly Guidelines for UN SDG 16 implementation. See CBD Guidelines on Ecosystem Approach, 1–50; UN General Assembly Guidelines on Implementation of Sustainable Development.

can provide some incentives in developing climate-resilient alternative livelihoods[51] which can encourage compliance with conservation and sustainable use mechanisms.

5.6.1.3 Conservation Research and Scientific Capacity

Good management depends on improving the information base and scientific understanding of ecosystems through the promotion, implementation and application of research and integrating this information into decision-making.[52] Conservation research is a crucial component of an institution for identification of threats to local flora and fauna, monitoring of biodiversity and processing reintroduction plans of threatened or rare species. To secure a complex ecosystem, the research entity needs to focus on multidimensional aspects such as socio-economic research, biological research and silvicultural research. The implementation of research-generated output requires appropriately skilled staff of state departments, local government, community members and NGOs be engaged in ecosystem management.

5.6.1.4 Pollution/Threat Control

Ecological growth and succession depend on congenial atmospheric elements like air, water and soil nutrients. Pollution of these atmospheric components interrupt the food chain, resulting in risks to the stability of the biota itself and of the biochemical cycle of an ecosystem. Development of an appropriate mechanism for controlling pollution and extraneous actions is a crucial need for the regulatory institutions to secure the biotic and abiotic environment of an ecosystem.

5.6.1.5 Monitoring and Enforcement

According to Hickey, the magnitude of forest sustainability demands effective monitoring.[53] To ensure conservation and sustainable use practices, the executing institutions usually introduce some control mechanisms. The compliance of these restrictive provisions depends on the monitoring capacity and enforcement mechanism of the institution. The strength of monitoring and enforcement mechanism reflects the overall scenario of the governance system of an institution.

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[51] CBD Guidelines on Ecosystem Approach, 48.
[52] Ibid 29.
[53] Gordon M Hickey, 'Evaluating Sustainable Forest Management' (2008) 8(2) *Ecological Indicators* 109.

5.6.2 Status of Institutions in Implementation of Conservation and Sustainable Use

5.6.2.1 State Institutions

5.6.2.1.1 Forest Department

Implementation of the conservation and sustainable use principle is more of a management issue. The FD's Forest Management Wing and the WNCC through its field units (i.e., Sundarbans East Forest Division, Sundarbans West Forest Division and Khulna Wildlife Management & Conservation Division) are entrusted to implement the principle in the Sundarbans.

The Sundarbans has been the victim of indiscriminate resources exploitation since the Mughal period (1526–1756) when agriculture was prioritised above forestry. The forest was used as game reserves and a source of timber for shipbuilding which led to forest clearance.[54] Under the British colonial regime (1757–1947), the Sundarbans was subject to maximum exploitation for shipbuilding and railway sleeper production. To increase rent collection, the local Zamindars even brought the ethnic Munda community in the Sundarbans from Bihar to clear the forest for cultivation.[55] Despite declaring the Sundarbans a reserved forest in 1885, the policy of maximum resources extraction remained unchanged until the Pakistani regime (1947–1971).[56] After Bangladesh's independence, a new Forest Policy was adopted in 1979 that brought about little change in the nature of forest use and management, and several aspects such as community participation, enterprise development and forestry extension received inadequate attention. The colonial legacy of state-sponsored commercialisation of forest interests and disregard for local communities' traditional rights and needs continued, resulting in a decline in the Sundarbans's resources.[57] Thus, rethinking of conservation procedure and consideration of restrictive measures has become crucial for the conservation of the Sundarbans.

To revamp the colonial style of the Sundarbans's conservation, the FD has endorsed several strict conservation measures since 1989 including the *Moratorium on Tree Felling*

[54] M Millat-e-Mustafa, 'A Review of Forest Policy Trends in Bangladesh' (Policy Trend Report, 2002) 116.
[55] A Karim, 'Vegetation' in Zakir Hussain and Gayatri Acharya (eds), *Mangroves of the Sundarbans - Volume 2: Bangladesh* (IUCN, 1994) 3.
[56] Millat-e-Mustafa, above n 54, 116.
[57] Ibid 120.

1989[58] to prohibit felling of trees from the Sundarbans to protect plant diversity and the *Canals Closure Regulation 1989* to ban collection of aquatic resources from 18 canals located outside the sanctuaries for safeguarding aquatic biodiversity.[59] Due to the FD's persuasion, the Ministry of Fishery and Livestock added a new provision (Rule 8(1A)) to the *Protection and Conservation of Fish Rules 1985* by which the capture of shrimp fry in estuaries and coastal waters using monofilament nets was prohibited.[60] In 1996, the areas of wildlife sanctuaries were extended and closed to any types of extraction.[61] Generally, the Sundarbans NTFPs collection follows the seasons, though some activities are operational most times of the year. The seasonal extraction calendar of the Sundarbans is presented in Table 5.1.

Table 5.1: Sundarbans Seasonal Calendar of Resource Extraction

Product	Month											
	J	F	M	A	M	J	J	A	S	O	N	D
Golpata												
Hilsha Fish												
Sada Fish												
Shrimp Golda/Bagda												
Shrimp Fry												
Crab												
Honey												
Shutki (dry fish)												

Note: green = major extraction, red = minor extraction, blue = major processing, yellow = minor processing.

The staff of the FD try to restrict the FDCs to collect resources according to the seasonal calendar. But collection of resources in lean periods is common even after a cyclone warning or in rough weather.[62] Nevertheless, the department's control mechanism has to some extent become ineffective due to lack of commitment and weak enforcement practices, undermining conservation and sustainable use. A similar view was given by some environmental experts:

[58] Government of Bangladesh Gazette Notification No Sha-2/MOEF192/90/580 of 1989 (Moratorium on Tree Felling).
[59] Sundarbans Divisional Forest Office, Office Memo 5087/18-1, Issued on 11 May 1989 (Canal Closure Regulation 1989).
[60] *The Protection and Conservation of Fish Rules 1985* Rule 8(1A).
[61] Government of Bangladesh Gazette Notification No MOEF (sec3)/7/96/147, dated 6 April 1996 (Extension of Sundarbans Wildlife Sanctuaries).
[62] Abu Nasar Mohammad Abdullah, *Livelihood Strategies of People Surrounding the Sundarbans Mangrove Forest* (PhD Thesis, Charles Darwin University, 2014) 190.

> Despite moratorium on harvesting of timber, illegal timber extraction continues unabated at the connivance of some corrupt Forest Department staff, local government representatives and influential business groups. The poor collectors are sometimes being involved into illegal practices to recover the amount paid as ransom to the pirates or the extra money given to the local forest offices for collection of permits or due to feeling of livelihood insecurity by Forest Department's protective measures on traditional income sources without providing alternative sources of income.[63]

With the formation of three CMCs in Mongla, Sarankola and Koyra sub-districts, the FD institutionalised the co-management system in the SIZs in 2010. Some other co-management entities like VCF, PF and CPG are now in the development stage.[64] Sharing of responsibilities is established through delegation of some functions to these community-based organisations, a significant step towards community empowerment. Nevertheless, some research findings indicate that much development is still needed to make the CMOs truly functional. Roy observes that the FD is attempting to implement 'benefit-sharing' instead of 'co-management' because more than 50 per cent of the CMC members are from state agencies. Selection of FDC members is biased, with elite dominance.[65] Despite the FD's recent efforts to increase stakeholder's involvement via formation of Wildlife Advisory Board at the national level, the Conservation Council for protected areas and activation of CMCs, Muhammed et al's study shows some unsatisfactory outcomes in terms of actual stakeholders' representation into those committees and calls for some form of restructuring.[66]

The FD has started promoting AIG activities for enhancing the livelihood security of Sundarbans FDCs through implementing several projects.[67] One of the core focuses of the Integrated Protected Area Co-Management (IPAC) Project, CREL Project and SEALS Project is to develop AIG sectors through activation of the co-management system, mobilisation of poor FDCs to receive skills training and value chain support for AIG activities. To improve their living conditions, under the AIG scheme improved cooking stoves, bio-gas plants and solar energy panels are being delivered.[68] Still, extensive efforts

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[63] Summary of the Interviews with EC, PP (face to face, 10–22 January 2017).
[64] Rahman, above n 13, 84.
[65] Roy, above n 16, 263.
[66] Nur Muhammed, Masao Koike and Farhana Haque, 'Forest Policy and Sustainable Forest Management in Bangladesh: An Analysis from National and International Perspectives' (2008) 36(2) *New Forests* 201, 215.
[67] Mohammad Shaheed Hossain Chowdhury, Masao Koike and Shigeyuki Izumiyama, 'Critical Analysis of the Forest Policy of Bangladesh: Highlights on Conservation and People's Participation' in Mohammad Shaheed Hossain Chowdhury (ed), *Forest Conservation in Protected Areas of Bangladesh: Policy and Community Development Perspectives* (Springer, 2014) 45.
[68] Rahman, above n 13, 85.

are required for provisioning alternative livelihood means such as interest-free micro-credit and education allowance for the children involved in shrimp fry collection. These incentives encourage poor FDCs to adopt homestead-based livelihoods to withstand poverty and climatic damage and reduce their reliance on the Sundarbans's resources.[69]

Currently, mangrove research is not carried out by the FD due to an absence of research laboratories and funding allocation. The FD depends on other research institutes such as BFRI, BARC and various university forestry departments (e.g., Khulna University and Chittagong University).[70] The FD's Education and Training Wing organises training for the departmental staff in the forestry educational institutions (Forest Academy, Forest Department and Training Centre and Forest Schools), but not for non-FD people (i.e., CMC members and members of LGIs) involved into the Sundarbans's management. Some NGOs organise training workshops which help to develop capacity of non-FD community persons. The FD's networking with other research and training institutes can help to enhance the capacity of non-FD communities.

Dissemination of research findings is important for raising conservation awareness. Pure research, done for academic purposes, usually finds less acceptability among FD staff unless the useful research outputs are included in FD's annual development plans.[71] A sound communication and outreach strategy for the Sundarbans can help to foster sustainable behaviour patterns required for its conservation. Generally, the Mass Communication Officer of the FD's Public Relation Unit is responsible for dissemination of information relating to biodiversity conservation and forestry-linked socio-economic functions through circulating communication materials. The Sundarbans East Forest Division and Sundarbans West Forest Division regularly circulate booklets, flipcharts and pamphlets on the Sundarbans's biodiversity for raising mass awareness. But no state-led website has yet been established for the Sundarbans from which the local community can find information on Sundarbans-centric development initiatives.

Control of piracy is a recurring issue, not least because resource collectors have reportedly paid pirates for safe passage. To protect the Sundarbans's wildlife and resource collectors

[69] IRMP for the Sundarbans, 184.
[70] Ibid 263.
[71] Ibid.

from piracy and poaching, the WNCC was created in 2001.[72] Under the WNCC, a Wildlife Management and Nature Conservation Division was established in Khulna to control crime against Sundarbans's wildlife. Due to a shortage of manpower, patrol vessels and technological kits, forest crimes were not significantly curbed. Therefore, activation of participatory monitoring and joint patrolling are emphasised in the IRMP for the Sundarbans.[73] Subsequently, SMART patrolling with modern cyber tracking and vehicular equipment was introduced in 2017, resulting in a decline in criminal activity in the Sundarbans.[74] Police, Coast Guard and Rapid Action Battalion (RAB) sometimes conduct operations around the Sundarbans to rescue captive FDCs. During their actions, 135 forest and water pirates were killed in armed encounters between 2012 and November 2018, 507 pirates were arrested, and large stashes of arms and ammunition seized.[75] Although some research findings mention these efforts as inadequate as the gang leaders on the mainland remained untouched.[76]

Although the FD has the overall role of protecting the Sundarbans from undue threats, its efforts are deemed insignificant. Despite apprehension of severe threats to the Sundarbans, the Rampal Power Plant project, established close to the Sundarbans ECA borderline, received an ECC. The DoE approved[77] the EIA of the project,[78] ignoring the project's imminent impact on the Sundarbans which was criticised by national and international environmental entities like the UNESCO[79] and TIB.[80] The joint World Heritage

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[72] Government of Bangladesh Gazette Notification No PaBaMa/Sha-2/Ban (Pra:Sa:)-22/98(6)/296, dated 24 June 2001 (Establishment of Wildlife and Nature Conservation Circle [WNCC]).

[73] IRMP for the Sundarbans, 184.

[74] Staff Correspondent, 'Smart Patrolling: Crime Going Down in the Sundarbans', *The Dhaka Tribune* (Dhaka, Bangladesh), 6 April 2018 <https://www.dhakatribune.com/bangladesh/nation/2018/04/06/smart-patrolling-crime-going-sundarbans>.

[75] Shakawat Kowser, 'No More Surrender in the Sundarbans', *The Daily Bangladesh Protidin* (Dhaka, Bangladesh), 31 October 2018 <http://www.bd-pratidin.com/first-page/2018/10/31/372284>.

[76] Abdullah, above n 62, 196.

[77] Government of Bangladesh, *Approval Letter of Environmental Impact Assessment (EIA) Report for Proposed Khulna 1320 MW Coal Based Thermal Power Plant Construction Project at Rampal Upazila under Bagerhat District* (5 August 2013) <https://www.bifpcl.com/new/wp-content/uploads/2014/06/Approval-of-EIA.pdf>.

[78] CEGIS (Center for Environmental and Geographic Information Services), 'Environmental Impact Assessment of 2x (500-660) Megawatt Coal Based Thermal Power Plant to be Constructed at the Location of Khulna' (Report, Center for Environmental and Geographic Information Services, 2013) <http://www.indiaenvironmentportal.org.in/files/file/EIA%20of%202x%20(500-660)%20MW%20Coal%20Based%20Thermal%20Power%20Plant%20at%20Rampal%20in%20Bagerhat%20District,%20Khulna.pdf>

[79] A K M Wahiduz Zaman, 'Menace at the Mangrove', *The Dhaka Tribune* (Dhaka, Bangladesh), 27 December 2014 <http://www.dhakatribune.com/long-form/2014/dec/27/intoxicating-sundarbans>.

[80] Transparency International Bangladesh, *Rampal and Matarbari Power Projects: Governance Challenges in Environmental Impact Assessment and Land Acquisition* (2015) <http://www.ti-bangladesh.org/beta3/images/2015/es_ffs_coal_15_en.pdf>.

Centre/IUCN Reactive Monitoring team also flagged several impacts of the project on aquatic species.[81] The effect of the Rampal Power Plant on the Sundarbans was identified as irreversible by environmental expert Abdullah Harun Chowdhury.[82] The issuance of ECCs and site clearances for 190 industrial units within the Sundarbans ECA by the DoE (of which at least 24 units fall under the 'red category', meaning awful harm to the Sundarbans's biodiversity) is another example of the failure of the FD.[83]

The sinking of cargo vessels in the Sundarbans's water route has now become a common issue. Since 2014, at least 10 lighter vessels with furnace oil, fertilizer, coal and cement sunk in the Sundarbans's river channels and the spillage of oil and other chemical substances from those vessels resulted in severe threats to the Sundarbans.[84] A 31-kilometre shipping channel from Mongla to Ghasiakhali was introduced in the 1970s as a shipping route through the forest, resulting in deteriorated water quality and disturbances to wildlife. Owing to navigation problems, the BIWTA has recently withdrawn the channel, without seeking permission from the MoEFCC or FD, starting use of an alternative route from Mongla to Sannashi which covers huge ecologically important areas of the Sundarbans.[85] Forest fire is another threat to the Sundarbans. Since 2002, more than 100 hectares of forest have been destroyed by miscreant-led fire, causing substantial damage to plant species and shrinkage of wildlife's roaming areas.[86]

To execute conservation and sustainable use practices in the Sundarbans, the FD has introduced some control mechanisms including permit/Boat Loading Certificates (BLCs) for collection of NTFPs, bans on timber extraction, and restricting fish and crab harvesting in breeding season. Compliance with these preventive provisions depends on the FD's

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[81] Naomi Doak, Mizuki Murai and Fanny Douvere, 'Report on the WHC/IUCN Reactive Monitoring Mission to the Sundarbans World Heritage Site, Bangladesh, from 22 to 28 March 2016'.

[82] A. H. Chowdhury, 'Environmental Impact of Coal Based Power Plant of Rampal on the Sundarbans (World Largest Mangrove Forest) and Surrounding Areas' (2017) 2 *MOJ Ecology and Environmental Science* 1, 2, 14.

[83] Staff Correspondent, 'Licence to Harm Sundarbans', above n 35.

[84] Md Abu Sayd Sunu, 'The Sundarbans is Becoming a Dumping Ground for Crap Vessels: Biodiversity Under Threat', *The Daily Manobzamin* (Dhaka, Bangladesh), 21 April 2018 <http://mzamin.com/article.php?mzamin=114094>.

[85] T I Suman, 'Mongla-Ghasiakhali Water Route has been Introduced to Protect the Sundarbans', *The Daily Amader Shomoy* (Dhaka, Bangladesh), 17 December 2011.

[86] Staff Correspondent, 'Tendency to Grabbing Destroying the Sundarbans', *The Daily Amader Somoy.com* (Dhaka, Bangladesh), 20 April 2016 <http://www.amadershomoys.com/newsite/2016/04/20/574872.htm#.VxiFhTFObIU>; Staff Correspondent, 'Sundarbans is Burning with Miscreant Fire', *The Daily Bangladesh Protidin* (Dhaka, Bangladesh), 27 May 2017 <http://www.bd-pratidin.com/country/2017/05/27/235246#sthash.xzfbRrMq.dpuf>.

monitoring and enforcement capacity. Despite such prohibitory measures, illegal extraction of timber continues, demonstrating the failure in execution of the harvest ban rule.[87] Poaching of wildlife is a common concern. Strengthening the FD's monitoring and patrolling mechanism is necessary to prevent illegal extraction, poaching of wildlife and piracy. These ongoing issues all prompt questions about the effectiveness of the FD's monitoring mechanisms in safeguarding the Sundarbans.

5.6.2.1.2 Bangladesh Forest Research Institute

As a pioneer state institute for forestry research, the BFRI's role is crucial in conducting research on improvement of mangrove habitat, silvicultural practices on regeneration and sustainable harvesting of NTFPs. The BFRI initiated research on mangroves in 1985 with formation of a Mangrove Silviculture Division in Khulna followed by eight field stations in the Sundarbans.[88] Little research has so far been evident on mangrove silvicultural studies. It was found that BFRI's current research strategy overlooks socio-economic aspects for mangrove conservation. This missing link leaves a serious gap in achieving socio-political benefits from conservation policies.[89]

5.6.2.1.3 Department of Environment

The DoE is entrusted to ensure environmentally sustainable development in Bangladesh. Declaration of an ECA, control of environmental pollution and assessment of development programme–induced environmental impact are the tools used by the DoE in this regard. Since the DoE declared the Sundarbans periphery an ECA, it has the responsibility to prevent any environmentally detrimental activities therein. But the DoE's contradictory role in the protection of the Sundarbans is evident with their approval of the EIA and ECC of the Rampal Power Plant Project and issuance of ECCs and site clearances for 190 industrial units within the ECA without considering their impact on the Sundarbans.[90]

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[87] Roy, above n 16, 232.
[88] United Nations Educational, Scientific and Cultural Organisation (UNESCO), *Sundarbans World Heritage Site Devastated by Cyclone* (2007) <http://whc.unesco.org/en/news/399/>.
[89] Roy, above n 16, 42.
[90] Staff Correspondent, 'Licence to Harm Sundarbans', above n 35.

5.6.2.1.4 Local Government Institutions

It is recognised in the IRMP for the Sundarbans that without LGIs' strong participation co-management in Sundarbans may not be sustainable.[91] As per their institutional mandate, LGIs have roles in protecting the forest, strengthening the capacity of CMC members for making the CMOs functional, and raising community conservation awareness. But LGIs' current role in nature conservation is not noteworthy. Interviews revealed the opinion that that politicisation and lack of integrity of these institutions are the major obstacles in managing the Sundarbans.[92]

5.6.2.1.5 Law Enforcement Agencies

Compliance with NTFPs harvesting regulations and controlling of unsustainable practices depends on strong enforcement and monitoring. Apart from the FD's own initiatives, the role of law enforcement agencies is important in this endeavour. Law enforcement agencies generally assist the FD in controlling forest-related crimes and help enforcing state regulations. Evidence suggests that the RAB, Coast Guard and police often conduct operations around the Sundarbans to clear the Sundarbans of forest and water pirates.[93] The RAB's contribution is prominent in this regard, with their efforts reportedly resulting in the surrender of 328 members of 32 pirate groups, 462 weapons and 22,504 rounds of ammunition between 2015 and 2018 under a state-offered rehabilitation package.[94] By this effort, the Sundarbans was declared a 'Pirate Free Zone' on 1 November 2018.[95]

5.6.2.1.6 Cross-Sectoral Institutions

The Sundarbans is primarily governed by the FD. Other state agencies, especially the DoF, Bangladesh Water Development Board (BWDB), DAE and BIWTA have some synergistic programmes which influence the Sundarbans. Thus, the FD has scope to set collaborative programmes around the Sundarbans to maximise conservation benefits.[96] However, gaps in the FD's cross-sectoral coordination are an issue in maintaining

[91] IRMP for the Sundarbans, 184.
[92] Interview with PP (face to face, 10–22 January 2017).
[93] Abdullah, above n 62, 195; Roy, above n 16, 227.
[94] Staff Correspondent, 'The Sundarbans Is Declared Pirate Free', *The Dhaka Times* (Dhaka, Bangladesh), 1 November 2018 <http://www.dhakatimes24.com/2018/11/01/101770>.
[95] Ibid.
[96] IRMP for the Sundarbans, 262.

Sundarbans's environment which was apparent during the capsize of a furnace oil tanker in the Sundarbans's water channels. During that time, the FD failed to engage other agencies in quick removal of the vessel as an oil layer spread. The FD's tendency to overlook or tousle-free policy creates opportunities for other state and non-state agencies to initiate environment threatening programmes around the Sundarbans. Salinisation is another concern for the Sundarbans as expressed in the experts' interview responses. The modulation of saltwater toxicity in the Sundarbans's surroundings which keeps the environment suitable for mangrove vegetation is being interrupted due to substantial drop in the Ganges' freshwater flow from India with the construction of the Farakka dam. Lack of initiative in negotiating equitable sharing of the Ganges' water with India at a state level is evident. Admitting the presence of some institutional loopholes, some FD officials also pointed out challenges such as shortages in manpower, budget and logistics needed for providing all-out efforts in ensuring the conservation and sustainable use of the Sundarbans's resources.[97]

5.6.2.2 Non-State Actors

A number of NGOs, namely, the Bangladesh Environment and Development Society (BEDS), Centre for Coastal Environmental Conservation (CCEC), Sosilon, Uttoron, Prodipan, BRAC and Action Aid, are contributing to the conservation of the Sundarbans through various activities such as organising advocacy programme on sustainable harvesting, providing micro-credit for developing homestead-based livelihoods and developing mangrove-based entrepreneurship with real resource harvesters. These NGO initiatives help FDCs to be self-reliant and assist building conservation-aware citizenry, crucial for ensuring sustainable use of the Sundarbans's resources.[98]

Some export-oriented industries (shrimp and crab) are established in the Sundarbans-associated landscape which contributes to the local economy. Research revealed some anti-environmental implications of the commercial shrimp culture—deterioration of the geo-morphological condition, soil quality and regeneration process of mangrove

[97] Summary of Interviews with EC, PP (face to face, 10–24 January 2017).
[98] Mohammad Mojibul Hoque Mozumder et al, 'Social-ecological Dynamics of the Small Scale Fisheries in Sundarban Mangrove Forest, Bangladesh' (2018) 3(1) *Aquaculture and Fisheries* 38, 44.

biodiversity and even intensification of social tensions among the Sundarbans FDCs.[99] But the business community–promoted small-scale businesses like fry trading, salt production, processing of fish, honey, wax and ecotourism are AIG activities, diversifying FDCs' livelihoods and increasing income, thereby providing a survival strategy during lean periods. Business communities have scope to invest more in building conservation awareness as part of corporate social responsibilities.

The media acts as a catalyst in the Sundarbans's conservation through circulating the incidence of forest fire, water contamination and law enforcement agencies operations against pirates. The news of Sundarbans-centric state and non-state agencies' development initiatives helps raise local voices on environmentally damaging development programmes. The media's role in compelling wrongdoers to quit their Sundarbans-based destructive activities and convincing pirates to surrender to the law enforcement agencies and resume normal lives by accepting the rehabilitation package offered by the government is praiseworthy.[100] The media's surveillance role also assists in ensuring transparency in forest management.[101]

5.7 Implementation of Access and Equitable Benefit Sharing

5.7.1 Criteria for Assessment of Institutional Performance

The success of other ecosystem approach principles is dependent on proper institutionalisation of access and equitable benefit sharing mechanisms. Without establishing equity and environmental justice through enabling ecosystem resource users' access and developing a fair benefits distribution tool, sustainability of the ecosystem cannot be ensured. To measure the performance of relevant institutions in implementation

[99] Asif Ishtiaque and Netra Chhetri, 'Competing Policies to Protect Mangrove Forest: A Case from Bangladesh' (2016) 19 *Environmental Development* 75, 77; Brojo Gopal Paul and Christian Reinhard Vogl, 'Impacts of Shrimp Farming in Bangladesh: Challenges and Alternatives' (2011) 54 *Ocean and Coastal Management* 201; Debashis Chakraborty and Sacchidananda Mukherjee, 'How do Trade and Investment Flows Affect Environmental Sustainability? Evidence from Panel Data' (2013) 6 *Environmental Developm*ent 34.

[100] Staff Correspondent, 'The Sundarbans Is Declared Pirate Free', above n 94.

[101] Manzoor-E-Khoda, *Transparency and Accountability in Forest Conservation and Management: Problems and Way Out* (Transparency International Bangladesh, 2008) 3.

of access and equitable benefit sharing mechanism, the following criteria have been selected:[102]

- capacity of determining and handling access rights
- capacity for valuation of ecosystem service
- incentive for development of cooperative marketing and trading network
- provisioning of incentives for developing alternative sources of livelihoods.

The justifications for selecting these criteria for assessing are discussed below.

5.7.1.1 Determining and Handling Access Rights

Benefits derived from the array of functions provided by biodiversity at ecosystem level provide the basis of human environmental security and sustainability.[103] The indigenous and poor communities that live in and around the natural ecosystem are generally dependent on ecosystem resources for their subsistence. Controlling access to ecosystem is commonly applied to maintain sustainability of biodiversity. However, sustainable production and management of ecosystems largely depends on ensuring reasonable access of ecosystem resource users to the ecosystem. Thus, before imposing any control mechanism on access to ecosystem, it is critical that cost, effectiveness and socio-economic reality are examined.

5.7.1.2 Valuation of Ecosystem Services

Many ecosystems provide economically valuable goods and services. Valuation of ecosystem goods and services is important to gain profitability and distribute economic benefits among ecosystem-dependent groups. But for proper valuation of ecosystem services, it is necessary to understand and manage ecosystems in an economic context. Adoption of appropriate practical economic valuation methodologies is critical for assessment of ecosystem goods and services (direct, indirect and intrinsic values), and for the environmental impacts (effects or externalities).[104]

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[102] Annotated from the CBD Guidelines on Ecosystem Approach and the UN General Assembly Guidelines for UN SDG 16 implementation. See CBD Guidelines on Ecosystem Approach, 1–50; UN General Assembly Guidelines on Implementation of Sustainable Development.
[103] CBD Guidelines on Ecosystem Approach, 32.
[104] Ibid 32.

5.7.1.3 Incentive for Establishment of Cooperative Marketing and Trading Network

The ecosystem approach encourages establishing cooperative markets and distribution system so that economically viable goods collected by the local resource users cannot be undervalued.[105] This could help reduce the market distortions of ecosystem services and resist the intermediaries from price manipulation on one hand, while enabling equity among the ecosystem resource user group on the other.[106]

5.7.1.4 Incentives for Developing Alternative Sources of Livelihoods

To reduce pressure on ecosystem resource use and for the survival of resource users in off-season, the ecosystem approach suggests alignment of economic and social incentives for development of alternative livelihoods.[107] In many cases, poor ecosystem resource users are engaged in ecosystem resources harvesting by any means due to lack of profitable alternatives. Provisioning of minimum incentives can bring changes in their livelihood which helps promote conservation and sustainable use of biodiversity in the long term.[108]

5.7.2 Status of Institutions in Implementation of Access and Equitable Benefit Sharing

5.7.2.1 State Institutions

5.7.2.1.1 Forest Department

Implementation of access and equitable benefit sharing principle is more of a management issue. The FD's Forest Management Wing through its field units executes ABS in the Sundarbans. DFOs of the Sundarbans East Forest Division and Sundarbans West Forest Division are responsible for the collection of revenue within their respective jurisdiction, enforcement of felling and other silvicultural operations, execution of participatory benefits sharing agreements and distribution of shares to the stakeholders.

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[105] CBD Guidelines on Ecosystem Approach, CBD Decision VII/11, 14.
[106] Ibid 15.
[107] Ibid.
[108] Avit A Chami, 'Can Socio-Economic Incentives Improve the Livelihoods of Communities Surrounding Rehabilitated Ecosystems? An Empirical Evidence of Kondoa Rehabilitated Rural Areas, Dodoma, Tanzania' (2018) 1(3) *Current Investigations in Agriculture and Current Research* 85, 94.

The FAO[109] and UNEP's[110] estimate about 3.5 million people are dependent on the Sundarbans. Under the present institutional framework, FDCs' right of access and use of Sundarbans resources are controlled by local forest offices. The FDCs enjoy 'access' and 'withdrawal' rights for a limited period subject to renewal of permits. After banning timber harvesting in 1989, NTFPs are the only harvestable goods in the Sundarbans. Fishing in 18 canals close to buffer zones is banned.[111]

For ensuring access to permissible areas, the station officers of local forest stations issue permits for a fee. After collection of resources, the resource harvesters are to report to the nearest patrol office for supervision of collected resources. Research findings show that the legal procedure for renewal of BLC and obtaining permission for NTFPs extraction is complex and costly. Resource collectors often have to pay an unofficial levy to the local forest offices (divisional forest office, station office and patrol post) for collection of a clearance certificate.[112]

No mechanism has yet been developed within state functionaries for marketing of extracted Sundarbans resources. The traditional trading system developed in the Sundarbans's region over centuries fails to ensure equitable sharing of costs and benefits among the resource extractors which leads to overuse of resources or unsustainable practices.[113] As there is no specific source of capital available for poor resource collectors to buy boats and nets for collection of resources, they are mainly dependent on the traditional moneylenders (mahajan) for credit (dadon) to afford that equipment. The moneylenders dominate the supply chain of extracted products where the resource collectors act like their puppets. In relation to illegal extraction, they manage the local FD staff, providing bribes in each step of the process from extraction to marketing. The actual resource collector's weakness in social and financial capital means they have little scope to bargain with FD staff.[114] The complex picture of marketing system is evident in the value chain analysis conducted by the IRMP for the Sundarbans where the main activities

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[109] FAO, 'Integrated Resource Management Plan of the Sundarbans Reserved Forest' (Report No DP/BGD/84/056 for the IRDP of the Sundarbans Reserved Forest, 1998).
[110] UNEP, 'The Sundarbans, Bangladesh' (Report, UNEP, 2011).
[111] IRMP for the Sundarbans, xi.
[112] Abdullah, above n 62, 183.
[113] Michael Getzner and Muhammad Shariful Islam, 'Natural Resources, Livelihoods, and Reserve Management: A Case Study from Sundarbans Mangrove Forests, Bangladesh' (2013) 8 *International Journal of Sustainable Development and Planning* 83.
[114] Ibid 184.

centred on the Sundarbans's products were assessed in terms of value added, starting from resource collectors to ultimate consumers.[115] The basic structure of marketing system and value chain is shown in Figure 5.2.

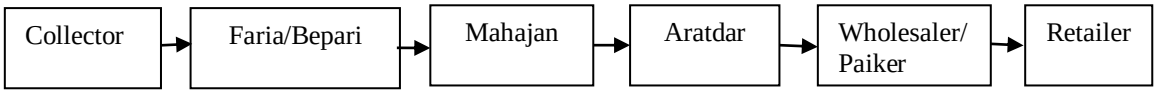

Figure 5.2: Basic Marketing System and Value Chain for Sundarbans's Resources

Note: **Collector** = *resource harvester who collect ecosystem goods from the permissible areas of the Sundarbans on permits/BLCs received from the local forest office*, **Faria/Bepari** = *a petty trader who purchase products from the resource collectors/farmers, bring their consignment to the wholesale market and sell them to the Paiker or retailer through Aratdar*; **Mahajan** = *a traditional local money lender and powerful intermediary in the product value chain who invests money and organises the harvesting of resources of the forest; they also provide loans as part of interlocked credit-marketing transactions, whereby the borrower has to sell to/through the loan provider at a discounted price*; **Aratdar** = *a commission agent who has a fixed establishment and operate between Bepari/Faria and retailers;* **Wholesaler/Paiker** = *wholesaler in consuming area is known as Paiker, who purchase products from Faria/Bepari through Aratdar and sell those to the retailer or consumer*; **Retailer** = *the last link in the marketing channel who buys products from Aratdar or wholesaler and sells these to the consumer. Retailer is independently organised and has permanent shop in the market.*

In the absence of a viable marketing and distribution system under the supervision of a state agency, a number of powerful agents and intermediaries have arisen whose anti-competitive behaviour (e.g., price manipulation and control of supply chain) has given rise to the sense of inequity in income distribution among the landscape population.[116] The dismay in ensuring ABS within the Sundarbans's FDCs was reflected in some interviews:

> The resource harvesters, having controlled by the moneylenders for BLC and credit, are deprived of equitable sharing of their income from harvested produces over the years in absence of a state-based or resources harvesters owned cooperative marketing system. Some forms of effective marketing system need to develop following the best practices of other countries to provide equitable ecosystem benefits to the real FDCs.[117]

The Sundarbans is under multiple anthropogenic pressures due to the surrounding population's high dependency on it. Reduction of the FDC's pressure necessitates developing AIG activities. Since 2008, the FD has initiated AIG activities among the resource users living in the SIZ through the IPAC project (2008–2012) in collaboration with USAID followed by the EU-assisted SEALS project (2011–2015).[118] The FD also

[115] IRMP for the Sundarbans, 152.
[116] Ibid 153.
[117] Summary of the Interviews with EC, PP (face to face, 10–24 January 2017).
[118] Rahman, above n 13, 83.

strengthens its efforts to involve the FDCs in ecotourism activities to provide enhanced scope of alternative incomes.

In economic terms, the forest produces two types of goods: private (e.g., timber, fuelwood and fish) and public goods (e.g., support for biodiversity, protection of coastal habitat and maintaining water quality). The observable value of the Sundarbans-generated public goods are not yet recognised.[119] So far, methods have been developed for the use of private goods, which encourages quick appropriation of resources as they are based on discounting of future value for present ones.[120] The extraction rates based on economic criteria tend to be higher than those based on ecological criteria. This was observed from 1986–1990, when the annual allowable cut for *Excoecaria agallocha* was increased by 43 per cent to ensure the profits of Khulna Newsprint Mill.[121] The underappreciation of forest value gradually leads to overexploitation of ecosystem resources. Under these conditions, proper valuation of allowable harvested goods is essential not only for their sustainable use but for equitable distribution of ecosystem-generated benefits.

So far, no such valuation of the Sundarbans's ecosystem services has been done by the FD, although their high value is noted in Uddin's study.[122] That study reveals that the economic value of the provisioning, cultural and regulatory services of the Sundarbans is almost US$43 million/year—US$42 million for regulatory service (e.g., coastal protection and storm regulation), US$744,000 for provisioning services (e.g., timber, fish, thatching materials, crab and honey) and nearly US$42,000 for cultural services (e.g., tourism). The forest also provides supporting services like biodiversity and habitat for wildlife. Among multiple services provided by the Sundarbans, although regulatory services have generated the highest monetary value, provisioning services are identified as a potential contributor to FDCs' subsistence.[123] Uddin's study indicates that the economic value of provisioning and some cultural services are evident in conventional market, but economic valuation of

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[119] Donald J Macintosh and Elizabeth C Ashton, *A Review of Mangrove Biodiversity Conservation and Management* (Centre for Tropical Ecosystems Research, University of Aarhus, 2002) v.
[120] Camille Bann, *The Economic Valuation of Mangroves: A Manual for Researchers* (Economy and Environment Program for Southeast Asia, 1998) 5.
[121] J A Canonizado and M A Hossain, 'Integrated Forest Management Plan for the Sundarbans Reserved Forest' (Report, Mandala Agricultural Development Corporation and Forest Department of Bangladesh, 1998).
[122] Md Shams Uddin, *Economic Valuation of Sundarbans Mangrove Ecosystems - Bangladesh* (LAP LAMBERT Academic Publishing, 2013) 38.
[123] Ibid.

regulatory and supporting services are not yet fairly conceptualised in management policies. As a large portion of the local community depend on the Sundarbans's ecosystem services, economic valuation of these services can be considered for future livelihood improvement programmes.

The Sundarbans is currently managed by the FD under a state property rights regime. Due to lack of recognition of FDCs' traditional knowledge and property rights, conflicts between mangrove maintenance and provisioning of economic benefits to them have persisted over the years.[124] As a remedy, co-management has emerged as a substitute for providing an alternative property rights regime.[125] It can deliver exclusion rights to the FDCs through redefinition of institutions which ensures their involvement in policymaking and management.[126] As part of enabling benefit sharing, a co-management system has been introduced in the Sundarbans in which 50 per cent of revenue goes back to the CMCs to bear management expenditure.[127] For institutionalisation of the co-management system, the FD has registered the CMCs and VCFs with the Department of Social Welfare.

Sustainable level of harvesting is a recognised practice for ensuring socio-ecological security. But the government imposes restrictions on harvesting of NTFPs for regeneration of ecological resources which results in the loss of benefits FDCs have traditionally derived from the forest. The subsistence of the Sundarbans's FDCs is now limited to seasonal extraction. No safety net programme is evident to redress their miseries during lean season. Thus, the IRMP for the Sundarbans emphasises introducing arrangements for NTFP-based livelihoods, keeping the extraction level below the maximum sustainable yield.[128] Mainstreaming households-based income generation is also stressed for providing economic benefits to traditional harvesters during off-season.

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[124] Anjan Kumer Dev Roy and Jeff Gow, 'Attitudes Towards Current and Alternative Management of the Sundarbans Mangrove Forest, Bangladesh to Achieve Sustainability' (2015) 58(2) *Journal of Environmental Planning and Management* 213.
[125] Ryan Plummer and David Fennell, 'Exploring Co-Management Theory: Prospects for Sociobiology and Reciprocal Altruism' (2007) 85 *Journal of Environmental Management* 944.
[126] Roy and Gow, above n 124, 216.
[127] Rahman, above n 13, 84.
[128] Ibid 196.

5.7.2.1.2 Local Government Institutions

LGIs, entrusted to implement sectoral development programmes, have important roles in the livelihood improvement of the Sundarbans's FDCs. But some LGI representatives, who own shrimp farms in the Sundarbans's adjoining areas, constantly pressure local farmers to be engaged in shrimp cultivation by quitting their original livelihoods (i.e., agriculture). Local farmers who desire to return to agriculture are restrained in doing so due to such vested interests.[129] Conflicts between the lessee (user) and lessor (owner) over land rent issues is common in shrimp farming areas. Due to lack of authority in determining land rent, the local Shrimp Resource and Development Management Committees refer such issues to the LGIs. But the LGI's traditional structures for conflict resolution tend to favour socially influential persons which hinders the stabilisation of the Sundarbans FDCs' livelihoods.[130]

5.7.2.1.3 Law Enforcement Agencies

Pirate-induced shocks is a longstanding issue in the Sundarbans, causing loss of livelihoods and productive assets, increased the cost of resource collections and impacting equitable sharing of ecosystem resources.[131] Paying ransom to pirates or coping with the loss of productive assets compels the FDCs to borrow from moneylenders, sometimes resulting in lifelong debts.[132] Previously, it was not possible for the FD to take prompt actions against the pirates owing to lack of patrolling and technological equipment. But SMART patrolling, introduced in September 2017, has proved effective in ensuring security for the Sundarbans's resources and FDCs.[133] Similarly, the role of police, Coast Guard and RAB is important in the fight against piracy in the Sundarbans. The establishment of security has some bearing on production costs and some benefits automatically trickle down to harvesters.[134]

[129] Abdullah, above n 62, 241.
[130] Ibid 347.
[131] Ibid 184.
[132] Ibid 208.
[133] Staff Correspondent, 'Smart Patrolling: Crime Going Down in the Sundarbans', above n 74.
[134] Abdullah, above n 62, 208.

5.7.2.1.4 Cross-Sectoral Institutions

As the Sundarbans provides multidimensional benefits to millions of people, several other state agencies including the DoF, DoE, BWDB and DAE have conducted some synergistic development activities for the maintenance of forest resources and improvement of FDCs' livelihoods. However, cross-sectoral agency's role in implementing the ABS mechanism among the Sundarbans's FDCs is minimal.

5.7.2.2 Non-State Actors

A number of NGOs are conducting multiple livelihood-enhancement activities in the Sundarbans region. The BEDS and CCEC organise environmental advocacy programmes on sustainable harvesting and productive farming techniques and assist in developing mangrove-based entrepreneurship with actual resource harvesters which helps to improve the livelihoods of poor FDCs.[135] Sosilon, Gonomoki, Uttoron, Prodipan, BRAC and Action Aid are promoting AIGs activities by providing micro-credit to FDCs.[136] But many NGO initiatives fail due to lack of monitoring and relevant expertise. The adverse effect of NGO-provided loans increases income pressure on FDCs and causes overharvesting as a means to generate more income for repayment of loans and interest.[137] Based on the Sundarbans's resources, export-oriented shrimp industries have grown which assists in increasing the income of the Sundarbans communities.[138] Some subsidiary businesses also provide AIG opportunities for FDCs. The media's role in mainstreaming the ABS mechanism is noteworthy. By publicising the Sundarbans's appeals to development partners and international tourists, the media helps in attracting investments to promote AIG opportunities for the Sundarbans's FDCs.

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[135] Muhammad Asiful Basar, *Climate Change, Loss of Livelihood and the Absence of Sustainable Livelihood Approach: A Case Study of Shymnagar, Bangladesh* (Master's Thesis, Lund University, 2009) 52.
[136] Mozumder et al, above n 98, 44.
[137] Roy, above n 16, 242.
[138] M R Rahman and M Asaduzzaman, 'Ecology of Sundarban, Bangladesh' (2010) 8(1–2) *J. Sci. Foundation* 44.

5.8 Implementation of Decentralisation of Ecosystem Management

5.8.1 Criteria for Assessment of Institutional Performance

People's participation—often described through various modes such as wide engagement of stakeholders (Malawi Principle 12), decentralised management or delegation of management authority to the lowest appropriate level (Malawi Principle 2), societal choice (Malawi Principle 1)—is one of the core components of the ecosystem approach. The notion is emphasised for achieving a set of targets including identifying real socio-economic needs, creating a sense of ownership among communities, valuation of indigenous and local knowledge, and ascertaining appropriate incentives to encourage long-term participation. Different studies reveal that ecosystem management cannot be fully decentralised in developing countries because of the long-practiced top-down approach and communities' massive dependency on ecosystem resources. Thus, a combined bottom-up and top-down approach is identified as the best way to meaningfully engage communities in ecosystem management.[139] The following criteria have been selected[140] to measure the performance of relevant institutions in enabling stakeholders' engagement to make the Sundarbans's management transparent and responsive:

- ensuring resource user representation in resource management committees
- delegation of responsibilities
- arrangement of capacity-building programmes
- allocation of incentives to encourage long-term participation
- collaborative monitoring/patrolling and supervision.

The justifications for selecting these criteria are discussed below.

5.8.1.1 Ensuring Resource User Representation in Resource Management

Institutions are the most humanly devised malleable platform for structuring political, economic, social and environmental interaction.[141] They can contribute to natural resource

[139] Smith and Maltby, above n 49, 31.
[140] Annotated from the CBD Guidelines on the Ecosystem Approach and the UN General Assembly Guidelines for UN SDG 16 implementation. See CBD Guidelines on Ecosystem Approach, 1–50; UN General Assembly Guidelines on Implementation of Sustainable Development.
[141] Elinor Ostrom, 'Background on the Institutional Analysis and Development Framework' (2011) 39(1) *Policy Studies Journal* 7.

conservation by providing 'fit' with a social-ecological system.[142] In most developing countries, the decision-making of natural resources is under the control of state functionaries where the role of marginalised resource dependents is generally overlooked.[143] Democratisation of decision-making authority and equitable distribution of benefits among state and non-state actors has recently been initiated under the banner of co-management. Ensuring real stakeholder representations will make the collaborative management system effective, which is needed to make the forest management system transparent and accountable.

5.8.1.2 Delegation of Responsibilities

Delegation of responsibilities is an important step to connect communities into natural resource management.[144] As co-management promotes people's participation in protected areas management, identification of priority areas is a prerequisite for increasing the levels of participation continuum and for sharing responsibilities between multiple levels of administration and stakeholders.

5.8.1.3 Arrangement of Capacity-Building Programmes

Arrangement of capacity-building programmes is important to develop shared understanding, establish an equitable knowledge base to enable working relationships and provide opportunities for collaboration. Appropriate training can help the personnel involved in co-management not just to enhance capacity to efficiently contribute to the planning and decision-making process but to acquire more generalist skills needed for collective decision-making and working in partnership.[145]

5.8.1.4 Allocation of Incentives

A regular source of funding is decisive for institutional reform and ensuring the sustainability of adaptive models. The major concern for the sustainability of the

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[142] Graham Epstein et al, 'Institutional Fit and the Sustainability of Social–ecological Systems' (2015) 14 *Current Opinion in Environmental Sustainability* 34.
[143] R Patrick Bixler et al, 'The Political Ecology of Participatory Conservation: Institutions and Discourse' (2015) 22 *Journal of Political Ecology* 166.
[144] Mario Angst et al, 'Connectors and Coordinators in Natural Resource Governance: Insights from Swiss Water Supply' (2018) 23(2) *Ecology and Society* 1.
[145] Bill Cooke and Uma Kothari, 'The Case for Participation as Tyranny' in Bill Cooke and Uma Kothari (eds), *Participation: The New Tyranny?* (Zed Books, 2001) 1.

Sundarbans-associated CMOs is the continuation of programme financial support. From the conceptualisation to formation of co-management platform, all hurdles have been overcome with the support of donors.[146] Donors' contributions, appropriate incentives from the government's side and equal sharing of ecosystem-generated benefits can help move the co-management structures towards being active partners in achieving conservation goals.

5.8.1.5 Collaborative Monitoring and Supervision

Shifting the balance of power from the FD to local communities and distribution of decision-making authority across stakeholders to deal with the management issues collaboratively is a dynamic process.[147] In developing countries, development programmes are usually monitored up to the project tenure, resulting in disruption of progressive achievement of a programme's outcomes. Such apprehension is evidenced in some studies where it is found that the enthusiasm of co-management has started fading with time due to the absence of monitoring, inadequate financial support and reluctance of FD staff.[148] Thus, collaborative monitoring seems key to moving the co-management system in the right direction.

5.8.2 Status of Institutions in Implementation of Decentralisation of Ecosystem Management

5.8.2.1 State Institutions

5.8.2.1.1 Forest Department

Decentralisation of ecosystem management through delegation of managerial responsibilities and ensuring community's rights to decision-making is a mammoth task that requires development of community-centric institutional platforms. The FD's commitment and continuous persuasion with the MoEFCC and donors are crucial for

[146] A Z M M Rashid, *Legal Framework for Community Participation in Governance: The Role of Co-Management in the Forest Protected Areas Management of Bangladesh* (PhD Thesis, University of Western Sydney, 2012) 189.
[147] Jefferson Fox (ed), *Connecting Communities and Conservation: Co-Management Initiatives Implemented by IPAC in Wetlands and Forests of Bangladesh* (USAID Bangladesh, 2013) 6.
[148] A Z M Manzoor Rashid, Donna Craig and Sharif Ahmed Mukul, 'Shifting Paradigm of Governance in the Natural Resources Management of Bangladesh: Centralist to Pluralistic Approach in the Forest Protected Areas Management' in Sharif Ahmed Mukul and A Z M Manzoor Rashid (eds), *Protected Areas: Policies, Management and Future Directions* (Nova Science Publishers, 2016) 16.

bringing necessary changes in legislative and institutional frameworks and creating sufficient funds for capacity enhancement at all level. In the history of the Sundarbans's management, from 1879–1994, FDCs' involvement was not recognised in policy or practices.[149] The provision for managing the designated forests with local residents was first recognised in the *Forest Policy 1994*.[150] But due to lack of defined ownership and rights, FDCs remained outside the Sundarbans's management.[151] In the name of establishing participatory forestry, the government incorporated the concept of social forestry and agro-forestry to include the interested community in forest generation based on benefit-sharing arrangements.[152] The concept of participatory forestry in the context of the Sundarbans remained absent in policy until 2009. The FD has introduced inclusive 'co-management' in five protected areas on a pilot basis under the USAID-supported Nishorgo Support Project (NSP), but the Sundarbans was not included in this. After the completion of the pilot project in 2007, it was scaled up under the name IPAC, with a broader scope that included wetlands along with forest protected areas.[153]

To institutionalise the NSP-developed community participation tool in protected areas management, the government issued guidelines in 2009 for the formation of potential stakeholder-inclusive Co-Management Councils and CMCs.[154] As such, the co-management system has started gaining roots in natural resource management. It has also received a strong legal base with the issuance of the *Protected Areas Management Rules 2017*.[155] Although different studies reveal that co-management interventions in protected areas are slow, its transformation process is evident.[156] Continuous legal support is imperative to move the shared forest governance mechanism from the nascent stage to sustainability.

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[149] Anjan Kumer Dev Roy and Khorshed Alam, 'Participatory Forest Management for the Sustainable Management of the Sundarbans Mangrove Forest' (2012) 8(5) *American Journal of Environmental Science* 550; Rahman, above n 13, 81.
[150] Nur Muhammed et al, 'Reckoning Social Forestry in Bangladesh: Policy and Plan versus Implementation' (2005) 78(4) *Forestry* 373.
[151] Roy and Alam, above n 149, 550.
[152] Ibid.
[153] A Z M M Rashid et al, 'A Journey Towards Shared Governance: Status and Prospects for Collaborative Management in the Protected Areas of Bangladesh' (2013) 24(3) *Journal of Forestry Research* 599, 600.
[154] Government of Bangladesh Gazette Notification No pabama/parisha-4/nishorgo/105/sting/2006/398 dated 11 November 2009 (Protected Areas Co-management Councils and Co-management Committees Guidelines).
[155] Government of Bangladesh Gazette Notification No SRO No 314 Ain/2017 Ministry of Environment and Forests, 8 November 2017 published 12 November 2017 (Protected Areas Management Rules 2017).
[156] Rashid et al, above n 153, 603.

The FD is authorised to make necessary arrangements for activation of the co-management system in protected areas. It is realised that influential forest destroyers stand against the poor communities who are the real stakeholders of forest resources. An institutional structure with representation of various social groups is needed to counter these divisive forces that intensify lower inter-class tension.[157] After a series of efforts from state and non-state actors, donors and contributions of foregoing projects,[158] the co-management system has been engrained in protected areas. A three-tiered co-management structure has been in practice in the SIZs since 2011: 1) VCFs established at community levels is the basis of the co-management system, and resource users and the poorest section living in SIZs can become members of the VCFs; 2) PFs established at the forest range level constituting the umbrella structure of resource users and poorest people, with each VCF in the respective range represented in the PF by two representatives; and 3) Co-Management Councils and CMCs, constitute with representatives from the PF, FD, other state agencies, LGIs, civil society and relevant stakeholders, are the overarching structures at the forest range level.[159] CPGs were formed in support of the CREL Project as another tier of the co-management structure.

The priority areas for sharing responsibilities with the CMOs were fixed by the government notification in 2009[160] and afterwards modified by the *Protected Areas Management Rules 2017*. The major areas of responsibilities delegated to the Co-Management Council and the CMC are stated in Appendix F. The responsibilities of PF and VCF, constituted to assist the Co-Management Council and CMC are mentioned in Appendix G. The major functions of CPG as described in Rule 19 are conducting joint patrolling with FD staff and supporting in recovery of encroached land. But some researchers find a degree of ambiguity in the assigned roles of the FD and CMOs which conflicts with the notions of cooperation and accountability.[161] As the CMOs operate under the FD, it is the FD's responsibility to make those co-management units functional.

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[157] Nishorgo, *Nishorgo: Bangladesh's Protected Area Management Programme* (Forest Department, 2008).
[158] USAID-funded NSP, IPAC and CREL Project; UNDP-funded Community-based Adaptation to Climate Change through Coastal Forestation Project; EU-funded SEALS and Sundarbans Development and Alternative Resources Integration (SUNDARI) Project; and GIZ-funded SMP Project.
[159] Rahman, above n 13, 81.
[160] Government of Bangladesh Gazette Notification No pabama/parisha-4/nishorgo/105/string/2006/398 dated 23 November 2009.
[161] Rashid, above n 146, 603.

The co-management tiers in the Sundarbans are still in a nascent stage. The VCFs are still comparatively weak. Resource users are not yet fully represented in the VCFs and PFs. The coordination mechanism between the VCFs and the PFs is not activated. Limited understanding in the expected roles of co-management tiers is an issue prevalent among the CMOs and FD staff. Arrangement of training is needed to prepare the members of CMOs for shouldering responsibilities and demonstrating better governance.[162] To enhance the capacity of members of the CMOs, several projects were initiated such as the CREL Project, SMP Project and BAGH Activity Project.

The CMOs are still operating with a Grant Financing System of donors which creates dismay among the conservationists,[163] for example:

> ... government hardly support any conservation and management project of Sundarbans from its own budget [revenue budget] ... projects so far been implemented or implementing by the Forest Department are mainly with donor's assistance. How can you expect to establish or reflect your vision, mission and goals with other's [donors] money? It is the time to come out of this practice [complete reliance] and to demonstrate the state's commitment towards activation of participatory governance.[164]

However, the government determined the protected areas revenue distribution policy via *Protected Areas Management Rules 2017*,[165] which is shown in Table 5.2. Accordingly, 50 per cent of the Sundarbans-generated revenues are to be allocated for the development, administration and capacity building of the CMOs, but this may not be sufficient to ensure CMOs are self-reliant.

Table 5.2: Protected Areas–Induced Revenue Distribution System

Source of Income	Parties for Entitlement	Share (%)
Revenue from Sundarbans	Forest Department	50
	Co-Management Committees	50

As the multi-tiered co-management structures of the Sundarbans management are in the developing stage, comprehensive monitoring and evaluation is required not only for assessing those mechanisms' effectiveness in meeting community aspirations but for

[162] Ibid.
[163] Rahman, above n 13, 84.
[164] Summary of the Interview with EC3 (face to face, 24 January 2017).
[165] *Protected Areas Management Rules 2017*, Rules 25, 27, sch 1.

ensuring transparency and accountability of the overall initiative.[166] In line with the spirit of the *Protected Areas Management Rules 2017*, the FD officials of Khulna Circle are entrusted to monitor the activities of the Sundarbans-associated CMOs. However, as the CMOs consist of different state and non-state actors, capacity building of local forest staff is needed to effectively monitor the activities of these multi-professional platforms. It is observed that some forms of training components are aligned in the CREL Project, SMP Project and BAGH Activity Project for enhancing the monitoring skills of local forest staff and participants of the CMOs.

5.8.2.1.2 Local Government Institutions

LGIs can play a more immediate role in policing local co-management partners to meet responsibilities. As LGIs' representation is ensured in the Co-Management Councils and CMCs by the *Protected Areas Management Rules 2017*, they have a role in helping to enhance the capacity of the FDCs to participate in development projects and be active partners of FD in managing the Sundarbans. However, LGIs sometimes engage the poor communities in unsustainable practices for fulfilling their own interests which undermines the spirit of participatory management. This demands standardisation of the FD's monitoring mechanism. Here, the opinions of some experts are noteworthy:

> .... politically influential representatives of LGIs for extension of their shrimp farms engaged poor communities to set fire in Sundarbans or encroach part of forests … sometimes compels the poor FDCs to divert their piece of agricultural land either to lease to them [LGIs representatives] or motivate them in shrimp cultivation … in most of the cases those communities having failed to repay the loans involved in illegal extraction of Sundarbans resources for repayment of loans and recovery of their land from LGIs members ... Due to Forest Department's weak monitoring over contributing actors, the poor FDCs are being utilized by local elites or LGIs representatives which obstructs to the empowerment of poor FDCs.[167]

The collaborative structure in the Sundarbans's management is still nascent. It is expected that collaborative monitoring mechanisms, once established, will bring changes in the mismanagement embedded in the Sundarbans's management and will make resource handling and distribution procedure transparent.

[166] Rashid, above n 146, 195–196.
[167] Summary of the Interviews with PP, EC (face to face, 13–22 January 2017).

5.8.2.1.3 Law Enforcement Agencies

As the representations of law enforcement agencies (police, RAB, Border Guard and Coast Guard) are ensured in the Co-Management Councils and CMCs, their active role can assure local communities, civil societies and NGOs to be involved in collaborative management in the Sundarbans.

5.8.2.1.4 Cross-Sectoral Institutions

The cross-sectoral agencies such as local agriculture extension, fisheries, livestock and social welfare offices who operate development programmes with a common agenda (conservation of environment, ecosystem and adaptation to climate change) have an important role in connecting local communities to the implementation of such development programmes. Different projects are being implemented under different state departments in the landscapes surrounding the Sundarbans which help improve the livelihoods of the Sundarbans-encircled communities. However, with the recognition of their roles in the *Protected Areas Management Rules 2017*, both in the Co-Management Councils and CMCs, their responsibilities have been increased which will motivate them to contribute more in future.

5.8.2.2 Non-State Actors

Some non-state actors such as NGOs, business communities and media organise programmes and play a contributory role in empowering local communities. NGOs are involved in capacity enhancement of local resource users and community mobilisation on issues related to resources conservation and climate change. But some sort of mistrust is evident among the forest offices and NGOs regarding their activities and nature of cooperation. Some local forest staff are dubious of some NGOs' claim about community empowerment and their expertise in participatory management. Conversely, some development activists raise issues of local forest offices' non-cooperation and non-transparency in resource mobilisation. The conflict of interests in terms of sharing responsibilities between the state and non-state actors is identified as a barrier in

mainstreaming co-management in the Sundarbans.[168] But experts emphasise increasing government–NGO collaboration for the sustainability of the Sundarbans.

The business community–operated businesses in the Sundarbans region helps secure the livelihoods of the poor FDCs in terms of providing AIG opportunities. Such types of AIG opportunities have brought changes in the living standards of a portion of poor FDCs. Given the amount earned from NTFPs collections vs income incurred from household-based or small-scale industries, some have quit their traditional livelihoods. Nevertheless, in the name of generating massive employment opportunities and changing poor communities' living standards, the establishment plans of some 'red category' industrial units around the Sundarbans risks deterioration of the forest and is recognised as a major threat by environmental experts, LGI representatives, the business community, journalists and even local forest officials.[169]

The media's role in building conservation-aware citizenry is well recognised. As the media reflects public opinion, the public discourse on critical environment and forest issues raised by the media has a chance to influence policy decisions.[170] In Bangladesh, the Sundarbans has received considerable media attention, although research indicates that such coverage puts less emphasis on forest policy renovation.[171] Although the media-assisted campaign on the Sundarbans-centric planned establishment of large-scale industrial units help to generate some sort of environmental awareness against those projects' possible effects on the Sundarbans, such media-induced public reactions have had little effect on development planners. One reason for this, as mentioned by a respondent, is diverse uses of media from different central actors such as politicians and administration in legitimising their policy decisions and the political system's civil society/peripheral actors in propagating their ideas through argumentation in a rational discourse.[172]

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[168] Rashid, above n 146, 145.
[169] Summary of the Interviews with EC, PP, PI, BC (face to face, 10–24 January 2017).
[170] Md Nazmus Sadath, Max Krott and C Schusser, 'Forest-climate Politics in Bangladesh's Media Discourse in Comparison to Global Media Discourse' (2013) 3(1) *Open Journal of Forestry* 1.
[171] Md Nazmus Sadath and Max Krott, 'Can Print Media Discourse Drive Forest Policy Change in Bangladesh?' (2013) 6(5) *Journal of Sustainable Development* 8.
[172] Summary of the Interview with EC7 (face to face, 14 January 2017).

5.9 Implementation of Adaptive Management

5.9.1 Criteria for Assessment of Institutional Performance

Since the ecosystem approach recognises humans as a component of the ecosystem and establishes the idea that the ecosystem should be managed and developed on societal choice, the need for handling the development-oriented risks to ecosystem is added to the risks of scientific uncertainties. The rapid economic growth has brought changes in the degree of ecosystem resource uses. To transition towards a sustainable economy from the recent pattern of development and to tackle its pervasive impact on environment, the ecosystem approach advocates the implementation of adaptive management. However, integrating adaptive management through institutional setting requires adoption of a series of actions. To measure the performance of the relevant institutions in application of adaptive management, the following aspects have been selected:[173]

- developing an inventory of biodiversity
- adoption of risk assessment, management and mitigation procedure
- designing of appropriate adaptive management mechanism
- developing change implementation procedure
- strengthening supervision and monitoring mechanism
- scientific, technological expertise and availability of incentives for procedural adjustment.

The justifications for selecting these criteria are discussed below.

5.9.1.1 Inventory Management

Adaptive management begins with collection and compilation of existing information for each ecosystem to be managed and exchange of ideas with stakeholders. Inventory may include biotic surveys, public opinion surveys, market analyses and preparation of appropriate databases. Ecosystem information; responses of species, habitat and dependent communities at spatial and temporal scales to human and climatic interventions; and the socio-economic and cultural issues that influence ecosystem sustainability are subject to

[173] Annotated from the CBD Guidelines on the Ecosystem Approach and the UN General Assembly Guidelines for UN SDG 16 implementation. See CBD Guidelines on Ecosystem Approach, 1–50; UN General Assembly Guidelines on Implementation of Sustainable Development.

change and are important in designing possible mechanisms of adaptive management.[174] According to McLain and Lee, inventory management is crucial for attaining three elements: rapid knowledge acquisition, effective information flow and processes for creating shared understandings that facilitate adaptive learning.[175]

5.9.1.2 Risk Assessment, Management and Mitigation Procedure

Identification of potential risks associated with ecosystems is essential for setting conservation goals of each ecosystem.[176] EIA, SIA and ecosystem survey are the tools commonly applied for assessing the vulnerability of species, habitats and dependent communities against extraneous interventions. As ecosystem succession is a dynamic issue, appropriate scientific and technical expertise are critical to the interpretation and scaling of vulnerabilities and setting of priorities for urgent interventions.

5.9.1.3 Designing of Appropriate Adaptive Management Mechanism

Uncertainty is an inherent feature of environmental problems that can arise in decision-making processes at many points because of extended timescales, competing values, information gap and difficulties in establishing cause and effect relationships.[177] To address multiple scales of uncertainty, adaptive management can involve building planning cycles based on regular reflections on policy and program assumptions, learning from on-ground actions, and then making any required changes. Flexible decision-making depends on the understanding that large-scale environment problems require collective actions from a range of actors. Some scholars recommend caution when engaging a large set of societal factors because those, in practice, can make the change more complex.[178] These factors also vary across setting, social system and time. Thus, when adopting adaptive management or precautionary measures, appropriate scale, cost effectiveness, competing sectors' opinions and capacities of executing institutions should be taken into

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[174] Alan Haney and Rebecca L Power, 'Adaptive Management for Sound Ecosystem Management' (1996) 20(6) *Environmental Management* 879, 881.
[175] Rebecca J McLain and Robert G Lee, 'Adaptive Management: Promises and Pitfalls' (1996) 20(4) *Environmental Management* 437.
[176] Haney and Power, above n 174, 882.
[177] Stephen Dovers et al, 'Uncertainty, Complexity and the Environment' in Gabriele Bammer and Michael Smithson (eds), *Uncertainty and Risk: Multidisciplinary Perspectives* (Earthscan, 2008) 245–260.
[178] Nicki Mazur et al, *Applying the Principles of Adaptive Management to the Application, Selection and Monitoring of Environmental Projects* (University of Tasmania, 2013) 10.

account. Strict application of legal measures is considered imperative if the disadvantages of current resource use become clearly visible.[179]

5.9.1.4 Implementation Procedure of Change Management

Ideally, implementation of management practices needs piloting or testing of the adaptive models. In developing treatments, managers should be sensitive to landscape issues and socio-economic factors. Changes in ecosystem structure or imposing sudden harvesting regulations can create problems for species or ecosystem user groups. Experimentation on a small scale might be costly but is important for assessing the reactions or desirable changes of the projected adaptive measures.[180]

5.9.1.5 Strengthening Monitoring and Supervision Mechanism

The viability and cost effectiveness of an adaptive model is usually judged at the assessment level. Strong monitoring is required to record the response of ecological and socio-economic variables. Selection of appropriate indicators for monitoring the adaptive measures is critical as it allows managers to demonstrate progress towards desired goals.[181] Although ecosystem monitoring is challenging, once integrated the process is cyclic; components of adaptive management model evolve as information is gained and socio-ecological systems change. Unless management is flexible, outcomes become less sustainable and less accepted by stakeholders.[182]

5.9.1.6 Scientific, Technological Expertise and Availability of Incentives for Procedural Adjustment

Most ecological management involve multiple conflicting stakeholders and objectives. The institutions that deal with the ecosystem need to be flexible to adapt with the change to resolve all possible conflicts, else adaptive management programmes might be dysfunctional. In a highly centralised institutional structure, introducing adaptive procedure is difficult.[183] Appropriate incentive, budget, technological upgradation and

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[179] FAO, *The Ecosystem Approach and Adaptive Management* (2003) <http://www.fao.org/docrep/006/y4810e/y4810e0f.htm>.
[180] Haney and Power, above n 174, 883–884.
[181] Ibid.
[182] Ibid 885; FAO, above n 179.
[183] David A Keith et al, 'Uncertainty and Adaptive Management for Biodiversity Conservation' (2011) 144(4) *Biological Conservation* 1175, 1177.

arrangement of training can add some sort of tonic to embrace new thinking, utilise new scientific tools and adjust with the changes.

5.9.2 Status of Institutions in Implementation of Adaptive Management

5.9.2.1 State Institutions

5.9.2.1.1 Forest Department

Adaptive decision-making depends on a series of events. From experimentation to implementation, adaptive management require gradual upgrading of policy, law and reorganisation of institutional structures. As the Sundarbans is managed by the FD, the integrated efforts from its Planning Wing, Forest Management Wing and WNCC together with their field units (i.e., the Khulna Circle, Khulna Management Plan Division and Wildlife and Nature Conservation Division) are crucial for introducing adaptive management procedure into the Sundarbans's management. The FD's Resource Information Management Wing is assigned to maintain ecosystem inventory and supply of ecosystem information to the Planning Wing during processing of Sundarbans-centric adaptive decisions. But the agency's unorganised research and inventory management slows the intermediary actions needed to address emerging threats to the Sundarbans.

The FD's role in identification of threats on the Sundarbans's ecosystem and dependent communities is important. But the state department is fully dependent on donors in risk assessment which impacts on scaling of uncertainties/risks and setting conservation priorities. Evidence suggests that most of the changes in the forestry sector's legal and institutional framework have occurred due to push factors from the donors' side. Government's attention to the Sundarbans is limited to declaratory forms such as declaration as wildlife sanctuary, fish sanctuary and ECA. The pre-declaration ecosystem vulnerability assessments are also done with donors' assistance. Any type of adaptive or change management where there less attention from the government's side demands capacity building of management agencies.[184]

Any type of adaptive management measure has had some impact on the existing system or beneficiaries. Thus, for the avoidance of post-implementation conflict or effective

[184] Interviews with EC, PP, PI, BC (face to face, 10–24 January 2017).

execution of adaptive measures at the ecosystem level, the processing of adaptive management should follow a collaborative system (EIA, SEA, stakeholder consultation, consideration of possible alternatives, cost and benefit analysis) so that the ground reality can be critically realised. In terms of the Sundarbans, adaptive management measures introduced so far are of two types, restrictive and protective. A synopsis of these is depicted in Table 5.3.

Table 5.3: Adaptive Management Measures for the Protection of Sundarbans Resources

Mode	Types of Actions	Impact on Ecosystem	Institutional Effect
Protective	Declaration of three wildlife sanctuaries (Sundarbans East, West and South) in 1977 and prohibition on harvesting ecosystem resources[185]	biodiversity protection	enhanced management, monitoring and enforcement
	Extension of wildlife sanctuaries from Sundarbans West (9,069 ha) to (71,502 ha), Sundarbans South (17,878 ha) to (36,970 ha) and Sundarbans East (5,439 ha) to (31,227 ha) and continuation of ban on any types of extraction in 1996[186]	biodiversity protection	enhanced management, monitoring and enforcement
	Declaration of 10-km (59,600 ha) periphery of Sundarbans as ECA on 30 August 1999	protection of biodiversity, forest degradation	enhanced management, monitoring and enforcement
Restrictive	Moratorium on Tree Felling in 1989[187]	protection of forest degradation	enhanced management, monitoring and enforcement
	Ban on extraction from 18 streams/canals outside the sanctuaries since 1989[188]	protection of aquatic biodiversity	enhanced management, monitoring and enforcement
	Ban on shrimp fry collection from Sundarbans adjacent estuaries and coastal waters using monofilament fixed set bag nets	protection of shrimp fry, fish,	enhanced management, monitoring and

[185] Government of Bangladesh Order No 1/For-92/77/1122 dated 7 October 1977 (Declaration of Sundarbans Wildlife Sanctuaries).
[186] Government of Bangladesh Gazette Notification No MOEF (sec3)/7/96/147, 6 dated April 1996 (Extension of Sundarbans Wildlife Sanctuaries).
[187] Government of Bangladesh Gazette Notification No Sha-2/MOEF192/90/580 of 1989 (Moratorium on Tree Felling).
[188] Sundarbans Divisional Forest Office, Office Memo 5087/18-1, Issued on 11 May 1989 (Canal Closure Regulation 1989).

Mode	Types of Actions	Impact on Ecosystem	Institutional Effect
	(current jals)[189]	zooplankton	enforcement
	Ban on establishment of industrial units within 10-kilometre radius of Sundarbans by the High Court Division of Bangladesh on 24 August 2017[190]	protection of biodiversity, environment	enhanced management, monitoring and enforcement
Protective	Declaration of three river channels (Pasur river) at Dhangmari, Chandpai and Dudhmukhi areas (31.4 km) as dolphin sanctuaries on 29 January 2012[191]	protection of freshwater cetacean	enhanced management, monitoring and enforcement
	Introduction of Co-management System (Co-Management Councils/CMCs/VCFs/PFs/CPGs) in 2011[192]	biodiversity protection	participatory management, monitoring, enforcement
	SMART Patrolling started in September 2017[193]	biodiversity protection	

Success of adaptive management largely depends on effective monitoring and strong enforcement. Due to insufficient focus on pre-adoption procedure, non-availability of modern technological equipment, unwillingness in structural rearrangement from the lesson learned and lack of strong enforcement, the effectiveness of many adaptive management initiatives has questionable. For example, without creating sufficient AIG opportunities for the 3.5 million people in the Sundarbans's FDCs, moratoriums or limitations have been imposed on extraction of wood and non-wood products since the 1990s. Consequently, illegal extraction of resources become a common issue. Newspaper reports, research findings and expert opinions state that unlawful resource extractions are continuing with indirect support of some local FD staff who regularly receive some

[189] *The Protection and Conservation of Fish Rules 1985*.
[190] Staff Correspondent, 'No Industry in 10 km of Sundarbans: High Court', *The Daily Star* (Dhaka, Bangladesh), 24 August 2017 <http://www.thedailystar.net/country/bangladesh-sundarbans-mangrove-forest-no-industry10km-high-court-1453480>.
[191] PhysOrG, *Bangladesh to Set up Dolphin Sanctuaries* (2011) <https://phys.org/news/2011-10-bangladesh-dolphin-sanctuaries.html>.
[192] Government of Bangladesh Gazette Notification No pabama/parisha-4/nishorgo/105/string/2006/398 dated 23 November 2009; Government of Bangladesh Gazette Notification No SRO No 314 Ain/2017 Ministry of Environment and Forests, 8 November 2017 published 12 November 2017 (Protected Areas Management Rules 2017).
[193] Staff Correspondent, 'Smart Patrolling in Sundarbans to Begin in September', *The Daily Independent*, (Dhaka, Bangladesh), 27 August 2017 <http://www.theindependentbd.com/arcprint/details/111505/2017-08-27>.

benefits from illegal collectors.[194] Avoiding the allegation of unfair practices, some field-level FD staff mentioned inadequate funding, patrol vessels, hi-tech monitoring equipment and manpower as slowing down the enforcement of adaptive management.[195]

The FD's Sundarbans monitoring system is segregated into two distinct types—activity monitoring, which includes observing the quantity and quality of forest management actions (silvicultural practices and forest protection) and resource monitoring, which entails baselines status and change in key biophysical parameters of forest resources. The state agency does not have a regular resource monitoring system. The past assessments were done on an ad hoc basis based on availability of funds and specific needs of the time. The present monitoring system lacks time series assessment data. Some forms of technology-based remote sensing and GIS-based forest resource monitoring have been introduced under the World Bank–funded Climate Resilient Participatory Afforestation and Reforestation Project, but that is insufficient for substantial changes in the FD's monitoring system.[196]

Due to the FD's poor monitoring mechanism, the real objectives of many adaptive or precautionary measures fail to achieve stated targets. For example, the 10-km periphery of the Sundarbans was declared an ECA in 1999, prohibiting any environment or biodiversity threatening activities therein. But 190 industrial units have received approval for establishment in this ECA. This indicates flaws in the FD's monitoring skills. To make the state-centric monitoring tools transparent, the co-management system has been introduced. SMART patrolling is another structural innovation currently added to the Sundarbans's monitoring system. Nevertheless, modification of previous adaptive management actions is needed due to change in the pattern of threats. Thus, the monitoring and recording of activities should be continuous.[197]

The adaptive management ideas or models are usually introduced in the context of the Sundarbans from the best practices of the Western world with the push from donors (see Table 5.4). The experimentation of the models is vital to assessing their viability for the

[194] Abdullah, above n 62, 337–338; Roy, above n 16, 60, 195.
[195] Interview with PI (face to face, 16–19 January 2017).
[196] World Bank, 'Project Appraisal on the Bangladesh Climate Resilient Participatory Afforestation and Reforestation Project' (Implementation Completion and Results Report of Bangladesh Climate Resilient Participatory Afforestation and Reforestation Project, World Bank, 2017) 5 <http://documents.worldbank.org/curated/en/223981499717230448/text/ICR00004026-06302017.txt>.
[197] Summary of the Interviews with PP, PI, BC (face to face, 10–24 January 2017).

Sundarbans's geo-morphological dimensions, the socio-economic dynamics of its surrounding landscape and climate change variabilities. In most of the cases, adaptive management models are introduced in support of funding agencies.

Table 5.4: Recently Experimented/Introduced Adaptive Models in the Sundarbans

Types	Intended Impact	Contributors	Piloting	Replication
Co-management System	Ecosystem and Ecosystem Resource Users	IPAC Project [USAID], SEALS Project [EU], CREL Project [USAID], CBACC-CF Project [SADC-GEF-UNDP], SMP [GIZ]	Yes	Yes
SMART Patrolling	Ecosystem and Ecosystem Resource Users	SMP [GIZ], Strengthening Regional Cooperation for Wildlife Protection Project [WB], Bengal Tiger Conservation Activity [USAID]	Yes	-
AIG Model - Arannayk Foundation introduced Household-based Model; CBACC-CF Project introduced FFF Model	Ecosystem and Ecosystem Resource Users	CRPAR Project [WB], IPAC [USAID], SEALS [EU], SMP [GIZ], SUNDARI Project [EU], CBACC-CF Project [SADC-GEF-UNDP]	Yes	-
Declaration of Dolphin Sanctuaries	Ecosystem and Ecosystem Resource Users	Bangladesh Cetacean Diversity Project (BCDP) [USAID and WCS]	Cetacean Mortality Monitoring Network	Yes
REDD+ Mechanism	Ecosystem and Ecosystem Resource Users	Foundation of Collaborative REDD+ Improved Forest Management Sundarbans Project (CRISP) developed under IPAC Project [USAID]; SEALS [EU]; SMP [GIZ]	Sundarbans Forest Carbon Inventory for Carbon Trading	-

Note: SMART = Spatial Monitoring and Reporting Tool, CBACC-CF = 'Community-Based Adaptation to Climate Change through Coastal Afforestation', AIG = alternative income generation, FFF = Forest, Fish, Fruit, SADC = Southern African Development Community, GEF = Global Environment Facility, UNDP = United Nations Development Programme, EU = European Union, SMP = Management of the Sundarbans Mangrove Forests for Biodiversity Conservation and Increased Adaptation to Climate Change Project, USAID = United States Agency for International Development, WCS = World Conservation Society, WB = World Bank.

During the piloting stage, identification of change indicators is critical to formal replication or absorption in modified form. In the centralised policymaking system, introduction of adaptive measures requires substantial changes in policy, legislation and institutional frameworks. Financial flow, technological backwardness and anti-reform attitude are other barriers that decelerate the institutional adjustment process.[198] However, the transformation from single state agency (FD) controlled Sundarbans management to co-management is a significant step for the implementation of adaptive management. Continuous monitoring and constant financial flow both from the government and donors can give this institutional readjustment process a strong base.

All conservation projects occur under a myriad of uncertainties which can affect the achievement of objectives.[199] To address the circumstantial uncertainties (scientific, climatic, political and financial) of projects, flexible institutional mechanism is required to rearrange project implementation plans. Without introducing adaptive management, the expected outcome may not always achievable which can affect project beneficiaries. For example, the SBCP (1999–2006) designed for reduction of threats to the Sundarbans by introduction of participatory management and improvement of poor FDCs' livelihoods through developing AIG ended before the planned timeframe with total failure in achieving stated objectives.[200] ADB, the co-funding agency, suspended the project in September 2003 citing problems in project design and implementation of some activities and proposed mid-term revision of the project implementation plan.[201] Later, the SBCP was unilaterally cancelled by the ADB in early 2005, who blame the FD for failure to revise the project.[202] As the Sundarbans is a World Heritage Site, the project's cancellation

[198] Summary of the Interviews with PP, PI, BC, EC (face to face, 10–24 January 2017).
[199] Edward T Game et al, 'Subjective Risk Assessment for Planning Conservation Projects' (2013) 8 *Environmental Research Letter* 1.
[200] ADB, above n 38, 44.
[201] Saiful Karim, 'Proposed REDD+ Project for the Sundarbans: Legal and Institutional Issues' (2013) 1 *International Journal of Rural Law and Policy* 6.
[202] Hossain and Roy, above n 26, 7.

created dismay among local community and even attracted international criticism.[203] This example indicates the rigidity of the FD's institutional system and its incapacity to respond to situational uncertainty. To avoid future instances of this, the adaptive management needs to align with the FD's institutional framework.

5.9.2.1.2 Department of Environment

EIA is a long-practiced adaptive management mechanism, included in the *Environmental Conservation Act 1995*, by which the environmental impact of development projects is ascertained by the DoE. But the DoE has failed to show its efficiency in assessment of the environmental impact of some Sundarbans-surrounded development projects. The DoE's role in protection of the Sundarbans is dubious. The agency declared the 10-kilometre periphery of the Sundarbans as an ECA but allowed establishing heavy industries therein. As a custodian of the Sundarbans, the FD's position is noticeable here. Environmental experts, activists and representatives of LGIs that were interviewed expressed their concerns about the dual stance of the DoE and FD, and on the DoE's capacity in assessing the EIA procedure, particularly for those projects that have a significant impact on protected forest areas like the Sundarbans.

5.9.2.1.3 Bangladesh Forest Research Institute

The BFRI's role is vital in developing an adaptive management model for the maintenance of Sundarbans's species, habitat and its associated dependents. The BFRI, as a co-implementer of the CBACC-CF project, has pioneered an innovative land-use model, the FFF model, for providing climate-resilient livelihoods for coastal communities. The BFRI's study reveals that the mangrove dependents are heavily reliant on four climate-sensitive sectors: agriculture, forestry, fisheries and livestock.[204] The FFF model presents new options for resource and income generation by integrating all four sectors into one system to sustain a continuous flow of resources and income leading to livelihood sustainability. The FD can replicate this FFF model in the Sundarbans's buffer zones for

[203] Thomas Griffiths, *Indigenous Peoples and the Global Environment Facility (GEF) Indigenous Peoples' Experiences of GEF-funded Biodiversity Conservation – A Critical Study* (Forest Peoples Programme, 2005) 45.
[204] Donald J Macintosh, R Mahindapala and M Markopoulos (eds), *Sharing Lessons on Mangrove Restoration* (Mangroves for the Future and IUCN, 2012) 245–246.

securing its dependent community's livelihoods and enhancing their climate resilience capacity.

5.9.2.1.4 Local Government Institutions

Since the Sundarbans's periphery is a declared ECA, LGIs, particularly the Union Council[205] and the Upazila Council,[206] have a prominent role in its overall management. Some CMOs, such as CMCs, VCFs, PFs, CPGs and the ECA Management Coordination Committees at the Union and the Upazila level, have been formed for managing the Sundarbans ECA's resources in a collaborative way. Further, as members of the Co-Management Councils and CMCs, the agents of Sundarbans-surrounded LGIs are committed to implement the adaptive management models.

5.9.2.1.5 Law Enforcement Agencies

The effective outcomes of an adaptive management mechanism depend on continuous monitoring and strong enforcement. Apart from the FD, CPGs and SMART patrol team's monitoring endeavours, some law enforcement agencies conduct operations to secure the Sundarbans which is crucial for experimentation and application of adaptive management models.

5.9.2.1.6 Cross-Sectoral Institutions

Besides the FD, cross-sectoral institutions have some role in mainstreaming the adaptive mechanism in the Sundarbans ECA. For instance, the Ministry of Fisheries, Livestock and Agriculture for developing AIGs; the Ministry of Disaster and Rehabilitation for the protection of coastal communities; the Ministry of Shipping for controlling movements of commercial vessels inside the Sundarbans water channels and maintaining these channels' navigability; and the Ministry of Industry and Power, Energy and Mineral Resources for restricting adoption of environment damaging programmes around the ECA. Despite declaring the environment, biodiversity and climate change issues as a national agenda, most of the development ministries still initiate programmes on a sectoral basis. Synchronisation of sectoral development programmes is in line with the national agenda

[205] The lowest local government unit governed by Union Council or Union Parishad.
[206] Sub-district, lowest administrative unit.

and their integrated implementation can help to address new challenges related to the Sundarbans.

5.9.2.2 Non-State Actors

A large number of civil society organisations (CSOs) and NGOs are working for the improvement of livelihoods and climate-resilience capacity of the locals. For example, the Bangladesh Centre for Advanced Studies is disseminating knowledge on 'baira cultivation' (floating vegetable beds) as an adaptation strategy to reduce coastal poor communities' climate vulnerability and seasonal food insecurity.[207] The Arannayk Foundation's household-level model (vegetable cultivation, small-scale businesses, poultry and livestock rearing) and the UNDP–BFRI–local NGOs' FFF model are other innovative integrated farming models which are providing climate-resilient livelihoods for coastal communities.[208] These AIG models can be replicated for the Sundarbans for enhancing poor FDCs' recurrent income flow and climatic risk adaptive capacity. The business communities promote AIGs models in the Sundarbans's buffer zone through investing in small-scale businesses. Mass media circulates that state and non-state actors develop innovative models on AIG and climate adaptation programmes that helps encourage others to implement those around the Sundarbans.

5.10 Implementation of Inter-Sectoral Coordination

5.10.1 Criteria for Assessment of Institutional Performance

Environmental problems are usually influenced by various sectors. Inter-sectoral coordination among the interlinked sectors and a collaborative approach are treated as powerful tools to address the multifarious environmental problems in an integrated way.[209] Since the ecosystem approach advocates for integrated management of land, water and living resources, unprecedented coordination between the mentioned sectors (Operational Guidance 5);[210] harmonisation of policies, institutional mandates, monitoring and evaluation mechanism; increased cooperation among various levels of state management

[207] Mohiuddin Ahmad and Atiq Rahman, 'The Stimulating Role of NGOs in Bangladesh' in Robbert Misdorp (ed), *Climate of Coastal Cooperation* (Coastal & Marine Union - EUCC, 2011) 62–63.
[208] Macintosh, Mahindapala and Markopoulos, above n 204, 245–246.
[209] Alison P Galvani et al, 'Human–Environment Interactions in Population and Ecosystem Health' (2016) 113(51) *PNAS* 14505.
[210] CBD Guidelines on Ecosystem Approach, Operational Guidance 5.

and state and non-state actors; and involvement of multidisciplinary professionals (Malawi Principle 12)[211] are important for effective implementation of the ecosystem approach. To measure the executing institution's performances in strengthening inter-sectoral collaboration and coordination the following criteria have been selected:[212]

- harmonisation of sectoral policies and institutional mandates
- identification of common conservation priorities
- development of appropriate financial mechanism
- development of public-private partnership
- alignment of multi-sectoral and multidisciplinary expertise
- creation of a comprehensive information database and communication platforms.

The justifications for selection these criteria are discussed below.

5.10.1.1 Harmonisation of Sectoral Policies and Institutional Mandates

Many issues cannot be tackled by single policy or specific legislation. There is a strong interdependence between forest policy and other public policies of a more general scope such as economic, natural resources, environment, energy, industry, technology and education.[213] They have substantial effects on the development and implementation of forest policy and programmes and may foster or impede sustainable forestry practices. Thus, policy coordination is considered crucial. However, it requires a degree of focuses including reduction of redundancy in policies, programmes and institutional mandates and identifying gaps. Interdepartmental cooperation can help to eliminate such deficiencies.

5.10.1.2 Identification of Common Conservation Priorities

Identification of common threats and developing a clear vision of the natural resource managing sectors' interlinked objectives are the preconditions of effective inter-sectoral collaboration. The setting of combined conservation priorities is usually relied on in global and national risk status along with trend, threat, feasibility and stewardship responsibility.

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[211] Ibid Principle 12 of Ecosystem Approach.

[212] Annotated from the CBD Guidelines on Ecosystem Approach and the UN General Assembly Guidelines for Implementation of UN SDG 16. See CBD Guidelines on Ecosystem Approach, 1–50; UN General Assembly Guidelines on Implementation of Sustainable Development.

[213] Franz Schmithüsen, 'Understanding Cross-sectoral Policy Impacts – Policy and Legal Aspects' in Yves C Dube and Franz Schmithüsen (eds), *Cross-sectoral Policy Impacts between Forestry and Other Sectors* (FAO, 2003) 8.

5.10.1.3 Development of Appropriate Financial Mechanism

A clear mandate and joint funding at the inter-ministerial level is essential for the collaborative management of natural resources. A comprehensive monitoring system is critical to mapping stock of progress and selecting the most cost-effective method of resources allocation to achieve optimal conservation outcomes.

5.10.1.4 Public-Private Partnership

State departments' budgets are always insufficient, which restrains the executing agencies from undertaking any dynamic initiative for the development of ecosystem and ecosystem resource users. Mobilisation of sustainable financing for conservation becomes easy if public-private partnerships can be built. Formation of resource harvesters' cooperatives can also assist in reducing the vulnerability of the lower layer actors of value chains. This can help create storage, post-harvest processing and encourage shared transportation on a collective basis. Not only these cooperatives will prove beneficial in income generation, they will contribute to resource harvesters' confidence building, empowerment and overall sustainable harvest management and in coping with natural disasters.

5.10.1.5 Alignment of Multi-Sectoral and Multidisciplinary Expertise

The ecosystem approach encourages integration of multidisciplinary and multi-sectoral entities such as NGOs and CSOs in conservation drives for strengthening cross-sectoral collaboration. Gemmill and Bamidele-Izu also suggest NGOs and CSOs' engagement because they play a crucial part in governance facilitating negotiations by giving the politicians access to competing ideas from outside the bureaucratic channels and working as a driving force for the mobilisation of public opinion.[214] Universities can be the generators of knowledge. Their constructive participation in issue spotting, policy planning and assessment can enable the collaborative efforts more effective. Employment/involvement of specialists from other sectors is vital for enhancing the capacity of natural resource managing institutions.

[214] Barbara Gemmill and Abimbola Bamidele-Izu, 'The Role of NGOs and Civil Society in Global Environmental Governance' in Daniel C Esty and Maria H Ivanova (eds), *Global Environmental Governance: Options and Opportunities* (Yale Center for Environmental Law and Policy, 2002) 7.

5.10.1.6 Creation of a Comprehensive Information Database and Communication Platforms

The effectivity of integrated actions largely depends on an information databank on natural resource managing sectors' development plan, budget and objectives on common issues: biodiversity environment and climate change. Fragmented plan of actions based on insufficient information can lead to inter-sectoral conflicts. An inter-ministerial communication platform can contribute to achieving conservation goals through sharing tools, techniques and exchange of knowledge.

5.10.2 Status of Institutions in Implementation of Inter-Sectoral Coordination

5.10.2.1 State Institutions

5.10.2.1.1 Forest Department

Different wings of FD are consigned to coordinate the activities of relevant actors involved in the Sundarbans's management. The WNCC is entrusted to supervise issues related to management of protected areas, ECAs and wetlands of international importance. The Development Planning Unit is assigned to coordinate the technical assistance/programme of donors. The Management Planning Unit is responsible for gathering statistical information relating to forests and feed the Resource Information Management System (RIMS) with all data while the Resource Information Management Unit is allocated to manage the computer-based RIMS and GIS. At the field level, Conservators of Forests of Khulna Circle and DFOs of the Khulna Wildlife Management and the Nature Conservation Division usually coordinate cross-sectoral programmes.[215]

The integration of natural resource managing policies is required for avoidance of overlap in institutional mandates and priorities. In Bangladesh, since 1992 the MoEFCC works with other ministries to ensure that environmental concerns, including biodiversity and climate change issues, are given priority in their development projects. Each ministry's Planning Cell works closely with the Planning Cell of the MoEFCC for correctly integrating environmental and climate change matters in their sectoral programmes. The FD plays a vital role in coordination of forest-related programmes including the

[215] Bangladesh Forest Department, 'Charter of Duties' (2017) <http://www.bforest.gov.bd/site/charter_of_duties/6bdaa3dc-2fff-45fa-b6c3-ae1c4f6f0c92/->.

Sundarbans. But budget constraints impede to continuation of policy research and outcome evaluation in key areas.[216] To deal with critical issues arising from complexities of climate change and budgetary constraints, the ecosystem approach emphasises adopting integrated approaches for making ecosystem development initiatives are cost effective. But no significant tool has been developed within the MoEFCC, FD, DoE or CCT for the synchronisation of synergistic components of sectoral policies to manage the Sundarbans in a collaborated way.

Identification of common priorities for reduction of threats to the Sundarbans's species and FDCs necessitates a vulnerability assessment. The FD, as manager, is mandated to conduct such an assessment. But due to scarcity of resources, it is dependent on donors for conducting a risk assessment. The FD, with the financial and technical assistance of USAID, conducted different assessments on the vulnerabilities and potentials of the Sundarbans.[217] Analysing those reports in line with state priorities and the lens of cost-effectiveness, the FD can set common priorities for the cross-sectoral agencies in developing joint development programmes around the Sundarbans.

Establishment of a common fund is integral to initiate integrated development in the Sundarbans. A state-sponsored Bangladesh CCT Fund and partnership-based Bangladesh Climate Resilient Fund have been established for enhancing climate change adaptation capacities, but no fund has yet been established for the integrated ecosystem management in general and the Sundarbans in particular. Thus, the notion of inter-sectoral coordination remains superfluous within state governance mechanisms.

Public-private partnerships can redress such gaps to some extent. The FD's Nishorgo Vision 2010 focuses on co-management and community partnership as strategies for strengthening the management of protected areas.[218] In Bangladesh, multi-stakeholder partnerships have shown some positive results.[219] For example, the Mangroves for the

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[216] Ibid 10.

[217] IPAC SWOT (Strengths, Weaknesses Opportunities and Threats) analysis of the tourism in the Sundarbans reserved forest 2009, IPAC Conservation and Management of Fisheries Resources Assessment of the Sundarbans reserved forest 2010, IPAC Value Chains Assessment of the Sundarbans reserved forest 2010, Bangladesh Tropical Forests and Biodiversity Assessment 2016.

[218] Jona Razzaque, 'Payments for Ecosystem Services in Sustainable Mangrove Forest Management in Bangladesh' (2017) 6(2) *Transnational Environmental Law* 309, 321.

[219] Mangroves for the Future, *Ecosystems across Borders: MFF at the World Parks Congress 2014* (2014) <http://www.mangrovesforthefuture.org/news-and-media/news/asia-region/2014/mff/>.

Future[220] and the Ecosystem for Life[221] projects are creating a platform for long-term partnership in biodiversity management at a national and transboundary (India–Bangladesh) level involving civil society, government and the private sector. The idea of partnership-based Sundarbans protection has recently been introduced with the formation of three CMCs in the SIZ for managing the Sundarbans on shared responsibilities. The newly formed CPG is one kind of partnership-based mechanism entrusted to protect the Sundarbans's resources through joint patrolling. This CMCs and CPGs are expected to ensure the sustainable use of the Sundarbans's NTFPs which, in turn, can support recurrent income flow and secure FDCs' livelihoods.[222]

Strong institutional frameworks are required for better interdepartmental coordination. In this regard, focal points are designated in each ministry for synchronising the biodiversity, environment and climate change issues at a policy level. But weaknesses in coordination mechanisms between the MoEFCC and its technical arms (i.e., the FD, DoE and CCT) is evidenced in many project appraisal reports. Thus, the 7th FYP emphasises developing a better coordination system to activate non-state actors in natural resource management,[223] while the NSDS suggests formation of a 'Sustainable Development Monitoring Council' to ensure coordination among state agencies.[224]

Aside from biodiversity conservation, several other issues for managing the Sundarbans such as FDCs' livelihood improvement and climate change adaptation are involved where different state agencies have roles to play. Strong linkage with natural resources managing institutions is essential for utilising their multidisciplinary expertise in community mobilisation and revolving loan funds. Strong communication skills are also required to better coordinate with NGOs, CSOs and the business community contributing to the Sundarbans's management. So far, few initiatives have focused on capacity building of forest staff. No institutional arrangement has been documented for exchanging experts

[220] Mangroves for the Future, *Bangladesh* (2018) <https://www.mangrovesforthefuture.org/countries/members/bangladesh/>.
[221] IUCN, *Ecosystem for Life: A Bangladesh-India Initiative* (2013) <http://bangladesh.nlembassy.org/binaries/content/assets/postenweb/b/bangladesh/netherlands-embassy-indhaka/import/water-management/project-documents/e4l/e4l-annual-report-2012.pdf>.
[222] IRMP for the Sundarbans, 262.
[223] The 7th FYP 470.
[224] NSDS 137.

from other natural resource managing departments and/or private research institutions to the FD or vice versa.[225]

The general state of the FD's information management is dismal. The basic forestry data such as the growth and yield functions of important species and forest stands—fundamental to preparing forest management plans), monitoring of forestry activities and enhancing coordinating efforts—are not stored properly. The GIS-based approach is almost absent. To digitalise the forestry sector data, a RIMS was set up at the FD Headquarters in the late 1980s, but limited expertise and resources have restricted its implementation.[226] This RIMS facility has not been extended to the Khulna Circle. To facilitate access to information on the state's biodiversity and its management initiatives, the formation of a National Biodiversity CHM is under consideration.[227] Although the operation of the CHM is entrusted to the DoE, a separate state agency, once established, it can be a central platform for coordination of biodiversity and environmental development initiatives and exchange of knowledge.

5.10.2.1.2 Department of Environment

The DoE is empowered to control any type of development activities causing substantial damage to the ECA through assessing EIA and issuance of ECC necessary to establish any industry or development activity around the Sundarbans. Establishment of a National Biodiversity CHM for enhancing inter-sectoral collaboration and sharing of information is under consideration within the DoE. The DoE's weakness in coordinating natural resource managing sectors is revealed in many research findings.[228] So FD–DoE collaboration is critical for the coordinated development of the Sundarbans.

5.10.2.1.3 Climate Change Trust

The CCT is responsible for coordinating the nation-wide climate change adaptation programme. Since the Sundarbans's FDCs are vulnerable to climate change–induced disasters, the CCT has scope to accelerate their climate-resilient capacity through

[225] Summary of the Interviews with EC, PP, PI (face to face, 10–24 January 2017).
[226] BFD, *Bangladesh Forestry Master Plan 2017-2036* (Bangladesh Forest Department Climate Resilient Participatory Afforestation and Reforestation Project, 2016) 138.
[227] NBSAP 92.
[228] World Bank, *Enhancing Opportunities for Clean and Resilient Growth in Urban Bangladesh: Country Environmental Analysis 2018* (World Bank, 2018) 4.

coordinating state agency–operated programmes under climate change adaptation funds. The CCT has so far played an insignificant role in enhancement of adaptation capacity and promotion of climate-resilient AIGs for the Sundarbans's FDCs.

5.10.2.1.4 Bangladesh Forest Research Institute

The BFRI has a potential role in the Sundarbans's development by conducting research on threats to the Sundarbans and discovering viable solutions. Analysis of causes of top dying in the Sundarbans is a significant study by the BFRI.[229] However, limited manpower and resources are impeding the BFRI from becoming a unique platform for research on the Sundarbans. The Bangladesh Khulna University, Chittagong University, Jahangirnagar University, IUCN and some national NGOs (e.g., WildTeam and Bangladesh Centre for Advanced Studies) also conduct research on the Sundarbans. The BFRI needs to coordinate with those research entities for collaborative production of information which is vital for designing conservation and development plans for the Sundarbans.

5.10.2.1.5 Local Government Institutions

The ecosystem approach's effective implementation in the Sundarbans depends on strong coordination and collaboration between the FD and Sundarbans-surrounded LGIs who are the implementers of sectoral development programmes at a union and upazila level.

5.10.2.1.6 Law Enforcement Agencies

In contrast to the FD's weak enforcement mechanism, the activities of law enforcement agencies (i.e., the RAB, Police and Coast Guard) are effective, but they remain inadequate and somewhat disjointed from the FD's efforts as the Sundarbans is considered the responsibility of the FD. Only recently was joint patrolling under the banner of CPG and SMART introduced. These collaborative efforts could be strengthened in support of law enforcement agencies because of the Sundarbans's geo-ecological variations.

[229] Mohd Abdul Awal, 'Analysis of Causes of Top-Dying in Sundarbans Natural Forest Resources' (2014) 2(4) *American Journal of Agriculture and Forestry* 168, 176.

5.10.2.2 Non-State Actors

Though non-state actors such as NGOs, business communities and the media are collaborating to secure the Sundarbans's resources and its dependent community's livelihoods, their contributions are not well recognised because of the FD's weak coordination and lack of collaborative mindset. Lopa and Ahmed's study shows that the state invites few CSOs/NGOs to operate a limited number of development activities in compliance of donors' policies to receive aid, but it displays arbitrary attitudes towards their involvement in wider development activities.[230] Since the vulnerability of the Sundarbans is increasing, intensification of state and non-state agency cooperation is needed. As a lead coordinator of Sundarbans-centric development, the FD has failed to create ample space for collaboration among those sectors and actors. Interviewed experts emphasised establishing a cell in the FD with skilled staff to elevate the desired level of coordination among state and non-state actors and development partners.[231]

5.11 Evaluation of the Institution's Role, Contribution and Challenges in Implementing the Ecosystem Approach

This section summarises state and non-state actors' institutional role, current contribution and challenges in implementing the ecosystem approach's six principles in the Sundarbans. As per legal arrangements and institutional mandates, the Sundarbans has been solely governed by the FD since 1869.[232] The boundary of the forest is well maintained compared to other forestlands of Bangladesh, which indicates the FD's impressive achievement in maintaining the physical integrity of the Sundarbans. However, in terms of preservation of its resources, the FD has to face multidimensional challenges, resulting in, for example, depletion of forest resources and geo-morphological environment. To control these emerging challenges, the co-management system was introduced in 2011. Besides the FD's leading role, other state agencies and non-state actors are contributing to the Sundarbans. The status of these managing institutions in implementing the principles of the ecosystem approach are presented in Table 5.5.

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[230] Fowzia Gulshana Rashid Lopa and Mokbul Morshed Ahmad, 'Participation of CSOs/NGOs in Bangladeshi Climate Change Policy Formulation: Co-operation or Co-optation?' (2016) 26(6) *Development in Practice* 781.
[231] Summary of the Interviews with EC, PP (face to face, 10–24 January 2017).
[232] Rahman, above n 13, 81.

Table 5.5: Sundarbans Managing Institutions' Status in Implementing Ecosystem Approach Principles

Institution		Component-wise Status					
		Integration of Entire Ecosystem Components	Conservation and Sustainable Use	Access and Equitable Benefit Sharing	Decentralisation of Ecosystem Management	Adaptive Management	Inter-Sectoral Coordination
State Actors							
Core State Institutions *(under the MoEFCC)*							
Forest Department (FD)	**IR**						
	CP						
Department of Environment (DoE)	**IR**						
	CP						
Climate Change Trust (CCT)	**IR**						
	CP						
Bangladesh Forest Research Institute (BFRI)	**IR**						
	CP						
Bangladesh National Herbarium (BNH)	**IR**						
	CP						
Other State Institutions							
Local Government Institutions (LGIs)	**IR**						
	CP						
Law Enforcement Agencies	**IR**						
	CP						
Cross-Sectoral Institutions	**IR**						
	CP						
Non-State Actors							
NGOs/CSOs	**IR**						
	CP						
Local Business Communities	**IR**						
	CP						
Mass Media	**IR**						
	CP						

Note: MoEFCC = Ministry of Environment, Forest and Climate Change, IR = ideal role as per law (red = major, green = moderate, blue = minor/not determined), CP = current position (black = strong, olive = moderate, yellow = weak, blue = minor/not determined).

Table 5.5 was developed based on desktop analysis and expert opinions from interviews and ranked the assessment criteria set forth in Sections 5.5.1–5.10.1. It is apparent that the application of the ecosystem approach principles in the context of the Sundarbans is mainly entrusted to the FD, the leading state institution for managing the Sundarbans. The FD's application is noted as weak except for mainstreaming the notion of conservation and sustainable use. To execute the conservation and sustainable use concept, the FD has initiated a series of protective or adaptive measures (see Table 5.3). But the effectiveness of those protective measures is undermined by weak enforcement and monitoring.

Under the MoEFCC, aside from the FD, other departments including the DoE, CCT, BFRI and BNH's specific institutional mandates influence the Sundarbans's management. The DoE has cardinal responsibility to protect the Sundarbans from development-induced threats by observing the principles of integration of entire ecosystem components, conservation and sustainable use, and assisting in promoting adaptive management. However, the DoE has failed to adhere to its institutional mandates in the case of the Sundarbans. For example, approval of the Rampal Power Project around the Sundarbans's periphery and approval of 190 industrial units within the Sundarbans's ECA without adequate consideration of those projects' long-term impact on the Sundarbans (discussed in Section 5.5.2.1). These actions reveal the coordination gaps between the DoE and FD. The CCT's institutional mandates are to mainstream climate change adaptation programs in coastal areas. However, the CCT focuses more on other coastal areas than on improving the adaptation capacity of the Sundarbans-dependent poor community. The BFRI and BNH have scope to conduct research on mangroves and dissemination of the Sundarbans's biological information, vital for designing the ecosystem-based conservation programmes, but very few initiatives are undertaken due to their fragile institutional capacity.

Cross-sectoral state agencies have institutional responsibilities in managing the Sundarbans and securing the livelihoods of FDCs. Due to coordination gaps and the absence of integrated programme of actions, other state agencies' contributions are not worth mentioning. The LGIs have a prominent role in engaging the poor FDCs in local development projects and provisioning AIG services to ensure their livelihood security and reducing their reliance on the Sundarbans's resources. But poor institutional capacity and commitment impedes the LGIs from playing a contributory role in empowering the local community. Law enforcement agencies are important in the protection of the

Sundarbans though their operational activities in curbing the forest-related crimes, but their actions are rarely publicised and are disjointed from the FD's efforts.

Besides the state-centric conservation and management initiatives, some non-state actors such as NGOs, local business communities and the media are playing complementary roles in promoting sustainable management practices in the Sundarbans, though their contributions remained overshadowed in the state-controlled forest management system. Local and national NGOs have tried to affect changes in poor communities' customary survival strategy by providing micro-credit or developing suitable AIG models which encourages agro-based and household-based income sectors as opposed to their traditional forest resources–based subsistence. The local business communities have invested into some NTFP-based businesses which to some extent assist the FDCs in getting fair value for their harvested goods and provide some alternative income sources. However, the recent efforts of some business groups to set up large-scale industrial units around the Sundarbans have created concerns among environmentalists (discussed in detail in Section 5.5.2.1). In a situation where the Sundarbans's managing state institutions are engulfed by structural, functional, financial and technological limitations, the media's surveillance role can help making the Sundarbans's management transparent and assist in building conservation-informed citizenry.

The analysis has identified some challenges that largely impede state and non-state institutions from implementing the ecosystem approach's principles in the context of the Sundarbans. Some challenges are common, while others are institution specific (see Table 5.6). After the Sundarbans was declared a World Heritage Site, the FD's tasks were drastically increased. Yet, there has been a lack of state initiatives for the FD's structural reorganisation, upskilling of manpower, increased funding or technological upgradation required for discharging such multidimensional tasks. Thus, all of these have become donor dependent. Structural reformation, capacity enhancement, mapping of risk/vulnerability, piloting or replication of adaptive management models, and monitoring—all are conducted with donor assistance. The interviewed experts signalled this trend as a major obstacle for the endurance of the forestry sector's structural renovations and indicator of the state and donors' dominant role.

Table 5.6: Challenges of the Sundarbans's Influencing Institutions in Applying the Ecosystem Approach

Institution	Component-wise Potential Challenges					
	Integration of Entire Ecosystem Components	**Conservation and Sustainable Use**	**Access and Equitable Sharing of Benefits**	**Decentralisation of Ecosystem Management**	**Adaptive Management**	**Inter-Sectoral Coordination**
State Actors						
Core State Institutions *(under the MoEFCC)*						
Forest Department	Lack of financial resources, excessive donor dependency, lack of risk/vulnerability assessment capability, insufficient technical expertise	Excessive donor dependency, lack of financial resources, lack of manpower, weak monitoring, supervision, enforcement	Lack of valuation of ecosystem goods and service, absence of cooperative market, non-transparent monitoring mechanism	Reluctance in sharing responsibilities, insufficient allocation for capacity building, dependency on donors for structural renovation, capacity building, lack of monitoring and supervision	Less focus on risk assessment, inventory management, weak monitoring and evaluation mechanism, weak enforcement, lack of incentives in developing AIG models	Segregated policies, institutional mandates, gaps in selection of common conservation priorities, absence of strong institutional unit and common fund, lack of multidisciplinary expertise, absence of central database
Department of Environment	Lack of commitment in controlling pollution, insufficient expertise in EIA assessment	Shortage of manpower at field level, weak monitoring and supervision	-	-	Lack of expertise in assessment of EIA, ECC, Site Clearance, EMP of development programs	Lack of Coordination
CCT	Inadequate financial resources, unrealistic resource allocation, lack of commitment, lack of coordination					
BFRI	Inadequate allocation for research, insufficient technical expertise					

BNH	Inadequate allocation for research and documentation, lack of technical expertise
Other State Institutions	
LGIs	Lack of capacity, commitment and coordination
Law Enforcement Agencies	Lack of commitment, coordination and recognition
Cross-Sectoral Institutions	Segregated institutional mandate, lack of commitment in mainstreaming shared management and coordination
Non-State Actors	
NGOs/CSOs	Insufficient fund for large-scale projects, lack of trust and recognition, lack of coordination
Business Communities	Lack of commitment, lack of coordination
Mass Media	Lack of commitment, lack of recognition

Note: MoEFCC = Ministry of Environment, Forest and Climate Change, CCT = Climate Change Trust, BFRI = Bangladesh Forest Research Institute, BNH = Bangladesh National Herbarium, LGIs = local government institutions, NGO = non-government organisation, CSO = civil society organisation.

Another impediment for effective management of the Sundarbans is the state's inadequate focus on Sundarbans-related research. Since the FD has no research unit, it depends on the BFRI. The BFRI, with limited technical expertise and available infrastructure, devotes little research to mangrove silviculture, assessment of threats to the Sundarbans or valuation of the Sundarbans's ecosystem services. Consequently, in designing ecosystem conservation programs, the FD has to rely on donor-led assessments. Shortage of workforce and labour capacity are common challenges faced by most institutions. Thus, patrolling activities in the Sundarbans have become irregular, impeding monitoring and enforcement activities, although this situation has slightly improved with the SMART patrolling and CPGs. Gaps in the FD's coordination mechanisms has weakened the integrated programme of actions, a crucial component for implementation of ecosystem-based conservation.

Weak enforcement practice is a major concern for the protection of the Sundarbans, as shown in most project reports, research findings and expert opinions. Despite imposition of a series of restrictive mechanisms, the illegal harvesting of timbers and NTFPs and poaching of wildlife is an ongoing issue, reflecting the weak enforcement of state regulations. Some LGI representatives noted that such unlawful practices are being conducted under the auspices of some politically influential local elites who have illicit ties with local corrupt FD staff (discussed in Section 5.5.2.1). Lack of commitment among local FD staff remains a challenge in enforcement of laws in the Sundarbans.

Both internal and external factors are involved in effective enforcement of state regulations in and around the Sundarbans which results in the ineffectiveness of many conservation and development initiatives. In terms of implementation of the ecosystem approach principles, institutions experience the same institutional challenges noted in international legal frameworks (discussed in Sections 3.2.4–3.7.4).

5.12 Conclusion

This chapter investigated the Sundarbans governing/influencing state and non-state institutions' designated role and current status of contribution and identified existing challenges impeding effective application of the ecosystem approach's principles in the Sundarbans's management. The strengths, weaknesses and challenges were identified

based on institutions'-chartered duties and previous research findings crosschecked with expert opinions. The overall picture of managing institutions' status in implementing the ecosystem approach's six influential components was presented in Figure Table 5.5 and major challenges were presented in Table 5.6. The Sundarbans have long been governed by a single state agency, the FD, with several other state and non-state actors playing complementary roles in its conservation and development. It was observed that from 1869–2010, the Sundarbans was basically administered in a traditional way. The concept of integrated management in the context of the Sundarbans has gained ground from the early 2000s, by which the notions of the ecosystem approach's principles have gained roots. This shifting trend in forest governance was further stimulated with the introduction of co-management in the management of the Sundarbans in 2010. But the process of effective application of the ecosystem approach principles in the context of the Sundarbans is still in the progressing stage.

Institutions are the most functional units of the state by which state policies and legislation are practiced. Effective implementation of state priorities depends on dynamic changes in institutional mandates coupled with continuous arrangement of capacity enhancement programmes for the persons involved in management. This process is crucial for the institutions entrusted to manage any complex natural forest like the Sundarbans. The FD has been assigned to administer the Sundarbans since the British colonial period (1869) and was employed to implement maximum production or utilisation priority of the state until 1977. This production-based institutional structure has slightly transformed into a protection-based model with the declaration of three wildlife sanctuaries and prohibition of all types of extractions therein. Afterwards, a series of restrictive mechanisms was introduced to protect the Sundarbans's resources. But the FD's institutional strength in terms of budget, manpower and technical capacity has not been increased in tandem with its additional mandates. Consequently, biodiversity assessments have noted the decline of the Sundarbans's resources. This raises questions about the FD's institutional capacity, particularly its monitoring, coordination and enforcement mechanism. To reduce the gaps in institutional mechanisms, a paradigm shift from single agency management to co-management was recently undertaken in the context of the Sundarbans. It is comprehended that more time and investment is required to make those co-management structures fully functional, but even this dilatory change in management has created ample scope for

implementation of the basic principles of the ecosystem approach in the context of the Sundarbans.

Apart from excessive human pressure and climatic interventions, the Sundarbans faces multidimensional challenges to its survival. Its sustainability depends on the integrated programme of actions from all state and non-state agencies/actors involved in the conservation, management and development of natural resources. While Bangladesh is moving ahead with *the Vision 2021* and *the 7th FYP*, aiming to reach the stage of a middle-income country, it is imperative that the country focus more on the conservation of biodiversity and the environment to make the current development paradigm environmentally sustainable. Protection of the Sundarbans, the largest natural reserve of Bangladesh, can help to maintain the country's ecological balance and absorb development-induced environmental hazards. To achieve this, the current analysis has demonstrated the need to address the institutional barriers obstructing the effective implementation of the ecosystem approach principles in the Sundarbans's management.

Chapter 6:
Integration of Ecosystem Approach in Legal and Policy Frameworks of Bangladesh for Sustainable Conservation of the Sundarbans: A Way Forward

6.1 Context of the Study

The Sundarbans's national and international significance is well recognised. The ever-increasing threats from anthropogenic interventions and climate change to the Sundarbans's ecosystem are well documented. Thus, sustainable conservation of the Sundarbans has become a challenge for Bangladesh. The ecosystem approach is the latest tool which promotes the conservation and sustainable use more comprehensively than any other conservation approach. Through the conservation and sustainable use concept in the ecosystem conservation paradigm, the ecosystem approach helps bridge ecosystem conservation and human development. Additionally, by promoting access and equitable benefit sharing, resource users' engagement in ecosystem management and recognising the interconnectedness of all interested groups (state departments, NGOs, civil societies, indigenous and local communities, private sectors and business communities) in ecosystem management, the ecosystem approach promotes equity and environmental justice for people and nature. However, environmental justice or ecologically sound development cannot be established automatically.

State machineries such as policy, legislative and institutional frameworks are the vehicles by which environmental justice, sustainable use and ecologically sustainable development can be ensured. Effective and dynamic policy, legislation and institutions not only establish rights of people but generate a sense of responsibility, transparency and accountability. To gain maximum output from the ecosystem approach, integration of its principles in the legal and policy frameworks regulating the Sundarbans is critical. Some aspects of the ecosystem approach have already been integrated in Bangladeshi policy and legislation. Nevertheless, some of the ecosystem approach principles remain outside the national legal domain—it is critical that they are incorporated therein to make the

ecosystem-based conservation approach realistically applicable in the context of the Sundarbans.

The main objective of this research was to assess the viability of the ecosystem approach in the sustainable conservation of the Sundarbans and to investigate the extent to which the principles of the ecosystem approach have been integrated in the biodiversity–environment–climate change–related policy, legal and institutional frameworks regulating the Sundarbans of Bangladesh. Content analysis was used to derive desired goals according to the research questions and objectives of the study. Apart from reviewing available literature, face-to-face interviews were conducted to gain information from, and learn the perspectives of, the personnel involved in the conservation and management of the Sundarbans. Data extracted from the existing literature and policy documents were crosschecked against expert feedback and information gathered through fieldwork, and these are systematically presented in the following sections.

6.2 Ecosystem Approach: A Strategic Framework for Sustainable Management of Natural Resources

Despite taking care of the unique ecosystem since the British colonial regime, the ecosystem, environment and dependents of the Sundarbans are under threat. To halt this situation, efforts from different corners of the society—policymakers, researchers and conservationists—have been intensified at national and local levels to identify root causes. Systematic environmental injustice in terms of resource use, distribution of ecosystem-generated benefits and unsustainable development actions overlooking the long-term impacts on the ecosystem have accelerated the Sundarbans's deterioration (discussed in Section 1.7). Without ensuring environmental justice, reduction of environmental degradation or climate-resilient development, successful outcomes of conservation programmes are impossible to achieve. Different approaches or mechanisms have been developed at a global level for promoting environmental justice in natural resource management.

The ecosystem approach is one of the prominent strategic conservation frameworks, evolved in the 1992 CBD, encompassing the potential tenets of environmental justice. It aims to prevent depletion of natural resources and promote ecologically sustainable

development through ensuring conservation, sustainable use and equity in distribution of environment and ecosystem-generated benefits and burdens. Since protection of the Sundarbans is a pressing need for the maintenance of the country's ecological balance, promoting the principles of the ecosystem approach is identified as a potential solution (research sub-question one) in this study (examined under Section 2.4). However, ecosystem sustainability relies on responsive policies, pragmatic legislation and adaptive institutional framework (examined in Section 1.5). This thesis investigated the relevant policies, laws and strategies regulating the Sundarbans in terms of integrating the principles of the ecosystem approach and their implications for sustainable conservation of the Sundarbans.

6.3 Ecosystem Approach's Recognition in International Legal Framework

Globally, the natural resource management approach is gradually transforming from the single species approach to integrated approaches due to the increasing demands of ecosystem resources and pervasive impacts of development interventions and climate change. The ecosystem approach has evolved to encompass the integrated nature of sustainable conservation and development principles and has gradually become a part of IEL practice. Thus, international biodiversity-related instruments like the Ramsar Convention, World Heritage Convention, CITES, CBD and UNFCCC acknowledge the significance of the ecosystem approach and integrate its principles in their regular course of actions for achieving common objectives—protection, conservation and sustainable use of biological resources and promotion of sustainable development (research sub-question three). These instruments urge State Parties to integrate the ecosystem approach principles in their national and regional policy frameworks and to implement those at an ecosystem level (demonstrated in Section 3.8).

The significance for integration of the ecosystem approach principles into national policy instruments and best practices are further bolstered within regional frameworks, such as the ACTO, ASEAN, SAARC and EU, which are developed to address the myriad challenges faced by transboundary ecosystems and to achieve the Aichi Biodiversity Targets in a collaborative way (discussed in Section 3.8). Some intergovernmental organisations—the FAO, IUCN, ITTO and ISME—are undertaking ecosystem-based

conservation initiatives either by promoting policy/guidelines or supporting the implementation of ecosystem-based conservation programmes with financial or technical assistance (discussed in Section 3.8). Although the implementation of global environmental conventions/agreements is slow, their being 'soft' law by nature, the recent trend of integrating the ecosystem approach principles in international and national legal frameworks followed by their application at the ecosystem level indicate their worldwide gradual acceptance in natural resource management.

6.4 Ecosystem Approach: A Potential Vehicle for Sustainable Conservation of the Sundarbans

The Sundarbans is a biologically complex and dynamic ecosystem used by humanity for generations. Because of its richness in species, diversity in ecosystem resources and outstanding universal value, it was declared a reserved forest by the British Government in the 1870s, a Ramsar Site under the Ramsar Convention in 1992 and a World Heritage Site by the UNESCO in 1997. Owing to its ecological and socio-economic importance, this unique mangrove ecosystem has received considerable attention under the political regimes in terms of conservation, management and utilisation of its resources. The policy of maximum extraction or utilisation of resources, maximum revenue generation, state-sponsored commercialisation of forest interests and disregarding of local communities' traditional rights, prolonged until the 2000s, coupled with the massive dependency of FDCs and ubiquitous effects of climate change has resulted in significant consequences such as deterioration of the geo-morphological environment, depletion of forest resources and decline in wildlife species (discussed in Sections 1.1 and 5.11). To reassess the traditional approaches to conservation, rethinking of the Sundarbans's conservation approach—from sector-based resource management to integrated resource management, from FD-controlled (i.e., single state agency) management to participatory management, and from maximum resource utilisation to sustainable use—has become crucial, as reflected in the literature and expert opinions. The adoption and application of the ecosystem approach principles is considered essential for affecting substantial changes in the Sundarbans's management by way of addressing multidimensional challenges to its ecosystem, environment and dependents (discussed in Section 2.4).

This study demonstrated the indispensability of the core principles of the ecosystem approach including integration of entire ecosystem components, conservation and sustainable use, access and equitable benefit sharing, decentralisation of ecosystem management, adaptive management and inter-sectoral coordination, and assessed the domestic and international legal frameworks governing the Sundarbans. This thesis has found that despite some recent efforts to integrate the tenets of the ecosystem approach in the Bangladeshi legal framework, some challenges remain. The ecosystem principle's status in the Bangladeshi legal, policy and institutional frameworks regulating the Sundarbans and the challenges identified in this research are presented below (research sub-questions four and five).

6.4.1 Conservation of Ecosystem Morphology

Conservation of ecosystem morphology is important for securing natural functioning and resilience of an ecosystem which supports both biodiversity and resource productivity. Various biophysical attributes (biotic-abiotic environment, food-webs, nutrients and hydrological system), socio-economic attributes (climate vulnerabilities, dependent community's livelihoods and environmental pollution), ecological attributes (ecosystem services, vegetation and wildlife) are identified as crucial components for sustainable conservation of the Sundarbans. Effective conservation of the Sundarbans's ecosystem morphology requires an in-depth understanding of these ecosystem attributes and their integration in relevant policies, legislation and institution's mandates. The capacity of and availability of resources for the institutions governing the Sundarbans are also critical for successfully achieving desired outcomes.

6.4.1.1 Strength

The thrust for integration of ecosystem components as a whole is moderately reflected in the major policies regulating the Sundarbans—the *Forest Policy 1994*, *Environmental Policy 1992*, NBSAP and IRMP for the Sundarbans. But the policy commitments were not translated into the corresponding legislation until 2000. However, the Wildlife (C&S) Act 2012, *Bangladesh Biological Diversity Act 2017*, ECA Management Rules 2016 and *Protected Areas Management Rules 2017*, by incorporating elements of integration of entire ecosystem components, to some extent filled those gaps (examined in Sections 4.4.1.3 and 4.5).

6.4.1.2 Weakness

Despite declaring the Sundarbans, a protected area and a declaring of 10-km periphery as an ECA, the frequent capsizing of chemical-carrying vessels inside the Sundarbans's water channels and planned establishment of a thermal power plant at Rampal, close to the Sundarbans's ECA, are substantial threats to the maintenance of the Sundarbans's ecosystem morphology. Both situations are regulated by the *Inland Shipping Ordinance 1976* and ECA 1995 (examined in Sections 4.4.1.3 and 4.5). It is observed that the elements of integration of entire ecosystem components were introduced into the ECA 1995 with inclusion of a provision for declaration of a vulnerable ecosystem as an ECA for protection of its ecosystem and environment and the subsequent declaration of the Sundarbans's surrounding landscape as an ECA. Yet the repeated ship capsizes, and progress of the Rampal Power Plant Project are a few examples of activities that indicate weaknesses in the legislation.

6.4.1.3 Challenges

Gaps in understanding the nature and extent of the ecosystem approach, lack of political and bureaucratic commitment, persistence of the command-and-control-based management approach, and an anti-reform attitude were identified as obstacles to integration of entire ecosystem components into legal and institutional frameworks. While lack of expertise in risk/vulnerability assessments and EIAs, inadequate attention in research and insufficient financial allocation were noted as potential barriers at the implementation level (see Sections 4.4.1.3, 4.5 and 5.11).

6.4.2 Maintenance of Ecosystem Integrity

The novelty of the ecosystem approach lies in its recognition of the multiple needs of biological resources for human wellbeing and its equal emphasis on making a balance between conservation and utilisation of resources for the maintenance of ecosystem integrity. Sustainable use is a dominant principle of the ecosystem approach on which the balance and resilience of biodiversity depend. Mainstreaming this tool in the Sundarbans is synonymous with the conservation, growth and availability of its ecosystem resources and processes.

6.4.2.1 Strength

It was found that there has been considerable focus on integration of the conservation and sustainable use principle in the policies and legislation influencing the Sundarbans. This indicates that commitments are being implemented through the institutional framework in different ways, including banning or limiting harvestable products or harvesting seasons, introduction of co-management structures and SMART patrolling (see Sections 4.4.2.3, 4.5 and 5.11). This research identified that the decline in ecosystem resources, increased climate change effects and visible atmospheric changes in the Sundarbans warrant increased implementation of the conservation and sustainable use paradigm.

6.4.2.2 Weakness

Contradictory priority setting in some sectoral policies such as the *Environmental Policy 1992* versus *Industrial Policy 2016* and *Land Use Policy 2001* versus *Water Policy 2012* largely impedes activation of policy and legislative pledges at the ecosystem level. For example, the *Land Use Policy 2001* continues to treat forestry activities as outside of its scope, while the *Water Policy 2012* fails to consider commercial plantations. The *Environmental Policy 1992* promises to protect environment and ecosystem integrity, whereas the *Industrial Policy 2016*, despite containing promises to prevent industrial set up around the protected areas, encourages establishment of industrial units around the Sundarbans's ECA. It was observed that the government has taken steps to fill the gaps by revising the *Environment Policy 1992* and *Forest Policy 1994* and drafting a new *Environment Policy 2013* and *Forest Policy 2016*, although these are not yet finalised. The new policy drafts contain strong promises to maintain the country's ecological and environmental integrity and ensure sustainable use of natural resources (discussed in detail in Section 4.4.2.1).

6.4.2.3 Challenges

The notion of the conservation and sustainable use principle has been introduced in major policies and legislation regulating the Sundarbans. Following the legislative provisions, numerous executive orders and government notifications have been issued to restrain or control access to certain areas of the Sundarbans and limit/ban harvesting of some ecosystem services (highlighted in Section 5.9.2). But the effectiveness of the regulations

at the implementation level is in question owing to some institutional limitations such as weak monitoring, supervision and enforcement mechanisms; manpower, logistics and budget shortcomings; excessive dependency on external funding sources (i.e., donors) for structural renovation and capacity building; lack of commitment in controlling pollution; and an unrealistic assessment of human–climatic impact on the environment (discussed in Sections 4.4.2.3, 4.5 and 5.11).

6.4.3 Promotion of Equity and Environmental Security

Around 3.5 million people living in the Sundarbans's periphery are dependent on the forest's resources for their livelihoods. The number of the Sundarbans's dependents is increasing, while climatic disasters frequently affect resource stocks. Human–climatic interventions have led to decline in the Sundarbans's resource reserves which has further accelerated illegal activities by local resources users' due to livelihood insecurity and shrinkage of their traditional income opportunities owing to the state-imposed protective and preventive measures without provision of adequate alternative opportunities for income generation (examined in Section 5.9.2). Implementation of access and equitable sharing of ecosystem-generated benefits can establish equity and environmental security among the Sundarbans's ecosystem user groups.

6.4.3.1 Strength

This research highlighted the state authority's limited attention to incorporating resource users' access rights and effective revenue or benefit-distribution mechanisms in the policies and laws governing the Sundarbans by which they can avail fair and equitable costs and benefits of extracted resources (see Sections 4.4.3.3 and 5.11). However, a few recent policies such as the IRMP for the Sundarbans and some legal instruments—the *Bangladesh Biological Diversity Act 2017* (s 30), ECA Management Rules 2016 and *Protected Areas Management Rules 2017*—have introduced the provisions for distribution of ecosystem benefits equitably to the resource-dependent communities (see Sections 4.4.3.2 and 5.8.2). The most significant legal recognition of ecosystem benefits distribution is included in Rules 25 and 27 of the *Protected Areas Management Rules 2017*, by which 50 per cent of the revenue incurred from the Sundarbans's ecosystem services are to be distributed to the Sundarbans's CMCs (representing the FDCs).

6.4.3.2 Weakness

The Sundarbans-dependent communities are only allowed to harvest permissible NTFPs with permits/BLCs following the seasonal calendar. For half of the year, the Sundarbans-dependent communities are restricted from collection of resources, with no sufficient AIG opportunities or social safety-net programmes arranged by the FD. This pushes many FDCs' to undertake illegal harvesting (discussed in Sections 4.4.3.3 and 5.6.2).

6.4.3.3 Challenges

Issues that hinder equitable distribution of benefits from the Sundarbans to FDCs include a lack of political and bureaucratic will for recognition of real resource users' traditional or propriety rights, non-transparent policy and illegal practices in allocation of permits/BLCs necessary for harvesting of NTFPs, lack of proper valuation of ecosystem services, absence of a state-sponsored or resource user–driven cooperative marketing system, and gaps in anti-piracy operations (discussed in Sections 2.4, 4.4.3.3 and 5.11).

6.4.4 Expansion of Stakeholder-centric Ecosystem Management

The principle of decentralisation of ecosystem management was analysed in Chapters 2, 4 and 5 in line with the Sundarbans FDC's involvement in resource management processes (management planning, implementation, monitoring and supervision of development programmes). The academic literature, project completion reports, policy studies and opinions of experts state that adequate participation of stakeholders is an important vehicle for efficient handling of resources and tackling of unprecedented challenges to the environment and ecosystem of the Sundarbans.

6.4.4.1 Strength

In the search for stakeholder representation in the Sundarbans's legal framework and within the FD-controlled institutional structure, it was revealed that stakeholder involvement in the truest sense remained absent until the 2000s. Diffusion of the participatory management provision included in post-2000 biodiversity–climate change–environment policies into legislation has been slow. As part of recognition of stakeholders' participation in resource management decisions, the IRMP for the Sundarbans emphasised community-based co-management in Goal 4. This trend has

received strong legal basis with the issuance of the *ECA Management Rules 2016* and *Protected Areas Management Rules 2017* by which multi-tiered stakeholder-representative co-management structures were included in the Sundarbans's management. Although the reorganisation process of the CMOs in the SIZs is proceeding slowly, recent changes in legal and institutional frameworks have marked a significant shift in implementing inclusive management (examined in Sections 2.4, 4.4.4 and 5.11).

6.4.4.2 Weakness

The notion of participatory management is a common element in promoting access, equity and justice for stakeholders. Despite the concept being included in a few recent legal instruments, several other policies and legislation which have direct and indirect influence on the Sundarbans still lag behind in recognising this principle both in content and spirit. For example, since the *Fisheries Policy 1998* and *Wetland Policy 1998* do not recognise the participatory resource management mechanism, the concept remains absent in the corresponding legislation such as the *Protection and Conservation of Fish Act 1950*, *Protection and Conservation of Fish Rules 1985* and *Inland Shipping Ordinance 1976* (assessed in Section 4.4.4).

6.4.4.3 Challenges

The majority of policies governing the Sundarbans have incorporated participatory management in some forms, but that commitment has not been properly translated into legislation due to the absence of an authority/responsibility-sharing mentality among ecosystem managers. Failure to recognise stakeholder representation in legal frameworks slows the development of stakeholder-centric co-management platforms. Further, piloting, structural renovation, capacity building and functioning of co-management structures are all, for the time being, dependent on donors' assistance. Gaps in understanding the shared responsibilities among members of CMOs and local forest staff are also a major challenge, as reflected in expert opinions (evaluated in Sections 4.4.4, 5.8.2 and 5.11).

6.4.5 Mainstreaming Adaptive Management

Uncertainties are unavoidable in the complex and variable nature of ecosystem processes and functions, and only increases with the interaction of socio-economic and cultural

dynamics of the ecosystem coupled with the ostensive impacts of rapid economic growth and climate change on environment and ecosystem. The magnitude of both human and climate change–induced effects on the Sundarbans is apparent. Therefore, introducing the adaptive management procedure to the policy, legislative and institutional frameworks is necessary to deal with the complexity of ecosystem functioning and to respond to uncertain events emanated from human and climate change–induced impacts on the Sundarbans's ecosystem (explained in Sections 4.4.5 and 5.9.2).

6.4.5.1 Strength

In adaptive management's reflection in the legal frameworks influencing the Sundarbans, it was found that features have been diffused in two modes: precautionary, for example, limiting harvesting seasons, adoption of pollution control procedure and climate change adaptation measures; and preventive, for example, moratorium on harvesting timbers, bans on harvesting from wildlife and fish sanctuaries and introducing CPGs and SMART patrolling for strengthening monitoring and enforcement (see Sections 4.4.5, 5.9.2 and 5.11). Policies and legislation containing adaptive management procedures have become operational with the issuance of executive orders or gazette notifications (demonstrated in Section 5.9.2).

6.4.5.2 Weakness

The ECA 1995 contains some environment and ecosystem-friendly provisions such as declaration of ecologically critical area (s 5), controlling discharge of excessive pollutants (s 9) and environmental clearance for industrial establishment (s 12). Following ECA 1995's provisions, the Sundarbans buffer zone was declared an ECA for the protection of its environment and ecosystem. Yet, issuance of an ECC allowed for the establishment of a 'red category' thermal power plant around the ECA. Other 'red category' industrial units within the ECA were also approved using the same provisions. In another case, despite imposing bans on extraction from 18 streams/canals outside the Sundarbans's wildlife sanctuaries via the *Canal Closure Regulation 1989* and declaration of three river channels of Passur river as dolphin sanctuaries in 2012, these designated river channels are used as shipping routes which poses a significant threat to the Sundarbans's aquatic species by way of water contamination from capsized chemical-carrying cargo vessels and regular discharge of bilge from ships (discussed in Section 5.9.2). The permission for plying of

vessels in inland waterways is regulated under the *Inland Shipping Ordinance 1976*. Contradictory provisions in the legal frameworks regulating the Sundarbans to some extent restrain the state-centric adaptive mechanism/procedure from properly functioning which jeopardises the integrity of the Sundarbans's ecosystem.

Additionally, as part of enhancing the adaptive capacity and resilience of the Sundarbans's dependents to climate change and for their survival in off-seasons or during natural disasters, few efforts have been made for introducing AIG models, and these have all been from non-state actors. Despite promotion of AIG activities for the ecosystem resource users in the *Bangladesh Biological Diversity Act 2017*, *ECA Management Rules 2016* and *Protected Areas Management Rules 2017*, no significant initiative has so far been visible from state agencies either in provisioning of incentives such as disbursing micro-credit or arranging training and preliminary logistics for developing household-based AIG sectors. In the absence of AIG efforts from the government side, livelihood insecurity is gradually intensified among the Sundarbans's FDCs. This pushes FDCs to violate state regulations on harvesting and also gradually disables the sustainable use mechanism.

6.4.5.3 Challenges

In terms of proper implementation of state-arranged adaptive procedures, some gaps were observed (mainly from expert responses) such as weak enforcement of laws, lack of expertise in deciding EIA and SIA and inadequate public consultation before imposing restrictions (assessed in Sections 4.5 and 5.11). The contradictory provisions of some legal instruments governing the Sundarbans were also identified as a concern for mainstreaming adaptive management.

6.4.6 Intensification of Inter-Sectoral Cooperation and Coordination

Enhancement of inter-sectoral consultation and coordination within state departments, between state and non-state actors and among multidisciplinary experts are emphasised in the ecosystem approach, not only to deal with the multifarious environmental problems in an integrated way but to achieve optimum outcomes through efficient uses of limited resources. In the context of the Sundarbans, although the FD is assigned to the overall management of forest resources, several other state agencies like the DoE, CCT, BFRI, BNH, DoF, DAE, BWDB and BIWTA and some non-state actors such as NGOs, local

business communities, law enforcement agencies and the media have complementary roles in the Sundarbans's conservation. Legal support is essential for establishing collaborative platforms for managing the Sundarbans in an integrated fashion—for this, incorporation of the notion of inter-sectoral collaboration and coordination in legal frameworks is crucial.

6.4.6.1 Strength

Since conservation of biodiversity, protection of environment and climate change adaptation have been set as national priorities in the Perspective Plan, the 7th FYP and NSDS, it is apparent that the notion of increased coordination will automatically be transmitted into all state regulations and machineries, policies, action plans, development programmes and institutional mandates of natural resource handling sectors. The study outlined the moderate status of inter-sectoral cooperation and coordination in the policies regulating the Sundarbans and its absence in corresponding legislation (see Sections 4.4.6, 5.10.2 and 5.11). It was found that although the notion is not visible in the legislative provisions governing the Sundarbans (with a few exceptions such as the *Bangladesh Biological Diversity Act 2017*, *ECA Management Rules 2016* and *Protected Areas Management Rules 2017*), some of the coordination platforms have recently been established via executive orders (discussed in Section 4.4.6.1). For example, the provision for 'Biodiversity Management and Monitoring Committee' under the *Bangladesh Biological Diversity Act 2017*, the 'Ecologically Critical Area Management Council' under the *ECA Management Rules 2016*, the 'Protected Areas Management Council' under the *Protected Areas Management Rules 2017*, and the National Environment Council and National Committee for Implementation of UN SDGs as part the NSDS and the NBSAP have been formed with multi-sectoral and multidisciplinary representatives.

6.4.6.2 Weakness

Establishment of a National CHM, a basic requirement of the CBD, for strengthening inter-sectoral and interdisciplinary corporation and sharing of knowledge, technology and expertise among state and non-state sectors and actors has not been achieved. However, the government has taken steps to establish the National Clearing House of Biodiversity in the DoE. Additionally, a Joint Working Committee has been established between Bangladesh and India in 2011 under a MOU for addressing the transboundary challenges in a collaborative way. But the Indo-Bangladesh Joint Working Group on Sundarbans has

so far not taken any visible steps to mitigate the challenges experienced in the Sundarbans (discussed in Section 4.4.6.3).

6.4.6.3 Challenges

The root causes of the unimpressive inter-sectoral coordination in the laws governing the Sundarbans are found in national development plans, project appraisal reports and expert opinions: overlapping and segregated policies, contradictory priorities, conflicts of interests among sectors and a tendency to ignore the contribution of local communities and non-state actors (examined in Sections 4.4.6, 4.5 and 5.11). Nevertheless, a lack of commitment among implementing agencies outweighs all other shortcomings in maintaining a collaborative environment in the Sundarbans's management.

A number of policies and legislation directly and indirectly influence the Sundarbans's management. The question is whether the current policy and legal frameworks of Bangladesh are adequate to secure the integrity of the Sundarbans (research sub-question two) and equity and environmental justice among the Sundarbans's resource-dependent communities. It was observed that the ecosystem approach principles are not reflected comprehensively in some legislation influencing the Sundarbans. A reason may be that those laws have been enacted to address specific issues related to the Sundarbans. Nevertheless, as the conservation of biodiversity, protection of environment and climate change adaptation have been set as national priorities, the tenets of the ecosystem approach principles should be reflected in the legal frameworks. Yet in terms of determining the adequacy of policy and legislation, some important findings were revealed in expert responses. Very few experts that are involved in the management of the Sundarbans (either by policymaking, policy analysis or policy implementation) highlighted the need for further adoption of new policy or legislation. The majority shared the view for the need to make necessary reform to how existing policy and legal instruments are implemented. Further suggestions were for executing orders to fill the gaps in legislation (discussed in Section 4.4.6.3).

6.5 Effective Application of the Ecosystem Approach in Management of the Sundarbans: The Way Forward

This section presents some recommendations for efficient use and integration of the ecosystem approach principles in policies and practices. The effective integration and realistic implementation of the ecosystem approach principles in the Sundarbans's governance framework could bring substantial changes in the Sundarbans's resource management.

6.5.1 Setting Strong and Unambiguous Conservation Priorities

The contradictory priority of the government is strongly manifested in the Sundarbans's conservation and development plan. The government has signed the Paris Agreement and SDGs and is committed to protect the natural environment, undertake adequate mitigation measures to make development programmes ecologically sustainable and commence adaptation plans for enhancing resilience to climate change. The government, aware of the nation's vulnerability to climate change, has given more attention to attracting funds from international climate change negotiation or forums for adaptation to climate change, but this has reduced the resources available for internal efforts to encounter climate change, but this has reduced the resources available for internal efforts to encounter climate change. The government's development priority needs to be clarified in line with the spirit of art 18A of the Constitution of Bangladesh and should be reflected in their development actions.

Harmonisation of sectoral policy is essential in setting priorities, particularly those concerned with conservation and management of an ecosystem or natural resource base. In this context, the ideal is protection of natural resources first, then harmonisation as required. The diffusion of expertise, capacity and integrity of the FD depends on strong and unambiguous conservation priority of the government and strong signals to agencies to implement policies accordingly.

6.5.2 Reforms in Policy and Legislation

Too much dependency on external actors is a constraint for realistic policy reform. Single agency–based policy formulation processes coupled with weak coordination among

sectoral agencies often creates conflicts in implementation of sectoral policies and impedes sectoral policy integration (see Sections 6.4.1.2, 6.4.2.2 and 6.4.5.2). Harmonisation of policies and programmes of natural resource management sectors such as agriculture, forestry, water resources and fisheries along with adequate consultation with relevant stakeholders, NGOs, national-level policy advocacy groups and international agencies like the IUCN and FAO are essential for overcoming these limitations.

In Bangladesh, the conservation of nature as a state duty was only recognised in the Constitution in 2011 via insertion of art 18A. Now, as per the constitutional provisions, it is the duty of the state to protect the integrity of the Sundarbans. Most of the policies regulating the Sundarbans including the *Forest Policy 1994* and *Environment Policy 1992* and dominant legislation such as the ECA 1995 and *Forest Act 1927* were designed before this amendment of the Constitution and should be revised or redesigned accordingly. This could affect a breakthrough in the conservation and management paradigm of the Sundarbans.

Modification of the legislative framework of the Sundarbans in line with the principles of internationally agreed conservation approach (i.e., the ecosystem approach) can help address the gaps in existing resource management policies and regulations. For example, the Sundarbans is mainly regulated by the *Forest Act 1927* and ECA 1995 which were promulgated before the global accreditation of the ecosystem approach. The *Forest Policy 1994* contained the provision of participatory forestry against the long-embedded FD-led command-and-control mechanism, but these provisions remained on paper until 2010. Inclusive stakeholders' management has received legal support with the issuance of the *ECA Management Rules 2016* and *Protected Areas Management Rules 2017* under which the multi-level CMCs and CMOs have recently been formed in the SIZs. But the voice and roles of the real resource users in the newly established co-management structures is overshadowed. Adequate clarification is required for making the CMOs, the focus of Sundarbans's management by creating a functional interdependence and increasing strategic partnerships between communities and other stakeholders that are believed to have significance in producing tangible environmental, social and economic outcomes for the Sundarbans.

Some basic notions of the ecosystem approach, such as provisions for adaptive management, benefit sharing and sectoral coordination, are still not explicitly integrated in the legislation regulating the Sundarbans on which the equity and resilience of the Sundarbans's ecosystem, environment and dependents generally depend. The application of ecosystem-based conservation initiatives is not possible unless those principles are expressed in the key regulatory frameworks. The law is a social tool and there should be flexible provisions to address the emerging issues related to ecosystem management.

6.5.3 Supportive and Adaptive Institutional Framework

The Sundarbans has been administered by the FD since 1869 in a traditional way. Over the years, different forest management methods have been tested. Some of those are aligned with the policies regulating the Sundarbans, for example, the *Forest Policy 1994* recognised the principle of participatory forestry (although this remained dysfunctional until 2009). The concept of co-management has received institutional shape with the formation of several CMOs. Transformation of production-based or maximum utilisation resource management into protection-oriented or sustainable use system is another significant shift initiated by the Sundarbans's management with the declaration of its vast areas as wildlife and fish sanctuaries or the surrounded areas as an ECA.

Designation of the Sundarbans as a World Heritage Site and Ramsar Site added additional responsibilities to preserve the value of the forest. New anthropogenic challenges such as environmentally risky development plans; illegal extraction; forest fire; water contamination; reduction of freshwater flow; and climate change effects in the form of salinisation, sea level rise and top dying diseases are increasing in severity. But the FD's institutional strength in terms of budget, manpower and technical expertise has not been enhanced. To implement policy commitments at the ecosystem level, more focus should be given to structural renovation and institutional capacity building. Periodic Strengths, Weaknesses, Opportunities and Threats analysis could be an option for identifying the gaps of institutional frameworks and their approaches and rationalising them.

6.5.4 Focusing on Research, Financing and Awareness Building

To maintain the subsistence of the Sundarbans's communities, both conservation and development are priorities to the government. However, the link between conservation and

development is poorly understood. As a signatory to the World Heritage Convention, Ramsar Convention and CBD, Bangladesh is committed to undertaking adequate measures which endorsed the principles of the ecosystem approach for the protection of the Sundarbans's resources. To manage the Sundarbans in line with the ecosystem approach, capacity building of the foresters and considerable statutory and institutional reorganisation are necessary which demands adequate financial sustainability. Yet state financial allocation for the forestry sector is marginal. The forestry sector receives only one per cent of the funding allocated by the government, and this is gradually decreasing. Revenue earned through forestry activities is centrally appropriated, and although the Sundarbans produces 41 per cent of all forest revenue for Bangladesh, it receives a mere five per cent of total funding allocation and 14 per cent of forestry sector funding allocation. This restricts the FD's efforts to develop an independent management plan.

Inadequate focus on Sundarbans-related research is another issue recognised in this study. In absence of a FD research unit, the FD relies on the BFRI which is beset with a myriad of institutional issues such as shortages of funding, technical expertise and technological equipment. As a result, there is little research conducted on mangrove silviculture, threat assessment and valuation of ecosystem services which are crucial elements in formulating management plans, developing integrated programme of actions and adaptive decisions. Reluctance to promote conservation awareness is an issue that impedes optimisation and dissemination of expected outcomes from conservation programmes.

Numerous studies show that conservation initiatives in the Sundarbans have largely failed to produce noticeable outcomes due to lack of conservation awareness. The ecosystem approach presents several new mechanisms such as integration of entire ecosystem components, equitable benefit sharing, justifiable market and trading system, participatory monitoring and auditing for ensuring equity and sustainability in ecosystem conservation. The Sundarbans's managers, members of CMOs and local communities should have better understanding of these new conservation dynamics for their implementation in the Sundarbans. Building community awareness through platforms can help enhancing the community's knowledge on the costs and benefits of implementation of the ecosystem approach mechanisms. The NAPA and IRMP for the Sundarbans also emphasise arrangement of an awareness-building programme, including for the rules relating to sustainable use of resources, rights and responsibilities of CMCs, sustainable harvesting,

and marketing of NTFPs for creating a conservation-educated community in collaboration with multi-sectoral entities for safeguarding the Sundarbans. Apart from attracting investments from development partners, increased government funding is crucial for more research and awareness-raising programmes for the Sundarbans. This could expedite the required legal and institutional changes.

6.5.5 Developing a Value-Based Marketing and Trading System

To maintain an ecological balance in the Sundarbans, the government has imposed restrictions on the harvesting of some forest products since 1989. These measures have resulted in the loss of benefits to local communities. Resource harvesters now need permission from the FD for the collection of NTFPs with a corresponding fee. Although existing acts, rules and policies have manifested the notion of shared governance and community participation, the status of equity in benefit and cost sharing, crucial for establishing environmental justice, are still negligible. Under these conditions, proper valuation of harvestable goods can ensure sustainable use of the Sundarbans's resources. But the traditional mahajan-dominated marketing system has deprived the harvesters of fair prices for harvested resources. A group of powerful intermediaries are engaged in price manipulation and controlling the supply chain, breeding a sense of insecurity and inequity in income distribution among resource extractors. This malpractice has accelerated unsustainable practices and overuse of the Sundarbans's resources, undermining state regulations. Breaking the cycle of this value chain or restructuring the traditional marketing system is a challenge. Development of a value-based market and trading system, either under the supervision of the FD or harvester-owned cooperatives, can help establishing equity and justice among the Sundarbans-dependents communities and ensure the sustainable use of the Sundarbans's resources.

6.5.6 Bolstering Monitoring, Coordination and Enforcement

Despite imposition of a series of restrictive mechanisms to protect the Sundarbans's resources, the illegal harvesting of NTFPs and poaching of wildlife continues unabated. This trend indicates gaps in state monitoring, coordination and enforcement mechanisms. The proper implementation of existing regulations can help facilitate a better management regime, as illustrated by the case study. Ensuring good governance is a prerequisite for the

successful implementation of the ecosystem approach and remains a challenge in the case of the Sundarbans.

In establishing good governance in the forestry sector, a series of initiatives including monitoring, coordination and enforcement mechanisms need to be re-evaluated. Decision-making should account for societal choices and be transparent and accountable. Decision-making authority should to be placed at an appropriate level to better address the interests of the community affected by the decisions. For example, decisions associated with the sharing of ecosystem-generated benefits among local stakeholders or allocation of revenue earned from the Sundarbans among the CMOs could be determined not by the central government but by an agency with a good understanding of community needs.

Strengthen of the coordination among the natural resource management agencies like forestry, agriculture, fisheries, water resources and other production sectors that have direct and indirect implications for the Sundarbans is required to avoid inter-sectoral conflicts and enable the sustainable use of the Sundarbans's resources. Institutionalisation of a National Clearing House of Biodiversity, establishment of a National Monitoring Council for the Sundarbans and a common biodiversity management fund can also assist in enhancing inter-institutional and state–non-state collaboration by way of setting common conservation priorities, developing mutually supportive programmes and joint development programmes to achieve maximum conservation benefits with coordinated investment of resources and efforts. Finally, strengthening the monitoring and enforcement machineries with the latest technologies, skilled manpower, interconnected multi-sectoral entities (NGOs, educational institutions and civil society) along with strong commitment from state and non-state actors can make the integrated course of conservation actions enforceable in the context of the Sundarbans.

Putting the ecosystem approach's principles into the Sundarbans-related policy and practice is a mammoth task. The legal and policy responses for managing the Sundarbans of Bangladesh have profound implications for the survival of the unique ecosystem and its dependent generations, and for the continual provisioning of economic, social and environmental benefits to the local, national and global community.

BIBLIOGRAPHY

A Books

Agrawala, Shardul et al, *Development and Climate Change in Bangladesh: Focus on Coastal Flooding and the Sundarbans* (OECD Publication, 2003)

Andrade Pérez, Angela et al, *Principles and Guidelines for Integrating Ecosystem-based Approaches to Adaptation in Project and Policy Design* (IUCN-CEM, CATIE, 2012)

Armstrong, Chris, *Global Distributive Justice: An Introduction* (Cambridge University Press, 2012)

Bann, Camille, *The Economic Valuation of Mangroves: A Manual for Researchers* (Economy and Environment Program for Southeast Asia, 1998)

Barry, Brian, *A Treatise on Social Justice, Volume 1: Theories of Justice* (University of California Press, 1991)

Bates, Gerry, *Environmental Law in Australia* (LexisNexis Australia, 8th ed, 2013)

Bhuyan, Anita, Anne Jorgensen and Suneeta Sharma, *Taking the Pulse of Policy: The Policy Implementation Assessment Tool* (USAID, 2010)

Brighouse, Harry, *Justice* (Cambridge Polity Press, 2004)

Brownile, Ian, *Principles of Public International Law: Contemporary Principles and Practices* (Oxford University Press, 6th ed, 2003)

Canonizado, J A and M A Hossain, *Integrated Forest Management Plan for the Sundarbans Reserved Forest (Final Draft)* (Mandala Agricultural Development Corporation and Forest Department, Ministry of Environment and Forest, Bangladesh, 1998).

Choudhury, Junaid K and Md Abdullah Abraham Hossain, *Bangladesh Forestry Outlook Study: Asia-Pacific Forestry Sector Outlook Study II* (FAO, 2011)

Churchill, Robin and Daniel Owen, *The EC Common Fisheries Policy* (Oxford University Press, 2010)

Cole, Luke W and Sheila R Foster, *From the Ground Up: Environmental Racism and the Rise of the Environmental Justice Movement* (New York University Press, 2001)

Colls, A, Neville Ash and Ninni Ikkala Nyman, *Ecosystem-based Adaptation: A Natural Response to Climate Change* (IUCN, 2009)

Creswell, John W, *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (Sage Publications Ltd, 2013)

Day, Tapan Kumer and Md Golam Rabbi, *Guide Book on Wildlife Law Enforcement in Bangladesh* (Bangladesh Forest Department, 2015)

Dixon, Martin, *Textbook on International Law* (Oxford University Press, 6th ed, 2005)

Dovers, Stephen, *Environment and Sustainability Policy: Creation, Implementation, Evaluation* (Federation Press, 2005)

Farrier, David, Rosemary Lyster and Linda Pearson, *The Environmental Law Handbook*: *Planning and Land Use in NSW* (Redfern Legal Centre Publishing, 3rd ed, 1999)

Foster, Caroline E, *Science and the Precautionary Principle in International Courts and Tribunals* (Cambridge University Press, 2011)

General Economics Division of Bangladesh Planning Commission, *Bangladesh Development Journey with SDGs* (General Economics Division of Bangladesh Planning Commission, 2017)

Greiber, Thomas et al, *An Explanatory Guide to the Nagoya Protocol on Access and Benefit-sharing* (IUCN, 2012)

Griffiths, Thomas, *Indigenous Peoples and the Global Environment Facility (GEF) Indigenous Peoples' Experiences of GEF-funded Biodiversity Conservation – A Critical Study* (Forest Peoples Programme, 2005)

Grove, Richard H, *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1860* (Cambridge University Press, 1996)

Hardee, Karen et al, *Linking Health Policy with Health Systems and Health Outcomes: A Conceptual Framework* (Futures Group, USAID, 2012)

Hartje, Volkmar, Axel Klaphake and Rainer Schliep, *The International Debate on the Ecosystem Approach - Critical Review: International Actors Obstacles and Challenges* (Bundesamt für Naturschutz, 2003)

Hossain, Jakir and Kushal Roy, *Deserting the Sundarbans: Local People's Perspective on ADB-GEF-Netherlands Funded Sundarbans Biodiversity Conservation Project* (Unnayan Onneshan – The Innovators, 2007)

Hussain, Mohammed Zakir, *Bangladesh Sundarban Delta Vision 2050: A First Step in its Formulation—Document 2: A Compilation of Background Information* (IUCN, 2014)

IUCN, *Red List of Bangladesh, Volume 2: Mammals* (IUCN Bangladesh Country Office, 2015)

Jamieson, Dale, *Global Environmental Justice* (Royal Institute of Philosophy Supplement 36, 1994)

Kabir, Dewan Muhammad Humayun and Jakir Hossain, *Resuscitating the Sundarbans: Customary Use of Biodiversity and Traditional Cultural Practices in Bangladesh* (Unnayan Onneshan – The Innovators, 2008)

Kaimowitz, David and Arild Angelsen, *Economic Models of Tropical Deforestation: A Review* (Center for International Forestry Research, 1998)

Macintosh, Donald J and Elizabeth C Ashton, *A Review of Mangrove Biodiversity Conservation and Management* (Centre for Tropical Ecosystems Research, University of Aarhus, 2002)

Manzoor-E-Khoda, *Transparency and Accountability in Forest Conservation and Management: Problems and Way Out* (Transparency International Bangladesh, 2008)

Matthews, Geoffrey Vernon Townsend, *The Ramsar Convention on Wetlands: Its History and Development* (Ramsar Convention Bureau, Switzerland, 1993)

Mazur, Nicki et al, *Applying the Principles of Adaptive Management to the Application, Selection and Monitoring of Environmental Projects* (University of Tasmania, 2013)

McLeod, Elizabeth and Rodney V Salm, *Managing Mangroves for Resilience to Climate Change* (IUCN, 2006)

Millennium Ecosystem Assessment, *Ecosystems and Human Well-being: Synthesis* (Island Press, 2005)

Ministerial Conference on the Protection of Forests in Europe, *Sustainable Forest Management and the Ecosystem Approach* (WARSAW, 2005)

Ministry of Environment and Forests, *Land and Forest Area* (Ministry of Environment and Forests, 2005)

Neumann, Roderick P, *Imposing Wilderness: Struggles over Livelihood and Nature Preservation in Africa* (University of California Press, 1998)

Nishorgo, *Nishorgo: Bangladesh's Protected Area Management Program* (Forest Department, 2008)

Nixon, Rob, *Slow Violence and Environmentalism of the Poor* (Harvard University Press, 2011)

Nussbaum, Martha Craven, *Women and Human Development: The Capabilities Approach* (Cambridge University Press, 2000)

Organisation for Economic Co-operation and Development, *The Social Dimension of Environmental Policy: Policy Brief* (OECD, 2006)

Pye, Steve et al, *Addressing the Social Dimensions of Environmental Policy – A Study on the Linkages Between Environmental and Social Sustainability in Europe* (European Commission, 2008)

Ramsar Convention Secretariat, *Water-related Guidance: An Integrated Framework for the Convention's Water-related Guidance. Ramsar Handbooks for the Wise Use of Wetlands* (Ramsar Convention Secretariat, 4th ed, 2010) vol 8

Rawls, John, *A Theory of Justice* (Harvard University Press, 1971)

Rescher, Nicholas, *Fairness: Theory and Practice of Distributive Justice* (Transaction Publishers, 2002)

Rotich, Brian, Esther Mwangi and Sreven Lawry, *Where Land Meets the Sea: A Global Review of the Governance and Tenure Dimensions of Coastal Mangrove Forests* (CIFOR, Bogor, Indonesia and USAID Tenure and Global Climate Change Program, Washington, DC, 2016)

Sanjayan, M A, Sushan Shen and Malcom Jansen, *Experiences with Integrated Conservation and Development Projects in Asia* (World Bank, 1997)

Schofield, Philip, *Utility and Democracy: The Political Thought of Jeremy Bentham* (Oxford University Press, 2006)

Scholosberg, David, *Defining Environmental Justice: Theories, Movements, and Nature* (Oxford University Press, 2007)

Sen, Amartya, *The Idea of Justice* (Harvard University Press, 2009)

Shelton, Dinah, *International Law and Domestic Legal System: Incorporation, Transformation, and Persuasion* (Oxford University Press, 2011)

Smith, Richard D and Edward Maltby, *Using the Ecosystem Approach to Implement the Convention on Biological Diversity: Key Issues and Case Studies* (IUCN, 2003)

Spalding, Mark, Mami Kainuma and Lorna Collins, *World Atlas of Mangroves* (Earthscan, 2nd ed, 2010)

Stephens, Carolyn, Ruth Willis and Gordon Walker, *Addressing Environmental Inequalities: Cumulative Environmental Impacts: Science Report* (UK Environment Agency, 2007)

Sze, Julie, *Noxious New York: The Racial Politics of Urban Health and Environmental Justice* (MIT Press, 2007)

Tangah, Joseph et al, *Rehabilitation of Mangroves in Sabah − The SFD-ISME Collaboration (2011−2014)* (Sabah Forestry Department (SFD), International Society for Mangrove Ecosystems (ISME) and Tokio Marine & Nichido Fire Insurance Co Ltd, 2015)

Triggs, Gillian Doreen, *International Law: Contemporary Principles and Practices* (LexisNexis Butterworths, Australia, 2006)

Uddin, Md Shams, *Economic Valuation of Sundarbans Mangrove Ecosystems - Bangladesh* (LAP LAMBERT Academic Publishing, 2013)

United Nations Environment Programme and Development Alternatives, *South Asia Environment Outlook 2009* (UNEP, SAARC and DA, 2009)

Van Lavieren, Hanneke et al, *Securing the Future of Mangroves: A Policy Brief* (UNU-INWEH, UNESCO-MAB, 2010)

Walker, Gordon, *Environmental Justice: Concepts, Evidence and Politics* (Routledge, 2012)

Waltner-Toews, David, James J Kay and Nina-Marie E Lister, *The Ecosystem Approach: Complexity, Uncertainty, and Managing for Sustainability* (Columbia University Press, 2008)

Whiteside, Kerry H, *Precautionary Politics: Principle and Practice in Confronting Environmental Risk* (MIT Press, 2006)

World Bank, *Enhancing Opportunities for Clean and Resilient Growth in Urban Bangladesh: Country Environmental Analysis 2018* (World Bank, 2018)

Zander, Joakim, *The Application of the Precautionary Principle in Practice: Comparative Dimensions* (Cambridge University Press, 2010)

B Edited Books

Andrade Pérez, Angela (ed), *Applying the Ecosystem Approach in Latin America* (IUCN, 2008)

Fisher, Elizabeth, Judith Jones and René von Schomberg (eds), *Implementing the Precautionary Principle*: *Perspectives and Prospects* (Edward Elgar, 2006)

Fox, Jefferson (ed), *Connecting Communities and Conservation: Co-Management Initiatives Implemented by IPAC in Wetlands and Forests of Bangladesh* (USAID Bangladesh, 2013)

Kasparek, Max et al (eds), *Committed to Biodiversity: Germany's International Cooperation in Support of the Convention on Biological Diversity for Sustainable Development* (BMZ and BMUB, 2014)

Kidd, Sue, Andy Plater and Chris Frid (eds), *The Ecosystem Approach to Marine Planning and Management* (Earthscan, 2011)

Macintosh, Donald J, R Mahindapala and M Markopoulos (eds), *Sharing Lessons on Mangrove Restoration* (Mangroves for the Future and IUCN, 2012)

McNeely, Jeffrey A (ed), *Parks for Life: Report of the IVth World Congress on National Parks and Protected Areas* (IUCN, 1992)

Moser, Mike (ed), *Towards a Community of Practice of Wetland Project Managers: Lessons Learned from Central and West Asia and the Mediterranean* (Conservation of Iranian Wetlands Project and Ramsar Regional Centre for Central and West Asia, 2011)

Nancy J Myers and Carolyn Raffensperger (eds), *Precautionary Tools for Reshaping Environmental Policy* (The MIT Press, 2006)

Pritchard, David (ed), *Ramsar Handbooks for the Wise Use of Wetlands, Handbook 7, Participatory Skills: Establishing and Strengthening Local Communities' and Indigenous People's Participation in the Management of Wetlands* (Ramsar Convention Secretariat, 4th ed, 2010)

Raffensperger, Carolyn and Joel Tickner (eds), *Protecting Public Health and the Environment: Implementing the Precautionary Principle* (Island Press, 1999)

Shepherd, Gill (ed), *The Ecosystem Approach: Learning from Experiences* (IUCN, 2008)

van Bochove, Jan-Willem, Emma Sullivan and Takehiro Nakamura (eds), *The Importance of Mangroves to People: A Call to Action* (UNEP World Conservation Monitoring Centre, 2014)

C Book Chapters

Adams, William and David Hulme, 'Conservation and Communities: Changing Narratives, Policies and Practices in African Conservation' in David Hulme and Marshall Murphree (eds), *African Wildlife and Livelihoods: The Promise and Performance of Community Conservation* (James Currey, 2001)

Agyeman, Julian, Robert D Bullard and Bob Evans, 'Joined-up Thinking: Bringing Together Sustainability, Environmental Justice and Equity' in Julian Agyeman, Robert D Bullard and Bob Evans (eds), *Just Sustainabilities: Development in An Unequal World* (MIT Press, 2003)

Ahmad, Mohiuddin and Atiq Rahman, 'The Stimulating Role of NGOs in Bangladesh' in Robbert Misdorp (ed), *Climate of Coastal Cooperation* (Coastal & Marine Union - EUCC, 2011)

Alam, Shawkat and Jona Razzaque, 'Sustainable Development versus Green Economy: The Way Forward?' in Shawkat Alam et al (eds), *International Environmental Law and the Global South* (Cambridge University Press, 2015)

Barrow, Edmund and Marshall Murphree, 'Community Conservation from Concept to Practice: A Practical Framework' in David Hulme and Marshall Murphree (eds), *African Wildlife and Livelihoods: The Promise and Performance of Community Conservation* (James Currey, 2001)

Chowdhury, Mohammad Shaheed Hossain, Masao Koike and Shigeyuki Izumiyama, 'Critical Analysis of the Forest Policy of Bangladesh: Highlights on Conservation and People's Participation' in Mohammad Shaheed Hossain Chowdhury (ed), *Forest*

Conservation in Protected Areas of Bangladesh: Policy and Community Development Perspectives (Springer, 2014)

Chynoweth, Paul, 'Legal Research' in Andrew Knight and Les Ruddock (eds), *Advanced Research Methods in the Built Environment* (Wiley-Blackwell, 2008)

Clayton, Susan, Elisabeth Kals and Irina Feygina, 'Justice and Environmental Sustainability' in Clara Sabbagh and Manfred Schmitt (eds), *Handbook of Social Justice Theory and Research* (Springer, 2016)

Cooke, Bill and Uma Kothari, 'The Case for Participation as Tyranny' in Bill Cooke and Uma Kothari (eds), *Participation: The New Tyranny?* (Zed Books, 2001)

Di Chiro, Giovanna, 'Environmental Justice from the Grassroots: Reflections of History, Gender and Expertise' in Daniel J Faber (ed), *The Struggle for Ecological Democracy: Environmental Justice Movements in the United States* (Guilford Press, 1998)

Dobinson, Ian and Francis Johns, 'Qualitative Legal Research' in Mike McConville and Wing Hong Chui (eds), *Research Methods for Law* (Edinburgh University Press, 2007)

Dovers, Stephen et al, 'Uncertainty, Complexity and the Environment' in Gabriele Bammer and Michael Smithson (eds), *Uncertainty and Risk: Multidisciplinary Perspectives* (Earthscan, 2008)

Francioni, Francesco, 'Equity in International Law' in Rüdiger Wolfrum (ed), *Max Planck Encyclopedia of Public International Law* (Oxford University Press, 2010)

Fraser, Nancy, 'Social Justice in the Age of Identity Politics: Redistribution, Recognition, and Participation' in Grethe B Peterson (ed), *The Tanner Lectures on Human Values* (University of Utah Press, 1998)

Gemmill, Barbara and Abimbola Bamidele-Izu, 'The Role of NGOs and Civil Society in Global Environmental Governance' in Daniel C Esty and Maria H Ivanova (eds), *Global Environmental Governance: Options and Opportunities* (Yale Center for Environmental Law and Policy, 2002)

Höft, Robert, ‘Convention on Biological Diversity’ in *Encyclopedia of Life Sciences* (eLS) (John Wiley & Sons Ltd, 2008)

Huq, Nazmul et al, ‘“Climate proofing” Water Resources Development Policy: The Evidence from Bangladesh’ in Walter Leal Filho (ed), *Climate Change and the Sustainable Use of Water Resources, Climate Change Management* (Springer, 2012)

Islam, Saiful, Mizanur Rahman and Sourav Chakma, ‘Plant Diversity and Forest Structure of the Three Protected Areas (Wildlife Sanctuaries) of Bangladesh Sundarbans: Current Status and Management Strategies’ in Ibrahim Faridah-Hanum, Abdul Latiff Khalid Rehman Hakeem and Munir Ozturk (eds), *Mangrove Ecosystems of Asia: Status, Challenges and Management Strategies* (Springer, 2014)

Karim, A, ‘Vegetation’ in Zakir Hussain and Gayatri Acharya (eds), *Mangroves of the Sundarbans - Volume 2: Bangladesh* (IUCN, 1994)

Macintosh, Donald J, M M Epps and O Abrenilla, ‘Ecosystem Approaches to Coastal Resources Management: The Case for Investing in Mangrove Ecosystems’ in *Food for All Investing in Food Security in Asia and the Pacific—Issues, Innovations, and Practices* (Asian Development Bank, 2011)

Maiese, Michelle, ‘Distributive Justice’ in Guy Burgess and Heidi Burgess (eds), *Beyond Intractability* (Conflict Research Consortium, University of Colorado, 2003)

McShane, Thomas O and Michael P Wells, ‘Integrated Conservation and Development?’ in Thomas O McShane and Michael P Wells (eds), *Getting Biodiversity Projects Work: Towards More Effective Conservation* (Colombia University Press, 2004)

Nandy, Paramesh and Ranju Ahmed, ‘Navigating Mangrove Resilience through the Ecosystem based Adaptation: Lessons from Bangladesh’ in Donald J Macintosh, R Mahindapala and M Markopoulos (eds), *Sharing Lessons on Mangrove Restoration* (Mangroves for the Future, Thailand and IUCN, 2012)

Preston S C, Justice Brian J, ‘The Effectiveness of the Law in Providing Access to Environmental Justice: An Introduction’, in Paul Martin et al (eds), *The Search for Environmental Justice: The IUCN Academy of Environmental Law Series* (IUCN, 2015)

Rashid, A Z M Manzoor, Donna Craig and Sharif Ahmed Mukul, 'Shifting Paradigm of Governance in the Natural Resources Management of Bangladesh: Centralist to Pluralistic Approach in the Forest Protected Areas Management' in Sharif Ahmed Mukul and A Z M Manzoor Rashid (eds), *Protected Areas: Policies, Management and Future Directions* (Nova Science Publishers, 2016)

Rashid, S M A, A Khan and A W Akonda, 'Fauna' in Zakir Hussain and Gayatri Acharya (eds), *Mangroves of the Sundarbans - Volume 2: Bangladesh* (IUCN, 1994)

Sayer, Jeffrey A and Stewart Maginnis, 'New Challenges for Forest Management' in Jeffrey A Sayer and Stewart Maginnis (eds), *Forestry in Landscapes: Ecosystem Approaches to Sustainability* (Earthscan, 2005)

Schmithüsen, Franz, 'Understanding Cross-sectoral Policy Impacts – Policy and Legal Aspects' in Yves C Dube and Franz Schmithüsen (eds), *Cross-sectoral Policy Impacts between Forestry and Other Sectors* (FAO, 2003)

Tarlock, Dan A, 'Ecosystems' in Daniel Bodansky, Jutta Brunnée and Ellen Hey (eds), *The Oxford Handbook of International Environmental Law* (Oxford University Press, 2007)

Vincent, Andrew, 'Is Environmental Justice A Misnomer?' in David Boucher and Paul Kelly (eds), *Social Justice: From Hume to Walzer* (Routledge, 1998)

Wiener, Jonathan B, 'Precaution' in Daniel Bodansky, Jutta Brunnée, and Ellen Hey (eds), *The Oxford Handbook of International Environmental Law* (Oxford University Press, 2007)

D Journal Articles

Abensperg-Traun, Max, 'CITES, Sustainable Use of Wild Species and Incentive-driven Conservation in Developing Countries, with an Emphasis on Southern Africa' (2009) 142 *Biological Conservation* 948

Adams, William M et al, 'Biodiversity Conservation and the Eradication of Poverty' (2004) 306 *Science* 1146

Afroz, Tanzim and Shawkat Alam, ‘Sustainable Shrimp Farming in Bangladesh: A Quest for an Integrated Coastal Zone Management’ (2013) 71 *Ocean & Coastal Management* 275

Ahmad, Nesar and Marion Glaser, ‘Coastal Aquaculture, Mangrove Deforestation and Blue Carbon Emissions: Is REDD+ a Solution?’ (2016) 66 *Marine Policy* 58

Alam, Mahbubul, ‘Evolution of Forest Policies in Bangladesh: A Critical Analysis’ (2009) 2(2) *International Journal of Social Forestry* 161

Alam, Mahbubul, A Z M Manzoor Rashid and Yasushi Furukawa, ‘Policy Implications and Implementation of Environmental ICTPs in Developing States: Examples from Bangladesh’ (2008) 1(26) *Electronic Green Journal* 5

Alongi, Daniel M, ‘Mangrove Forests: Resilience, Protection from Tsunamis and Responses to Global Climate Change’ (2008) 76(1) *Estuarine, Coastal and Shelf Science* 1

Amjad, A Shah and Kamaruzaman Jusoff, ‘Mangrove Conservation through Community Participation in Pakistan: The Case of Sonmiani Bay’ (2007) 4(1) *International Journal of Systems Applications, Engineering & Development* 78

Angst, Mario et al, ‘Connectors and Coordinators in Natural Resource Governance: Insights from Swiss Water Supply’ (2018) 23(2) *Ecology and Society* 1

Ashraful, M Z, ‘Status of Treaty Under the Constitution of SAARC Countries: An Approach Towards Bangladesh and India Perspective’ (2014) 5(2) *Mediterranean Journal of Social Sciences-MCSE* 129

Awal, Mohd Abdul, ‘Analysis of Causes of Top-Dying in Sundarbans Natural Forest Resources’ (2014) 2(4) *American Journal of Agriculture and Forestry* 168

Backera, Hermanni et al, ‘HELCOM Baltic Sea Action Plan – A Regional Programme of Measures for the Marine Environment Based on the Ecosystem Approach’ (2010) 60(5) *Marine Pollution Bulletin* 642

Ban, Natalie C et al, ‘A Social–ecological Approach to Conservation Planning: Embedding Social Considerations’ (2013) 11(4) *Frontiers in Ecology and the Environment* 194

Beretta, Ilaria, ‘Some Highlights on the Concept of Environmental Justice and its Use’ (2012) 17 *e-cadernos CES* 136

Bixler, R Patrick et al, ‘The Political Ecology of Participatory Conservation: Institutions and Discourse’ (2015) 22 *Journal of Political Ecology* 164

Blackstock, Kirsty et al, ‘Linking Process to Outcomes - Internal and External Criteria for A Stakeholder Involvement in River Basin Management Planning’ (2012) 77 *Ecological Economics* 113

Blaikie, Piers and Joshua Muldavin, ‘Environmental Justice? The Story of Two Projects’ (2014) 54 *Geoforum* 226

Borja, Ángel et al, ‘Marine Management – Towards an Integrated Implementation of the European Marine Strategy Framework and the Water Framework Directives’ (2010) 60(12) *Marine Pollution Bulletin* 2175

Brundtland, GH, ‘Our Common Future - Call for Action’ (1987) 14(4) *Environmental Conservation* 291-294

Brunnée, Jutta and Stephen J Toope, ‘Environmental Security and Freshwater Resources: A Case for International Ecosystem Law’ (1994) 5 *Yearbook of International Environmental Law* 41

Burns, William C G, ‘Potential Causes of Action for Climate Change Impacts Under the United Nations Fish Stocks Agreement’ (2007) 7(2) *Sustainable Development Law and Policy* 34

Byron, Helen and Jo Treweek, ‘Editorial, Special Issue on Biodiversity and Impact Assessment’ (2005) 23 *Impact Assessment and Project Appraisal* 4

Chakraborty, Debashis and Sacchidananda Mukherjee, 'How do Trade and Investment Flows Affect Environmental Sustainability? Evidence from Panel Data' (2013) 6 *Environmental Developm*ent 34

Chami, Avit A, 'Can Socio-Economic Incentives Improve the Livelihoods of Communities Surrounding Rehabilitated Ecosystems? An Empirical Evidence of Kondoa Rehabilitated Rural Areas, Dodoma, Tanzania' (2018) 1(3) *Current Investigations in Agriculture and Current Research* 85

Chandani, Achala, 'Distributive Justice and Sustainability as a Viable Foundation for the Future Climate Regime' (2007) 2 *Carbon and Climate Law Review* 152

Chan, K M A et al, 'When Agendas Collide: Human Welfare and Biological Conservation' (2007) 21 *Conservation Biology* 59

Cohen, Ronald L, 'Distributive Justice: Theory and Research' (1987) 1(1) *Social Justice Research* 19

Cooney, Rosie, 'CITES and the CBD: Tensions and Synergies' (2001) 10(3) *RECIEL* 259

Chowdhury, Abdullah Harun, 'Environmental Impact of Coal Based Power Plant of Rampal on the Sundarbans (World Largest Mangrove Forest) and Surrounding Areas' (2017) 2 *MOJ Ecology and Environmental Science* 1

Cowling, Richard M and Angelika Wilhelm-Rechmann, 'Social Assessment as a Key to Conservation Success' (2007) 41 *Oryx* 135

Davies, Stephen, 'In Name or Nature? Implementing International Environmental Procedural Rights in the Post-Aarhus Environment: A Finnish Example' (2007) 9 *Environmental Law Review* 190

de Jonge, Bram, 'What is Fair and Equitable Benefit-sharing?' (2011) 24 *Journal of Agricultural and Environmental Ethics* 140

De Lucia, Vito, 'Competing Narratives and Complex Genealogies: The Ecosystem Approach in International Environmental Law' (2015) 27 *Journal of Environmental Law* 91

DeRose, A M, ‘Fifth IUCN World Parks Congress’ (2003) 5(1) *Special Buletion on Global Processes’* 1 <http://pdf.wri.org/wpc_specialbulletin.pdf>.

Dietz, Thomas and Paul C Stern, ‘Science, Values, and Biodiversity’ (1998) 48(6) *BioScience* 441

Donato, Daniel C et al, ‘Mangroves Among the Most Carbon-rich Forests in the Tropics’ (2011) 4(5) *Nature Geoscience* 293

Duke, Norman C et al, ‘A World Without Mangroves?’ (2007) 317(5834) *Science* 41

Ebbesson, Jonas, ‘The Rule of Law in Governance of Complex Socio-ecological Changes’ (2010) 20 *Global Environmental Change* 414

Epstein, Graham et al, ‘Institutional Fit and the Sustainability of Social–ecological Systems’ (2015) 14 *Current Opinion in Environmental Sustainability* 34

Fee, Eric et al, ‘Stuck in the Clouds: Bringing the CBD’s Ecosystem Approach for Conservation Management Down to Earth in Canada and Germany’ (2009) 17(4) *Journal for Nature Conservation* 212

Finlayson, C Max et al, ‘The Ramsar Convention and Ecosystem-based Approaches to the Wise Use and Sustainable Development of Wetlands’ (2011) 14(3–4) *Journal of International Wildlife Law & Policy* 176

Galvani, Alison P et al, ‘Human–Environment Interactions in Population and Ecosystem Health’ (2016) 113(51) *PNAS* 14505

Game, Edward T et al, ‘Subjective Risk Assessment for Planning Conservation Projects’ (2013) 8 *Environmental Research Letter* 1

Garcia, Serge M and Kevern L Cochrane, ‘Ecosystem Approach to Fisheries: A Review of Implementation Guidelines’ (2005) 62 *ICES Journal of Marine Science* 311

Germani, Anna Rita, Piergiusseppe Morone and Giuseppina Testa, ‘Environmental Justice and Air Pollution: A Case Study on Italian Provinces’ (2014) 106 *Ecological Economics* 69

Getzner, Michael and Muhammad Shariful Islam, ‘Natural Resources, Livelihoods, and Reserve Management: A Case Study from Sundarbans Mangrove Forests, Bangladesh’ (2013) 8(1) *Int. J. Sus. Dev. Plann* 75

Giessena, Lukas and Muhammad Alif K Sahideb, ‘Blocking, Attracting, Imposing, and Aligning: The Utility of ASEAN Forest and Environmental Regime Policies for Strong Member States’ (2017) 67 *Land Use Policy* 19

Grumbine, R Edward, ‘Reflections on What is Ecosystem Management?’ (1997) 11(1) *Conservation Biology* 41

Hannah, Lee, Guy F Midgley and D Millar, ‘Climate Change-integrated Conservation Strategies’ (2002) 11(6) *Global Ecology and Biogeography* 485

Haney, Alan and Rebecca L Power, ‘Adaptive Management for Sound Ecosystem Management’ (1996) 20(6) *Environmental Management* 879

Harrison, James, ‘Significant International Environmental Law Cases: 2012-14’ (2014) 26 *Journal of Environmental Law* 519

Hartig, John H, Michael A Zarull and Neely L Law, ‘An Ecosystem Approach to Great Lakes Management: Practical Steps’ (1998) 24(3) *Journal of Great Lakes Research* 739

Harvey, Celia A et al, ‘Climate Smart Landscapes: Opportunities and Challenges for Integrating Adaptation and Mitigation in Tropical Agriculture’ (2014) 7(2) *Conservation Letters* 77

Hasan, Rakibul, ‘Deteriorating Forestry and the Tale of Adivasis in Bangladesh: Whom to Blame?’ (2014) 6 *Environmental Values* 7

Hickey, Michael J, ‘Acceptance of Sustainable Use within the CITES Community’ (1999) 23 *Vermont Law Review* 861

Hickey, Gordon M, ‘Evaluating Sustainable Forest Management’ (2008) 8(2) *Ecological Indicators* 109

Holling, Crawford Stanley, ‘Surprise for Science, Resilience for Ecosystems, and Incentives for People’ (1996) 6(3) *Ecological Applications* 733

Hutton, Jon, William M Adams and James C Murombedzi, ‘Back to the Barriers? Changing Narratives in Biodiversity Conservation’ (2005) 30(2) *Forum for Development Studies* 341

Iftekhar, M S and M R Islam, ‘Degeneration of Bangladesh’s Sundarbans Mangroves: A Management Issue’ (2004) 6(2) *International Forestry Review* 123

Iftekhar, M S and M R Islam, ‘Managing Mangroves in Bangladesh: A Strategy Analysis’ (2004) 10(1) *Journal of Coastal Conservation* 139

Ishtiaque, Asif and Netra Chhetri, ‘Competing Policies to Protect Mangrove Forest: A Case from Bangladesh’ (2016) 19 *Environmental Development* 75

Jacquemont, Frédéric and Alejandro Caparrós, ‘The Convention on Biological Diversity and the Climate Change Convention 10 Years After Rio: Towards a Synergy of the Two Regimes?’ (2002) 11(2) *RECIEL* 169

Janssen, Willem and Peter Goldsworthy, ‘Multidisciplinary Research for Natural Resource Management: Conceptual and Practical Implications’ (1996) 51(3) *Agricultural Systems* 259

Jones, Estelle Victoria et al, ‘A Comparative Analysis of the Three Marine Governance Systems for Implementing the Convention on Biological Diversity (CBD)’ (2016) 66 *Marine Policy* 30

Karim, Mohammed Fazlul and Nobuo Mimura, ‘Impacts of Climate Change and Sea-level Rise on Cyclonic Storm Surge Floods in Bangladesh’ (2008) 18(3) *Global Environmental Change* 490

Karim, Saiful, ‘Proposed REDD+ Project for the Sundarbans: Legal and Institutional Issues’ (2013) 1 *International Journal of Rural Law and Policy* 1

Kariyawasam, Kanchana ‘Access to Biological Resources and Benefit-sharing: Exploring a Regional Mechanism to Implement the Convention of Biological Diversity (CBD) in SAARC Countries’ (2007) 29(8) *European Intellectual Property Review* 325

Keith, David A et al, ‘Uncertainty and Adaptive Management for Biodiversity Conservation’ (2011) 144(4) *Biological Conservation* 1175

Khan, Saiful Islam, ‘Protecting the Protectors: Lessons for Adaptation Strategies of Mangrove Forests from Bangladesh’ (2009) 6(38) *IOP Conference Series: Earth and Environmental Science* 1

Kistenkas, Frederik H, ‘Innovating European Nature Conservation Services by Introducing Ecosystems Services’ (2014) 23 *GAIA* 88

Knight, Andrew T et al, ‘Knowing but Not Doing: Selecting Priority Conservation Areas and the Research–Implementation Gap’ (2008) 22 *Conservation Biology* 610

Knight, Richard L and Gary K Meffe, ‘Ecosystem Management – Agency Liberation from Command and Control’ (1997) 25(3) *Wildlife Society Bulletin* 676

Koki, Jairus N, ‘Contribution of Ecotourism Towards Sustainable Livelihood of the Communities Living on Wasini Island, Kwale County, Kenya’ (2017) 5 *Journal of Tourism and Hospitality Management* 106

Kremen, Claire, Adina M Merenlender and Dennis D Murphy, ‘Ecological Monitoring: A Vital Need for Integrated Conservation and Development Programs in the Tropics’ (1994) 8(2) *Conservation Biology* 388

Kriebel, David et al, ‘The Precautionary Principle in Environmental Health Science’ (2001) 109 *Environmental Health Perspectives* 871

Kunasekaran, Puvaneswaran et al, ‘Measuring Sustainable Indigenous Tourism Indicators: A Case of Mah Meri Ethnic Group in Carey Island, Malaysia’ (2017) 9(7) *Sustainability* 1256

Kusters, Koen et al, ‘Balancing Development and Conservation? An Assessment of Livelihood and Environmental Outcomes of Nontimber Product Trade in Asia, Africa, and Latin America’ (2006) 11(2) *Ecology and Society* 20

Lacity, Mary C and Marius A Janson, ‘Understanding Qualitative Data: A Framework of Text Analysis Methods’ (1994) 11(2) *Journal of Management Information Systems* 137

Lopa, Fowzia Gulshana Rashid and Mokbul Morshed Ahmad, ‘Participation of CSOs/NGOs in Bangladeshi Climate Change Policy Formulation: Co-operation or Co-optation?’ (2016) 26(6) *Development in Practice* 781

Maggio, Gregory F, ‘Recognizing the Vital Role of Local Communities in International Legal Instruments for Conserving Biodiversity’ (1997) 16 *UCLA Journal of Environmental Law and Policy* 179

Makame, Makame Kitwana and Emmanuel Kwesi Boon, ‘Sustainable Tourism and Benefit-Sharing in Zanzibar: The Case of Kiwengwa-Pongwe Forest Reserve’ (2008) 24(2) *Journal of Human Ecology* 93

Martin, Adrian, Shawn McGuire and Sian Sullivan, ‘Global Environmental Justice and Biodiversity Conservation’ (2013) 179(2) *The Geographical Journal* 122

McGillivray, Donald, ‘Mitigation, Compensation and Conservation: Screening for Appropriate Assessment Under the EU Habitats Directive’ (2011) 8 *Journal of European Environmental & Planning Law* 329

McLain, Rebecca J and Robert G Lee, ‘Adaptive Management: Promises and Pitfalls’ (1996) 20(4) *Environmental Management* 437

Mistry, Jayalaxshmi et al, ‘Using a Systems Viability Approach to Evaluate Integrated Conservation and Development Projects: Assessing the Impact of the North Rupununi Adaptive Management Process, Guyana’ (2010) 176(3) *Geographical Journal* 241

Morello-Frosch, Rachel A, ‘Discrimination and the Political Economy of Environmental Inequality’ (2002) 20 *Environment and Planning C: Government & Policy* 477

Morello-Frosch, Rachel, Manuel Pastor and James Sadd, 'Integrating Environmental Justice and the Precautionary Principle in Research and Policy Making: The Case of Ambient Air Toxics Exposures and Health Risks among School Children in Los Angles' (2002) 584 *ANNALS AAPSS* 47

Morgera, Elisa and Elsa Tsioumani, 'The Evolution of Benefit-sharing: Linking Biodiversity and Community Livelihoods' (2010) 19(2) *RECIEL* 163

Mozumder, Mohammad Mojibul Hoque et al, 'Social-ecological Dynamics of the Small Scale Fisheries in Sundarban Mangrove Forest, Bangladesh' (2018) 3(1) *Aquaculture and Fisheries* 38

Mugwagwa, Julius, Daniel Edwards and Sylvia de Haan, 'Assessing the Implementation and Influence of Policies That Support Research and Innovation Systems for Health: The Cases of Mozambique, Senegal, and Tanzania' (2015) 13 *Health Research Policy and Systems* 21

Muhammed, Nur et al, 'Reckoning Social Forestry in Bangladesh: Policy and Plan versus Implementation' (2005) 78(4) *Forestry* 373

Muhammed, Nur, Masao Koike and Farhana Haque, 'Forest Policy and Sustainable Forest Management in Bangladesh: An Analysis from National and International Perspectives' (2008) 36(2) *New Forests* 201

Murphy, Gavin, 'How Legislation is Drafted and Enacted in Bangladesh' (2006) 27(3) *Statute Law Review* 133

Orellana, Marcos A, 'Saramaka People V. Suriname: Judgment (Preliminary Objections, Merits, Reparations, and Costs)' (2008) 102 *American Journal of International Law* 841

Ostrom, Elinor, 'Background on the Institutional Analysis and Development Framework' (2011) 39(1) *Policy Studies Journal* 7

Oviedo, Gonzalo and Tatjana Puschkarsky, 'World Heritage and Rights-based Approaches to Nature Conservation' (2012) 18(3) *International Journal of Heritage Studies* 285

Panta, Menaka, Kyehyun Kima and Chudamani Joshi, ‘Temporal Mapping of Deforestation and Forest Degradation in Nepal: Applications to Forest Conservation’ (2008) 256(9) *Forest Ecology and Management* 1587

Paul, Brojo Gopal and Christian Reinhard Vogl, ‘Impacts of Shrimp Farming in Bangladesh: Challenges and Alternatives’ (2011) 54 *Ocean and Coastal Management* 201

Pearce, David, Francis E Putz and Jerome K Vanclay, ‘Sustainable Forestry in the Tropics: Panacea or Folly?’ (2003) 172 *Forest Ecology and Management* 229

Plummer, Ryan and David Fennell, ‘Exploring Co-Management Theory: Prospects for Sociobiology and Reciprocal Altruism’ (2007) 85 *Journal of Environmental Management* 944

Rahman, Laskar Muqsudur, ‘Development Initiatives of the Sundarbans of Bangladesh’ (2015) 79(1–2) *The Malaysian Forester* 81

Rahman, Mohammed Mahabubur et al, ‘A Brief Review on Pollution and Ecotoxicologic Effects on Sundarbans Mangrove Ecosystem in Bangladesh’ (2009) 1(4) *International Journal of Environmental Engineering* 369

Rahman, Mohammed M, M Motiur Rahman and Kazi S Islam, ‘The Causes of Deterioration of Sundarban Mangrove Forest Ecosystem of Bangladesh: Conservation and Sustainable Management Issues’ (2010) 3(2) *AACL Bioflux* 77

Rahman, M R and M Asaduzzaman, ‘Ecology of Sundarban, Bangladesh’ (2010) 8(1–2) *J. Sci. Foundation* 44

Rahman, Mohammad Sayedur et al, ‘An Annotated Checklist of the Vascular Plants of Sundarban Mangrove Forest of Bangladesh’ (2015) 22(1) *Bangladesh J. Plant Taxon.* 17

Rao, Madhu, Arlyne Johnson and Nora Bynum, ‘Assessing Threats in Conservation Planning and Management: Synthesis’ (2007) 1 *Lessons in Conservation* 46

Rashid, A Z M M et al, ‘A Journey Towards Shared Governance: Status and Prospects for Collaborative Management in the Protected Areas of Bangladesh’ (2013) 24(3) *Journal of Forestry Research* 599

Razzaque, Jona, ‘Payments for Ecosystem Services in Sustainable Mangrove Forest Management in Bangladesh’ (2017) 6(2) *Transnational Environmental Law* 309

Richter, Carsten H, Jianchu Xu and Bruce A Wilcox, ‘Opportunities and Challenges of the Ecosystem Approach’ (2015) 67 *Futures* 40

Reed, Mark S, ‘Stakeholder Participation for Environmental Management: A Literature Review’ (2008) 141(10) *Biological Conservation* 2417

Ross, William A, Angus Morrison-Saunders and Ross Marshall, ‘Common Sense in Environmental Impact Assessment: It is Not as Common as It Should be’ (2006) 24 *Impact Assessment and Project Appraisal* 3

Ros-Tonen, Mirjam A F et al, ‘Forest-related Partnerships in Brazilian Amazonia: There is More to Sustainable Forest Management than Reduced Impact Logging’ (2008) 256(7) *Forest Ecology and Management* 1482

Roy, Anjan Kumer Dev and Jeff Gow, ‘Attitudes Towards Current and Alternative Management of the Sundarbans Mangrove Forest, Bangladesh to Achieve Sustainability’ (2015) 58(2) *Journal of Environmental Planning and Management* 213

Roy, Anjan Kumer Dev and Khorshed Alam, ‘Participatory Forest Management for the Sustainable Management of the Sundarbans Mangrove Forest’ (2012) 8(5) *American Journal of Environmental Science* 550

Roy, Anjan Kumer Dev, Khorshed Alam and Jeff Gow, ‘A Review of the Role of Property Rights and Forest Policies in the Management of the Sundarbans Mangrove Forest in Bangladesh’ (2012) 15 *Forest Policy and Economics* 46

Roy, Anjan Kumer Dev, Khorshed Alam and Jeff Gow, ‘Community Perceptions of State Forest Ownership and Management: A Case Study of the Sundarbans Mangrove Forest in Bangladesh’ (2013) 117 *Journal of Environmental Management* 141

Roy, T K and S T Hossain, ‘Role of Sundarbans in Protecting Climate Vulnerable Coastal People of Bangladesh’ (2015) 1(1) *Climate Change* 40

Sadath, Md Nazmus and Max Krott, ‘Can Print Media Discourse Drive Forest Policy Change in Bangladesh?’ (2013) 6(5) *Journal of Sustainable Development* 8

Sadath, Md Nazmus, Max Krott and C Schusser, ‘Forest-climate Politics in Bangladesh’s Media Discourse in Comparison to Global Media Discourse’ (2013) 3(1) *Open Journal of Forestry* 1

Sadath, Md Nazmus and Max Krott, ‘Identifying Policy Change — Analytical Program Analysis: An Example of Two Decades of Forest Policy in Bangladesh’ (2012) 25 *Forest Policy and Economics* 93

Sandker, Marieke, Manuel Ruiz-Perez and Bruce M Campbell, ‘Trade-Offs Between Biodiversity Conservation and Economic Development in Five Tropical Forest Landscapes’ (2012) 50(4) *Environmental Management* 633

Sarker, Swapan Kumar et al, ‘Are We Failing to Protect Threatened Mangroves in the Sundarbans World Heritage Ecosystem?’ (2016) 6 *Scientific Reports* 1

Sayer, Jeffry et al, ‘Ten Principles for a Landscape Approach to Reconciling Agriculture, Conservation, and Other Competing Land Uses’ (2013) 110(21) *Proceedings of the National Academy of Science* 8349

Schlosberg, David, ‘Reconceiving Environmental Justice: Global Movements and Political Theories’ (2004) 13 *Environmental Politics* 517

Segger, Marie Claire Cordonier and Freedom-Kai Phillips, ‘Indigenous Traditional Knowledge for Sustainable Development: The Biodiversity Convention and Plant Treaty Regimes’ (2015) 20 *Journal of Forestry Research* 430

Seely, Mary K et al, ‘Creative Problem Solving in Support of Biodiversity Conservation’ (2003) 54 *Journal of Arid Environments* 155

Sen, Amartya, ‘The Ends and Means of Sustainability’ (2013) 14 *Journal of Human Development and Capabilities* 6

Shackleton, Charlie M et al, ‘Reflecting on the Next Generation of Models for Community-based Natural Resources Management’ (2010) 37(1) *Environmental Conservation* 1

Sikor, Thomas and Peter Newell, ‘Globalizing Environmental Justice?’ (2014) 54 *Geoforum* 151

Smith, Robert J et al, ‘Let the Locals Lead’ (2009) 462 *Nature* 280

Soloviy, Ihor P and Frederick W Cubbage, ‘Forest Policy in Aroused Society: Ukrainian Post-Orange Revolution Challenges’ (2007) 10(1–2) *Forest Policy and Economics* 68

Suiseeya, Kimberly R Marion, ‘Negotiating the Nagoya Protocol: Indigenous Demands for Justice’ (2014) 14 *Global Environmental Politics* 102

Sze, Julie and Jonathan K London, ‘Environmental Justice at the Crossroads: A Critical Introduction to the “State of the Field” ’ (2008) 2 *Sociology Compass* 1331

Taylor, William W et al, ‘Educating Fisheries Professionals Using a Watershed Approach to Emphasize the Ecosystem Paradigm’ (1995) 20(9) *Fisheries* 6

Thomas, Nathan et al, ‘Distribution and Drivers of Global Mangrove Forest Change, 1996–2010’ (2017) 12(6) *PLoS ONE* 1

Toxopeus, Michelle and Louis J Kotze, ‘Promoting Environmental Justice Through Civil-based Instruments in South Africa’ (2017) 13 *Law, Environment & Development Journal* 47

Trejos, Bernardo and Lan-Hung Nora Chiang, ‘Local Economic Linkages to Community-based Tourism in Rural Costa Rica’ (2009) 30 *Singapore Journal of Tropical Geography* 373

Trouwborst, Arie, ‘The Precautionary Principle and The Ecosystem Approach in International Law: Differences, Similarities and Linkages’ (2009) 18(1) *RECIEL* 26

Uddin, Md Shams et al, ‘Climate Change Impacts on the Sundarbans Mangrove Ecosystem Services and Dependent Livelihoods in Bangladesh’ (2013) 2(2) *Asian Journal of Conservation Biology* 152

Vaz, Justine and Agnes Lee Agama, ‘Seeking Synergy Between Community and State-based Governance for Biodiversity Conservation: The Role of Indigenous and Community-conserved Areas in Sabah, Malaysian Borneo’ (2013) 54(2) *Asia Pacific Viewpoint* 141

Wahid, Shahriar Md, Mukand S Babel and Abdur Rahman Bhuiyan, ‘Hydrologic Monitoring and Analysis in the Sundarbans Mangrove Ecosystem, Bangladesh’ (2007) 332(3) *Journal of Hydrology* 381

Wale, Edilegnaw and Asmare Yalew, ‘On Biodiversity Impact Assessment: The Rationale, Conceptual Challenges and Implications for Future EIA’ (2010) 28(1) *Impact Assessment and Project Appraisal* 3

Walker, Gordon, ‘Beyond Distribution and Proximity: Exploring the Multiple Spatialities of Environmental Justice’ (2009) 41 *Antipode* 614

Waylen, Kerry et al, ‘The Need to Disentangle Key Concepts from Ecosystem-Approach Jargon’ (2014) 28(5) *Conservation Biology* 1215

Weiss, Edith Brown, ‘Climate Change, Intergenerational Equity and International Law’ (2008) 9 *Vermont Journal of International Law* 615

Wilson, Kerrie A et al, ‘Conserving Biodiversity Efficiently: What To Do, Where, and When’ (2007) 5 *PLoS Biol* 223

E Reports

Asian Development Bank, ‘Country Environment Analysis: Bangladesh’ (Report, Asian Development Bank, 2004)

Asian Development Bank, ‘Project Completion Report Bangladesh: Sundarbans Biodiversity Conservation Project’ (Report, Asian Development Bank, 2008)

Bangladesh Institute of Development Studies, ‘A Study of the Principal Marketed Value Chains Derived from the Sundarbans Reserved Forest’ (Report, Integrated Protected Area Co-management Project - IPAC, 2010)

Barlow, Adam, ‘Sundarbans Reserved Forest: Protection Status: Target State’ (Report, European Union and Zoological Society of London, 2010) <https://www.researchgate.net/publication/313649854_Sundarbans_Reserved_Forest_Protection_status_Target_state_report>

Canonizado, J A and M A Hossain, ‘Integrated Forest Management Plan for the Sundarbans Reserved Forest’ (Report, Mandala Agricultural Development Corporation and Forest Department of Bangladesh, 1998)

CBD Secretariat, ‘Connecting Biodiversity and Climate Change Mitigation and Adaptation: Report of the 2nd Ad Hoc Technical Expert Group on Biodiversity and Climate Change, Technical Series No 41’ (CBD Secretariat, 2009).

CEGIS (Center for Environmental and Geographic Information Services), ‘Environmental Impact Assessment of 2x (500-660) Megawatt Coal Based Thermal Power Plant to be Constructed at the Location of Khulna’ (Report, Center for Environmental and Geographic Information Services, 2013) <http://www.indiaenvironmentportal.org.in/files/file/EIA%20of%202x%20(500-660)%20MW%20Coal%20Based%20Thermal%20Power%20Plant% 20at%20Rampal%20in%20 Bagerhat%20District,%20Khulna1.pdf>

CEGIS (Centre for Environment and Geographic Information Services), ‘Impacts of Sea Level Rise in Land-use Suitability and Adaptation Options’ (Report, Centre for Environmental and Geographic Information Services, 2006)

Deodatus, Floris and Zahir Uddin Ahmed, ‘Sundarbans Biodiversity Conservation Project – Directives for Wildlife Management Planning (Report No 1643/3158, Asian Development Bank-Bangladesh, 2002)

Doak, Naomi, Mizuki Murai and Fanny Douvere, ‘Report on the WHC/IUCN Reactive Monitoring Mission to the Sundarbans World Heritage Site, Bangladesh, from 22 to 28 March 2016’

FAO, ‘Integrated Resource Management Plan of the Sundarbans Reserved Forest’ (Report No DP/BGD/84/056 for the IRDP of the Sundarbans Reserved Forest, 1998)

IPCC, ‘Climate Change 2007: The Physical Science Basis: Summary for Policymakers’ (IPCC WGI Fourth Assessment Report, 2007)

IPF (Intergovernmental Panel on Forests), ‘Report of the Ad Hoc Intergovernmental Panel on Forests on its Fourth Session New York, 11-21 February 1997, E/CN.17/1997/12’ (United Nations Commission on Sustainable Development, New York)

IUCN, ‘Trade Measures in Multilateral Environmental Agreements: A Report by IUCN – the World Conservation Union of the Effectiveness of Trade Measures Contained in the Convention on International Trade in Endangered Species of Wild Fauna and Flora’ (Report prepared for the Economics, Trade and Environment Unit, UNDP, 2001)

Korn, Horst, Rainer Schliep and Jutta Stadler (eds), ‘Report of the International Workshop on the “Further Development of the Ecosystem Approach” at the International Academy for Nature Conservation Isle of Vilm, Germany, October 9-11, 2002’ (Bundesamt für Naturschutz, 2003)

Kramer, Arnoldo Matus, ‘Adaptation to Climate Change in Poverty Reduction Strategies’ (Occasional Paper No 2007/34, UNDP Human Development Report Office, 2007)

Laffoley, Dan et al, ‘The Ecosystem Approach: Coherent Actions for Marine and Coastal Environments’ (Report of English Nature to the UK Government, 2004)

Millat-e-Mustafa, Md, ‘A Review of Forest Policy Trends in Bangladesh’ (Policy Trend Report, 2002)

Ministry of Environment and Forests, ‘Bangladesh - Rio+20: National Report on Sustainable Development’ (Report, Government of Bangladesh, 2012)

Nishat, Ainun et al, ‘Loss and Damage - The Case of Sea Level Rise in Bangladesh’ (Report, International Centre for Climate Change and Development, 2013)

Secretariat of the Convention on Biological Diversity, ‘Global Biodiversity Outlook 3’ (Secretariat of the Convention on Biological Diversity, 2010)

Sundarban West Forest Division, ‘Sundarbans: The World Heritage Site’ (Report, Divisional Forest Office, Sundarban West Forest Division, 2010)

UN Department of Economic and Social Affairs, ‘World Economic and Social Survey 2013: Sustainable Development Challenges’ (United Nations, 2013)

UN DESA, ‘Economic and Social Survey 2014/2015’ (Report, United Nations Department of Economic and Social Affairs, 2016)

UNDP (United Nations Development Programme), ‘Environmental Justice: Comparative Experiences in Legal Empowerment’ (Report, United Nations Development Programme, 2014)

UNDP-UNEP, ‘Breaking Down the Silos – Integrating Environmental Sustainability in the Post-2015 Agenda’ (Report of the Thematic Consultation on Environmental Sustainability in the Post 2015 Agenda, 2013)

UNEP, ‘The Sundarbans, Bangladesh’ (Report, UNEP, 2011)

UNEP-WCMC, ‘Promoting Synergies Within the Cluster of Biodiversity-related Multilateral Environmental Agreements’ (Report, UNEP World Conservation Monitoring Centre, 2012)

UNFF (United Nations Forum on Forests), ‘Report of the Secretary-General on National Forest Programmes, 2001, Draft, E/CN.18/2002/4’ (United Nations Forum on Forests, New York)

Waylen, Kerry, Kirsty Blackstock and Kristy Holstead, ‘Exploring Experiences of the Ecosystem Approach’ (Report, The James Hutton Institute, 2013)

World Bank, ‘Project Appraisal on the Bangladesh Climate Resilient Participatory Afforestation and Reforestation Project’ (Implementation Completion and Results Report of Bangladesh Climate Resilient Participatory Afforestation and Reforestation Project, World Bank, 2017) 5 <http://documents.worldbank.org/curated/en/223981499717230448/text/ICR00004026-06302017.txt>

F Working Papers

CBD (Convention on Biological Diversity), 'Biodiversity in EIA and SEA' (Background Documents to CBD Decision VIII/28: Voluntary Guidelines on Biodiversity Inclusive Impact Assessment, Commission for Environmental Assessment, Netherlands, 2006)

G Conference Papers

Aminuzzaman, Salahuddin M, 'Environment Policy of Bangladesh: A Case Study of an Ambitious Policy with Implementation Snag' (Paper presented at the South Asia Climate Change Forum, Monash Sustainability Institute, Monash University, 5–9 July 2010)

Maltby, Edward, 'Ecosystem Approach: From Principle to Practice' (Paper presented at the International Conference on Ecosystem Service and Sustainable Watershed Management in North China, Beijing, PR China, 23–25 August 2000)

'Proceedings of Meeting of Heads of Institutes/Centres of Forestry Research Related to "Sustainable Forest Management, Climate Change related to Forestry and Mountain Ecosystems in the SAARC Region" ' (SAARC Forestry Centre, Thimphu, Bhutan, 10–11 October 2012) <http://www.sfc.org.bt/images/research.pdf>

The International Academy for Nature Conservation (INA), *Expert Workshop Promoting CITES-CBD Cooperation and Synergy*, International Academy for Nature Conservation, Isle of Vilm, Germany 20-24 April 2004

H Theses

Abdullah, Abu Nasar Mohammad, *Livelihood Strategies of People Surrounding the Sundarbans Mangrove Forest* (PhD Thesis, Charles Darwin University, 2014)

Afroz, Tanzim, *Climate-development Integrated Approach in Coastal Management of Bangladesh: Legal and Policy Responses* (PhD Thesis, Macquarie University, 2014)

Basar, Muhammad Asiful, *Climate Change, Loss of Livelihood and the Absence of Sustainable Livelihood Approach: A Case Study of Shymnagar, Bangladesh* (Master's Thesis, Lund University, 2009)

McGrath, Christopher James, *How to Evaluate the Effectiveness of an Environmental Legal System* (PhD Thesis, Queensland University of Technology, 2007)

Rashid, A Z M M, *Legal Framework for Community Participation in Governance: The Role of Co-Management in the Forest Protected Areas Management of Bangladesh* (PhD Thesis, University of Western Sydney, 2012)

Roy, Anjan Kumer Dev, *An Investigation into the Adequacy of Existing and Alternative Property Rights Regimes to Achieve Sustainable Management of the Sundarbans Mangrove Forest in Bangladesh* (PhD Thesis, University of Southern Queensland, 2012)

I International Legal Instruments

United Nations Documents

Cartagena Protocol on Biosafety to the Convention on Biological Diversity, opened for signature 29 January 2000, 2226 UNTS 208, 39 ILM 1027 (entered into force 11 September 2003)

CBD COP8: Decision VIII/16 on Cooperation with Other Conventions and International Organizations and Initiatives; Curitiba, Brazil, 20 – 31 March 2006, para 11 <https://www.cbd.int/doc/decisions/cop-08/cop-08-dec-17-en.pdf>

CBD COP14: Decision 14.5 on Biodiversity and Climate Change; 17 – 29 November 2018, Sharm El-Sheikh, Egypt, para 17(g) <https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-05-en.pdf>

CBD COP14: Decision 14.7 on Sustainable Wildlife Management; 17 – 29 November 2018, Sharm El-Sheikh, Egypt, para 9(b) <https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-07-en.pdf>

CBD COP14: Decision 14.24 on Capacity-building and Technical and Scientific Cooperation; 17 – 29 November 2018, Sharm El-Sheikh, Egypt, sec 10 <https://www.cbd.int/doc/decisions/cop-14/cop-14-dec-24-en.pdf>

CITES COP17: Decisions 16.13 and 16.16 on the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES); September – October 2016,

Johannesburg, South Africa, sec 15 <https://www.cites.org/sites/default/files/eng/dec/valid17/E17-Dec.pdf>

CITES COP17: Decision 17.14 on Access to Funding; September – October 2016, Johannesburg, South Africa, sec 7 <https://www.cites.org/sites/default/files/eng/dec/valid17/E17-Dec.pdf>

CITES COP17: Decisions 17.26, 17.27 on Young Engagement and Decisions 17.28, 17.29 and 17.30 on Engagement of Rural Communities; September – October 2016, Johannesburg, South Africa, sec 17 <https://www.cites.org/sites/default/files/eng/dec/valid17/E17-Dec.pdf>

CITES COP17: Decisions 17.31, 17.32, 17.33 and 17.34 on Capacity Building; September – October 2016, Johannesburg, South Africa, sec 10 <https://www.cites.org/sites/default/files/eng/dec/valid17/E17-Dec.pdf>

CITES COP17: Decision 17.36 on Livelihoods; September – October 2016, Johannesburg, South Africa, sec 12 <https://www.cites.org/sites/default/files/eng/dec/valid17/E17-Dec.pdf>

CITES COP17: Decisions 17.41 and 17.42 on Food Security and Livelihoods; September – October 2016, Johannesburg, South Africa, sec 13 <https://www.cites.org/sites/default/files/eng/dec/valid17/E17-Dec.pdf>

CITES COP17: Decisions 17.55 and 17.56 on Cooperation with Other Biodiversity-related Conventions; September – October 2016, Johannesburg, South Africa, sec 17 <https://www.cites.org/sites/default/files/eng/dec/valid17/E17-Dec.pdf>

CITES COP17: Decision 17.86 on Community Awareness on Wildlife Trafficking; September – October 2016, Johannesburg, South Africa, sec 23 <https://www.cites.org/eng/dec/valid17/81837>

Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, signed 25 June 1998, 2161 UNTS 447

Convention on Biological Diversity, opened for signature 5 June 1992, 1760 UNTS 79, 31 ILM 818 (entered into force 29 December 1993)

Convention on Biological Diversity, 'Decision V/6, Ecosystem Approach', UN Doc UNEP/CBD/COP/5/23 (22 June 2000)

Convention Concerning the Protection of the World Cultural and Natural Heritage, opened for signature 16 November 1972, 1037 UNTS 151, 27 UST 37, 11 ILM 1358 (entered into force 17 December 1975)

Convention on International Trade in Endangered Species of Wild Fauna and Flora, opened for signature 3 March 1973, 993 UNTS 243 (entered into force 1 July 1975)

Convention on Wetlands of International Importance especially as Waterfowl Habitat, opened for signature 2 February 1971, 996 UNTS 245 (entered into force 21 December 1975)

CBD Decision 10/2, The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets, UNEP/CBD/COP/10/27 (20 January 2011)

CBD-COP4, *Cooperation between the Convention of Wetlands and Convention between Biological Diversity*, UNEP/CBD/COP/4/Inf.8/Inf.8 27 March 1998, II5c

CBD-COP10, *Decision X/2: The Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets*, UNEP/CBD/COP/DEC/X/2 (29 October 2010)

CBD Secretariat, *Aichi Biodiversity Targets*, Strategic Goal B: Reduce the Direct Pressures on Biodiversity and Promote Sustainable Use

Gangwon Declaration on Biodiversity for Sustainable Development, the twelfth meeting of the Conference of the Parties to the Convention on Biological Diversity, COP12/MOP7/MOP1, Pyeongchang, Korea, 2014

Guidelines for Establishing and Strengthening Local Communities' and Indigenous People's Participation in the Management of Wetlands, Ramsar Resolution VII.8, COP7 Report, 1999

International Treaty on Plant Genetic Resources for Food and Agriculture, opened for signature 3 November 2001 (entered into force 29 June 2004)

Johannesburg Declaration on Sustainable Development 2002

Ramsar COP13 Resolution XIII.3 on Governance of the Convention; Dubai, United Arab Emirates, 29 October 2018, sec 16 <https://www.ramsar.org/sites/default/files/documents /library/xiii.3_governancee.pdf>

Ramsar COP13 Resolution XIII.7 on Enhancing the Convention's Visibility and Synergies with Other Multilateral Environmental Agreements and Other International Institutions; Dubai, United Arab Emirates, 29 October 2018, para 28 <https://www.ramsar.org/sites/ default/files/documents/library/xiii.7_synergies_e.pdf>

Ramsar COP13 Resolution XIII.12 on Guidance on Identifying Peatlands as Wetlands of International Importance (Ramsar Sites) for Global Climate Change Regulation as an Additional Argument to Existing Ramsar Criteria; Dubai, United Arab Emirates, 29 October 2018, para 7 <https://www.ramsar.org/sites/default/files/documents/library/xiii. 13_peatland_restoration_e.pdf>

Ramsar COP13 Resolution XIII.14 on Promoting Conservation, Restoration and Sustainable Management of Coastal Blue-carbon Ecosystems; Dubai, United Arab Emirates, 29 October 2018, para 1(d) <https://www.ramsar.org/sites/default/files/ documents/library/xiii.14_blue_carbon_e.pdf>

Ramsar COP13 Resolution XIII.17 on Rapidly Assessing Wetland Ecosystem Services; Dubai, United Arab Emirates, 29 October 2018, para 2 <https://www.ramsar.org/sites/ default/files/documents/library/xiii.17rapid_assessment_ecosystem_servicese.pdf>

Ramsar COP13 Resolution XIII.18 on Gender and Wetlands; Dubai, United Arab Emirates, 29 October 2018, paras 6, 12 <https://www.ramsar.org/sites/default/files/ documents/library/xiii.18gendere.pdf>

Ramsar COP13 Resolution XIII.20 on Promoting the Conservation and Wise Use of Intertidal Wetlands and Ecologically-associated Habitats; Dubai, United Arab Emirates, 29 October 2018, para 46 <https://www.ramsar.org/sites/default/files/documents/library/ xiii.20intertidalwetlandse.pdf>

Rio Declaration on Environment and Development, United Nations Conference on Environment and Development, UN Doc A/Conf.151/5/Rev. 1, 31 ILM. 876, 879 (1992), Principle 10

Secretariat of the Convention on Biological Diversity, *The Ecosystem Approach: CBD Guidelines* (Secretariat of the Convention on Biological Diversity, 2004)

Stockholm Declaration of the United Nations Conference on the Human Environment, 16 June 1972, UN Doc. A/CONF.48/14 (1973)

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity, opened for signature from 2 February 2011, UN Doc UNEP/CBD/COP/10/27 (entered into force 12 October 2014)

The Paris Agreement to the United Nations Framework Convention on Climate Change 2015, 7 FCCC/CP/2015/L.9/Rev.1 (12 December 2015)

The Ramsar Convention on Wetlands, The 10th Meeting of the COP to the Convention on Wetlands, Changwon, South Korea, 28 October – 4 November 2008, Res. X.3: The Changwon Declaration on Human Well-Being and Wetlands

The Ramsar Convention on Wetlands, The 3rd Meeting of the Conference of the Contracting Parties to the Convention on Wetlands, Regina, Can., 27 June – 5 May 1987, Recomm. 3.3: Wise Use of Wetlands, at annex

The World Heritage Centre's Natural Heritage Strategy (UNESCO World Heritage Centre, 2006)

UNESCO-WHC 29th Session: Decision WHC-05/29.COM/22 on Item 7B: General Issues: Threats to World Heritage Properties; Durban, South Africa 10 – 17 July 2005, para 11 <http://whc.unesco.org/archive/2005/whc05-29com-22e.pdf>

UNESCO-WHC 41st Session: Decision WHC/17/41.COM/5C on Item 5C: World Heritage Convention and Sustainable Development; Krakow, Poland, 2 – 12 July 2017, para 4 <https://whc.unesco.org/archive/2017/whc17-41com-18-en.pdf>

UNESCO-WHC 41st Session: Decision WHC/17/41.COM/18 on Item 7: State of Conservation of the Properties Inscribed on the World Heritage List; Krakow, Poland, 2 – 12 July 2017, paras 25, 40 <https://whc.unesco.org/en/decisions/6940>

UNESCO-WHC 42nd Session: Decision WHC/18/42.COM/7 on Item 7: State of Conservation of World Heritage Properties; Manama, Bahrain, 24 June – 4 July 2018, paras 17, 20 <https://whc.unesco.org/archive/2018/whc18-42com-18-en.pdf>

UNFCCC COP24: Decision 2/CP.24 (FCCC/CP/2018/10/Add.1) on Local Communities and Indigenous Peoples Platform; Katowice, Poland, 2 – 15 December 2018, para 16 <https://unfccc.int/sites/default/files/resource/cp2018_10_add1_advance.pdf>

UNFCCC COP24: Decision 3/CP.24 (FCCC/CP/2018/10/Add.1) on Long-term Climate Finance; Katowice, Poland, 2 – 15 December 2018, para 4 <https://unfccc.int/sites/default/files/resource/cp2018_10_add1_advance.pdf>

UNFCCC COP24: Decision 8/CP.24 (FCCC/CP/2018/10/Add.1) on National Adaptation Plans; Katowice, Poland, 2 – 15 December 2018, para 12 <https://unfccc.int/sites/default/files/resource /cp2018_10_add1_advance.pdf>

UNFCCC COP24: Decision 8/CP.24 (FCCC/CP/2018/10/Add.1) on Long-term Climate Finance; Katowice, Poland, 2 – 15 December 2018, paras 6, 8 <https://unfccc.int/sites/default/files/resource/cp2018_10_add1_advance.pdf>

UNFCCC COP 24: Decision 9/CP.24 (FCCC/CP/2018/10/Add.1) on Report of the Adaptation Committee; Katowice, Poland, 2 – 15 December 2018, para 10 <https://unfccc.int/sites/default/files/resource/cp2018_10_add1_advance.pdf>

UNFCCC COP 24: Decision 10/CP.24 (FCCC/CP/2018/10/Add.1) on Report of the Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts; Katowice, Poland, 2 – 15 December 2018, para 10(b) <https://unfccc.int/sites/default/files/resource/cp2018_10_add1_advance.pdf>

United Nations Climate Change Secretariat, 'Opportunities and Options for Integrating Climate Change Adaptation with the Sustainable Development Goals and the Sendai

Framework for Disaster Risk Reduction 2015–2030' (Technical Paper of the United Nations Climate Change Secretariat for the FCCC/TP/2016/6)

United Nations Convention to Combat Desertification 1994, opened for signature 17 June 1994 (entered into force December 1996)

United Nations Convention on the Conservation of Migratory Species of Wild Animals, opened for signature 23 June 1979, 19 I.L.M. 15, 1651 U.N.T.S. 28395 (entered into force 11 January 1983)

United Nations Convention on the Law of the Sea 1982, opened for signature 10 December 1982, 1833 UNTS 3 (entered into force 16 November 1994)

UNCTAD, *BioTrade Principles and Criteria* (United Nations Conference on Trade and Development, 2007)

UNESCO World Heritage Centre, *Operational Guidelines for the Implementation of the World Heritage Convention* (UNESCO World Heritage Centre, 2016)

UNFCCC, *SBSTA/2017/3 Synthesis Report on 'Adaptation Planning, Implementation and Evaluation Addressing Ecosystems and Areas such as Water Resources' for the 46th Session* (Bonn, 8–18 May 2017)

United Nations Environment Programme Guidelines for the Development of National Legislation on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters 1-7 (2010)

United Nations Framework Convention on Climate Change, opened for signature 9 May 1992, 1771 UNTS 107, 31 ILM 849 (entered into force 21 March 1994)

United Nations Framework Convention on Climate Change, Paris Agreement on Climate Change, FCCC/CP/2015/L.9/Rev.1 (12 December 2015)

United Nations General Assembly, *Transforming Our World: The 2030 Agenda for Sustainable Development*, A/RES/70/1 (21 October 2015)

Vienna Convention on the Law of Treaties, opened for signature 23 May 1969, 1155 UNTS 331 (entered into force 27 January 1980)

World Summit on Sustainable Development 2002, Report of World Summit on Sustainable Development, Plan of Implementation,45th Sess., I 67(b), U.N. Doc A/CONF.199/20 (2002).

Regional Documents

Agreement on the Establishment of the ASEAN Centre for Biodiversity, signed 12 September 2005 (entered into force 23 July 2009)

Amazon Cooperation Treaty, signed on 3 July 1978, UNTS I-19194 (entered into force 2 February 1980)

Amazonian Strategic Cooperation Agenda 2010 (Approved at the X Meeting of the TCA's Ministers of Foreign Affairs, Brasilia)

ASEAN Agreement on Transboundary Haze Pollution, opened for signature 10 June 2002 (entered into force 25 November 2003)

ASEAN Socio-Cultural Community Blueprint 2025 (ASEAN Secretariat, March 2016)

Association of Southeast Asian Nations Charter 2007, signed 20 November 2007 (entered into force 15 December 2008)

Charter of the South Asian Association for Regional Cooperation (SAARC), adopted on 8 December 1985

Declaration Constituting an Agreement Establishing the Association of South-East Asian Nations (ASEAN), opened for signature 8 August 1967, 1331 UNTS 235 (entered into force 8 August 1967)

EC Council Directive 92/43/EEC of 21 May 1992 on the Conservation of Natural Habitats and of Wild Flora and Fauna, *Official Journal of the European Communities* (1992) L 206/7

EU Biodiversity Strategy for 2020 (EUR-Lex - 52011DC0244 - EN - EUR-Lex - Europa EU)

European Commission, *A New EU Forest Strategy: For Forests and the Forest-based Sector*. In COM (2013) 659 final (European Commission, 2013)

EU Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the Conservation of Birds, *Official Journal of the European Union* (2010) L 20/7

European Parliament Council Directive 2000/60/EC Establishing a Framework for Community Action in the Field of Water Policy, *Official Journal of the European Union* (2000) L327: 1–72

European Union, *Consolidated versions of the Treaty on European Union, the Treaty on the Functioning of the European Union and Charter of Fundamental Rights 2016*, OJ C 202 (2016), EUR-Lex - 12012E/TXT - EN - EUR-Lex - Europa EU

SAARC Convention on Cooperation on Environment, opened for signature 29 April 2010 (entered into force 23 October 2013)

SAARC Environment Action Plan 1997, adopted in the 3rd Meeting of the SAARC Environment Ministers, Malé, 15–16 October 1997

Strategic Plan of Action for ASEAN Co-operation in Forestry (2016-2025)

The Treaty on European Union and the Treaty on the Functioning of the European Union 2012/C 326/01

Others

FAO Commission on Genetic Resources for Food and Agriculture, *ABS Elements: Elements to Facilitate Domestic Implementation of Access and Benefit-Sharing for Different Subsectors of Genetic Resources for Food and Agriculture* (FAO Commission on Genetic Resources for Food and Agriculture, 2016)

FAO, *Cross-sectoral Policy Impacts Between Forestry and Other Sectors* (FAO Forestry Policy 142, 2009)

FAO, *FAO Social Protection Framework – Promoting Rural Development for All* (FAO, 2017)

FAO, *FAO Technical Guidelines on Marine Protected Areas and Fisheries* (FAO, 2011)

FAO, *Technical Guidelines for an Ecosystem Approach to Responsible Fisheries: The Ecosystem Approach to Fisheries* (FAO, 2003)

International Tropical Timber Agreement 2006, adopted 27 January 2006, United Nations, Treaty Series, vol. 2797, I-49197 Doc. TD/TIMBER.3/12 (entered into force 7 December 2011)

International Tropical Timber Organization, *ITTO Mangrove Workplan 2002-2006* (ITTO, 2002)

ITTO/IUCN, *Guidelines for the Conservation and Sustainable Use of Biodiversity in Tropical Timber Production Forests*, ITTO Policy Development Series No 17 (ITTO-IUCN, 2009)

IUCN, *IUCN Policy Statement on Sustainable Use of Wild Living Resources* (IUCN, 2000)

IUCN, *Policy on Social Equity in Conservation and Sustainable Use of Natural Resources* (IUCN, 2000)

Macintosh, Donald J and Elizabeth C Ashton, *Principles for a Code of Conduct for the Management and Sustainable Use of Mangrove Ecosystems* (World Bank, ISME, Center Aarhus, 2004)

The International Society for Mangrove Ecosystems (ISME), *Charter for Mangroves* (ISME, November 1991)

World Bank, *Guidelines for Monitoring and Evaluation for Biodiversity Projects* (World Bank, 1998)

J National Policies

Bangladesh

Bangladesh Agriculture Policy 2013

Bangladesh Climate Change Strategy and Action Plan 2009

Bangladesh Coastal Zone Policy 2005

Bangladesh Draft Environment Policy 2013

Bangladesh Draft Forest Policy 2016

Bangladesh Fisheries Policies 1998

Bangladesh Forestry Master Plan 2017-2036

Bangladesh Forest Policy 1994

Bangladesh Industrial Policy 2016

Bangladesh Land Use Policy 2001

Bangladesh National Adaptation Programme of Action 2009

Bangladesh National Sustainable Development Strategy 2010-2021

Bangladesh Tiger Action Plan 2009

Bangladesh Tourism Policy 2010

Bangladesh Water Policy 2012

Bangladesh Wetland Policy 1998

Compensation Policy for Causalities Caused by Wildlife 2010

Environment Policy 1992

Integrated Resources Management Plans for the Sundarbans (2010-2020)

National Adaptation Programme of Action 2004

National Biodiversity Strategy and Action Plan of Bangladesh 2004

National Biodiversity Strategy and Action Plan of Bangladesh 2016-2021

National Perspective Plan of Bangladesh 2010-2021

National Sustainable Development Strategy 2010-21

The Seventh Five Year Plan (FY2015/16-FY2019/20)

The Sundarbans Tourism Policy 2014

The Vision 2021

Other

European Union Forest Action Plan 2006

India's National Policy on Biodiversity 2008

National Environment Action Plan of the Maldives 2016-2025

Norwegian Biodiversity Policy and Action Plan 2001

K National Legislation

Bangladesh

Bangladesh Biological Diversity Act 2017

Bangladesh Secretariat Instructions 2014

Bangladesh Wildlife (Conservation and Security) Act 2012

Canals Closure Regulation 1989

Constitution of the People's Republic of Bangladesh 1972

Ecologically Critical Areas Management Rules 2016

Environmental Conservation Act 1995

Environmental Conservation Rules 1997

Environment Court Act 2010

Forest Act 1927

Inland Shipping Ordinance 1976

Moratorium on Tree Felling (Sundarbans) 1989

National River Protection Commission Act 2013

Protected Areas Management Rules 2017

Protection and Conservation of Fish Act 1950

Protection and Conservation of Fish Rules 1985

Sundarbans Forest Transit Rule 1959

Territorial Water and Maritime Zone Act 1974

Water Act 2013

Other

Indian Biological Diversity Act 2002

Mexican General Law on Climate Change 2012

Norway Act relating to the Management of Biological, Geological and Landscape Diversity 2009

South Africa's National Environmental Management Protected Areas Act 2003 (Law No 57 of 2003)

Swiss Federal Act on the Protection of Nature and Cultural Heritage 1966 (amended in 21 March 2014)

The Constitution of Colombia 1991

The Constitution of Republic of Ecuador 2008

The Constitution of Tunisian Republic 1959

The Philippines Department of Environment and Natural Resources prescribed Guidelines on the Establishment and Management of Buffer Zones for Protected Areas, Memorandum Circular No 16 of 1993

The Republic of the Congo's Wildlife Law 2008 (Law No 37-2008)

Vietnam's Biodiversity Law 2008 (Law No 20/2008/HQ12)

L Gazettes

Government of Bangladesh Gazette Notification No SRO No 291 Ain/2016 Ministry of Environment and Forests, 22 September 2016, published 25 September 2016 (ECA Management Rules, 2016)

Government of Bangladesh Gazette Notification No MOEF (sec3)/7/96/147, dated 6 April 1996 (Extension of Sundarbans Wildlife Sanctuaries)

Government of Bangladesh Gazette Notification No Sha-2/MOEF192/90/580 of 1989 (Moratorium on Tree Felling)

Government of Bangladesh Gazette Notification No pabama/parisha-4/nishorgo/105/string/2006/398, dated 23 November 2009

Government of Bangladesh Gazette Notification No SRO No 314 Ain/2017, Ministry of Environment and Forests, 8 November 2017, published 12 November 2017 (Protected Areas Management Rules 2017)

Government of Bangladesh Gazette Notification No pabama/parisha-4/nishorgo/105/sting/2006/398, dated 11 November 2009 (Protected Areas Co-management Councils and Co-management Committees Guidelines)

Government of Bangladesh Gazette Notification No PaBaMa/Sha-2/Ban (Pra:Sa:)-22/98(6)/296, dated 24 June 2001 (Establishment of Wildlife and Nature Conservation Circle [WNCC])

Government of Bangladesh Order No 1/For-92/77/1122, dated 7 October 1977 (Declaration of Sundarbans Wildlife Sanctuaries)

Sundarbans Divisional Forest Office, Office Memo 5087/18-1, Issued on 11 May 1989 (Canal Closure Regulation 1989)

M Cases

Bangladesh

Bangladesh v Hasina (2008) 60 DLR (AD) 90

Chaudhury and Kendra v Bangladesh (2008) WP 7977

Dr. Mohiuddin Farooque v Bangladesh (1996) IX BSCR (AD) 27; (1997) 17 BLD (AD) 1

M. Farooque v Bangladesh (1997) WP 948

M. Farooque v Bangladesh (1997) 49 DLR (AD) 1

Zahida Ahmed (Liza) v Syed Noor Uddin Ahmed and Another (2009) 38 CLC (HCD)

Other

Brazilian Federal Loans Case (France v. Brazil) (1929) PCIJ (serial A) No 21 (July 12)

Metro Manila Development Authority v. Concerned Residents of Manila Bay, G.R. Nos. 171947–48, (Dec. 18, 2008), 574 SCRA 661

Oposa v. Factoran, G.R. No. 101083, (July 30, 1993), 224 SCRA 792

Peter Sweetman, Ireland, Attorney General and the Minister for the Environment, Heritage and Local Government and Others v An Bord Pleanála, C-258/11 (April 11, 2013), 3 CMLR 16

Saramaka People v. Suriname (Preliminary Objections, Merits, Reparations, and Costs), Judgment November 28 2007 IACHR, Case 12.338 of the Twelve Saramaka Clans (LOS), Suriname. March 02, 2006

Southern Bluefin Tuna Cases (Australia v Japan, New Zealand v Japan) (Requests for Provincial Measures), 27 August 1999, 38 ILM 1624 (1999)

Subhash Kumar v. State of Bihar and others, AIR 420 India SCR (1) 5 Judgement, 1991 (January 9)

Wildlife and Environment Society of South Africa v. MEC for Economic Affairs, Environment and Tourism, Eastern Cape Provincial Government and Others (Costs, with pained regret), 6 SA 123 (E), 2005 (April 28)

Winterstein and Others v. France (Merits), Judgement, 2013, ECHR, Section Fifth, Appl no 27013/07 (October 17)

N Newspaper Articles/Bulletins/Periodicals (Online)

Ahsan, Md Didarul, 'Bangladesh Climate Change Trust: Latest Scenario of Activities and Developments', *The Guardian* (Dhaka, Bangladesh), 23 July 2014 <http://www.theguardianbd.com/bangladesh-climate-change-trust-latest-scenario-of-activities-and-developments/>

Chowdhury, Jaglul Ahmed, 'Planning Commission as a Think-Tank', *The Financial Express* (Dhaka, Bangladesh), 13 April 2013 <http://thefinancialexpress.com.bd/epaper/2013/04/13/files/fe%2013%20april%202013.pdf>

Kowser, Shakawat, 'No More Surrender in the Sundarbans', *The Daily Bangladesh Protidin* (Dhaka, Bangladesh), 31 October 2018 <http://www.bd-pratidin.com/first-page/2018/10/31/372284>

Mahmud, Iftekhar and Sumal Sarafat, '186 Industrial Projects around Sundarbans', *The Daily Prothom Alo* (Dhaka, Bangladesh), 12 July 2017 <http://en.prothomalo.com/bangladesh/news/153543/186-industrial-projects-around-Sundarbans>

Suman, TI, ‘Mongla-Ghasiakhali Water Route has been Introduced to Protect the Sundarbans’, *The Daily Amader Shomoy* (Dhaka, Bangladesh), 17 December 2011

Sunu, Md Abu Sayd, ‘The Sundarbans is Becoming a Dumping Ground for Crap Vessels: Biodiversity Under Threat’, *The Daily Manobzamin* (Dhaka, Bangladesh), 21 April 2018 <http://mzamin.com/article.php?mzamin=114094>

Staff Correspondent, ‘Government Changes Name of the Ministry of Environment’, *bdnews24.com* (Dhaka, Bangladesh), 14 May 2018 <https://bdnews24.com/bangladesh/2018/05/14/government-changes-name-of-the-ministry-of-environment>

Staff Correspondent, ‘Licence to Harm Sundarbans’, *The Daily Star* (Dhaka, Bangladesh), 6 April 2018 <http://www.thedailystar.net/frontpage/licence-harm-sundarbans-1558918>

Staff Correspondent, ‘No Industry in 10 km of Sundarbans: High Court’, *The Daily Star* (Dhaka, Bangladesh), 24 August 2017 <http://www.thedailystar.net/country/bangladesh-sundarbans-mangrove-forest-no-industry10km-high-court-1453480>

Staff Correspondent, ‘Smart Patrolling in Sundarbans to Begin in September’, *The Daily Independent* (Dhaka, Bangladesh), 27 August 2017 <http://www.theindependentbd.com/arcprint/details/111505/2017-08-27>

Staff Correspondent, ‘Smart Patrolling: Crime Going Down in the Sundarbans’, *The Dhaka Tribune* (Dhaka, Bangladesh), 6 April 2018 <https://www.dhakatribune.com/bangladesh/nation/2018/04/06/smart-patrolling-crime-going-sundarbans>

Staff Correspondent, ‘Sundarbans is Burning with Miscreant Fire’, *The Daily Bangladesh Protidin* (Dhaka, Bangladesh), 27 May 2017 <http://www.bd-pratidin.com/country/2017/05/27/235246#sthash.xzfbRrMq.dpuf>

Staff Correspondent, ‘Tendency to Grabbing Destroying the Sundarbans’, *The Daily Amader Somoy.com* (Dhaka, Bangladesh), 20 April 2016 <http://www.amadershomoys.com/newsite/2016/04/20/574872.htm#.VxiFhTFObIU>

Staff Correspondent, ‘The Sundarbans Is Declared Pirate Free’, *The Dhaka Times* (Dhaka, Bangladesh), 1 November 2018 <http://www.dhakatimes24.com/2018/11/01/101770>

Wahiduzzaman, A K M, ‘Menace at the Mangrove’, *The Dhaka Tribune* (Dhaka, Bangladesh), 27 December 2014 <http://www.dhakatribune.com/long-form/2014/dec/27/intoxicating-sundarbans>

Zaman, A K M Wahiduz, ‘Menace at the Mangrove’, *The Dhaka Tribune* (Dhaka, Bangladesh), 27 December 2014 <http://www.dhakatribune.com/long-form/2014/dec/27/intoxicating-sundarbans>

O Internet Materials

Ansari, Abdul Haseeb, *Legal and Policy Framework for Ecosystem-based Adaptation to Climate Change in Malaysia: A Reform Oriented Study* (2014) <http://irep.iium.edu.my/37829/2/haseeb_paper.pdf>

ASEAN Declaration on Heritage Parks 2003 (2003) <http://environment.asean.org/asean-declaration-on-heritage-parks/>

Bangladesh Forest Department, ‘Charter of Duties’ (2017) <http://www.bforest.gov.bd/site/charter_of_duties/6bdaa3dc-2fff-45fa-b6c3-ae1c4f6f0c92/->

Biodiversity Information Sharing Service, *ASEAN Biodiversity Outlook* (2011) <http://chm.aseanbiodiversity.org/index.php?option=com_content&view=article&id=146&Itemid=232>

FAO, *Biodiversity: Ecosystem Approach* (2018) <http://webcache.googleusercontent.com/search?q=cache:CCFom0434LYJ:www.fao.org/biodiversity/cross-sectoral-issues/ecosystem-approach/en/+&cd=1&hl=en&ct=clnk&gl=au>

FAO Commission on Genetic Resources for Food and Agriculture, *Cross-sectoral Matters* (2002) <http://www.fao.org/nr/cgrfa/cross-sectorial/abs/en/>

FAO, *The Ecosystem Approach and Adaptive Management* (2003) <http://www.fao.org/docrep/006/y4810e/y4810e0f.htm>

Government of Bangladesh, *Approval Letter of Environmental Impact Assessment (EIA) Report for Proposed Khulna 1320 MW Coal Based Thermal Power Plant Construction Project at Rampal Upazila under Bagerhat District* (5 August 2013) <https://www.bifpcl.com/new/wp-content/uploads/2014/06/Approval-of-EIA.pdf>

Hai, Nguyen Tien, 'Mangrove Forest Management: Lessons from Thailand' on *Agroforestry World* (29 September 2015) <http://blog.worldagroforestry.org/index.php/2015/09/29/mangrove-forest-management-lessons-from-thailand/>

Hossain, M Shahadat et al, *Opportunities and Strategies for Ocean and River Resources Management* (2014) <http://www.plancomm.gov.bd/wp-content/uploads/2015/02/19_Strategy-for-Ocean-and-River-Resources-Management.pdf>

Hossain, Syed Emran, 'The Issue of Rampal Power Station: Not Worthy of a Summary Rejection', *Think Legal Bangladesh* (2013) <http://thinklegalbangladesh.com/home/uploads/article/890472218_1484647331.pdf>

Innes, Larry and Len Moores, *The Ecosystem Approach in Practice: Developing Sustainable Forestry in Central Labrador, Canada* (2003) <http://www.fao.org/docrep/ARTICLE/WFC/XII/0717-C1.HTM>

ITTO/CBD, *Collaborative Initiative for Tropical Forest Biodiversity* (2018) <http://www.itto.int/cbd/>

IUCN, *Ecosystem for Life: A Bangladesh-India Initiative* (2013) <http://bangladesh.nlembassy.org/binaries/content/assets/postenweb/b/bangladesh/netherlands-embassy-indhaka/import/water-management/project-documents/e4l/e4l-annual-report-2012.pdf>

IUCN, *World Heritage Nomination – IUCN Technical Evaluation of the Sundarbans Wildlife Sanctuaries of Bangladesh* (IUCN, 1997) <http://whc.unesco.org/document/154300>

Khalequzzaman, M, *National Environment Policy: Promises Need to Follow with Action* (2013) <http://opinion.bdnews24.com/2013/10/07/national-environment-policy-promises-need-to-follow-with-action/>

Kurukulasuriya, Lal, *National Legal and Institutional Frameworks for Implementing the Paris Agreement Provisions on Adaptation to Climate Change* (2016) <https://law.nus.edu.sg/apcel/cca/NationalLegalInstitutionalFrameworksImplementingParisAgreementProvisionsAdaptationClimateChange_LalKurukulasuriya.pdf>

Long, Ronán, *EU Law and The Ecosystems Approach: Making it Work in Practice* (2010) <https://www.iho.int/mtg_docs/com_wg/ABLOS/ABLOS_Conf6/S3P3-P.pdf>

Mangroves for the Future, *Bangladesh* (2018) <https://www.mangrovesforthefuture.org/countries/members/bangladesh/>

Mangroves for the Future, *Ecosystems across Borders: MFF at the World Parks Congress 2014* (2014) <http://www.mangrovesforthefuture.org/news-and-media/news/asia-region/2014/mff/>

Martin, R Michael, *Regional Approaches: Bridging National and Global Efforts* (2004) <http://www.fao.org/docrep/007/y5841e/y5841e02.htm>

Organogram Structures of the Ministry of Environment, Forest and Climate Change of Bangladesh and Bangladesh Forest Department (2015) <https://moef.gov.bd/site/organogram/2cbb5fe9-f2b2-48c8-a466-740f0614ee72/Organogram>;<http://www.bforest.gov.bd/site/ page/ac1b4adc-82ee-48eb-9150-ade7058a642c/->

PhysOrG, *Bangladesh to Set up Dolphin Sanctuaries* (2011) <https://phys.org/news/2011-10-bangladesh-dolphin-sanctuaries.html>

Ramsar Convention Secretariat, *Partnerships with Other Conventions* (2014) <http://www.ramsar.org/about/partnerships-with-other-conventions>

Ramsar Secretariat, *Bangladesh Enlarges Sundarbans Ramsar Site* (2003) <https://www.ramsar.org/news/bangladesh-enlarges-sundarbans-ramsar-site>

Silveira, André and Paul Pritchard, *The Multiple Meanings of Justice in the Context of the Transition to a Low Carbon Economy: Working Paper by the Cambridge Institute for Sustainability Leadership* (2016) <https://www.cisl.cam.ac.uk/publications/publication-pdfs/justice-in-the-transition-to-a-low-carbon-economy.pdf>

Strong, Asa and Susan Minnemeyer, *Satellite Data Reveals State of the World's Mangrove Forests* (2015) <https://www.wri.org/blog/2015/02/satellite-data-reveals-state-world-s-mangrove-forests>

'The Vision 2021 of Bangladesh Awami League' on *bdfact* (12 December 2008) <http://bdfact.blogspot.com.au/2008/12/vision-2021-of-bangladesh-awami-league.html>

Transparency International Bangladesh, *Rampal and Matarbari Power Projects: Governance Challenges in Environmental Impact Assessment and Land Acquisition* (2015) <http://www.ti-bangladesh.org/beta3/images/2015/es_ffs_coal_15_en.pdf>

UNCCD, *Synergies Among the Sister Conventions* (2018) <http://www2.unccd.int/unccd-cbd-and-unfccc-joint-liaison-group>

United Nations Educational, Scientific and Cultural Organisation (UNESCO), *Sundarbans World Heritage Site Devastated by Cyclone* (2007) <http://whc.unesco.org/en/news/399/>

UNEP, ACTO and Research Center of Universidad del Pacífico (CIUP), *Environmental Outlook in Amazonia, Geo Amazonia* (2009) <http://wedocs.unep.org/bitstream/handle/20.500.11822/9421/-Environment_Outlook_in_Amazonia_%E2%80%93_GEO_Amazonia-2009GEO_Amazonia_2009_1.pdf.pdf?sequence= 4&isAllowed=y>

UNEP, *Genetic Resources for the Benefit of All* (2016) <https://www.unenvironment.org/news-and-stories/story/genetic-resources-benefit-all-0>

Walters, Bradley B, *Local Mangrove Forest Management: Successful Conservation or Efficient Resource Exploitation?* (2003) <http://www.fao.org/docrep/ARTICLE/WFC/XII/0032-C1.HTM>

APPENDICES

APPENDIX A

Questionnaires

<u>Questionnaire</u> (Set-1) [Policymaking Level]

Target Group: Ministry of Environment, Forest and Climate Change, Forest Department & Department of Environment

1) Are you familiar with the 'Ecosystem Approach'? What would be your definition of 'Ecosystem Approach'?
2) Is the Ecosystem Approach relevant for the conservation and management of ecosystem and natural resource management in Bangladesh?
3) Explain the status of Ecosystem Approach in legal regimes of Bangladesh in general and the Sundarbans mangrove in particular.
4) Could you tell me the international legal instruments that deal with the conservation and protection of the Sundarbans? What are the implementation challenges for complying with these international obligations?
5) The Forest Department is the only state agency to regulate the Sundarbans mangrove forest—how could you explain the Forest Department's role in safeguarding the mangrove resources?
6) Could you tell me the position of Sundarbans's conservation in the context of climate change and development policies of Bangladesh? Is there any conflict between development priorities and climate change policies in Sundarbans?
7) Is coordination among related state agencies an issue for implementation of development program in the Sundarbans region? Please explain how this issue could be handled properly for smooth running of conservation initiatives keeping harmony with the agencies involved therein.
8) Ecosystem approach encourages provision of adaptive management for adoption of new technology, updating ecosystem database, instituting appropriate monitoring and evaluation system to encounter the ensuing challenges that requires adequate budgetary allocation. Do you think sufficient budget are usually allocated per annum

for updating the management system of the Sundarbans? What about institutional capacity and technological challenges?

9) For empowering the forest dependent communities (FDCs), Co-management Committees (CMCs) have been established—please tell me your view on the current level of Sundarbans FDCs' participation in the CMCs.

10) Please tell me the major challenges/limitations both in legal and regulatory frameworks for sustainable conservation of Sundarbans World Heritage.

<u>Questionnaire</u> (Set-2) [Policy Implementation/Management Level]

Target Group: Foresters of different portfolio working in Sundarbans region & Chairman of CMCs

1) Are you familiar with the 'Ecosystem Approach'? What would be your definition of 'Ecosystem Approach'?

2) Is the Ecosystem Approach relevant for the conservation and management of ecosystem and natural resource management in Bangladesh?

3) Explain the status of Ecosystem Approach in legal regimes of Bangladesh in general and the Sundarbans mangrove in particular.

4) Could you tell me the international legal instruments that deal with the conservation and protection of the Sundarbans? What are the implementation challenges for complying with these international obligations?

5) Could you tell me the position of Sundarbans's conservation in the context of climate change and development policies of Bangladesh? Is there any conflict between development priorities and climate change policies in Sundarbans?

6) Is coordination among related state agencies an issue for implementation of development program in the Sundarbans region? Please explain how this issue could be handled properly for smooth running of conservation initiatives keeping harmony with the agencies involved therein.

7) Ecosystem approach encourages provision of adaptive management for adoption of new technology, updating ecosystem database, instituting appropriate monitoring and evaluation system to encounter the ensuing challenges that requires adequate budgetary allocation. Do you think sufficient budget are usually allocated per annum

for updating the management system of the Sundarbans? What about institutional capacity and technological challenges?

8) For empowering the forest dependent communities (FDCs), Co-management Committees (CMCs) have been established—please tell me your view on the current level of Sundarbans FDCs' participation in the CMCs.

9) Conservation and development of livelihoods of the FDCs goes hand in hand—do you think the existing Sundarbans based conservation–development initiatives are conducive to the ecological sustainability of this heritage?

10) Please tell me the major challenges/limitations both in legal and regulatory frameworks for sustainable conservation of Sundarbans World Heritage.

<u>Questionnaire</u> (Set-3) [Environment Experts/Academics]

Target Group: Persons having expertise on Environment/Biodiversity/Mangrove Policy Research

1) Are you familiar with the 'Ecosystem Approach'? What would be your definition of 'Ecosystem Approach'?

2) Is the Ecosystem Approach relevant for the conservation and management of ecosystem and natural resource management in Bangladesh?

3) Explain the status of Ecosystem Approach in legal regimes of Bangladesh in general and the Sundarbans mangrove in particular.

4) Could you tell me the international legal instruments that deal with the conservation and protection of the Sundarbans? What are the implementation challenges for complying with these international obligations?

5) The Forest Department is the only state agency to regulate the Sundarbans mangrove forest—how could you explain the Forest Department's role in safeguarding the mangrove resources?

6) Could you tell me the position of Sundarbans's conservation in the context of climate change and development policies of Bangladesh? Is there any conflict between development priorities and climate change policies in Sundarbans?

7) Is coordination among related state agencies an issue for implementation of development program in the Sundarbans region? Please explain how this issue could

be handled properly for smooth running of conservation initiatives keeping harmony with the agencies involved therein.

8) Ecosystem approach encourages provision of adaptive management for adoption of new technology, updating ecosystem database, instituting appropriate monitoring and evaluation system to encounter the ensuing challenges that requires adequate budgetary allocation. Do you think sufficient budget are usually allocated per annum for updating the management system of the Sundarbans? What about institutional capacity and technological challenges?

9) For empowering the forest dependent communities (FDCs), Co-management Committees (CMCs) have been established—please tell me your view on the current level of Sundarbans FDCs' participation in the CMCs.

10) Conservation and development of FDC's livelihoods goes hand in hand—do you think the existing Sundarbans based conservation–development initiatives are conducive to the ecological sustainability of this heritage?

11) Please tell me the major challenges/limitations both in legal and regulatory frameworks for sustainable conservation of Sundarbans World Heritage.

<u>Questionnaire</u> (Set-4) [Environmental Activists]

Target Group: NGOs & Civil Societies working in Protection of Sundarbans Ecosystem & Livelihoods

1) Are you familiar with the 'Ecosystem Approach'? What would be your definition of 'Ecosystem Approach'?

2) Is the Ecosystem Approach relevant for the conservation and management of ecosystem and natural resource management in Bangladesh?

3) Explain the status of Ecosystem Approach in legal regimes of Bangladesh in general and the Sundarbans mangrove in particular.

4) Could you tell me the international legal instruments that deal with the conservation and protection of the Sundarbans? What are the implementation challenges for complying with these international obligations?

5) The Forest Department is the only state agency to regulate the Sundarbans mangrove forest—how could you explain the Forest Department's role in safeguarding the mangrove resources?

6) Could you tell me the position of Sundarbans's conservation in the context of climate change and development policies of Bangladesh? Is there any conflict between development priorities and climate change policies in Sundarbans?

7) Is coordination among related state agencies an issue for implementation of development program in the Sundarbans region? Please explain how this issue could be handled properly for smooth running of conservation initiatives keeping harmony with the agencies involved therein.

8) Ecosystem approach encourages provision of adaptive management for adoption of new technology, updating ecosystem database, instituting appropriate monitoring and evaluation system to encounter the ensuing challenges that requires adequate budgetary allocation. Do you think sufficient budget are usually allocated per annum for updating the management system of the Sundarbans? What about institutional capacity and technological challenges?

9) For empowering the forest dependent communities (FDCs), Co-management Committees (CMCs) have been established—please tell me your view on the current level of Sundarbans FDCs' participation in the CMCs.

10) Conservation and development of FDC's livelihoods goes hand in hand– do you think the existing Sundarbans based conservation–development initiatives are conducive to the ecological sustainability of this heritage?

11) Could you tell me the status of participation of the NGOs/members of civil societies' in ecosystem conservation policy formulation?

12) Please tell me the major challenges for sustainable conservation of Sundarbans.

<u>Questionnaire</u> (Set-5) [Business Communities]

Target Group: Sundarbans Tourism Groups & Sea Food Exporters

1) Please tell me the impact of your business on the Sundarbans-dependent livelihoods.

2) Explain the contribution of your business to the acceleration of local (Sundarbans region) as well as national economy.

3) Overexploitation of ecosystem services is considered a major cause for resource depletion and massive deterioration of the Sundarbans ecosystem—what is your opinion about it?

4) Explain the procedure of application of permit to access to the resource extraction in Sundarbans. Do you face any complexity there? What is your suggestion for better improvement of accessibility procedure?

5) The Forest Department is the only state agency to regulate the Sundarbans mangrove forest—how could you explain the Forest Department's role in safeguarding the mangrove resources?

6) Mention any activity that your company yet to introduce as a commitment to the environmental conservation in the Sundarbans region. What are your contributions to the biodiversity conservation in the area?

7) What is your suggestion to mitigate impact of business on environment especially in the mangrove forest?

APPENDIX B

Profile of the Persons Interviewed during Field Study

Categories	Portfolio of Participants Interviewed	Numbers Interviewed	Code
Policymaking level (Ministry of Environment, Forest and Climate Change (MoEFCC), Forest Department (FD), Department of Environment (DoE))	Additional Secretary, MoEFCC Director General, DoE Joint Secretary, DoE Deputy Secretary (Forest Section-1), MoEFCC Deputy Secretary (Forest Section-3), MoEFCC Deputy Chief, MoEFCC ACCF, Establishment Unit, FD Director (Research and Capacity Building), Governance Innovation Unit & General Focal Point for SDGs at the Prime Minister's Office	8	PM
Policy implementation/ Management level (Khulna Circle, District Administration, Khulna Management Plan Division, Khulna Wildlife Management & Nature Conservation Division, Sundarbans East & Sundarbans West Forest Division)	CF, Khulna Circle Deputy Commissioner, Khulna DFO, Management Plan Division, Khulna DFO, Wildlife Management & Nature Conservation Division, Khulna DFO, Sundarbans East Forest Division, Bagerhat DFO, Sundarbans West Forest Division, Khulna ACF, Satkhira Range ACF, Chandpai Range, Bagerhat Chairman, Dakop-Koyra CMC, Khulna Range Chairman, Chandpai CMC, Chandpai Range	10	PI
Environment activists/ conservationists/ Journalist (NGOs and civil societies)	Executive Director, BELA Director, International Centre for Climate Change & Development (ICCCAD) Executive Director, Bangladesh Centre for Advanced Studies (BCAS) Member Secretary, National Committee to Protect Oil, Gas, Mineral resources, Power and Ports Executive Director, Centre for Climate Justice-Bangladesh Director, Centre for Coastal Environmental Conservation (CCEC) Environmental Journalist, Daily Prothom Alo	7	EC
Policy prescription level (Academia, researchers)	Professor Ainun Nishat, Centre for Climate Change and Environmental Research, BRAC University Professor Mohammad Nazmuzzaman Bhuian, Dhaka University Professor Abdullah Harun Chowdhury, Khulna University Professor A K Fazlul Hoque, Khulna University Country Representative, IUCN Bangladesh	5	PP
Business communities (Sundarbans Tourism Groups/Sea-Frozen Food-Shrimp Exporters Associations)	Managing Director, The Bengal Tours Ltd Managing Director, The Tiger Trail Managing Director, Amam Sea Food Industries Ltd., Khulna & Director, Bangladesh Frozen Food Exporters' Association Executive Director, National Sea Food Ind. Ltd., Khulna	4	BC
Total		34	

Note: ACF = Assistant Conservator of Forests, CF = Conservator of Forests, DFO = Divisional Forest Officer.

Appendix C of this thesis has been removed as it may contain sensitive/confidential content

APPENDIX D

CBD's Twelve Principles of Ecosystem Approach (The Malawi Principles)

Principle 1	The objectives of management of land, water and living resources are a matter of societal choices.
Principle 2	Management should be decentralized to the lowest appropriate level.
Principle 3	Ecosystem managers should consider the effects of their activities on adjacent and other ecosystems.
Principle 4	Potential gains from management should be recognized; there is usually a need to understand and manage the ecosystem in an economic context.
Principle 5	Ecosystem structure and functioning should be conserved to maintain ecosystem services.
Principle 6	Ecosystems must be managed within the limits of their functioning.
Principle 7	Action should be undertaken at the appropriate spatial and temporal scales.
Principle 8	Objectives for ecosystem management should be set for the long term.
Principle 9	Management must recognize that change is inevitable.
Principle 10	Action should seek the appropriate balance between, and integration of, conservation and use of biological diversity.
Principle 11	Action should consider all forms of relevant information, including scientific and indigenous and local knowledge, innovations and practices.
Principle 12	The approach should involve all relevant sectors of society and scientific disciplines.

APPENDIX E

CBD-prescribed Operational Guidance for Ecosystem Approach

Point 1 **Focus on the relationships and processes within ecosystem.**

Better knowledge of ecosystem functions and structure and the roles of the components of biological diversity in ecosystems, is required to understand the ecosystem resilience, the effects to biodiversity loss and habitat fragmentation, underlying causes of biodiversity loss and determinants of local biological diversity in management decisions.

Point 2 **Enhance benefit-sharing.**

EA seeks that the benefits, derived from the range of functions provided by the biodiversity at ecosystem level based on human environmental security and sustainability, are to be maintained. These functions will benefit the stakeholders responsible for their production and management.

Point 3 **Use adaptive management practices.**

Ecosystem processes and functions are complex and variable. Their level of uncertainty is increased by the interaction with social constructs, which need to be better understood. Ecosystem management requires recognizing the diversity of socio-cultural factors affecting natural resource use. Similarly, there is a need for flexibility in policy-making and implementation. Ecosystem management should be envisaged as a long-term experiment that builds on its results as it progresses.

Point 4 **Decentralization of management actions.**

An ecosystem is a functioning unit that can operate at any scale, depending upon the issue being addressed. Decentralisation of decision-making power regarding management of natural resources can be helpful to make appropriate decisions. Effective decentralization requires proper empowerment, which implies that the stakeholder can assume responsibility and the capacity to carry out appropriate action and needs to be supported by enabling policy and legislative frameworks.

Point 5 **Ensure inter-sectoral cooperation.**

The success of EA largely depends on developing and reviewing national biodiversity strategy and action plans. There is also a need to integrate the EA into agriculture, fisheries, forestry and other production systems that influence biodiversity. Management of natural resources calls for increased inter-sectoral cooperation at different levels i.e., ministries, management agencies which might be promoted through formation of inter-ministerial bodies within the government or the creation of networks for sharing information and experience.

APPENDIX F

Responsibilities of Co-Management Councils and Co-Management Committees

Co-Management Councils (Rule 6)	Co-Management Committees (Rule 10)
1) Approval of Co-Management Executive Committees prepared ADP and requisition to the DFO for funds 2) Monitoring and evaluation of all activities in and around the PAs 3) Supporting the CMCs for forest conservation with cooperation and guidelines 4) Providing necessary advices for maintenance and management of biodiversity and natural resources 5) Providing advices in determining the policy of equitable sharing of benefit derived from ecosystem goods and services of PAs among the people engaged in co-management 6) Resolution of conflicts, if arises, in course of discharging functions of the CMCs 7) Supervision of CMCs produced revenue and expenditure reports incurred from co-management activities	1) Preparation of ADP and budget 2) Initiatives for biodiversity and natural resources management 3) Upgrading the lists of members of the VCFs 4) Encouraging local communities to participate in conservation and development activities of PA 5) Initiating sustainable economic development activities in PA 6) Strengthening patrolling activities with CPGs in the PA 7) Development of CPGs by providing incentives and AIG activities 8) Collection of revenue for the development of PA 9) Supervision of plantation activities in the landscape zone 10) Assisting FD in managing fishery resources around the PA 11) Campaigning on biodiversity conservation and climate change adaptation among local community 12) Expediting the compensation process of victims by wildlife 13) Promoting AIG activities for the FDCs of PAs 14) Arrangement of training for VCFs, PFs & CPGs 15) Assisting the FD recovery of grabbed forestland 16) Scrutiny of co-management actions incurred revenue and expenditure 17) Undertaking anti-encroachment campaigns around the PAs

Note: ADP = annual development plan, CMC = Co-Management Committee, PA = protected area, VCF = Village Conservation Forum, CPG = Community Patrol Group, AIG = alternative income generation, FD = Forest Department, FDC = forest-dependent community, PF = People's Forum.

APPENDIX G

Responsibilities of People's Forum and Village Conservation Forum

People's Forum (PF) (Rule 17)	Village Conservation Forum (VCFs) (Rule 18)
1) Awareness generation on conservation of natural resources of the PA and its surrounding landscape 2) Supporting in preparation of PA natural resource management plan and ensuring poor FDC's participation into its implementation process 3) Helping the VCFs in developing AIG initiatives for the FDCs 4) Supporting the activities of the CMCs 5) Awareness generation on laws related to forest, wildlife and environment and helps the FD in proper enforcement 6) Assisting the VCFs and CMCs in selection of beneficiaries and implementation of social forestry 7) Supporting the environment-friendly agro-forestry or tree plantation activities in PA encircled bare landscape 8) Helping the CMCs in formation and governing of CPGs 9) Assisting the CMCs in selection of beneficiaries of the buffer and landscape zone and creation of forests, and in monitoring and supervision process of equitable sharing of PA ecosystem resources generated benefits 10) Mass awareness campaign on climate change	1) Supporting in preparation and implementation of PA management plan 2) Mass awareness generation on the conservation and protection of forest resources and wildlife 3) Encourage communities to comply with the laws related to forest, wildlife and environment 4) Supporting in implementation of social forestry programs 5) Assisting the CMCs in formation and administering of CPGs 6) Supporting the CMCs and the FD in deterrence of felling of trees, stealing of forest resources, forest land encroachment and other forest related crimes and also in prevention of wetlands degradation 7) Assisting the CMCs in preparation and implementation of annual development plan 8) Supporting in mass awareness building campaign on climate change

Note: CPG = Community Patrol Group, AIG = alternative income generation, FD = Forest Department, CMC = Co-management Committee, FDC = forest-dependent community, PA = protected area.

APPENDIX H

Copy of Selected Publications Related to This Thesis

Alam, Shawkat and Sheikh Noor Mohammad, 'Applying the Ecosystem Approach to the Sundarbans of Bangladesh: Possibilities and Challenges' (2018) 27(2) *RECIEL* 115–129.

Alam, Shawkat and Sheikh Noor Mohammad, 'The Precautionary Principle in Biodiversity and Natural Resource Management in Bangladesh: Institutional and Policy Challenges for a Sustainable Future' (2018) 48(3–4) *Environmental Policy and Law* 187–203.

Alam, Shawkat and Sheikh Noor Mohammad, 'The Ecosystem Approach and Environmental Justice Nexus in Natural Resource Management' (2019) *Chinese Journal of Environmental Law (CJEL)* [in press].

Pages 367-402 (Appendix H) of this thesis have been removed as they contain published material. Please refer to the following citation for details of the articles contained in these pages.

Alam, Shawkat and Sheikh Noor Mohammad, 'Applying the Ecosystem Approach to the Sundarbans of Bangladesh: Possibilities and Challenges' (2018) 27(2) RECIEL 115–129. https://doi.org/10.1111/reel.12230

Alam, Shawkat and Sheikh Noor Mohammad, 'The Precautionary Principle in Biodiversity and Natural Resource Management in Bangladesh: Institutional and Policy Challenges for a Sustainable Future' (2018) 48(3–4) Environmental Policy and Law 187–203. https://doi.org/10.3233/EPL-180077

Abstract of the Article Selected for Publication in the Chinese Journal of Environmental Law (CJEL)

Title: The Ecosystem Approach and Environmental Justice Nexus in Natural Resource Management

Authors: Shawkat Alam and Sheikh Noor Mohammad

Abstract

The ecosystem approach emerged in the international environmental realm for promoting equity and justice for both people and nature. It presents a set of mechanisms, including equitable benefit sharing; conservation and sustainable use; adaptive management; and participatory practices. This article explores how the ecosystem approach used in natural resource management, shares synergies with notions of environmental justice, including distributional, procedural, justice-as-recognition. This article also explores how the ecosystem approach responds to two additional notions of justice specific to environmental disciplines, namely, intergenerational equity and the precautionary principle. This article illustrates the complementarity that is shared between the ecosystem approach and environmental justice through practical examples, and advocates that environmental justice can be realised by utilising the ecosystem approach as a vehicle for policy-makers.