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Corporate Biodiversity Management for Sustainable Growth

Assessment of Policies and Action Plans

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Preface

The Biodiversity loss will have an impact on businesses, and businesses now have to streamline their operations considering biodiversity, if they want to achieve sustainable goals. The need of the hour is mainstreaming biodiversity.

Biodiversity and its ecosystem services are the fundamental ingredients of the business and its operations to exist. The natural capital, including biodiversity and economic activity, is closely linked with each other. Ecosystem productivity and its resilience declines over time due to natural capital catastrophe, which also includes biodiversity loss. The business and industries pose a significant risk to biodiversity too (International Finance Corporation, 2019). With these catastrophes, there is an increase in risk for both society and business. The spectrum of the risk and sustainable development nexus is multifaceted and multidimensional. While the industries and businesses are a part of the problem, these sectors have the potential to address the risk to provide solutions to it through their remarkable and well-appreciated actions and policies on the ground. These steps have offered essential opportunities for the different competitors and society at large in terms of its innovations, effectiveness, and commitment towards biodiversity management and conservation.

There are efforts and approaches developed by different agencies, regulatory bodies, and advocacy institutions to address the risks of biodiversity loss, challenges, and opportunities for the businesses and industries. The sustainable development goals (SDGs), Aichi targets, and various multilateral conventions including the Convention on Biological Diversity are some of the critical global achievements in this journey. As a result, we have witnessed many international agreements, national targets, and industry-driven initiatives to meet the objectives of conservation of biological diversity through multilevel stakeholders' partnerships and the sustainable use of resources. The industry–biodiversity management nexus has emerged in the current years and focuses on delineating interconnectedness and linkages in terms of its dependencies and impacts on biodiversity. The nexus between biodiversity management and achieving sustainable development is now getting more and more compounded, with uncertainties because of climate change and fluctuating economies around the world. United Nations established the SDGs as the ambitious road map towards a sustainable future. The success of SDGs hinges

on the ability to engage the private and corporate sector and unleash their innovative power and approaches. However, still, the business development and biodiversity institutions are working separately from one another. Therefore, the mainstreaming efforts of integrating biodiversity management while considering development decisions require the integration of the policy as well as the philanthropic level.

The contributions by the United Nations Environment Programme (UNEP), International Institute for Environment and Development (IIED), International Finance Corporation (IFC) World Bank Group, Confederation of Indian Industry (CII), Federation of Indian Chambers of Commerce & Industry (FICCI), and other institutions like World Business Council for Sustainable Development (WBCSD), The World Economic Forum (WEF), World Resources Institute (WRI), and public–private initiative Millennium Ecosystem Assessment (MEA) are commendable to meet the needs, frameworks, and approaches of the CBD for biodiversity conservation and management. In 2010, a report by the Global Risk Network by the World Economic Forum, reported the biodiversity loss at the core of many global risk interconnections impacting the businesses. It advocates that biodiversity risk is a "material" for mainstreaming businesses.

Because of the efforts and many other targets set globally and at the national level by different parties and public agencies, the momentum for mainstreaming and addressing biodiversity will continue to build severe and sustained corporate sector engagement in biodiversity. The actions and plans are observable in many countries and at the sustainability forums. The initiatives like Millennium Ecosystem Assessment, Natural Capital Declaration (NCD) by UNEP- Finance Initiative, Indian Business and Biodiversity Initiative (IBBI) launched by CII with the support of German International Cooperation (GIZ), corporate ecosystem review (ESR), etc., and various other frameworks by advocay institutes, governing bodies, and academic world for the corporate biodiversity management have played a very crucial role in fostering sustainable development through the corporate world. The main agenda of the corporate biodiversity management is to conserve biodiversity and to increase the economic success of the companies through targeted, voluntary actions, plans, and policies visible and having broad-spectrum impact of coverage strengthening the triple bottom line. The current SDGs globally along with the other Nationally Determined Targets by the different countries alike demand an integrated approach through the biodiversity, social and economic factors. The corporate social responsibility (CSR), corporate responsiveness, corporate social values, and corporate charter are an attempt to integrate the biodiversity management approach by the different industries' policies and action plans. Still, business houses and organizations have a long way to go.

The idea of CSR and strategic CSR is to initiate dialogue from conversation to conservation, through corporate engagement with the local stakeholders. The holistic approach as a concept signifies to have a better-shared interest in a successful development process. The approach balances earning profits from society to give back to society. The whole idea is to bridge the gap and achieve the goal of sustainability through integrating the business ideas, goals with the stakeholder's connectivity, and developing competencies for the conservation. Organizations are

exploring their CSR activities towards biodiversity conservation and community development leveraging CSR to achieve SDGs along with the engagement of sector experts.

This book structured the broad areas and many chapters illustrating the biodiversity management along with the community development in a holistic way through their well-planned activities and programs demonstrating the integration of biodiversity as their strategic decisions for achieving sustainable growth. It brings together a valuable collection of typical examples of cases, history, and conceptual approaches that outline the biodiversity conservation and management by the industries and companies. The many problems, challenges, and role of companies to address those challenges through their actions and policies are discussed. These chapters illustrate the corporate biodiversity management approaches through the lens of the corporate world. The discussed frameworks and the role of current technologies, social media and data resources for biodiversity management reporting will be the new addition to the literature on corporate biodiversity management. The book conceptualizes the corporate social responsibility actions with biodiversity management through the demonstrated portray of corporate action plans. Societal and community development will come hand in hand through the outcomes of the results.

Chapter 1 introduces the expanding horizons and relevancy of the concept "corporate biodiversity management." The relevancy in the context of mainstreaming of biodiversity, benefits and drivers of biodiversity management by the corporate, and the impact of this subject explained with a hope that this contribution will initiate the dialogue from conversation to conservation by the corporates.

Chapter 2 discusses the "biodiversity net gain" approach for businesses in their operations and the biodiversity informatics support in identifying their impacts, planning interventions, and reporting biodiversity net gain on a global scale. This chapter is a valuable addition for the corporate agencies in terms of providing useful biodiversity informatics resources to improve their corporate reporting and biodiversity conservation program.

Chapter 3 looks into the policy performance of CSR and biodiversity conservation and other policy of natural capital conservation with major emphasis on India and Global scenario. It delineates the present status and action to be taken for good governance through CSR activities in the implementation of biodiversity management based on the four pillars of good governance.

Chapter 4 delves into the compelling case of Ecosia and its commitment towards the reforestation initiatives across different countries. This contribution provides an excellent business case of amalgamating biodiversity conservation through information technology. It describes in a short but crisp manner how the increasing use of technology can be developed into a social business that contributes towards biodiversity conservation.

Chapter 5 initiates a very relevant topic of discussion, "Does nature conservation matters to the corporations?", revolves around presenting the juggernauts of market peer competitive forces and corporate responsiveness and social responsibility. The study discusses the findings and analysis of CSR spending by different Indian companies to answer the question, "Is nature conservation an area of interest for the

corporate world or not?" The chapter sparks the discussion on why biodiversity conservation should matter to the businesses and what could be the possible policy measures to enhance the funding towards nature conservation, making this contribution pertinent and relevant in the current context of a paradigm shift towards sustainable development. On the similar lines of CSR, Chap. 6 discusses the role of CSR in natural resource conservation and addresses the need to strengthen further the cause-and-effect linkages between business activity and environmental safeguards to minimize the trade-offs. The contribution argues the intervention of science-based primary evidence to support the actual implementation of the CSR initiatives.

Chapters 7, 8, and 9 delve into the action-oriented programs by the different industries and companies towards biodiversity management through their on-ground success stories involving the community development also. These contributions provide the real success stories on businesses converted towards biodiversity management and conservation and provide an exemplary business case on corporates who are serious and committed towards their actions to sustainable growth.

Chapters 10, 11, and 12 provide an expansive vision of the concept of philanthropy and actions of few corporate houses from India towards the conservation and management of biodiversity. These chapters advocate the mainstreaming of biodiversity management as a philanthropy and vision goals of many companies. The two percent solution (CSR) is also discussed through the case examples in Chap. 12 specifically. These contributions have highlighted how companies have leaped one step forward beyond the mandatory two percent rule in context to India.

Chapter 13 addresses suggestions towards the policy frameworks and action strategies based on empirical findings. It delves with the natural capital management, presenting the framework and support of identifying the natural capital inventories by adapting to the proposed framework. The study advocates the natural capital to be defined in the company's business activities and the risk associated with the company that can become a threat if there is a loss in biodiversity and natural capital. The chapter contributes and advocates on the mainstreaming of biodiversity management by the companies in their actions and plans.

This book attempts to present an exciting and useful compilation of different actions, plans, policies, and successful cases of biodiversity management through sincere corporate efforts. These actions demonstrate that the mainstreaming of biodiversity by the businesses is measurable and could help organizations to achieve sustainable development goals. This contribution will provide perspectives of corporate and their actions, useful for the key stakeholder such as public agencies, financial institutions, consultants, CSR managers, businesses, corporate, and overall, will be a useful contribution to the academic literature. This book will appeal to scholars, professors, and practitioners. We do hope that readers will find this resourceful insight useful and helpful to sustainability practice towards biodiversity management by the corporate.

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This book was born out of a discussion on the impacts and dependencies of businesses and environmental impacts including biodiversity issues, which are commonly depicted in the corporate biodiversity management forums and conservation programs.

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We are thankful to the Editorial Advisory Board members for their extended support and helping us throughout the process with their knowledge and experience. We are also obliged to all the reviewers for their valuable suggestions to authors and to complete the review process well in time. Their commitment to providing a review of the chapters, besides their busy academic and job schedules, is well appreciated and gratefully acknowledged. We wish to place on record our sincere thanks to the valuable contributors to this book. Their hard work and confidence in the book title have brought together disparate contributions for this publication. We enjoyed and learned to work with all the authors and co-authors and wish them a great success for their research endeavor.

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Finally, and most importantly, we owe a great deal to our family members for their patience, encouragement, understanding, and support throughout this lengthy process.

This book could not have been completed without the support, assistance, and guidance of the aforementioned individuals. We are very grateful and indebted to all of them. We are also grateful to Springer for providing the chance to publish this book.

Abbreviations

ABS	Access and benefit sharing
ABT	Aichi Biodiversity Targets
AF	Adaptation Fund
AIACA	All India Artisans and Craftworkers Welfare Association
ATI	Appropriate Technology India
ATREE	Ashoka Trust for Research in Ecology and the Environment
BAIF	Bhartiya Agro Industries Foundation
BBOP	Business and Biodiversity Offsets Programme
BCA	Biodiversity Conservation Act
BNG	Biodiversity net gain
BNGR	Biodiversity net gain reporting
BNHS	Bombay Natural History Society
BSE	Bombay Stock Exchange
BVIEER	Bharati Vidyapeeth Institute of Environment Education and Research
C.A.F.E.	Coffee and Farmer Equity
CBD	Convention on Biological Diversity
CBI	Community-based Institution
CEED	Centre for Environment Education and Development
CEOs	Chief executive officers
CEPA	Conservation and Environment Protection Authority
CI	Conservation International
CII Code	Confederation of Indian Industry
CIL	Central Indian Landscape
CITES	Convention on International Trade in Endangered Species
CNA	Conservation Needs Assessment
CSOs	Civil society organizations
CSR	Corporate social responsibility
CTR	Corbett Tiger Reserve
CWN	Connectedness with nature
DBH	Diameter at breast height

DEC	Department of Environment and Conservation
DFO	District forest officer
DSC	Development Support Center
DSIR	The Department of Scientific and Industrial Research
DSP	DS Prabhudas
EbA	Ecosystem-based adaptation
EES	Environmental engineering services
EIA	Environmental impact assessment
EMP	Environmental Management Plan
ETP	Endogenous Tourism Project
FES	Foundation for Ecological Security
FICCI	Federation of Indian Chambers of Commerce and Industry
FPME	Friedman Plus More Ethics
G &B	Godrej & Boyce Mfg. Co. Ltd.
GBIF	Global Biodiversity Information Facility
GDP	Gross domestic product
GEF	Global Environment Facility
GIB	Great Indian bustard
GSTC	Global Sustainable Tourism Criteria
GTF	Global Tiger Forum
HDGC	Housing Development Finance Corporation Limited
HMS	Horticulture Management Services
HTPF	H. T. Parekh Foundation
HWIM	Human–wildlife interaction management
IBAT	The Integrated Biodiversity Assessment Tool
IBBI	The India Business & Biodiversity Initiative
IBP	India Biodiversity Portal
ICAR	Indian Council of Agricultural Research
ICDPs	Integrated conservation and development projects
ICOR	India CSR Outlook Report
IGCMC	Indira Gandhi Conservation Monitoring Centre
IGS	Indian Grameen Services
IS	Information system
ISO	The International Organization for Standardization
ISRO	Indian Space Research Organisation
IT	Information technology
ITC	India Tobacco Company
KCT	KC Thapar
KMVS	Kutch Mahila Vikas Sangathan
KPC	Kanha-Pench Corridor
LNP	Leh Nutrition Project
MCA	Ministry of Corporate Affairs
MDGs	Millennium Development Goals
Mfg. Co. Ltd.	Manufacturing company limited
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act

MoEF&CC	Ministry of Environment, Forests & Climate Change
MoU	Memorandum of understanding
NABARD	National Bank for Agriculture and Rural Development
NALCO	National Aluminium Company Limited
NBT	National Biodiversity Targets
NCA	The Natural Capital Awards
NCF	Nature Conservation Foundation
NDC	Nationally Determined Contribution
NEWS	Nature Environment & Wildlife Society
NGRBC	National Guidelines on Responsible Business Conduct
NGCPR	The Naoroji Godrej Centre for Plant Research
NGO	Non-governmental organization
NMDC	National Mineral Development Corporation
NSE	National Stock Exchange
NTCA	National Tiger Conservation Authority
NTFP	Non-timber forest Product
NVGs	National Voluntary Guidelines
OECD	The Organisation for Economic Co-operation and Development
ONGC	Oil and Natural Gas Corporation
PA	Protected areas
PATA	Pacific Asia Travel Association
PFS	Papuan Forest Stewards
PJV	Porgera Joint Venture
PNG	Papua New Guinea
PPVFR	Protection of Plant Variety and Farmers Right
PRADAN	Professional Assistance for Development Action
PSC	Project Steering Committee
RBS	Royal Bank of Scotland
RBS FI	RBS Foundation India
SDG	Sustainable development goal
SEEP	School Environment Education Programme
SLC-IT	Snow Leopard Conservancy India Trust
SPS	Sanitary and phytosanitary measures agreement
STCI	Sustainable Tourism Criteria of India
STF	Save the Tiger Fund
TCS	Tata Consultancy Services
TCSRD	Tata Chemicals Society for Rural Development
TEEB	The Economics of Ecosystems and Biodiversity
TELCO	TATA Engineering and Locomotive Company
TERI	The Energy and Resources Institute
TISS	Tata Institute of Social Sciences
TNC	The Nature Conservancy Centre
TOFTiger	Tour operators for tiger
TRIPS	Trade-related Aspects of Intellectual Property Rights
UN	United Nations

UNDP	United Nations Development Programme
UNESCO	The United Nations Educational, Scientific and Cultural Organization
USA	United States of America
VDC	Village Development Committee
WBCSD	The World Business Council for Sustainable Development
WCS	Wildlife Conservation Society
WCT	Wildlife Conservation Trust
WII-ENVIS	Wildlife Institute of India Environment Information System
WMS	Wetland Management Services
WOTR	Watershed Organisation Trust
WTI	Wildlife Trust of India
WWF-India	World Wide Fund for Nature India

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Part I
Introduction

Chapter 1
Corporate Biodiversity Management: Expanding the Horizons of Managing Biodiversity and Environmental Management

Ravi Sharma, Aparna Watve, and Amitabh Pandey

Abstract This introductory chapter provides an overview of mainstreaming biodiversity in corporate actions through their actions and policies which also include various innovative approaches for achieving sustainable growth. It illustrates the interlinkages of the research areas in the corporate biodiversity management field and different application focus areas covered in the corporate biodiversity studies globally. It addresses the prospects and challenges of corporate biodiversity management, underpinning the questions arises why there is a need for biodiversity management, and what are the key drivers for biodiversity management to be focused by the corporate? The multi-tier interactions involving different stakeholders associated with biodiversity conservation and management are discussed and emphasizes on the need for assessment of action plans and policies that could play a significant role and covers different approaches towards sustainability in reality. These discussions will lead the way to future directions and actions towards the integration of biodiversity management in industries and corporate decision-making strategies.

Keywords Biodiversity management · Mainstreaming · Corporate actions · Policies · Drivers · Challenges

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1 Background

Biodiversity, including ecosystems, species, and genetic diversity, provides invaluable and intangible benefits to society. Degradation and loss of biodiversity affect the society and economy both directly and indirectly. The spectrum of risks associated with biodiversity loss is increasing and is a concern for society, conservationists, and businesses. In line with the Convention on Biological Diversity and the 2011–2020 Aichi Biodiversity Targets, the 2030 Agenda for Sustainable Development places a strong emphasis on biodiversity. There is a need for immediate action and the collective engagement of all parts of society, governmental agencies, non-governmental organizations, and the corporate in the mainstreaming of biodiversity for achieving sustainable development goals (SDGs) (IIED and UNEP-WCMC, 2012).

"Mainstreaming" means the integration of the conservation and sustainable use of biodiversity in both cross-sectoral and sectoral plans of sustainable development goals (SDGs) like poverty reduction, climate change adaptation/mitigation, as well as trade and international cooperation (IIED and UNEP-WCMC, 2012). It also applies to sector-specific plans such as agriculture, fisheries, forestry, mining, energy, tourism, and transport, among others. In all cases, it implies changes in development models, strategies, and paradigms (Adams, 2006). Mainstreaming is specifically about integrating biodiversity conservation and management into existing structures, working, or plans of the agencies. Mainstreaming of biodiversity in government policies and sectoral plans has been started in many developed and developing countries. Integrating biodiversity objectives into current economic models is a complex challenge, as it will necessitate many changes in the functioning of corporate (Martin, Maris, & Simberloff, 2016; Polasky et al., 2019). However, many companies have initiated policies and actions towards the conservation of biodiversity and sustainable management.

In some countries, "Corporate Environmental Responsibility" is legally mandated. Innovative business models have been proposed and tested for integrating environmental protection and economic growth. The amalgamation of the industry and the biodiversity management with their strategies is laden with the innovative potential and provides ample opportunities for business growth. The concept of sustainability and global focus on climate change and mitigation measures has resulted in a deeper fostering of this discussion for a better understanding of the importance of farsighted resource management. It is also rightly stated by Alexander Watson (Founder & CEO of Open forests) that, "*Instead of focusing on environmental sustainability, today, the term sustainability has expanded even further and has become part of the global jargon and is widely used by multiple disciplines and sectors and in many cases unrelated to its original meaning*." Therefore, it is the need of the hour to use the term "sustainability" more holistically by the companies and organizations so that the real meaning of sustainability could be achieved.

Recently with the increased focus on mainstreaming biodiversity by the corporate houses ensuring sustainable growth, many guidelines and disclosure reporting

to achieve the concept of sustainability with economic growth simultaneously have been formulated. Globally many government and public sectors have made mandatory for the corporates and industries to focus on environmental management and biodiversity in their strategic decisions. The initiatives of the Confederation of Indian Industries (CII), The Federation of Indian Chambers of Commerce and Industry (FICCI), The India Business & Biodiversity Initiative (IBBI) are few examples that have showcased evidence of mainstreaming biodiversity management in the corporate world. The corporate social responsibility (CSR), Natural Capital Declaration (NCD), and environmental sustainability disclosures are some other innovative approaches for mainstreaming biodiversity management for good companies. There are different development financial institutions initiatives which have laid down sector-specific tools and methodologies for assessing the company's natural capital. This identification of the natural capital will assist the organizations in drawing the opportunities and strengths based on their dependencies and risks associated with the loss of biodiversity in their operations. The Natural Capital Finance Alliance (NCFA) is one such organization that provides the material aspects of natural capital for financial institutions.

There is increasing evidence that depicts the ecosystem degradations and its impacts on the companies' operations and profits, both environmental as well as social impacts. The troubling trends in habitat destruction, freshwater scarcity, land degradation, loss of biodiversity, and allied forms of declining natural capital continue to accelerate (Kumar, 2012; Millennium Ecosystem Assessment, 2005; TEEB, 2010). The companies nowadays are adopting a natural capital and ecosystem management approach into their formal business and planning strategies. The new opportunities are emerging and perceived by the business houses in restoring and managing ecosystems. It is estimated that the global business opportunities in natural resources will be US $2–6 trillion per annum as per the vision 2050: The new agenda for the business (WBCSD, 2010). Therefore, the adoption of natural capital and ecosystem service management approach will provide the long-term sustainability of the business and realized by the investors in the current stage of development. In the current focus on achieving SDGs, there is a dire need for businesses to identify primary drivers of biodiversity within the paradigm of corporate social responsibility, conservation programs, sustainability reporting, and environmental restoration programs in close government relations, including communities, stakeholders, and legislation. The reporting and performance can then be evaluated on the identified primary indicators and key performance indicators into actions.

2 Key Drivers and Challenges for Corporate Biodiversity Management

The biodiversity as an issue and mainstreaming of these critical issues in the organizational activities related to management and conservation by the corporate is still the least priority for businesses. Only a few corporates see this as an opportunity for

their business operations. Other handfuls of businesses are dealing with biodiversity for the sake of fulfilling requirements of their business reporting, sustainability reporting, or as a part of standard or compliance requirements. The core of biodiversity management lacks linkages with the vision and mission statements by the corporates. The accounting of natural capital and its management is still a niche concept and has to be explored to its full extent. Most of the biodiversity and socio-economic initiatives are taken care of through the company's corporate social responsibility (CSR) actions. The reputed multinational companies and global fortune enterprises actively engaged in CSR initiatives and have recognized and integrated the biophysical foundations with the conservation and protection of biodiversity (Winn & Pogutz, 2013). Such initiatives have enabled active and robust participation for avoiding destructive and enabling constructive and restoration projects with the proved evidence of management and conservation efforts along with other key stakeholders, including public agencies. The concept of CSR in itself demands the companies to extricate the complex relationships among their social obligations and to define CSR strategies that are effective and efficient (Arena, Azzone, & Mapelli, 2018). Apart from the CSR initiative, the other aspects that corporates are practicing to highlight their sustainability footprints are through developing and implementing corporate sustainability reporting along with CSR initiatives. Barkemeyer, Stringer, Hollins, & Josephi (2015) emphasized on the corporate reporting, as a solution to the wicked problems of land degradation and biodiversity conservation response by the corporate sector. However, unfortunately, corporate reporting, biodiversity reporting, and sustainability accounting are still in a nascent stage and superficial (Rimmel & Jonäll, 2013). The adoption of sustainability and greening their supply chain and operations are indeed becoming widespread and integrated into the company's core business and vision. Thereby resulting in the fusion of various innovations in design and process at the strategic levels (Hall & Vredenburg, 2003; Nidumolu, 2013; Nidumolu, Prahalad, & Rangaswami, 2009; Winn & Pogutz, 2013).

A study by Armsworth et al. (2010) illustrates that the businesses are interested and demanding varied ecological researches, but the publications that are published in the frontier applied ecological research publications and reports by the different ecological research agencies failed to reveal cross-disciplinary ecological research with the engagement with businesses, thereby limiting the application of ecological research in day-to-day business operations, management, and strategies. We in order to explore the various domains of research areas explored by the corporates conducted a short reconnaissance survey of the available renowned published research databases. An analysis of Scopus and Web of Knowledge research database enables us to explore the research areas coverage, and its relationship with each other in terms of the application by the corporates is depicted in Fig. 1.1. This will also justify the availability and gaps filled in the area of corporate biodiversity. The analysis and interconnectedness were drawn from a total of 108 relevant research articles explored from the research databases based on its bibliographic data and co-occurrences of critical terms. The Web of Sciences yields 50, and Scopus research database yields 58 relevant research articles focusing on the "corporate biodiversity management" and "biodiversity conservation and corporates." Only the

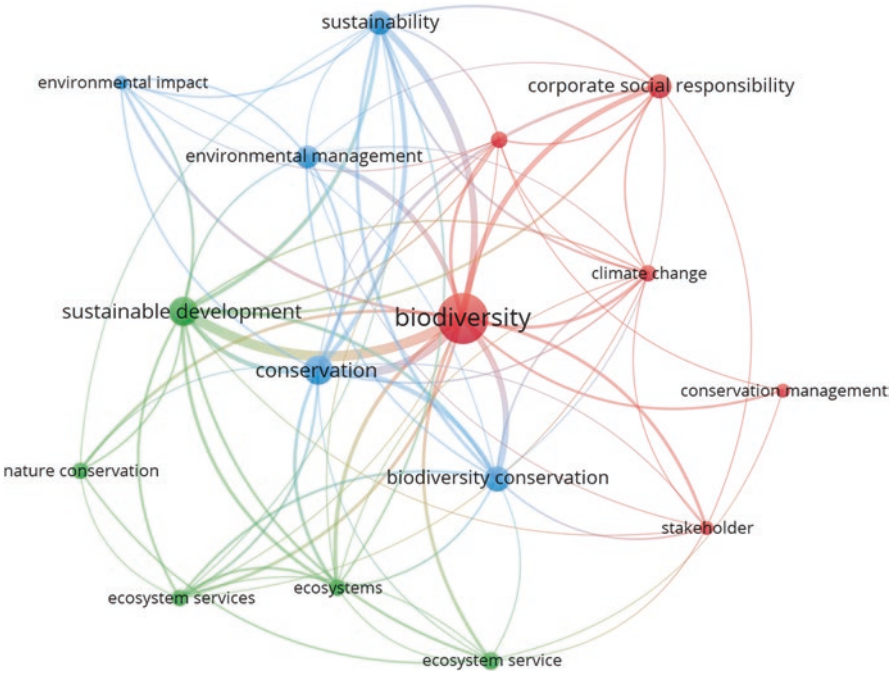

Fig. 1.1 Cluster and interlinkages of research areas in the corporate biodiversity management field

keywords which occurred at least five times were selected for drawing the result and interlinkages in this domain of research. The results suggests the development and association of corporate biodiversity management in the three major areas considering its application focus. They are as follows:

1. Biodiversity focusing on climate change, conservation management, and corporate social responsibility (red colored lines);
2. Ecosystem services approach for nature conservation and sustainable development (green colored lines); and
3. Environmental management and sustainability were inclusive of environmental impacts (blue colored lines).

The importance of biodiversity and ecosystem approach coupled with ecosystem services is a new trend by the corporates. The ecosystem services approach has been routinely acknowledged by the different researchers in their scholarly articles earlier (Balvanera et al., 2017; Cardinale et al., 2012). Despite the research elaborated, the biodiversity approach remains peripheral primarily to mainstream business strategies and decision driven by companies' corporate environment and sustainability divisions (Winn & Pogutz, 2013). However, the past few years have also witnessed a considerable increase in the ecosystem conservation and nature preservation efforts featuring the leading firms, corporates, and different stakeholders (Dempsey, 2013; Reale, Magro, & Ribas, 2018; Robinson, 2012; Tallis, Goldman,

Uhl, & Brosi, 2009; Wolff, Gondran, & Brodhag, 2017). The literature search, therefore, has illustrated the spark in the corporates addressing biodiversity management. The addressability is through the CSR, corporate sustainability standards, and sustainability reporting with different approaches, methods, and objectives. The more considerable chunk of efforts is through their CSR activities.

After reviewing the journey of corporate biodiversity management, the underpinning question arises why there is a need for biodiversity management, and what are the drivers for biodiversity management to be focused by the corporate?

The key drivers and challenges, therefore, would be:

- Except for giant corporate houses and global fortune companies, most of the companies are still unaware of the concept of an ecosystem or natural services, upon which their business operations are dependent. The interdependencies and impacts, therefore, are still a niche concept for such companies. The concept of natural or environmental accounting is a very new concept for them. Hence, the big challenge prevails that there needs to be a sufficient policy and capacity building initiatives compensating the organization towards the issue of their dependencies on the ecosystem, biodiversity, and to measure and evaluate their dependencies.
- The inclusion of biodiversity as a strategy or vision goal is still lacking in almost all the organizations putting the agenda of biodiversity management misleading.
- The conservation and management efforts are still acts of altruism rather than symbiosis and strategy goals. It is the vision of risk in terms of the supply chain, market, brand value, and liabilities.
- Even the reporting of biodiversity or non-financial sustainability reporting practices neglects the biodiversity issue because of low levels of awareness across the sectors. The limited knowledge and no consensus on what to report result into a minimal disclosure on biodiversity (Rimmel & Jonäll, 2013; van Liempd & Busch, 2013).
- Multi stakeholders' approach intertwining with governance structure mandates for the integration of corporate biodiversity management to achieve the goals of SDGs holistically. This will require a mature, stable, and concrete conceptual framework for the standardization of biodiversity and ecosystem approach for effectively addressing the range of challenges systematically. This will further require the strengthening of governance capacity structure and public governance institutions through policymaking and awareness. The sustainability standards need to address biodiversity issues in a robust, sustainable approach.

Hence, the key drivers towards the integration of biodiversity and ecosystem services approach by the corporates are the critical stakeholders pressure including local governance and peer-pressures, risks associated with the business, cost reduction by catering the dependencies, and new venue of business opportunities for the corporates (Macellari, Gusmerotti, Frey, & Testa, 2018). Similarly, the challenges faced by the corporates in the inclusion of biodiversity management into their core values are unavailability of standard guidelines and practices focusing on biodiversity issues, lack of standard environmental policies at the public governance level,

lack of suitable tools of biodiversity assessment and measurement, diffused awareness among the stakeholders and peers (Boiral & Heras-Saizarbitoria, 2017; Boiral, Heras-Saizarbitoria, & Brotherton, 2018; Macellari et al., 2018; Spangenberg, 2007).

3 Stakeholders in Corporate Biodiversity Management

Multiple tiers of stakeholders are associated with biodiversity conservation and management. They are both vertically aligned as well horizontally spread in the catchment areas of biodiversity zones. Similarly, the stakeholders associated with corporate sectors are both in their value chain as well as the auxiliary units. The most important stakeholders are local communities who are directly or indirectly benefitted or impacted by the action of industries.

Corporate biodiversity management can be done in-situ and ex-situ areas. In-situ means within the geography of operation of corporate, whereas ex-situ means management of biodiversity outside corporate control regimes, which requires a collaborative effort with the state legal organization or local bodies of indigenous groups who by legal framework have first right over biodiversity resources based on law and policies of different nations. Generally, primary stakeholders in biodiversity management are local communities for ex-situ sites; here, corporate as interface stakeholders can play an essential role in supporting different stakeholders with technical and financial support. The corporate social responsibility rules in India mandate corporates to play an active role in the conservation of biodiversity. However, the social capital between the corporate and local communities is quite low due to the lack of skills in collective action formation to conserve biodiversity.

Sometimes they conflict, if the corporate intervention results in damage and loss of biodiversity, especially in large scale mining projects. The key stakeholders, i.e. government agencies, do not act as a bridge between local and corporate as per CSR norms. However, in recent times with environmental governance gaining importance, corporates have strategically been giving importance in engagement with primary and critical stakeholders. Stakeholder participation has a successful track record in assisting in the management of species protection issues; guidance now exists for the implementation of ecological networks through stakeholder participation (Jones-Walters & Çil, 2011) and concerning local biodiversity action planning. In India, many mining industries have started involving local communities' in conservation of biodiversity and developing local community institutions for management and conservation of biodiversity.

The local community engagement is considered as the interest of corporations and business entities to eradicate the risk of conflict relational to the consumption of resources. It also manifests the subsistence use of local resources. There is now a distinct group of corporations and business think tanks that are interested in environmental sustainability. New business ventures "green" or "organic" ventures are being created, which address environmental concerns as well as social concerns. Businesses based on renewable resources, circular economy models, upcycling,

carbon fixing are some examples. At the same time, even within local stakeholders, groups are diverging from the earlier sustainable practices and having a significant impact on ecosystems and biodiversity on which they depend. It could be because of a lack of knowledge or because of changing the relationship with the natural environment and demands of new economic structures. Therefore our understanding of stakeholders and their interests in the preservation of biodiversity or ecosystems cannot be based on past stereotypes of stakeholders. It is possible, and in some cases, in the book, it has been shown that the community, as well as the businesses, can work in a mutually supportive role for conservation and sustainable use. This could be made possible through CSR, payment for ecosystem services, social businesses where the company can provide technological and technical inputs for managing the resources while the community, in turn, contributes their traditional ecological knowledge of the resources use. Their roles, in this case, are not antagonistic but symbiotic and catering to a broader community-society which is the third stakeholder. For example, the local people in a tourism town and tourism business operators both have the same interest—i.e., preservation of the natural values of the area, to cater to the tourists, thus building a true partnership for conservation. The same is the case of communities engaging with a corporate through access and benefit sharing mechanisms. The role of the government agencies, in this case, becomes that of a facilitator or regulator.

4 Needs for Assessment of Policies and Actions

With the advent of environmental policies in the decade in 1980 and sustainable development discourse, the legal and social compliances on corporate bodies started becoming more stringent. This made companies change strategies through a corporate social responsibility approach in engagement with external stakeholders, namely the state and local communities.

Internationally, laws and policies about business operations involving biodiversity have emerged since the 1980s. Agenda 21 of Convention on Biological Diversity (CBD), followed by Millennium Ecosystem Assessment and SDGs, are some of the vital global statements that helped create policies for the corporate engaging with biodiversity as natural capital. Various governments have taken actions accordingly to create standards, frameworks, and laws for businesses. The European Parliament and the Council of Europe's Directives encourage companies to present non-financial elements in their management reports including those regarding environmental performance, was one such step. United Nations organizations and IUCN have led the formulation of policy documents for diverse industrial sectors that are known to affect biodiversity adversely. IUCN and the International Council on Mining and Metals' Good Practice Guidance for Mining and Biodiversity was a step towards the positive engagement of corporate in conserving biodiversity. Biodiversity Strategy and Action Plan documents that are created by several countries, in most cases, include discussion and directives about the role of corporate.

Along with this, the financial institutions have simultaneously developed biodiversity risk assessment frameworks for the businesses operating in biodiversity-rich areas. A model of partnership between corporate-local communities is also being explored in some countries.

National Forest Policy of India 1988 mentions explicitly about the public–private partnership of corporate in forest governance. Some industries ventured into this design in the early twenty-first century. Later on, in 1996, the extension of the Panchayati Raj Act[1] provided ownership of Non-Timber Forest Produces (NTFP) to the village and its sustainable forest management. However, the local factors are not so suitable for such policy interventions. The Water Policy (2001), the Forest Right Act (2006), became the threshold for governing natural resources.

The biodiversity act mandates documentation of existing biodiversity in the local geographies and prepares the report of its status (MoEFCC, 2019). In addition, the act also prescribes for the institutionalization of management and conservation of village or local resources through the formation of micro-level institutions, namely the Biodiversity Management Committee (BMC) in each village, in consultation with the local people near the forest for the information on availability and indigeneous knowledge of bio-resources available.

In 2001, the Indian government came up with the Biodiversity Act and later on, it came up with the Biodiversity Action Plan in 2008, which mandates roles and responsibilities for different stakeholders. An important element in CSR is the use of various policies of natural resource management in its strategic goal. The enactment of Companies Act (2013) in India, clause 6, mandates corporates to ensure environmental sustainability, which encompasses natural capital and wildlife conservation goals of the country.

This also opens the road for collaboration for corporates to engage in bi-party or tri-party collaboration in the conservation of biodiversity. Many corporate houses like Tata group (engaged in conservation of Asiatic lions and sea turtles in Gujarat); Muthoot group is supporting in reducing the human–animal conflict (especially elephants) in southern states of India; Sony Group in protection of Red panda; Godrej and Boyce Manufacturing Company Limited—Marine Ecology Centre; Rio Tinto India—Vulture Project are some examples (Baroth & Mathur, 2019).

The 17 goals mentioned in sustainable development goals (SDGs) implemented by 200 nations from 2015 mandate each nation to protect and conserve its territorial land system ecology as well as its ocean ecology. One of the sectors in the planning SDG in India is the ecosystem and landscape management of natural resources. The corporate has a significant role through the goal of the CSR approach to assist the nation in achieving the target of SDG by 2030, the timelines prescribed by the United Nations for all countries.

[1] In India, the Panchayati Raj generally refers to the system of local self-government in India. This system of local self-governance mainly in the rural areas is introduced by a constitutional amendment in 1992.

5 Contents of the Book and Cases

This publication emphasizes to bring together the diversity of innovative actions and policy level changes initiated by the corporate for mainstreaming biodiversity and integrating ecologically sustainable management in their functioning. The policy environment necessary to sustain such efforts also needs to be discussed. The role and importance of drivers such as market forces, consumer opinion, exemplary success stories and cases globally were considered showcasing the effort and integration of corporate visions into the biodiversity management apart from the monetary values associated with their businesses. It is an attempt to explore the theoretical and practical aspects of biodiversity conservation and ecological management by the corporates. It will bring together actions undertaken by the corporates in different ecoregions and diverse economic sectors for the mainstreaming of biodiversity. The compilation of success stories by different corporate houses advocating the path for different approaches of corporate in developed and developing countries are addressed. The essence of this book is different from the others on the merit that it is practical applicability of the field studies and their outcomes in the ambit of the policies and actions by corporates.

Multinational companies may often have to adopt various approaches in their working in different countries. The essential human development needs in countries like India, Bangladesh, Nepal, etc. have led to more emphasis on the social responsibility of the corporates, for example, in achieving poverty reduction, improving health, reducing malnourishment, etc. However, more and more scientific studies have now shown strong linkages of these social problems with the underlying environmental problems of habitat degradation, biodiversity loss, etc. The book sections will explore if the corporate response to improving societal well-being has now changed towards addressing the environmental well-being and if so, what are the measures being adopted for the same. The role of the environmental lobby in shaping the corporate opinions and actions will also be documented.

The book will be a useful knowledge resource for academicians, researchers, corporate bodies, policymakers, civil society groups, policy think tanks, government organizations, international agencies, and other interested agencies in learning from different approaches and identifying best practices.

5.1 Objectives, Impact, and Values

This publication aims to understand the diversity of approaches adopted by the corporates towards mainstreaming biodiversity and ecological management in their policies and actions. It will also explore the role played by the corporates in achieving the national and global targets for the sustainable development goals. The publication will address various aspects of corporate actions such as corporate environmental responsibility, green businesses, market-based approaches to

biodiversity conservation, biodiversity trade-offs, a framework for natural capital management, etc. The synergy or discordance between national policies and action plans and corporate policies and action plans will be discussed.

Key objectives include:

- Understanding corporate approaches towards mainstreaming biodiversity and ecology in policy and action plans for sustainable development,
- Comparing the examples and assess the positive and negative impacts of corporate involvement in biodiversity conservation in the developed and developing countries,
- Provide a platform to discuss policies and laws that support the mainstreaming of biodiversity in different sectors through the success stories and evidence,
- Moreover, showcasing the innovative approaches, best practices, and models that can be replicated in diverse environmental conditions.

The studies included in the publication will help those working in the field of corporate involvement in biodiversity conservation. It will provide different models, approaches and outline the strengths and weaknesses of the approaches, which will be useful for designing new action plans. It will spark a debate and discussions on how effective the corporate actions or strategies are to cater to the need of sustainable development goals and how integrated their activities and actions are towards the conservation and environmental management. These discussions will lead the way to future directions and actions towards the integration of biodiversity management in industries and corporate decision-making strategies.

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Part II
Corporate Biodiversity Management: Policies, Data Sources and Technology

Chapter 2
Identification of Biodiversity Informatics Needs to Support Biodiversity Net Gains Reporting by Corporates in India

Aparna Watve

Abstract The relationship between Biodiversity and Business is complex and involves risks as well as opportunities. Various frameworks, policies, tools and indicators for assessing corporate impacts on biodiversity are established. IUCN advocates a "Biodiversity Net Gains" approach for businesses in their operations and at a landscape level that will contribute to the global goals for biodiversity conservation. Biodiversity informatics can help corporates in identifying their impacts, planning interventions and finally reporting Biodiversity Net Gains on a global scale. This study aimed to review Indian biodiversity informatics infrastructure and its usefulness to corporate agencies for reporting Biodiversity Net Gains.

For this study, components of corporate net gain reporting were listed, and biodiversity information needed for each were identified. Review of databases, platforms and portals providing information on Indian biodiversity was conducted. Most databases address spatial information on species and habitats but the temporal analysis is not possible. Essential data on ecosystem services, stakeholders, management practices and rights is unavailable in a searchable format. This paper suggests changes necessary in present infrastructure to address the gaps and enable corporate reporting on Biodiversity Net Gains fairly and transparently.

Keywords Biodiversity informatics · Net gains · Biodiversity offsets · Corporate reporting · India

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1 Introduction

Conservation of biological diversity is one of the main goals of sustainable development. Griggs et al. (2013) classified biodiversity as "Planetary Must-Haves" and argued for its inclusion in Sustainable Development Goals. It is expected that the private sector will take a lead role and create innovative models for sustainable development. The integration of biodiversity into different economic activities is necessary to achieve the SDGs (Addison, Bull, & Milner-Gulland, 2019). Along with the government and civil society organizations, the corporate need to proactively engage with biodiversity conservation.

Biodiversity poses risks as well as opportunities to business (Athanas, 2005; Barrington, 2004; Energy and Biodiversity Initiative (EBI), 2003). The nature tourism industry directly depends upon ecosystems, species, agrobiodiversity and cultural aspects of biodiversity. But tourism can degrade the ecosystems if it exceeds the carrying capacity of the area. The food industry capitalizes on food products derived from biodiversity. It can positively influence agriculture to increase agrobiodiversity through niche markets. Corporate bodies do take steps to prevent biodiversity loss (Baroth & Mathur, 2019). But the biodiversity conservation actions of corporate bodies are never presented in a consolidated manner nor weighed against the biodiversity losses caused by the companies' operations. Recently IUCN Business and Biodiversity Programme (2017) has advocated the "Biodiversity Net Gains" approach for businesses in operations and at a landscape level which will help understand the actual achievement in terms of the global goals for biodiversity conservation.

1.1 Essentials of BNG Reporting (BNGR)

Biodiversity Net Gains are "*a goal for a development project, policy, plan or activity in which the impacts on biodiversity it causes are outweighed by measures taken to avoid and minimize the impacts, to undertake on-site restoration and finally to offset the residual impacts, to the extent that the gain exceeds the loss*" (BBOP Business and Biodiversity Offsets Programme, 2018). As a measure of all the positive and negative impacts of a particular business together, it is extremely important for biodiversity stakeholders. It can be measured as the difference between the biodiversity risks or impacts caused by a project and the sum of biodiversity offsets and impact mitigation efforts (Fig. 2.1). If the biodiversity impacts are negative, the mitigation and offsets should exceed the impacts to achieve Net Gains; otherwise, there will be a Net Loss. For example, if an industry causes loss of habitat, to achieve Net Gain, it should mitigate the impacts by restoration and also support habitat conservation through biodiversity offsets for the habitat to truly benefit.

Bull and Brownlie (2017) pointed out that BNG is not a simple calculation, such as number of trees planted vs. trees cut. Stakeholders attach subsistence, economic

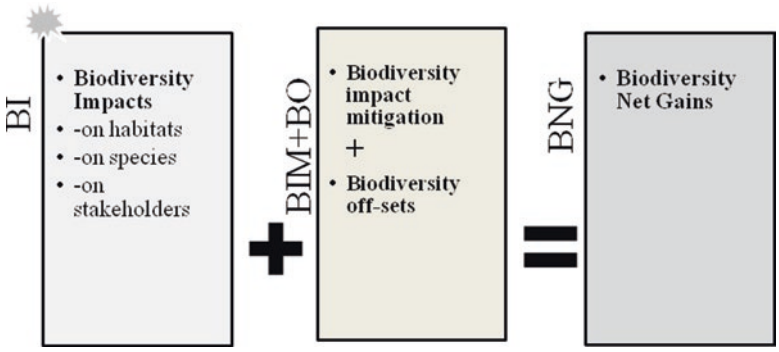

Fig. 2.1 Components of Biodiversity Net Gains

and cultural values to biodiversity apart from intrinsic ecological values, which also need to be considered in BNG reporting. BNG calculations can be reported by a single agency, based on its own actions, but their true worth can be assessed only when compared against the biodiversity conservation priorities recognized by various stakeholders. The priorities can vary from local to regional to global, which makes it even more complicated for the corporate to take decisions regarding appropriate course of actions in mitigation planning or offsets. The issue therefore is not just of corporate reporting, but of corporates making informed decisions regarding biodiversity that result in conservation.

Jones et al., (2010) describe various indicators of corporate reporting. Global reporting initiative for sustainability reporting (Global Reporting Initiative, 2006; Measurabl, 2015), guidelines and indicators for reporting impacts specifically on biodiversity and ecosystems (IUCN French Committee, 2014), a protocol for Biodiversity Net Gain review to be used by independent monitoring agencies to take management (IUCN Business and Biodiversity Programme, 2017) are some key documents available on the subject. They also mention ways in which decision-making can be linked with conservation priorities. But the decision-making and planning require reliable biodiversity information. Specific regional policies and legal requirements need to be considered by the corporates while planning. It is thus a daunting task for a single agency but can be made possible through collaborative action of various agencies motivated for biodiversity conservation.

In India, each component of BNG is covered by separate policy or law. A brief description is given below which will be useful to understand the information needed for addressing each in reporting.

Biodiversity Impact Assessment: In the Indian context, biodiversity impact assessment is part of the mandatory environmental impact assessment for some projects and information required is as per the Environment Impact Assessment Notification and Environment (Protection) Act, 1986 (Khera & Kumar, 2010; Potdar, Gautam, Singh, Unnikrishnan, & Naik, 2016). Some large projects with

foreign investments often use IFC6[1] standards. These standards mainly cover biodiversity impacts during the project initiation phases, impacts on biodiversity can continue throughout the project operation period as well and need to be regularly reported by corporate as biodiversity impacts. This is generally done through monitoring which is part of EMP or Wildlife Management Plan provisions of the EIA notification in India. Businesses that do not require EIA as per the law can also have biodiversity impacts. For example, collection of biodiversity for producing a product (e.g., species used in pharmaceuticals, cosmetics or food products) or exploitative use of habitats (e.g., tourism in sensitive habitats) have biodiversity impacts, which may not be covered completely under the purview of EIA law.

Biodiversity impact mitigation includes the interventions planned by the corporate agencies to mitigate the impacts on biodiversity at the project site or in the zone of influence or its business operations. EMP and Wildlife Management Plans are suggested, especially in areas of threatened habitats or wildlife likely to be affected by the projects. The industry may contribute towards the restoration of wildlife habitats, sustainable livelihood generation in the areas of operation which are positive impacts on biodiversity values in the corporate reporting cycle.

Biodiversity offsets as described by BBOP Business and Biodiversity Offsets Programme (2009, 2012) are biodiversity conservation actions or interventions well beyond the impact mitigation. Biodiversity offsets are carried out globally by large companies (Ten Kate, Bishop, & Bayon, 2004). These are at times in regions outside their zone of impact.

Biodiversity reporting in a mega-diversity country like India is challenging due to spatial and temporal dynamics, interlinkages, a multitude of ecosystem services and stakeholders with rights over access and use of the local biodiversity. Accurate and standardized biodiversity information on all aspects is the essential requirement for all. Corporates require it for decision-making and reporting and the government as well as the community requires it for monitoring the quality of reporting. Considering this, there is an urgent need to use information and communication tools (ICT) to analyse and present biodiversity information in a manner that facilitates corporate BNG reporting.

The aim of this paper is to review the status of informatics infrastructure for Indian biodiversity and assess its usefulness for Biodiversity Net Gain Reporting (BNGR) by the corporates. The specific objectives were:

- To list parameters and indicators for BNGR
- To identify essential data needed for BNG reporting in India
- To review data needs addressed by existing Indian biodiversity informatics infrastructure and identify gaps

The results of these searches are used to suggest further development of infrastructure and tools that can facilitate corporate users in BNG reporting.

[1] International Finance Corporation's guidance note 6: biodiversity conservation and sustainable management of living natural. www.ifc.org.

2 Methodology

Various global frameworks, protocols and standards on BNG were consulted. A useful review of biodiversity indicators can be found in Jones, Solomon, Rimmel and Jonäll (2013), Phalan et al. (2018) and Addison, Carbone and McCormick (2018). A list of parameters and indicators for biodiversity risks, impacts and Net Gains was compiled from literature review to identify essential data needed for BNG reporting. Scales for measuring positive or negative changes in the indicators due to corporate interventions were also listed.

Biodiversity databases and repositories that provide essential data required to address the listed parameters were scanned. Characteristics of the database were noted using website's declarations, metadata on portals and scientific papers. Information on hosting institutes and administrators, data coverage, spatial and temporal attributes of data, online/offline status, accuracy, transparency and updates, user-interface and availability of analytics tools especially for the corporate users were also documented using primary and secondary sources of information. (Barve & Otegui, 2016; Dwivedi & Kumar, 2012; Juffe-Bignoli et al., 2016; Vattakaven et al., 2016). A list of selected databases mentioned in the text is given. Comparison between data required for BNGR and ICT available for data analytics helped to identify gaps and information needs. Globally available knowledge products and tools for corporate reporting were also searched. Based upon this, suggestions are given for further development of Indian informatics infrastructure for accurately reporting BNG.

3 Results and Discussion

3.1 Parameters and Indicators for Indian Biodiversity Reporting

BNG reporting in India requires accurate information on parameters and indicators listed in Table 2.1. Each can be used to prepare project specific indicators and checklists for reporting by the corporate agencies for understanding positive or negative impacts of their interventions. Examples of how measurable scales can be created are also suggested in the table below.

3.2 Essential Data Needed for BNG Reporting

Review of Table 2.1 indicates the essential data requirements can be classified into (a) spatial data on presence of biodiversity and (b) temporal data for detecting changes. Spatial data includes aspects such as maps of occurrence (presence or

Table 2.1 Parameters and indicators for Biodiversity Net Gain reporting

Parameters	Impact factors for assessing changes (negative/positive)	Examples of scales and measures of assessment that can be prepared
Ecosystems information with particular focus on		
Sensitive habitats Threatened habitats Specific communities of plants and animals (threatened plant communities, migratory birds, etc.) Protected habitats	Area covered (reduction/increase) Duration (reduction/increase) Degradation/restoration Loss/recovery	E.g. Change in the area of wetland (either reduction or increase) or change in visiting time of migratory species (either reduction or increase)
Species information with special focus on		
Endemic and Threatened species Red-listed species Species covered by the Wildlife (Protection) Act 1972 NTFPs, commercially useful species, etc.	Area covered (reduction/increase) Numbers (reduction/increase) Populations (degradation or increase) Harvest (sustainable or unsustainable)	Populations increase or decrease Species recovery Sustainable harvesting
Local stakeholders information with special focus on		
Community rights Ethnobiological uses Livelihood dependence	Area under community rights (reduction/increase) Traditional uses of biodiversity Transfer of traditional knowledge Sustainable livelihood (loss/gain) Income (loss/gain)	Community rights strengthened Documentation, outreach Sustainable use Improved livelihoods Increase in income

absence of a species), abundance (e.g., the number of birds in a place), behaviour (phenology, or breeding sites), ecosystem services (habitats), etc. Although this can be done for all species and habitats, BNGR requires data mainly on parameters and indicators specified in Table 2.1 such as sensitive habitats, endangered species, areas protected by government or people, ecosystem services of habitat, etc. These are needed at the biodiversity risk assessment stage in which baseline creation is crucial.

The essential data requirements for different components of BNGR are shown in a simplified format in Table 2.2.

Web search on parameters identified above returned a list of several repositories and platforms on Indian biodiversity. Information in more than 70 sites was reviewed, of which selected datasets quoted in this paper are listed in Table 2.3. Their key characteristics are discussed below.

Table 2.2 Essential data requirements for Biodiversity Net Gain reporting

Components of BNG	Biodiversity risk assessment/ EIA	Biodiversity impact mitigation/ EMP	Biodiversity offsets
Purpose for analysis	Biodiversity baseline creation	Change/trend analysis following interventions by corporate	
Nature of dataset required	Spatial datasets on species/ habitats/ecosystem services/ legal status	Temporal datasets on species/habitats/ ecosystem services/legal status	
Biodiversity Net Gain report	*Capturing temporal changes in spatial data* Tool needed for documenting trends, time-series analysis		

3.3 Indian Biodiversity Informatics Infrastructure and Its Usefulness for BNG Reporting

Systematic biodiversity documentation in India started almost 150 years ago. Bringing this information in digital format and later in online databases was started at the beginning of this century. The earliest efforts, such as an electronic catalog of Indian fauna (Chavan et al., 2004), regional databases like Sasya Sahyadri (Ganeshaiah & Uma Shaanker, 2003) are not available anymore. However, there has been a phenomenal increase in the availability of information on Indian biodiversity in an open-access format. Indian datasets today are linked with global biodiversity datasets through protocols and standards formulated by GBIF.[2] The largest datasets on biodiversity of India are available with organizations such as Botanical and Zoological Survey of India, Bombay Natural History Society, etc. Parts of these verified by subject experts such as zoologists, botanists, ecologists are being made publicly available as "Expert datasets" which are reliable for further analysis.

Apart from this, there is an increase in datasets collected through participatory efforts—often called "Citizens-science datasets", which gather occurrence data on biodiversity. Collaborative data collection platforms such as IBP,[3] iNaturalist[4] have empowered individuals to contribute geotagged data, which can be then verified by expert scientists. These developments are advancing our knowledge of biodiversity and enabling analysis required for decision-making on management.

3.3.1 Spatial Information on Habitats

Spatial information on the entire Indian landscape and land use is mainly available with ISRO. The agency has an extensive spatial database of satellite imagery collected over many years along with maps of land use-land cover (LULC), topography, vegetation types, etc. Legacy data such as toposheets, older land classification

[2] Global biodiversity information facility. www.gbif.org.

[3] https://indiabiodiversity.org.

[4] https://www.inaturalist.org/.

Table 2.3 List of Indian biodiversity databases and portals mentioned in the text

	Database/portal	Characteristics	Access
1.	Spatial datasets Bhuvan portal	Geoplatform with diverse services partial access to vegetation types, ecosystem uniqueness, species richness. endemic, rare, endangered, threatened and medicinally/ economically important species	Partially accessible through Bhuvan portal https://bhuvan-app1.nrsc.gov.in/thematic/thematic/index.php
2.	Indian plant information Botanical Survey of India	List of Indian plants, specimen data, research papers and books, etc.	Offline access
3.	Indian animals information Zoological Survey of India	List of Indian animals, specimen data, research papers and books, etc.	Offline access
4.	Traditional knowledge digital library (CSIR and AYUSH)	1200 ayurvedic, unani and siddha formulations	http://www.tkdl.res.in/
5.	IndOBIS Ministry of Earth Sciences	Marine species, legacy and observation data	https://cmlre.gov.in/mlrprograms/indobis# and https://obis.org/
6.	National Forest Inventory of India Forest Survey of India	Data on vegetation with special focus on forest	Offline through maps http://fsi.nic.in/about-forest-inventory
7.	Protected areas and others Wildlife Institute of India	National park, wildlife sanctuaries, conservation reserves, Ramsar sites, natural heritage sites, etc.	http://www.wiienvis.nic.in/Database/Protected_Area_854.aspx. Partially accessible through Bhuvan portal
8.	Indian biodiversity information system	Indian flora and fauna (mostly fauna at the moment)	https://indianbiodiversity.org/
9.	Biodiversity atlas by National Centre for Biological Sciences	Butterflies, moths, odonata, cicada, reptiles, amphibians and birds, mammals and other taxa	https://www.bioatlasindia.org/
10.	India Biodiversity Portal ATREE, French Institute of Pondicherry and Strand Life Sciences	Biodiversity checklist with focus on collection of observation records through citizen participation, maps, datasets, documents available	http://indiabiodiversity.org/
11.	Diversity India	Several yahoo groups on plants and animals (linked to iNaturalist, FB, Flickr)	http://diversityindia.org/
12.	eBird	Online checklist program, observation collection	https://ebird.org/home

13.	The global biodiversity information facility (GBIF)	Is an international network and research infrastructure funded by the world's governments and aimed at providing anyone, anywhere, open access to data about all types of life on Earth	https://www.gbif.org/
14.	Ocean biogeographic information system (OBIS)	Marine biogeographic data	http://www.iobis.org
15.	Species information system International Union for Conservation of Nature (IUCN)	The IUCN Species Information Service (SIS) is the central database used by IUCN to store and manage species accounts and assessments (not openly accessible)	www.iucn.org/themes/ssc/our_work/sis.html
16.	Red List of Species International Union for Conservation of Nature (IUCN)	Database on threatened species	https://www.iucnredlist.org/
17.	Protected planet (UNEP-WCMC, IUCN and World Commission on Protected Areas)	Protected areas declared by the countries as well as by the communities	http://www.protectedplanet.net/
18.	The world database of key biodiversity areas	Key biodiversity areas (KBAs)	https://www.iucn.org/resources/conservation-tools/world-database-on-key-biodiversity-areas
19.	IUCN Red List of Ecosystems	Database on threatened ecosystems	www.iucnredlistofecosystems.org
20.	iNaturalist Cornell University with others	Observational database on biodiversity	https://www.inaturalist.org/

maps and imagery are now openly available for research and planning purpose. Time-wise analysis is possible in the ISRO databases although the intervals between successive updates are large. Apart from ISRO, The Forest Survey of India, Forest Research Institute and the Ministry of Environment, Forest and Climate Change have developed habitats maps for specific habitats like forests and wetlands. Many of these maps are not openly accessible online for analysis and have to be purchased or accessed for specific projects. Data on the other important threatened and sensitive habitats of India such as banni[5] grasslands, cold desert, rock outcrops, *Myristica* swamp forests are compiled by researchers but are not openly accessible on open portals.

Database on protected areas of India is available with the Wildlife Institute of India, at the WII-ENVIS Centre on Wildlife & Protected Areas. It includes national parks, wildlife sanctuaries and sites of conservation importance (e.g., biosphere reserves, natural heritage sites, etc.) protected through global initiatives on biodiversity. Community conserved areas are not yet adequately covered by these agencies.

Information on Indian habitats and Protected Areas is also covered by the Protected Planet which is the online interface for the World Database on Protected Areas, managed by the United Nations Environment Programme, World Conservation Monitoring Centre and IUCN. It holds information on designated protected areas and sensitive sites, including heritage sites, key biodiversity areas, important bird areas, Ramsar sites. It enables use of existing protected area data for information-based decision-making, policy development and business and conservation planning. Businesses can use this data to identify biodiversity risks and opportunities for a given project. It can also be used to plan conservation and predict the outcomes of interventions and identify areas for biodiversity offsets. The global datasets mainly include data contributed by the countries and hence any gap in the national database or missing links will reflect on global maps. For this, it is necessary to ensure that national mapping is complete.

Changes in data sharing policies have increased open-access to several spatial datasets available with Indian government agencies. This is made possible through the Indian web portal "BHUVAN", which has research-grade spatial-temporal datasets that can be accessed or purchased. It provides access to several critical thematic sections on environment and forestry, Green India Mission, land use & land cover changes, protected areas, wetlands, rivers, project Tiger, etc. Although it allows users to create their projects to some extent, it does not yet allow participatory monitoring of the landscape by people.

3.3.2 Spatial Information on Species

Expert datasets on species are available with the Botanical and Zoological Survey of India and several other centres of biodiversity studies, mainly as legacy data (from museum or herbarium specimens). With few exceptions, these are not

[5] A grassland type occurring in the Rann of Kutch in Gujarat State, India.

available in map-format and therefore cannot be used efficiently for biodiversity risk analysis. Every EIA or threat analysis has to start by collating species data from various books, researchers, institutes and followed by ground-truthing. This may lead to missing information on many important and sensitive taxa. Accurate, fine-scaled and reliable maps of endemic and threatened species distribution, species scheduled under the Wildlife (Protection) Act, 1972 and Indian Forest Act 1927, are not available for risk assessment studies. IUCN's Red List provides distribution maps of red-listed species but several species from India are not yet included in the assessed. Hence accurate mapping of risks to threatened species becomes a time-consuming process in which various agencies, old datasets, books need to be referred and can lead to errors or gaps in knowledge.

A significant contribution to the spatial datasets on species has been made by the citizen-science initiative like India Biodiversity Portal, Diversity India, Biodiversity Atlas—India, iNaturalist, eBird, etc. These have built observation datasets on selected taxa in an online manner through the participation of several observers. The strength of these initiatives is the continuous collection of real-time data on species occurrence and its presentation on a map. Some include other features such as phenology, life history, etc., but most emphasis is on occurrence—simple presence and absence. However, they do have observer-bias and may not cover several areas or taxa, making it only partially useful for biodiversity risk analysis. Participatory tools and platforms for data collection provided by the citizens-science databases are more useful for the BNGR than the actual data they contain.

3.3.3 Spatial Information on Stakeholders

One of the most important aspects of biodiversity is information related to biodiversity use, rights of use, economic and cultural aspects of biodiversity and conservation measures by the community and society.

Some initiatives by the government are the Traditional Knowledge Digital Library, The Indian Medicinal Plants Database and the Indian Bioresource Information Network (Kuriakose & Pisupati, 2019). In future, this information will be useful for comprehensive assessments of traditional uses of plants. It will guide corporates interested in undertaking projects on medicinal plant conservation, ex-situ cultivation of rare species, etc., by the corporate. The knowledge needs to be organized region-wise or community-wise to help the corporate users to understand the legal implications of the use of this knowledge, to design interventions for strengthening the knowledge or designing livelihood programmes as part of mitigation or offsets.

The availability of accurate baseline maps is a prerequisite for biodiversity risk assessments in EIA and hence needs to be facilitated. Existing databases on Indian biodiversity need to be strengthened in these aspects. Unless baseline maps are available, any change in biodiversity for better or for worse will not be detected and BNGR cannot be completed.

3.3.4 Identification of Gaps in Spatial Information

a. *Lack of Spatial Information on Biodiversity Stakeholders and Ecosystem Services*

Biodiversity is widely used all over India and it supports livelihoods of local communities in many ways. Ecosystem services of various types (supporting, regulating, cultural) are known for habitats as well as species. Local communities have maintained indigenous germplasm of domesticated plants and animals in many areas. This agrobiodiversity is of extreme importance to local livelihoods. Laws such as The Forest Rights Act, 2006, The Biological Diversity Act, 2002, The Indian Forest Act, 1927 and The Wildlife Protection Act, 1972 and their various amendments recognize a variety of rights of stakeholders over habitats and species including those of access, use, management and conservation.

Prominent examples are sacred groves, community reserves, areas where community forest rights or nistar[6] rights are granted, etc. For companies that use biodiversity for commercial purposes, for example, pharmaceutical companies, it is mandatory to report on associated traditional knowledge and share benefits accruing from it under the Access to Benefit Sharing protocols as per the Biological Diversity Act, 2002. Very few Indian databases or platforms collate or make available information on this aspect. There is no comprehensive national database that documents ecosystem services, agrobiodiversity or biodiversity stakeholders and their rights in a spatial format. This is a major gap in risk assessments during EIA, which requires at least a partial documentation of these parameters. A corporate project in an area is most likely to compete with the local stakeholders including community right holders, those dependent on ecosystem services of the area, leading to conflicts and jeopardizing investments. This has already led to conflicts in several mega-projects (Martinez-Alier, Temper, & Demaria, 2016) in India leading to delays and court cases. There is an urgent need to create openly searchable national databases at least in cases where legal rights over biodiversity have been granted. Corporates agencies can contribute towards database creation as it will ensure reduced financial risks in future projects. Support to the local stakeholders, improvement in ecosystem services can be made part of the mitigation and biodiversity offset mechanisms leading to Net Gains.

b. *Absence of Linkages Between Expert Datasets: Citizens-Science Datasets*

A significant gap in the biodiversity infrastructure in India is the absence of linkage between the expert databases and citizens-science databases. If this can be established, the real-time data coupled with specimen/legacy data can help create more accurate spatial datasets on Indian biodiversity. These will be of great help not only

[6] "Nistar" is a type of right granted for domestic use of forest produce.

in biodiversity risk assessments but also in the monitoring of changes and identifying areas for interventions. Efforts of mitigation or offsets such as ecorestoration, species recovery can be monitored and assessed by corporate themselves as well as monitoring agencies in a participatory manner through citizens-science platforms. Overlaying these with national databases will allow analysis that can guide in planning future interventions for biodiversity conservations.

c. *Lack of Tools for Detecting Temporal Changes and Assessing Impacts*

At present spatial datasets are well established, but very few allow analysis of trends or time-series data or comparison of species distribution of habitats over time. Unless these are made available, change detection, for example, before and after interventions by the corporate agencies, is not possible. Spatial data needs to be collected periodically to understand the impacts of operations by corporates, positive and negative effects of mitigation and offsets and finally, for calculating Net Gains by analyzing the changes in selected indicators over time.

Landscape-level changes at finer scales need to be captured for assessing the impacts of interventions. Such a database can form a useful reporting tool for companies. For example, if regular landscape photography is done in an area, say over a plantation or ecorestoration area, the time-series pictures can show an increase in the cover of species. Efforts of landscape documentation such as those in the USA by the National Science Foundation are also required in India. Initiatives in the USA such as the National Ecological Observatory Network[7] and the Ocean Observatories Initiative[8] for data from terrestrial, freshwater, ocean and coastal ecosystems offer tools and datasets with spatial and temporal data that allow the analysis of change in a region.

Citizens-science initiatives for collecting ecosystem/landscape data are currently not available in India. There is an urgent need to create ecosystem/regional monitoring systems where observers can contribute photos and other datasets. This can be done through the use of Google Earth or Wiki maps to some extent as they already collect data from individuals on landscape attributes. Citizen-science portals such as iNaturalist allow the creation of projects, and the datasets are monitored by subject experts who volunteer in data curation. This provision can be used by corporates to report on the mitigation and offset efforts. Collaborative monitoring of indicators such as migrant birds in a restored habitat can be made as part of biodiversity reporting which becomes openly available for external monitoring.

Such a facility will be useful for corporate users to continuously monitor and analyse changes in the ecosystems following interventions that could improve mitigation planning and calculation of Net Gains. Integration and sharing of these can be done at the project level for BNGR—for example, corporate users collect spatial

[7] Ecological Observatory Network. https://www.neonscience.org/.

[8] Ocean Observatories Initiative. https://oceanobservatories.org/.

data on their areas of operations (sites, the zone of influence, etc.) as part of EIA. The same areas can be continuously filmed or photographed to understand the effects of interventions such as green belt development or habitat restoration. Sharing this geotagged data openly for independent review and monitoring by external government or voluntary agencies can be a part of biodiversity reporting.

4 Conclusion

All the parameters used for assessing biodiversity are dynamic entities, changing continuously. The changes in biodiversity, for better or for worse, due to the corporate interventions, can be calculated based on spatial and temporal attributes. Biodiversity informatics infrastructure can be considered useful for Biodiversity Net Gain reporting only if it allows for measurement of change on the spatial and temporal scales. Review of various websites, tools, platforms for Indian biodiversity shows that they are weak in their capacity to detect changes or trends in biodiversity at present. Although there has been considerable progress in the informatics, and access to authentic information is increasing, they all cater mainly to biodiversity researchers or at best citizen scientists. The government databases have the technical capacity to allow trend analysis but are providing only coarse datasets in the public domain.

Biodiversity informatics in India has come a long way since its inception, although some gaps continue to remain. Chavan and Ingwersen (2009) have highlighted the social, political and cultural issues that create hurdles in open-access to biodiversity data that can prevent further analysis. The data available so far in spatial format can only support biodiversity risk assessment, and reporting, and that too, to a limited extent. Unless the gaps are addressed, it cannot be used for decision-making regarding mitigation or offsets or calculating BNG. Possible ways of improving the existing informatics infrastructure are listed above that will help in designing interventions and monitoring of biodiversity impact mitigation and offsets.

At present, there is no analytical tool available to help corporate agencies for any component of the BNG reporting. Globally at least one such tool is available for biodiversity risk assessment. The Integrated Biodiversity Assessment Tool (IBAT)[9] made available by IUCN provides a basic risk screening on biodiversity at a global scale. It draws together information from IUCN's four Knowledge Products: IUCN Red List of Threatened Species, Red List of Ecosystems, Key Biodiversity Areas and Protected Planet/The World Database (details in Table 2.3). There is a great need to design similar knowledge products and tools for risk assessment specifically for India, including key parameters such as ecosystem services and stakeholder

[9] https://ibat-alliance.org/.

communities. The same tool can be further expanded to help with planning and monitoring mitigation, offsets and finally, in BNG calculation.

For quantitative measurement of BNG, specific calculators such as those made available for carbon sequestration need to be developed. Much research is needed for devising scales and measures of BNG in the Indian context. It needs to cover all the parameters and should not rely only on simple measures of biodiversity like species richness. Future researchers can look into these aspects.

Biodiversity reporting by corporates is mostly voluntary at the moment and included in the CSR reports, annual reports and other publications which mostly remain inaccessible for reviewing or monitoring by the society. Whether it supports the national or global priorities of biodiversity conservation and sustainable development or hampers them cannot be analysed until the BNG reports are overlaid on the biodiversity conservation prioritization maps. For this purpose Corporate Biodiversity Reporting platform can be created that will allow users to see the various initiatives taken by corporates towards conservation of Indian diversity and compared against their impacts. A common report for corporates together will help to review businesses' cumulative impact on biodiversity. If these datasets are overlaid on the maps of threatened species, or habitats or areas of ecosystem services or community conservation areas, corporate can think of taking up mitigation/offset in areas that are not covered by earlier efforts. This platform can help guide the corporate efforts to cover national and global needs of biodiversity conservation and community development.

Considering this, suggestions are provided below for further development of biodiversity infrastructure to facilitate corporate users in BNG reporting.

a. Ensuring spatial and temporal analysis features for all biodiversity databases.
b. Addressing gaps in biodiversity information available online and searchable through national platforms.
c. Creation of a platform specifically for corporate users to report on biodiversity, including impact assessment, mitigation and offsets.
d. Creation of knowledge products and tools for calculating Biodiversity Net Gains by assessing the information provided through corporate reporting.

BNG reporting is not just a legal or policy requirement or assessment of corporate performance but a positive step towards achieving national priorities for biodiversity conservation. Citizens and government agencies should not play only a limited role of watchdogs in this effort, but actively provide support considering biodiversity as a societal need and not a sectoral requirement.

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Chapter 3
Corporate Social Responsibility Role in Biodiversity Conservation: Policy Action and Good Governance

Amitabh Pandey

Abstract The industrialization process in due course of modernization and development has impacted the natural capital. Through strategic policy of corporate social responsibility, Corporate have aimed to address the natural capital loss and biodiversity loss. Subsequently, intervention in Biodiversity conservation was also incorporated in the policy developed by the government of India in 2013. The real challenge is the implementation of the policy in an effective and equitable manner. With the Sustainable Development Goals (SDG) in place, the goal of biodiversity conservation becomes even more critical. Application of Good Governance principles in CSR will make it more robust and strengthen the role of multiples stakeholders in the achievement of policy goals of biodiversity conservation. This paper looks into the policy performance of CSR, biodiversity conservation and other policies of natural capital conservation. This provides opportunities and challenges to Corporate to develop frameworks and collaborate with local communities in biodiversity conservation.

Keywords Public policy · Natural resources · Indigenous communities · Good governance · Biodiversity conservation

1 Introduction

Biodiversity management is core to human civilization's sustenance and livelihood. The role of multiple stakeholders becomes essential in this journey. The corporate organizations of the country are a key stakeholder and user of natural products, the role becomes important and its contribution needs to be ensured both by a legal and social process. A policy problem aims to solve the problems faced by society at a given point of time. The industrialization process in due course of modernization

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and development has impacted the natural capital, in lieu of this, corporate through its voluntary value-based or strategic policy aimed to address the natural capital loss and biodiversity loss through corporate social responsibility. Subsequently, intervention in Biodiversity conservation was also incorporated in the policy developed by the government of India in 2013.

According to the Convention on Biological Diversity (1992) biodiversity loss is one of the pressing issues of the twenty-first century. It advocates action at global as well as national level. Biodiversity support is vital for the existence of human civilization and its intrinsic value. It is necessary to preserve this wealth of species and habitats, through effective public policy and good governance. Similarly, the Biological Diversity Act, 2002 addresses the issue of conservation of biological diversity, sustainable use of its components. The act ensures fair and equitable sharing of the benefits arising out of the use of biological resources and associated traditional knowledge (Ministry of Law and Justice, Government of India, 2002).

The real challenge is the implementation of the policy in an effective and equitable manner, for which compliance and monitoring are essential. With the Sustainable Development Goals (SDG) in place, the goal of biodiversity conservation becomes even more critical. Good Governance principles application in CSR makes it more robust and strengthens the role of multiple stakeholders in the achievement of policy goals of biodiversity conservation. Both the internal and external stakeholders of the CSR organization need to be developed and monitored so that they participate in the process of biodiversity conservation.

This paper looks into the policy performance of CSR with respect to biodiversity conservation and other policies that aim to conserve the natural capital and biodiversity of the country and contribute to the SDG goals. The number of policies associated with biodiversity conservation has been framed in past two decades in India, starting from National Forest Policy, 1988, Panchayats (Extension to Scheduled Areas) Act, 1996 (PESA, 1996), The Biological Diversity Act 2002, and The Forest Rights Act, 2006, all aim to provide a major role to the indigenous communities in biodiversity management.

This provides numerous opportunities as well as challenges to Corporate to develop frameworks to collaborate with local communities and contribute to biodiversity conservation through developing linkages between CSR organizations and indigenous communities.

2 Policy Related to CSR and SDG

The Ministry of Corporate Affairs implemented section 135 and Schedule VII of the Companies Act 2013. Provisions were made later with the Corporate Social Responsibility Policy Rules, 2014 implemented on April 1, 2014 (Bahl, 2014). Under this, the activities that Corporate can take up to attain CSR objectives are defined. These include the removal of poverty and hunger, health, promoting education, and promoting gender equality. It also has issues of external stakeholders like

poor excluded communities and indigenous communities, besides ensuring environmental sustainability and ecological balance, wildlife conservation, etc.

The National Voluntary Guidelines (NVGs) on the Social, Environmental and Economic Responsibilities of Business were released by the Ministry of Corporate Affairs (MCA), Government of India, in 2011. These guidelines aimed to provide guidance for socially responsible businesses. In continuation, these guidelines were aligned with Sustainable Development Goals (SDGs) in 2015. In 2019, after, revision of the new principles, they are called the National Guidelines on Responsible Business Conduct (NGRBC) which are provided with the NVGs. The NGRBC has been designed to assist businesses to perform above and beyond the requirements of regulatory compliance (Ministry of Corporate Affairs, Government of India, 2019).

Therefore these national guidelines aim to integrate all the existing laws and policies applicable in the Indian context. The seventeen goals mentioned in SDG are holistic and aim for terrestrial and water natural resource conservation and sustainability.

3 Policies Related to Biodiversity Conservation

IUCN developed the parameters of biodiversity conservation for the world and is supervising as well as guiding all nations to take care of its biodiversity and inform about the status of biodiversity through Red list, which gives details of threatened species. Post-independence, India in its all forest policies, starting from 1952 to 1988 and later on in its Biological Diversity Act 2002, clearly delineated the principles and strategies of biodiversity conservation.

The forest and biodiversity laws and policies give institutional structure from the central government level to village or community level and prescribe the normative procedures for ownership and governance. The States of India have established the Biodiversity Boards. The state board at district level has a District Forest Officer (DFO), who acts as nodal officer for conservation and protection of biodiversity. At the village level, the Biodiversity Management Committee is constituted to prepare the People's Biodiversity Register which documents the status of the existing biodiversity in a village or within the village panchayat boundaries and subsequently prepares a time-bound plan to harvest and manage them sustainably.

The Wildlife Protection Act, 1972 and its later amendments in 2002, addresses the issues of controlling the damage caused to wildlife population as well as protect them for the importance of ecosystem services they deliver to the society. The creation of Protected Areas addresses biodiversity conservation. Under Corporate Social Responsibility number of corporate houses are playing a vital role in biodiversity management.

Similarly, policies in the agriculture sector focused on conservation of agricultural biodiversity, with many international law and treaties like Convention on Biological Diversity (CBD), Convention on International Trade in Endangered Species (CITES), the Agreement on Trade-related Aspects of Intellectual Property

Rights (TRIPS), and the Sanitary and Phytosanitary Measures agreement (SPS). At National level, after recognizing the importance of conservation of agro-biodiversity, and value of genetic pools, Indian government in harmony with international treaties came up with The Biological Diversity Act, 2002 and The Protection of Plant Variety and Farmers Right Act, 2001 (PPVFR) providing rights to farmers. Provision to protect plant germplasm has been embedded in the law. Indian Council of Agricultural Research (ICAR) is the nodal agency to implement and it has instituted a mechanism for registration for experimentally developed superior germplasm of potential value (Shivraj, Sunil Kumar, Kumar, & Tirupathi Reddy, 2018).

4 Policies Related to the Rights of Communities in Biodiversity Conservation

Before 1988, the social and economic development policy of India did not have much role for the community in natural resource management. However, after 1988 the Forest Policy and 1994 Watershed Management Policy, the role and space for community engagement became more prominent and impactful. This also initiated the process of capacity development, social and community institution development for conservation of natural resources in general and indirectly aim at biodiversity conservation. During same period, the Indian parliament passed the Panchayat Raj Institution Act 1994, popularly known as PRI Act, which transferred the power of governance at the lowest level of administration in India this village Panchayat, village and Gram Sabha.

With this legal and administrative institutional process, the role of local and indigenous communities increased. Therefore the gainful result of the journey of participatory forest management was seen in State Forest report 2017, which reported the increase in total forest cover to 21.53%, which is about 2% more from the year of comparison 1991.

India has 30% of villages categorized as forest fringe villages, i.e., the villages which are within the radius of 5 km from forest boundaries and they have been bestowed usufruct rights to use forest NTFP (Non-Timber Forest Resources) for subsistence living. In 1997, the PRI Act was extended to Scheduled Areas (densely tribal populated district promulgated by presidential order) and named as Extension of Panchayati Raj in Scheduled Areas which is popularly referred as PESA, which transfers rights over ownership of NTFP of tribal communities living in the Scheduled Area Villages.

In the regime of natural resource management, the gradual transfer of use right to the community has resulted in improvement in the management of natural resource status. This, in turn, has brought the focus on conservation of biodiversity and its various uses in the livelihood and health system of the indigenous communities. This created a widespread involvement of communities and control over the

natural capital. Subsequently in 2006, The Forest Rights Act 2006 was implemented which transferred the ownership of privately owned land as well as community right to the local community over the forest areas which they controlled personally or has credible evidence to prove the customary rights.

Under the *Vanbandhu Kalyan Yojana* (Ministry of Tribal Affairs, Government of India, 2015), aimed to develop an enabling environment for the tribal development in a holistic manner. The aim of this process is to ensure delivery of the intended benefits to tribals under various schemes of Central as well as State Governments by the convergence of resources through the appropriate institutional mechanism. There is a focus on providing open market space for the trade of NTFP as a self-sustained process of demand and supply under this scheme. Maximum selling price for NTFP is being implemented in schedule V States initially as a part of this scheme. The web-based portal has also been developed, which indicates the current price of MFPs on a real-time basis across different *mandis*[1] of the States.

5 Status of Natural Capital Management and Role for Corporates

With the number of policies and laws to conserve biodiversity, the status of the natural capital is improving. The tiger population in different national parks and protected areas have shown steady raise and sustained growth. Similarly, forest cover has improved and different states have practiced Tree Outside Forest (TOF) and private forestry policies. All state government in India, after setting up the biodiversity boards have undertaken the work of documenting its biodiversity and have set up a mechanism of institutionalizing the management at micro-level. The number of research support are undertaken in the path of sustainable management. However, the major issues are financial and skilled managerial support on a sustained basis, which the government would not be able to provide to local communities. This demands a role for corporate and entrepreneurs to support the central as well as state government to carry forward the work of biodiversity management at the micro-level.

The CSR law 2013 of India (MCA, 2013) makes special provision for environmental management and conservation, from the contribution it has to make for CSR activities. Many corporates in India have set up an independent foundation within the organization with competent human resources and well-defined strategies to address the goals of agriculture, water, and forest biodiversity.

There is a need to have public finance support for India's biodiversity management and conservation. Design of new and innovative efforts involving the corporate

[1] *Mandis* is a Hindi word meaning "Rural Agricultural Markets" in English.

sector through Corporate Social Responsibility finds (CSR), mainstreaming of biodiversity in the agriculture sector and Access and Benefit Sharing (ABS) of biogenetic resources, identified through the country's Biodiversity Finance Plan, can make headway to achieving the country's biodiversity targets. India's Biodiversity Finance Plan has been developed by UNDP BIOFIN to help achieve India's vision of conserving biodiversity and promoting its sustainable use. This is to be achieved through mobilizing resources and integrating national biodiversity targets with other sustainable development targets such poverty alleviation, food security and elimination of hunger, sustainable livelihoods, women's empowerment, health and nutrition, mitigation and adapting to climate change and others (BIOFIN, 2019).

6 Good Governance Approach to Biodiversity Management and CSR

Good Governance is defined as an approach followed by the country to achieve optimum and sustainable management of its ecological, social, and political resources for sustainable development. The main four pillars of good governance are: (a) public sector management, (b) accountability, (c) legal framework for development, and (d) transparency and information.

In the case of corporate, compliance with its CSR goal, accountability and transparency are desirable qualities and goals. Two major principles of CSR are environmental compliance and social performance, and the corporate needs to address these two qualities in its journey of biodiversity management. The role of corporate in biodiversity management became more prominent after they started consciously and strategically adopting CSR principles for gaining more social acceptance.

After the 2013 compliance norms, they started to engage more systematically in this process and also developed frameworks of engagement with public authorities in the contribution of biodiversity conservation. TATA, Godrej group corporates are few lead players in India in biodiversity conservation. However, others are also strongly creating a system to follow the path of nature conservation and contribute to the sustainable management of natural capital.

Table 3.1 delineates the present status and action to be taken for good governance through CSR activities in the implementation of biodiversity management based on the four pillars of good governance. It is more important to integrate the CSR role in biodiversity management with good governance approach so that future pathways can be made more accountable and transparent and socially acceptable. The assessment is made of the present status, in general, using qualitative parameters like fair, good, and scope of improvement. They are suggestive but open a window of opportunity.

Table 3.1 Status and action to be taken for good governance for CSR goal by corporate in implementation of biodiversity policies and laws in India

	Good governance principles			
Polices and Law	Management	Legal framework	Accountability	Transparency
Companies Act 2013	Fairly good	Fairly good	Improved but need to be equitable	Needs improvement
Wildlife Act of 1972	The more proactive role is needed	Compliance should be done	Compliance should be done	Needs improvement
Forest Conservation Act of 1980	Fairly good	Fairly good	Accountable from legal perspective need social acceptance	Needs improvement
Water (prevention and control of pollution) Act 1974	Needs improvement	Needs improvement	Needs improvement	Needs improvement
Water (prevention and control of pollution) CESS Act 1974	Fairly good	Abide by legal procedure	Accountable	Needs improvement
Air (prevention and control of pollution) Act 1981	Needs improvement	Needs improvement	Needs improvement	Needs improvement
Forest Policy 1988	Fairly good	Abide by legal procedure	Accountable	Needs improvement
Environment protection Act 1986	Fairly good	Abide by legal procedure	Accountable	Needs improvement
National Environmental Policy 2006	Fairly good	Abide by legal procedure	Accountable	Needs improvement
Coastal Aquaculture Authority Act of 2005	Fairly good	Abide by legal procedure	Accountable	Needs improvement
Special Economic Zone Act of 2005	Fairly good	Abide by legal procedure	Accountable	Needs improvement
The Scheduled Tribes and Other Traditional Forest Dwellers (Forest Right) Act 2006	Needs improvement	Needs improvement	Needs improvement	Needs improvement
The Biological Diversity Act 2002	Need to develop a strong system	Need to develop a strong system	Need to develop a strong system	Need to develop a strong system

7 Conclusion

For the management of natural capital, policies are framed at regular intervals by the national government. Secondly, policies are also made to tune with prevailing world order and United Nations resolutions. Biodiversity policy was earlier implicit

in forest and agriculture management programs. However, in 2002, it was made an explicit policy to protect and conserve the biodiversity of the country and even the legal frame to protect the ownership. Therefore, the corporate role was gradually defined and created in biodiversity management through CSR activities.

At present, CSR law clearly and categorically defines roles for corporate in environmental conservation in its catchment areas as well as in the neighboring region and country. Subsequently, they have created a system, human resources, institutional setup. They have also worked on the development of stakeholder partnerships with government, NGO, and community-based organizations in taking forward the objective.

The good governance principles should be the final goal of Corporate in CSR application because biodiversity management has multiple stakeholders. The primary stakeholder is the local communities and sometimes they are an indigenous community with several legal protection and ownership. In such a situation, corporate trust development exercise is needed and they also need to develop a unique set of human resources trained in social system management. Overall the future needs more participation from corporates in the management of natural capital and biodiversity conservation. Such a participatory role of corporate will also help in attaining the Sustainable Development Goals of the country.

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Chapter 4
A Solution to Deforestation Through the Amalgamation of Biodiversity Conservation and Web Search Engines: A Case of Implications of Ecosia in Indonesia

Ravi Sharma, Abhay Misri, and Amitabh Pandey

Abstract Ecosia is a web internet search engine that substantially fills in as a social plan of action. On each forty-fifth search that a user made, they plant a tree. This assists their work in relieving the impacts of environmental change. The web search engine Ecosia attempts to repay the emanations by giving the vast majority of its incomes to the World Wide Fund for Nature (WWF) and spare rainforest from deforestation. This paper deals in understanding how a social business model (1) in the context of Ecosia works; (2) understanding and investigating the financial report of Ecosia; (3) as palm oil contributes to deforestation, how Ecosia can help to reduce palm oil plantation and how it can be suitable? This work also encourages organizations and other associations to combat palm oil planting as it has negative impacts on the ecosystem and biodiversity. This study also aids worldwide business pioneers in understanding the ill- effects of palm oil plantation and encourages them to transition to an innovative social plan of action replacing the traditional business model. This paper is also a step towards further work in information system (IS) on sustainable enterprises and IT-based green action plans. This contributes to the increasing study of manageable IS that looks at social and ecological perspectives. The results include feedback on the significance and impact of social enterprises in the degree of site administration and examine the data framework. This also creates insights into the global enormity of sustainability in site administration.

Keywords Internet search engines · Social business models · Ecosia · Biodiversity conservation · Afforestation

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1 Introduction

Living and non-living organisms, their biological processes, the environment, and climatic conditions can be regarded as dependent parts of the world on each other, and their sustenance is central to the world's strength and survival. The recent effects of climate change are certainly a significant concern about environment well-being. The recent rise in temperature and drought has negative impacts on the diversity of species as well as on human ecosystem goods and services. As the planet rapidly warms up, climate patterns fluctuate in regions around the world, mostly because of human activity. Habitats will be forced to fluctuate in accordance with the regional climate, and this could affect many species. Anthropological influences have also played a significant role in catalyzing the pace of climate change, given these aspects.

Technology plays an essential role in reducing the ill effect caused by human action. The recent development of information technology has increased the access and knowledge of humans about the environmental crisis and climate change impacts. However, it has also contributed to environmental problems. Some recent initiatives in contribution to sustainable environmental management by information technology have also come into notice. This paper discusses a similar case.

This paper discusses the problems of monoculture plantation cultivation like palm. Later on, it moves to the explanation of the difference between business model and social business model in general and information based web search engine social business model of Ecosia in particular. Finally, it compares and suggests how the agroforestry model with multiple species plantations can contribute to biodiversity conservation through corporate intervention in the present era.

The effect of habitat fragmentation and land-use change on biodiversity, coral bleaching, production of palm oil, and many more examples are there to prove how the human intervention is affecting the biodiversity and ecosystem. Human activity has significantly changed the world's surface from one-third to one-half. People are expected to severely impact 50–90% of the land in developing countries over the next 50 years (Pokhrel, Felfelani, Shin, Yamada, & Satoh, 2017). This is the result of population growth and excessive natural resource consumption.

Palm oil, no doubt, is ubiquitous in the global market place. It has become a necessary ingredient in thousands of products from fried goods, processed foods, and baked goods to products like toothpaste, shampoo, cleaning products, etc. However, this necessity product has created havoc concerning climate change and the environment (WRM, 2006). Producing palm oil creates environmental damage, resulting in deforestation, habitat degradation, and animal habitat loss. The World Wild Fund for Nature (WWF) reports that for palm oil processing, an area about the size of 300 football fields is cleared in tropical rainforests every hour (WRM, 2006). Tragically, because present palm oil generation techniques frequently cause the pulverization of carbon-rich tropical backwoods and peatlands, it is a noteworthy supporter of global warming.

There had been many initiatives taken by the international organization in minimizing the palm oil ill effects. One of the major initiatives is the Sustainable Palm Oil Initiative by United Nations Development Programme (UNDP). This initiative aims to promote sustainable palm oil by reducing deforestation and paradigm shifts in the palm oil sector.

In the global scenario, the selection of a business model creates a dilemma in companies. Most of the organizations are still working as a traditional business model, and these can transform themselves into a social business model.

"Accordingly, social-business can, therefore, be defined as a non-misfortune, non-profit business". A major segment of profits are passed on or used to build social and natural exercises. Financial specialists are pursuing a twofold main concern profit—maintaining monetary value as well as having a positive social and natural impact. This type of business model takes into consideration the "bottom of the pyramid".

We characterize a social business model, which is basically in light of information technology and seeking fundamental goals as an information technology based social plan of action.

1.1 A Conceptual Review of the Social Business

A social business model takes into consideration both the social and natural within the prospective of cost inclusion. It describes a roadmap from the basic human need to continuous financial success. Hence, it separates itself plainly from customary plans of action. The social business model is very much different from the traditional business model. It reverses the concept of profit maximization. The principal intent of the traditional business model is to maximize the profit having a main target group of shareholders. The approximation of profits is done among dividends to shareholders and reinvestment. In the case of the social business model, the intent is to maximize the social and environmental benefits and the major target audience is the society. Similarly, the approximation of the profits is done for the extension of activities, reinvestment purpose, and payback of investors (Schmidt, 2009).

The Nobel Prize receipt Yunus (2008) has done a lot of work on social business models. Muhammad Yunus has conferred that organizations that align themselves with a social business model map and justify their success based on society or environment rather than profits in a given financial period (Schmidt, 2009).

A related economic concept is called the "Bottom of the Pyramid". The statement mentions the major poverty—a stricken socio-economic group of the world's total population. The concept explains the major opportunities for companies to work for the neglected demographic segmentation of the customers and to obtain a different positioning of the market for the deprived ones (Olsen & Boxenbaum, 2009).

2 Search Engine Market Structure

A web service is a data recovery framework that is utilized to find the website pages applicable to client inquiries. In any case, from the client's perspective, the fundamental innovation is not applicable, as long as his essential need to get a reaction to his inquiry question is met.

Firstly, a competitive environment analysis is required. Google dominates the German search engine market with a market share of 89.6%. Yahoo and Bing have only 2.6% and 2.2% market share, respectively (Palos-Sanchez & Saura, 2018). As per the current scenario, the German search engine market is much smaller than the US market, with only about 4 percent of all global search requests compared to a 17% share. Google's market leader is also unchallenged at the international level, although it is not as overt as it is in Germany (Palos-Sanchez & Saura, 2018).

Ecosia is an internet web index situated in Berlin, Germany that plants trees by giving 80% or a higher amount of its surplus pay to non-profit organizations that emphasize on reforestation and protectionism. Ecosia offers insight into social business, is CO_2-negative, and is certified by B-Lab, the Skoll Award-winning B-Corp certification body, as an advantage partnership. It is founded by Christian Kroll. The concept of the social business model in terms of web search engines is not very new. Other than Ecosia, there are also other search engines such as Benefind was established in 2009, partnered with Yahoo and Bing having a primary objective of donation of €0.5 Cent per search; Ecocho, another search engine was established in 2008, partnered with Yahoo with an objective of purchase of CO_2 certifications. Another one was GoodSearch which primarily worked on green search engines with an objective of donations of 50% of the profit to the trees. These search engines indicate the growing importance of social business models for web services. Apart from GoodSearch which was formed in the year 2005, all the search engines were founded in the past decade. Every search engine in one way or another is working in alignment towards the social business model (Palos-Sanchez & Saura, 2018)

These search engines, therefore, depict how the companies are looking and exploring the opportunities in finding out the solutions for addressing the issues of deforestation and related issues like combating climate change. The digitization has always provided a well-known pathway for the global issues that have been successful for years.

3 Ecosia: A Cure to the Amalgamation of Deforestation and Climate Change

Bing and Yahoo outfit Ecosia with pursuit elements and upheld associations. Ecosia does not run a case look record under fiscal and mechanical restrictions. Customer taps deliver their earnings on upheld associations. The development partners are paid a small fragment of their profits. Ecosia gets EUR 0.13 per click on a sponsored

association, which is typical. Since, at any point, 80% of this aggregate amount is given to World Wide Fund; further, only the remaining of the sum of up to 20% can be used for pay rates, internet servers, rooms, and advances to rest of the organizations of various undertakings (Fig. 4.1). The CEO pays himself a salary below €1000/month.

Consequently, Ecosia works precisely at full recuperation. It demonstrates that it is an unadulterated social plan of action instead of the current plan of action. The organization has distributed its month-to-month budgetary report on its website.

3.1 Is Ecosia Truly Evident?

Many articles have a different side of the perspective of whether or not Ecosia is legit? Keeping in mind the above facts, we will try to analyze the financial report of the organization.

As Ecosia produces monthly financial reports on its website (www.ecosia.org), we tried to analyze its financial report for January 2019, as shown in Table 4.1.

$$\text{Total Profit} = \text{Revenue} - \left(\text{Operating Cost} + \text{Others}\right)$$

$$= €1{,}044{,}925 - €499{,}128 = 545{,}797$$

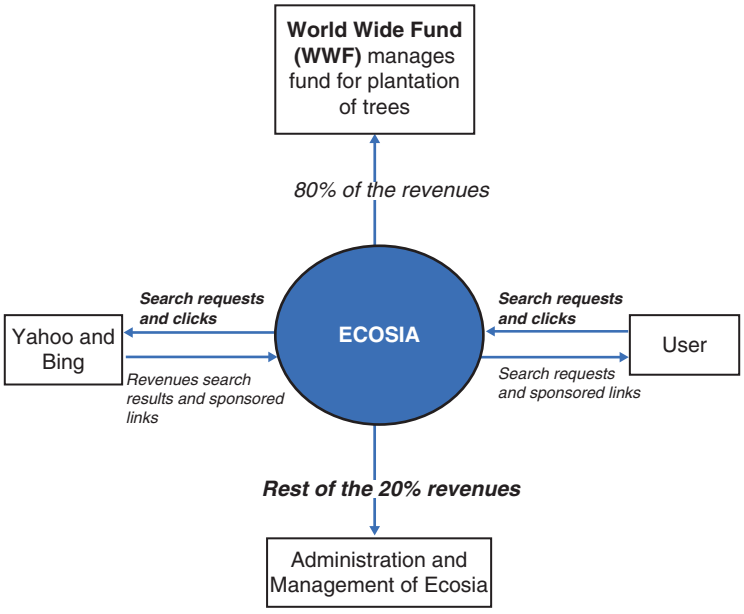

Fig. 4.1 Business model of Ecosia

Table 4.1 Analysis of financial report for January 2019

Particulars	Amount
Total income (January 2019)	€1,044,925
Invested in tree planting	€4,388,436
Reserves	€106,951
Spreading the world	€176,235
Operational Costs	€322,893

Source: Ecosia's Financial Data as per their January 2019 report published on their website (Ecosia, 2019)

Percentage Spent on Tree Planting = Tree Planting / Total Profit

= €438,846/€575,797 = 0.7621 or 76.21%

Ecosia claims to have spent far more than its target on planting trees in January 2019. These are also clever and putting away a considerable amount of money for the future so that they can grow and ride out a stormy market.

Today, Ecosia is used for web services by over more than seven million users. To this day, it has financed around 6,779,677 trees, with over €2,85,663 used and the number grows with every 11 s.

Ecosia is currently supporting projects in Tanzania, Morocco, Indonesia, Ethiopia, Madagascar, Brazil, and other parts of the world.

Therefore, from the analysis, we can highlight that Ecosia benefits the society by their projects which creates jobs in the rural communities, benefits the environment with more than 20,000 hectares of forests restored, replicable with the restoration of the consumer products, and low cost helps the application to grow as the number of users increases.

- Revenues: the Ecosia social business model, therefore, generates 10% revenue growth as per 2017 it was around $8.8 million (estimated results).
- Profits: $5 million with a 50% net margin

The focus of Ecosia is on the restoration of land, which is around 100,000 hectares up to 2020. Ecosia has grabbed the attention of the customers by the number of trees it has planted to date. Even the location of planted trees can be traced out with the help of Ecosia. The estimated cost per tree planted varies from $0.10 to $2.00 (Faruqi, Wu, Brolis, Ortega, & Batista, 2017), through the local projects, Ecosia has planted nearly 20 million native trees and spent over $5 million in conservation. Methods of regeneration include, among others, planting for enrichment, direct seeding, and agroforestry. Several programs are building wildlife buffer zones and corridors. Management of Ecosia believes that local communities need to benefit in order to be sustainable in the long run.

The organization's reforestation initiatives have created thousands of mainly seasonal jobs in poor rural areas, with over 80% of women (Faruqi et al., 2017). The business model of Ecosia helps it to proliferate while improving living conditions and rehabilitating some of the world's most biodiverse ecosystems (Faruqi et al., 2017).

4 Ecosia Can Be a Perfect Solution to the Palm Oil Production: A Case of Implications of Ecosia in Indonesia

The palm oil industry is harmful to the environment as it produces monocultures on the lands of farmers and in neighbouring forests (WRM, 2006). Monocultures affect the biodiversity and impact soil and moisture conservation and eventually make it degradable and infertile.

Palm oil is found in cosmetic products as well as consumer goods which include shampoo, candles, lipstick, bread, and chocolate, etc. (WRM, 2006). It has a range of useful properties which is used for cleansing properties as well as cooking purpose and improving the texture of foods. It is also a critical component in petrochemical products, with biodiesel being traced out from the palm oil in the European Union. However, the market is likely to phase out the palm oil for fuel by 2030 as the demand is getting subsidize under current plans.

Crucially, palm oil is cheap. Oil palms are very productive crops that produce a large amount of oil for a relatively low cost. Because of the enormous global demand, palm oil has gained significant importance in the Southeast Asian economies, employing millions of people living in rural areas (Wang, Luse, Townsend, & Mennecke, 2015).

Like other crops, the degree to which oil palm has been a direct cause of deforestation is difficult to quantify due to a lack of reliable data on land-cover change and a lack of understanding of its complex causes. Oil palm expansion could, in principle, contribute to deforestation in four often indistinguishable ways: (a) clearance of unharmed forests; (b) forest restoration previously destroyed by deforestation or fire-related problems; (c) joint economic undertaking, such as timber, plywood, or paper pulp revenues used to offset the cost of planting; (d) indirectly by providing enhanced road access to previously inaccessible forests or by displacing other trees (Holmes, 2002).

For other purposes, land may also initially be deforested and then be planted with palm oil. In such cases, palm oil could quickly, but wrongly, be identified as permission to clear millions of hectares of forest under the pretext of plantation establishment, without later planting them, especially in Kalimantan, Indonesia (Salt, 2019).

Palm plantation area rose by 4.4 million hectares between 1990 and 2005 to 6.1 million hectares (Koh & Wilcove, 2008), while total forest loss was 28.1 million hectares. As a result, palm oil conversion could account for a maximum of 16% of recent deforestation.

It was estimated that during this time, 1.7–3.0 million hectares of forest were lost to palm plantation. The uncertainty surrounding these figures is high, and they could be over- or underestimated because they exclude improvements in unproductive land area and include only mature palm areas (Koh & Wilcove, 2008). Elsewhere, oil palm has been documented as replacing forests in southern Thailand, Myanmar, and Papua New Guinea.

4.1 Indonesia: "The Devil's Favourite Playground"

One of the significant palm oil production countries is Indonesia. Palm oil has proved to be one of the most important yields in Indonesia for resilience, health, and universal trade.

Indonesia has over 28,000 species of plants and 300,000 individual animals, including Sumatran tigers, dwarf elephants, rhinoceros, and orangutans. Be that as it may, the forests of Indonesia are at stake. An influx of deforestation has cleared the nation since the 1970s. Incredible forestland tracts are regularly torched to make room for the cultivation of palm oil. Two million hectares of forestland have gone up in smoke over a year. This led to shortages in reservoirs, environmental devastation, and severe floods.

Mass media and several environmentalists have concentrated on the loss of biodiversity and climate change. These get resulted from the clearing and burning of forests to make room for palm oil plantations. Such type of activities vastly affects the biodiversity as many species get extinct. Nonetheless, customers, politicians, international media, and consumer goods firms that purchase the product were under scrutiny.

Palm oil plantations have created a disaster like conditions in rural parts of Indonesia. The major significance of palm oil is that it has a massive impact on Southeast Asia's natural rainforests. On a local and global environmental level, these human-made monocultures are toxic. The current use of palm oil goods is unsustainable. As the rainforests are being cleared off, a massive amount of CO_2 is being released in the air, whereas these rainforests hold more than a quarter of the world's terrestrial carbon. Palm plantation acts as a catalyst in raising global temperatures. Palm oil plantations accelerate the rise in global temperatures especially old trees in primary rainforests, and are the most efficient carbon absorbers in the world (www.ecosia.org).

Globally, palm oil plantations impact biodiversity. Around 193 critically endangered, endangered and vulnerable species consider palm oil plantation as one of their major threats for survival purposes (www.iucn.org).

4.2 How Ecosia Can Help in Such Type of Situations

With the help of internet searches, Ecosia reforests the Sumatra (www.ecosia.org) where earlier palm plantations were done. In Indonesia, there is a case where twelve indigenous villagers from Mount Saran's foothills came together and decided to fight back against the growing problems caused by palm oil plantation. This may make sense that people are also concerned about palm oil's ill effects (Salt, 2019).

They formed the Gunung Saran Lester Foundation and reached out to Masarang, an NGO that has been empowering local communities for over 30 years with sustainable and lucrative alternatives to monocultures of palm oil. Such

ground-breaking alternatives include the Tengkawang Factory with zero waste and the Village Hub of the City.

The revenue generated through the Ecosia search engine, the funds are routed through WWF for reforestation programmes. This initiative has helped villagers and local communities towards the planting of productive trees like *Rubber*, *Jenkol*, and *Gaharu* trees, as well as other local tree species and mixed forests in the vicinity of the villages (www.ecosia.org).

The plantation initiative by the Ecosia has other benefits like livelihood and alternate source of income for the local people. The social issues could be managed like selling of land to palm oil companies, which were directly contributing to the deforestation of existing forests and plantation of palm oil trees on a massive scale. Also, the burning of existing trees will be prevented with this initiative. The promotion of mixed-forests plantation will have a direct connection with the biodiversity conservation measures and thereby providing a variety of products and associated benefits in terms of ecological services provided by the conservation programmes. This plantation initiative by Ecosia has reported increasing livelihood shields for local communities, participation, and engagement of local stakeholders and has retained the hope for the orangutans survival in these areas along with enhancing the scenic appeals of these areas. The forestry practice has now starting overshadowing the earlier unsustainable practice of pesticide-covered palm oil monocultures (Salt, 2019).

5 Conclusion

Government regulation, consumer demand, and supplier pressure combine to create a "perfect storm" that drives company sustainability with a robust environmental imperative.

The benefits of implementing a sustainable social business model using the social media platform and internet have proved to be an engaging initiative with increasingly eco-conscious clients and have provided such companies to distinguish themselves from their competitors. All these internets and social media platforms have also provided a venue for sharing the information, experiences, and related content to biodiversity thereby sensitize the understanding of conservation science. Towards conservation, social media platforms like Facebook, Twitter, etc. could be explored as a future opportunity by the multinational companies towards biodiversity conserve action and initiatives (Daume, Albert, & Von Gadow, 2014; Richards & Friess, 2015; Stafford, Hart, Collins, et al., 2010). Ecosia, considered to be a "green search engine", has emerged as a social business dedicated to environmental sustainability. The source of driving the rainforest protection programme are the donation of revenue through WWF partnering (Büscher, 2008). Ecosia has emerged as an excellent example of the internet's amalgamation between conservation technology and has provided an essential political-economic conservation tool (Fuchs, 2008). Ecosia has a distinct goal to achieve one billion tree plantations by

the year 2020 through its plantation programme initiatives in different countries. Ecosia drive has boomed the reforestation and counters the illicit cutting of trees for palm oil plantation in Indonesia. The Ecosia reforestation efforts are visible through the impacts they had created among nature and societies countering the land-use change, degradation of the environment, preventing destructive palm oil monocultures, and benefiting nature and local communities at large.

Such initiative and models are an excellent business case or biodiversity management and could be adopted by the other companies and organizations who are thinking of adopting technology use for conservation of nature. This study opens the discussion for future on the further use of recent technologies like artificial intelligence, data sciences, and information technology advancements, including and embedded in internet reforms using social media platforms towards the conservation dialogue and actions.

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Chapter 5
Does Nature Conservation Matter to Corporations?

Gurudas Nulkar and Madhura Bedarkar

Abstract The juggernaut of globalization and the forces of hyper competition have kept Indian corporations busy pushing growth and profits. The Companies Act and Corporate Social Responsibility (CSR) rules in India mandate certain categories of businesses to fulfill their social and environmental responsibilities. Twelve activities are listed where CSR funds can be employed. However, most companies choose to spend their funds on healthcare and sanitation, education, rural improvement, and arts and culture. This is hardly surprising, as it can potentially improve the company's image in the eyes of its customers. On the other hand, the natural environment is a distant seventh preference of the top 100 companies. This prompts a question—does nature conservation, specifically biodiversity, matter to companies? Even as increasing production and consumption have impacted natural systems, the answer to this question is hardly encouraging. In this chapter, we discuss the findings from our study of CSR spending of corporations in India. We examined the CSR expenditure data of select companies, from their 2017 annual reports, National CSR India portal data, and CSR surveys such as KPMG CSR Reporting Surveys of N100 (ranked on National Stock Exchange on the basis of market capital) companies. From this study, we try to understand the motivations behind nature conservation, expected outcomes from this expenditure, and challenges in biodiversity and nature conservation as a CSR goal. This chapter concludes by arguing why biodiversity conservation should matter to businesses and what could be the possible policy measure to enhance this funding.

Keywords CSR · Nature conservation · Biodiversity · CSR nature · India CSR India biodiversity

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1 Introduction

Biodiversity, an essential element of Earth's life support system, determines the sustenance of human societies (Dirzo and Raven, 2003; Romanelli et al. 2015). However, due to continuous economic growth since the industrial revolution, global biodiversity has significantly diminished. It is further threatened by human-induced climate change and this is resulting in increased fragmentation and loss of habitat (Segan et al. 2015). There are some debates and disagreements around the loss of biodiversity and its connection to life. The differences can be classified into (1) the uncertainty about the extent of biodiversity loss today and (2) the incomplete knowledge about its impact on the lives of human health. Newbold et al. (2016) attempt to quantify the present extent of biodiversity loss and suggested that the average local abundance of species has decreased to around 85% of its original value in the absence of human land use and around 58% of the world's land surface. Nine out of fourteen terrestrial biomes have breached the safe limit of 90% of biodiversity intactness. They further alarm that biodiversity loss, if goes unchecked, will challenge efforts towards long-term sustainable development.

Though biodiversity loss is recognized as a critical issue (Oliver, 2016), its conservation becomes relevant, especially with respect to developing and emerging economies (Rajvanshi, 2015). Southeast Asia is one such region. Though being known as a hotspot of biodiversity and endemism, this region is one of the most biotically threatened ones due to several drivers (Hughes 2017). India, according to a UNDP study (UNDP, 2008), hosts rich and diverse biodiversity, being home to 8% of the world's biodiversity. It holds a unique identity for its diverse natural ecosystem, ranging from forests, wetlands, grasslands, marine areas and mangroves, deserts, and glaciers. Its Western Ghats and the Eastern Himalayas are two among the global 25 hotspots of biodiversity on the Earth. The country has a population of Asia's rarest animals and 2.9% of the world's threatened species. The study further points out that India's biodiversity is threatened due to poaching, rapid urbanization, changed agricultural practices, demographic changes, etc. It is difficult to single out any one actor to address these concerns. However, multi-lateral agencies, governments, communities, and corporate are stakeholders and thus shall assume the responsibility of conserving biodiversity.

There have been many debates and discussions on the "social responsibility" of businesses and various opinions exist on the nature and scope of corporate social responsibility (CSR). Milton Friedman (1970) argues that the only social responsibility of a corporation is to maximize its profits while adhering to the basic rules of the society in which the firm is operating. Freeman and Liedtka (1991) brought out another aspect of CSR, wherein they question the role of CSR in helping create a good society. According to them, CSR failed to deliver its promise and has instead become a barrier to fruitful dialogue on corporations and "the good life". They advocate abandoning the concept of CSR and replacing it with an ongoing discussion on corporations and "the good life".

Contrary to Freeman and Liedtka, Porter and Krammer (2006) argue that corporate impacts societies positively by giving jobs, investing capital, buying goods, which are less addressed by governments and NGOs. Not only in developing countries but even in economically weaker communities of developed economies, corporations, through their know-how and resources, can improve situations, which typically are characterized by poverty, poor wages, and exploitation of natural resources. They propose a shift in the present perception of CSR as a "damage control" or "public relations (PR)" to a new one that "builds shared value" and leads to competitive success. When a business offers its vast resources, expertise, and management talent to issues that it understands and has a stake in, it is likely to have a more significant impact on societal well-being.

Schwartz and Saiia (2012) attempt to bring out diverse views on CSR. They present a discussion on two approaches to CSR, viz. "the narrow view" put forth by Milton Friedman (1970) and "the broad or beyond profits view". By synthesizing both these approaches, they propose a new position on CSR, called as "Friedman Plus More Ethics" or FPME. To explain their "FPME" position further, they point out that the CSR stand of business professionals is essential as their business decisions may impact society positively or negatively.

In developing nations, where ineffective or inefficient governance may have left voids in the social sector, expenditure through the CSR route could be a potent approach to make up the deficit in social welfare (Doh, Littell, & Quigley, 2015). This is perhaps most applicable for India, where the geographic, cultural, and climatic diversity has imposed enormous challenges on national policy.

Being among a few nations to introduce CSR as a directive,[1] India ensured participation from its promising corporates in social areas such as health, education, environment, rural development, poverty alleviation, etc., as identified under Schedule VII of Companies Act.[2]

[1] India was one among a few nations to introduce corporate social responsibility (CSR) as mandatory through enactments such as the Companies Act, 2013 (Section 135) and the CSR (Policy) Rules, 2014. The Ministry of Corporate Affairs is entrusted with enforcement and regulation of these legislations. As per the provisions of these Acts, a company fulfilling any one of the following criteria in a financial year is obliged to spend 2% of its net profit towards CSR projects as identified and approved by its CSR Committee :

- a net worth of INR 500 crore or
- a turnover of INR 1000 crore and more or
- a net profit of INR 5 crore and more.

[2] Schedule VII of the Companies Act enlists areas for CSR activities to be incorporated and executed by companies in their CSR policies and programs. Broadly, these areas are health, education, environment, rural development, reducing inequality, P.M. Relief Fund, art and culture, sports, war veteran, technology business incubator, and women empowerment. Such companies are required to set a board-level CSR Committee, which would formulate CSR policy, recommend CSR projects, and determine budgets for the same. The CSR Committee shall also establish a monitoring mechanism for CSR projects and conduct reviews of these projects. Moreover, CSR disclosures shall be made in the Director's annual report.

There has been a mixed response to this enactment. For instance, there had been considerable debate around whether companies should be compelled to carry out CSR since many, especially economists, believe that such obligations intervene with a company's efficiency of operations (Sarkar, 2014), especially for smaller firms who depend on net profits as a source of investment. On the other hand, improving the economic efficiency of these firms is of paramount importance as they are the drivers of the long-term growth of nations. Another criticism of mandatory CSR is that it serves largely as an initiative to outsource the government's social responsibility to the private sector. This involves making the private sector pay for the failure of the government in fulfilling its societal responsibilities (Sarkar & Sarkar, 2015). On the contrary, according to a report by the High-Level Committee on Corporate Social Responsibility (2018), the very objective of mandatory CSR is to nurture responsible and sustainable business philosophy and promote corporations to bring in innovative ideas and management systems to resolve social and environmental concerns of the local level and needy areas in the country.

Though CSR awareness and consciousness have improved significantly among large and medium scale firms (Ministry of Corporate Affairs, 2019), the impact of corporations on sustainable development is unclear and needs more research. For example, Frynas (2008) doubts whether complex developmental problems can be solved with corporate involvement. The Indian CSR Rules provide a framework for companies to create CSR initiatives. However, companies are free to choose where they spend the money. CSR expenditure data shows that the preferred areas are healthcare and sanitation, education, rural improvement, women empowerment, and arts and culture. Activities in some areas can potentially improve the company's image in the eyes of its customers (Overbeek, Harms, & Van Den Burg, 2013).

On the other hand, the natural environment is a distant seventh preference of the top 100 companies (KPMG, 2018). Even as international debates on climate change turn hotter, the planet would undoubtedly benefit from contributions made by industries. However, there seems to be a reluctance to spend in the field of conservation and improvement of the natural environment. This prompts a question: Does biodiversity and nature conservation matter to companies? Even as increasing production and consumption have impacted natural systems, the answer to this is hardly encouraging.

In this chapter, we analyze the CSR spending of Indian companies on biodiversity and nature conservation to assess if there is a potential to make a significant impact on India's natural capital. India is blessed with a benign tropical climate that has nurtured the biological diversity that inhabits the country. This has bestowed highly productive natural ecosystems to the land. Over the centuries, they have shaped the cultures of the people living here. Unfortunately, the government machinery has overwhelmingly sided the cause of development over nature conservation, leaving the country poorer in natural capital. CSR thus could have a huge potential to improve in this area. We examine CSR expenditure data from selected company annual reports, data from the Ministry of Corporate Affairs, the National CSR India portal, and CSR surveys like the KPMG CSR Reporting Surveys of

N100[3] companies. Discussions with CSR managers of selected companies complemented the findings from the secondary data. Through these in-depth interviews, we attempt to understand the motivations to conserve nature, expected outcomes from this expenditure, and challenges in biodiversity and nature conservation as a CSR goal.

The objective of this chapter is to analyze the CSR spending of companies on the conservation of biodiversity. Our focus, thus, is on CSR expenditure on environmental sustainability, ecological balance, protection of flora and fauna, animal welfare, agroforestry, conservation of natural resources, and maintaining the quality of soil, air, and water. We employed a purposive sampling technique. This technique is a random selection of sampling units within the segment of the population with the most information on the characteristic of interest (Guarte & Barrios, 2006). With this approach, we selected 100 companies in India, based on three criteria. The company (1) must be listed on the National Stock Exchange (NSE) (2) must meet the requirement of CSR spending mandate (3) must have an actual CSR spending of over INR 1 crore in the financial year 2017–2018. From the companies which met these three criteria, we selected the top 20 CSR spenders in India for 2017–2018 across different sectors and the top CSR spenders in 13 business sectors categorized in the IIM-U report (Majumdar, Rana, & Sanan, 2018). These companies represent diversified sectors such as materials, consumer staples, utilities, capital goods, information technology, other industrials, energy, other financials, healthcare, consumer discretionary, financials and telecom services. The rest of the 67 companies were selected from the list of eligible companies by our criteria.

For each of the sampled firms, we studied the annual reports for the financial year 2017–2018. By the Indian CSR Rules of 2014, companies that are liable for CSR spending must include their CSR report as an annexure in their annual financial report. This report is filed with the Registrar of Companies and is available for investors on company websites. The disclosures on CSR for each of the 100 companies were examined to check for spending on three themes—environment, biodiversity, and nature conservation. Further, to understand why companies shy away from environment conservation as CSR, we conducted in-depth interviews of CSR Heads of companies. Our analyses and discussions are based on the analysis of CSR spends and insights gained from in-depth interviews.

2 CSR Spending by Indian Companies

KPMG India has been publishing CSR Survey Reports since the year 2015. These reports are based upon the public filings of the top 100 (N100) by market capital among the companies listed on the National Stock Exchange of India. In these, KPMG evaluates the degree of compliance of N100 companies to the provisions of

[3] Ranked on National Stock Exchange on the basis of market capital.

the Act. The reports offer valuable insights for key stakeholders of CSR activities. We studied the three reports published by KPMG, for the years 2016, 2017, and 2018 (part). The reports show a positive trend where Indian companies are making CSR expenditures more transparently. The number of companies sharing details of projects and spends has increased in the 3 years. The year 2015, being the very first year of mandatory CSR reporting, many companies channelized resources for instituting governance and developing mechanisms for efficient reporting. It was evident that CSR projects adopted by companies were in the early stages of development and were fine-tuned further for scalability and impact. "India CSR Reporting Survey 2016" (2017) presents a comparison with CSR spending in the previous year's report. It finds that compliance by companies to the provisions of Companies Act 2013 and Notification of Section 135 improved over the previous year. The improvement was with respect to the availability of information in public domain, governance mechanism, and more importantly CSR spending. A few companies exceeded the mandatory limit of 2% of the net profit as CSR spending. Consequently, a higher allocation was received by thematic areas such as health, education, and sanitation.

The following year's report, "India CSR Reporting Survey 2017" (2018), observes greater compliance to regulatory provisions of the Act along with an increase in CSR spending. Among all sectors, education and health continued to receive maximum attention in terms of CSR projects and funds. A higher number of companies report spending more than mandatory 2% on their CSR projects. While designing CSR programs, companies are driven by their strategic intent. Also, the geographic spread of CSR projects has improved as compared to earlier years, wherein states such as Maharashtra, Gujarat, Rajasthan, Karnataka, and Tamil Nadu received the largest number of CSR projects and funds. This report also highlights the need to link CSR policies and projects with the attainment of sustainable development goals (SDGs) and the government's role in leveraging CSR expenditure for forging a partnership with corporates to speed up development and for reducing regional imbalances. This report also points out that there is a more excellent dialogue among stakeholders as CSR activities receive recognition through several events and awards now.

The most recent survey of KPMG (2018) notes "universal" compliance with 99% of companies implementing their CSR policies and 90% of companies having their stand-alone CSR committees. A greater percentage of companies reported at least one woman on their CSR Committees. Education and health account for 66% and 61% of CSR projects and spends. This survey once again highlights that companies have been attempting to align their CSR projects with SDGs.

Table 5.1 is a summary of data from the three KPMG reports. The table presents the CSR spending of N100 companies in India in the period 2015–2016 to 2017–2018. It is seen that the utilization of funds earmarked for CSR projects has not only improved, but in recent year companies spent more amount on their CSR initiatives as compared to the prescribed one.

Table 5.2 shows the percentage share of CSR spending across different sectors/areas.

Table 5.1 Total funds spent on CSR by eligible Indian companies

Year	Amount spent (INR crore)	Amount prescribed (INR crore)	Amount unspent (INR crore)	Percent utilization of prescribed amount (%)
2015–2016	6518	7234	716	90.10
2016–2017	7216	7410	194	97.38
2017–2018	7536	7202	–	104.64

Source: Compiled by authors from KPMG India's CSR Reporting Survey (KPMG 2015, 2016, 2017, and 2018)

Table 5.2 Sector-wise CSR spending

Areas of CSR spending	2014–2015	2015–2016	2016–2017	2017–2018
Education	24.41	30.35	33.31	29.22
Health and sanitation	26.27	33.40	22.74	22.44
Rural areas	8.66	12.34	12.32	13.65
Reducing inequality	4.14	0.94	1.88	6.97
Multiple areas	17.94	8.84	11.45	6.70
Environment	10.93	6.98	11.04	6.41
Arts and culture	0.96	0.72	2.33	3.70
Sports	0.94	0.80	1.84	1.59
Welfare funds	1.09	0.77	0.03	0.94
War veterans	–	0.02	0.43	0.09
TBIs	0.02	0.05	0.03	–
Other areas	4.63	4.82	2.59	8.29

Source: Compiled by authors from KPMG India's CSR Reporting Survey 2015, 2016, 2017, and 2018

It is seen from Table 5.2 that a large proportion of CSR spending has been towards education and health and sanitation. Expenditure on reducing inequality has continuously increased from 8.66% in 2014–2015 to 13.65 in 2017–2018. Furthermore, art and culture have gradually grown in prominence, with CSR spending on such programs increasing from 0.96 to 3.70% during these 4 years. It is observed that a negligible amount has been spent on areas such as sports, war veterans, technology incubators, and welfare funds. Though India has significant environmental challenges, CSR spending on the environment has not only been fluctuating but has drastically decreased from 11.04% to 6.41% in the last 2 years.

Furthermore, our study of 100 CSR spenders shows that activities involving solar energy programs, LED bulb distribution, and sewage treatment plants are classified under the environment. A negative trend is that companies have spent on activities which could not be clubbed under any of Schedule VII items. CSR spending on such "other activities" has seen a twofold increase from 4.63% to 8.29%.

3 Linking CSR with India's Initiatives to Attain SDGs

The 17 sustainable development goals (SDGs) adopted by the United Nations in 2015, are well-defined through 169 targets set for the year 2030. India has played a defining role in shaping and developing SDGs and is committed to its timely attainment. The responsibilities of their achievement are assigned to the central and state governments. Many state governments have emerged with their own "Vision 2030" documents and have also set up SDG cells and mapped schemes with SDGs. At the central level, the National Institution for Transforming India (NITI) Aayog has been entrusted with the responsibility of implementing SDGs. In turn, it has identified CSR as an opportunity to combat inequality and promote backward areas. For attaining SDGs, NITI Aayog highlights the need to mobilize resources, primarily from corporates and promotes "conscious capitalism" wherein corporates strive to achieve a maximum social return. It urges corporates to incorporate SDGs into their business models (Business Standard, March 14, 2019).

NITI Aayog has enlisted 115 backward districts based on socio-economic parameters. These districts are accorded the status of "aspirational districts". However, there lies an irony as these districts hosted only a quarter of CSR projects collectively and received merely 13% of total CSR expenditure in 2017–2018. This calls for greater alignment between companies' CSR initiatives and governmental efforts to attain SDGs.

Besides geographic focus, another area of concern is the lopsided focus of CSR projects and spending on two areas, viz. education and health. For an improved alignment between their CSR initiatives and SDGs, companies shall divert their CSR efforts towards the environment since a majority of SDGs are linked directly or indirectly with this sector.

4 Do Indian Companies Spend on Biodiversity, Nature Conservation, and Ecological Measures?

Every human economic activity consumes natural resources. Industries process resources into products for human consumption, and nature is brought into the monetary cycle. The economic growth of countries is dependent on the financial growth of industries. Furthermore, humans need ecosystem services for survival and industrial production. The atmospheric gas balance, carbon sequestration, hydrological cycle, decomposition and recycling of organic matter, and hundreds of other environmental services are responsible for sustaining human industrial activities and all life on the planet. It is no longer debated that growing economic activities have pushed the consumption of natural resources to a stage where ecosystem services have degraded and the natural environment's capacity to sustain life has diminished (Lovins, Lovins, & Hawken, 2007; Reinhardt, 1999). Energy consumption has accelerated climate change, which is showing up in unexpected places on the planet.

This makes a compelling argument for industries to take up measures of enhancing biodiversity, conserving natural resources and restoring ecosystem services. However, are companies spending their money on nature conservation? To answer this question, we examined the CSR spending of 100 selected companies for expenditures made on the environment, especially biodiversity and nature conservation.

5 Previous Studies

There has been much debate on the scope and definitions of CSR. There is no single established definition of CSR (Schwartz & Saiia, 2012) though there seems to be a consensus that CSR involves managing a firm in a way that is "economically profitable, law-abiding, ethical and socially supportive." (Carroll, 1999).

Corporate understanding of CSR has improved over the years, and with that, the impacts they have have been positive. Despite uncertainty in the impacts of CSR expenditure, Corporate India has increased its CSR spend in the last 4 years by 47%. The average amount spent per company in 2017–2018 has gone up to INR 761 million, from INR 588 million in 2014–2015 (KPMG, 2018).

However, biodiversity is a relatively alien term in business language. Moreover, the impacts of economic activities on the natural environment are often ignored in board rooms, and the depleting health of ecosystems, fundamental in sustaining life, is overlooked. One of the key reasons for low CSR spending on biodiversity is the lack of information, lack of understanding in collecting data, and the uncertainty about the impact of activities (Overbeek et al., 2013). Companies do not produce sufficient and detailed information on their impact and dependencies on biodiversity and ecosystem services. Business risks arising from a company's dependence and impact on ecosystem services have to be mapped better (TEEB, 2010).

In November 1988, the United Nations Environment Programme (UNEP) convened the Ad Hoc Working Group of Experts on Biological Diversity to explore the need for an international convention on biological diversity. This led to the establishment of the Convention on Biological Diversity (CBD), which was triggered by the growing international commitment to sustainable development. CBD is a crucial step in the conservation of the planet's biological diversity. In the tenth session of the Conference of Parties to the CBD, the Aichi Biodiversity Targets[4] (ABT) were adopted by parties. The ABT lays down 20 biodiversity conservation targets, encompassed in five strategic goals. Of these targets, the fourth target focuses on the importance of sustainable production and consumption systems for biodiversity conservation. However, in the CBD framework, the industry does not have a clearly defined role in the process of discussing and creating international policy solutions (Griffiths, 2010). Based on ABT, India has developed 12 National Biodiversity Targets (NBT) (MoEFCC, 2018).

[4] https://www.cbd.int/sp/targets/.

Many studies have tried to unravel the motivations in the choice of CSR themes. Most companies have strategic reasons—they can potentially benefit from CSR activities by sending a signal to stakeholders of their commitment to responsibility. Moreover, they could signal overall quality, trust, and reliability (Doh et al., 2015). This can potentially be a strategic differentiator for customers and other stakeholders who value socially responsible initiatives. Furthermore, introducing biodiversity conservation actions in management systems can help contribute towards the achievement of sustainable principles and conscious environmental exploration (Reale, Magro, & Ribas, 2019).

Overbeek et al. (2013) have conducted an exploratory study of corporate commitment towards the conservation of biodiversity and ecosystem. This includes a literature review on sustainability approaches and interviews with twelve sustainability representatives of companies in the Netherlands. Their study observes that some companies are trying to incorporate biodiversity in their CSR policies, but they face challenges with it. Biodiversity is perceived as an intangible phenomenon and, therefore, difficult to capture it with a uni-dimensional factor or single indicator. The paper presents some concrete examples from the sampled companies of what companies do to protect biodiversity.

Similarly, another study by Slootweg (2009) shares that though biodiversity is gaining increased attention, its interpretation lacks clarity. To address this gap, the author presents a conceptual model based on the definitions and principles of CBD. This model, the biological assessment framework, acts as an analytical framework to assess the impact of human activity on biodiversity. It consists of nine principles and eleven analytical steps. This framework is developed to guide corporations to integrate biodiversity in their sector or company-specific instruments such as impact assessment, sustainability reporting, certification of products, life cycle analysis, etc.

There is an increasing acceptance of the pivotal role played by corporations in the conservation of biodiversity. For example, Robinson (2011) points out its transformation from “rapacious exploiter of nature” to “conservation saviour”, enabled through the policies and practices of CSR. He further highlights that private corporations could generate substantial conservation impacts if they are able and willing to alleviate the negative effects of their activities. Also, several ways of making biodiversity a viable business proposition are discussed. This paper also presents examples of how collaborations between private corporations and conservation organizations resulted in the mitigation of environmental impacts.

Ketola (2009) illustrates the role played by corporate responsibility (CR) in developing and managing biodiversity and further converting it into business strategies through case studies of two multinational forest companies. The study finds that forest companies usually tend to be reactive in their approach to biodiversity conservation. Therefore, they respond to external pressures and fulfill minimum legal compliance. However, forest companies, especially those dealing with forest produces like paper and pulp, may find new business opportunities through their biodiversity conservation initiatives. For instance, for better future opportunities, these companies may collaborate with indigenous communities, environmental

organizations, governments, and other stakeholders who could plant multicultural forest gardens, instead of existing monocultural tree plantations as it offers several ecosystem services. Also, forest companies may undertake large-scale leasing of forest land for conservation.

6 CSR Spending of Indian Companies on the Natural Environment

From the annual reports of the 100 sampled companies, we compiled the total CSR spent in the financial year 2017–2018. This included the amount spent on projects and administrative overheads (as required by the Companies Act) and the component spent on nature conservation. Schedule VII of the Companies Act lists the activities where CSR funds can be employed. The Schedule lists out 12 activities, loosely connected to the SDGs, which are allowed for spending CSR funds. In the list, the fourth allowable activity is about environmental activities. They are described as "*ensuring environmental sustainability, ecological balance, protection of flora and fauna, animal welfare, agroforestry, conservation of natural resources and maintaining the quality of soil, air and water, including contribution to the Clean Ganga Fund set-up by the Central Government for rejuvenation of river Ganga*" (Ministry of Corporate Affairs, 2014). The activities in Schedule VII are to be interpreted liberally, to capture the essence of subjects mentioned in it. Companies are free to choose any or all of the activities in this Schedule for their CSR expenditure. Furthermore, the Act allows companies to execute CSR projects through own or group foundations formed with other companies, implementing agencies or non-governmental organizations (NGO). The sector-wise break up of our 100 sampled companies is shown in Table 5.3.

For the 100 companies, we extracted the CSR amount spent during the year 2017–2018, on environment-related activities. Item (iv) of Schedule VII of the CSR Rules has worded the environmental spending category rather broadly and thus there is a vast diversity in the activities undertaken by companies in this category. Of the sample companies, those that spent funds on "environment" (Schedule VII (iv)) were tabulated and their amount (Table 5.4).

Our findings are similar to studies conducted by other organizations in India. A comparison is shown in Table 5.5. This reveals that a meager portion of India's CSR expenditure goes towards the natural environment.

From our 100 samples, 69 companies did not spend any CSR funds on the environment. Surprisingly, the top CSR spender, Reliance Industries (INR 771 crores) too, did not spend any funds on the environment. As we were examining spending specifically on biodiversity and nature conservation, we could identify a pattern of themes. Based on this, we further split the activities under the "environment" category of CSR spending into seven themes (Table 5.6).

Table 5.3 Classification of sampled companies by industry

Sector	Number of sample companies
Energy and power	17
Consumer products	13
Banking and finance	11
Industrial manufacturing	11
Materials	10
Automobile and allied	9
Diversified	9
Construction and cement	8
IT consulting and software	5
Telecom	3
Chemicals	2
Pharmaceuticals	2
Number of companies sampled	100
Total CSR they spent in 2017–18 (INR crores)	7971.22

Table 5.4 Details of CSR spends on environment conservation, of the 100 sample companies

Number of sample companies who spent on schedule VII (iv) "environment"	31 (31%)
CSR spending on "environment" of the 31 companies (INR crores)	717.62 (9%)

Table 5.5 Comparison of our findings with other studies

Organization which conducted the study	Number of companies studied and sampling criteria	Amount of total CSR spent in 2017–2018 INR crores	Amount spent on schedule VII (iv) "environment"	
			INR crores	Percent of the total (%)
Authors' study	100 listed companies; selected based on multiple criteria	7971.22	717.62	9
KPMG, India (KPMG 2019)	100 top companies by market capitalization; All N100 of NSE	7536.30	797.00	10.57
CRISIL (2019)	1246 listed and unlisted companies; all those eligible for CSR spending	9999.00	1008.00	10.08
Renalysis consultants (Renalysis 2018)	Top 500 listed companies in India; by revenue	11,215.00	1075.00	9.58

Table 5.6 CSR activities of sampled companies, under "environment"

Sr. No.	Themes within the "environment" category of CSR expenditure	Activities included in the theme
1	Biodiversity and nature conservation	a. Plantations, afforestation, green cover, sapling distribution b. Garden and park improvements c. Lake and pond conservation, rejuvenation d. Conservation of natural resources e. Ecological balance f. Protection of flora and fauna g. Endangered species conservation h. Bee harvesting
2	Water	a. Watershed management b. Water harvesting c. Desilting d. Soil and water conservation e. Lake repair and maintenance
3	Waste management	a. Solid waste management b. Sewage management
4	Energy	a. Solar energy, SPV panels, solar microgrids b. Biogas, LPG distribution c. Energy efficiency, LED lights installation d. Other forms of clean energy
5	Swachh Bharat Abhiyan	a. Contributions made to the Government of India program of Swachh Bharat (Clean India mission)
6	Industrial sustainability	a. Driving environmental sustainability activities within small and medium enterprises
7	Not specified	Company has spent funds on "environment", but their report does not provide details of activities
8	Nil	The company has not spent any CSR funds on "environment"

The amount of INR 717.62 crores, spent on "environment" activities by the 31 companies, were categorized into eight themes (Table 5.7).

Over half (53.59%) of the total amount was spent on "energy" related activities. These include investments in clean energy sources like solar photovoltaic cells, solar microgrids and windmills, energy-efficient devices like LED street lights and CNG and LPG gas sources. It is not surprising that this theme has attracted a significant portion of the CSR spending in the environment. The technology is proven, results are measurable, and impacts can be quantified into savings in carbon emissions, month on month.

Similarly, the impacts of activities under "waste management" are measurable and visible to civil society. Activities like waste segregation, recycling, organic waste composting also contribute to the livelihoods of the formal and informal workforce involved in waste management.

Yes Bank was the only organization which funded activities under "industrial sustainability". This bank has a strong focus on lending to the small and medium

Table 5.7 CSR spending on "environment" categorized further

Themes within "environment" category of schedule VII CSR spending	Amount of CSR spending on each theme	
	INR crores	Share of the total (%)
Energy	384.59	53.59
Biodiversity and nature conservation	186.69	26.02
Swacch Bharat Abhiyan	60.05	8.37
Water	49.86	6.95
Waste management	15.42	2.15
Not specified	12.36	1.72
Industrial sustainability	8.65	1.21
Grand total	717.62	100

enterprise (SME) sector in India. Under this theme, Yes Bank funds SMEs to undertake environmental sustainability activities. While it is not mentioned who were the beneficiaries, they are likely the bank's customers. Activities that improve the environmental sustainability within firms have the potential to reduce risks arising out of environmental issues (Nulkar, 2014), which is useful to the firm's lenders.

Swacch Bharat Abhiyan is a Government of India initiative of cleanliness, and 8.37% of the funds are allotted to this program. The Government regularly broadcasts the impacts of this program. Thus, CSR managers have little hesitation in allocating funds to the program.

While activities under "Water" theme are not easy to quantify, this subject has an emotional appeal. Moreover, water is a politically sensitive subject in India, especially among farmers, village administration and bureaucrats. Funding water conservation and lake/pond rejuvenation programs have a positive effect on the company's image. Water programs have attracted 6.95% of the funds in the sampled companies.

The impacts of CSR programs taken up under "Biodiversity and nature conservation", are slow in showing results. Species conservation may take few decades to a century to show results. Technology has a minor role in conservation and often, conservation techniques are debated by scientists. These are essential reasons why biodiversity and nature conservation is less attractive as a CSR expenditure. Our sample data showed that just over a fourth (26.02%) of the spending in the "environment" sector was made on "Biodiversity and nature conservation". Even within this theme, activities such as tree plantation programs, afforestation, improving parks and gardens, and urban green cover are quantifiable and visible and have attracted over 50% of the INR 186.69 crores spent here. The rest of the money was spent on flora/fauna conservation and pond/lake rejuvenation. The 26 companies that had a significant expenditure on biodiversity and nature conservation are listed in Table 5.8, with the description of their activities. The amount reaching the theme of "Biodiversity and Nature Conservation" is depicted in Fig. 5.1.

Table 5.8 Companies with a major expenditure on biodiversity and nature conservation

No	Name of company	Total CSR INR crores	Env and nature INR crores	Description
1	Oil and Natural Gas Corp	503.00	17.13	GreenHub—train youth in NE India for wildlife photo documentation. The report says 20% spent on environment
2	ITC	290.98	73.04	Ensuring environmental sustainability, ecological balance, protection of flora and fauna, animal welfare, agroforestry, conservation of natural resources, and maintaining the quality of soil, air, and water including contribution to the Clean Ganga Fund. No details
3	Tata Steel	231.62	4.21	Environmental sustainability, protection of flora and fauna, agroforestry, animal welfare, resource conservation, maintaining the quality of soil, air, water
4	Housing Development Banking and Finance Corp	175.97	1.18	Programs for environmental sustainability including recycling, conservation, animal protection, and ecology
5	NMDC Ltd.	169.37	27.91	Ensuring environmental sustainability, protection of flora and fauna, and animal welfare
6	Larsen and Toubro Ltd.	100.92	27.93	Development of gardens and maintenance of public spaces; Tree plantation and environment protection; awareness programs—environment, energy
7	HCL Technologies	91.37	0.86	Afforestation, conservation, preservation of trees; Landscape based approach to conserve and restore designated landscapes of the Nilgiri biosphere reserve
8	Adani Ports and Special Economic Zone Ltd.	57.18	4.50	Environment awareness and maintenance of ecological balance through rally for rivers
9	Vedanta Ltd.	45.19	0.43	Tree plantation and green belt at Barmer
10	NLC India Ltd.	43.59	3.03	Plantation
11	Bosch Ltd.	36.30	7.37	Check dams, cleanliness project, lake rejuvenation
12	Hindalco Industries Ltd.	31.09	1.98	Natural resource conservation programs and non-conventional energy bio gas support program; solar energy support; other energy-efficient supports; plantations; soil conservation; land development; water conservation and harvesting structures; development of common pasture land
13	NALCO	29.00	0.80	Plantation, solarization

(continued)

Table 5.8 (continued)

No	Name of company	Total CSR INR crores	Env and nature INR crores	Description
14	Shree Cements Ltd.	27.81	0.97	Tree plantation, environment protection, animal welfare
15	M&M Banking and Finance	27.16	1.28	Hariyali: increasing green cover in the country by planting trees in multiple locations across India and Environmental conservation and restoration projects
16	Dabur India	23.74	3.70	Programs to protect endangered species of herbs and plants, enhancing the livelihood of farmers, beekeeping, tree plantation, solar energy
17	Tata Motors Ltd.	21.44	1.38	Ensuring environmental sustainability through awareness and protection of natural habitats
18	Idea Cellular Limited	19.94	0.42	Increasing green cover and sensitizing people about it
19	Ashok Leyland Ltd.	15.67	1.02	Lake rejuvenation, tree sapling distribution, and ensuring environmental sustainability; contribution to Mukhyamantri Jal Swavlamban Abhiyan for the conservation of water level
20	Havells India Ltd.	14.95	0.46	Plantation
21	Tata Chemicals Ltd.	14.28	4.63	Conserve—maintain ecological balance and conserve natural resources through a participatory approach for environmental sustainability
22	Welspun India Ltd.	11.10	0.40	Plantation, waste management project, a donation to Vimal Research Society for agro biotech
23	Rashtriya Fertilizers and Chemicals Ltd.	7.79	0.27	Rejuvenation and renovation of four parks in Palakkad to maintain and preserve natural resources, to build recreational space and to create water bodies; Installation of a solar power plant in Tandur Mandal, Telangana; financial assistance to Sangopita Foundation for solar installation; clean Alibaug beach drive
24	JK Tyre & Industries Ltd.	4.56	0.30	Green cover and environmental conservation
25	Jain Irrigation Systems Ltd.	4.05	1.19	Creation of a theme park, afforestation
26	Suzlon Energy Ltd.	3.56	0.30	Sustainable need based village development

What makes biodiversity and nature conservation less attractive to CSR managers? Several studies point out that CSR is used as a strategic tool by firms to maximize firm value. This is accomplished by aligning social and environmental goals with the firm's corporate goals. Strong CSR performance has greater potential to increase shareholder value and can positively affect the firm's value in the short term and the long run (Malik, 2014). Towards these objectives firms prefer to utilize

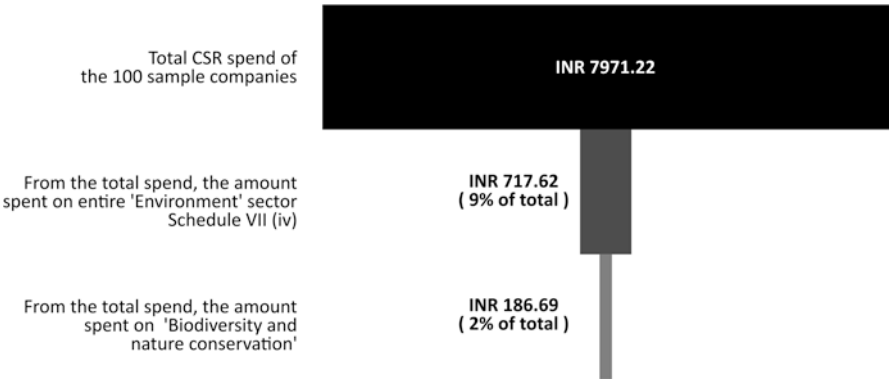

Fig. 5.1 How much of the CSR funds reached biodiversity and nature conservation?

CSR funds in activities that can be quantified or have visible impacts. Unfortunately, biodiversity and nature conservation is weak in both these areas.

Moreover, companies shy away from CSR spending on biodiversity or nature conservation due to a weak understanding of the term. What constitutes biodiversity and how is it connected to the business, could be a challenging question to some. This might result in their inability to approach biodiversity conservation as a valuable business proposition.

7 Insights from CSR Managers and NGOs

We interviewed six CSR managers to understand their perspective of CSR expenditure on natural capital. All these companies are eligible for the mandatory CSR spending and are listed on the National Stock Exchange. Furthermore, the founder of TreePublic, an NGO working in the field of biodiversity, was interviewed. TreePublic is engaged by several companies for its CSR and undertakes tree plantations, lake and forest restoration programs. Some of the insights from these interviews are summarized below:

1. Not all CSR managers saw a business connection with nature conservation efforts. They acknowledge the criticality of natural resource inputs to their businesses; however, they do not see a direct or tangible business benefit from conservation. Everyone we met undertakes measures to reduce resource and energy use within their plants. While these are conservation efforts, they fall under the ambit of sustainability and not CSR. As they have a positive impact on profitability, companies cannot ignore them. Two CSR managers did see a strong business connect. A large global manufacturer of energy equipment has a water conservation program in Ahmednagar, where they have a factory. Many of their workers in this factory have a farm and the company expects the benefits of the

water conservation program to have a positive effect on their worker relations. Another CSR Manager of a distillery equipment manufacturing company sees a strong connection. Watershed development is a focus theme for them and includes afforestation and biodiversity improvement. This company's products—distillery equipment—require farm produce, and water availability is an essential criterion for farm productivity. Thus they consider environmental spending to be important for their business.

In many businesses, there could be no direct business connection of CSR spending, and this can be a challenge for companies.

2. We asked the CSR managers what outcomes they seek from the CSR expenditure in "environment". A global company manufacturing ball-bearings said that it was important for them to contribute to the management of scarce natural resources for the future of the world economy. Also, the carbon sequestration from their plantation drives was a remarkable outcome for them. The manufacturer of dairy equipment said they wanted to see increased water availability from their watershed management programs. The manufacturer of energy equipment said they wished to create more green cover in their geographies of operation.

   Broadly, we saw that companies had more altruistic reasons than business reasons for their environmental spending. If CSR leaders can see business reasons, then environmental spending would be more relevant. The majority of them are not able to establish and leverage any linkage between their businesses and environmental conservation.
3. Taking this ahead, we asked them how could biodiversity and nature conservation be turned into a viable business proposition? There were several suggestions on this. Two CSR managers were of the opinion that the terms "biodiversity" and "nature conservation" are not fully understood by business managers. Thus, it is unclear as to how they are connected to the business. Tree plantation and afforestation are well understood and hence prevalent in CSR programs. Training interventions for CSR leaders would help improve this situation. One manager felt that organizations like Confederation of Indian Industries (CII) and Federation of Indian Chambers of Commerce and Industry (FICCI), who are already working on sustainability and green businesses, can take the lead to educate companies on this. One manager said that while companies indulge in sustainability practices within their premises, sustainability managers should realize that practices outside their gates would have even more impact. They could then influence CSR managers. An important suggestion was to have sustainability and CSR in one department. In many companies, the CSR expenditure is under the purview of Human Resources or Administration. He felt that sustainability and CSR working together would have a greater impact.

   Another CSR leader said that biodiversity and nature conservation does not feature in most CSR conferences. Renewable energy and water conservation lead the discussions in the "environmental" theme. This must be changed and chambers of commerce or trade organizations should take the lead in this. One CSR manager said a big challenge to nature conservation was in the metrics.

Measures to ensure program execution are not clear, some are not agreed upon by researchers or some are hard to measure. When such issues crop up, it becomes tough to propose environmental spending to leaders.

4. We asked all the managers if they had heard of the Aichi Biodiversity Targets and India's 12 National Biodiversity Targets (NBT). As expected, none of them had heard of these. The Government has communicated the SDGs in the corporate world, and the NBTs must be diffused similarly. Nature conservation needs all the help it can, in the form of government organizations, industries, NGOs, and communities.

One CSR manager felt that the government must have some policy measures which mandate nature conservation in CSR spending.

India's dwindling biodiversity and loss of natural capital is a matter of grave concern. Conservation science argues the need to save all species on earth. Charismatic species like the tiger, rhino, and the elephant have a critical role in ecosystems and an enduring value in the tourism industry. But scientific evidence and live business cases around the world argue that biodiversity is critical to sustaining the businesses around the world. The natural environment has a crucial role in the health of a nation's economy and biodiversity provides critical inputs to industry. Nature provides genes, species, and ecosystem services to businesses in their production processes. Furthermore, businesses depend on productive ecosystems to treat and assimilate industrial waste, maintain soil and water quality, and control the atmospheric composition. Long-term business survival, thus, depends on healthy ecosystems, as much as life does.

Unfortunately, the conservation history of India is hardly encouraging. The list of threatened species is growing every year, non-native species of flora are increasingly capturing the landscape, and physical features of the land are being changed by large-scale building and construction activities. The CSR mandate had offered hope to India's natural heritage; however, the insignificant amounts being spent on the environment and ecosystems leave little hope.

8 Recommendations

Our research offers compelling reasons for immediate measures to improve the CSR expenditure on India's natural environment. The Ministry of Corporate Affairs, which is responsible for CSR expenditure in India, can contribute towards this in many ways, as can the companies themselves.

a. Based on our findings, we observe that businesses lack sound ecological knowledge. Furthermore, companies may not have internal capabilities and mechanisms to assess the benefits of nature conservation. Some of the outcomes of degraded natural capital—like resource price volatility, risks of water scarcity, or environmental impacts of operations and supply chains are difficult to quantify. The first step is, thus, to create a keen awareness among corporations, of the

connection between industry, natural resources and healthy ecosystems. The key challenge here is that the impacts of a degrading natural environment may take years to show up in businesses. Companies engrossed in short-term competitiveness may not fathom the relevance of long-term conservation efforts. This needs to be thought out in the communication. The organizations which can take up this responsibility are CII and FICCI. Both of them have, in the past, rolled out successful communication strategies for quality improvement in Indian industries and industrial sustainability programs. They have the internal capabilities and the reach in the Indian industry to make this effort successful.

b. The Ministry of Corporate Affairs (MCA), responsible for the CSR program, can prepare a comprehensive list of possible areas in nature conservation that corporations can get involved in. Their prior knowledge often influences the choices of CSR managers. It is important to show them avenues which they may not have employed earlier. Informed CSR managers are more likely to be encouraged to take up nature conservation.
c. Furthermore, the Ministry of Environment, Forests and Climate Change (MoEFCC) must enforce the legal protection already existing, for endangered plant and animal species. This can be leveraged by the MCA to encourage CSR spending on conservation (Faruqi, 2017).
d. A considerable challenge facing the Indian industry is the confounding way in which various ministries operate or share responsibilities. For example, the Ministry of Corporate Affairs is responsible for the CSR rules, but the Ministry of Environment, Forest and Climate Change has the authority towards nature conservation. The Ministry of Commerce and Industry watches over the industrial ecosystem. As CSR in India is yet in infancy, a special cell with powers to negotiate with relevant ministries would be worthwhile.
e. Improvement in environmental CSR requires complementary policies. There is also a need to develop international guidelines and common policy and legal frameworks to support and streamline such initiatives. Developing such a policy strategy is likely to produce a self-reinforcing gain to firms, investors, and society (Barbier & Burgess, 2018).
f. Out of 26 companies spending on biodiversity, a majority conducted these activities through implementing agencies. Thus, it is essential to ascertain that these agencies have not only location-specific scientific expertise but also prior experience of biodiversity conservation. Otherwise, experiments such as large-scale afforestation, watershed development might have unintended impacts on the environment.

9 Conclusions

In 2010, the TEEB Report recognized the role of private corporations in biodiversity conservation. As businesses benefit directly from natural resources, they must recognize their role in their conservation. This requires measures to trigger recognition

in businesses and encourage their participation in nature conservation. In our study, we see that companies narrowly interpret the word "social" in corporate social responsibility to mean human society. If this has to change, it is crucial to include the word "environment" in the term corporate social responsibility. Studies have shown that a healthy natural environment is critical for a healthy society and leads to a good quality of life. The environmental problems facing all forms of life are far too grievous for the government alone to rectify. An improvement in the present status of the natural environment needs the government's efforts and sharing of responsibility by all stakeholders in society. As the world runs out of time, Indian companies must recognize their role and act. Without immediate and substantial reformation, the human race is at the highest risk in the history of the planet.

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Chapter 6
The Deer that Rode a Car: Role of CSR in Natural Resource Conservation

Sonali Ghosh and Vinod B. Mathur

Abstract The role and proactive engagement of the private sector towards the environment and other public goods and services is a recent but evolving concept that is garnering support from conservationists and local communities. CSR has been hailed as one of the enabling factors that can help mitigate or minimize the tradeoffs associated with development that extracts natural resources. At the same time, the precautionary principle is a key operating guideline for the Convention on Biological Diversity and also for several industries that use the natural resource as a base for their operation. There is, therefore, a need to further strengthen linkages between developmental activities and the environmental safeguards that must be adhered to minimize tradeoffs. This paper explores the origins of CSR in biodiversity and wildlife conservation in India and provides a few best practices that may be "scaled-up" to support CSR engagement. It is argued that environmental CSR initiatives must be based on science-based primary evidence that, in turn, would help the actual implementation of the CSR initiative.

Keywords CSR · Biodiversity · Wildlife · Flagship species · India · Whale shark · Swamp deer

All views expressed in this article are Authors' personal views.

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1 Background

Corporate Social Responsibility (CSR) programs trace their origins in philanthropy and have been defined as external relationships with stakeholders to address social problems (Rondinelli & Berry, 2000). These have been further expanded to include the simultaneous consideration of economic growth, environmental protection, and social equity in business planning and decision-making. CSR is a theme that is multi-sectoral and is actively sought out by academia and conservationists alike as it has the potential to match the scale and intent of state-sponsored welfare schemes. In recent years, CSR has gained prominence as the economy is globalized, and private sector engagement encouraged, besides the growing realization in the business sector, to contribute towards human society and the environment. The debate is especially relevant in global south countries with expanding economies and evolving regulatory frameworks (Panwar & Hansen, 2015).

The base pillar supporting CSR is the intent to contribute towards the betterment of civil society without the motive of profit-making. This is achieved by targeting ecological, social, and economic aspects that may be directly or indirectly related to the developmental activity which the company is undertaking. The origins of CSR have been attributed to the triple-bottom-line framework derived in the mid-1990s (Elkington, 1998). This sustainability framework specifies the 3Ps-people, planet, and profit that must be met (Elkington, 1998; Slaper and Hall, 2011). It was also originally meant to be a voluntary approach accepted by the companies, though over time, it has become mandatory as part of a company's dealings. The corporate social responsibility of business has, therefore, been defined as "A concept whereby companies integrate social and environmental concerns in their business operations and their interactions with their stakeholders." Under CSR, companies may have the secondary responsibility to look after the interest of society and environmental protection besides taking care of their employees and the profit of the company. The basic agenda of CSR remains sustainable marketing, wherein companies try to reduce environmental and social tradeoffs (Benobou & Tirole, 2010). Measures such as the use of green energy, effective solid waste management, and sustainable use of natural measures, therefore, become paramount and management of environmental becomes one of the major concerns of these companies (Baxi & Ray, 2009).

The origins of the term "corporate accountability" have been pinned to the World Summit on Sustainable Development in 2002 wherein standards were laid in for private companies and industries to work for the protection of certain global welfare interests such as environment, health, and education (Morgera, 2012). Additional support has come in from references to CSR in the OECD Guidelines for Multinational Corporations, and the Environmental and Social Standards of the World Bank's International Finance Corporation as published in 2011.

2 CSR and Biodiversity

Biodiversity conservation and management pose a challenge to business houses, especially in this era of global free trade, as the impacts are often indirect with low visibility that unfolds over several generations.

The Convention for Biological Diversity (CBD) was ratified in 1992 at the historic Earth Summit in Rio de Janeiro, Brazil. The international treaty enshrines in its primary objectives, to safeguard and conserve biodiversity through sustainable use and equitable benefit sharing with the local communities. It currently has more than 196 state parties ratifying the treaty, thereby leading to near-universal participation among countries. Since its inception, CBD has addressed the issues of biodiversity loss, including threats from climate change and has carried out scientific assessments and developed tools and processes that have helped local communities, NGOs, government departments, women and local youth, and other stakeholders including business companies to manage their natural resources sustainably. Similarly, the Cartagena Protocol on Biosafety, 2003 and the Nagoya Protocol on Access and Benefit Sharing, 2014, have further strengthened the CBD with their overall aims to protect genetic resources and its utilization across the world.

The precautionary principle is a key operating guideline for the Convention on Biological Diversity. Applicable to firms and government authorities alike, it exercises caution, especially since the plausible impacts of any business activity on the environment are not fully established. This is particularly relevant when interlinkages and complexity of ecosystems are poorly understood or documented (e.g., valuation of ecosystem services) to enable correct decision-making. Another aspect of the precautionary principle is that all relevant sectors of society and scientific disciplines should be involved in and cooperate toward addressing challenges related to maintaining biodiversity and the health of ecosystems. In other words, stakeholder engagement is important (Reade, Goka, Thorp, Mitsuhata, & Wasbauer, 2014). In this regard, the converge in CSR and implementation of CBD are now being increasingly made public as environmental-cultural assessments and benefit-sharing mechanisms are being referred to by corporate companies to ensure both the protection of the environment and human rights.

3 CSR and Sustainability

In recent times, there has been a clear shift in the way the companies report their performance through communications with their stakeholders (Charumathi & Ramesh, 2017). Moving from mere profit, the companies are increasingly showing their non-financial performance in terms of sustainability and social responsibility. Companies not only want to spend on sustainability, but also want to project their social sector activities to gain a favourable image among the stakeholders. A separate set of report called corporate sustainability report, which is based on the

triple-bottom-line of profit, people, and planet is now a new norm (Du, Bhattacharya, & Sen, 2010; Elkington, 1998).

By engaging in CSR activities, businesses can garner public support including those of their stakeholders thereby improving their overall image as an ethical and morally responsible company. This also enhances sales and brand value especially if it is a consumer good targeted to special category of consumers (e.g., cosmetics, beverages, furniture, etc.). The level of social and environmental disclosures has significantly improved post business responsibility reporting that has also influenced market valuations (Charumathi & Ramesh, 2017).

CSR's mandate has gradually evolved from merely managing the company's environmental responsibilities such as pollution in the early 1990s to that of building it within the business processes and also set up norms for its processes such as to improve environmental policy statements, training schemes, pollution mitigation and recycling, social and impact assessments including environmental assessments, and environmental certification (Clapp & Utting, 2008). It was also promoted in the 1992 Rio Earth Summit wherein it was encouraged to seek corporate sector contribution toward sustainable development without environmental degradation. It is observed that many leading organizations have committed themselves towards this goal (Benobou & Tirole, 2010).

In the decade beginning 2000, the subject of corporate responsibility came in prime focus as over 3600 companies, including 148 of the world's largest 500 corporations pledged to CSR (Clapp & Utting, 2008). The companies were advised to choose and develop green technology and take precautions to ensure social and climate safeguards while addressing environmental concerns (Clapp & Utting, 2008).

At the same time, governments in various countries also started using the concept of CSR and revised their policies regarding its implementation. Although it is not needed for the companies to disclose their corporate environment reports, a few countries such as Netherlands and Denmark have made CSR compulsory (Baxi & Ray, 2009).

On April 1, 2014, India became the world's first country to make CSR legally a part of the Companies Act, 2013. As per the revised provisions, companies with a net profit before tax of at least Rs. 5 crore, or a net worth of at least Rs. 500 crore, or a turnover of at least Rs. 1000 crore were now mandated to spend two percent of its average net profit before tax of the preceding three years, on CSR. It was also compulsory to publish their CSR investments in the company's annual reports (Charumathi & Ramesh, 2017).

4 Third-Generation CSR and Nature Conservation

The new emerging third-generation CSR is approached where companies ensure that within their core businesses, deliver sustainable development results. This is different from the first generation of CSR, where the charity was viewed as a way of using profits and then the second generation of CSR evolved that only aimed at

minimizing the negative impacts of the companies' operations (Saquib, Sahgal, & Pamlin, 2016).

The new approach meant that environmental and social concerns were the starting point for any business activity and should be the top priority (Charumathi & Ramesh, 2017). This improved the overall company image as it provides the information that allowed the government to proactively change business regulations in order to incentivize companies who have shown commitment towards the outcome-based results on social and environmental fronts.

In the following section, a case for greater CSR initiatives in natural resource conservation is being made, especially with putting forth the argument that this sector requires a multi-sectoral approach that can provide a win-win situation for all. A summary of best practices of CSR initiatives that have helped in global wildlife conservation have also been elucidated.

5 Wildlife as a Natural Resource in India

Biodiversity conservation is intrinsic to Indian social ethos and culture (Eck, 2012; Rangarajan, 2005). This is because of India's enormous variation in climate and terrain as a result of which it is one of the world's 17 most mega-diverse countries in the world and contains 4 of the world's biodiversity hotspots—the Western Ghats, the Eastern Himalayas, Indo-Burma, and Sundaland (Myers, Mittermeier, Mittermeier, Da Fonseca, & Kent, 2000). A diverse array of over 45,000 plant and 77,000 animal species have been reported from the Indian subcontinent thereby contributing to over 7 percent of the total plant and 6.4 percent of the total animal species found in the world (Bharucha, 2002).

Policies and legislation for conservation and sustainable use of biological resources based on indigenous knowledge systems and practices are enshrined in the Constitution of India (Article 48A and Article 51A) towards environmental protection. At the same time, strong legal, policy, and participatory measures including the Wildlife (Protection) Act, 1972, Forest Conservation Act, 1980, Biological Diversity Act, 2002 among others that have helped in providing the required safeguards and regulatory mechanisms. In terms of wildlife conservation, India is a leading example in Asia as it has in spite of high population pressure been able to preserve the world's largest numbers of mega-fauna such as tigers, elephants, asiatic wild buffalo, greater one-horned rhinoceros, gaur, asiatic lions among others. It is also one of the countries with over 5 percent of its total geographical area under legally designated Protected Areas set aside for wildlife preservation (ENVIS, 2019).

All wildlife (includes plants and animals), irrespective of land ownership, which is in their natural habitat, belongs to the nation-state, managed largely through govt. schemes (primarily administered through Ministry of Environment, Forests and Climate Change (MOEFCC) and state forest departments (Narain, Panwar, Gadgil, Thapar, & Singh, 2005).

Despite consistent increase in the financial outlay on schemes targeting five broad areas (viz., environment, river conservation, forestry & wildlife, afforestation and eco-development, and animal welfare) in the last three five year plans (Anon, 2012), there has been a felt need to include extra-budgetary resources including CSR for the multi-sectoral initiatives.

From an average annual outlay of Rs. 2800 million rupees in 1992–1993, the outlay was enhanced to Rs. 22,000 million rupees in 2010–2011. The Xth Plan (2002–2007) budgetary support for MoEFCC was Rs. 56,000 million rupees with a projection of Rs. 100,000 million rupees for the XIth Plan (2007–2012). The Ministry's budget for the next five years is projected to be Rs. 150,000 million rupees approximately under the XIIth plan, for which budgetary provisions on wildlife by the state, International funding agencies, and private sector are to encouraged (Madras Courier, 2017).

Inspite of all these efforts environmental issues still lag behind in terms of resource allocation, and new strategies and partnerships, especially with NGOs, civil society organizations and the corporate sector, is required to bring in the funds and the resources (The Hindu, 2017).

6 CSR in Species Conservation Efforts: The Benchmarks

6.1 When Icons Meet Flagships

The tiger (*Panthera tigris*) is the world's largest cat and an apex predator that requires inviolate wilderness forested areas to survive. As per WWF, India has the highest numbers of the Bengal tiger subspecies, the populations of other subspecies in the remaining 13 countries in Asia are largely precarious. Tigers are iconic in every society and culture with several attributes of enigma and valour attributed to them. Ecologically, it is a flagship species upon which the survival of several other species, including its prey, is dependent on. It is for this reason that poaching and habitat loss concerns for decimating the tiger populations have caught global attention in the last four decades.

The Save the Tiger Fund (STF) was established as a partnership between the ExxonMobil Foundation and the National Fish and Wildlife Foundation in 1995. ExxonMobile is a large American multinational oil and gas corporation also touted to be the world's largest company by revenue. The STF gave 336 grants totaling US $17.3 million between 1995 and 2009, amounting to about one-quarter of all philanthropic funds spent on tiger conservation globally (CSR Wire, 2000). In recent times, ExxonMobil's contribution to this effort is one of the largest single corporate commitments in saving a wild species.

Recently Lacoste, (a French company founded in 1933 is a global player for clothing, footwear, sportswear, eyewear, and leather goods; and globally well recognized from its logo which features a crocodile), had a three years' tie-up with IUCN (International Union for Conservation of Nature) as part of its CSR. It has come up with clothing that also features ten other endangered species as the logo (Lacoste,

2019). The website advertised that these limited-edition polo t-shirts would be available only on a single day (22nd May 2019) across nine cities and also online, the sales of which would entirely go towards funding these species through the 'Save our Species' project of the IUCN.

6.2 Corporate-Corporate Collaborations

Nestlé Nespresso S. A., trading as Nespresso, is an operating unit of the Nestlé Group based out of Switzerland and is a global leader in marketing instant coffee. Similarly, Starbucks Corporation is an American coffee company and coffeehouse chain that has made coffee popular across the globe. Both these companies have tied up with other companies/conservation NGOs for sustainability solutions. Nespresso has signed a memorandum with another multinational mining company Rio Tinto, to use responsibly sourced aluminum for its coffee capsules. The two companies have signed a Memorandum of Understanding (MoU) to work together with Nespresso's capsule manufacturers. The objective is to fulfill a commitment of sourcing 100% sustainable aluminum by 2020. This will allow their customers a "guilt-free" coffee brand known for its responsibly produced packaging material (Rio Tinto, 2018).

Rio Tinto itself, as part of its CSR, has made efforts towards conserving the botanical diversity in the rain forest of Cameroon and Indonesia. These two countries also have some of their largest mining interests (Rio Tinto, 2018b). It has partnered with many NGOs like The Bird life international, WWF Australia, Royal Botanic Garden in Kew, and the Eden Project in the UK to fund scientific research and conservation measures in the rain forests.

Similarly, Starbucks, a high-value brand name in coffee, has also committed to buying 100% ethically sourced coffee in partnership with Conservation International (CI, 2019). It has also invested more than US $100 million in supporting coffee communities as part of the CI's Sustainable Coffee Challenge. Collaborative farmer programs and activities—including Coffee and Farmer Equity (C.A.F.E.) Practices, farmer support centers, farmer loans, and forest carbon projects.

All of these programs ensure a long-term supply of high-quality coffee for the industry and directly support farmer livelihoods, although for the next generation of reforms, it is now widely debated whether extensive packaging can be done away with altogether, thereby further reducing the carbon footprint and waste generation.

6.3 Devising New Sustainability Standards Through CSR

IKEA is a Swedish-founded multinational group which is also the world's largest furniture retailer since 2008. The company's USP of high-quality designs and ready-to-assemble furniture, kitchen appliances, and home accessories make it one

of the most popular wood-based companies in the world. IKEA has been promoting responsible forest management and credible forest certification working with WWF since 2002. In 2011, the partnership contributed to the first-ever FSC certification of the rattan forest in Laos. This has ensured a certain minimum standard of procurement in a developing country with a broad base of the informal economy. This collaboration has achieved its primary objective of supporting smallholders and sustainable production of non-timber forest products such as bamboo and rattan with their significant focus in the Greater Mekong region, along with the linking of communities to global markets (WWF, 2019).

6.4 Best Practices from India

Globally, CSR support philanthropy for charismatic/iconic wildlife species remains miles ahead, yet companies are coming forward to lend a helping hand in protecting/creating awareness on lesser-known species such as the great Indian bustard, elephants, one-horned rhinoceroses, and red panda are finding companies to support their conservation.

a. *Species recovery projects*: ONGC (Oil and Natural Gas Corporation) is an Indian multinational oil and gas company that has been conducting oil and natural gas explorations from Assam since its inception in 1956. It naturally has a stake in earning goodwill and a healthier environment in the landscape. As part of its CSR, ONGC funded the Eastern Swamp Deer Conservation Project that enabled 19 individuals of the barasingha or the Eastern Swamp deer to be captured (without using any chemical restrains) and transported to Manas National Park (TET, 2014). Of the three subspecies of the swamp deer in India, less than a thousand individuals of the eastern swamp deer (*Rucervus duvaucelii ranjitsinhii*) are left in a single population in Kaziranga. Apart from this, a tiny population also exists in Manas, the remnants of a once-thriving population before civil strife hit the area (in the 1990s) and the species became locally extinct in the large reserve. Since 2005, scientific evidence was obtained that swamp deer had survived but their population needed to be augmented to achieve long term viability in the small number. The translocation of swamp deer (in two batches, first in Dec 2014 and then in Feb 2017) from Kaziranga to Manas (was carefully planned with support from scientists and ecologists. The translocation per se was funded through CSR and the post-release monitoring was supported by the forest department and Wildlife Trust of India, an NGO. The successful exercise clearly showed the need to bring in scientific rigor and planning while executing CSR projects.
b. *Saving Whale sharks*: The Whale shark *Rhincodon typus* is the largest fish on earth. Although distributed widely across tropical and warm temperate seas, limited information is available on the population trends of this species, especially along the Indian coastline. Catch statistics and anecdotal reports suggest that the

population of whale sharks is declining. Unregulated and unsustainable fishing practices to meet international trade demands for shark fins, liver oil, skin and meat, accidental entanglement in fishing nets, collision with boats as well as extensive coastal pollution have been attributed as major threats to the survival of this species (WTI, 2019). As part of the CSR, a very innovative and novel approach was taken up by Tata Chemicals and Gujarat Heavy Chemical Ltd in collaboration with Wildlife Trust of India and Gujarat Forest Department, wherein spiritual leaders such as Shri Morari Bapu were roped in to preach against the killing and capturing of whale sharks by fishing communities. This was 2 years after the Central government banned the killing of whale shark in 2001, and the forest department was struggling to implement it. Every year, at least 250 whale sharks were killed along the Saurashtra coast. The 'Save The Whale Shark' Campaign was a huge success, and the campaign has now been extended to the coastal waters of Lakshadweep and Kerala, where the Cochin shipyard has also pitched in to create awareness and alternate incentives (Janyala, 2007).

c. *CSR for less known taxa*: In 2015, the Muthoot Group, Sony India Pvt. Ltd, and Tata Capital Housing Finance Ltd (a subsidiary of Tata Capital Ltd), signed up with WWF- India for wildlife conservation. Tata Capital Housing pledged an overall amount of 40 Lakhs rupees to WWF India in the first year (2014–2015), and after that contributed a total of 30 million rupees over the subsequent three years upto 2018 to support pilot in select sites for conservation of Great Indian bustard (*Ardeotis nigriceps* in Desert national park in Jaisalmer and Barmer, Rajasthan), red panda (*Ailurus fulgens* in the community-owned forests of western Arunachal Pradesh) and one-horned rhinoceros (*Rhinoceros unicornis* in Laokhowa-Borachapori wildlife sanctuary, Assam). Similarly, the Muthoot Group has committed to working with asiatic elephant (*Elephas maximus*) conservation projects in six states for a year and will donate about 50 lakhs rupees under CSR for mitigating human-elephant conflict (Chowdhry, 2015).

7 Discussion

One of the primary critiques of CSR is the "conflict of interest" clause when companies that are involved in harvesting natural resources indulge in promoting them through ancillary activities as part of the image-management. Related to social responsibility, the mining, oil-extraction, and logging companies have long had a questionable reputation, especially in developing countries (Jenkins, 2004; Prieto-Carrón, Lund-Thomsen, Chan, Muro, & Bhushan, 2006). While they have come under greater public scrutiny, the mining companies have improved their environmental standards by developing global corporate social responsibility strategies. In these strategies, local communities, their rights and livelihood support find a prominent place. However, for business ethics, one fundamental issue is whether such an approach to CSR is likely to completely address the development concerns of local

communities (Kapelus, 2002). At the same time, the tradeoff between environmental concerns versus community welfare are also some of the issues that may hinder effective implementation of CSR interests.

The second critique that is perhaps slowly diminishing is that CSR is largely a north-led agenda with narrow focus. At the same time corporate sector in developing economies in global south (especially India) have largely benefited, their transition from philanthropic mindsets to CSR has been lagging as compared to the industry's impressive financial growth (Arora & Puranik, 2004). This is particularly true when one examines India's experiment with corporate social spending, which has been a mixed bag so far. As of now, as many as two-thirds of the 6000 odd-companies registered with Ministry of Corporate Affairs are yet to meet up the two percent spending mandate (Verma, 2015). Besides, CSR investments have been made primarily in the sector of sanitation, education, health, and rural development which may largely be due to a people-centric approach. Non-compliance with socio-environmental regulations have also emerged as an issue especially with the argument being given is that it is an emerging economy.

It is well established that the enabling environment for CSR is mainly dependent on four enabling policies that of tax and fiscal reforms, regulatory regimes, socio-cultural settings, and government procurements. According to the Doing Good Index (CAPS, 2018), if the right regulatory and tax policies were in place, Asian philanthropists could give over US$500 billion. This would be contributing to the US $1.4 trillion annual price tag needed to achieve the sustainable development goals.

7.1 The Way Forward

From the above, it is clear that in spite of different conceptualizations of CSR, there is a commonly agreed-upon understanding that companies need to be increasingly more responsive to social and environmental issues. However, global think tanks also argue that a context-specific approach is more feasible with far-reaching effects (Benobou & Tirole, 2010).

Borrowing from the OECD publication "Scaling Up Finance Mechanisms for biodiversity" where the opportunities for scaling-up finance for biodiversity through the so-called innovative financial mechanisms, have been described (Karousakis & Perry, 2013); a way forward agenda for CSR for the environment is as proposed.

- Borrowing from Environmental Fiscal Reforms—The process of shifting the tax burden from desirable economic activities to activities that entail negative environmental externalities have been mainly an accepted norm in modern economies. CSR activities can mandatorily address such aspects before a project is launched.
- Venturing into newer territories—such as payment for ecosystem services and biodiversity services. It is well established that Nature provides several benefits (such as clean air, water, climate regulation) that are not been factored in while

taking up developmental projects that use such resources similarly, compensating/incentivizing farmers or rural communities in exchange of managing their land for providing ecological services (e.g., promoting agroforestry on farming land) can also be brought under CSR.
- Promote market for greener products and branding—CSR must be integral to only those products that are sustainably manufactured by using the natural resource.
- Evidence backed CSR initiatives—finally, environmental CSR initiatives must be based on science-based primary evidence that, in turn, would help the actual implementation of the CSR initiative. It is expected that a win-win situation for development and environment can be achieved after all.

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Part III
Integration of Biodiversity Management Through Corporate Actions and Plans

Chapter 7
Ecotourism: An Innovative Approach to Biodiversity Conservation and Community Development

Seema Bhatt

Abstract The traditional conservation approach of designating Protected Areas (PAs) for biodiversity conservation has come under severe criticism in the last few decades. This conservation paradigm worked well where there were no nature-resource dependent communities, but it has done inordinate harm where such communities existed. The challenge has been to seek innovative approaches to conservation, while also taking into consideration community development. Ecotourism has emerged as one such approach. Ecotourism or simply 'responsible travel to natural areas that conserves the environment and improves the welfare of local people', is a concept that has grown considerably in the last few decades. It offers possibilities of improving livelihood security in and around ecologically sensitive areas. The benefits of ecotourism can provide necessary incentives to local people for conservation. This paper describes two examples from India where local communities, as a result of being involved in ecotourism, have become partners in conservation, and have benefited from the same. One example is from Ladakh, where community-based homestays have helped reduce the hostility of people towards the snow leopard. The other is from Kachchh, where a similar initiative has helped support conservation of the Banni grasslands. Based on these experiences, the chapter discusses some enabling mechanisms to ensure that ecotourism becomes a viable business.

Keywords Biodiversity · Tourism · Ecotourism · Livelihoods

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1 History of Protected Areas as a Conservation Measure

The aspiration of human beings to set aside areas that are distinctive in terms of sacred, cultural, and ecological values is perhaps as old as the human race. As early as 10,000 BC, when agriculture started to be practiced, peoples' relationship with nature itself started changing; and they felt the need to protect some spaces for their spiritual significance (Chape, Spalding, & Jenkins, 2008). Over the centuries, countries devised strategies to conserve what they thought important. With the establishment of the International Union for the Conservation of Nature and Natural Resources (IUCN) in 1948 and the World Wildlife Fund (WWF) in 1961, the establishment of Protected Areas (PAs) gained impetus. The First World Conference on National Parks in 1962, held in Seattle, USA resulted in formal international support for PAs. The conference also recommended a category system. An international definition of PAs was introduced. This definition has, however, evolved as the role of these areas in broader society has changed over time. As stated by McNeely (1998), 'Protected Areas are a cultural response to perceived threats to nature. Because society is constantly changing, so too are social perspectives on Protected Areas and the values that they are established to conserve'.

PAs the world over have been instrumental in conserving the planet's natural wealth, particularly as the pressure on natural resources increases and new threats emerge.

The concept of PAs in India is not new. Literature dating back thousands of years has references to sacred areas where all forms of life were protected. As early as the third century BC, Emperor Ashoka established sanctuaries for wild animals (Chape et al., 2008). This perhaps was the first governmental/administrative decree for the protection of animals. Historically, royalty in India, and subsequently the Mughal rulers also reserved areas, but mostly for hunting. The British Colonial rulers followed by establishing 'Game Reserves'.

Interestingly, many of the PAs in India today were erstwhile hunting reserves set aside by the ruling class in India over centuries. Several British officers who started as keen sportsmen later became conservationists, and also supported the creation of PAs. In 1936, the first national park was established and named after the then governor of the United Provinces, Sir Malcolm Hailey. In 1957, the park was renamed Corbett National Park after Jim Corbett who became famous first as a hunter and then as a naturalist. Today India has over 800 PAs under four categories designated under the Wildlife Protection Act, 1972 and amendments.[1]

[1] http://www.wiienvis.nic.in/Database/Protected_Area_854.aspx.

2 Communities, Protected Areas, and Tourism: The Links

The traditional approach that believed in delineating areas (now known as PAs) for conservation, free of people, worked in places across the globe where there was no resource dependence. In several countries, including India, it is challenging to create PAs as insular spaces, without human interactions. Millions of people depend on natural resources from within these areas to meet their livelihood needs. The 'hands off' approach has been detrimental for conservation particularly where resource dependency existed; and over the past few decades, there has been growing frustration with this paradigm.

Ironically this trend was set by the very first national park established in the world. The Yellowstone National Park in the USA became the first national park to be declared globally in 1872. Hayden, who was one of the first persons to explore it extensively, stated that 'setting aside the area as a pleasure ground for the benefit and enjoyment of the people should be the priority' (Merrill, 2003). Yellowstone is known for its spectacular volcanic craters and other geothermal features. It also has one of the world's largest petrified forests and is rich in wildlife with ungulates that include bison, moose, elk, and pronghorn; two bear species and other fauna. The park has over 1100 species of native plants. What is generally overlooked is the fact that Native Americans have lived in the Yellowstone region for at least 11,000 years. Many of the tribes made seasonal use of the area. In the 1870s and 1880s, Native Americans were effectually removed from the national park. The Native American Eastern Shoshone who were year-round residents of the area, left it on the assurance of a treaty negotiated in 1868 whereby the tribe would give up their lands but would retain their right to hunt in the area. However, this treaty was never ratified, and no claims of any tribe were ever recognized (Merchant, 2002). Yellowstone remains an iconic park, which has received approximately 183,430,851 visitors from March 01, 1872, to December 2018.[2] It also remains etched in history as the first park that did not consider the livelihoods of the resident and migratory Native Americans that had used the area for centuries. Section 7.3.1 describes a similar conflict in Keoladeo Ghana National Park in India.

As the conservation movement has evolved over the years, so has the concept of PAs. PAs, as we see them today, conserve not only ecosystem services but are also repositories for other social, cultural, and economic values. The earlier model of removing people from areas to protect wildlife has been revised to one wherein local communities are considered an inherent part of the ecosystem, in several PAs. New categories of PAs have been consequently designated, and new innovative approaches sought and applied.

Several such approaches have been tried in the last few decades. Perhaps the most publicized have been the Integrated Conservation and Development Projects (ICDPs) and Ecodevelopment projects that were first introduced in the mid-1980s. ICDPs were targeted towards PA management. The idea was to enhance

[2] https://www.yellowstone.co/stats.htm.

local livelihoods and support local participation to achieve the dual purpose of conservation and development. The concept of 'ecodevelopment' became popular in the 90's as an approach to tie-in biodiversity conservation in PAs with socio-economic development of communities in the vicinity (Wells and Brandon 1992). Ecodevelopment involved a set of activities designed to discourage local communities' dependence on declining natural resources by helping to provide alternatives. Rogers (1998) defined ecodevelopment as 'activities leading to protection and regeneration of the biological resources of a wild protected area through the economic development of local communities'. It was under the purview of this approach that tourism was considered as a viable activity to link communities with conservation.

Tourism, from time immemorial has been considered a benign activity for leisure and enjoyment. In several examples around the world, tourism has helped to enhance the local as well as the national exchequer. Well-managed tourism, time and again, has even conserved ecosystems and endangered species and restored cultural heritage. However, there is an ugly side to tourism too where unplanned and mismanaged mass tourism has damaged the social fabric as also, cultural and natural sites. Escalating circumstances finally made the tourism industry and the media concede to the adverse effects from mass tourism and in 2017, the word 'overtourism' was coined (Francis, 2018; UNWTO, 2018). This is a simple term describing a situation when far too many tourists visit a site. The term 'far too many' itself is subject to interpretation and would be determined by local inhabitants, visitors, as also the travel faternity. For PAs, the condition of the ecosystem and species could be relevant indicators. There are also many others signs. These include situations when local communities are coerced into selling their properties to the hospitality sector and subsequently forced to relocate; when forest tracts get jammed with too many tourist vehicles; where overwhelming crowds make wildlife viewing impossible, fragile ecosystems get degraded, and wildlife itself is disturbed.

Tourism is linked to people and depends on people, and its social dimensions are significant. Unplanned and unregulated tourism has very high social costs. Ironically, the tourism industry, in particular, has been in denial about the adverse social impacts of mass tourism. Further, the present mass tourism paradigm has been unsuccessful as a vehicle for social and economic upliftment (Bhatt & Liyakhat, 2008).

3 The Conflict

There is an intrinsic link between tourism and PAs, ever since these areas came into existence. The business of tourism in Protected Areas gives rise to a three-way conflict. These conflicts are between (a) Conservation and Communities, (b) Conservation and Tourism, (c) Communities and Tourism. Figure 7.1 is a pictorial depiction of this conflict. Conservation, Tourism, and Communities are an integral

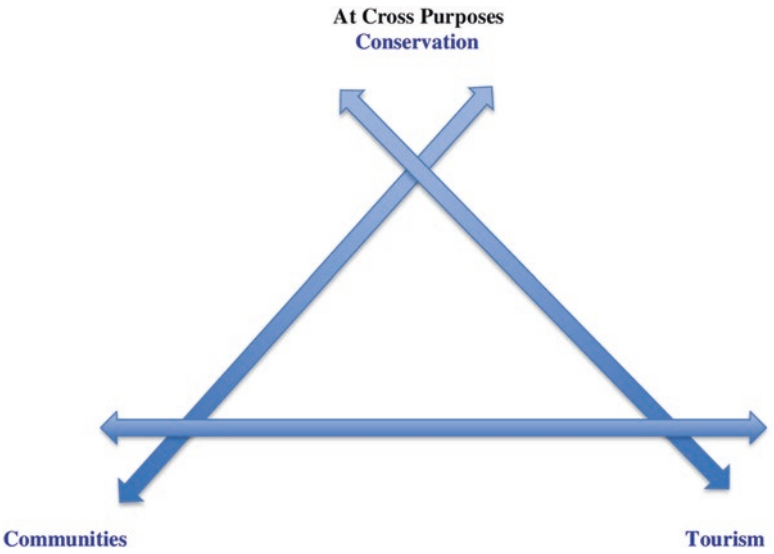

Fig. 7.1 At cross purposes: conflicts between conservation and communities (*Author's own Creation*)

part of the triangle but each seems to be at cross purposes with the other, resulting in conflict. This section describes this conflict through examples. In an ideal situation, all three sides of this triangle could meet to form the perfect configuration.

3.1 Conservation and Local Communities

Keoladeo Ghana National Park is a popular birding destination in Rajasthan, with over 350 species of birds. The surrounding communities traditionally and historically used this area for grazing their cattle. In 1982, when the wildlife sanctuary was upgraded to a National Park, a ban on grazing was implemented in the area. The transition happened almost overnight, leaving local communities no options, and resulting in serious conflict. Seven villagers were killed when police opened fire on graziers who were demonstrating against this ban. This incident is considered a black mark in the history of wildlife conservation in India.

Ironically, the Bombay Natural History Society (BNHS), a conservation, Non-Governmental Organization (NGO) that had been involved in biological research at the site, showed later that buffalo grazing was actually beneficial in maintaining the wetland (Bhatt & Kothari, 1997).

3.2 Conservation and Tourism

The Corbett Tiger Reserve (CTR) is one of the most frequented protected areas in India. More than 200,000 visitors visit CTR every year. It is estimated that over 150 vehicles carrying about 600 people are allowed into the reserve on a daily basis during the open tourist season. Approximately, 3000 visitors can be accommodated around the reserve.[3] Besides genuine nature lovers, the proximity of CTR to Delhi has given rise to a different kind of tourism here, popularly known as the 'five-star' tourism culture where affluent tourists, expecting and seeking urban amenities, have started frequenting this area. There is also an increasing demand for resorts around Corbett to host ostentatious weddings and parties. The town of Ramnagar on the eastern side of the reserve has become the hub for tourists visiting Corbett and the growth of luxury resorts here is unparalleled. The Wildlife Institute of India carried out a study in the village of Dhikuli situated just outside the eastern edge of the Corbett National Park to look at tourism-related impacts (Sharma, Chen, & Liu, 2019). The study found that high-end tourism in Dhikuli was resulting in economic disparity and subsequent hostility amongst local inhabitants. A high demand for water by these resorts is also resulting in acute water shortage in the town.[4]

3.3 Communities and Tourism

'Riding on their imperial horses, Flying like kings, Thinking that they have understood everything. Do they not realize that even birds fly?'[5] These words by Tashi Rabgyas, a resident of the Union Territory of Ladakh, eloquently express his frustrations after encountering more tourists than locals in this extremely popular tourist destination.

The tension and conflict between the tourism industry and the local community exacerbate as tourism grows in rural areas. In India, the creation of PAs has been responsible for the eviction of several indigenous communities across the country in the past. The situation has been aggravated, and often leads to conflict, as local communities see tourists coming to and enjoying the very same area from where they were evicted. Tourism, when promoted by outsiders who lack sensitivity to local cultures, has often given rise to hostility, mainly where communities have not seen any benefits from the tourism and have instead been deprived of traditional livelihoods.[6]

Tourism could potentially destroy the social fabric of the local community and erode its cultural values. Popular tourist destinations in India such as Goa and

[3] www.indiaenvironmentportal.org.in/files/corbett_tourism_report.pdf.

[4] http://www.sanctuaryasia.com/magazines/cover-story/10094-tourists-from-the-dark-side.html.

[5] https://www.ijbmi.org/papers/Vol(5)12/J05127581.pdf.

[6] http://ijseas.com/volume2/v2i1/ijseas20160119.pdf.

Manali have witnessed this kind of destruction. Cases of exploitation and trafficking of women and children for sex or cheap labour have been documented. Vulnerable populations have also been exposed to drug abuse. Tourism in many places has also resulted in the distortion and commodification of culture. The example of the Jarawas is a case in point. This indigenous community has been living on the Andaman Islands for centuries. Only about 300 individuals are known to survive today. The Government of India has declared a Jarawa Reserve that is legally out of bounds for visitors. However, one of the biggest threats to this community has been the Andaman Trunk Road that runs through the reserve. There is a Supreme Court ruling for the closure of the road, but traffic continues, bringing with it a dangerous kind of tourism whereby tourists driving through are curious to see the Jarawas who are often sighted by the roadside. Tourists have been known to offer them alcohol, tobacco, etc. Cases of sexual harassment have also been reported in the past (Bhatt & Liyakhat, 2008). But change is inevitable, and the Jarawas too have changed owing to increased interaction with the outside world.

4 Ecotourism

The 1992 United Nations Conference on Environment and Development, also known as the Rio de Janeiro Earth Summit, had several outcomes. One was a set of principles on environment and development that defined the rights and responsibilities of nations in the areas of protection and sustainable development. In response to this, the tourism industry, taking cognizance of the harmful impacts of mass tourism, felt the need to promote tourism that was sensitive to the environment and provided some benefits to the local community. This is considered the first step in the evolution of the concept of ecotourism.

The first formal definition of ecotourism came from the IUCN and stated that ecotourism: '...Is environmentally responsible travel and visitation to relatively undisturbed natural areas in order to enjoy and appreciate nature (and any accompanying cultural features - both past and present) that promotes conservation, has low negative visitor impact and provides for beneficially active socio-economic involvement of local populations' (Ceballos-Lascuráin, 1996). A more straightforward definition by The International Ecotourism Society described ecotourism as 'responsible travel to natural areas that conserves the environment and improves the welfare of local people'.

Honey (1999) in her book lists seven defining points for ecotourism: (1) Involves travel to natural destinations, (2) Minimizes impacts, (3) Builds environmental awareness, (4) Provides direct financial benefits for conservation, (5) Provides financial benefits and empowerment to local people, (6) Respects local culture, (7) Supports human rights and democratic movements.

In the last two decades or so, there has been far greater awareness and interest in tourism that is environmentally and socially responsible. The business of ecotourism is thus very significant. The following case studies (Fig. 7.2) describe two

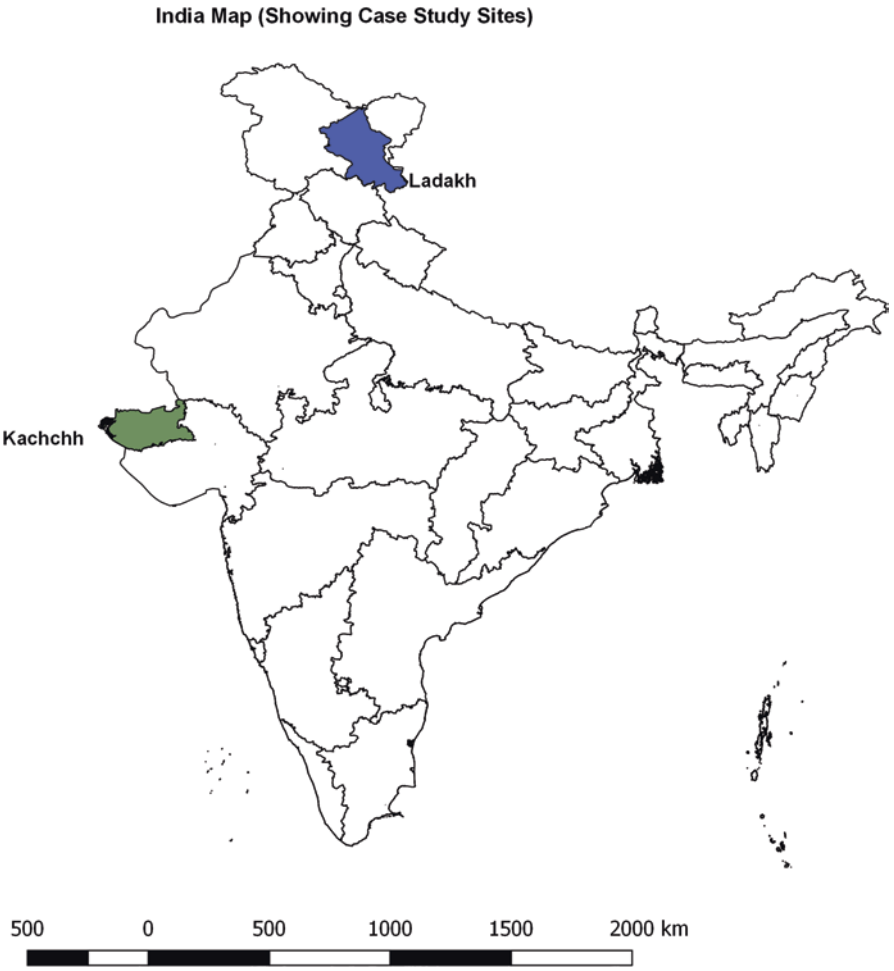

Fig. 7.2 Map of India with the two case study sites

initiatives in different ecosystems in India where this business has been substantially successful, while also supporting the conservation of biodiversity.

4.1 Biodiversity Conservation Through Homestays in Ladakh

Ladakh, that translates into the 'land of passes' is located in the trans-Himalayan region of the recently constituted Union Territory of Jammu and Kashmir. It lies between the Karakoram mountain range to the north and the Himalaya to the south. The Trans-Himalayan ranges of Ladakh include one of the most fragile ecosystems of the world and are home to several species of distinctive fauna and flora. The

region opened to tourism commercially about 20 years ago, but adventure tourism in Ladakh has been recorded as early as the nineteenth century. There are accounts of British officials undertaking the trek from Srinagar to Leh, and there were agencies in Shimla and Srinagar to support sports-related activities like hunting, fishing, and trekking. Ladakh is best known for its spectacular landscape (see Fig. 7.3) and the special kind of Buddhism practiced there. Over the last few decades, Ladakh has seen phenomenal growth in tourism. What was once a remote place frequented mainly by foreigners has become one of the most sought-after destinations both within India and abroad. In 2018, over 300,000 tourists visited Ladakh. That is almost ten times the figure in 2002. Over 277,000 tourists visited Leh alone (the main town for the district) in 2018, almost twice the number of residents in the region. These figures were quoted by a senior member of the state tourism department.[7]

Tourism itself has also diversified here, resulting in variation in the accommodation sector. The concept of homestays (see Fig. 7.4) has increasingly become more popular especially in the Himalayan region. The focus of the concept is one where the local community opens their own homes to tourists. Many village people let out one room in their own homes where accommodation is simple but clean and comfortable. Tourists get a first-hand experience of the local hospitality as well as the

Fig. 7.3 Ladakh: the landscape (*Photographed by Seema Bhatt, Author*)

[7] https://www.business-standard.com/PTI Stories/National.

Fig. 7.4 Homestay in Ladakh, India (*Photographed by Seema Bhatt, Author*)

opportunity of interacting with the family members, trying traditional cuisine, and getting a sense of the local culture at a reasonable price. Communities gain economically and are able to showcase their culture.

An NGO called the Snow Leopard Conservancy-India Trust (SLC-IT) developed the pioneering homestay initiative in Ladakh in 2002. The Himalayan Homestay programme of the SLC-IT originated while the organization was attempting to address a conservation issue facing the snow leopard (*Panthera uncia*). India has approximately 500 snow leopards. This is an endangered species, the conservation of which is the key mandate of SLC-IT. During the winter months in Ladakh, snow leopards descend to lower altitudes. In their search for food, they get into enclosures where local communities house their livestock. Once inside, snow leopards end up killing a large number of animals, causing substantial financial loss to communities. Snow leopards are killed in retaliation by the local people, and this is the major threat to this species in the region (Vannelli, Hampton, Namgail, & Black, 2019).

No alternate sources of livelihood or other positive incentives were available to prevent these retaliatory killings. Many of the villages where snow leopards posed such a threat were also on popular trekking routes. It was mooted that if there were a way whereby communities could benefit by having tourists come and stay while on treks, they would gain financially, offsetting losses from livestock predation. The idea of homestays originated as a possible way to do this. SLC-IT invested a considerable amount of time and resources towards training and capacity building of the

local community in hospitality and related aspects. These included extensive discussions on codes of conduct, standards of hygiene, and sanitation. The community was initially skeptical. There was hesitation in sharing their home with strangers and a fear that their simple lifestyle may not be appreciated. However, that changed when tourists started coming and enjoying these homestays. An increase in incomes also helped in changing the community outlook. Homestays are primarily run by women, and their success is a tribute to their entrepreneurial spirit.

The experience has significantly helped towards the empowerment of local women. Local youth in these villages are also now working as wildlife and trekking guides. Tourism has changed local attitudes towards the snow leopard and instead of viewing the animals as a threat to local livelihoods, they are now seen as a source for better incomes. It is indeed a 'win-win' situation because this enterprise has also contributed to the conservation of the highly endangered snow leopard. The Himalayan Homestay Programme of the SLC-IT works in several valleys in the Leh district of Ladakh. Since 2002, SLC-IT has trained over 130 families to offer homestays across Ladakh. The programme has also won many awards that include the recent 2018 TOFTiger Wildlife Tourism Award for Community Based Tourism Initiative of the Year, and 2018 Adventure Travel Conservation Fund Grant Winner.[8]

Following on this ecotourism model was WWF India (Worldwide Fund for Nature India) that established homestays at the high altitude wetlands of Tso Moriri and Tsokar, known for their migratory birds. These wetlands are spectacular and a great attraction for tourists. The Jammu and Kashmir Wildlife Protection Department has subsequently worked successfully with local communities across the region and established over 1200 homestays.

4.2 A Community-Based Tourism Initiative in Kachchh, Gujarat

On the northern border of the Bhuj district in Gujarat, India lies the pastureland of Banni. It is postulated that this was once a part of the Great Rann of Kachchh. Banni grassland extends across an area of 3847 km^2 covering about 8.4% of the total geographical area of the Kachchh district. This area was amongst the most significant grassplands in Asia. Over 40 grass species have been known to exist, but over time only 10-15 species have been documented. Banni continues to support a range of floral and faunal species. Wild fauna of Banni includes Blue bull, Chinkara, Indian hare, Jackal, Grey wolf, Caracal, Hyena, Fox, and Jungle cat. There are indications that historically Blackbuck were found here, but they are not found anymore. The landscape supports seasonal wetlands that host a significant population of migratory birds. A total of 207 bird species, including 100 residents and 107 migratory species, have been recorded in the Banni. Among these are Flamingos, Great Indian

[8] http://snowleopardindia.org/about-himalayan-homestays.php.

Bustard, Houbara Bustard, White-winged Black-naped Tit, Stoliczka's Bush Chat, and the Grey Hypocolius.

Banni, with its grassland ecosystem supports a very high livestock diversity that has evolved over time to contend with harsh climatic conditions. Key breeds include the Kankrej Cattle, Banni Buffalo, Kachchhi Goat, Kachchhi Camel, Marwari and Patanwadi Sheep. The Banni Buffalo was registered as India's 11th distinct buffalo breed in 2010. It was the first indigenous breed, maintained by the local community, and this has been acknowledged at the national level. Livestock contribute significantly to the local economy as it provides milk and milk products and meat to the pastoral Maldhari community. Some of the finest embroidery and leatherwork also originates from the Banni region. It is the women who create this beautiful embroidery in vibrant colours, and the skill is passed on mother to daughter, over generations.

In the heart of Banni is the village of Hodka that epitomizes the traditional culture of the region. Hodka became one of the 36 selected rural destinations to pilot/implement what was called the Endogenous Tourism Project (ETP), jointly promoted by the Ministry of Tourism, Government of India (MoT, GoI) and the United Nations Development Programme (UNDP). This was a four- year project (2003–2007)[9] (Bhatt, 2015).

In 2004, Hodka was shortlisted for the proposed project in Kachchh. The Kutch Mahila Vikas Sangathan (KMVS) was selected as the nodal agency for the initiative. KMVS had not worked on tourism in the past but was aware of the issues in the region and it looked at this opportunity as one that could help empower local communities, revitalise local culture and traditions and also generate support for the conservation of the Banni grasslands.

The concept of community-based homestays was not socially or culturally acceptable in Hodka. The local *Gram Panchayat* that represented the 13 villages in this area suggested that some common land be used for the tourism initiative. This was the genesis of the resort called Shaam-e-Sarhad that literally means 'Evening at the Border'. The resort opened in 2005. In the initial phase, accommodation consisted of tents that had been received during the disastrous earthquake of 2001. As the resort began to get established, additional accommodation was planned in the form of traditional mud huts called *Bungas*. The idea was to also promote traditional acrhitecture and local building material through these.

Since tourism was a new concept here, KMVS did spend considerable time to support this initiative in the earlier years. There was also a concerted effort to build capacity of the local community, particularly youth in aspects of hospitality such as catering, sanitation and hygiene. As tourism at the resort picked up, the *Gram Panchayat* itself established a Tourism Committee that supported the management of the resort. Since 2012, Shaam-e-Sarhad is owned and managed entirely by the community. There are 14 full-time employees who are all from the surrounding

[9] http://www.vikalpsangam.org/static/media/uploads/Vikalp%20Sangam%20Case%20Studies/casestudy_shaamesarhad_seema.pdf.

villages. The tourist season in Hodka is from October to March, but the youth that are employed receive 50% of their salary even in the off-season. The employees continue traditional pastoral activities during the off-season. Shaam-e-Sarhad (Figs. 7.5 and 7.6) has been successfully running now for over 15 years. At present there are six two-person tents, four *bungas* and two family rooms. All these have attached toilets. Three meals are served as part of the package and feature traditional cuisine. Shaam-e-Sarhad is the winner of the 2010 Pacific Asia Travel Association (PATA) Gold Award for Best Rural Tourism Project.[10]

The grasslands of Banni represent a significant ecosystem of the country. Economically as well as socially, the health of this ecosystem is critical for the livelihoods of the local pastoral Maldhari community that has traditionally managed these grasslands. The success of Shaam-e-Sarhad has boosted the confidence of the community members and they now take pride in this initiative as well in their culture and ecology. It has encouraged them to look closely at how best to conserve the biodiversity in this ecosystem. In an attempt to do so and to protect their livelihoods, the Hodka *Panchayat* has supported the formation of the *Banni Pashu Uchherak Maldhari Sangathan* (BPUMS) or the Banni Livestock Breeders' Association.

Fig. 7.5 Shaam-e-Sarhad resort in Hodka, Gujarat (*Photographed by Seema Bhatt, Author*)

[10] Adapted from: Case study is an outcome of the VikalpSangam: documentation and confluence of alternatives in India project initiated by Kalpavriksh and funded by Oxfam, India. http://www.vikalpsangam.org/static/media/uploads/Vikalp%20Sangam%20Case%20Studies/casestudy_shaamesarhad_seema.pdf.

Fig. 7.6 Showcasing of local culture (*Photographed by Seema Bhatt, Author*)

Besides other activities, the association is now working towards a collaborative effort with the relevant government institutions for the management of the Banni grasslands.

5 Making Ecotourism a Tool for Conservation

The business of ecotourism is fickle. It is seasonal and greatly impacted by natural disasters, as well as being a victim of political and other upheavals. All these impact the local biodiversity, which is the very basis for an ecotourism enterprise. Local communities need to be aware of this and thus cannot rely entirely on ecotourism as a source of income. The greatest of all challenges is the overwhelmingly increasing number of tourists who will compromise on any standards to get what they want. An ecologically fragile area can withstand only a certain amount of pressure, and tourist numbers beyond a certain level will be disastrous for these areas. There is a very thin line between a successful ecotourism enterprise and the health of the ecosystem.

A discussion on some of the critical points to keep in mind for a successful ecotourism model follows.

5.1 Building Trust and Getting a 'Buy-in'

A community-based initiative will be successful only if the community believes in it and agrees to be part of it. Such an enterprise cannot be thrust upon them. It is ideal if the community itself approaches the relevant authority to be part of the initiative. A successful 'buy-in' can only happen through a 'trust-building' process that involves all the relevant stakeholders and all community members. Towards this, it is often advisable to first approach the community elder or head person. This needs to be followed with a series of consultations with different target groups in the community, including the women and youth. Each consultation may need to be designed according to the target group. The community needs to be made aware of both the positive and negative impacts of such an enterprise. What also needs to be discussed with the community is the fact that the ecotourism in question relies on the local ecosystem, the health of which needs to be continuously monitored. Overexploitation of any resource within this ecosystem, particularly to address the needs of visitors, must not be allowed. This aspect can only be strengthened if the community takes pride in the local environment and regularly monitors it. In both the initiatives described earlier, there was considerable discussion with the communities in question before initiating the enterprise. Discussions with a range of stakeholders and their views need to be incorporated into the management/business plan. In the case of the Ladakh initiative, women who run the homestay were the key stakeholders, and their feedback was critical.

5.2 Training and Capacity Building

A key component of a thriving ecotourism enterprise is building the capacity of the host community. It is unreasonable to expect that any community will execute a successful business enterprise without adequate training and capacity building. Training and capacity building are, thus critical for a successful tourism enterprise. Training needs to focus on different aspects of hospitality that include housekeeping, accounting, cuisine and waste recycling. Guidance on how to deal with tourists from other cultures is also required. For nature-based tourism, training as guides in nature interpretation needs to be planned. Continued capacity building is required for renewing and upgrading the skills of the entrepreneurs. Capacity building is also required to ensure that the health of the ecosystem is maintained. Support from a local conservation organization to help establish a simple monitoring protocol that could be administered by select members from the local community is recommended. In the case of Ladakh, the SLC-IT ensured that this was done.

5.3 External and Local Institutional Support

A community-based ecotourism initiative needs both technical and financial support. Many such enterprises are initially supported through donors or government schemes. However, a successful enterprise needs to break even at some stage and become self-sufficient. This is a viable business model that needs to be adopted. However, considerable handholding is required in the initial phase of such initiatives, and a local NGO or other institution makes this easier. Support from conservation NGOs is also required to set monitoring protocols that are easy for the community to administer. Monitoring protocols are needed to ensure that visitors to the area in question do not exceed the carrying capacity, and also to monitor the impacts from the ecotourism enterprise itself. In the Ladakh example, the initiative was launched by the SLC-IT and they provided a considerable amount of training support. In the case of Hodka, the Kutch Mahila Vikas Sangathan (KMVS) provided the required support and also facilitated inputs from other organizations as and when required.

5.4 Setting Standards

The push towards ecotourism has been both good and bad. Several hundred tour operators have jumped on to the 'ecotourism bandwagon' once they realized the marketability and profitability of the concept, but without really understanding its philosophy. It is a misconception that community-based tourism does not need standards. There is today a great demand for community-based tourism, and tourists actively seek out such places through the Internet. However, the environmentally aware visitors also look for some certification for the place they are going to visit. Basic standards of cleanliness, energy use, waste disposal, etc. are necessary. Standards are also critical to ensure that the negative environmental impacts of tourism are controlled, and biodiversity is not destroyed. An exercise carried out to set standards for homestays in Ladakh led to some interesting results. A framework of standards was discussed primarily with the women who run the homestays. The women as a group suggested that a common water filtration unit be set up in the village to ensure the minimal use of plastic water bottles.

A viable business needs benchmarks, and standards are critical. These standards exist and may perhaps need to be modified. There are now Global Sustainable Tourism Criteria (GSTC) and in India, the Sustainable Tourism Criteria of India (STCI) that are based on GSTC.

5.5 Marketing

An effective marketing strategy should be a core part of the business model. For an enterprise to be successful, it needs to be widely known. There is, of course, the 'word of mouth' path once a satisfied visitor goes back, but in today's world with

active social media, a lot more is required. Effective communication is a part of marketing and essential for showcasing the ecosystem in question. Marketing material for the traveler should not only include good interpretation material that describes the place, but also introduces a code of conduct. Such material could include audio-visual material, checklists of fauna and flora found, and description of places of cultural and social interest. Both the initiatives described have their websites that garner considerable response and business.

5.6 Feedback and Adaptive Management

A successful ecotourism business model must include a mechanism for the traveler to give feedback. This feedback must be taken seriously, assessed and addressed to ensure that adaptive management is taking place. Both the initiatives described have established systems for feedback. Interestingly a majority of the tourists visiting the Ladakh site commented on the initiative of putting curbs on tourists bringing in plastic water bottles. Many visitors to Hodka said that they had not even been aware of the rich biodiversity of the region that is primarily known for its crafts.

6 Conclusion

Ecotourism takes into account both the natural and cultural aspects of a given site. Given the richness and multi-faceted character of this heritage, such an enterprise needs to be a fluid and dynamic one where change is constant; but to make this an effective business model takes a lot. Given that youth are a significant part of the population, and with the changing profile of the average tourist, there is tremendous scope for innovative tourism models. However, there is also a downside to this, and that is a burgeoning tourist population that is responsible for the very concept of ‘overtourism’. There is a growing number of destinations globally who do not wish to have tourists at all. How then does one ensure that the ecological, social, and cultural values of the site in question are conserved? Degradation of these values in the context of ecotourism is like killing the goose that lays golden eggs. Tourism is indeed a double-edged sword that can bring considerable benefits but can also do inordinate harm. Ecotourism presents an innovative model to incentivize conservation. The SLC-IT has used it effectively for the conservation of the snow leopard. The initiative in Hodka has given the local community immense pride in its own natural and cultural heritage, and thus the motivation to conserve it. Many more conservation organizations are looking at ecotourism as a tool to support conservation. The model brings in revenue, imparts awareness about the need to conserve, building a larger support group while also engaging the local community as allies as well as an additional workforce to help support conservation measures such as

monitoring. In the present scenario, where emerging threats to biodiversity such as climate change bring greater challenges, ecotourism, if done well, presents an innovative and viable approach to conservation and community development.

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Chapter 8
A Corporate Partnership Helping Papua New Guinea Create a National Protected Area System: The Case of the Porgera Joint Venture Mine

William Thomas, Randall FitzGerald, and Rodney Ingersoll

Abstract Extractive industries, like mining, are by their nature unsustainable. However, these companies often work in biologically valuable landscapes. They have the logistical, financial, and political wherewithal to manage conservation projects in remote locations that their host countries and local governments cannot. In what follows, we describe the development of two protected areas in Papua New Guinea (PNG) by the country's largest gold mining operation, the Porgera Joint Venture (PJV). Since 2005, we have collaborated with PJV and local landowners to conserve the Kaijende Highlands, a montane grassland threatened by climate change, and the Headwaters of the Strickland River in PNG's Central Range. Both areas are conservation priorities for PNG. The conservation plans for these globally significant landscapes have been built on a UNESCO certified Best Practice in the use of indigenous knowledge and an innovative program known as the Papuan Forest Stewards. These protected areas will offer a sustainable way forward through tradition and conservation to remote communities. With gazettal in 2019, they will become the largest protected areas in PNG and the pilot projects for a national system of protected areas to be developed in collaboration with other extractive industries licensed to operate in PNG.

Keywords Papua New Guinea · Indigenous knowledge · Community conservation · Extractive industry · Sustainable development · Tradition

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Fig. 8.1 The island of New Guinea courtesy of Wikipedia

1 Introduction

New Guinea (Fig. 8.1) is the world's largest tropical island and perhaps the world's most significant bastion of cultural and biological diversity (Meyers, Mittermeier, Mittermeier, da Fonseca, & Kent, 2000). Situated on the edge of the Australian and Pacific plates, New Guinea is one of the most tectonically complex regions of the world (Baldwin, Fitzgerald, & Webb, 2012). This tectonic complexity and the resulting geologic activity have created steep mountains and valleys so secluded that New Guinea is home to countless endemic species and over 1000 separate languages. Today this island remains one of the planet's least scientifically explored, with extensive tracts of forest rivaling the Amazon and the Congo in their biodiversity. These forests are home to singing dogs, tree kangaroos, the world's largest butterflies—the Queen Alexandra' Birdwing—over 700 species of birds and over 9000 species of plants (Swartzendruber, 1993). In a remote, rugged landscape with few roads, many of New Guinea's forests are inaccessible and 75% of its original vegetation is intact.

The same geologic activity that has created this biologically diverse landscape has also brought valuable resources to the surface and helped spawn the extractive industries that are the foundation of the island's economy. Mining, for example, accounts for over 25% of PNG's economy and while inherently unsustainable, provides hard currency for PNG (see below). The challenge for PNG and other resource rich developing nations is in channeling these funds into sustainable projects that will build a future for their citizens after mine closure when the forests, minerals, or petroleum have been depleted.

Politically, the island is divided into two. The western side of the island contains the Indonesian province of West Papua. The eastern half is the independent nation of Papua New Guinea (PNG). Large swaths of the island are considered wilderness

by westerners (Robles, 2002). However, it is not politically possible to create a U.S. style park system by removing landowners in either nation because of the on the ground realities concerning land rights. This is especially true in PNG where traditional land rights are constitutionally protected. Moreover, landowners support themselves by gardening, hunting, and gathering on their traditional lands. Without enormous cash transfers or a government funded relocation project, no one in PNG is willing to abandon their most valuable asset (their land) for a park or any other conservation initiative.

Yet, PNG's political landscape has created an opportunity for a different type of protected area system—one based on landowner participation and tradition. The government in PNG expect traditional landowners, not government agencies or NGOs, to advocate for the conservation of their lands (Firth & Beehler, 1998). With little funding extensive forests and remote mountain ranges that remain unexplored, the government is committed to using indigenous knowledge in the conservation process. This makes PNG an ideal nation to test the viability of traditional environmental knowledge as a conservation tool (Swartzendruber, 1993).

Intact forests, unique organisms, and extraordinary biodiversity have made PNG a global priority for conservation (Melick, Kinch, & Govan, 2012). This chapter describes an innovative conservation partnership in the Central Highlands of PNG between the Porgera Joint Venture gold mine and local landowners. It is an attempt to conserve two globally significant landscapes—the Kaijende Highlands and the Headwaters of the Strickland River in the context and challenge of an operational mine site—through an initiative known as the Papuan Forest Stewards.

PNG has long been known to contain globally significant landscapes and endemic species. However, traditional government and NGO driven conservation initiatives have had very little impact. Yet over the past 15 years, a partnership between local landowners and the Porgera Joint Venture mine has created the largest protected areas in PNG's central highlands (Fig. 8.2). Only private industry, with the means to reach these areas and the willingness to break new ground in conservation, has been successful.

2 The Porgera Joint Venture Mine

The Porgera Joint Venture Mine (PJV) is a gold mine located in PNG's highland Enga Province, approximately 600 km northwest of the capital Port Moresby. PJV is a partnership between the Canadian owned Barrick corporation and Chinese owned Zijin Mining group and a regional government body comprised of the Enga Provincial government and Porgera Special Mining Lease landowners. Since 1989, the mine has produced more than 20 million ounces of gold and 10% of PNG's annual GDP exports (www.barrick.com).Over this same period, PJV has distributed $297 million to landowners and the provincial government; spent $1.5 million on contracts with PNG businesses and infrastructure in the Porgera Valley (www.barrick.com). Since 1990, Porgera has paid more than $1.1 billion in taxes (www.barrick.com). The mine

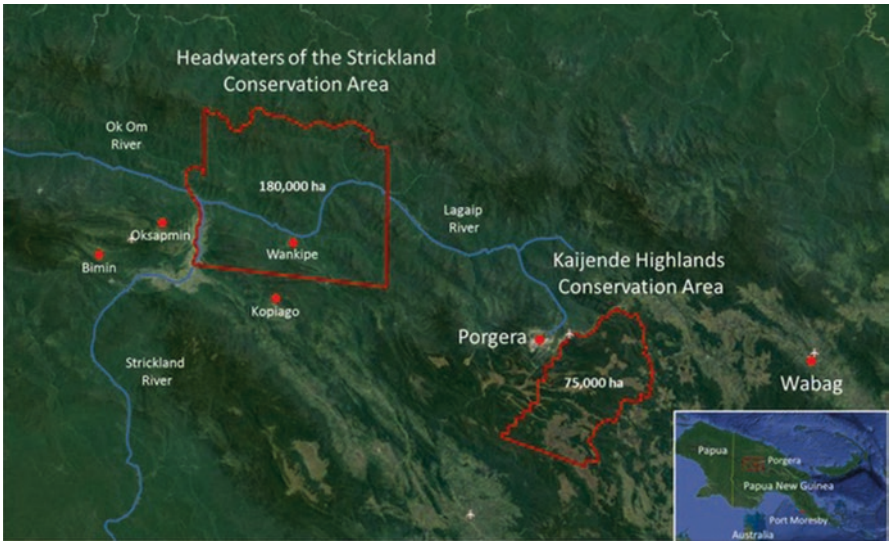

Fig. 8.2 The location of the headwaters of the Strickland and the Kaijende Highlands Conservation Areas

is currently negotiating an extension of its current lease. Customary landowner groups are divided with the mine renewal process and many have lodged legal partitions to the government questioning PJV's original customary Mining Lease and original Mining Development Contract agreements which they say have not been honored (Ikuavi, 2019; Kep, 2018). In addition, unresolved legacy issues are delaying the government's mine life extension request. The government is also considering increasing its financial ownership options for the mine site. Nonetheless PJV has been permitted to continue operations until a legal ruling is confirmed.

During the planning stage of the Porgera Mine, PJV identified Mt. Kaijende, especially the grasslands above 3000 m, as having unique values within the region and a priority for protection. PJV subsequently made a commitment to work with the former PNG Department of Environment & Conservation towards the establishment of a National Park at the Mt. Kaijende area. Very limited progress was made towards this objective, until 2004 when Conservation International approached PJV for support in conducting a Rapid Biodiversity Assessment (RAP) of the Mt. Kaijende area. The 2005 RAP discovered seven new species of frogs and documented the range of several mammals and birds, thus confirming the uniqueness of the area and its priority for conservation (Richards, 2007). PJV supported Conservation International in a 5-year program, including the hire of a full-time conservation officer to engage with traditional landowners of Kaijende Highlands for establishment of a conservation area at Mt. Kaijende (C. Ross personal communication).

Around this time, PJV began searching for an approach to conservation that was tailored to conditions in PNG. The company became aware of Dr. William Thomas'

work with the Hewa people on conservation of their lands, language, and cultural tradition and engaged him to work with the landowners in the Kaijende Highlands.

Additionally, PJV supported Conservation International in conducting a second RAP in 2008 at the Muller Range in the Central Highlands of PNG. This RAP identified more than 50 species of frogs, insects, and plants new to science (C. Ross personal communication).

In 2011, PJV's review of Conservation International's conservation program at Kaijende Highlands concluded that the conventional approach to establishing a National Park at Kaijende was an abject failure and an alternative was needed. Dr. Thomas' Forest Stewards program which engaged and paid traditional owners as custodians of their lands was seen as a viable model for conservation and PJV redirected resources to support Dr. Thomas' work with the Hewa people while implementing the same model with the landowners of the Kaijende Highlands (C. Ross personal communication).

3 The Kaijende Highlands Conservation Area Enga Province

The Kaijende Highlands consists of over 75,000 hectares of uninhabited montane grasslands and forests in Enga Province south of the Porgera Station. The Cyathea tree-fern savanna is the dominant feature in this wilderness area and presents a landscape of spectacular beauty that is unique in New Guinea (Richards, 2007). Geologically, the Kaijende Highlands are on the New Guinea fold belt (Hill & Hall, 2003). This accident of plate tectonics has produced a dramatic alpine landscape of a type not currently represented in PNG's conservation initiatives. Dotted with limestone cliffs that rise from montane forests, grassland panoramas, and isolated mountain lakes, the beauty of this landscape alone is reason enough to create a Kaijende Highlands Conservation Area.

Since montane grasslands are rare in the Pacific, the Kaijende Highlands, and the creatures living there are significant. As the participants had hoped, the 2005 RAP discovered an area rich in species that are of great concern to conservationists in New Guinea. For example, they found sixteen new species of plants and nine species of amphibians; four species of birds of paradise—Brown Sicklebill, Ribbon-tailed Astrapia, King of Saxony Bird of Paradise, and the Short-tailed Paradigalla—as well as other increasingly rare birds like the New Guinea Harpy Eagle and the Shovel-billed Kingfisher (Beehler & Sine, 2007; Richards, 2007). As one might expect in a rare environment threatened by climate change, several species of amphibians, six birds and mammals found here are increasingly rare in PNG (Richards, 2007).

In 2005, PJV began working with the authors, the international conservation community and landowners to develop a strategy for the conservation of this ecosystem. This partnership produced the above-mentioned RAP and underscored the conservation value of this region. Once the conservation value of these grasslands was confirmed, PJV began looking for a locally appropriate model for their

conservation and partnered with the authors to implement a bio-cultural conservation project called the Papuan Forest Stewards (PFS) (see below) that currently engages twenty-four men as rangers and teachers to monitor the proposed protected area and instruct the next generation of rangers in traditional environmental knowledge.

Since the Kaijende Highlands are uninhabited and ownership/use rights uncontested, there is no need to compensate or relocate landowners when developing a conservation plan. The competing interests such as mineral rights or forestry claims were incorporated into the proposed boundaries of the conservation area. There has been local support for a conservation initiative of some sort in the region effected by the mine since its inception. Today that support includes the mine, landowners, the local tourism board, and the Porgera business community. We are currently exploring several long-term funding options including the sale of carbon credits on the emerging PNG carbon market. More importantly, the conservation area will enjoy several years of logistical support from PJV while it becomes established.

4 Headwaters of the Strickland Conservation Area Hela Province

The Headwaters of the Strickland Conservation Area (Map 2) is located in the largest tract of karst formation in New Guinea and part of the *largest* intact forest ecosystem on this island (Takeuchi, 2007). It contains 200,000 hectares of lower montane forest, is the transition zone between the flora and fauna of the Central and the Star Mountain ranges (Swartzendruber, 1993). These watersheds feed the Fly River, PNG's second largest, and are vital to the health PNG's coastal ecosystems. The authors of the latest PNG Conservation Needs Assessment (CNA) described this region as "a major terrestrial unknown" and a "national conservation priority" (Swartzendruber, 1993, p. 11).

4.1 Today this Region Remains Virtually Unexplored

This region is extremely rugged with no roads. It has been crossed by a few government patrols, but sees few outsiders. The Headwaters are the homeland of a group known as the Hewa. Approximately 3000 Hewa live within the conservation area, with most concentrated at the confluence of the Laigaip and Om, Pori, and Urubwa Rivers. However, since the soil's fertility is low, they are constantly moving across the landscape and are described by their more sedentary highland neighbors as "nomads." These mountains contain the richest forest biodiversity in PNG (Swartzendruber, 1993). In 2008–2009, PJV sponsored the first systematic scientific exploration of this region by financing another RAP. This expedition discovered *50 new species* (Richards, 2011).

The publicity generated by the RAP brought international attention to the Headwaters of the Strickland and have encouraged the landowners to establish the Headwaters of the Strickland Conservation Area. Crucial to the success of the Headwaters will be an innovative program aimed at bringing the benefits of forest conservation to the Hewa called the Papuan Forest Stewards initiative.

5 The Papuan Forest Stewards Conservation Initiative

Conservation in Papua New Guinea begins with a local community consultation. Since 2005, PJV began working with the authors to build local support for a conservation initiative known as the Papuan Forest Stewards (PFS). Not only is landowner commitment essential to any conservation plan, but also without the resources to employ an outside team of scientists, landowners in remote areas must be able to employ traditional environmental knowledge to conserve their lands for conservation. The land owners of both the conservation areas continue to live close to the land and hence have an intact traditional knowledge bases. As such, they are capable of predicting the impact of human activities on biodiversity, especially birds. Birds are good indicators of biodiversity and the best know organism in New Guinea (Beehler, Pratt, & Zimmerman, 1986; Coates, 1985; Schodde, 1973). By sharing their traditional knowledge with conservationists, landowners have proven to conservationists that their knowledge matches that of the best western naturalists and can be used to create a conservation program for these forests. These techniques have been recognized by UNESCO as a "Best Practice"[1] and have given the PFS program more credibility with sponsors (Thomas, 2002). Once they understood that the purpose of a conservation program is to save the birds and forests they and their ancestors have cherished, the landowners were willing to make the appropriate adjustments to their land use strategies to accommodate the goals of a conservation area. Their willingness to partner on conservation has enabled the authors to implement an innovative approach to conservation known as the Papuan Forest Stewards (PFS) (Thomas, 2011).

PFS projects are launched by first developing teams of local experts. The lessons learned from the 30 years of experience in remote PNG made it much easier to quickly implement a PFS initiative with landowners. For example, traditional societies in PNG are kin based. Therefore, nepotism is a real problem. Even outside of a village setting, one's ability to find work is often related to "who they know" and not "what they know." Known in Melanesian TOK PISIN, as the "Wantok System," nepotism can be a real detriment to getting any work done and detrimental to projects that rely on experts because expertise is replaced by social connections. To overcome this cultural constraint, positions are filled through publicly held

[1] https://unesdoc.unesco.org/ark:/48223/pf0000147859?posInSet=2&queryId=b8f8fa26-f010-41ae-830f-f49391d036e6.

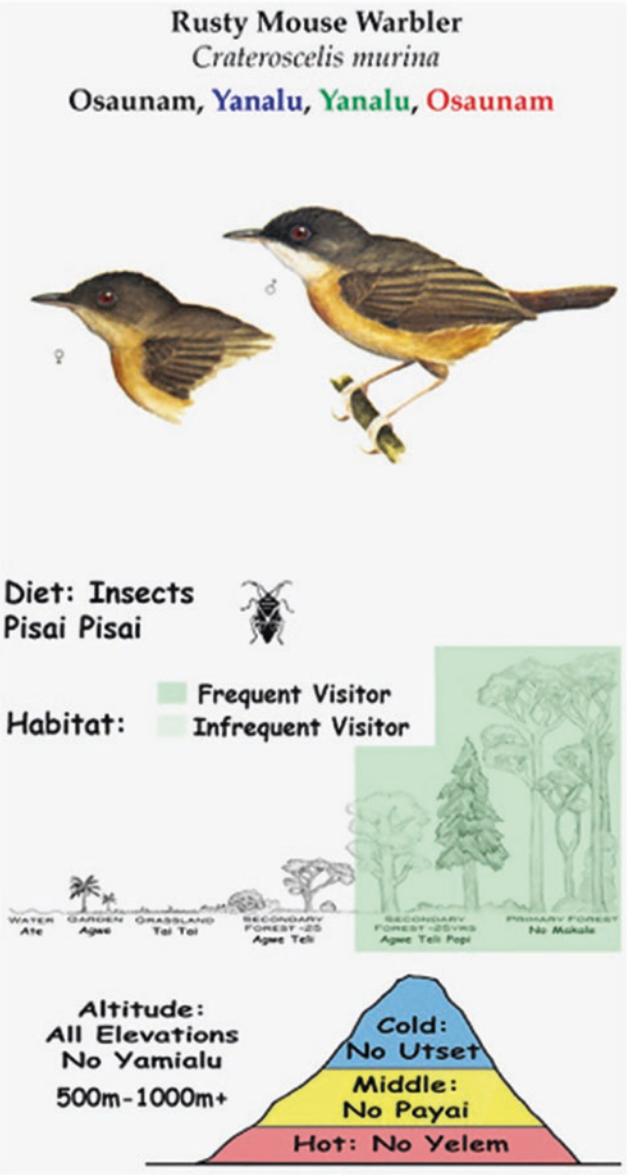

Fig. 8.3 An example of the flash cards used for the PFS examination and the information required of applicants

competitive examinations. In a two-phased examination, the applicants are shown a set of flash cards and must identify all of the local birds (Fig. 8.3). Those who pass this test are asked to sit for a second test in which they will identify the pollinators and seed dispersal agents of a randomly selected set of local trees. Contrary to

popular belief in the developed world, everyone living a traditional lifestyle in PNG does not have this type of fine-grained environmental knowledge. Like western trained naturalists, traditional naturalists have spent countless hours in the field often learning from a mentor. We knew that if we were to gain the stamp of approval for a conservation initiative based on traditional knowledge, we had to employ only the best naturalists in each community. Our experiences with the PJV sponsored RAPs reinforced this belief when international experts were teamed with the first Papuan Forest Stewards helped find over fifty new species to science (Richards, 2011).

In spite of the stringent requirements, we have over the years found a sufficient supply of expert local naturalists from each of the landowning clans for both conservation areas. At this writing 161 stewards are employed by the Headwaters PFS as well as the aforementioned twenty-four working in the Kaijende Highlands. Each is acting as a ranger, compensated for making monthly patrols and recording avian diversity on their cell phones.

In addition to their role as rangers, each PFS must take on an apprentice, who after years of study and testing will hopefully inherit their mentor's patrol. To assist in this apprenticeship, the PFS have created "Living Classrooms" along the clan boundaries where they can take the next generation of naturalists to teach them about their forests. By agreement, in these areas there will be no gardening or trapping. Hunting is by bow only. These boundary classrooms will become wildlife corridors connecting intact forest habitats across the proposed protected areas. Cassowaries, the largest and most iconic bird in New Guinea, are protected in these corridors. They are found in primary forest and forest succession that is at least twenty-five years old. As the living classrooms return to climax forest, future generations should experience cassowaries at all elevations.

The aim of the PFS initiative is to create a community-based conservation initiative based on traditional environmental knowledge. With PJV's financial and logistical support, we have been working with landowners to raise awareness of the need to conserve this unique resource by recording their traditional environmental knowledge. Through their participation in the respective Kaijende and Strickland RAPs, the local landowner/naturalists proved the worth of their traditional environmental knowledge to western scientists (see Richards, 2007, 2011). With PJV's help, we are ready to market both the PFS initiative and their traditional environmental knowledge to the global market for biodiversity research and conservation.

Currently, we are working with PNG's Conservation and Environment Protection Authority (CEPA) and the Office of Climate Change and Development to allow the respective Kaijende and Headwaters landowners to become participants in the emerging global carbon markets. In the future, we expect that the "buyers" of the above-mentioned community assets will be natural history museums, universities and conservation organizations, anxious to tap the intact knowledge bases of traditional communities with intact traditions. This exchange—either in the form of carbon credits or shared knowledge—will provide a sustainable source of financing rooted in the conservation both biodiversity and tradition. We are working with the most committed individuals in both the Headwaters and Kaijende communities to develop a data base on local birds.

An additional element of PFS success is the inclusion and endorsement by local village and regional politics. Respecting the local political structures resulted in the PFS being discussed outside the forest boundaries within the Local Level and Provincial Government. Letters of support were documented, signed, and included in a National Government submission to highlight traditional owner support for the proposed Kaijende Highlands and Headwaters of the Strickland as Conservation Areas. For more information on the Papuan Forest Stewards, please go to: https://www.newguineaconservation.org

6 Discussion

To date, PNG has formally conserved very little (1.6%) of its land (Nix et al., 2000). Yet the challenges presented by climate change and the devastation of the planet's forests make it more important than ever that developing nations like PNG conserve their forests. In a developing nation like PNG, corporations like PJV with their ability to safely travel to the most remote and globally significant regions can be vital partners in conservation. These conservation areas are a first step in demonstrating that extractive industries can also help developing nations conserve their natural heritage.

Although it may seem counterintuitive for an extractive industry to be concerned with biodiversity conservation, PJV's mission in PNG includes a concern for the people and the area affected by the mine after closure. A conservation-based development program seems to be a good fit for such a remote region. Without a corporate partner who is aware of the importance of seizing this opportunity to conserve landscapes of global significance; who also has an understanding of the logistical, political, and social challenges that awaited us; as well as an appetite for the innovation and risk inherent to working outside the typical NGO paradigm; and a willingness to fund these projects, both of these globally significant areas would be beyond the reach of the typical NGO.

The PJV mining lease expired on 16th August 2019 and the company is allowed temporary permission to operate until further consultation with Landowners, Provincial Governments, and PJV (see: https://mine.onepng.com/2019/08/legacy-issues-delay-png-govt-decision.html). PJVs operational environment is changing and the company's future lease renewal is not guaranteed. As the PFS model seeks direct funding from the extractive industry, an upfront funding commitment for the duration of the mining lease may be necessary for project longevity and guaranteed project success. Without such a strong commitment in a challenging political mining environment, political and landowner pressures could jeopardize future PFS outcomes.

The Papuan Forest Stewards initiative is a test case as well as a first step in implementing PNG's national conservation strategy. We know that remote societies have few opportunities for development that do not compromise their natural heritage. We also know that they typically lack the education and resources to deal with

developers. However, unlike most development the PFS initiative does not want to change these cultures. Rather, we see their local culture, traditions, language, and remote intact forests not as liabilities, but assets upon which to build a sustainable future by monetizing them. These native languages hold the key to unlocking the natural world that PFS communities have managed for centuries. By fostering intergenerational and cross-cultural communication, the PFS initiative allows communities to use their traditions to participate more fully in decisions about resource conservation.

The PFS initiative presents the landowners of these globally important but exceeding remote landscapes with an opportunity to conserve their forests and cultures while meeting their aspirations for development by participating in the international carbon markets and or partnering with universities, museums, and NGOs. It conserves the linkage between biodiversity and culture, while giving participating communities an economic stake in conservation. With few sources of income, we have found that the landowners of these remote and biologically valuable areas have been easy to recruit to our efforts to conserve their natural and cultural heritage.

6.1 Lessons Learned

As the PFS is a relatively new approach to conservation, identifying project success and recommendations to improve future project performance is vital. Table 8.1 summarizes lessons learned and recommendations for improvement.

6.2 Current Status and Next Steps

Both conservation areas have garnered the required political support at the local and provincial levels. They are now moving through the national public comments period. Once any comments have been satisfactorily answered, we expect that the projects will be approved by PNG's parliament.

We are aware of the unique challenges to conservation presented by PNG (see Melick et al., 2012). It is our intent that both the Kaijende Highlands and the Headwaters of the Strickland will become self-sustaining with funding support from partner institutions like the UN Global Environment fund and or the sale of carbon credits. Currently, we are working with the Office of Climate Change and Development and the Conservation and Environment Protection Agency (CEPA), to unlock these and other sources of funding. Once we have established a sustainable source of funding, we will create a community endowment. There is, for example, an estimated $300 million in carbon sequestered in the Headwaters of the Strickland Conservation area. If managed properly, this fund this conservation project indefinitely. As the world's carbon stocks shrink and the value of these forests grow, the

Table 8.1 Lessons learned to improve future project performance

Issue	Problem/success	Impact	Recommendation
PFS contract	Long-term industry commitment & support	Non-responsive proposal requests, Project delays, Premature project end	• Choose an industry that has a commitment and local ties to the environment and culture • Ensure project proposals detail funding and timeline requirements for PFS life • Link to mine social and environmental commitments where possible • Promote project successes within the company • Conduct regular mine manager meetings to update decision makers on PFS progress
Politics	Government support	Premature project end Poor understanding and commitment	• Ensure local level government representatives are well consulted and understand the benefits for their traditional people • Hold regular meetings with both local and national government representatives • Include government representatives in PFS media
Community	Community support	Premature project end Poor data collection and results	• Seek community permission • Be a willing student of traditional culture and environment. Do not go into communities expecting to teach traditional owners • Ensure entire community have the chance to discuss project concepts • Pay a fee for service to avoid cargo cult mentality • Reduce nepotism at all costs. Test each person hired. Those that pass move onto employment • Meet all financial commitments on time
Team	Surround project with an expert team	Greater project exposure Increased understanding, support and credibility	• Build a team of company, local and industry experts, and supporters for the project

endowment should grow, and the Papuan Forest Stewards should be assured of long-term sustainability.

It must be acknowledged that no matter how important the conservation of PNG's forests are to the global community, little of the above would have been

accomplished without industry and major international conservation NGO's. Working in partnership will allow PNG to create a national system of protected areas. CEPA does not have the resources to survey and gazette remote areas. NGOs are populated by educated expats and nationals who are stationed in the capital, Port Moresby and are focused on conserving biodiversity, not landowner rights. However, in PNG, conservation, by law, begins with landowners. Appeals to conserve endemic species that may be threatened by climate change can seem rather esoteric to landowners struggling to make ends meet and have thus far had little success. It took a corporation focused on results and not tied to donors' wishes to embrace a landowner driven, conservation-based development initiative to embrace the PFS approach.

As a mining company, PJV understood the need to build trust with the landowners. They also realized that this would take years and consistent personal contact with people who are without roads. PJV has a relationship with CEPA and a record of complying with PNG's environmental regulations. Once their Environment and Community Affairs staff witnessed the support that the authors had developed at the Headwaters of the Strickland, PJV extended their support to a project in the Kaijende Highlands.

Over the past fourteen years, PJV has spent approximately $5,000,000 in logistical support and direct payments to bring these conservation areas to fruition. When approved by parliament, the Kaijende Highlands and the Headwaters of the Strickland will become the largest protected areas in PNG's highlands. By embracing the PFS initiative, PJV has ground-proofed a method of developing sustainable conservation projects. Based on traditional environmental knowledge, the PFS initiative has no need to constantly import outsiders to manage the conservation areas. Their efforts have not gone unnoticed. CEPA has recently engaged Barrick, through PJV, to help craft a national biodiversity mitigation policy.

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Chapter 9
Landscape Restoration and Community Involvement in Biodiversity Conservation

Sunil Kumar Nandamudi and Abhinav Sen

Abstract A combination of factors—geographical, constitutional, economic, cultural among others have resulted in an unsustainable extraction of resources and a drift towards the appropriation of commons. Degraded landscapes with sub-optimal productivity have emerged from these unsustainable extractions, and this, in turn, has impaired the access of communities as well as the wider society to effective ecosystem services. The conservation design that has emerged is one that recognizes communities as an integral part of a natural ecosystem while also acknowledging that the direct economic benefits to communities are subsidiary to ecosystem services that benefit the wider society for the sustenance of all life forms. Royal Bank of Scotland (RBS) saw this vital interlinks between communities and ecosystems and through 'Supporting Enterprise'—the flagship program of the RBS Foundation India (RBS FI) began identifying landscapes and key stakeholders. It started the implementation of projects in association with civil societies that facilitated community participation in planning, execution, and social audit within the ambit of prevailing legislation.

The chapter describes the three pillars of the approach adopted by RBS FI, which has benefitted 126,500 families and improved 130,000 ha of degraded lands in some of India's most critical landscapes. The chapter goes on to explain its approach using RBS FI's initiative in the Central Indian—Kanha–Pench Corridor landscape.

Keywords Climate change · Tiger conservation · Kanha–Pench Corridor · Environment sustainability · Livelihoods · Natural resource management

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1 Introduction

The government of India recently announced its aspiration to be a $5 trillion economy by the Year 2024. The ambition outlines a transformative 5-year phase for India, with prosperity expected to permeate its population. This phase can be defined for its natural capital, as well. As an economy, whatever its size cannot be meaningfully evaluated independently of the extent of natural capital in it.

As India takes its first steps towards this ambition, there is a need to recognize the present challenges

- India is among the countries most affected by climate change. Its impacts are turning critical, putting as much as 600 million of our citizens at risk (Ravindranath, 2019). Floods, droughts, and heat waves are more frequent than ever. A total of 78,543 people lost their lives due to extreme weather events in India from 2001 to 2014 with an average of 5610 deaths per year during this period (Mahapatra, Walia, & Saggurti, 2018). Fifteen of the twenty most polluted cities in the world are in India—shortening lives and lowering productivity (AirVisual, 2018). International Labour Organisation estimates that heat stress will lead to a loss of 34 million full-time jobs in India—up from 15 million in 1995 (Kjellstrom, Maître, Saget, Otto, & Karimova, 2019).
- India's rivers are her lifelines. Rivers are integral to life and the backbone of our agrarian economy. Our rivers face challenges such as nutrient run-off from agriculture, widespread degradation of its riparian zones and forests, over-extraction of water, construction of dams, and pollution from sewage discharge and solid waste dumping. This combined with climate change impacts and agriculture policies that drive excessive usage of water continues to hamper our water security.
- India is seeing rising inequalities and resultant increasing vulnerability of a large section of its population like never before. Research indicates an increasing concentration of wealth in fewer hands. Our commons, including forests that are critical livelihood support and coping mechanisms of over 300 million (Biswas, 2003) vulnerable citizens, continue to face degradation. This, along with rising water scarcity and agricultural stress, has reduced the ability of such families to stay above the threshold of poverty—deepening inequalities.

In this backdrop, India's developmental strategies must be aligned to make careful and sustainable use of its natural capital and avoiding loss or damage to it. Since this damage will only mean intensification of the above challenges. The questions that arise are:

- How can India manage these challenges while approaching a $5 trillion economy?
- How can it balance its high developmental aspirations and heightened environmental responsibility?

The answer to both the questions lies in how India manages its landscapes—especially its forests. Forest ecosystems have the potential to address India's

present-day challenges—climate change, water insecurity, and rising inequalities. Just about 5% of India's land is under protected areas (WII, 2019) whose forests are the head-waters of its rivers, strongholds of biodiversity, and major carbon sinks.

Conserving India's Protected Areas and restoring the degraded forests surrounding such areas can potentially reduce the estimated investments required in combating climate change—estimated to be around $2.5 trillion as per the intended Nationally Determined Contribution (NDC) declared by the Government of India (2016). The strategy can be seen as the most efficient and cost-effective way forward to India, becoming a $5 trillion economy while addressing its most pressing issues. It can also be seen as a fundamental contributor towards India's commitment to Bonn Challenge, its NDCs, and the UN SDGs, mainly those on climate change, poverty eradication, food security, water, and biodiversity conservation.

2 The Role of RBS FI

RBS FI is a not for profit organization promoted by RBS under the Indian Companies Act 2013, to carry out its community development and social responsibility work in India.

2.1 The Approach of RBS FI

As India develops, rapid urbanization is expected to be one of its most dominant trends in the coming years. It is estimated that as against 30%, currently, about 40% of the country's population would be urban by 2030 (Sankhe, 2010). With population and income growth, this shift will likely be realized alongside demographic changes that will exponentially increase the demand for infrastructure and urban amenities like housing, energy, transport, food, water, and waste disposal.

Given the imperative of becoming an economic powerhouse while addressing issues of widespread poverty, water insecurity, and climate change, India faces a formidable and complex challenge especially when its huge population continues to be dependent on its increasingly stressed natural resources—which also form the basis of economic growth.

In this backdrop, India's natural ecosystems face severe pressure and widespread degradation. The resultant loss in biodiversity and functionality of these ecosystems triggers a vicious cycle—affecting the most vulnerable. Such vulnerable communities, who earn about a third of their income by extracting natural resources from these ecosystems, often rely on these resources as safety nets to keep themselves above the poverty threshold. It is estimated that over 200 million people in India fall under this classification (MoEF&CC, 2009).

With the diminished value of natural ecosystems due to diversion and over-extraction to meet rising peri-urban/urban demands and climate change impacts,

more and more people face the risk of being forced into poverty. Poverty thus runs deepest among those dependent on natural ecosystems.

The socio-economic and environmental impacts of degradation are even more in the context of ecosystems that support high biodiversity and are ecologically critical for the wider range of services they provide. Ensuring the functionality of such landscapes is thus vital. However, it cannot be ensured unless the community is integral to the conservation action and management of natural resources.

Addressing the developmental needs of the local community while fostering conservation of such ecologically important ecosystems is thus the approach adopted by RBS FI. Through its 'Supporting Enterprise' programme, it aims to promote social, environmental, and economic equity by building on the three pillars of its approach. These are—*Improving livelihoods, restoring degraded lands, and strengthening institutions.*

Since its inception in year 2007, the Supporting Enterprise programme has benefitted 126,500 families residing in 1055 villages and improved over 130,000 ha of degraded lands. Through this approach, it continues to create shared and sustained benefits for India's community, biodiversity, and landscapes. The success of RBS FI's work lies in its inclusive approach, and it continues to focus on forming and strengthening partnerships with implementing partners, government bodies, and multilateral agencies.

2.2 Pillar I: Improving Livelihoods

Livelihoods in rural India are centred around agriculture. Along with its allied sectors like animal husbandry, forestry, and fisheries, agriculture support 70% of our population, which is nearly 900 million (FAO, 2019). Thus, agriculture remains the mainstay of the rural economy even while its contribution to GDP has seen a steady decline, especially since the 1990s.

Small-holder systems form the majority of rural India, with as much as 82% of farmers being small and marginal. These small-holder systems rely on a basket of activities to ensure their livelihood security. These activities are primarily agriculture and agriculture-allied in nature. However, these systems are getting increasingly vulnerable and relying on distress migration for manual and semi-skilled labour opportunities to make ends meet. This trend is mainly attributed to the rise in population and low returns from agriculture. The rainfed area still constitutes as much as 60% of the sown area in the country (Jharwal, 2008).

Rising land degradation, deepening water insecurity, and frequent climate change impacts have also contributed to this trend. With these expected to intensify, the livelihood security of small-holder systems faces threats, deeply undermining their ability to remain above the threshold of poverty. Such communities residing in and around India's critical ecosystems are even more vulnerable due to their remoteness, often leading to a lack of intensity and inequitable distribution of government welfare schemes.

To ensure livelihood security in such communities, RBS FI promotes livelihoods that are ecologically aligned, equitably prioritized, and economically rewarding. RBS FI believes that the livelihoods of small-holder systems are strongly linked to the health of the ecosystem and its components like soil, water, and biodiversity. The foundation's interventions are thus designed to secure livelihoods within the threshold of an ecosystem to ensure its sustainability. Details of such interventions are given in Table 9.1.

We also support diversified livelihoods like the development of handicraft enterprises. Handicraft being India's second-largest employer, is integral to the rural economy and strengthening it provides a safety net to the most vulnerable families, including the landless. It also contributes to reviving traditional practices. Contemporary diversified livelihoods like ecotourism and skill development are also promoted considering the local context and aspirations of the community, especially the youth. Such diversified practices contribute directly to the efficient utilization and conservation of natural resources by providing additional incentives to the community.

Our interventions also recognize the influence of local institutions in driving livelihood decisions, and we design our interventions to improve collective action. This is done with a view to reduce transactional costs, distribute related risks, and promote efficient usage of natural resources.

2.3 Pillar II: Restoring Degraded Lands

India's ability to meet its developmental aspirations and environmental commitments rest heavily on how it manages its landscapes. While land degradation is increasing in India, the emergent situation also provides opportunities for large scale restoration. Through enhanced productivity of land, restoration can strengthen rural economy, diversify incomes, and create new employment and enterprise opportunities. Successful landscape restoration also provides multiple long-term environmental benefits such as soil and moisture conservation, biodiversity protection, and carbon sequestration (FES Internal Sourcebook, 2008). Studies estimate that nearly 140 million hectares of land in India have the potential for forest protection and landscape restoration that can sequester 3–4.3 billion tons of above-ground carbon by 2040 (Chaturvedi, 2018).

Restoring degraded lands has a direct bearing on the resilience of the most excluded and vulnerable communities. Since in the rural context, the relatively well-off families have a greater ability to exploit ecosystems and natural resources as they have larger assets like livestock, access to hired labour, credit, and markets. On the contrary, it is the most vulnerable and poor asset households that rely significantly on common pool resources under open access or common property regimes. These sections are heavily dependent on biodiversity and commons as a risk mitigation strategy to cope with shocks and stay above the threshold of poverty.

Table 9.1 Initiatives of RBS Foundation India across various states

S. no	Name of the initiative	Location	Partners	Initiation year
1	Livelihood Enhancement Programme through Natural Resource Management in Gujarat	Multiple locations	Development Support Center (DSC)	2008
2	Kanha–Pench Corridor Climate Adaptation Project	Mandla, Balaghat, and Seoni	Foundation for Ecological Security (FES); Professional Assistance for Development Action (PRADAN);Watershed Organisation Trust (WOTR);BAIF Institute of Sustainable Development	2010
3	Livelihood Enhancement Programme through Natural Resource Management in Madhya Pradesh	Dhar, Dewas, andAlirajpur	Development Support Center (DSC)	2014
4	Developing Craftmark Green	Multiple locations	All India Artisans and Craftworkers Association (AIACA)	2013
5	Integrated Livelihoods in the hills of Uttarakhand	Pauri	Appropriate Technology India (ATI)	2011
6	Supporting Enterprises at Kotra	Udaipur	Seva Mandir	2013
7	Supporting Enterprises at Andhra Pradesh	Anantpur, Chittoor	Foundation for Ecological Security (FES)	2015
8	Supporting Enterprises at Sathyamangalam	Erode	Care Earth Trust	2018
9	Supporting Enterprises at Malenad-Mysore	Multiple locations	Wildlife Conservation Society (WCS)	2014
11	Supporting Enterprises at Satkosia	Angul	Foundation for Ecological Security (FES)	2014
12	Supporting Enterprises at Simlipal	Mayurbhanj	Indian Grameen Services (IGS)	2010
13	Supporting Enterprises at Kutch	Kutch	Hunnarshala Foundation	2015
14	Supporting Enterprises through crafts	Multiple locations	All India Artisans and Craftworkers Association (AIACA)	2013
15	Supporting Enterprises at Sunderbans	24 South Parganas	Nature and Wildlife Society (NEWS)	2017
16	Supporting Enterprises at Ladakh	Leh	Nature Conservation Foundation (NCF) and Leh Nutrition Project (LNP)	2016
17	Supporting Enterprises at Tansa	Thane	Tata Institute of Social Sciences (TISS)	2018

(continued)

Table 9.1 (continued)

S. no	Name of the initiative	Location	Partners	Initiation year
18	Supporting Enterprises at Hoshangabad	Hoshangabad	Indian Grameen Services (IGS)	2014
19	Ecotourism at Mangalajodi	Khorda	Indian Grameen Services (IGS)	2009
20	Wayanad Flood Relief Project	Wayanad	Wildlife Conservation Society (WCS)	2018
21	Supporting Enterprises at Ranthambhore	Sawai Madhopur	Ranthambhore Foundation	2014

Source: RBS FI Annual Report 2019–2020

Restoring degraded lands is seen as the most efficient and cost-effective way forward to alleviate poverty and generate climate benefits. It is also seen fundamental to achieving India's NDC and the UN SDGs, mainly those on climate change, poverty eradication, food security, water, and biodiversity conservation. Acknowledging the importance and effectiveness of restoration, India has committed to restoring 21 million hectares by 2030 under the Bonn Challenge.

RBS FI has been assisting rural communities in undertaking the restoration of degraded common and private lands through our initiatives across India. We support the communities to adopt a process that enables conservation planning at a village level. This is with a view to address the degradation of commons and private lands—including grazing areas, waterbodies, and woodlots. Our interventions focus on land treatment, eradication of invasive species, and afforestation of indigenous species. These activities are complemented by establishing governance around the optimum harvest of fuelwood, fodder, water, Non-Timber Forest Produce (NTFPs) considering the threshold of the ecosystem and its regenerative capacity.

Local knowledge and practices are integral to these interventions, and they are implemented within the customary resource sharing mechanisms. Our projects aim to establish linkages and bring together multiple village-level institutions to promote a landscape approach to restoration and derive larger benefits for the biodiversity and ensure long-term ecological security.

2.4 Pillar III: Strengthening Institutions

In India, community institutions traditionally play an important role in driving local governance, livelihood practices, and the management of natural resources. By distributing risks, including those associated with climate change, these institutions structure vulnerability, particularly in small-holder systems. They play an important role in defining how the community responds to adversity and addresses its development aspiration. Thus, efficient institutions are the basis of a resilient community and landscape.

However, due to missing synergy in the efforts of communities and state welfare programmes, the effectiveness of these institutions is seen to be diminishing. Conflicting alignment of conservation priorities with developmental agendas and lack of participation/misrepresentation of vulnerable sections like women, particularly vulnerable indigenous groups, is often noticed as well (Brundtland et al., 2012).

This institutional deficit affects the ability of communities to take collective and informed decisions around livelihoods, having equitable access, and making judicious usage of natural resources. This institutional deficit also affects the impartial access and distribution of welfare programmes. Addressing this institutional vacuum is thus essential to foster locally agreed, collective, and equitable behaviours that keep individual interests in check and safeguard the interest of the most vulnerable.

Strong local institutions help communities seek active support for adaptation in the form of financial flows, information, and capacity-building support. Therefore, empowerment through strengthened community institutions can contribute significantly to reducing the vulnerability of communities to various risks, including those related to climate variability and change.

Recognizing the importance of local institutions for communities' overall resilience, strengthening community institutions has been an integral component of the projects supported by RBS FI. Our projects assist the communities to form new institutions and strengthen the existing institutions with a view to fill the institutional void. This is done with a view to promote alignment of conservation priorities and developmental aspirations at a local and landscape level.

We support these institutions to grow under the Panchayats' ambit and ensure that relevant village-level issues, especially those on livelihoods and conservation, are made part of the Panchayats' discussion and addressed through equitable governance. Through established processes, our initiatives promote inclusive and neutral institutions with balanced representation from marginal and excluded groups.

By focusing on strengthening institutions and making them integral to planning and action, our interventions under livelihoods and restoration can make a lasting impact. Thus, investing in strengthening institutions has not only improved the probability of such physical interventions being successful, but it has also developed the community's ownership to self-initiate action for their long-term well-being.

3 Case Study: Kanha–Pench Corridor Climate Adaptation Project

Kanha–Pench Corridor (KPC) is a vital ecosystem spread on 3200 sq. km, linking two protected areas (PA)—Tiger Reserves of Kanha and Pench in central India (Fig. 9.1).

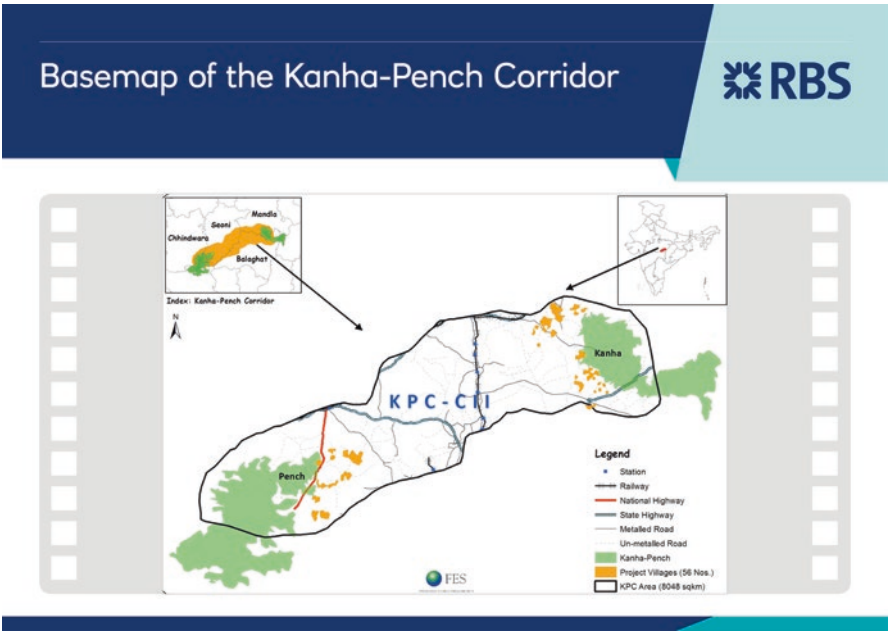

Fig. 9.1 Basemap of the Kanha–Pench Corridor

The KPC is a mix of PA, non-PAs, revenue, and private lands and provides a livelihood to over half a million indigenous people who reside within it. It also provides services like regulating hydrology and sequestering carbon. Over recent decades, the KPC has faced severe fragmentation/degradation due to anthropogenic activities and climate change. In 2010 RBS Foundation India began working in the KPC and realized that collaboration and pooling resources was pivotal to ensure the long-term well-being of KPC and its dependent communities. In 2016, the detailed project report on the proposed project in KPC submitted to the UN Adaptation Fund by RBS FI in partnership with National Bank for Agriculture and Rural Development (NABARD) was approved. Thus, RBS FI played a leading role in bringing the key stakeholders (government+ civil societies) together on the same platform. Moreover, it ensured enough resources (USD ten million, including USD 2.56 million from UN Climate Adaptation Fund) for KPC.

3.1 Challenges

1. Creating a long term and conducive partnership with Forest Department is critical yet difficult due to frequent officer changes and related variations in orientation, priorities, etc.

2. Collaborating with ideologically strong civil society partners and guiding them to work together to adopt a consistent approach for achieving the objectives. To ensure there is flexibility in a rigid system.
3. Managing inter-intra community conflicts since the project is being implemented at a landscape level.
4. To design interventions that create a balance between the environment and socio-economic aspects. No socio-economic interventions (e.g., agriculture, livestock development) promoted should harm the ecological integrity of the KPC and vice versa.
5. To facilitate pooling of resources from different sources and prevent overlap. Ensure implementation, reporting, and monitoring requirements of the donors, including environmental and social safeguards.

3.2 Beneficiaries

The project reaches out to 22,500 families in 255 villages settled in the KPC. Over 70% of the beneficiaries are indigenous, mainly Gonds and Baigas tribes (categorized as particularly vulnerable). Main livelihoods include agriculture, livestock, NTFP collection, and wage labour.

RBS FI has brought multiple CSOs, government agencies, and other stakeholders on one platform to interact and implement activities on conservation and livelihoods. RBS FI has taken a lead role to establish a Project Steering Committee, and through its funds, and from Adaptation Fund's support, it has ensured sustainable and varied sources of funding. By partnering with the State Forest Department and Animal Husbandry Department and NABARD, RBS FI has ensured financing is received from government programmes to this solution.

Community contributions are another critical source of financing, which ensures the sustainability of initiatives at the village level and provides a corpus that is used as a coping mechanism by the community (Fig. 9.2).

3.3 Working Together to Optimize Efforts and Resources in KPC

Ecosystem-based adaptation (EbA) and conservation of non-PAs are possible only if done at a landscape level. Multiple stakeholders with varying interests and agendas co-exist and influence a landscape, including the communities that reside within them. It is critical to create consensus among these stakeholders. Getting stakeholders together requires a driving force—it can be an individual/group/organization/a set of Organizations—they can be public/private or civil society. Working together, especially if done with government agencies, helps create widespread impacts and

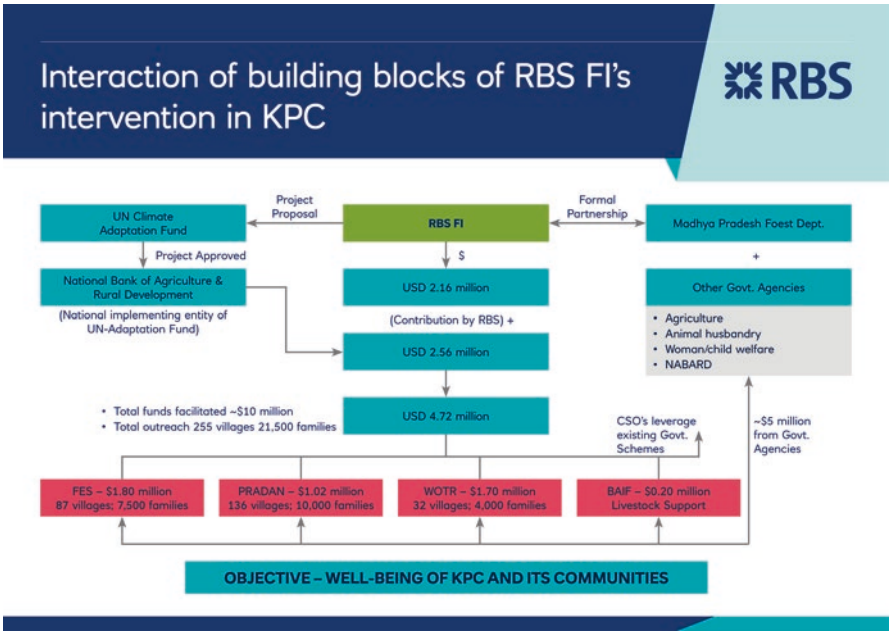

Fig. 9.2 Interaction of building blocks of RBS FI's intervention in KPC

ensure optimum utilization of resources (financial, time, human, common, physical). More often than not, interventions done on EbA/conservation are done in isolation, do not achieve the devised outcomes, and lead to failed investments. Working together reduces this risk. It gains further importance in a country like India, with complex administrative structures and conflicting priorities among stakeholders. Working together leads to the pooling of resources, including knowledge and learning, essential for tackling the complexity of prevalent issues in landscapes like the KPC (Fig. 9.3).

'Working Together' is a value that RBSFI and other stakeholders have adopted through the Project Steering Committee (PSC) platform, and it forms the basis of project success.

Enabling Factors

- A common goal: it is very important for stakeholders to have a common vision/goal. In this solution, all stakeholders had the well-being of the KPC and its communities as
- A driving force that brings all stakeholders together, and a core operational team
- Transparent systems (a Project Steering Committee, environmental and social safeguards, as well as a grievance mechanism in this solution) and strong implementation, monitoring and reporting framework
- Sustainable and varied sources of finances

Fig. 9.3 Construction of a pond by local villagers as a community-based intervention on water conservation

Lessons Learned

The solution worked because all the stakeholders had a common goal of ensuring the well-being of KPC (ecological), or its communities (socio-economic) or both. Before the solution was initiated, the stakeholders were working in silos with their ideologies and priorities; however, this solution contributed to the alignment and expansion of their work. These organizations started being flexible in their approach. For example, Foundation for Ecological Security (FES), an organization working on institution building and governance of commons recognized the gender aspects and started working on gender and livelihood issues; Professional Assistance for Development Action (PRADAN) and Watershed Organisation Trust (WOTR) working entirely with women on livelihoods, started recognizing and addressing the conservational issues. They started work on commons and private lands on restoration/plantation. BAIF's association with the project sensitized them to the need for the ecology of the area and led them to move away from promoting artificial insemination and introduction of high yielding varieties in the project area to focusing on indigenous solutions.

Thus, while respecting the ideology of the various stakeholders, the solution opened them up to identifying the other relevant issues in the landscape. Also, it is critical to developing such solutions in partnership with government agencies like,

in this case, the Forest Department, as, without them, the solution will not be replicable or scalable. The project went from 15 villages to 255 villages in 7 years because it had the support of the sovereign.

3.4 Sustainable and Varied Sources of Finance to Ensure Continuity of Initiatives

Large scale conservation and EbA projects require a long gestation period to establish institutions and practices that can create long-term benefits for the landscapes and their community. The involvement of government agencies is thus critical in ensuring the success of solutions like these. Government agencies ensure strong institutional capacity, continuity, and a source of finances to undertake conservation and developmental activities.

However, the success of the solution also lies in ensuring that the initiative receives financing from varied resources. For example, in this project—RBS FI and Adaptation Fund (AF) provided the requisite financing to support activities that are not covered by the government funds—activities like *Lantana* eradication, strengthening institutions are not covered under MGNREGA. Cattle sheds; para-vet models promoted under the project—like *pashoo sakhee*[1] and *pashoo mitra*; work on indigenous poultry and livestock are not covered by government funds. RBS FI and AF funds have enabled CSOs to meet their institution's costs and employ trained human resources at the grass-root levels. The involvement of CSOs facilitates the convergence of project activities with government schemes and thus ensures that funds are spent optimally.

Community contribution is also a critical source of finance, and under this solution, all activities and interventions have this element. Every activity has a contribution from the community. This is mostly in the form of labour. Also, the community contributes as part of material, particularly in interventions like cattle sheds, poultry sheds, which are household centric interventions. This ensures that the community is invested in the project and owns up to the activities being promoted. Having a transparent and robust contribution system gives a boost to sustainability.

Enabling Factors

- Long-term commitment of non-governmental funding agencies—in this solution, RBS FI has been committing finances since 2010. This has helped the CSOs integrate their project activities with the government programmes and leverage over 2 rupees for every rupee spent.

[1] *Pashoo Sakhee* refers to female volunteer and *Pashoo Mitra* refers to male volunteer who help the households engaged in rearing small ruminants, esp. poultry.

- Variety of financing sources to ensure gap funding—Grant financing available comes with certain conditions. For example, in the Adaptation Fund (AF) project, only 9.5% of the grant can be employed as meeting management costs. To meet the deficit, a solution needs to have varied sources to fill these gaps.

Lessons Learned

- The sources of financing need to be diverse. A successful solution—a large scale, replicable, and sustainable solution needs a variety of financing sources. An ideal mix is a combination of public, private, and community contribution to a solution.
- Non-governmental funding is required to fill the gaps and ensure efficient spending of the government funds. If such sources of financing exist in the long term, they can lead to a successful solution.
- Community contribution should be integrated into all the project activities and should form a sustainable source of financing for future developmental and conservational initiatives in the project.

3.5 Project Steering Committee to Institutionalize Partnerships

The project includes a multi-layered—governing, and implementing the framework. The Project Steering Committee (PSC) forms the highest level of this framework. The PSC is chaired by the Principal Chief Conservator of Forests (Wildlife) Madhya Pradesh Forest Department and co-chaired by the Head, RBS FI. Other members of the PSC include:

- Representatives from the Indian Forest Services; (the Field Director of Kanha Tiger Reserve, the Field Director of Pench Tiger Reserve, and the Chief Conservator of Forests of the Mandla, Balaghat, and Seoni);
- A representative of the National Bank of Agriculture and Rural Development (NABARD), Government of India;
- Concerned government agencies from the State Govt. of Madhya Pradesh comprising the Farmer welfare and Agriculture Department, the New and Renewable Energy Department, and the Animal Husbandry Department;
- The Regional General Manager of the Forest Development Corporation;
- The Chief Functionary/representatives of implementing CSO partners as well as the Civil Society Organizations (including the ones implementing the project).

The PSC meets every 6 months. It provides supervision for the implementation of the project activities. It facilitates collaboration among its diverse membership for intensifying project impacts.

Enabling Factors

The PSC brings the concerned government agencies, with their respective mandates, manpower, and government funding, together with the Civil Society Organizations, who bring specialized technical skills in natural resource management and other fields. This requires the willingness on behalf of the senior government officials to participate in such a forum. It requires a high level of technical expertise from the participating Civil Society Organizations to provide valuable inputs into the multi-stakeholder forum.

Lessons Learned

The multi-stakeholder membership of the PSC provides an important institutional platform for ensuring the sustainability of the interventions. Chairmanship of the PSC is provided by a senior government official (the Chief Wildlife Warden of the State of Madhya Pradesh—a senior Indian Forest Service officer), which ensures excellent coordination among concerned government agencies, and collaboration with other stakeholders who are working in the Kanha–Pench Corridor.

The diverse membership and mix of stakeholders, with different knowledge and perspectives, share lessons learned and experiences with each other. The CSOs can interact directly with the government agency representatives, who ensure that their respective livelihood schemes are implemented effectively. The PSC also allows the project team to have a dialogue with relevant government agencies and ensures that viable on-going government schemes are leveraged for the project area.

3.6 Community and Community Institutions

At the village level, project planning, implementation, and monitoring are driven by a community-based institution (CBI). In order to address the concerns of the poorest and the marginalized and make the Gram Panchayat a key player, while also insulating the developmental effort from competitive and negative politics, a new pedagogy called the *WASUNDHARA*[2] approach has been developed (Joshi & Huerim,

[2] Wasundhara means 'caring earth', and for WOTR it also means WOTR Attentive to Social Unity for Nature, Development and Humanity in Rural Areas. Wasundhara represents a paradigm shift, putting the responsibility for development in the hands of not only NGOs and agencies but of the villagers themselves. Only in this way can the projects sustain themselves organically over time. This approach creates a development partnership between NGOs and villagers based on the regeneration of the resource base, transparency, equitable distribution of benefits, and gender equality—all components of eradicating poverty. Each village program is tailored to that particular region's quality and quantity of natural and human resources. On the ground, this starts with supplementing watershed development by incorporating the poor and the women into decision-making processes by established a Village Watershed Committee (VWC) and Village Development Committee (VDC).

Fig. 9.4 Village-level committee meetings to discuss and plan interventions and collective decision making

2009). This approach builds on the Participatory Operational Pedagogy and seeks to make equity a community concern. A Village Development Committee (VDC) is set up, also a representative body, but with a mandate that encompasses all the developmental need of the village, including watershed development and management of natural resources. Participatory impact monitoring happens wherein community members get together and review the progress made vis-a-vis the Village developmental plans. Community members assign activities to specific members of the community for accountability and discuss delays challenges and how to solve them in the future. The CSOs sensitize the communities and mobilize them to form CBIs. The CSOs prioritize reviving existing CBIs rather than forming new institutions.

Each village CBI comprises representatives/leaders from the village community. To ensure equitable representation, the community undertakes a Participatory Rural Appraisal, with help from the CSO partners. This exercise output is the social—resource mapping and wealth ranking—categorizing village families into four wealth strata—prosperous, medium, poor, and very poor. Representatives from all strata are included in the CBI.

This structure ensures that the most vulnerable are supported through the project. The CBIs and CSOs also create village-level plans or vision documents (Fig. 9.4).

These plans are the guiding documents for the villages and are created to address the prevalent issues in each village. These plans also help the project to adopt a bottoms-up approach of implementation and address the most pressing issues of the village.

Enabling Factors

- Setting the right expectations with community.
- Participatory and transparent approach: bottoms-up mode of planning and implementation.
- Selection of the most vulnerable communities—For the selection of community, wealth ranking exercise is conducted, and four categories are ascertained—prosperous, medium, poor, and very poor. The project interventions are equitably prioritized going upwards from the very poor category. Thus, very poor households are prioritized for project interventions. This wealth ranking exercise is undertaken in a consultative manner, and all village members are in agreement with this priority.
- Community contribution and ownership in all project interventions.
- Each CBI has a nominated president, secretary, and treasurer who carries the joint responsibility to initiate preparation of village-level development plans, oversee its implementation and monitoring at the village level. This structure can vary depending on the existing institutions and community preference.

Lessons Learned

- Community participation and their views are essential to devising project interventions as they are key to determining success of the project. Hence, it is important to involve community is all aspects of planning and take their inputs before finalizing activities.
- Before the project was initiated, the proponents undertook a detailed vulnerability assessment. After project initiation, the project team spent a great deal of time in identifying village-level issues with each community.
- Building rapport with the community takes a lot of time (as much as a year). This has to be considered before initiating the implementation of activities within a village.
- Community institutions need time to be functional. It is worth spending time to build a strong foundation before initiating intensive work on livelihood/conservation initiatives. Robust institutions were deemed important towards achieving project sustainability.
- There are instances where CBIs in project villages (without the intervention of the CSO) took a lead to solve village-level issues/conflicts and initiate development conservation measures. In multiple villages, the community has opposed and stopped teak plantations initiated by the forest department in their village vicinity. Monoculture of teak adversely affects the livelihood of the community. The community got together and was able to stop this.
- Another example is of prioritizing *Lantana* eradication where the community has gone to the forest department to demand the eradication of *Lantana* from their commons as *Lantana* invasion was affecting their livelihoods and intensifying human-wildlife conflict.

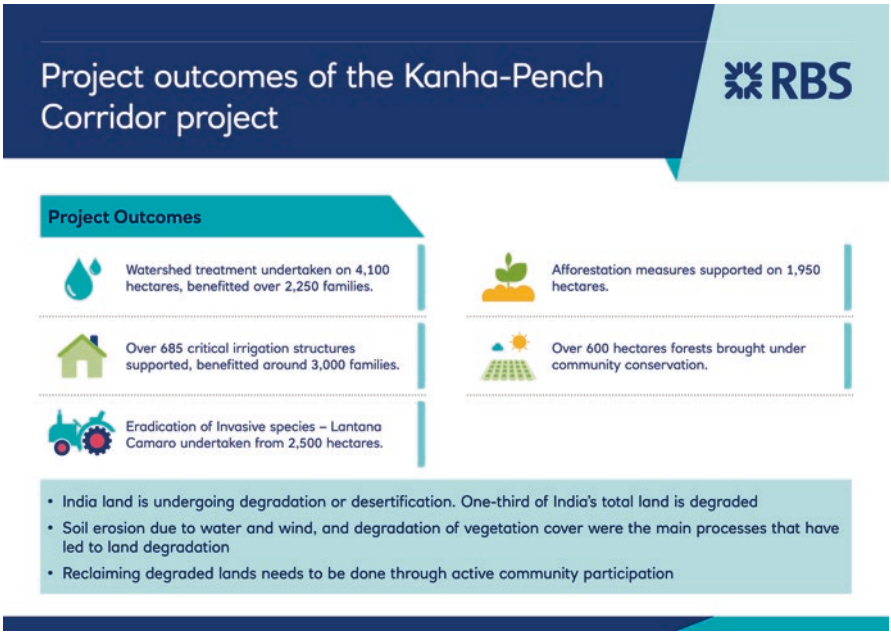

Fig. 9.5 Project outcomes of the Kanha–Pench Corridor project

3.7 Civil Society Organizations: Thematic Experts and Driving Implementation

The project is being implemented through four CSOs.

1. *Foundation for Ecological Security (FES):* Core expertise/issues addressed: Commons governance; Institutional Development; Eco-restoration; Invasive species management and sustainable livelihoods. Outreach—7500 families in 87 villages in Mandla and Balaghat (Fig. 9.5).
2. *Professional Action for Development Action (PRADAN):* Core expertise/issues addressed: Gender issues; Women self-help groups; Women-centric livelihoods; Small enterprises—poultry, goat rearing. Outreach—10,000 families in 136 villages in Balaghat.
3. *Watershed Organisation Trust (WOTR):* Core expertise/issues addressed: Watershed treatment; Agricultural development; Agro advisories using local weather stations; Disaster risk reduction, Knowledge Management. Outreach—4000 families in 32 villages in Seoni (Fig. 9.6).
4. *Bhartiya Agro-industries Foundation (BAIF):* Core expertise/issues addressed: Livestock management; Selective breed improvement; Feed and disease management; Dairy value chains. BAIF has livestock expertize, working in all three districts and supporting all three partner CSOs on livestock management (Fig. 9.7).

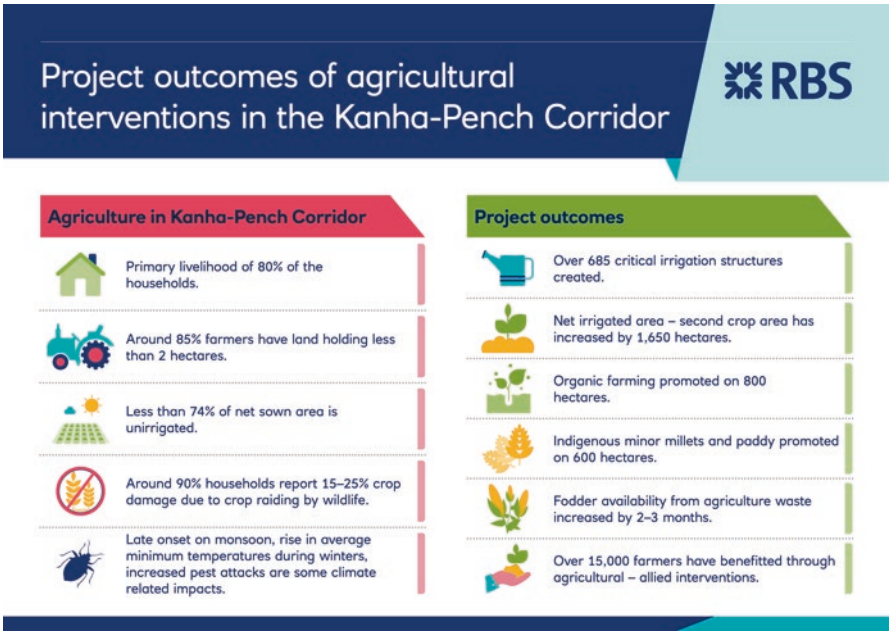

Fig. 9.6 Project outcomes of agricultural interventions in the Kanha–Pench Corridor

The CSO partners work in tandem. They undertake regular cross-learning and best practices sharing to ensure that the threats to KPC are addressed holistically.

Enabling Factors

- Adopting a transparent and participative approach.
- Recognizing and appreciating the efforts and expertise of each CSO working in the landscape.
- Identifying their core skills and helping them adopt the core skills of other CSOs.
- A catalyst is required to get the CSOs working together and build relationships/partnerships. This requires the stakeholders involved to be flexible and make joint efforts for the greater good of the landscape.

Lessons Learned

- Having a set of partners working in the same landscape with a set of diverse core skills made RBS FI recognize the need to help these CSOs in identifying areas of improvement to achieve one common goal.

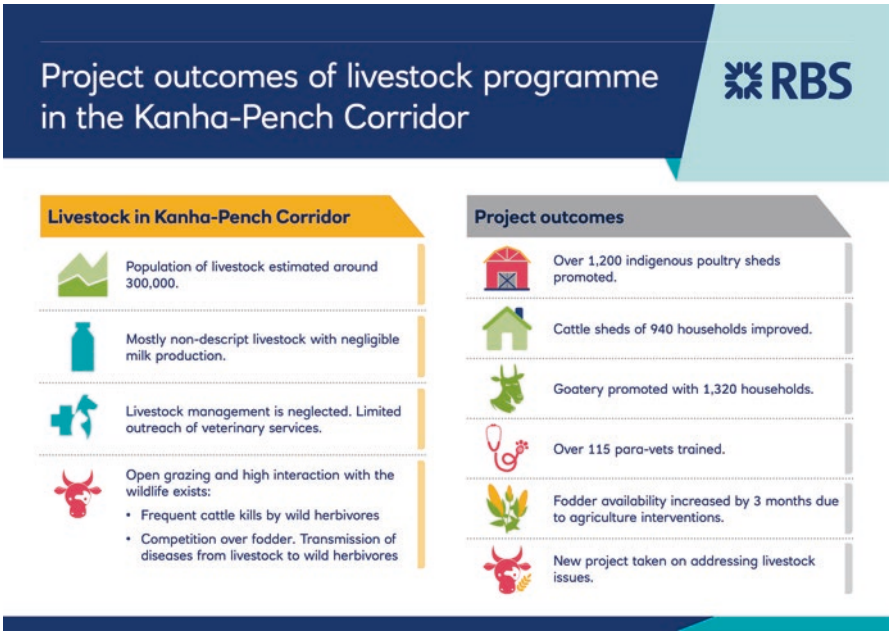

Fig. 9.7 Project outcomes of livestock programme in the Kanha–Pench Corridor

- With this view, cross-learning and best practice sharing were established. This helped all the CSOs working together appreciate efforts of one other and incorporate other CORE skills into their project too.
- PRADAN learnt from FES, started appreciating the important role commons play, and started incorporating conservation efforts in their plan of activities. They initiated a dialogue in their villages to conserve and use natural resources sustainably.
- FES from PRADAN recognized the role women plan in conservation and started gender-focused activities and started encouraging women participation in the village institutions.

3.8 RBS Foundation India: Leading the KPC Initiative

RBS FI mission is to build the resilience of India's ecologically vital landscapes and the vulnerable communities which reside within these. With this view, RBS FI has been supporting its partner CSO—FES since 2010 in the KPC landscape.

Overtime, RBS FI recognized that KPC is facing threats that hamper its functionality as a wildlife corridor, carbon sink, watershed, and livelihood source. These threats are multi-dimensional, and to address these; there is a need to get relevant stakeholders together and working towards a common goal. (Especially in the absence of a single leading legal framework).

Multiple stakeholders with varying interests and orientations exist and influence a landscape, including the community that resides within. It is thus critical to create a balance within these stakeholders. Getting stakeholders together requires a driving force—it can be an individual/group/organization/a set of organizations—they can be a public/private or civil society.

RBS FI took a lead role in getting all the stakeholders together, including Forest Department, CSOs, and other government agencies. Contributed self-funds of USD 2.12 million and leveraged another USD 2.56 from UN Climate Adaptation Fund. RBS FI continues to contribute with time and resources towards the well-being of KPC.

Enabling Factors

- Long-term engagement with the landscape, RBS FI has been working in the KPC since 2010.
- The continuous flow of financing for the project interventions. RBS FI, CSOs, and government agencies have ensured that efforts are ongoing in the landscape through provision of sustainable financing.
- Encouraging CSOs and government agencies with strong ideologies to work together requires having a flexible approach and engaging with the agencies involved regularly.

Lessons Learned

Continuous engagement, especially with government agencies, is required, all the more since corridors do not enjoy a special legal framework. While they do get covered under a combination of them, corridors comprise protected areas, territorial forest divisions, revenue, and private lands where there are multiple legal systems at work, including Forest Department, Revenue Department, and others.

Despite institutional strengths, government organizations' working priorities are determined by an individual official—his/her style of functioning. The tenure and transfer of government officers often result in a change in individual officials. The project is often caught up in building relationships with officials on a flow basis. Thus, creating institutions like the PSC and ensuring that they become robust is essential. Such institutions assist in internalizing the project as a bonafide work priority for every successive official.

3.9 Impacts

- Pooled resources of USD ten million: USD two million—RBSFI, USD 2.56 million—Adaptation Fund, USD three million-Civil Society, Govt dept. USD 2.5 million for KPC.

- Comprehensive mapping of KPC, including a socio-economic profile of sample villages for improved understanding of the landscape dynamics. This will soon be available in the public domain.
- The enhanced capacity of the community is 255 villages/22,500 families to take collective action on conservation, livelihoods, and other developmental issues through robust local institutions.
- Improved participation of women in decision making, with 30 percent representation and gender-focused activities like indigenous poultry, *PashooPakshee* model promoted under this project. *Mahila Adhiveshan*[3] is conducted each year under the project to bring women from the landscape together and raise issues around land rights, resource rights, decision making in conservation, livelihoods, and domestic violence. Being implemented with 600 women self-help groups.
- Improved community governance on over 20,000 ha of village woodlots, commons, and water bodies in KPC. Collective efforts by community members led to the protection and restoration of degraded land, which has further contributed to their improved economic status.
- Eradication of invasive plant species such as *Lantana camara* from 2500 ha common and private lands. The project interventions have focused on strengthening community stewardship around forest and biodiversity management, improving knowledge on sustainable harvesting techniques and thresholds, improving tree cover in the farmlands and other common lands in the village to reduce dependence on the PAs, support the communities in undertaking soil and moisture conservation measures, in eradication of invasive species and plantation of endogenous/indigenous species, and work towards habitat restoration.
- Reduced grazing and fuelwood pressure on the KPC by an average of 5000 ton per annum and 10,000 ton, respectively. *Lantana* has been eradicated from 1400 ha of land, both commons and private. A biomass assessment exercise is conducted in the area freed from lantana. The study shows that 1 ha of plot produces 1.5 ton (approx) of grass fodder per annum, and the cattle graze the same plot at least twice a year. Therefore, for 1400 ha, 2100 ton of grass fodder is produced (in case of single grazing).
- The same study shows that the one-hectare area produces 1.25 ton of dry *Lantana*, which is further used as fuel wood by the community. Within the project period, 1700 ton of dry fuelwood has been produced from 1400 ha of land and used by the community.
- At least a 20% increase in the gross income of community members by improved management of natural resources. The management of natural resources has been the prime objective of this project. To preserve the natural fertility of the soil and restore the groundwater, plenty of activities are taking place in the course of this project.

[3] Mahilaadhiveshan is an annual celebration of the women group who come together to discuss issues, share success stories wherein they invite local government departments and representatives from the local community.

- Farm bunds are constructed around the field so that it helps in preserving soil and prevent soil erosion and also avoid water run-off, which leads to an increase in recharging of the groundwater.
- Construction of farm bunds: Farm bunds are constructed in an area of 345 ha. Out of which 160 ha was wasteland, but now after the soil and water conservation work on the same land, the farmers have started producing crops in at least one season. This activity is being implemented with 410 farmers. Earlier, when the land was not treated, the productivity was around eight quintals per year. Productivity has now increased to 12 quintals per year. Similarly, on the waste land, the production was zero before the conservation work, but now it takes around eight quintals per year of production. 5 farm ponds and 5 earthen dams are also constructed on the land where the farmers have started harvesting crops twice a year instead of once as they used to do earlier.
- At least 50% increase in gross incomes of 10,000 families by the promotion of improved agriculture, livestock, skilling, and market access. This estimate is based on the quantitative as well as qualitative data that has been collected using methods like personal interviews and group discussions with the community members since 2016 by CSO partners.
- Knowledge dissemination to the community and other stakeholders to scale learnings/models in KPC and similar landscapes.

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Part IV
Corporate Biodiversity Management: Philanthropy, Action, Responsiveness, Framework and Mainstreaming

Chapter 10
Biodiversity Conservation Action by Corporate Houses: A Study of Tata and Godrej Group in India

Erach Bharucha

Abstract This paper introduces the thinking and ethos that goes into a proactive environment and nature conservation actions by the houses of Tata and Godrej. These two industrial giants were initiated in the early twentieth century and had a strong history of conservation of nature and natural resources. Their environmental conservation actions were linked to large charitable trusts as well as their individual companies. This has continued throughout the years and percolated into the conservation actions by past and current leaders. The chapter will provide a list of key actions related to environment and biodiversity conservation by the two corporate houses through their trusts and companies. These had emerged long before it became mandatory for corporates to contribute to social or environmental causes and has not been triggered by law or policies in the past. It is observed that their thinking (action) process was strongly influenced by an interest in nature. They used their finances to fund biodiversity conservation not for compliance purposes alone but through a genuine interest in species and or habitats. Key learnings are how such actions can be stimulated in other corporate groups for furthering the national agenda of biodiversity conservation.

Keywords Corporate Social Responsibility · Biodiversity · Tatas · Godrejes Ethos

1 Introduction

A corporate house is primarily an economic institution that provides goods and services to the public and profit to the owners. However, it is also a social organization, and, just like any other social group in today's world, it shares a responsibility

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towards environment conservation. It is recognized that corporate bodies can have significant impacts on sustainable development, and hence they hold an added responsibility of ensuring environment conservation on the one hand while fulfilling their profit-making motives on the other hand. Mouly Potluri and Temesgen (2008) write that two main developments have altered the behaviour of corporates; one being professional managers replacing the title-holders in companies, who play more of a trustee role, and secondly, the development of change in public attitude towards big businesses and their socially responsible actions.

Though profit is still one of the main drivers for corporate activities, it is no longer considered its only reason for existence. Companies consider themselves as an integral part of the society and act in a socially responsible way (European Commission, 2001) that goes well beyond the performance of a narrowly defined economic function (Khan & Atkinson, 1987). Corporate social responsibility (CSR) is "essentially a concept whereby companies decide voluntarily to contribute to a better society and a cleaner environment" (European Commission, 2001).

Sustainable Developmental Goal (SDG)-9 stated in 2015, targets "Building resilient infrastructure and promoting inclusive and sustainable industrialization", The World Business Council for Sustainable Development (WBCSD) suggests that industries can aim for eco-efficiency, "which is achieved by the delivery of competitively-priced goods and services that satisfy human needs and bring quality of life, while progressively reducing ecological impacts and resource intensity throughout the lifecycle to a level at least in line with the earth's carrying capacity" (DeSimone & Popoff, 2000).

Corporates in India have undertaken socially relevant activities for several decades. Their contribution to education, healthcare, poverty reduction has been substantial. The Companies Act (2013) mandated that companies spend 2% of their average net profits of the past 3 years on CSR. This has moved CSR in India from choice to compliance (Majumdar, Rana, & Sanan, 2015). Although the CSR spending has increased, its contribution to the environmental sustainability is less as compared to the spending on social responsibility projects, and the spending on biodiversity is even lesser—a fact that is incongruent considering the corporates' dependence as well as the impact on goods and services provided by biodiversity. It is also non-compliant with the globally accepted principle of "mainstreaming biodiversity", which was started back in 2004 at the Global Environment Facility (GEF) workshop in South Africa. Mainstreaming biodiversity is "to internalize the goals of biodiversity conservation and the sustainable use of biological resources into economic sectors and development models, policies and programmes, and therefore into all human behaviour". It is, therefore, vital not only to look at CSR activities of companies but also to look at the actions that directly target conservation and sustainable use of biodiversity. A recent study by Baroth and Mathur (2019) describes various interventions being taken up by the Indian industry in wildlife conservation. However, there is an urgent need to increase the reach of such interventions in a biologically diverse country like India.

As a part of the Maharashtra State Biodiversity Action Plan, data was collected from Annual CSR reports of 58 companies, which showed more spending on poverty alleviation, healthcare, and education as compared to biodiversity conservation. It also

showed that over 3 years (2014–2017), only 3–14 activities were directed towards species and habitat conservation, while 5–36 were environmental activities of more general nature like plantations. Their views on biodiversity conservation projects were limited to soil and water management, catchment development, and tree plantations, which were visualized by them as being biodiversity conservation projects. However, some of the industries' from Tata and Godrej groups had corporate social responsibility (CSR) programmes oriented explicitly towards conservation of wild species and preservation of wilderness habitats.

"What are the drivers of biodiversity conservation by Corporates?" emerged as a research question through the studies mentioned above. Finding answers to this question can provide us pointers for what needs to be done in the future to further biodiversity mainstreaming for Indian corporates. The present chapter discusses the drivers of biodiversity conservation actions taken up by two corporate houses—Tata's and Godrej's. Their actions have been exceptionally supportive of biodiversity conservation in India for several decades and have been documented by various studies (Karanjia, 1997; Lala, 2006; Rajan, 2019. They are also one of the oldest and largest of the corporate houses with significant turnover and a diverse portfolio of profit-making industries. The choice of these houses is not random, but made purposely as insights from the study will help suggest ways in which sustainability and biodiversity sensitive actions can be taken up by other industries.

The aim of this paper is exploring the pro-conservation ethos and actions by the House of Tatas and the Godrej Companies within India's biodiversity conservation scene. The specific objectives were to:

(a) List the broad spectrum of conservation actions carried out by the two corporates in India.
(b) To identify key individuals in these two corporates who have played leadership roles as visionaries in pro-environmental action and biodiversity conservation in India.
(c) To probe into the conservation ethos of the two companies and understand its transfer over the years in the corporate environment.

2 Methodology

2.1 Description of Corporate Houses

Tata group is one of the largest business groups in India, with 29 publicly listed enterprises and a market share of about 103 billion USD (in 2016). Founded in 1868 by Jamsetji Tata, the company gained international recognition after purchasing several global companies. One of India's largest conglomerates, Tata Group, is owned by Tata Sons. The Group supports education, health, livelihood generation, and art and culture through philanthropic trusts, which hold 66% of its equity share capital. In the domain of wildlife conservation, four entities of Tata Group, viz. Tata Chemicals Ltd., Tata Steel Ltd., Tata Housing Development Company Ltd., and

Tata Consultancy Services Ltd., are primarily working to protect threatened species in India under the umbrella of CSR (Baroth & Mathur, 2019).

The Godrej Group was established in 1897 and had its roots in India's Independence and *Swadeshi*[1] movement. The founder was Ardeshir Godrej, a lawyer-turned-entrepreneur. The group together has revenue of over 4.1 billion USD (2015) and more than 28,000 employees. They operate in sectors as diverse as real estate, consumer products, industrial engineering, appliances, furniture, security, and agricultural products. Subsidiaries and affiliated companies include Godrej Industries and its subsidiaries Godrej Consumer Products, Godrej Agrovet, and Godrej Properties, as well as the private holding company Godrej & Boyce Mfg. Co. Ltd.

2.2 Data Collection

A large amount of secondary data was collected through books, annual reports, papers, and declarations by corporate houses and their websites. This was followed by primary data collection regarding the interests and attitudes of past and present leaders in the two corporate houses. The information was collected by the use of a questionnaire followed by in-depth interviews with selected individuals in key positions. Top-level managers in Tatas and the Godrej group were contacted. The interviews focused on understanding historical aspects, the reasons, and motivation behind the actions. This helped in the listing of conservation actions by the houses. As these are large groups with various companies, the present study looked at the initiatives of selected companies within the group. The companies were chosen based on initiatives that covered priority biodiversity goals, viz. terrestrial, coastal, and marine ecosystem conservation, threatened species conservation, ex-situ and in-situ conservation. The companies included are Tata Power, Tata Chemicals, Tata Motors, and Godrej & Boyce Mfg. Co. Ltd.

The parameters for further categorization were the benefits of corporate actions to the biodiversity at ecosystems and species level. Those benefiting biodiversity directly were categorized "core actions", defined as actions where a specific species or specific habitat has been conserved, ensuring the survival of a species, especially endemic and threatened species of plants or animals or habitat. Those benefiting biodiversity indirectly were categorized as "congruent actions" defined as actions supporting biodiversity such as soil and water management, plantations, awareness, eco-development, etc., but not necessarily targeted at a specific habitat/ecosystem or species.

The author has closely worked with the leaders in both houses for more than three decades and has collaborated on programmes of environment and biodiversity conservation in various capacities. This gave a unique perspective, which helped in collecting as well as analyzing the data, which otherwise may not have been possible considering the diverse and complex interactions involved.

[1] Nationalist movement in India that encouraged using products made in India.

As this is a study of organizational culture related to biodiversity conservation, the period considered is from the inception of the corporate houses to present. The changes observed post the mandatory CSR regulation are discussed separately.

3 Results

The data collected strongly brought out the historical roots of the present conservation actions by the two houses. The results below are summarized after the collation of information gathered from the interviews and secondary sources of information. The data was verified after visits to various projects described below and observations on-site regarding the conservation activities described below.

A very long list of activities carried out by the corporate houses oriented towards environmental and biodiversity conservation was prepared, which spans over several years. Broadly they could be grouped as activities carried out as philanthropic activities, through their associated trusts (e.g. Tata trust) or through companies for their employees, and for society in general, organizational activities, such as green practices within companies areas of work and compliance activities required for environment impact mitigation (e.g. ecological restoration and wildlife management at mining sites by Tata Steel), and CSR activities after 2013. It is not possible to discuss all of them in detail. Hence only a select few in the last 5 years are listed in the sections below. The list is not exhaustive but will give a glimpse of varied activities carried out by some of the companies in these groups.

It can be seen that both these industrial houses have addressed both core conservation issues of species and protection of threatened ecosystems. Apart from these, they have done several congruent conservation actions such as greening, sustainable campus development, and conservation education.

In addition to this, conservation NGOs in India have been actively supported by both. Godrej supported World Wide Fund for Nature-India (WWF-India), and the Tata group has funded projects by Bombay Natural History Society (BNHS), Wildlife Trust of India (WTI), Ashoka Trust for Research in Ecology and the Environment (ATREE), to name a few.

3.1 Conservation Actions of the Two Groups

Tata Group

The very first environmentally oriented action of the group was by Jamshedji Tata, founder of the Tata group, himself. He was keen on hydropower plant in the Western Ghats (India), which were to ensure renewable energy supply helping to clean air in Mumbai. This was fulfilled by Sir Dorabji Tata. A series of leaders in the group have shifted the primary environmental focus towards biodiversity focus over the years.

The Whale Shark release programme has been implemented over 20 years by a consortium of Tata Chemicals (Mithapur, India) as funders and WTI as implementers with cooperation and funds for release by the Gujarat Forest Department. Tata Chemicals also funded and furthered a successful ex-situ translocation of coral on the Gujarat coast. The group has also rehabilitated mangrove forests both within and outside their land. The ecorestoration of a thorn forest system on degraded land at Mithapur led to the creation of a biodiversity park, a habitat for local grassland bird species including taxa of Accipitridae (raptors), Phasianidae (partridges, quails), *Vanellus indicus* (Red-wattled lapwing), *Cursorius coromandelicus* (Indian courser) and small mammals such as *Lepus nigricollis* (Black-naped hare), and a herd of *Boselaphus tragocamelus* (Nilgai).

Tata chemical's current activity is to set up a major Centre of Excellence for Coastal and Marine Biodiversity Conservation at Okhamandal on the Gujarat Coast of India for ecological restoration, conservation, and research into marine habitats and local biodiversity. This includes the removal of invasive species and restoration of the local sand-dune ecosystem. The protected salt work marshes are a haven for *Phoenicopterus roseus* (greater flamingo), Ciconiidae (storks), Threskiornithidae (ibis, spoonbills) Pelecanidae (pelicans), Anatidae (ducks, geese), and Laridae (terns, gulls). The winter skies are filled with massive formations of *Grus virgo* (demoiselle crane), and *Grus grus* (common crane) in thousands. There is a unique nesting colony of *Hydroprogne caspia* (Caspian terns) for which Tata Chemicals have created islands to facilitate the breeding of this uncommon species.

Tata Power's core landscape-level activity has been ecorestoration of its four large catchment areas in the Western Ghats over the last three or four decades. Much of this used indigenous species from its large nursery of local Western Ghats flora. This has led to the ecorestoration of a degraded area into a near-natural semi-evergreen forest. The landscape includes several sacred groves, endemic monsoon flora of basalt plateaus and forests surrounding local forts. A key initiative of Tata Power has been *Tor khudree* (Deccan mahseer)[2] and *Tor putitora* (golden mahseer) ex-situ fisheries project. Several rivers have been restocked with viable populations of mahseer from the Tata's Walvan fisheries section at Lonavala.

Tata Solar's grassland conservation and fodder distribution in Madhya Pradesh is a unique model. The grass, which is a fire hazard, is harvested by local cattle herders just before it begins to dry. A local village *sarpanch*[3] claims that they have never had access to so much good fodder. At Jamshedpur (India), the cooling ponds have become bird-watching sites for its employees.

The most unique environmental and conservation landscape management action was implemented at TELCO (now Tata Motors) at Pimpri-Chinchwad (Maharashtra, India) in the industrial town outside Pune in the 1980s. Mr. Sumant Moolgaokar, who headed the industrial campus, created a lake to recycle water in this low rainfall

[2] Mahseer is a freshwater carp that was once available in large numbers in rivers but has depleted due to degradation of riverine ecosystems.

[3] The head of village in India. *Sarpanch* is a hindi word.

tract. Today it is supplying water to a wetland downstream and supports migratory and local waterfowl. Mr. Moolgaokar also de-silted several lakes and ponds. Through a suggestion of the author, a wetland project was initiated below the TELCO lake, where a nesting colony of storks has been a positive conservation initiative. Mr. Moolgaokar created an indigenous tree nursery in drums that were provided to local villagers. Tata Tea has a major plantation programme in the Western Ghats, Assam, and several other locations in India.

Over 40 schools have been involved in a School Environment Education Programme (SEEP) in Maval and Mulshi Talukas of Maharashtra (India) around the hydro lake catchments that are unique hot specks of biological diversity of high conservation significance. This has been implemented over three decades by collaboration with Bharati Vidyapeeth's Institute of Environment Education and Research (BVIEER).

Other congruent activities by Tata include scholarships for students and School Environment Education programmes, which have led to several individuals becoming industry leaders and professionals with concern for environment. Tata Power (Hydro) with BVIEER has run conservation education programmes for schools in the Western Ghats around their Hydel lakes. An active volunteer programme for conservation has been implemented through The Tata Chemicals Society for Rural Development (TCSRD) initiative that has a strong action component. They also have a sustainable development training programme for employees. Tata Consultancy Services (TCS), India's largest technology services company, was ranked as the seventh "greenest" global company in Newsweek's 2011 Green Rankings and the eleventh in 2012 as reported by Ashton & Shenoy (2015).

The two associated trusts, the Sir Dorabji Tata Trust and the Sir Ratan Tata Trust, have furthered educational and livelihood development projects for rural communities apart from funding various biodiversity conservation projects of NGOs.

The Godrej Group

Godrej has played an active role in India's conservation history through corporate support and advocacy with the government in setting up WWF in India in 1969. The Godrej Group has funded the WWF building in Delhi—the Pirojsha Godrej Building, which has acted as a hub for the growth and development of nation-wide research, extension, and public awareness strategies at national and international levels. They have continued to support various activities, including the establishment of Indira Gandhi Conservation Monitoring Centre (IGCMC) from 1994 onwards.

Godrej Group's land at Vikhroli creek in Mumbai has protected and rehabilitated a mangrove forest with its associated flora and fauna and is an ecorestoration model on a private landholding. The Godrej group has encouraged the use of the nature trail in their mangrove ecorestoration programme for awareness generation in local school students. BVIEER's environment and biodiversity-friendly department building was funded by Soonubai Godrej and supported by Sohrabji Godrej.

The Naoroji Godrej Centre for Plant Research (NGCPR) was established in the year 1992 to carry out purposeful research in the areas of plant biodiversity and conservation. The Centre researches biodiversity and plant conservation, with emphasis on nurturing and propagating the unique plant life of the Western Ghats and medicinal plants of high conservation priority. The centre has promoted diverse biodiversity conservation activities, including grassland restoration, germplasm conservation, and cultivation for rare species, database creation, primary research on endemics, global threat assessment for medicinal species, to mention a few which have had a lasting impact on conservation in India.

After the advent of corporate social responsibility divisions run by social scientists of corporations, there is a reduction in the importance given to biodiversity conservation projects as they are selected by social scientists who prefer to fund traditional quantifiable societal concerns rather than ecological projects that only have long-term outcomes.

Table 10.1 shows the range of diverse activities that have been taken up over many decades in the past. They include conservation of habitat and species, eco-development work, and germplasm conservation. In-situ as well as ex-situ conservation programmes, civil society organizations, research institutes, and school programmes have benefitted in many parts of India. What is most interesting is that many of these were conducted before the CSR was made mandatory. They are also not always connected in any way with the environment management compliance.

3.2 Key Individuals in Biodiversity Leadership

The phenomenon observed here is far more complex and deep-seated than seen in other companies helping biodiversity through CSR. It started with the Founding Fathers of both houses and has continued over generations of decision-makers within the Corporate Houses. Interviews held with key persons in the groups throw some light on the motivation behind this action. What emerged very clearly was that each group has a long list of individuals, in the family, trustees, board members, decision-makers, and employees who acted as champions for biodiversity and environment conservation action. They championed the cause, led the programmes, supported others through funds and other means, and ensured the establishment of long-lasting conservation models in India.

Table 10.2 lists the names of individuals that emerged through the interviews and personal interactions with the groups over the years. Their leading associations with key projects of conservation are mentioned. Many of them not only supported others but were active leaders in conservation decision-making serving as board members of civil society organizations, conducted research and awareness for others within the company and outside.

Two of the leaders Sumant Moolgaokar at Tatas and Sohrabji Godrej at the head of the Godrej Group are described below for their exceptional contributions. Both were charismatic but self-effacing individuals. Both had an innate sense of respect

Table 10.1 Examples of core and congruent activities

Examples of core activities		
Avifauna survey was done in Maithon, Jharkhand	Tata Power	Habitat studies
Bird Niche nesting Project	Tata Steel	Habitat studies
Mangrove restoration Gujarat	Tata Power	Habitat conservation
Mangrove conservation at Vikhroli	Godrej Industries	Habitat conservation
Community-based forest management in Western Arunachal Pradesh	Tata Trust Aug 2010–July 2013	Habitat conservation
Rhincodon typus (whale shark), Gujarat/Coral Project 2003 onwards	Tata Chemicals Ltd.	Endangered species
Sea turtle monitoring	Tata Steel	Endangered species
Lepidochelys olivacea (olive ridley turtle) conservation programme along Maharashtra coastline	Tata Consultancy Services	Endangered species
Mahsheer conservation (ex-situ)	Tata Power 1980s	Endangered species
Mahsheer conservation (ex-situ)	Tata Consultancy Services limited	Endangered species
Panthera leo persica (Asiatic lion), *Ardeotis nigriceps* (great Indian bustard), *Ailurus fulgens* (red panda), *Rhinoceros unicornis* (Indian rhinoceros)_	Various Tata companies (Baroth & Mathur, 2019)	Endangered species
Ex-situ conservation of endemic and endangered plants of Western Ghats	Godrej Group Industries	Endangered species
Gaj Yatra project *Elephas maximus* (elephant corridors)	Tata Chemicals	Endangered species
Grus antigone (sarus crane) in farming systems eastern Uttar Pradesh and setting up community conserved areas WTI	Tata Trust Feb 2013–Jun 2019	Endangered species
Examples of congruent activities		
Strengthening of Van Panchayats Uttarakhand	Aug 2008–Mar 2013	Eco-development
Livelihood of Tharu tribal community WTI	Tata Trust 2010–2015	Eco-development
Valmiki Tharu livelihood project	Sir Dorabji Tata Trust	Eco-development
Kashmir alternative livelihood	Sir Dorabji Tata Trust	Eco-development
Land reclamation using mulberry plantation at west Bakora (congruent action)	Tata Steel	Habitat conservation
Chinnappanahalli lake conservation in Bengaluru	Tata Consultancy Services	Habitat conservation
Butterfly garden at Sukinda and Joda	Tata Steel	Habitat conservation

(continued)

Table 10.1 (continued)

Examples of core activities		
Pirojsha Godrej building for WWF in Delhi—Lodhi road	Godrej Industries 1989	Conservation organizations
Fellowship Programme Academy for Conservation Science And Sustainability Studies ATREE	Godrej Industries 2008–Mar 2020	Conservation organizations
Infrastructure for BVIEER green building auditorium and museum facility	Godrej Industries 2001–2003	Conservation institute
Environment Education conservation activities for school students	Tata Power	Biodiversity awareness
Environment Education conservation activities for school students	Godrej Industries	Biodiversity awareness
Nature clubs of India	Godrej Industries	Biodiversity awareness

for nature. Both had special interests in the environmental management of their companies and were dedicated to wildlife conservation. Their actions set an example for industrial managers, executives, and frontline workers to act as advocates of nature conservation. The history of corporate actions for conservation is linked to their characteristics and internalized interests that filtered across their industrial houses and are even today part of the core values within their multiple industrial ventures.

As a close associate of JRD Tata, Sumant Moolgaokar got enormous support for these off-beat ventures from the top echelons of power in the Tata Group. Early in the 1980s, when ecorestoration programmes were just being debated, Mr. Moolgaokar took up marshland restoration for the breeding of aquatic birds in the TELCO lake after discussions with the author. Mr. Moolgaokar supported the first GIS mapping project for a survey of Dangs forests to identify corridors between the Purna Wildlife Sanctuary and Vansda National Park in India. Creation of nursery, desilting of *Pazar* tanks, afforestation are some of the congruent actions undertaken under his leadership.

Sohrabji Godrej was known for his interest in the conservation of tigers and their habitat in the early 1970s. He influenced Prime Ministers, State Chief Ministers, and bureaucracy to undertake a plethora of different conservation priorities. His deep interest in conservation education at WWF led to Nature Clubs being spread across India by WWF and at BVIEER. His discussions led to initiating school environment education facilities at BVIEER funded by the Soonu Godrej Trust.

The list below includes members of the founding family and also others who, even if not related by blood to the families, still were and continue to have strong personal associations to the corporate family, having spent several years within the corporate houses and are well respected. Those interviewed remembered the personal interests of some of the past leaders, love for nature, flora, and fauna, which initially was through an interest in hunting, and later through an interest in nature photography. Most expressed strong nationalistic feelings and related the conservation of nature with the same feeling and also showed deep commitment for the betterment of the society through improved education and livelihood generation.

Table 10.2 List of influential leaders in the corporate houses and their biodiversity management programmes

Individuals	Association with programmes of biodiversity and environment conservation	Special interests reported
Tata Group		
Jamshedji Tata End nineteenth century	Started the Tata Group, and planned for the hydroelectric dams	Known to be fond of flora, fauna, and kept pets
Ratanji Tata	Poverty studies	Philanthropist
Sir Dorabji Tata Mid 19th to early 20th	Set up various companies, and completed the hydroelectric dams and Jamshedpur city project as planned Green Industrial city—Jamshedpur Formation of Tata Trusts for Green initiatives	A visionary planner who realized the importance of the environment for well-being
JRD Tata Mid twentieth century	Led all the group as Chairman of Tata (1938–1992), built a corporate structure of the group	Keen interest in social work
Sumant Moolgaokar Late twentieth century	GIS for forestry in India Led and greened TELCO and TISCO Built lake to recycle water. Conceptualized Mahsheer Breeding Centre at Tata Power Watershed management Created wetland for avifauna breeding Afforestation of hydroelectric stations, indigenous fruit tree cultivation	Interested in environment management Wildlife and culture photographer
Ratan Tata Present leader	Several new business ventures for the group and Tata Trust, supported Tata Institute of Social Sciences, environment division at Confederation of Indian Industry (CII)	Social causes of various types
Homi Sethna	Ecorestoration, Mahseer breeding Environment Education	Wildlife conservation
Shahrookh Sabawalla	Indigenous Afforestation Model to Tata Tea	Wildlife conservation
Myra	Telco—CEO, supported several nature conservation programmes of WWF	Wildlife conservation
Russi Mody	TISCO group	Social causes
Francis Menezes	Brought in biodiversity into management training programmes (Tata Management Training Centre) with dedicated time in the leadership programmes	Social causes
Dr. R. Mukundan	Coral reef restoration, whale shark conservation, Proposed Centre of Excellence in Coastal and Marine Biodiversity Conservation	
S.N. Ogale	Initiated the Mahseer ex-situ conservation programme. Indigenous plant nursery, Supported BVIEER school education initiative	Cultivation, awareness generation
Vivek Talwar	Whale Shark and Coral Transfer Involving employees in conservation	Sustainability and biodiversity conservation
Alka Talwar	Centre of Excellence on Coastal and Marine Biodiversity conservation at Okhamandal	Biodiversity conservation

(continued)

Table 10.2 (continued)

Individuals	Association with programmes of biodiversity and environment conservation	Special interests reported
Prasad Menon	Chairman of WTI, one of the largest conservation NGOs, Ecorestoration	Biodiversity conservation
Satish Trivedi	Nature Camps, Centre of Excellence on Coastal and Marine Biodiversity conservation at Okhamandal	Biodiversity conservation
Mahesh Paranjpe	Afforestation in hydroelectric station catchment areas Environment Education	Biodiversity conservation
Divyabhanu Chawda	Taj Hotels developed in wildlife resorts. Written books on wildlife history, President of WWF	Wildlife conservation
VishwasRao	Mahsheer breeding centre, Indigenous tree nursery	Biodiversity conservation
Godrej Group		
Ardeshir Godrej (1868–1936)	Pioneer in Indian manufacturer Interested in spirituality and nature	Nature lover Patriotic Empathy for flora and fauna (Karanjia, 2019)
Phirojsha Godrej (1882–1890)	Keen interest in the environment of industrial campuses	Nature lover Patriotic Environmental concern
Sohrabji Godrej	Founder trustee of WWF, Tiger Conservation champion. Phirojsha Godrej Centre for Conservation of Nature and Natural Resources for the Delhi office of WWF. Mangrove Interpretation Centre. Supported environmental studies at school and PG level at BVIEER	Nature lover
Burjor Godrej	Initiated moves for the use of biodegradable chemicals in detergents Made environmentally friendly soaps	Concerned about groundwater pollution
Soonu Godrej	Funded BVIEER infrastructure for formal and non-formal environment education	Education and Environment
Jamshyd Godrej	MD of Godrej Group Protection of Mangroves at Vikhroli Support of WWF Worked as Chairman of Board of Directors for Council on Energy, Environment, and Water	Conservationist Sustainable development Conservation
Pheroza Godrej	Supporter and member of Executive Committee of BNHS President of National Society of Friends of the Trees	Cultural aspects, History, Conservation
Smita Godrej-Crishna	Supported School Environment Education programme at BVIEER Pune	Environmental concern, keen on flora, fauna
Vijay Crishna	NGCPR, Environment Education programme through BVIEER in semi-arid Deccan ecosystem at Shirwal	Environmental concern, keen on flora, fauna conservation
Rishad Naoroji	Executive Committee of BNHS Written a book on birds of prey	Ornithologist, bird photographer

However, when currently retired top executives were asked why they implemented or funded biodiversity conservation, their answers were profound and pointed to intrinsic factors rather than external triggers. The Tata group leaders strongly voiced their opinions that nature conservation originated from the thinking or ethos created by the group's founders Jamshedji Tata, followed by JRD Tata and also the current leadership. Homi Khushro Khan and Prasad Menon, when interviewed, said, "*Wildlife and biodiversity are in our genes*!!" also, "*Conservation is in our DNA*!!" Several echoed that "Nature has always been respected" in our industrial ventures. The comments were reiterated on several occasions, with some variations during interviews.

Members of the Godrej group also said, "We have always been nature conscious" and "The family has initiated these conservation projects".

3.3 Conservation Ethos and Its Transfer in the Corporate Environment

What comes out strongly from the discussions with various leaders was how the environmental and biodiversity consciousness emerged, was encouraged, and also transferred across successive generations of leaders within both the corporate houses.

Corporate cultures the world over are changing in response to greater coverage of biodiversity and its values through the press and electronic media. For many years, the two groups studied here had not advertized their biodiversity or environmental conservation campaigns. The potential of these activities to gain consumer support or shareholder's support was never realized. However, as there is now an emergence of environment and biodiversity conscious consumers and investors, the possible use of the existing conservation programmes for branding or image building is being considered.

3.4 Change in Conservation Ethos: Individualized to Institutionalized

Tatas and Godrej houses are well-known for their philanthropic work for social development and biodiversity conservation for several decades. In 2014 corporate social responsibility spending was made mandatory by the law in India. One of the questions posed to the respondents was if the mandatory CSR requirements have influenced the type of biodiversity funding or conservation action in any manner.

The respondents admitted a certain shift in biodiversity conservation actions since the coming of mandatory CSR and the formation of separate departments in each company to look after CSR activities and spending. The respondents shared that the coming of CSR has led to certain changes in the already existing philanthropic programmes in these houses.

Most leaders shared that the CSR work is currently delegated to a separate CSR or Human Resources department in different industries. Some of the activities such as awareness generation for environment/biodiversity are now implemented by the groups themselves, through companies' CSR division, rather than in collaboration with the other agencies such as WWF/BNHS in the past. The list of activities prescribed under the mandatory CSR includes environmental sustainability without explicit mention of biodiversity. Most prefer short-term CSR projects that are preferred, and they require very clearly quantifiable and easily verifiable outcomes within short periods, just 1–3 years at times. Therefore, the preference is towards education, health care, or in case of the environment, plantation of quick-growing species or soil work, etc.

The biodiversity conservation actions, core as well as congruent, for species and habitat conservation are very long-term, require dynamic planning, and their positive impacts are often hard to evaluate in a quantifiable, verifiable manner. Hence in many cases, they are not taken up by the companies' CSR department, even when the top leaders are themselves interested in this. The executives in the CSR department are often professionals from disciplines such as Human Resources, Sociology, Social Work, and lack the disciplinary training in biodiversity conservation, ecological restoration activities and are more comfortable with funding social issues and give lesser importance to biological/conservation interests.

In workshops held as part of Maharashtra State Biodiversity Strategy and Action Plan at BVIEER in 2017–2018, the executives expressed doubts whether biodiversity conservation support systems (funding CSOs, institutes, etc.) will be accepted by the Ministry of Industry as a part of CSR or not and suggested a need to revise the list of activities prescribed under CSR.

As seen from this, it can be said that the conservation ethos of the companies, which was very much associated with individuals through which conservation culture was transferred and mainstreamed, is getting affected by its transfer to an institutionalized process in the corporate system. CSR may be working for ensuring some funding towards biodiversity activities, but it is having a negative influence on biodiversity mainstreaming, especially in companies that had internalized biodiversity as corporate culture and ensured its transfer across generations of corporate leaders.

4 Discussion

The scale of activities conducted by the Tata and Godrej and the motivated leaders who championed them bear witness to the biodiversity conservation ethos of the corporate giants. The motivation behind most activities listed here was not CSR or environmental compliance, but something more profound, more innate, which has pervaded the corporate culture and continues to be passed on through successive leaders. In this sense, it is very different from the suggestions of Mouly Potluri and Temesgen (2008) quoted earlier.

During discussions, a question was posed to the leaders about the possible cultural and religious drivers, if any, of their pro-conservation actions. This was asked in the context of both the founding families, Tatas and Godrejes, belonging to the Zoroastrian (Parsi) faith. The respondents did say that Parsis are nature conscious in many ways but did not see any apparent relationship or influence of religion and faith of the leaders and their pro-conservation ethics. Future researchers can probe deeper into the religious, cultural, social, and political aspects of the pro-conservation behaviour of corporates.

Observing conservation outcomes and listening to the leaders of those two corporate houses over the last 30 years, and discussions held with over 25 leaders of the present on when, why, and where the organizational conservation culture comes from, has shown that it has been a long-term sensitization process in their corporate culture. One of the respondents shared how those deeply involved in the companies' biodiversity conservation programmes were given special time and support even at the cost of regular duties. The support provided by the top management and leaders of the companies has been exceptionally high. Those corporates had attained a deep pro-conservation ethos more than half a century ago, which was integrally linked to their philanthropy. The expression of intrinsic factors being responsible was most interesting.

So far, proponents of mainstreaming of biodiversity in corporates have discussed incentivization, organization policy, legislative actions, etc. However, there have not been many attempts to address the mainstreaming of biodiversity as part of "organizational culture".

Culture is a model of norms, values, beliefs, and attitudes that affect organizational behavioir (Aktaş, Çiçek, & Kıyak, 2011). It has been defined in various ways. Robbins (1984) mentioned it as "Common perceptions which are held by the members of an organization; a system of common meaning". Kilmann (1985) stated that organizational culture is "shared philosophy, ideology, value, assumption, beliefs, hope, behaviour and norms that bound the organization together", while George and Jones (2002) mentioned it as "Informal design of values, norms that control the way people and groups within the organization interact through each other and with parties outside the organization" (Berson, Oreg, & Dvir, 2005).

The assertion of most leaders, family members, and top of the board CEOs that biodiversity conservation was indeed in their firms' very nature points to the development of an organizational culture of biodiversity and environment over almost a century, which is beyond the capacity of a CSR or legislating mechanism to generate.

Most of the top leaders in their houses went on to become leaders of conservation organizations either during their tenure at Tata or Godrej industries or after their retirement, indicating how they demonstrated conservation attitude beyond the requirements laid down by any external agency.

The evolution of this unique corporate culture is seen through answers of three questions: When initiated—responded to as being long before the advent of CSR, Why?—because all—pervading ethos had touched their personality and personal lives by growing love for nature. How was it triggered—was by felt a connectedness to biodiversity conservation through constant involvement as a "community" in the

nature-related activity. For CEOs, it started after being employed by the company. There are now planned efforts to increase the reach of such activities within these companies. At present, Tata Chemicals at Mithapur have developed volunteer groups for their executives and employees who participate in environmental activities either during their work time on deputation or after work hours. They participate in a variety of pro-environmental activities such as tree plantation, beach cleanup drives, gardening, or outings in the field, which are commonly furthered and encouraged by their HR and CSR sector. Within the organizations, this has to be specially designed and dealt with by the Corporate's Board Members, Senior Executive leadership, and by the middle and front line employees of the organizations.

Satish Trivedi at Tata Chemicals believes that doing a beach clean up job together is a great motivator. His volunteers are enthusiastic and willing to participate in more events. Yashda Kulkarni, who worked with Vivek Talwar's Sustainability Council initiatives at Tata Power, used a variety of tools for initiating conservation consciousness for nature. Locally devised tools such as bird-watching apps for identification of avifaunal species and bird calls have supported these activities through audio-visual shows and field visits initially. Several well-designed sites for converting water bodies to bio rich wetlands were shown to the author with great pride at Tata Steel and Tata Chemicals by their employees.

Zylstra, Knight, Esler, & Le Grange (2014) refer to Connectedness With Nature (CWN) as a process of receiving information, having an experience, being affected, and finding connectedness. We refer to these steps as "information", "'awareness" (of one's own environmental milieu), developing a "concern'" for the potential threats to nature, and producing pro-conservation "action" in people. It appears that the leaders in the two groups have made formal as well as informal efforts of encouraging this "connectedness" and producing "action". These efforts are individual-oriented, but there is a need now to incorporate these into the institution of CSR departments. This can be done through capacity building on biodiversity conservation issues for those coming from social science or human resources disciplines.

5 Conclusion

Insights from this study can be useful for furthering biodiversity consciousness in other corporate groups in India. The range of actions performed by industrial groups needs to be recognized for their contribution to the species, habitat, and livelihood gains that will ultimately further the National Biodiversity Strategy and Action Plan. A mechanism to formally recognize these by the government's monitoring agencies also needs to be created. Otherwise, the mandatory CSR and Environmental Compliance will remain limited only to actions that can be measured, such as "plantation of trees" or "distribution of conservation education material," etc.

Exploring biodiversity conservation ethics in these two groups has been an enlightening experience for this author. It was realized that biodiversity must touch the lives of all the employees and top management by field exposure in nature from

an early period. This can be through creating biodiverse campuses, field trips to wilderness areas, exposure to conservation education through capacity building, volunteering opportunities, etc. These initiatives can be stronger pro-conservation motivation within and outside the workplace that the CSR can never emulate. It is hoped that the article furthers corporate initiatives for biodiversity conservation across India's rapidly expanding industrial ventures, which ultimately depend on the conservation of natural resources and biodiversity.

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Chapter 11
The 2% Solution: Understanding Opportunities for Biodiversity

Rushikesh Chavan

Abstract The mandatory spending of 2% of the net profits of companies, for social and environmental causes, has captured everyone's imagination. Several organizations such as CII, KPMG, CSR BOX have assessed CSR spending. This chapter explores the nuances of CSR spending and CSR policies. It probes case studies such as the Whale Shark Programme of Tata Chemicals, Godrej's mangrove conservation initiative, and HTPF's support for tiger conservation. Further, the chapter studies the responses of industry leaders on corporate investments in biodiversity conservation. The chapter explores philanthropy initiatives taken by high net-worth individuals in India and how it shapes corporate giving.

Keywords Corporate social responsibility · Biodiversity · Environment · Ecology India · Companies · Sustainable development goals · Philanthropy

1 Introduction

"CSR activities of corporates are learning…" (Dasra, 2017) said Mr. Hemendra Kothari, Chairman, DSP Group, and India's leading philanthropist in the field of biodiversity conservation in his 2017 interview. This, more or less, sums up the state of CSR funding for biodiversity in India. In the past couple of decades, there has been a change in how biodiversity conservation is perceived by companies, yet it has not reached the levels that the economy needs. Support to biodiversity conservation was primarily looked at from a compassionate ground or was driven by the passion of the decision-maker; however, it is now slowly moving towards the value it holds for humans in the form of ecosystem services. That ecosystem services are vital to the sustainability of the human population is well established (Costanza et al., 1997; Daily, 1997; TEEB,

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2010). However, there is a long way to go for biodiversity conservation to be considered as an important area of investment for corporations. In this context, we look at how biodiversity conservation in India can be made relevant to businesses. One way to do that is to link businesses with Sustainable Development Goals (SDGs).

United Nations (UN), with the aim of global sustainable development, identified sustainability goals at the Rio Conference in 2012. Thus were born the seventeen SDGs (Box 11.1), which aim to meet the urgent environmental, political, and economic challenges facing our world (United Nations Development Programme, 2019).

Box 11.1: The seventeen SDGs are:

1. No poverty
2. No hunger
3. Good health and well-being
4. Quality education
5. Gender equality
6. Clean water and sanitation
7. Affordable and clean energy
8. Decent work and economic growth
9. Industry, innovation, and infrastructure
10. Reduced inequalities
11. Sustainable cities and communities
12. Responsible consumption and production
13. Climate action
14. Life below water
15. Life on land
16. Peace, justice, and strong institutions
17. Partnerships for goals

The SDGs are more holistic in their approach to sustainability and have replaced the Millennium Development Goals (MDGs) of 2000. The biodiversity SDGs are divided into two goals (SDG 14 and 15). However, biodiversity conservation can be achieved through SDG 11, 12, and 13 as well since addressing climate change would have a direct positive impact on biodiversity. This is a step up from the MDG 7: Ensure Environmental Sustainability goal. Reducing biodiversity loss was a subgoal (7b) of the MDG; with the SDGs, biodiversity conservation has received greater importance and has two separate goals.

The SDGs are an important call to action for 170 countries and territories and principal grounds for bringing UNDP funding to achieve them till 2030. Further, it fosters partnerships of governments, private sector, civil societies, and citizens to achieve these goals. The UN has taken several initiatives to achieve the SDGs. One such initiative is the Business for 2030. Business for 2030 is an attempt to reframe corporate sustainability by providing opportunities for the private sector to get involved and demonstrate how businesses can contribute to achieving the SDGs through public–private partnerships. Since 2015, there has been a historic

opportunity for the business community to contribute to the attainment of worldwide sustainability and development objectives (UN Global Compact, 2013). With the tightening of public development budgets and the developmental challenges the world over, there has been a move to boost funds from the private sector (Scheyvens, Banks, & Hughes, 2016). In this chapter, we explore businesses investing for biodiversity conservation in the Indian context.

2 The Two Percent Solution

India has a very strong legal framework, and some of the most comprehensive laws, The Companies Act, 2013, is one such act. The Act replaced the earlier act of 1956 and regulates the incorporation of companies in the whole of India and sets up responsibilities of the company and its directors. On April 1, 2014, vide clause 135 and Schedule VII Corporate Social Responsibility spending was made mandatory. This legislative mandate is definitely among the first few, if not the first such legal mandate globally. It says that during a fiscal year, if a company meets the designated threshold for profitability, net worth, and size, then it has to spend 2% of its average net profits of the past 3 years on listed CSR activities.[1] According to Ernst and Young, this could generate over USD 2.5 billion annually (Manchiraju & Rajgopal, 2015). The government notification dated February 2014 lists activities (Box 11.2) that may be included by companies in their Corporate Social Responsibility.

Box 11.2: List of activities under Schedule VII

1. Eradicating extreme hunger and poverty;
2. Promotion of education;
3. Promoting gender equality and empowering women;
4. Reducing child mortality and improving maternal health;
5. Combating human immunodeficiency virus, acquired immune deficiency syndrome, malaria, and other diseases;
6. Ensuring environmental sustainability;
7. Employment enhancing vocational skills;
8. Social business projects;
9. Contribution to the Prime Minister's National Relief Fund or any other fund setup by the Central Government or the State Governments for socio-economic development and relief and funds for the welfare of the Scheduled Castes, the Scheduled Tribes, other backward classes, minorities and women; and
10. Such other matters as may be prescribed.

[1] If a firm has either a net worth of INR 500 crores or more (approximately USD 71.4 million); or turnover of INR 100 crores or more (approximately 14.5 million); or net profit of INR five crore (approximately USD 0.7 million) or more, it is required to spend 2% of its average net profits of the last 3 years on CSR related activities.

The entries in Schedule VII must be interpreted liberally so as to capture the essence of the subjects enumerated in the said Schedule. This law was made to ensure that the industry contributes to the well-being of society. Thus, the items enlisted in Schedule VII of the Act are broad-based and are intended to cover a wide range of activities. To ensure compliance from companies, the law mandates them to form a CSR committee. It also mandates publicly disclosing an official policy on its CSR activities, documenting CSR activities in its annual report, and giving preference to local areas where they operate.

"The other challenge was that various social and environmental responsibilities were already legislated under many other laws. CSR legislation could not have gained precedence over other laws. Therefore, in that context, CSR legislation required businesses to take philanthropic responsibilities. Increasing the challenge were varying approaches and practices of CSR, suggesting that philanthropy and 'strategic CSR' were opposed to each other" (CII, 2018, p. 04). The law was received with mixed reactions; Dr. Montek Singh Ahluwalia, then Deputy Chairman of Planning Commission, called it "privatizing taxation." He said if the government wanted, it can increase the rate of corporate tax to 32% from the current 30% rather than making it mandatory for companies to spend 2% on CSR. "If you want them to spend another 2%, that is like saying that corporate tax would be raised to 32%… It is better to do that." However, the civil society received it with a hope that many funds would be now available for the organization to make a positive social change. "The government perspective on CSR has been that though India's business sector has generated wealth for shareholders for decades, the country continues to grapple with problems of poverty, unemployment, illiteracy, and malnutrition. Corporate growth is sometimes seen as widening the gap between India and Bharat (rural India) through its income-skewing capability" (Dhanesh, 2015, p. 150).

The relatively new law, whether privatizes taxation or not, is a topic for some other discussion, but it provides a great opportunity for companies to make a positive impact on society at large.

3 The CSR Bottom-Line for Biodiversity

Since the Act, CSR expenditure has been under scrutiny by a lot of researchers and organizations such as the Confederation of Indian Industries (CII), KPMG. Platforms like CSRBOX have come out with reports after analyzing the CSR expenditure of companies. However, there is little, or no exclusive work is done on understanding CSR expenditure on biodiversity in India. Further, most publications look at CSR expenditure and rarely look at the impact it has achieved. This points out to the fact that companies largely report on the expenditure rather than qualitative and quantitative assessments of the impact of its CSR activities. Understandably, the publications analyze the expenditure on the broad sectors that the government has laid out, resulting in the literature that fails to understand how much the companies have explicitly spent on biodiversity conservation. All initiatives to conserve biodiversity are clubbed under environmental sustainability, thereby making it difficult to segregate.

Additionally, the objective of these reports is to understand CSR spending as per the law, thus making a separate analysis of expenditure on biodiversity irrelevant. KPMG's CSR reporting survey, 2018, has included the SDGs, hence allowing some understanding of biodiversity conservation. In this section, we will look at some of these reports and understand the state of CSR spending on biodiversity.

3.1 Sustainable Development Report, 2019

As per the Sustainable Development Report, 2019, the assessment of India indicates that significant challenges remain in achieving SDGs 14 and 15, with a decreasing trend observed in achievement of life on land goal (SDG 15) and a stagnating trend for the goal of life below water (SDG 14). India's average scores on the country score scales for achieving SDGs 14 and 15 are 51.2 and 51.1, respectively. Further, it states that there is an absolute performance gap of 17.3% and 22.9% in achieving SDGs 14 and 15, respectively. The report assesses performance by indicators for each SDG. The assessment for SDG 14 and 15 is given in Tables 11.1 and 11.2 (Bertelsmann Stiftung and Sustainable Development Solutions Network, 2019).

3.2 The KPMG Reports

Since 2015, KPMG has been evaluating CSR compliance of the N100 companies (the top hundred listed companies as per market capital on the National Stock Exchange) through their India's CSR reporting survey. So far, they have come out with four editions of this survey report (KPMG, 2017, 2018a, 2018b, 2019). As per the reports, 59% of companies have spent their CSR funds on Schedule VII Environment category. However, the expenditure was lower in 2016 compared to 2015. In 2015 companies spent INR 559.4 crores compared to INR 455 crores in 2016. In 2017 and 2018, companies spent INR 797 crores and INR 483 crores,

Table 11.1 SDG 14—Life below water

Indicator	Value	Rating	Trend
Mean area that is protected in marine sites important to biodiversity (%)	29.0	Significant challenges still remain	Stagnating trend
Ocean health index goal—clean waters (0–100)	22.7	Major challenges	Stagnating trend
Percentage of fish stocks overexploited or collapsed by EEZ (%)	12.4	On the track or maintaining SDG	On the track or maintaining SDG
Fish caught by trawling (%)	10.2	Challenges remain	Stagnating trend

Table 11.2 SDG 15—Life on land

Indicator	Value	Rating	Trend
Mean area that is protected in terrestrial sites important to biodiversity (%)	26.1	Significant challenges still remain	Stagnating trend
Mean area that is protected in freshwater sites important to biodiversity (%)	15.2	Orange	Stagnating trend
Red list index of species survival (0–1)	0.7	Major	Decreasing
Permanent deforestation (5 years average annual %)	0.0	On the track or maintaining SDG	Information unavailable
Imported biodiversity threats (per million population)	0.3	On the track or maintaining SDG	Information unavailable

respectively. What this does not show is how much of these funds were spent on biodiversity conservation. However, it can be noted that there is no clear upward or downward trend as far as CSR spending on the environment is concerned. In contrast, the expenditure have yo-yoed in the last 4 years.

The 2017 and 2018 reports mention the SDGs; however, there are no details in these reports on the amount of money spent on each of the SDGs. KPMG has come out with a separate report on CSR and SDGs titled Sustainable Development Goals (SDGs): leveraging CSR to SDGs, 2017. However, even this report does not measure spending on biodiversity. It makes a case for bridging the gaps and making collaborations between the government, the private sector, and the civil society to achieve the SDGs.

3.3 CII Reports

Confederation of Indian Industry (CII) is an industry-led not-for-profit and non-governmental organization founded in 1895. CII publishes Annual CSR Tracker (CII, 2017, 2018) for companies listed with the Bombay Stock Exchange (BSE-listed). It is a comprehensive analysis of the companies obligated to practice CSR as per the Companies Act, 2013. Their Tracker report for 2017 is based on disclosures by 1,522 companies compared to 1,270 and 1,181 companies from 2016 and 2015, respectively. Their 2017 report claims to be the most comprehensive assessment with data captured from over 2,000,000 cells of a worksheet. In the FY17, a substantial increase in CSR spend at 66% was noted in the areas of the environment compared to the FY16. However, the percentage increase for the environment was fourth, with sports development being at the top with a 192% increase in the same year. As per the report in 2017, the category environment and ecology of Schedule VII received 9.70% of the total CSR spent amounting to INR 863.29 crores as against INR 520.20 crores in 2016 with 24% of this spent attributing to 40 PSEs. The report mentions that 54 disclosed the data for the abovementioned CSR spent

on environment and ecology. There has been a 20.07% decrease in CSR expenditure between FY15 and FY16, whereas a 65.95% increase in expenditure between FY16 and FY17. Like KPMG assessment, the CII assessment also observes the trend of fluctuating contributions to environment and ecology. It is fascinating to note that there is not much change in the overall percentage of companies contributing to environment and ecology; 29.34% in FY15, 29.98% in FY16, and 31.82% in FY17; yet interestingly, the contribution of non-PSEs has increased from INR 262.24–542.87 crores during the same period. The report further mapped seven SGDs (SGD 6, 7, 9, 11, 13, 14, and 15) to the environment and ecology category; however, there is no mention of spending per SDG, making it difficult to understand how much was directly spent on biodiversity conservation.

3.4 The India CSR Outlook Report

The India CSR Outlook Report (ICOR) is an annual research publication by NGOBOX (a venture of Reanalysis Consultants Pvt. Ltd.), an online communications platform for the development sector. It provides communications and a platform for networking to social sector organizations. It claims to have a network of over 95,000 organizations in India and has 20 million page views. Their 2017–2018 report claims to be a detailed study of 359 companies amounting to almost three-fourths of the total CSR spent in India on 5,233 projects for the year (NGOBOX & CSRBOX, 2018). Environmental sustainability received 10.8% of the total CSR spent by these companies, which has risen from INR 559 crores in FY2015–16 to INR 795 crores in FY2016–17 and INR 961 crores in FY2017–18, pegging it at fourth position among Schedule VII categories. It reports that INR 961 crores were attributed to 507 projects (Table 11.3).

These reports indicate that though companies are spending CSR funds on the Schedule VII category of environmental sustainability, not all of it is spent on biodiversity conservation. This is clear from the ratings of the Sustainable Development Report of 2019; SDGs 14 and 15 are not faring well, and this is a cause of concern. Also, the focus of these reports is majorly on CSR fund spending, which is not a

Table 11.3 Year-wise expenditure on environmental sustainability (as per India CSR Outlook Report)

Financial year	CSR expenditure on environmental sustainability (in INR crores)	Total expenditure (in INR crores)	Percentage of total
FY 2015–16	559	7,324	7.6%
FY 2016–17	795	8,194	9.7%
FY 2017–18	961	8,876	10.8%

holistic measure for assessing the impact of CSR on biodiversity. To evaluate the implications of funds for conservation, one needs a separate study to understand its impact on biodiversity conservation.

4 The CSR Icons for Biodiversity

India has a longish history of corporations supporting biodiversity conservation such as the Tata Group and the Godrej industries; they have created a legacy of sorts for the industry to emulate. In this section, we will look at some of the iconic biodiversity projects that are supported by the industry and try and understand what prompts them to support biodiversity conservation.

4.1 Whale Shark Conservation by Tata Chemicals

In 2004, Tata Chemicals supported the conservation of whale sharks, the largest fish in the world. Whale sharks were declared endangered in 2001 due to a decline in their population predominantly caused by excessive hunting for oil and meat. Whale sharks were killed in hundreds, that is when Tata Chemicals supported "Save the Whale Shark Campaign." Over the years, the project is successful and is in its third phase. The project is implemented with the Wildlife Trust of India, Gujarat Forest Department, and fishing communities of Veraval, Sutrapada, and Dhamlej of the Saurashtra coast.

The project came up with innovative ways to reduce hunting and accidental captures in fishing nets. The project began with the sensitization of fishermen as whale sharks were being killed due to entanglement in fishing nets. The project institutionalized granting monetary relief to fishermen who have incurred fishing net damages during whale shark rescue operations. The programme has helped rescue almost 600 whale sharks, which makes it one of the most significant achievements in the rescue and release of an endangered fish worldwide. They used roadshows, community engagement, made a religious leader as an ambassador apart from many other initiatives. They have satellite tagged at least seven whale sharks for monitoring their migration patterns, thus contributing to the scientific understanding of whale sharks.

Whale sharks are not the typical popular endangered species; they were under threat from hunting and getting strangled in fishing nets. To find merit in proposal to save whale sharks and commit considerably large funds to the tune of INR two crores is a leading example of CSR for biodiversity conservation. The project has won two awards from Bombay Natural History Society's National Green Governance Awards in 2005 and the UNDP Biodiversity Award in 2014 apart from other accolades.

4.2 Godrej Mangroves

Mangroves are neither charismatic nor a flagship species, despite its immense ecological and economic importance. This halophyte plant ecosystem is generally ignored and "reclaimed" to add additional areas to land starved cities and towns. This is especially true in the case of Mumbai, the financial capital of India. Several acres of mangroves have been cleared to make the land for development in the island city.

In 1948, Godrej acquired several hundred acres of land to set up an industrial hub in Mumbai. This included a large swatch of mangroves lining the west bank of Thane creek. In 1985, Godrej set up the Soonabai Pirojsha Godrej Foundation to formalize the conservation of mangroves under Godrej. This is a unique example where efforts were made to conserve the mangrove ecosystem when there was barely any legislation. They not only formalized conservation by acquiring ISO 14001 certification in 1997 (first for its kind in India), but they invested in research, awareness, and conservation.

These 1,750 acres of mangroves have proved to be a conservation laboratory for the world. This laboratory operates on three-pronged approaches of research, conservation, and awareness. Several types of research are undertaken in this mangrove forest by scientists from various universities and by independent researchers. Some major works are studied on carbon sequestration, biodiversity index, and jackals in mangrove ecosystems. This is apart from several in-house research projects. Godrej has undertaken several initiatives to protect mangroves from lopping, encroachments, and other illegal activities. They have created a mangrove nursery and have carried out mangrove plantations over hundreds of hectares. They have an active outreach programme, and in 2018–2019, 13,000 school and college students visited the mangrove interpretation center and mangrove trails. This does not include several hundred people reached through awareness programmes and publications. The multi-lingual mangrove mobile app is the first of its kind app in Asia. It has over 3,500 downloads from 65 countries. This is an excellent initiative which enables users to identify mangroves and associated species and disseminates information on the mangrove ecosystem.

This Godrej initiative has received accolades such as the Bombay Natural History Society's National Green Governance Awards and the WWF International's "White Pelican" Award.

4.3 The H.T. Parekh Foundation

The H.T. Parekh Foundation (HTPF) is a Section 25 company (a not-for-profit company registered under the Companies Act for the betterment of society), established by the Housing Development Finance Corporation Limited (HDFC). HDFC group is a strong financial conglomerate in the Indian capital markets. HTPF works with an objective to support and partner with socially relevant projects. They have funded

projects in the fields of education, health and sanitation, child welfare, community development, promotion of sports, and differently abled. They have supported tiger conservation projects since 2015 by partnering with the Wildlife Conservation Trust (WCT). The project is a multi-dimensional conservation initiative in Satpura Tiger Reserve and Pench Tiger Reserve, Madhya Pradesh, and in the Greater Tadoba Landscape, Maharashtra. These projects addressed some of the most critical tiger conservation issues of the Central Indian Landscape (CIL).

The programme in Satpura Tiger Reserve trained 152 forest guards and 60 forest officers in the implementation of the Wild Life (Protection) Act, 1972. It initiated the implementation of the M-STrIPES (GPS enabled forest patrolling) in the Pench Tiger Reserve; it collected patrolling data of over 100,000 km, which was analyzed, and results were shared with the forest department to improve patrolling efforts.

The project also carried out the first-ever comprehensive tiger estimation exercise in the difficult terrain of the Satpura Tiger Reserve. The HTPF further continued supporting tiger and leopard populations, and over 1, 100 sq.km of forest in the CIL was camera trapped to understand trends in populations of tiger and leopards. The efforts of monitoring tigers resulted in the discovery of the Eurasian Otter (*Lutra lutra*) for the first time in the CIL. Furthermore, the project focused on understanding economic and psychosocial drivers of firewood consumption in the Greater Tadoba Landscape and is currently developing models for policy inputs to arrest forest degradation due to firewood collection. A study on equitable use of ecosystem services, which argued to modify inefficient institutions like Forest Development Corporations for improved outcomes, was also included in this project. It proposed an alternative model that promotes forest conservation and improves livelihood for local communities. Another dimension of the project was to monitor road kills of wild animals to propose mitigation measures for roads passing through forested areas. The project currently focuses on understanding hydrological services (forest streams) provided by forests and the distribution of water-dependent species. This is a comprehensive work for the conservation of forests and biodiversity in the CIL. It sets an example of how CSR can promote projects that go beyond outputs and concentrate on larger complex conservation challenges.

4.4 YES BANK

YES BANK is India's fourth-largest private sector bank founded in 2004. As per the YES BANK's CSR policy, their objectives are "YES BANK, through its Responsible Banking ethos aims to enhance value creation and is committed to playing a larger role in India's sustainable development by embedding wider economic, social and environmental objectives." Their key focus areas are education, skills/employability training, healthcare, and social welfare, environmental sustainability, and arts, sports, and culture.

YES BANK has been investing in biodiversity conservation since 2013; they call it the "Nature Capital." Nature Capital is a tool through which they promote

conservation and awareness. The initiative has led to the institutionalization of The Nature Capital Awards (NCA), which aims to mainstream the adoption of natural capital imperatives in financial decision-making and advocate the importance of developing regulatory frameworks, disclosure mechanisms, and reporting measures for natural capital accounting. The NCA recognizes the work of individuals, organizations, and institutes who have contributed to natural capital preservation. Apart from this, they have supported the conservation of critically endangered and endangered species such as Greater One-horned Rhinoceros (*Rhinoceros unicornis*), Great Indian Bustard (*Ardeotis nigriceps*), and two upcoming projects to save Red Panda (*Ailurus fulgens*) and The Indian Pangolin (*Manis crassicaudata*).

YES BANK partnered with the Government of Assam in launching the "YES to Save Our Pride – the One-Horned Rhino." The campaign focused on on-the-ground interactions with villagers, forest guards, and forest officials to understand the man–animal conflict and threats from poachers and smugglers. They organized "Garh Basauk Abhiyan," which aimed at sensitizing people living near the National Park and help convert them into being protectors of the Rhinoceros. Their "Save the Godawan" project was launched in 2015–2016 to conserve the Great Indian Bustard (GIB). The project focused on sensitization and capacity building of villagers towards the need for protecting the GIB and its habitat, creating awareness on GIB conservation among tourists through hoardings and banners at strategic tourist locations and by developing safe enclosures for GIB in Desert National Park. These enclosures would prevent overgrazing, disturbance by cattle, dogs, or other animals while giving open access to GIB. The enclosure is up for the last 2 years and is used by the GIB and other species like a desert cat and vultures. Sightings have increased manifold as more of these critically endangered birds now find a haven here.

Their upcoming projects are conservation of the Indian Pangolin in CIL in collaboration with WCT. The project aims to understand activity patterns of pangolins and suggest measures for improving protecting pangolin sites in the wild. The other upcoming project is on the Red Panda.

4.5 K.C. Thapar Group

K. C. Thapar group was formed in 1929, as a coal mining company, today the KCT Group is a business conglomerate with interests in aquaculture, logistics, and real estate. KCT Group has 75 years of history in CSR. They have invested in promoting community progress by enabling access to opportunity, education, and healthcare and promoting environmental sustainability. Their areas of CSR interventions are education, rural development, healthcare and sanitation, gender equality, environment, arts and culture, and sports.

KCT Group, apart from supporting the government's Swachh Bharat Abhiyan and Clean Ganga initiative, has taken up afforestation drives in Andhra Pradesh. Their notable contribution to biodiversity conservation is their support for finding solutions to human–wildlife interaction management (HWIM) and investment in

technology to mitigate human–wildlife conflict. The programme is implemented in partnership with WCT. The objectives of the programme are to test technological solutions to protect standing crops from crop depredation by wildlife without harming them, to understand activity patterns of select wild animals such as the wild pigs, tiger, leopard, and deer species in this regards, and to create awareness and education among schools kids and communities around forest on HWIM.

Their experiments are in the early stages, and it would be too early to come out with any conclusions; however, the technological interventions have shown reductions in incidents of human–wildlife conflict. KCT has a long-term commitment to the issue, which has allowed the project to enter its second phase. The second phase concentrates on the human aspects of the HWIM through education of school kids that are vulnerable to carnivore conflict. This programme is a holistic approach to addressing HWIM and aims to make policy recommendations to the government and securing the most vulnerable sections of the communities.

These are only a few notable examples of industry-supported initiatives for biodiversity conservation. These are important as they set an example for others to follow. Also, these projects go beyond CSR spending and have had a significant impact on species and habitats.

5 Industry Trailblazers for Biodiversity

While researching the chapter, it was interesting to understand the decision-making process of the industry. Given the time constraints and scope of this chapter, three simple questions were sent to some of the industry decision-makers, and their responses are given below. These are not exhaustive and would require more extensive work. However, it gives an insight into the decision-maker's viewpoint.

5.1 The KCT Group

- *How did the KCT Group decide on supporting biodiversity conservation projects through its CSR?*
- Wildlife and conservation have always been close to our hearts, even before Corporate Social Responsibility (CSR) was mandatory in India. The KCT Group has always been involved in and contributed to various conservation initiatives and continues to do so now as a major focus area for CSR.
- *What is your opinion about how corporations view biodiversity conservation for CSR?*
- Businesses, across sectors, are inter-dependent in one way or another on ecosystems and biodiversity. More and more corporations are now beginning to understand this linkage and how any damage to even a microsystem can snowball into an environmental crisis. They are taking cognizance of the fact that corporate

commitment to biodiversity conservation is crucial not only for the protection of ecosystems but also to future-proof business growth. As a result, biodiversity conservation is beginning to get a prominent place on the sustainability agenda of corporations through CSR. This is a step in the right direction.

- *What do you think should be done to improve corporations to support biodiversity conservation through CSR?*
- I feel that apart from supporting and collaborating with external stakeholders involved in conservation efforts, corporations should also build internal commitment towards the environment. Organizations can help create greater awareness within their workforce about their ecological footprint, about the dependencies between their business as well as their lives and the ecosystems in which they function, and about ways to share resources in addressing ecological stress. Moreover, this must be a top-down approach, starting with the leadership of each employee. Awareness initiatives could take the form of workshops, seminars, screenings, or last-mile interventions by employees in order to make environmental responsibility part of a company's core values and ethos.

5.2 YES BANK

- *How did YES BANK decide on supporting biodiversity conservation projects through its CSR?*
- As an environmentally conscious corporate citizen, YES BANK has always considered natural capital to be of critical importance. In 2013, the Bank as a proactive member of the UNEP FI (United Nations Environment Programme Finance Initiative) was invited to sign the Natural Capital Declaration (now, part of the Natural Capital Finance Alliance). The Declaration is a CEO-led commitment to mainstream responsible natural capital consumption and accounting mechanisms. The awards concluded its fourth edition in October 2018 with more than 38,832 photographs submissions and 760 organization entries.
- As an extension to this wider engagement through the awards, YES BANK has started addressing grave concerns over the survival of endangered and critically endangered species. The first conservation project was a partnership with the local government (of the Indian state of Assam) to protect the Greater One-horned Rhino and its habitat at the Kaziranga National Park, home to two-thirds of this species. The "YES to Save Our Pride – the One-Horned Rhino" campaign launched by the Bank helped recognize the reasons for man–animal conflict and addressed threats from poachers and smugglers. The Bank, through local community engagement sessions, "Garh Basauk Abhiyans" sensitized people living near the National Park to involve them as protectors of the Rhino.
- The second such intervention for YES BANK was through the more extensive project to protect and conserve the Great Indian Bustard, or Godawan, its local name. Having established the critical role of local partnerships in conservation, the bank, along with the Government of Rajasthan, developed the campaign

"SAY YES TO SAVE THE GODAWAN." YES BANK developed safe enclosures for the Bustard in its habitat, the Desert National Park, along with extensive sensitization and capacity building of villagers, and conservation awareness among tourists at strategic tourist locations. These enclosures prevented overgrazing and disruption by cattle and other animals while ensuring open access to the bird and have now become an activity hub for Godawan and other species alike (including desert cat, vultures). A total number of sightings have increased manifold as more of these critically endangered birds now find a safe haven here.

- YES BANK intends to add more species that need urgent attention in India like the Indian Pangolin. The proposed joint project with WCT will be a first of its kind research project aimed at understanding the ecology of this species for identifying the key factors which govern their presence and habitat use. This research is expected to drive the development of appropriate conservation measures for the Indian Pangolin going forward.
- *What is your opinion about how corporations view biodiversity conservation for CSR?*
- Only 2–3% of all India's CSR funding goes towards biodiversity-related activities. While several corporates understand the importance of biodiversity and have directed their CSR efforts towards conservation projects, there is an appetite for more. Corporates typically use CSR funds in areas close to their business operations. So if a forest is in the vicinity of a company, you may see CSR funds being utilized for biodiversity conservation. It is often a piecemeal approach and does not consider an entire ecosystem. The number of corporates utilizing CSR funds for biodiversity conservation, as well as the corpus of money, is certainly on the rise. It would be great to see high-tech solutions coming to India, where the entire ecosystem is taken into consideration, and long-term holistic solutions are implemented. For example, drones have been effectively used in Africa for dissuading poachers.
- *What do you think should be done to improve corporations to support biodiversity conservation through CSR?*
- Awareness building is of utmost importance. The link between biodiversity conservation and balance sheet is intrinsic—higher resource consumption leading to scarcity of raw materials and higher costs are inevitable for a corporate. We already see this in the case of water across the world. If this link is better demonstrated to corporates with the help of reliable data, you would have a higher inflow of funds. Therefore, it is necessary that we start from the basics, conduct primary and secondary research, understand ground reality, and then device mechanisms that would address threats to biodiversity.
- Conservation mechanisms have long gestation periods and often take years to show results. Therefore corporates must be invested in projects for longer tenures than a one-off donation. Partnering with all stakeholders, including the forest department, the local community, including local communities, would help develop a holistic solution.

5.3 H.T Parekh Foundation (the Answers Are Paraphrased after Telephonic Discussions)

- *How did HTPF decide on supporting biodiversity conservation projects through its CSR?*
- HDFC has been in CSR for a long time even before the 2% rule came about; the foundation was started to promote the legacy of the founder of HDFC Ltd., Mr. H.T. Parekh. Mr. Parekh had much interest in education and health; the vision was primarily focused on social inclusiveness. The vision was not sector-specific, and the idea was that everyone should have equal opportunity in India. So when we started, we were looking for organizations in different sectors who could implement Mr. Parekh's vision. We were looking for organizations that had established credibility. As far as biodiversity was concerned, we did not know much, but Wildlife Conservation Trust (WCT) had a record and was known to have implemented projects effectively. This was one of the reasons why we started partnering in the environment. There are very few projects on the environment that do a great job in terms of achieving the outcomes. As a foundation, we believe that biodiversity is an important factor apart from other sectors. We need to expand to marine life in the future. A clean, safe environment must be available for everyone, and that is why we partnered with WCT.
- *What is your opinion about how corporations view biodiversity conservation for CSR?*
- The focus is still on education and health; the environment has not picked up. The fact of the matter is that if it is not visible, people do not support it. In terms of the environment, change is very gradual. Climate change or the importance of forest is not seen in the present; the effects are instead felt in the long-term. Corporations are still in the mode of supporting education, health, livelihoods; they are looking at it more sectorally. The current situation is that investors, especially foreign institutional investors investing in Indian industries, are concerned about what you are doing about sustainability and the environment around them. That pressure is coming up, and every corporate is writing about integrated reporting. When that comes in place, there would be a thrust by corporates to invest in biodiversity, and this is going to happen in the next few years. Most corporates are not implementing organizations; they are partnering organizations. Currently, there are not many organizations that instill confidence in investors, and there need to be at least 10–15 such organizations in the area which have suitable governance structures; only then will the corporate support follow. No one is going to support organizations that do not have the ability and scale.
- *What do you think should be done to improve corporations to support biodiversity conservation through CSR?*
- Organizations like WCT and WWF should help other smaller not-for-profit organizations in biodiversity conservation by the exchange of ideas and setting governance standards. For example, while the education sector allows exchanges of

ideas and adoption of different approaches, the same is not done in the biodiversity sector. They should also help smaller organizations prepare for corporate support and help them scale up. Industry leaders like WCT should help to create a system for the development of other organizations. Industry leaders cannot take whole responsibility by themselves. Thus they should build capacities of smaller organizations in areas where leading organizations cannot be present. Organizations like WCT can then endorse the more sustainable organizations, have the ability to execute, and have good governance. Once that happens, corporates would be interested. It is all about execution; corporates are looking at impacts and outcomes. That is the end goal.

5.4 The Noteworthy Philanthropist

CSR in a way was started by philanthropy, some of the biggest Industry leaders have contributed immensely to the society. However, a comparatively lesser number of philanthropists have made large investments in biodiversity. Among some of the prominent names in philanthropy, Mr. Hemendra Kothari stands out as probably the largest investor for wildlife conservation in India.

Mr. Kothari represents the fourth generation of a family of prominent stockbrokers. Former President of the Bombay Stock Exchange, he founded DSP Financial Consultants Limited, which later became DSP Merrill Lynch Ltd. He is currently the Chairman of DSP Investment Managers Private Limited. A board member of several industrial companies, Mr. Kothari is also associated with the CII. He has a great passion for wildlife and forests, education, health, and cultural initiatives. His contributions to the field are laudable. He is a member of the Rajasthan State Board for Wildlife, the National Tiger Conservation Authority (NTCA), the Advisory Council of the Global Tiger Forum (GTF), and The Energy and Resources Institute (TERI) Governing Council; and the India Chairman of The Nature Conservancy Centre (TNC).

Mr. Kothari is the Founder, Chairman, and Trustee of the Hemendra Kothari Foundation and WCT. For 100 years, his family has been giving back to society and his father gave away most of his savings in philanthropy, which had a profound impact on him.[2] His contributions have enabled Wildlife Conservation Trust to have a presence in over 160 protected areas in 23 states, which is about 20% of all Protected Areas and about 82% of tiger reserves in India. Its work ranges from improving protection through donating equipment to over 2,500 anti-poaching camps and vehicles, to training over 12,000 forest officials in law, to providing health care to over 16,000 front line forest staff and to improving their work motivation. WCT conducts the largest exercise to estimate large carnivores outside

[2] Paraphrased excerpt from personal communications.

protected areas. Apart from this, over 600 villages have benefitted from their livelihood programme and over 80,000 students have benefited from their education initiative.

In one of his interviews with Sanctuary Asia, he said, "I was like any other tourist… out to have a good time. Kruger, Masai Mara, Botswana, Tadoba, Corbett, Kaziranga, Pench, Kanha, Ranthambhore… I went to such places to relax and to take my mind off my work. I feel very differently about wildlife now. Wildlife has given me so much. I now want to give something back." (Sanctuary Asia, 2007b). He goes on to say that he will do whatever it takes to help protect the tiger and its forest and encourage others, including corporate bodies, to help. The key message from his interview was, "If prominent people are involved, the message percolates through the system. I started the Wildlife Conservation Trust (WCT) with like-minded friends to add some strength to the conservation movement."

Further, he says, "Frankly, we need to do much more to educate businessmen, politicians, and bureaucrats. Many are not even aware of what climate change is or its potential impact. However, we need a national consensus on this, and the Confederation of Indian Industries (CII), the Federation of Indian Chambers of Commerce (FICCI), and other such industrial bodies must participate in an open discussion on the subject of ecological security and national development." On his experience and how he started saving forests, he said, "I think it was probably late one evening in Tadoba…I was with the Field Director in his vehicle near a fire line after we had gone on an inspection to the outskirts of the park. As we parked our vehicle, we saw a tigress with her three full-grown cubs walk directly towards us in the bright light of the full moon. That was one of the incidents that convinced me that I had to do something for India's tigers, wildlife, and forests."

One other example of philanthropy where the business is integrated with conservation is Infinity Resorts Chairman and Founder Mr. Dilip Khatau. Mr. Khatau is a former Member of the National Board for Wildlife in India and a Member of the Indian Wildlife Business Council of CII. Mr. Khatau, on the Infinity Resorts website, writes, "When I returned to India after spending many years in Africa, my immediate thoughts were about the jungles and how much they had changed in the 20 years I was away. The sea of the jungle with pockets of human habitation has now become pockets of forests surrounded by a sea of human habitation. Every day, we hear news of man and wildlife conflicts and how the forest authorities are trying to cope with these problems. From my experience in Africa, I learned that unless there is a direct benefit to locals living around National Parks, these conflicts will continue, and India will be poorer every time we lose one of our species of wildlife to extinction" (Sanctuary Asia, 2007a). Having this belief, he has established The Corbett Foundation, a charitable trust in 1994.

The Corbett Foundation (TCF) has successfully demonstrated its interventions around important tiger conservation landscapes and towards the protection of Great Indian Bustard. TCF's intervention areas are sustainable livelihood, biodiversity conservation, habitat restoration, watershed development, sustainable rural development, human and veterinary health, and renewable energy solutions. TCF is a member of the International Union for Conservation of Nature (IUCN),

IUCN-Indian National Committee, Global Tiger Forum, Indian Chapter of the Society for Conservation Biology, and a SAVE Associate.

In an interview with Sanctuary Asia, Mr. Khatau says, "high life for me now means sitting on the deck of my home in Corbett, listening to elephants trumpeting across the Kosi." On being asked what drives him, he says, "I am driven by the belief that somehow nature will find a way to repair itself. Our job is to allow it to do so. We have serious problems to tackle in the days ahead, ranging from climate change and deforestation to the protection of endangered species like the tiger and all the wildlife associated with it. In this, the 30th year of Project Tiger, I believe the key to good governance is to teach young people to understand, defend, and even worship nature's monuments – mountains, rivers, forests, grasslands, deserts, and coasts. There can be no better way for them to express their love for their country, or to add meaning to their own lives."

While the case mentioned above studies have been game-changers, the list is in no way exhaustive. Works in the field by Piramal family, at Pench Tiger Reserve, Madhya Pradesh, through the Conservation Wildlands Trust, are commendable, and many other corporates have supported biodiversity conservation. The idea is to understand the outlook towards CSR from the perspective of the corporates.

5.5 Understanding Giving

When industry leaders were asked on how they decide to fund biodiversity conservation, it is interesting to note that it was not because it was part of the Schedule VII, but it was because biodiversity conservation was always on the agenda of the companies driven by their leaders and finding credible organizations to partner with. It is notable that if the share of CSR funds towards biodiversity conservation has to be increased, then it would be important to make biodiversity more relevant to the growth of society by showcasing linkages between biodiversity conservation and sustainable business growth. Biodiversity conservation has to be made as relevant as girl child education or health to increase the size of the pie. Another striking aspect is the direct correlation between industry leaders' sensitivity towards biodiversity conservation and CSR fund allocation.

6 Discussion: Balance Sheets to Biodiversity

Whether CSR should be voluntary or enforced is a matter of perspective. Both have their advantages and challenges. In India, CSR is mandatory for companies, and that is what matters. Schedule VII and clause 135 of the Companies Act open up opportunities for large investments in biodiversity conservation. The current reporting on CSR is in line with Schedule VII. This does not give

much insight into the impact CSR has had on biodiversity. There is a need for reassessment of Schedule VII categories, and there is a strong case for these categories to be replaced with SDGs.

Replacing the categories under Schedule VII with SDGs will firstly allow companies to contribute to India's commitment to achieving SDGs. Secondly, it will prompt the companies to report their CSR expenditure in-line with the SDGs, and this will allow the measurement of CSR contribution to biodiversity conservation. Further, it would be useful to incorporate qualitative reporting on efforts made for biodiversity conservation. This will allow the understanding of the impact of CSR spent beyond a number of beneficiaries and infrastructure created, which is critical to understand biodiversity conservation.

CSR remains within the philanthropic space in India and has moved towards community development (Singh & Verma, 2014). This appears to be true, especially for biodiversity conservation. Large commitments to biodiversity conservation by industry leaders such as Mr. Hemendra Kothari and Mr. Dilip Khatau are based on their personal experiences and their interactions with biodiversity. If biodiversity conservation has to attract a higher share of CSR funds, then engaging top leaders of the industries is mandatory. This is one sure way of attracting CSR funds. Of course, it is a given that biodiversity conservation as a sector has to be mainstream. Organizations must be well governed in order to instill confidence in investors. It is difficult to show tangible impact as direct beneficiaries are ecosystems and species, and cannot be easily converted to numbers such as women benefitted, books distributed, or training provided. However, organizations will have to find ways to show impact, and probably the best expertise lies within the corporate world to showcase it. Organizations must realize that when companies began addressing environmental issues themselves, it was usually in terms of risks or costs, and their license to operate (Kolk & Van Tulder, 2010). If these companies have to move away and graduate to investing in biodiversity conservation, organizations such as CII, FICCI, and Dasra will have played a role in building internal commitment through their engagements with the industry.

If the contribution of CSR funds to biodiversity conservation has to increase multiple folds, everyone from the government, industry, and the organizations working for the conservation of nature has to make changes at multiple levels. The government needs to incorporate SDGs in Schedule VII to improve commitment to biodiversity by the companies; industry leaders need to be sensitized by institutions such as CII and FICCI; and in order to bring in CSR funding and to optimize it, CSR spending should not be limited to mere compliance to the law. Conservation organizations need to understand and imbibe the governance and scalability requirements of corporates. Unless this happens, the 2% solution is always going to be at 2%.

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Chapter 12
Pirojshanagar: An Illustration of Co-Existence and Biodiversity Conservation Since Seven Decades

Laxmikant Deshpande and Tejashree Joshi

Abstract Corporate organizations are an important component of social and economic structure of society. Their actions have a direct effect on the society. Role of businesses in conservation of biodiversity has been recognized. Transformative changes have happened in policies and laws that direct corporate actions towards biodiversity. This paper presents the diversity of actions undertaken by Godrej & Boyce Mfg. Co. Ltd. The actions range from habitat restoration to ex-situ conservation of species. Many of these were initiated long before most other corporate groups in India. They are integrated in campus management and set an example to others on sustainable management and biodiversity conservation integrated in business operations.

Keywords Biodiversity · Pirojshanagar · Godrej · Campus · Urban · Mangroves Endangered

1 Introduction

Earth's biological diversity is our most precious resource. It is under grave threat owing to the unsustainable use of resources. Species are becoming extinct 1000 times faster than indicated by the historical trends (Mace, Masundire, & Baillie, 2005). Jones and Solomon (2013) have reiterated risk posed by habitat loss, changing weather patterns and mass extinction of species. Global phenomenon such as climate change can have irreversible impacts on the biodiversity. Our very survival depends upon conservation of biodiversity and the maintenance of ecosystem processes.

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The TEEB (The Economics of Ecosystems and Biodiversity) Report for business (TEEB, 2010) recognized the presence of private corporations in biodiversity conservation. There have been many transformative changes which have led the corporate taking increasing interest in biodiversity conservation. In some cases CSR policies have been the main drivers of corporate action for biodiversity management. Ketola (2009) presents an analysis of various corporate actions and values addressing biodiversity. Some corporate agencies have undertaken biodiversity management and conservation work for several decades. The Godrej Group in India has initiated various programmes and management actions for conservation of biodiversity.

This paper presents the diversity of actions undertaken by The Godrej Group's holding company Godrej & Boyce Mfg. Co. Ltd. These actions address various aspects of biodiversity conservation ranging from habitat restoration to ex-situ conservation of species.

The biodiversity management initiatives on Pirojshanagar Township campus of Godrej & Boyce Mfg. Co. Ltd. (G&B) have evolved over seven decades and become role model for sustainable township management by an organization. Biodiversity management initiated as Godrej family's commitment in the decade of 1940s, progressed as organizational value, integrated into systems, practices and is now aligned with the business strategy. Pirojshanagar with its rich mangrove and terrestrial biodiversity is an integral and important part of Godrej's identity among its internal and external stakeholders (listed below). These initiatives are operationally and financially integrated into campus management as organizational vision for sustainable campus development for generations to cherish, while G&B additionally supports biodiversity conservation beyond its fence through CSR projects or donations through Godrej Trust. The company follows both approaches—least interference in nature to sustain and rejuvenate through its own course in everyday management, and state-of-the-art technological interventions on need basis. Conscious efforts are made to interconnect research, conservation, awareness initiatives for output of one to be used as input of other for optimization of resource investment and maximization of biodiversity (for example, butterfly research leading to butterfly garden leading to butterfly awareness trails leading to further butterfly observations).

2 A Tradition Since Twelve Decades

The Godrej story started way back in 1897 when Ardeshir Godrej, a young man of 29, infused with the swadeshi spirit started manufacturing locks in a tiny shed adjacent to Bombay Gas Company at Lalbaug. Ardeshir moved restlessly from locks to safes and soaps. His brother, Pirojsha Godrej who joined the business in the year 1906 focussed on nurturing these growing and already thriving industries and placed the business on a strong footing. Their efforts and devotion eventually laid the foundation of a flourishing business and a household name—'GODREJ'. In the decade

of 1940s, Godrej moved its base to Vikhroli, a sleepy suburb inhabited only by fisherfolk then, to cater to the needs of growing business. Pirojshanagar Industrial Township was set up to accommodate production units and workers' residences followed by schools, workers' welfare centre, dispensary, and other necessary facilities.

During development of Pirojshanagar, conscious decision was taken to conserve, compensate, and enhance biodiversity of the campus. Various initiatives such as setting up of in-house plants nursery, developing and hiring skilled horticulturists and gardeners, plantations across campus, adoption of traffic islands in Mumbai were taken up. In 1985, Godrej & Boyce Mfg. Co. Ltd. (G&B) set up Soonabai Pirojsha Godrej Marine Ecology Centre with aim of conservation of Pirojshanagar Township's mangrove ecosystem on western bank of Thane creek (Figs. 12.1 and 12.2).

The Centre took upon mandate of research, conservation, and awareness for scientific management of mangrove ecosystem. The experience and expertise gained in mangrove conservation were extended for conservation of endangered plant species of Western Ghats with development of Naoroji Godrej Centre for Plant Research at Shirwal in Satara District in 1992. To ensure sustainability of organizational biodiversity and environment conservation initiatives, G&B adopted ISO 14001 certification. This helped in formulation of policies and practices offering systemic approach. The mangrove conservation by Godrej took a leap in the late 1990s with first-ever large-scale mangrove plantation of Maharashtra that became a case study for Forest Department, NGOs, academia and everyone interested in mangrove

Fig. 12.1 Mangrove ecosystem conserved by the Godrej Group at Thane creek

Fig. 12.2 Mangrove nursery

Fig. 12.3 Education and awareness at information centre

conservation. In the early 2000, G&B decided to extend awareness of mangrove ecosystem beyond its campus and initiated nature trails for academic institutes, citizen forums, NGOs and other organized groups (Fig. 12.3). This later evolved in setting up a Mangrove Information Centre which receives thousands of visitors each year.

The decade of 2010 saw adoption of initiatives such as CII Code for Ecologically Sustainable Business. In 2010 Godrej Group adopted its business sustainability

strategy termed 'Good & Green' for socially and environmentally responsible business for its stakeholders (both living and non-living). This strategy integrated environmental sustainability into mainstream business planning and execution of G&B. Since last 2–3 years, G&B has taken its biodiversity initiatives beyond the fence with plantations and mangrove poster exhibitions. After being a signatory to the India Business and Biodiversity Initiative in 2014, G&B has moved towards integrating aspects of biodiversity management and consideration of the impacts in business planning and operations.

3 Overview of Pirojshanagar Biodiversity

Godrej's Pirojshanagar Township, inhabited and used by around 50,000 employees, residents and visitors every day, spread across Vikhroli, an eastern suburb of Mumbai, is a role model of sustainable habitat with several hundred acres of mangrove forest thriving along with industrial plants, commercial offices, schools, hospital and three residential colonies. The campus hosts one of the largest Indian Flying Fox (*Pteropus medius*) colony in Mumbai, Baya Weaver (*Ploceus philippinus*) nesting colony, some rare plant species such as Krishna's Buttercup Tree (*Ficus benghalensis L var. krishnae*), Varun (*Crateva nurvala*), Cat's claw climber (*Doxantha unguis-cati)* and many other unique plant and animal species (Figs. 12.4 and 12.5).

Sandwiched between Powai hill on western side and Thane creek on eastern side, Pirojshanagar has various habitats such as hill, grasslands, moist deciduous forest, plantations, open spaces, roadside hedges, lawns, scrubby woods, mangrove forest, mudflats, saline blanks, creeklets and gardens (Fig. 12.6). These diverse habitats support rich terrestrial, coastal and marine biodiversity by providing habitat, roosting spaces and breeding grounds. The campus can be distinctly categorized into mangrove forest located on western bank of Thane creek and terrestrial habitat spread in the remaining area.

Systematic research and chanced sightings have so far recorded 1085 plant species including 16 mangrove and mangrove associate species, 208 bird species, 82 butterfly species, 75+ insect species, 81+ spider species and six wild mammal species including Golden Jackal, Wild Boar, Indian Grey Mongoose and Flying Fox. Thane creek waters around Godrej mangroves host 22 fish species, 13 crab species and eight prawn species. Godrej campus holds substantial potential for biodiversity and ecosystem research to reveal species treasure for future documentation[1] (Table 12.1).

[1] Development of City Biodiversity Index for Godrej & Boyce Mfg. Co. Ltd. by Confederation of Indian Industry, Indian Green Building Council, WWF India, May 2015.

Fig. 12.4 Camera trap picture of Golden Jackal in protected mangroves

Fig. 12.5 Baya Weaver Nesting in the campus

Fig. 12.6 Pirojshanagar campus hosts the largest terrace garden of Mumbai

Table 12.1 The highlights of our floral biodiversity documentation over the years

Category	2000	2015	2016	2017	2018
Trees	124	152	162	162	167
Shrubs	247	257	280	286	287
Palms	12	26	26	28	28
Ferns	26	44	50	51	51
Climbers	108	110	113	113	113
Cacti	152	152	162	162	162
Succulents	180	180	185	185	190
Medicinal and aromatic plants	73	73	80	82	87

4 Biodiversity Management Strategy and Approach

Environment is one of the core values of G&B, while green cover and biodiversity conservation are included in its environment policy. These initiatives are driven by three-pronged approach, namely Organizational Commitment, Appropriate Governance and Optimum Infrastructure.

The Organizational Commitment goes beyond mere statutory environmental and biodiversity related compliances by adopting voluntary strategies, policies, certifications and initiatives such as Corporate Sustainability Strategy, Environmental management System (ISO 14001) Certification, Green Company, Green Products

and Green Building certifications, Green Procurement Policy and subscribing to the India Business & Biodiversity Initiative (IBBI) to name a few. Besides commitment to these environmental initiatives, G&B has adopted other business management initiatives such as European Foundation for Quality Management's Business Excellence Model and Kaizen Improvement Model that offer distinct weightage to environmental initiatives.

Appropriate Governance involves formation of empowered dedicated departments such as Environmental Engineering Services (EES) for legal compliance, pollution control, environmental planning, design and deployment, environmental sustainability research and action, Horticulture Management Services (HMS) for green cover management, enhancement and propagation of indigenous species, Wetland Management Services (WMS) for conservation of Pirojshanagar mangrove ecosystem. These departments are supported by other functional teams for development and maintenance of environmental infrastructure. These departments along with G&B's Business Units (Ex: Godrej Appliances, Godrej Interio, Godrej Security Solutions, etc.) form cross-functional teams such as 'Greener India task force', 'Good & Green products task force', etc. for synchronization of biodiversity conservation activities. The updates and outputs of these activities are regularly reported and shared in scheduled meetings at departmental and cross-functional levels for review and future planning.

Optimum Infrastructure includes facilities such as nurseries of terrestrial and mangrove species, wastewater treatment and recycling plants, rainwater harvesting structures and systems and an integrated solid waste management facility for 'Zero Waste to Landfill' initiative. Mangrove ecosystem with mangrove information centre, watchtower, nature trails, theme gardens, marine aquarium and security infrastructure form important resources for biodiversity management. Besides these on-campus facilities, G&B has created a set of portable posters and a mobile app on mangrove ecosystem for creating mass awareness beyond its fence. A dedicated website, www.mangroves.godrej.com, enlightens thousands of researchers, teachers, students, NGOs and citizens about diversity and importance of mangroves. One can download presentations, posters and the Mangroves app from its awareness section. Recently, G&B developed and disseminated 'Many Secrets of Mangroves', India's first children story book focussed on mangrove ecosystem.

To summarize, G&B has taken the following approaches for biodiversity management.

- Increase in green cover, indigenous species and biodiversity index of Pirojshanagar campus
- Stringent pollution monitoring and control mechanisms with performance targets
- 'Beyond the Compliance' approach for biodiversity management and enhancement
- Active engagement with internal and external stakeholders in environment management and community development

5 Highlights of G&B's Biodiversity Management Journey

Substantial geographical area of Godrej campus is covered by mangrove ecosystem. Hence, mangrove management is a prime biodiversity management initiative that is based on three-pronged approach of research, conservation and awareness. The highlights of our initiatives and achievement of mangrove management for last 3 years are in Table 12.2.

Horticulture Management Services team has been undertaking number of initiatives on regular basis for green cover and indigenous species enhancement. These include:

- Treatment of trees for life enhancement
- Afforestation with indigenous species
- Plantations within G&B campuses at location like Vikhroli, Dhayari, Kalyan, Ambernath, Wagholi, Khalapur, Shirwal, Kudal, Madkai, Baroda, Dahej, Chennai, Haridwar, Mohali
- Plantations beyond G&B campuses with Forest Department/Gram Panchayats/Zilla Parishads at Vikhroli, Bhiwandi, Khalapur, Shirwal, Bhor, Chennai, Mohali, Bhagwanpur
- Transplantation of trees during campus/project development
- Pruning of invasive species to control their proliferation
- Monitoring of species density for tree maintenance
- Increase in ground cover for temperature management, soil conservation, water recharge and micro-habitats for small fauna
- Indigenous species seed collection to propagate green cover and enhance ratio of indigenous species
- Making water permeable areas and dykes around tree bases
- Retaining soil and water by making dykes, barriers, bunds, trenches and other structures, Maintaining stability of slopes within campuses
- Composting of leaf litter for manuring of landscapes

6 Key Research Initiatives on Biodiversity

Research and scientific data form foundation for any biodiversity conservation initiative. G&B teams have been compiling scientific biodiversity database through planned research projects and chanced sightings. The projects are conducted in-house, in collaboration with research/academic institutes (through their graduate or post-graduate students) or commissioned to subject experts considering skill sets required in project planning and execution. Here are a few of our unique projects conducted in recent years.

Table 12.2 Highlights and achievement of Mangrove Management for last 3 years

Strategy	2018–19	2017–18	2016–17
Awareness	The mangrove mobile app downloaded by 3000+ individuals from 65 countries. Awarded Most Appreciated Kaizen in GC competition. Being upgraded to cover all 67 Indian mangrove species in 11 languages	The mangrove mobile app launched by Shri Devendra Fadnavis, Hon. Chief Minister of Maharashtra in presence of Dr. (Mrs) Pheroza Godrej. Downloaded by 1850 individuals from 50 countries so far	Development of a presentation and an audio-visual on the biodiversity of Godrej campus for mass awareness
	Godrej WMS Department facilitated two-day National Conclave on Biodiversity in collaboration with K C College	Policy inputs to GoI through a National Workshop on CRZ Notification 2011 organized by Gujarat Ecology Commission and MoEF&CC	Publishing summary of research projects conducted at Godrej mangroves website for mass awareness
	Godrej mangroves Facebook group outreach increased to 1000+ members	Godrej mangroves Facebook group outreach increased to 900+ members	Upgradation of the Mangrove Information Centre for indoor awareness activities for visitors at Godrej mangroves
	Mangrove awareness programs' outreach jumped to 10,020 in 2018–19 from 9100 in 2017–18	Godrej case study of Mangrove management in 'Sustainability for Breakfast' event organized by Treeni Sustainability Solutions and Tata Motors	Two hundred and forty-five mangrove awareness programs, the highest since the inception of the mangrove conservation project in 1985
	Godrej WMS Department conducted mangrove poster exhibitions in six academic institutes of the MMR	Development of a portable exhibition of eight posters in English and Marathi for mass awareness	Session on animal rescue by PAWS NGO for Wildlife Week
	Godrej WMS Department delivered presentations in four national conferences and published five papers in conference proceedings and journals	Presentation at Marathi Vidnyan Parishad at Kudal. Attended by 500+ science teachers and educators. 38 science educators trained as resource persons for mangrove awareness programs	

(continued)

Table 12.2 (continued)

Strategy	2018–19	2017–18	2016–17
Research	Godrej WMS Department participated in HSBC India Bird Race recording 69 bird species on Godrej campus in a single day	Godrej WMS Department participated in HSBC India Bird Race recording 54 bird species on Godrej campus single day	Study of mangrove biodiversity and avifauna at Godrej mangroves
	Godrej WMS Department photo-documented and identified 45 spider species adding substantial data to Pirojshanagar Township's biodiversity index	Photo-documentation of 75+ insect species, five reptile & amphibian. Four research papers in conferences by Mangrove Society of India, Gujarat Ecology Commission-MoEF&CC and B N Bandodkar College-Bombay Natural History Society	
	Godrej WMS Department facilitated Camera Trap study to study Mammals diversity in mangroves, a first of its kind by an industrial township		
Conservation	Rescue of 44 wild reptiles, birds and mammals in distress from Pirojshanagar Township with support from RAWW	Rescue of 41 wild reptiles, birds and mammals in distress from Pirojshanagar Township with support from RAWW	Augmentation of species diversity and awareness infrastructure in the Medicinal Garden, Palm Garden of Godrej mangroves
	Facilitation of plantation of mangroves on 100 hectare land at Dahej, Gujarat with Gujarat Ecology Commission	Facilitation of plantation of mangroves on 100 hectare land at Dahej, Gujarat with Gujarat Ecology Commission	Development of a Butterfly Garden to conserve butterfly diversity and create awareness
	Installation of 120 plant labels in medicinal garden for identification and awareness	Donation of 600 mangrove saplings to Mira Bhayander Municipal Corporation through Terracon Consultancy	'Seed collection and maintenance of saplings' Training NGO for Van Mahotsav
	Reactivation of marine aquarium at creekside for awareness	Procuring four new mangrove species for biodiversity enhancement	Session on animal rescue by PAWS NGO for Wildlife Week

6.1 Carbon Sequestration by Godrej Mangroves

Mangrove ecosystem is acknowledged globally for its high carbon sequestration potential. Godrej WMS team along with Centre for Environment Education and Development (CEED), conducted a year-long research on carbon sequestered by mangroves of Pirojshanagar Township to understand its ecosystem service to the Mumbai Metropolitan Region. The entire ecosystem was divided into habitats such as dense mangroves, sparse mangroves, grasslands, mudflats, saline blanks and each habitat was divided into sample plots. Tree species, crown cover and mean diameter at breast height (DBH) for every tree were recorded and carbon in biomass above and below ground was calculated. According to the study finding, the total carbon sequestered by Godrej mangroves as on March 2020 is approximately 9,50,000 $MTCO_2e$.[2] Additionally, these mangroves sequester around 60,000 $MTCO_2e$ (see footnote 2) annually. This is significant ecological contribution to entire Mumbai Metropolitan Region for mitigation of climate change and regulation of local climate.

6.2 Biodiversity Index of Pirojshanagar Township

G&B along with WWF India and CII—Sohrabji Godrej Green Business Centre conducted two-year City Biodiversity Index for Pirojshanagar campus. City Biodiversity Index is a self-assessment tool for cities to evaluate and monitor the progress of their biodiversity conservation efforts against their own individual baselines. It comprises (a) the 'Profile of the City', which provides background information on the city and (b) the 23 indicators that measure native biodiversity, ecosystem services provided by biodiversity, and governance and management of biodiversity based on guidelines and methodology provided in the user's manual based on the Singapore Index on Cities 'Biodiversity. Pirojshanagar Township' scored 63 points of total 92 points. The study provided insights to campus's biodiversity and way forward for its better management.

6.3 Butterfly Diversity of Pirojshanagar Township

A year-long study was conducted to understand butterfly population and measures required for their conservation. The study covered industrial and residential areas, terrestrial open lands and the mangroves. The study revealed presence of impressive 82 butterfly species. Butterflies of the family Pteridae were found to be most abundant, while those of the family Nymphalidae were most diverse. It also

[2] Study Report Carbon Sequestration in Godrej Mangroves, Vikhroli by Centre for Environment Education & Development, September 2013.

recorded species such as Tricoloured Pied Flat and Blue Mormon which are rare for this region. Based on the study, HMS team has been planting 'food' and 'host' plants of butterflies in Pirojshanagar.

6.4 Insect Diversity of Pirojshanagar Township

Apart from impressive butterfly diversity with 82 species, the team has photo-documented and identified other insect diversity in all habitats of Pirojshanagar. Insects from Orders from Class Insecta have been documented so far: Thysanura (Silverfish), Odonata (Dragonflies and Damselflies), Orthoptera (Grasshoppers, Leafhoppers and Katydids), Phasmida (Stick insects), Dictyoptera (Cockroaches and mantids), Isoptera (Termites), Psocoptera (Bark or plant Lice), Hemiptera (Bugs), Neuroptera (Lacewings), Coleoptera (Beetles), Diptera (Flies), Lepidoptera—(Butterflies and Moths) and Hymenoptera (Bees and Wasps).

From the above orders, at least one or more members were found in the Township. Among these vast varieties of insects, giant stick insect, tiger beetles, forest cockroach, plant louse, Tussar silk moth, lacewing are some of the unique ones. Insects form important link in the food chain and indicate health of ecosystem, thus providing scientific leads for habitat management.

6.5 Plant Systematics and Conservation of Endangered Species of the Western Ghats

Named in fond memory of Late Shri Naoroji Godrej, The Naoroji Godrej Centre for Plant Research (NGCPR) was established in the year 1992 with an objective to carry out purposeful research in the areas of plant biodiversity and conservation. The Centre is also recognized by The Department of Scientific & Industrial Research (DSIR) of the Government of India to conduct need-based research in biodiversity and plant conservation, with particular emphasis on nurturing and propagating unique plant life of the Western Ghats and medicinal plants that are of national interest. NGCPR has pioneered plant conservation studies in Maharashtra State and has conducted conservation studies on two globally endangered plant species *Frerea indica* Dalzell (Apocynaceaes) and *Abutilon ranadei* Woodrow & Stapf (Malvaceae). A workshop organized on Conservation Assessment and Management Plan (CAMP) for Maharashtra State was the first of its kind and paved way for others to follow and prioritize medicinal plant conservation research. The Centre organizes a series of annual workshops on plant taxonomy to inculcate interest in plant identification, nomenclature and their importance in young botanists and plant enthusiasts. The study on endemic plants of Maharashtra was aimed to understand the patterns of flowering plants with a special reference to distribution, adaptations, local biodiversity hot spots, etc. The study contributed an enumeration of 687 endemic plant

species with their habit, phenology and appropriate distribution in Maharashtra. Recently the Centre has introduced a Mobile Application on Endemic Plants of the Western Ghats to nurture the uniqueness and value of endemic species in plant enthusiasts. The Centre has published more than 50 research articles (with ca. 200 citations) in various national and international journals which includes description of six new taxa viz. *Brachystelma naoroji*, *Arisaema murrayi* var. *soonubeniae*, *Commelina badamica*, *Murdannia ugemugei*, *Commelina rupestris* and *Commelina littoralis*.

7 Environmental Sustainability Initiatives for Biodiversity Management

G&B's biodiversity management initiatives are not planned in isolation, but they are synchronized with other environmental management practices. We recognize impact of quality of air, water and soil on habitats and biodiversity through inter-connections and interactions. Thus, Environmental Engineering Services (EES) Department's pollution control mechanisms play an important role in Wetland and Horticulture management team's planning and execution.

Here are a few environmental sustainability initiatives that positively impact biodiversity of Pirojshanagar:

7.1 Zero Waste to Landfill Initiative

Pirojshanagar Township generates approximately 10–11 metric tons of garbage everyday through its industrial, commercial, residential, and other establishments. Hundred percent of the garbage is collected from 60+ points across the township and brought to a central solid waste management facility. The garbage is segregated into dry and wet categories. Dry waste is further categorized into paper, cardboard, tetrapack, plastic, metal, glass, wood, thermocol and others. Each dry waste stream is sent to appropriate waste recyclers. Wet waste is composted, and manure is used for plantations on the campus. G&B has trained and employed unskilled waste pickers creating positive impact on their working conditions and income making the whole operation socially responsible. The initiative ensures prevention of negative impacts of unaddressed garbage on biodiversity.

7.2 Water Positive Company

G&B manufacturing operations across the country are water positive. Industrial and residential waste water is collected and treated in six effluent and sewage treatment plants on the campus. The treated water is recycled and reused in production

processes, toilet flushing, on landscapes and cooling towers. More than 40% of the total water footprint is sufficed by recycled water. The campus has traditional wells across the campus that suffice around 10% of water need. The campus has around 30 rainwater harvesting recharge structures. These ensure quantity of water harvested back to the ground is more than withdrawn. The township recharges more water than fresh water procured from the Municipal Corporation of Greater Mumbai and extracted from ground making it water positive.

7.3 Eco-Friendly Ganesh *Idol Immersion*

Pirojshanagar Township, home to approximately 4500+ families, celebrates Ganeshotsav with great fervour. Traditionally, Ganesh idols are immersed in Thane creek. G&B has taken initiative of regulating immersion of Ganesh idols of Pirojshanagar Township. Artificial water bodies are created every year to prevent pollution of Thane creek. Flowers and other organic decoration items are collected in separate containers and sent to solid waste management facility to generate manure. Noise level limits are prescribed and communicated to the Township residents. Thus, efforts are made to minimize impacts of large-scale celebration on surrounding biodiversity.

8 Engaging Stakeholders

8.1 Internal Stakeholders

G&B employees, Pirojshanagar Township residents, Godrej Udayachal Schools are key internal stakeholders for biodiversity management. While G&B's WMS, HMS, EES teams with support from other teams implement biodiversity management initiatives, conscious efforts are made to engage internal stakeholders in conservation and awareness. For example, HMS Department engages Udayachal High School students in collection of seeds and saplings of indigenous plant species. Every year, Udayachal Primary and High School students are engaged in plantation of terrestrial and mangrove species.

Pirojshanagar Township is ISO 14001:2015 certified for environment management. Its departments support in stakeholder's engagement. For example, Pragati Kendra (employee welfare centre) arranges Van Bhojan, an outing in mangrove forest and workshops on gardening for Mahila Manch—employees' wives group. Consumers Society organizes exhibition and sale of environment friendly lifestyle products which has positive effects on campus biodiversity. The Housing Department organizes plastic and e-waste collection drives for its recycling through government authorized recycling organizations that leads to cleaner and greener campus.

WMS team conducts mangrove awareness program in corporate induction programs since 2000. Feedback of the program participants on a scale of 5 is collected and has shown good rating consistently over the years.

Workmen are sensitized through poster exhibitions, presentations, essay writing and other awareness activities by respective business unit's HR Department. WMS and HMS departments celebrate environmental days like Wildlife Week, Van Mahotsav, World Wetland Day, Earth Day, Earth Hour, International Day for the Conservation of the Mangrove Ecosystem and other days with employees and residents.

Besides these, a number of competitions such as Foto Fiesta (by G&B Corporate), PHOTOTHON (by WMS Department), Kaizen Competitions (by Business and Corporate teams) bring forth biodiversity highlights and management issues to attention of internal stakeholders.

8.2 External Stakeholders

G&B encourages key external stakeholders for biodiversity research, conservation and awareness on its campus. External stakeholders have been segmented, identified for this purpose. Here is a summary of G&B's external stakeholders and modes of engaging them.

(a) Government departments and representatives

- Presentations by G&B in government seminars, conferences, consultations
- Visits of government organizations to Godrej campus for exposure and training
- Participation in government drives and initiatives such as plantations

(b) NGOs

- Facilitate NGOs' awareness programs in Godrej mangroves
- NGO visits to Godrej nursery for exposure and learning
- Participation in horticultural competitions organized by NGOs and the Municipal Corporations
- Engaging expert and authorized NGOs in wildlife rescue and rehabilitation
- Supporting NGO drives through donations, employee volunteering, technical support
- Collaboration for awareness programs

(c) Research Institutes

- Collaboration for in-situ and ex-situ biodiversity research
- Sharing expertise with research institutes
- Financial support for collaborative research

(d) Academic Institutes (Schools and Colleges)

- Mangrove awareness programs in Godrej campus
- Student research projects on Godrej biodiversity

- Financial, logistics, technical support to academic conferences and seminars
- Presentation, poster exhibitions in academic institutes

(e) Society (General)

- Mangroves mobile app for mangrove species identification and ecosystem awareness
- Popular articles in newspapers and magazines, interviews on radio channels
- Mangrove awareness programs (in-situ and ex-situ)
- Godrej mangroves Facebook group for awareness and engagement

(f) Business Consortiums such as CII

- Sponsoring biodiversity related events or sections of an event
- Facilitating and conducting collaborative forums such as India Business & Biodiversity initiative
- Sharing expertise and delivering presentations in conferences, seminars

(g) Godrej customers, vendors and other supply chain partners

- Updating stakeholders on biodiversity management in vendors and other meetings, and by publishing Sustainability Reports
- Encouraging good practices such as plantations, responsible waste management and water conservation
- Felicitating stakeholders for biodiversity conservation initiatives

9 Mangroves App: Asia's First Smartphone Platform for Mangrove Conservation

Godrej's Wetland Management Services team receives several queries from academic and research institutes, citizens and citizen forums, government agencies and other stakeholders regarding species identification and management of mangroves. A typical guided nature trail consists between 20 and 50 participants per batch and evokes a great curiosity among visitors. Over the decades, G&B realized need of technological intervention for identification of mangrove species as most people cannot carry a field guide book and reference websites are often ineffective due to slow internet speed.

With this background, Godrej Wetland Department decided to develop a mobile app as mangrove identification tool and field guide to empower interested citizens, teachers, students, researchers, NGOs, government employees and other stakeholders to identify, and hopefully conserve mangrove species.

The objectives of proposed 'Godrej Mangroves' app were to:

(a) Empower interested individuals and organizations with a free of cost, authentic and easy to operate resource for mangroves identification

(b) Exploit potential of technology through ever increasing smart phones and internet accessibility to large number of Indians
(c) Help correct identification of mangroves to facilitate research, conservation and awareness
(d) Foster the spirit of 'citizen scientist' among common people
(e) Showcase Godrej Mangrove Project as leading conservation case study among its stakeholders and general public
(f) Foster leadership in mangrove awareness by development and dissemination of first mobile app of India to identify mangrove species

Godrej completed development of Mangroves mobile App in 2017. The App focuses on both mangrove and mangrove associate species found in Maharashtra. The app has plant images of tree, flowers, fruits, roots and bark. Each species has information like tree shape and size, leaves type and arrangement, flower type, arrangement and season of flowering, bark, fruit shape, size and fruiting season and any other unique features. The users can access and identify mangrove species through four routes—leaf shape, flower colour, scientific/common name and region of appearance. The app also provides brief about mangrove ecosystem, Godrej mangroves, glossary of technical terms. Users can provide their feedback which is sent to Godrej Wetland Management Services through an email.

The App was launched in July 2017 by Honourable Chief Minister of Maharashtra in the presence of Godrej family members. It received wide appreciation in academic and research community. In 1 year, it was downloaded by 1300+ users from across 50 countries. The positive feedback of users prompted Godrej to upgrade the App in 2018. In June 2019, its upgraded version was released which now contains 67 mangrove and mangrove associated species of entire coastline of India. The App is now available in 11 languages—Gujarati, Marathi, Konkani, Kannada, Telugu, Tamil, Malayalam, Oriya, Bengali, Hindi and English. The App is now easily usable by fisherfolk, NGOs, Forest Department staff, students–teachers in their regional language. The App has been downloaded by 4500+ users from 65 countries so far. It has scored 4.9 of total 5 points and is the most downloaded mobile app among all apps developed on mangroves world over.

10 Conclusion

G&B has made conscious efforts at organizational level to inculcate appreciation and conservation of biodiversity among its stakeholders. Over the decades, its approach evolved from philanthropy to systemic integration. The organization follows both 'top-down' and 'bottom-up' approaches for interventions. The impact of these interventions is visible in flourishing mangrove ecosystem and biodiversity index of Pirojshanagar Township.

These efforts have been acknowledged by Government of India and world over. In 2006, G&B won 'Green Governance Award' announced by the Bombay Natural

History Society. In 2018, G&B was felicitated with Earth Care Award by JSW Foundation and Times of India for conservation of mangroves. Same year, G&B was bestowed National Biodiversity Award, special mention, by the National Biodiversity Authority of the MoEF&CC for conservation of wild species. In 2013, His Royal Highness, Prince of Wales, Charles visited and appreciated Pirojshanagar mangroves and the Medicinal theme garden developed for educational purpose.

G&B recognizes biodiversity conservation is a never-ending journey. It continues to learn and implement the learnings to save rich biodiversity of Pirojshanagar—one of the largest private campuses and green lungs of Mumbai. The organization is now moving towards inculcating the awareness of impact of business operations on biodiversity and internalizing this evaluation with the businesses decisions.

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Chapter 13
Natural Capital Management, Business Opportunities, and Framework: A Case for Automotive Sector

Ravi Sharma and Vinay Kumar

Abstract The need for the natural capital valuation is necessary for understanding how long a company can sustainably grow in the competitive availability of resources on the planet. The value of natural capital services is largely invisible to the companies and the government authorities. Present study supports to describe and identify the natural capital inventories by adapting the proposed framework, in order to limit the risks and increase the survival with case discussed for automotive sector. The approach in this chapter has been adapted from the traditional mechanism to support all kinds of the businesses. It is designed meticulously for the identification, demonstration, and to apprehend the natural capital inventories that an organization has to value for the survival. The natural capital management could help an organization to strategize and plan future layout of their operations in a sustainable manner. The framework has been developed with insights of the experts, and for validation purpose, automobile sector was chosen. The results showed how the natural capital can be identified in the company's business activities and what kind of ecosystem and risks are associated with the company that can become a potential threat or an opportunity.

Keywords Natural capital · Corporate · Business · Risk · Dependencies Automotive sector · Value chain · Management

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1 Introduction

Nature is a source of all kinds of goods and services. These services offers economic opportunities for various business operations by providing raw materials, land use, health and environment, resources, and recreation areas (Van Egmond & Ruijs, 2016). In 2016, United Nations Biodiversity conference following the significant discussion of the Conference of Parties (CoP 13) at Mexico, biodiversity was associated with the global agendas like the Sustainable Development Goals (SDGs) (Convention on Biological Diversity, 2016). The major reason for this initiative is the interconnectedness and integrating the biodiversity values in planning. However, these "natural capital" is under pressure due to the growing world population and increased economic prosperity. Stakeholders of the planet started to divert their attention from financial capital to natural capital and ecosystem services during the past few years and this is expected to grow in future because of governmental and corporate engagement in biodiversity management and valuation of their resource dependency throughout globally. Understanding the natural capital will help the companies to understand their risks associated with biodiversity loss and integrate it to their impacts and develop a strategy accordingly (Smith, Addison, Smith, & Beagley, 2018). Both public and private actors are now considering entrenching the process of biodiversity and its impacts into the policies, strategies, and practices to reduce risks associated with the biodiversity loss and ecosystem services (Redford et al., 2015). The Natural Capital Coalition has developed a tool to identify the ecosystem services and benefits that nature provides and incorporating it into decision-making (Natural Capital Coalition, 2016).

The concept of "natural capital" was used in a specific manner by the Organization for Economic Co-operation and Development (OECD) integrating natural asset benefits as inputs and it has become one of the approaches for the ecosystem valuation in contrast to traditional economics, that non-human things are valuable resources that enable the human existence. Thus, ecological health is important for the sustainable health of the company. The authors of Natural Capitalism say that if the linkage between capital and ecosystem services is possible, then "such an economy would offer a stunning new set of opportunities for all of society, amounting to no less than the next industrial revolution" (Hawken, Lovins, & Hunter, 1999).

Natural Capital Finance Alliance (NCFA) provides tools and solutions for the financial institutions and makes them understand the importance of integrating the natural capital to businesses (NCFA & PwC, 2018). In this context, IBBI (Indian Business Biodiversity Initiative) started by CII in India has taken a leap, it helps the businesses to identify and quantify the value of ecosystem services, and its declaration formally known as Natural Capital Declaration speaks about mapping the business operations with biodiversity interface, and valuating the natural capital (Herity et al., 2018; IBBI, 2015) in order to bring responsible consumption (SDG 12).

The corporate biodiversity disclosures can create a value to the business if they are integrated with a proper strategy and assessment. In this context the natural capital management plays a predominant role for many industries. Ecosystem

degradation has become topic of discussion for the governments and businesses after the release of IPCC report in 2018 (IPCC, 2018). This has determined the need for the valuation of ecosystem services and the natural capital. Even the hot cake reporting framework like Integrated Reporting which basically links all the capitals to financial capital determines that the major effect on the business can be caused if the businesses are considering nature for granted.

Natural capital reinforces all other capitals in an organization. The need for the natural capital valuation is necessary because what can be valued can be measured and what can be measured can be taken care of. The value of these services is largely invisible to the companies and the governments. Due to the growth in population and the greed of humans, the stress on nature has rapidly increased which has resulted in the degradation of the natural resources. Natural capital valuation can help in supporting for the development of new tools and techniques. Natural capital valuation is the heart of the natural capital management. Natural capital management is considered as the business innovation that drives the business processes, practices, systems, and strategies (Nidumolu, 2013).

Understanding this scenario, many businesses have started looking it as an opportunity in the European Union. The Natural Capital Coalition formerly known as TEEB coalition has come up with a natural capital protocol and tools to give a valuation to the biodiversity and the ecosystem services (Natural Capital Coalition, 2016). The valuation has enabled the pathway for the investors to make keen decisions like whether to invest or not in a company/project. This concept has later evolved as a true value of a product or service. The true value conceptualization takes the maximum intangible benefits that are associated with the product or service. Considering the Indian context with the above aspects after the recession in 1991. India opened its economy where the service sector has rapidly taken a stretch of growth and the global industries have ignited the competition in Indian market. This has changed the way we live and the way we work leading to increase in the consumption of resources causing the risk on biodiversity.

The Millennium Ecosystem Assessment has given a deep insight on the importance of the ecosystem services for the existence of life on the planet Earth. It possessed a scientific evaluation of the trends and necessary measures for acting on it. The assessment defined four categories of services: *Provisioning Services, Regulating Services, Cultural Services, and Supporting Services* (Millennium Ecosystem Assessment, 2005). After the release of report, many companies and business started identifying the difference between the natural resource and ecosystem services, and how they can be included in taking the crucial decision for building up long-term strategy. In this paper, we deal with wide scope in decision-making process in which the value of natural capital can be inculcated (Van Egmond & Ruijs, 2016). The critical decisions that can be taken in the production process can be directly or indirectly dependent on the natural resources and ecosystem services. It also denotes the decision for using the natural capital as a part of nature-based solution, which can contribute in rectifying the social and economic problems that arise. The industries and corporates must provide a sustainable contemplation into

its policies, action plans, and sustainable reporting to make wiser decisions on the usage of natural capital and ecosystem services. This is also a requirement as per the new Integrated Reporting (IR) Framework (which speaks about natural capital).

This paper summarizes the dependencies of a company in each operational phase, where it can be clustered into three domains for the planning and decision-making, these domains are called:

- Sustainable entrepreneurship, which deals with the companies to find the possibilities and opportunities in use of resources sustainably.
- Entrepreneurial nature management, which deals with nature and landscape organizations that are looking for new sources of income and for ways to broaden their support base, and
- Area development, which deals with spatial planning processes that search for ways to make more sustainable use of the natural capital within an area.

This paper moreover discusses how the value of natural capital could be made concrete in decision-making process in different domains. What problems the stakeholders face for stimulating the sustainable use of natural capital within use of each domain? The objective of this is to understand the natural capital management approach and to examine the journey so far of corporate biodiversity management and managing their natural resources (including ecosystem services) as capital. The emphasis will be to evaluate the risks and dependencies of business operations on biodiversity and ecosystem services. The case study of automotive sector is taken to evaluate and highlight the importance of ecosystem services dependencies of their operations. As an outcome, a framework is proposed which would help the companies to analyze the dependencies and associated risks for better decision-making and planning towards sustainable entrepreneurship, nature management, and sustainable planning process including use of natural capital.

2 Natural Capital Management: Approach

The approach towards the natural capital management cannot be same for all, as we speak it will be versatile to set a common agenda across all parts of the world. Since, it has been looked in a different way by different stakeholders and their interpretations for valuing the natural capital will be different. To understand and attain a grip on the interpretations the stakeholders' selection at each operational phase of the unit, and for each phase what kind of opportunities that can be availed for the use of natural capital is important. The inventory on what kind of business value for each phase do the stakeholders provide to the natural capital, and a new possibility creation for sustainable use is to be followed. For these the three elements are crucial and primary exercise to investigate as recommended by TEEB framework (TEEB, 2010).

2.1 How to Identify the Ecosystem Service Involved?

To identify the ecosystem services involved the stakeholders should be enquired about the problems and that need to be solved, and what are the ecosystem services that are provided by the relevant natural capital, and the status of demand and supply of that natural capital. This would help to identify the interests of the stakeholders and potential for the use of natural resources with less impact on the natural capital. This can also help us to identify nature-based solutions and reduce some of the impacts on society that will help in mitigating the societal and community issues.

2.2 How to Demonstrate the Identified Values?

In this stage of investigation, the valuation of the ecosystem service or natural capital takes a forward step. It can be sometimes qualitative or quantitative, or can be either financial terms (e.g. related market prices) or economic terms (e.g. related to welfare effects), but generally expressed in physical changes (e.g. biodiversity changes). The valuation actually makes the stakeholders to express the importance and prioritize the available natural capital and related ecosystem services.

2.3 How to Capture the Identified Values?

This question investigation actually provides an important primer for decision-making. What strategies can be implemented based on the collected data, and what kind of possibilities which relates to sustainable consumption of natural capital.

Each of the elements mentioned above has their importance. As per the description, the primary one gives the social point whereas the secondary one gives out the financial aspect and tertiary has economic point where it helps in creation of opportunities and possibilities. In this scenario, the evaluation of natural capital comes into role for igniting the decision-making process and planning a long-term strategy in order to continue the ease of doing business in a sustainable way. Under such circumstances, the stakeholders play a prominent role where a sufficient amount of aggregate data is collected from their interpretation and need. It would be obliviousness if the valuation does not create any awareness. So rather, the three mentioned steps would help in process of creating the awareness of natural capital to the society and the stakeholders that are involved in it.

3 Corporate, Natural Capital, and Biodiversity Management: The Journey So Far

The activities and operations of sectors which are highly and directly natural resource dependent like mining, forest, agriculture, pharmaceuticals, etc., are highly portrayed in the past literature in terms of exploitation (Mogaka, Simons, Turpie, Emerton, & Karanja, 2001) disturbing fragile ecosystems (Kitula, 2006; Nilsson & Grelsson, 1995; Wishart, 2012) and other consequences related to their usual business impacts. The current study focuses on looking the issue that how corporate are engaged in biodiversity management in the changing paradigm under SDGs, multinational level agreements, national and international targets to achieve sustainability. To study the journey of "corporate biodiversity management" and natural capital management as a part of planning process, a systematic review of literature was felt crucial. The review of literature is quite useful for developing evidence-based informed knowledge for identifying gap and trend in the core question to address. The core questions arising from this quest are, (a) how the concept of "natural capital management" has been explored to date, and (b) how and to what extent the concept of natural capital is investigated from business and strategy dimensions of construct across the literature. Both these questions will form the base of literature published till date and provide an overview of the corporate vision and commitments towards the natural capital approach and biodiversity at a large. To validate the question to address with specific objectives, we implemented a Scopus-based database search for analyzing existing literature and explore the concept of natural capital management from the corporate concern towards the biodiversity commitments. The review protocol included criterion for inclusion/exclusion of studies. While searching the Scopus-database, the queries string used were "Natural Capital Management," "Business," "strategies" from year 2009–2018. Further refinement on source and document type was limited to include research journal articles and review papers only in English language while excluding other criteria, which resulted into total six documents considering primary string variables.

It is evident that the literatures on corporate biodiversity management are inadequate and has been overlooked by the corporate organizations. The concept of natural capital as a concept is nowhere a part of the policy planning and strategies, which is depicted by the literature search. The commitment to the biodiversity seems to be not an underlying principle of motivation. It was looked either from the corporate environmental management (Boiral & Heras-Saizarbitoria, 2017), accounting (Maroun, Usher, & Mansoor, 2018), or as a philanthropy activity, and that too as a partial attempt. These studies remained misdirected, and deviating from the biodiversity problems (Bansal & Roth, 2000; Delmas & Toffel, 2004). The most envisioned investigations were specifically focused on impact assessments, benefits of natural resources, habitat conservation, conservation and protection programs, or community models (Virah-Sawmy, Ebeling, & Taplin, 2014). None of the studies was focused on strategic or planning investigation of the biodiversity or ecosystem services from the natural capital concept for biodiversity management based on

risks and opportunities. The result from the literature search above is a gap and necessitates the requirement of such studies, which explores the comprehensiveness of biodiversity risks and dependencies of business operations. The risks of biodiversity loss are not only to the company's core operations but also to the operations of up- and downstream in the supply chain. The neglect of biodiversity risks and dependencies by the industries marks a question on the sustainable existence of such industries and their committment towards sustainable growth and economies.

4 Biodiversity Risks and Dependencies for Automotive Sector: A Case Study

For developing a framework for the natural capital management strategy, the important and foremost criteria is to define the biodiversity/ecosystem services loss and associated risk with the different domains of the business operations (Havas, Matsui, Shaw, & Machimura, 2014). To determine the biodiversity dependency on the business and therefore risks involved at each phase as described in earlier sections of the chapter, the informal process of experts' opinion through workshop mode was adopted at the initial stage. The experts were from the automotive industries (from small-scaled, medium-scaled, and large industries) including the auto parts ancillary units and supply chains of large auto-companies from India and abroad. The scope of the study is four-wheeler production only. Most of the experts were holding the designation of Sustainability officer, Project manager, Environmental Officer and includes academicians with the expertise in biodiversity management, conservation and ecosystem services. The total number of experts considered at this initial round of workshop was 12. Through a brainstorming session with the experts, the outputs helped us in understanding the operations (phase-wise) in an automotive sector, raw materials used for manufacturing, the basic natural resources consumption at each stage. This workshop helps us in designing an open-ended questionnaire that was used further to collect data on natural capital for automotive sector. The company business reports, disclosure reports, and data available at different sources on public domain were also used as a secondary data wherever applicable during the workshop and designing of the questionnaire. In the second round of the study an open-ended questionnaire was prepared on the outcomes of the first round which was circulated to concerned parties who are responsible for developing sustainability strategy and report in the automotive units. For collecting of data, the anonymity of the company and the respondents was ensured and therefore not disclosed in the chapter too. The open-ended questionnaire was to seek their opinion and response on the different phases (as designed from first round of experts' opinion) from raw material procurement to the final assembly of the four-wheeler. The questionnaire was designed to capture the raw material used, ecosystem services involved, category of risks, and risks associated with the business operations because of natural capital loss, ecosystem category knowledge, and approaches

suggested to identify, demonstrate, and capture the values required for planning and decision-making considering the biodiversity/natural capital management. Wherever feasible and required, telephonic interview was amalgamated with the questionnaire while dealing with the respondents to capture authentic and genuine data. In total nine companies globally respond to the questionnaire survey.

The data received was compiled for further analysis and put together according to the operational phases, and natural resources to provide a detailed insight into the dependencies at each stage of operations. Further, each dependency was categorized for their risks and type of risks for each stage due to loss of biodiversity/natural service. The type of ecosystem service was also identified for final preparation and consideration for developing framework for natural capital management. Later, the identified dependencies and risks are assessed on the three parameters to convert them into the opportunities, in each operational phase. Three parameters/functional units are considered for building up a strategy after the development of framework. The reason behind using the framework is to objectify the business possibilities based on the ecosystem services that can be generated in future by linking them with the vision and mission of the company.

5 Biodiversity Loss and Business Risks for Automotive Sector

Down the lane from 1986 when the "Biological Diversity" word was first coined, the pressure that is created on biodiversity has never became a topic for discussion until the climate change impacts have become voluptuous, which are increasing the risks on performing a business activity (Hackett & Moxnes, 2015). The concept once evolved has taken a number of transformations as per the situations to date from the diversity to conservation and now managed along with others. The value of the biodiversity varies from location to location due to lot of constraints involved in it like the population growth, urbanization, economic growth, environmental policy and change in politics, etc., so it would become difficult to use a common arena for considering the loss caused (Fenichel & Abbott, 2014). Biodiversity loss and the decline in the ecosystem services are interconnected. The degradation in biodiversity will reduce the quality of ecosystem services that it is providing (Ntshane & Gambiza, 2016). In such scenario, the cost that is required to utilize the service will increase. Unlike the goods and services that are produced and sold in markets, ecosystem services do not have any of such things. Humans believe that the biodiversity and resources are readily available, and they are taken for granted. Due to this understanding the stress on the biodiversity has increased rapidly which led to degradation in the ecosystem services (Pelenc & Ballet, 2015). The damage has already happened: the land for agriculture use has increased; the forest cover has declined rapidly. The quality of life led by people has reduced which resulted in the reduction of life expectancy of the living organisms on the planet Earth (Millennium Ecosystem Assessment, 2005).

Table 13.1 Natural Capital Dependency sheet for the Automobile industry

Operations in a Plant	Dependencies		
	Natural	Metals and minerals	Polymers
Chassis Production Building the outer frame or body for mounting the parts in it. It requires around 2000 welds for the preparation	Water	Stainless steel	
	Timber	Steel	
		Quartz	
		Iron	
		Aluminum	
E-Coating Process It is used for protecting from corrosion. The body is submerged in a chemical where it gets coated completely from outside	Water	Manganese	
		Copper, zinc	
		Lead	
		Nickel	
		Silicon	
The Pre-Assembly 1. Doors 2. Instrument panel 3. Engine 4. Polishing	Water	Aluminum	Poly-carbonate
	Timber	Silicon	Poly-propylene
	Leather	Nickel	
	Natural rubber	Palladium	
		Chromium	
The Final Assembly 1. Install blocks of high density and thin sound proofing 2.Wiring and power components 3. Strong and stiff instrument panels 4. Attach engine to chassis 5. Windows and wind shields 6. Installation of seats 7. Wheels are mounted 8. Alignment and quality test	Water	Quartz	Polyester
	Leather	Chromium	Polyurethane
	Cotton	Aluminum	Poly-carbonate
	Timber	Palladium	Poly-propylene
	Natural rubber	Silicon	
		Stainless steel	
		Oxygen	
		Hydrogen	
		Nitrogen	
		Carbon	
		Xenon	
		Neon	

Compiled by the authors based on the Expert's Opinion Results

For the present case study, the groups of experts from the automobile industry were approached who has a keen knowledge of the process and understanding in sustainability. This team of experts includes the production managers, supervisors, academicians, consultants, and the middle level managers. The below mentioned table annotates about the dependency on the natural capital and ecosystem services in each phase of operations for automobile sector (Table 13.1).

The results of experts' interviewed, divulged that the dependency on the natural resources is high especially in automobile sector. This is because every phase of operations has a direct dependency on metals and minerals and they do not affect the ecosystem services directly. However, due to the mining activities, the impact on the biodiversity is huge and even these impacts would be affecting the quality of ecosystem services that are available which is a direct risk for the companies to perform their business activities sustainably in future.

According to the report published by the World Economic Forum (WEF) the biodiversity loss can lead to many risks as well as it can create opportunities. The risks that are identified by WEF are physical, regulatory and legal risk, market and other risks (World Economic Forum, 2010). For example, in an operation phase the use of raw material in a particular location can cost more due to change in policies and geographical conditions. The change in any of the single aspects in the operations will lead to the complete transformation in the business activities.

6 Framework Model for Automotive Sector

This framework has been designed in a way where the dependencies are linked with the ecosystem services that it is providing; these dependencies and the data that is written in the framework have been collected through the expert review. The mentioned dependency is linked with the ecosystem services that are directly dependent and has significant impact on the society, because every service is interlinked with one another (Table 13.2). The risk category has been identified based on the categories defined by the World Economic Forum (World Economic Forum, 2010). In addition, the relevant ecosystem service has defined and validated using the reference report published by the Millennium Ecosystem Assessment (Millennium Ecosystem Assessment, 2005).

When applying the traditional methods of performance of investments like Internal Rate of Return (IRR), return on investment (ROI), payback period, and indirect valuation, this discussion becomes more formal in nature. The recipe we discussed earlier speaks more about the strategy aspects in creating and proposing a value to the businesses. The challenges in this aspect would become robust when we do not consider the management and accounting aspect in the supply chain of the organization. An effective natural capital management requires a robust mechanism, which needs to be incorporated in the value chain of the system by identifying the dependencies and risks of the organization. The recipe of the framework has been developed by building a strong foundation on the aspects of the dependencies and Biodiversity Ecosystem Services (BES) risks (TEEB, 2010). Considerable research has been conducted on the ecosystem services and associated risks while identifying the impact drivers, which can be either direct or indirect. The definition of the "control and influence" clearly states in legal terms and accounting rules. This emphasizes on the determination of the significant impacts including the stakeholder's perception primarily with these concepts as foundation and life cycle impact

Table 13.2 Automobile sector—framework for the natural capital management strategy

S.no	Operational phase	Raw material		Risk/service involved			Approach: 1. Identify 2. Demonstrate 3. Capture the values
		Minerals/metals/ hydro-carbons	Nature service	Category of risk	Risks involved	Ecosystem service	
1	Chassis production	1. Stainless steel 2. Steel 3. Quartz 4. Iron 5. Aluminum	1. Water 2. Timber	Physical risk, financial risk	1. Inadequacy of the resources and rise in cost 2. Irregularity in the operations	Provisioning service	1. Proper stakeholder engagement to identify the relevant dependencies 2. Understanding the risks based on the identified dependencies by engaging the community in it 3. Include proper management system for capturing the quantified values
2	E-coating process	1. Manganese 2. Copper, zinc 3. Lead 4. Nickel 5. Silicon	N/A	Physical risk, regulatory and legal risks	1. Compensation and pricing regimes 2. Litigation	N/A	1. Identify the process step by step and involve the stakeholders of the process 2. Conduct the workshops to the stakeholders involved in process and educate them about the risks and dependencies 3. Compare it with the virgin material used and recycled content

(continued)

Table 13.2 (continued)

S.no	Operational phase	Raw material		Risk/service involved			Approach: 1. Identify 2. Demonstrate 3. Capture the values
		Minerals/metals/ hydro-carbons	Nature service	Category of risk	Risks involved	Ecosystem service	
3	The pre-assembly	1. Aluminum 2. Silicon 3. Nickel 4. Palladium 5. Chromium 6. Poly—carbonate 7. Poly-propylene	1. Water 2. Timber 3. Leather 4. Natural rubber	Physical risk, regulatory and legal risks, Supply chain risks and financial risks	1. Inadequate resources 2. Compensation and pricing regimes 3. Restriction of social license to operate 4. Effect on the organization balance sheet 5. Effect on the downstream operations	Provisioning services, legal and regulatory services, supporting services	1. Identify the potential supply and demand of resources and map them with the process 2. Opportunities need to identified for increasing the efficiency and services from the stakeholders involved in the process (for example recycling process) 3. Demonstrated values need to be given a financial cost to it
4	The final assembly	1. Quartz 2. Chromium 3. Aluminum 4. Palladium 5. Silicon 6. Stainless steel 7. Oxygen 8. Hydrogen 9. Nitrogen 10. Carbon 11. Xenon 12. Neon 13. Polyester 14. Polyurethane 15. Poly-carbonate 16. Poly-propylene	1. Water 2. Leather 3. Cotton 4. Timber 5. Natural rubber	Physical risk, regulatory and legal risks, Market risks, supply chain risks and financial risks	1. Inadequate resources 2. Regulations and compliance issues 3. Customer preferences 4. Social license for operating 5. Uncertainty in cash flows 6. Reputational value of the organization 7. Impact on the operations	Provisioning services, legal and regulatory services, supporting services and cultural services	1. Cost–benefit value analysis of the products and the proper valuation using scientific methods to link it with the ecosystem services and dependencies based on the feasibility check 2. Demonstrate these values with the comparison and concentrate more on the long-term risks involved 3. Bifurcate the identified dependencies step by step and develop true value mechanism to capture the actual cost involved which includes the intangible benefit cost as well

Authors own compilation

assessment (LCA) as a base structure in business line. Some points of references included from the methodology of LCA are industrial process phase-wise and internal supply value chain. Each of these points will have an implication for measurement, and selection of the indicators. The Biodiversity Damage Potential (BDP) addresses the conservation value of the biodiversity. The amalgamation of risks, opportunities, and dependencies is associated with both site and product level as per the LCA in a holistic way.

While engaging the stakeholders in this aspect, a comprehensive and robust mechanism has to be incorporated to get better results and for overcoming the challenges. A complex stakeholder engagement process has been followed as per the International Finance Corporation (IFC) 2007 annual report (World Bank, 2007), which comprises identification and analysis, consultation, partnership, and management functions.

Proposed framework model is mostly a supporting pillar for the adaptive management technique, which is incorporation into system and making it better by monitoring the performance and evaluation. However, in the case of proposed framework, it helps to make the analysis in a better way.

7 Opportunities

Based on the framework it would be helpful for the companies to use it as a tool to identify the dependencies of the company and what strategies need to be adopted to mitigate the identified risks and convert them into opportunities. In this context, businesses mostly try to mitigate the compliance issue. However, the proper development of the natural capital management strategy would help them to spawn a concrete path for future growth.

The three functional units that need to be considered while developing a natural capital management strategies are inclusiveness of entrepreneurial, managerial mindset with a hold of sustainability in the backend. At the same time, it is not viable to address all the impacts related to the aspects of the organization. So the area of development needs to be prioritized.

This framework creates opportunities in a wide arena and clears many barriers in the process of creating value in the system. There are several comprehensive barriers that can be stroked out like:

- Consistency metrics: Many companies have developed their metrics with the relevance of BES, but they lack the consistency. With this framework, one can overcome this barrier very easily with an effective approach.
- Perceived immateriality: Lacking prices for the intangible ecosystem prices, it happens mostly due to lack of compelling business.
- Scoping issues: When we consider the sustainable issues and aspects concerning biodiversity, sometimes the ecosystem services go beyond the measurement. Clarity is what that can be attained.

- Understanding issues: the companies that can be beaten out always see the matters that are related to the biodiversity and natural capital as a complex.

In an automobile industry, the impacts on the environment will be throughout the lifecycle of the product. During the manufacturing, more than 50,000 components are used inclusive of nuts and bolts. After manufacturing, the usage of the car creates pollution leading to CO (carbon monoxide), SO_X, NO_x, etc., which are considered as GHG emissions causing global warming. So, the businesses should build an entrepreneurial responsibility while identifying opportunities like usage of recycled material wherever necessary. It not only reduces the cost but also reduces the dependency on the environment and helps in mitigating the risks. Similarly, usage of the resources in an optimal way and managing the resources properly will also help in reducing the dependency on the natural capital and ecosystem services.

8 Conclusion

This paper discusses how natural capital can be identified in the company's business activities and what kind of ecosystem and risks are associated with the company that can become a potential threat or a potential opportunity. We introduced the representation of the operational phase with each natural capital and relevant ecosystem service. This approach would help the companies to develop a strategy to mitigate the risk that can become an obstacle for business operations.

The management of natural capital declines the market risk and constitutes a pavement for sustaining in the future which enables for upscaling the business ideas and existing value. In summary, the adoption of the framework by the companies will help them in broadening their strategies and scaling down the risks on the ecosystem. It helps in:

– Cop-out: which helps in refraining from policy issues, from the areas where the world heritage centers are located, also helps to forgo operations in some of the biodiversity-rich areas.
– Ethical practices: including proper plans for the biodiversity management, policies, and developing the strategies.
– Investment: enables in making the investments in the right place and right manner.
– Engagement: the stakeholder engagement will help them to understand and identify the necessities in a more robust manner.

The inclusion of the framework into the business operations will create a viable solution for many challenging issues that arise while managing the system for compliance and create support for three pillars in business. They are:

– Financial: Helps in defining the BES credits and debits, awareness for the investors and support for commercial ventures and competitive risk/reward profile.

– Regulatory: It helps in clear baselines to assess "pump-in" of investment in the development of the ecosystem, fiscal incentives can be availed. Adequate regulatory capacity to enforce.
– Market: Linked registries to record transactions for the intangibles. The project approval process would be efficient.

Companies can adopt the strategy to manage and scale down the risks that arise from and through biodiversity management. It enables to erase the line between financial and non-financial performance indicators. Further, the identified and prioritized natural capital resources as per operational phase can create some significant opportunities if they are viewed microscopically by indulging the sustainability in entrepreneurial approach and management with significant area of the development.

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